Watson Cogeneration Steam and Electric Reliability Project

Final Staff Assessment

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WATSON COGENERATION STEAM AND ELECTRIC RELIABILITY PROJECT
(09-AFC-1)
FINAL STAFF ASSESSMENT

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INTRODUCTION

This Final Staff Assessment (FSA) contains the California Energy Commission staff's independent evaluation of the Watson Cogeneration Steam and Electric Reliability (BP Watson) Project Application for Certification (09-AFC-1). The FSA examines engineering, environmental, public health and safety aspects of the BP Watson project, based on the information provided by the applicant, Watson Cogeneration Company (Watson) and other sources available at the time the FSA was prepared. The FSA contains analyses similar to those normally contained in an Environmental Impact Report (EIR) required by the California Environmental Quality Act (CEQA). When issuing a license, the Energy Commission is the lead state agency under CEQA, and its process is functionally equivalent to the preparation of an EIR.

The Energy Commission staff has the responsibility to complete an independent assessment of the project's engineering design and its potential effects on the environment and on the public's health and safety, and whether the project conforms with all applicable laws, ordinances, regulations and standards (LORS). The staff also recommends measures to mitigate potential significant adverse environmental effects and proposes conditions of certification for construction, operation and eventual closure of the project, for approval by the Energy Commission.

This FSA is a staff document. It is neither a Committee document, nor a draft decision. This FSA serves as staff's formal testimony in evidentiary hearings to be held by the Committee, which is comprised of two Commissioners and one hearing officer who are hearing this case. After evidentiary hearings, the Committee will consider the recommendations presented by staff, the applicant, all parties, government agencies, and the public prior to proposing its decision. The full Energy Commission will make the final decision, including findings, on the AFC after the Committee's publication of its proposed decision.

PROJECT LOCATION AND DESCRIPTION

Watson's primary objective of the BP Watson project is to increase and improve the reliability of the steam supply and electric power at the BP Carson Refinery. It proposes to do so by increasing the capacity of the existing 385-megawatt (MW) Watson Cogeneration Facility (Facility) by approximately 85 MW, through the construction of the BP Watson project, thus completing the original design of the Facility. Watson's additional objectives of the BP Watson project are to conserve natural gas and reduce environmental impacts from emissions and contributions to global climate change, and to enhance the reliability of the state's electrical system by adding generation capacity and voltage support near existing loads.

The proposed project site consists of 2.5 acres of previously developed land within the boundaries of the existing 21.7-acre Facility, which is located in the City of Carson in the County of Los Angeles. The Facility supplies steam to, and is integral to, the adjacent

BP Carson Refinery. The project area is located within a heavy manufacturing zone and is surrounded by existing refineries and other industrial facilities.

The project would include the addition of one General Electric (GE) 7EA Combustion Turbine Generator (CTG) with an inlet fogging system, one duct-fired heat recovery steam generator (HRSG), two redundant natural gas compressors, one boiler feedwater (BFW) pump, one circulating water pump, two new cells added to an existing cooling tower, an electrical distribution system, and a new on-site 69 kilovolt gas-insulated substation. No off-site improvements such as water supply, natural gas, or wastewater pipelines are currently planned by the project as it will connect to the existing supply pipelines currently used by the Facility. Upgrades to existing transmission lines to accommodate the project are not required.

AGENCY COORDINATION

As noted above, the Energy Commission certification is in lieu of any permit required by state, regional, or local agencies, and federal agencies to the extent permitted by federal law (Pub. Resources Code, § 25500). However, the Energy Commission seeks comments from, and works closely with, other regulatory agencies that administer LORS that may be applicable to proposed projects. These agencies may include, as applicable, the U.S. Environmental Protection Agency, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, State Water Resources Control Board/Regional Water Quality Control Board, California Department of Fish and Game, the California Air Resources Board, and the South Coast Air Quality Management District. On April 10, 2009, the Energy Commission staff sent the BP Watson AFC to all local, state, and federal agencies that might be affected by the proposed project.

OUTREACH EFFORTS

Energy Commission regulations require staff to send notices regarding receipt of an AFC and Commission events and reports related to proposed projects, at a minimum, to property owners within 1,000 feet of a project and 500 feet of a linear facility (such as transmission lines, gas lines and water lines). This was done for the BP Watson project.

The Energy Commission's outreach efforts are an ongoing process that, to date, has involved the following efforts:

LIBRARIES

On April 10, 2009, the Energy Commission staff sent the BP Watson AFC to the following libraries in the County of Los Angeles: Carson Regional Library, Wilmington Library, Long Beach Main Library, Dr. Martin Luther King Jr. Library, and Harbor Gateway Library. In addition to these local libraries, copies of the AFC are also available at the Energy Commission's Library in Sacramento, the California State Library in Sacramento, as well as, public libraries in Eureka, Fresno, Los Angeles, San Diego, and San Francisco.

PUBLIC OUTREACH EFFORTS

The Energy Commission staff provided notification by letter and enclosed notice of the September 3, 2009 Informational Hearing and Site Visit to the proposed site of the BP Watson project. In addition to property owners and persons on the general project mail-out list, notification was provided to local, state and federal public interest and regulatory organizations with an expressed or anticipated interest in this project. Also, elected and certain appointed officials of the County of Los Angeles were similarly notified of the hearing and site visit.

DATA RESPONSE AND ISSUE RESOLUTION WORKSHOP

The Energy Commission staff provided notification by letter and enclosed notice of the October 14, 2009 and January 20, 2010 Data Response and Issue Resolution Workshops. In addition to property owners and persons on the general project mail-out list, notification was provided to local, state and federal public interest and regulatory organizations with an expressed or anticipated interest in this project.

NOTIFICATION TO THE LOCAL NATIVE AMERICAN COMMUNITY

On April 10, 2009 and July 31, 2009, mail-outs were sent to the Gabrielino-Tongva Tribe, advising them of the proposed project and provided them with contact information. In addition, their names have been added to the BP Watson project mail-out list and will therefore be receiving a copy of all Commission notices for events and reports related to this project.

On April 10, 2009 and July 31, 2009 the Energy Commission staff sent mail-outs regarding the project to the Native American Heritage Commission. In addition, this Commission was also added to the BP Watson project mail-out list and will therefore be receiving a copy of all Commission notices for events and reports related to this project.

PRELIMINARY STAFF ASSESSMENT AND PSA WORKSHOP

On December 17, 2010, the Energy Commission published the Preliminary Staff Assessment which served as the predecessor to the FSA. Also on December 17, 2010, Energy Commission staff provided notification by letter and enclosed notice that the PSA was available to all persons on this project's mail-out lists.

On January 25, 2011, staff conducted a PSA Workshop. This workshop was continued on February 3, 2011. The PSA Workshop involved a discussion of the water issues.

In the original AFC, and subsequent data responses, the applicant stated that reclaimed water is the preferred water source option over municipal water and groundwater pumping. However, at the workshop, the applicant stated that discussions between the BP Refinery and the West Basin Municipal Water District regarding a water supply contract for reclaimed water are still on-going and the applicant could not predict when the negotiations would be concluded.

It is the goal of BP Watson to use reclaimed water. However, until the negotiations between BP Carson Refinery and the West Basin Municipal Water District are finalized, the applicant wants to use the municipal water and groundwater which is available to

the existing Watson Cogeneration Facility (approved by the Energy Commission in 1986 in Docket No. 85-AFC-1).

Staff requested that the applicant file additional information which would clarify and modify the information contained in the AFC's Water section. The applicant provided this information in its March 28, 2011 filing titled "Responses to CEC Requests from the February 3, 2011 PSA Workshop Continuation". This FSA analyzes BP Watson's water resources section of the AFC as revised by the applicant's March 28, 2011 filing.

PUBLIC ADVISER'S OFFICE

The Energy Commission's Public Adviser helps the public participate in the Energy Commission's hearings and meetings. The Public Adviser assists the public by advising them how they can participate in the Energy Commission process; however, the Public Adviser does not represent members of the public.

The Public Adviser's Office attended and presented information at the September 3, 2009 Informational Hearing and Site Visit.

Staff has also considered the comments of interveners, community groups, and individual members of the public in its analysis.

Issues Raised by the Public

At this time, there have been two public concerns brought to the attention of the staff. The first issue concerns BP Carson Refinery's record of past water violations. When responding to this concern, staff found that the Refinery's past violations were mainly administrative, with two exceptions: inadequate field management of laydown areas and a leaky valve that led to a clogged drain. The administrative violations were quickly fixed, the field management plan was remedied to regulation standards, and the leaky valve was replaced and the clogged drain was cleaned. The second issue concerns the use of alternative technology to reduce emissions that is superior to current equipment approved by the South Coast Air Quality Management District. These concerns are respectively discussed in the Soils & Water and Air Quality sections of this FSA.

ENVIRONMENTAL JUSTICE

The steps recommended by the U.S. EPA's guidance documents to assure compliance with the Executive Order 12898 regarding environmental justice are: (1) outreach and involvement; (2) a screening-level analysis to determine the existence of a minority or low-income population; and (3) if warranted, a detailed examination of the distribution of impacts on segments of the population. Though the Federal Executive Order and guidance are not binding on the Energy Commission, staff finds these recommendations helpful for implementing this environmental justice analysis.

Staff has followed each of the above steps for the following sections in the FSA: Air Quality, Public Health, Hazardous Materials, Land Use, Traffic and Transportation, Socioeconomics, Soils and Water, Transmission Line Safety and Nuisance, Noise, Visual Resources, and Waste Management. Over the course of the analysis for each of these areas, staff considered potential impacts and mitigation measures, significance of

impacts, and whether there would be a disproportionate impact on an environmental justice population.

The purpose of staff's environmental justice screening analysis is to determine whether a below-poverty-level and/or minority population exists within the potentially affected area of the proposed project site. Staff conducted the screening analysis in accordance with the "Final Guidance for Incorporating Environmental Justice Concerns in USEPA's National Environmental Protection Act Compliance Analysis" (Guidance Document) dated April 1998. People of color populations, as defined by this Guidance Document, are identified when:

- the minority population of the affected area is greater than 50% of the affected area's general population; or
- one or more U.S. Census blocks in the potentially affected area have a minority population of greater than 50%; or
- the minority population percentage of the area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.

DETERMINING MINORITY POPULATION

Socioeconomics Figure 1 (located in the Socioeconomics section of this FSA) shows the minority population within the six-mile radius of the proposed BP Watson site. For the proposed BP Watson project, the total population within the six-mile radius of the site is 778,090 persons, and the total minority population is 646,789 persons or 83.12% of the total population, which is greater than the 50% threshold.

DETERMINING POVERTY-LEVEL POPULATION

Below-poverty-level populations are identified based on Year 2000 census block group data (2010 census block group data was not yet available). Poverty status excludes institutionalized people, people in military quarters, people in college dormitories, and unrelated individuals under 15 years old. The below- poverty-level population within a six-mile radius of the BP Watson site (for which poverty status was determined by the US Census) consists of 161,414 people or 21.37% of the total population in that area.

SIGNIFICANT IMPACTS

Staff has determined that in the above-mentioned sections of the FSA (Air Quality, Public Health, Hazardous Materials, Land Use, Traffic and Transportation, Socioeconomics, Soils and Water, Transmission Line Safety and Nuisance, Noise, Visual Resources, and Waste Management), there is a reasonable likelihood that significant impacts can be mitigated through the recommended Conditions of Certification, thereby ensuring that the project would cause no disproportionate or significant impact on an environmental justice population.

Staff has worked closely with the applicant and the residents of the area to identify mitigation measures designed to reduce, to the greatest extent possible, any impact that will occur in the community surrounding the proposed project. Staff's environmental justice outreach has been incorporated into its overall outreach activity. This activity is

summarized in the **Introduction** section to the FSA, and in the subsection to this Executive Summary titled Public and Agency Coordination.

Staff concludes that the BP Watson Project as conditioned would not result in significant impacts from construction or operation of the power plant on minority or poverty level population if the proposed Conditions of Certification are implemented.

In addition, the Public Adviser's Office has been involved in this project since the September 3, 2009 Informational Hearing and Site Visit and has helped to ensure that full and adequate participation by members of the public has occurred in this Commission proceeding.

STAFF'S ASSESSMENT

Each technical area section of the FSA contains a discussion of the project setting, impacts, and where appropriate, mitigation measures and proposed conditions of certification. The FSA includes staff's assessment of:

- the environmental setting of the proposal;
- impacts on public health and safety and measures proposed to mitigate these impacts;
- environmental impacts and measures proposed to mitigate these impacts;
- the engineering design of the proposed Facility and engineering measures proposed to ensure the project can be constructed and operated safely and reliably;
- project closure;
- project alternatives;
- compliance of the project with all applicable LORS during construction and operation;
- environmental justice for minority and low income populations;
- conclusions and recommendations; and
- proposed conditions of certification.

SUMMARY OF PROJECT RELATED IMPACTS

Staff believes that as currently proposed, including the applicant's and the staff's proposed mitigation measures and the staff's proposed conditions of certification, the BP Watson project would comply with all applicable LORS.

For a more detailed review of potential impacts and LORS conformance, see staff's technical analyses in the FSA. The status of each technical area is summarized in the table below and the subsequent text.

Technical Area	Complies with LORS	Impacts Mitigated
Air Quality	Yes	Yes
Biological Resources	Yes	Yes
Cultural Resources	Yes	Yes
Efficiency	Yes	None Required
Facility Design	Yes	Yes
Geology & Paleontology	Yes	Yes
Hazardous Materials	Yes	Yes
Land Use	Yes	None Required
Noise and Vibration	Yes	None Required
Public Health	Yes	Yes
Reliability	Yes	None Required
Socioeconomic Resources	Yes	None Required
Soil & Water Resources	Yes	Yes
Traffic & Transportation	Yes	Yes
Transmission Line Safety/Nuisance	Yes	Yes
Transmission System Engineering	Yes	Yes
Visual Resources	Yes	Yes
Waste Management	Yes	Yes
Worker Safety and Fire Protection	Yes	Yes

INTRODUCTION

Testimony of Alan Solomon

PURPOSE OF THIS REPORT

This Final Staff Assessment (FSA) is the California Energy Commission (Energy Commission) staff's independent analysis of the proposed Watson Cogeneration Steam and Electric Reliability Project (hereafter referred to as BP Watson) Application for Certification (AFC). This FSA is a staff document. It is neither a Committee document, nor a draft decision. The FSA describes the following:

- the proposed project;
- the existing environment;
- whether the facilities can be constructed and operated safely and reliably in accordance with applicable laws, ordinances, regulations and standards (LORS);
- the environmental consequences of the project including potential public health and safety impacts;
- the potential cumulative impacts of the project in conjunction with other existing and known planned developments;
- mitigation measures proposed by the applicant, staff, interested agencies, local organizations and interveners which may lessen or eliminate potential impacts;
- the proposed conditions under which the project should be constructed and operated, if it is certified; and
- project alternatives.

The analyses contained in this FSA are based upon information from the: 1) Application for Certification (AFC), 2) responses to data requests, 3) supplementary information from local, state, and federal agencies, interested organizations and individuals, 4) existing documents and publications, 5) independent research, and 6) comments at workshops. The analyses for most technical areas include discussions of proposed conditions of certification. Each proposed condition of certification is followed by a proposed means of "verification." The FSA presents conclusions about potential environmental impacts and conformity with LORS, as well as proposed conditions that apply to the design, construction, operation and closure of the facility.

The Energy Commission staff's analyses were prepared in accordance with Public Resources Code section 25500 et seq. and Title 20, California Code of Regulations section 1701 et seq., and the California Environmental Quality Act (CEQA) (Pub. Resources Code, §21000 et seq.).

ORGANIZATION OF THE FINAL STAFF ASSESSMENT

The FSA contains an Executive Summary, Introduction, Project Description, and Project Alternatives. The environmental, engineering, and public health and safety analysis of the proposed project is contained in a discussion of 19 technical areas. Each technical

area is addressed in a separate chapter. They include the following: 1) air quality; 2) public health; 3) worker safety and fire protection; 4) transmission line safety and nuisance; 5) hazardous materials management; 6) waste management; 7) land use; 8) traffic and transportation; 9) noise and vibration; 10) visual resources; 11) cultural resources; 12) socioeconomics; 13) biological resources; 14) soil and water resources; 15) geological and paleontological resources; 16) facility design; 17) power plant reliability; 18) power plant efficiency; and 19) transmission system engineering.

These chapters are followed by a discussion of facility closure, project construction and operation compliance monitoring plans, and a list of staff that assisted in preparing this report.

Each of the 19 technical area assessments includes a discussion of:

- laws, ordinances, regulations and standards;
- the regional and site-specific setting;
- project specific and cumulative impacts;
- mitigation measures;
- closure requirements;
- conclusions and recommendations; and
- conditions of certification for both construction and operation (if applicable).

ENERGY COMMISSION SITING PROCESS

The Energy Commission has the exclusive authority to certify the construction, modification and operation of thermal electric power plants 50 megawatts (MW) or larger. The Energy Commission certification is in lieu of any permit required by state, regional, or local agencies, and federal agencies to the extent permitted by federal law (Pub. Resources Code, §25500). The Energy Commission must review power plant AFCs to assess potential environmental impacts including potential impacts to public health and safety, potential measures to mitigate those impacts (Pub. Resources Code, §25519), and compliance with applicable governmental laws or standards Pub. Resources Code, §25523 (d).

The Energy Commission's siting regulations require staff to independently review the AFC and assess whether the list of environmental impacts contained is complete, and whether additional or more effective mitigation measures are necessary, feasible and available (Cal. Code Regs., tit. 20, §§1742 and 1742.5(a)).

In addition, staff must assess the completeness and adequacy of the measures proposed by the applicant to ensure compliance with health and safety standards, and the reliability of power plant operations [Cal. Code Regs., tit. 20, §1743(b)]. Staff is required to develop a compliance plan (coordinated with other agencies) to ensure that applicable laws, ordinances, regulations and standards are met (Cal. Code Regs., tit. 20, §1744(b)).

Staff conducts its environmental analysis in accordance with the requirements of CEQA. No additional Environmental Impact Report (EIR) is required because the Energy Commission's site certification program has been certified by the California Natural Resources Agency as meeting all requirements of a certified regulatory program (Pub. Resources Code, §21080.5 and Cal. Code Regs., title 14, §15251 (j)). The Energy Commission is the CEQA lead agency.

The FSA is only one piece of evidence that will be considered by the Committee (two Commissioners who have been assigned to this project) in determining whether or not to recommend that the full Energy Commission approve the proposed project. At the public hearings, all parties will be afforded an opportunity to present evidence and to rebut the testimony of other parties, thereby creating a hearing record on which a final decision on the project can be based. The hearing before the Committee also allows all parties to argue their positions on disputed matters, if any, and it provides a forum for the Committee to receive comments from the public and other governmental agencies.

Following the hearings, the Committee's recommendation to the full Energy Commission on whether or not to approve the proposed project will be contained in a document entitled the Presiding Member's Proposed Decision (PMPD). Following publication, the PMPD is circulated for 30 days in order to receive written public comments. At the conclusion of the comment period, the Committee may prepare a revised PMPD and make it available for comment. At the close of the applicable comment period, the PMPD is submitted to the full Energy Commission for a decision.

AGENCY COORDINATION

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PUBLIC OUTREACH EFFORTS

The Energy Commission staff provided notification by letter and enclosed notice of the September 3, 2009 Informational Hearing and Site Visit to the proposed site of the BP Watson project. In addition to property owners and persons on the general project mail-out list, notification was provided to local, state and federal public interest and regulatory organizations with an expressed or anticipated interest in this project. Also, elected and certain appointed officials of the County of Los Angeles were similarly notified of the hearing and site visit.

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It is the goal of BP Watson to use reclaimed water. However, until the negotiations between BP Carson Refinery and the West Basin Municipal Water District are finalized, the applicant wants to use the municipal and groundwater which is available to the existing Watson Cogeneration Facility (approved by the Energy Commission in 1986 in Docket No. 85-AFC-1).

Staff requested that the applicant file additional information which would clarify and modify the information contained in the AFC's Water section. The applicant provided this information in its March 28, 2011 filing titled "Responses to CEC Requests from the February 3, 2011 PSA Workshop Continuation". This FSA analyzes BP Watson's water resources section of the AFC as revised by the applicant's March 28, 2011 filing.

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The Public Adviser's Office attended and presented information at the September 3, 2009 Informational Hearing and Site Visit.

Staff has also considered the comments of interveners, community groups, and individual members of the public in its analysis.

PROJECT DESCRIPTION

Testimony of Alan Solomon

INTRODUCTION

The Watson Cogeneration Company (Watson) currently operates a 385 megawatt (MW) cogeneration power plant facility (Facility) that is located in the British Petroleum (BP) Carson refinery in the City of Carson in Los Angeles County, California. The existing Facility was licensed by the California Energy Commission in 1986 (85-AFC-1) and has been in operation since 1988.

On March 19, 2009, Watson filed an Application for Certification (AFC) with the California Energy Commission requesting approval to expand the Facility. On July 29, 2009, the Energy Commission accepted the AFC, with the supplemental information, as complete. With the proposed modifications, the Watson Cogeneration Steam and Electric Reliability (BP Watson) project is projected to increase the Facility's electricity generation by 85 MW and provide additional process steam to the adjacent BP Carson Refinery.

PROJECT PURPOSE AND OBJECTIVES

Watson's objective is to improve the reliability of steam supply and electric power at the BP Carson Refinery by adding a fifth train to the existing four trains at the Facility, which would complete the original, five train design of the Facility. This fifth train would add a nominal 85 MWs, resulting in a total production of 470 MWs, and deliver an additional long-term supply of steam to the BP Carson Refinery. The high reliability of the BP Watson project would significantly reduce the possibility of refinery upsets due to loss of steam or power.

This project would address the future electricity needs of California, construct and operate an electrical generating facility on an existing brown-field site, provide additional electrical capacity within the County of Los Angeles, utilize existing Facility infrastructure to reduce environmental impacts and costs, and enhance the reliability of the state's electrical system by providing power generation near the centers of electrical demand.

The proposed project site consists of 2.5 acres located within the boundary of the existing 21.7-acre Facility. The project area is zoned Heavy Manufacturing and is surrounded by existing refineries and other industrial facilities.

The project would include the addition of one General Electric (GE) 7EA combustion turbine generator (CTG) with an inlet fogging system, one duct-fired heat recovery steam generator (HRSG), two redundant natural gas compressors, one boiler feedwater (BFW) pump, one circulating water pump, two new cells added to an existing cooling tower, an electrical distribution system, and a new on-site 69kV gas insulated substation. The steam produced by the fifth train would be delivered to the existing steam header shared by the four existing cogeneration trains. The proposed project

would use the existing water supply pipeline, natural gas pipeline, wastewater pipeline, and electric transmission lines.

PROJECT LOCATION

The proposed BP Watson project is located in the County of Los Angeles, in the City of Carson. The Dominguez Channel is located approximately 0.4 mile to the east, the Pacific Ocean is approximately 8.5 miles to the west of the project, and Long Beach Harbor is approximately five miles to the south (See **Project Description Figure 1**).

As mentioned, the proposed project would occupy a 2.5-acre brown field site within the existing boundary of the existing 21.7-acre area Facility. The project site is located approximately 0.7 mile south of the 405 Freeway, roughly bounded by East 223rd Street to the north, Wilmington Avenue to the west, East Sepulveda Boulevard to the south, and South Alameda Street to the east, in the City of Carson. The street address of the project site is located within the confines of the Facility at 22850 South Wilmington Avenue. The Construction Laydown and Parking Area, owned by BP, is a paved 25-acre parcel located approximately 1 mile southeast of the proposed project site, at the northeast corner of East Sepulveda Boulevard and South Alameda Street. The street address is at 2149 East Sepulveda Boulevard (See **Project Description Figure 2**).

The project site area is zoned Heavy Manufacturing and is surrounded by existing refineries and other industrial facilities. Adjoining and nearby properties within one mile to the west are commercial properties. Residential neighborhoods are five miles north of the project site.

PROJECT FEATURES

AIR QUALITY CONTROL

Air emissions from the combustion of natural gas will be controlled using state of the art systems. Emissions carbon monoxide (CO) and volatile organic compounds (VOC) will be reduced with the use of a CO catalyst system and a selective catalytic reduction (SCR) system that will use aqueous ammonia to control nitrogen (NOx) emissions. Emissions of particulate matter and Sulfur oxide (SOx) will be limited through the use of gaseous fuels. A Continuous Emissions Monitoring system will be installed to monitor emissions from the exhaust stacks.

NATURAL GAS SUPPLY

The existing Facility is serviced by Southern California Gas Company's natural gas pipeline which connects to a pipe rack at the refinery. The additional fifth train (BP Watson project) will obtain its gas from the existing refinery natural gas system at an interface point on the pipe rack. Natural gas for the fifth train will be compressed by two new redundant dedicated gas compressors and will be served via a six-inch connection with the refinery gas supply system, downstream of existing compressors.

WATER SUPPLY

It is the goal of BP Watson to use reclaimed water. However, until the negotiations between BP Carson Refinery and the West Basin Municipal Water District are finalized, the applicant wants to use the municipal and groundwater which is available to the existing Watson Cogeneration Facility.

STORM WATER AND WASTEWATER DISCHARGE

Industrial and storm water will be discharged to the existing oily water system at the BP Refinery. Storm water runoff from the project will also be directed to the oily water system. There will be no off-site discharges from the project. The existing sanitary system for the Facility is served by a connection to the sewer operated by the Los Angeles County Sanitation District.

TRANSMISSION SYSTEM

Electric power generated at the Facility that is not consumed for internal refinery use is transmitted from the existing switchyard to the Southern California Edison (SCE) Hinson Substation via a 230kV double-circuit, single conductor line that is approximately 1.6 miles long. From the switchyard, a new on-site 69kV gas insulated substation (GIS) will provide power to the refinery and connect the fifth train to the 230kV line for delivery to the existing on-site 230kV GIS. The 230kV GIS is then connected to the SCE Hinson Substation via two 230kV SCE transmission lines. From there, the generated power would be connected to the regional electric grid. Upgrades to the existing transmission lines are not required.

The on-site interconnection facility is an existing 230kV gas insulated indoor substation which connects via outdoor SCE line connection.

PROJECT CONSTRUCTION AND OPERATION

The project construction is expected to take approximately 26 months from the site mobilization to commercial operation.

CONSTRUCTION WORKFORCE

There would be an average and peak workforce of approximately 41 and 80 persons, respectively, consisting of construction crafts, supervisory, support, and construction management personnel on site during construction. Personnel requirements would peak from month six through month 16 of the construction period.

OPERATION WORKFORCE

No new operators or other staff would be hired for the proposed project as it would be operated and maintained by existing staff. The facility will be in operation 24 hours per day/seven days per week.

FACILITY CLOSURE

The anticipated life of a new cogeneration facility is at least 30 years. Continued

operation of the Facility beyond this time is likely to be viable, especially with good maintenance practices; however, at an appropriate point beyond that, the project would cease operation and close down. At that time it would be necessary to ensure that the closure occurs in such a way that the public health and safety and the environment are protected from adverse impacts.

Although the setting for this project does not appear to present any special or unusual closure problems, it is impossible to foresee what the situation would be in 30 years or more when the project ceases operation. Because the conditions that would affect the decommissioning decision are largely unknown at this time, these conditions would be presented to the Energy Commission when more information is available and the timing for decommissioning is more imminent. Facility closure would be consistent with laws, ordinances, regulations and standards in effect at the time of closure.

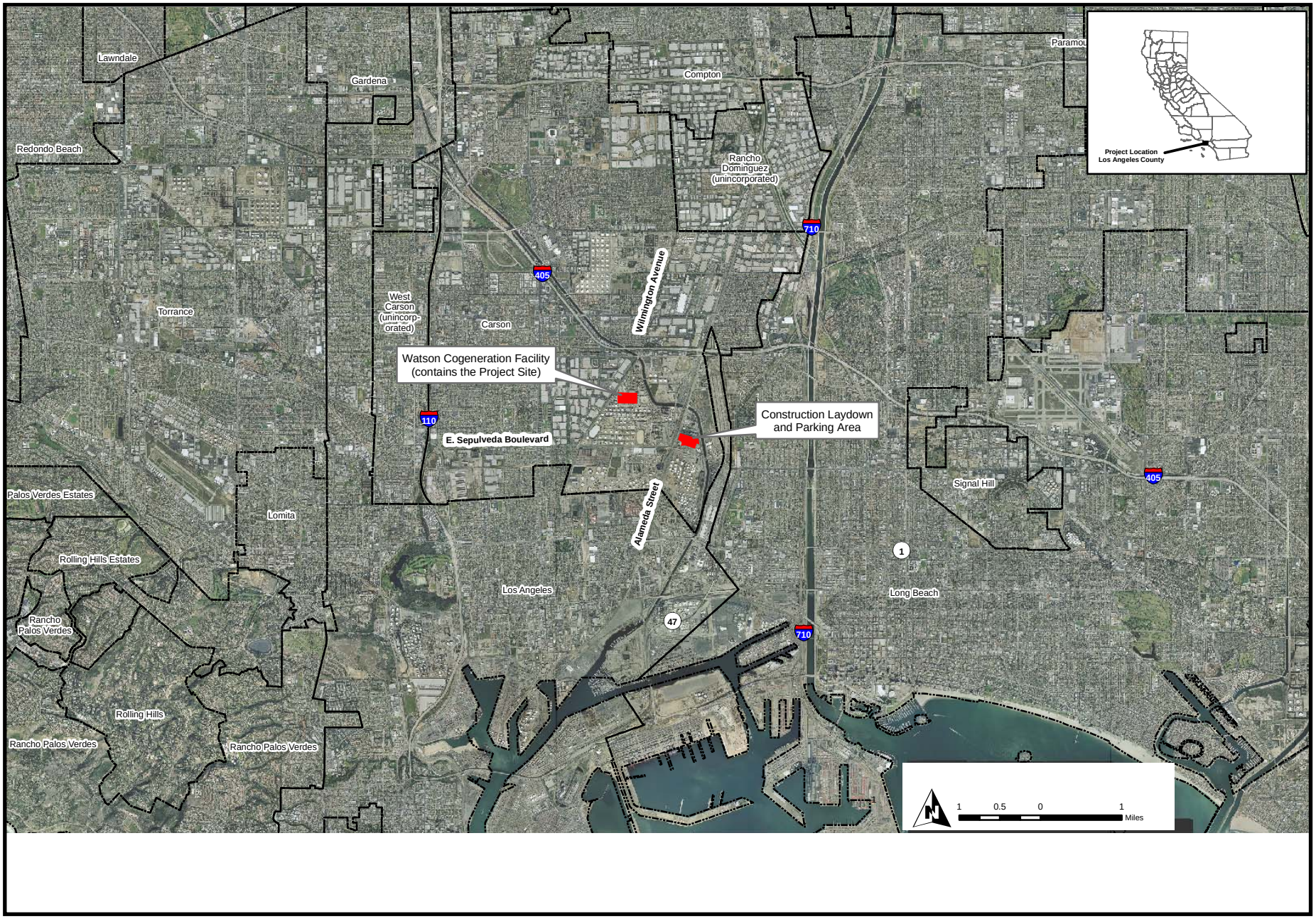
REFERENCES

ARCO 1985a – ARCO Petroleum Products Company. 1985. Application for Certification ARCO Watson Cogeneration Project. Submitted to California Energy Commission. May 31.

Watson 2009a – Watson Cogeneration Company/Thomas A. Lu (tn 50584). Application for Certification Volume I&II, dated 3/19/09. Submitted to CEC/Docket Unit on 3/19/09.

PROJECT DESCRIPTION - FIGURE 1

Watson Cogeneration Steam and Electric Reliability Project - Regional Map



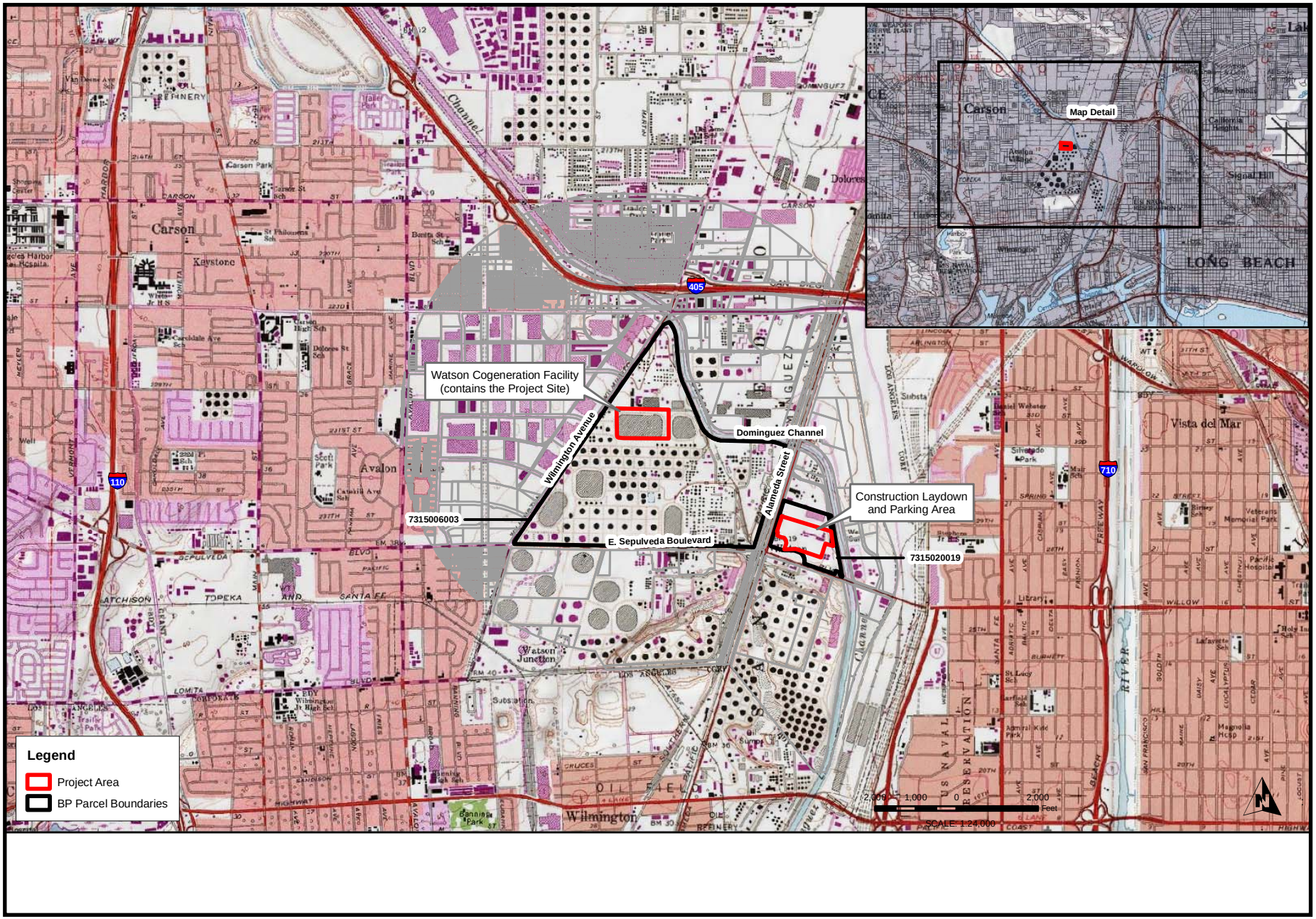
PROJECT DESCRIPTION

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: AFC Figure 3-1

PROJECT DESCRIPTION - FIGURE 2

Watson Cogeneration Steam and Electric Reliability Project - Project Vicinity Map



PROJECT DESCRIPTION

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: AFC Figure 3-5

ENVIRONMENTAL ASSESSMENT

AIR QUALITY

Testimony of Steve Radis

SUMMARY OF CONCLUSIONS

Staff finds that with the adoption of the attached conditions of certification the proposed Watson Cogeneration Steam and Electric Reliability (BP Watson) Project would comply with all applicable laws, ordinances, regulations, and standards (LORS) and would not result in any significant adverse air quality-related impacts. Staff also finds that:

- In the Socioeconomics section of this staff assessment, staff presents census information that shows that there are minority populations within six miles of the project. For the proposed Watson Cogeneration project, the total population within the six-mile radius of the site is 778,090 persons, and the total minority population is 646,789 persons or 83.12% of the total population (see Socioeconomics Figure 1). Energy Commission staff has identified significant adverse direct or cumulative air quality impacts resulting from the construction or operation of the proposed project; however, mitigation measures to reduce these impacts have been developed.

  Staff concludes that the BP Watson Project would not result in significant adverse air quality impacts from construction or operation of the power plant on minority population if the proposed Conditions of Certification are implemented. Therefore, there are no environmental justice issues for air quality.
- The project would comply with applicable South Coast Air Quality Management District (SCAQMD or District) Rules and Regulations, including New Source Review (NSR) requirements (SCAQMD 2011).
- The project would not cause new violations of any NO_2, SO_2, or CO ambient air quality standards, and therefore, the project's direct NOx, SOx and CO emission impacts are not significant.
- Without proper mitigation, the project's NOx and VOC emissions would potentially contribute to existing violations of the state's 1-hour and the federal 8-hour ozone air quality standards. Staff has determined that emission offset credits from the South Coast Air Basin would mitigate the project's contribution to ozone impacts to a level that is not cumulatively considerable (**AQ-SC7**).
- Without mitigation, the project's PM10 emissions and PM10 precursor emissions of SOx would contribute to the existing violations of the state 24-hour PM10 air quality standard. However, staff has determined that PM10 emissions would be within currently permitted levels under Title V and that SOx emission reductions credits would mitigate the project's contribution to PM10 and PM10 precursor emissions impacts to a level that is not cumulatively considerable.
- Without mitigation, the project's PM2.5 emissions and PM2.5 precursor emissions of SOx would contribute to the existing violations of the state 24-hour PM2.5 air quality standard. However, staff has determined that PM2.5 emissions would be within currently permitted levels under Title V and that SOx emission reductions credits would mitigate the project's contribution to PM2.5 and PM2.5 precursor emissions impacts to a level that is not cumulatively considerable.

- Staff has analyzed the potential incremental greenhouse gas (GHG) emission impacts from the proposed cogeneration project and concludes that they are not cumulatively considerable and thus do not represent a significant impact under the California Environmental Quality Act (CEQA). Refer to the Greenhouse Gas Appendix for details.

INTRODUCTION

The Watson Cogeneration Steam and Electric Reliability (BP Watson) Project is a proposed expansion of a steam and electrical generating (cogeneration) facility that is located in the City of Carson in Southern California. The BP Watson project will complete the original design of Watson Cogeneration Facility that has been in continuous operation for more than 20 years. The BP Watson project would add a nominal 85 megawatt (MW) combustion turbine generator (CTG) with a single-pressure heat recovery steam generator (HRSG) to provide additional process steam to the BP Carson refinery. The original plant design allocated plot space and included provisions to accommodate a new unit at a later date. The additional unit is sized and designed to provide reliable base load operations with supplemental duct firing in the HRSG.

The BP Watson project includes one General Electric (GE) 7EA CTG, with an inlet fogging system, one duct fired HRSG, two redundant natural gas compressors, one boiler feedwater (BFW) pump, one circulating water pump, two new cells added to an existing cooling tower, electrical distribution system, instrumentation and controls, and all necessary auxiliary equipment as described herein. The BP Watson project's primary objective is to provide additional process steam in response to the refinery's process steam demand.

The BP Watson project complements the existing cogeneration facility located within the confines of the refinery. The existing facility has four GE 7EA CTGs, four HRSGs and two steam turbine generators (STG). In operation since 1988, the existing cogeneration facility is owned by Watson Cogeneration Company (Watson) and operated by BP West Coast Products, LLC – BP Carson Refinery. Watson is a joint partnership between subsidiaries of BP America and Edison Mission Energy. Since the BP Watson project consists of adding a fifth CTG/HRSG to the existing configuration, it is also referred to as the "fifth train."

Because BP Watson would be part of a cogeneration facility with little fluctuation in steam demand, there is limited ability for this facility to provide back-up capabilities for California's expanding portfolio of renewable—but intermittent—electricity supplies from solar and wind facilities.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Air Quality Table 1 summarizes the applicable LORS. The District issued its Final Determination of Compliance (FDOC) (SCAQMD, 2011) for the project on March 16, 2011. The FDOC, or determination of compliance with District rules and regulations, included a set of air quality conditions that are drafted to ensure continuous compliance during construction and operation of the facility. Staff has incorporated the District conditions in this Final Staff Assessment.

Air Quality Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

40 Code of Federal Regulations (CFR) 52	Nonattainment New Source Review (NSR) requires a permit and requires Best Available Control Technology (BACT) and Offsets. Permitting and enforcement delegated to SCAQMD. Prevention of Significant Deterioration (PSD) requires major sources to obtain permits for attainment pollutants. A major source is defined as any one pollutant exceeding 250 tons per year, unless the source is a named PSD category (which the BP Watson project is not), when the limit is 100 tons per year. Since the emissions from the BP Watson project are not expected to exceed 250 tons per year, PSD does not apply. However, greenhouse gases trigger PSD review. See Greenhouse Gas Appendix.
40 CFR 60 Subpart KKKK	New Source Performance Standard for gas turbines: 15 parts per million (ppm) NOx at 15% O_2 and fuel sulfur limit of 0.060 lb SOx per million Btu heat input. BACT will be more restrictive. Enforcement delegated to SCAQMD.
40 CFR Part 70	Title V: Federal permit assuring compliance with all applicable Clean Air Act requirements. Title V permit application required within one year of start of operation. Permitting and enforcement delegated to SCAQMD. BP Watson would be required to amend their existing Title V permit to include the new unit.
40 CFR Part 72	Acid Rain Program. Requires permit and obtaining sulfur oxides credits. Permitting and enforcement delegated to SCAQMD.
State	
Health and Safety Code (HSC) Section 40910-40930	Permitting of source needs to be consistent with approved Clean Air Plan.
HSC Section 41700	Restricts emissions that would cause nuisance or injury.

Air Quality Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

HSC Sections 21080, 39619.8, 40440.14 (AB1318)	Requires the executive officer of the South Coast Air Quality Management District, upon making a specified finding, to transfer emission reduction credits for certain pollutants from the South Coast District's internal emission credit accounts to eligible electrical generating facilities.
Local – South Coast Air Quality Management District (SCAQMD)	
Regulation II: Permits	This regulation sets forth the regulatory framework of the application for issuance of construction and operation permits for new, altered and existing equipment.
Regulation IV: Prohibitions	This regulation sets forth the restrictions for visible emissions, odor nuisance, fugitive dust, various air emissions, fuel contaminants, start-up/shutdown exemptions and breakdown events.
Regulation VII: Emergencies	Establishes the procedures for reporting emergencies and emergency variances.
Regulation IX: Standards of Performance for New Stationary Sources	Regulation IX incorporates provisions of 40 CFR Part 60, Chapter I, and is applicable to all new, modified, or reconstructed sources of air pollution. Sections of this regulation apply to electric utility steam generators (Subpart Da) and stationary combustion turbines (Subpart KKKK). These subparts establish limits of PM10, SO_2, and NO_2 emissions from the facility as well as monitoring and test method requirements.
Regulation XI: Source Specific Standards	Specifies the performance standards for stationary engines larger than 50 brake horse power (bhp).
Regulation XIII: New Source Review	Establishes the pre-construction review requirements for new, modified or relocated facilities to ensure that these facilities do not interfere with progress in attainment of the national ambient air quality standards and that future economic growth in the SCAQMD is not unnecessarily restricted. However, this regulation does not apply to NOx or SOx emissions from certain sources, which are addressed by Regulation XX (RECLAIM).
Regulation XVII: Prevention of Significant Deterioration	This regulation sets forth the pre-construction requirement for stationary

Air Quality Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

	sources to ensure that the air quality in clean air areas does not significantly deteriorate while maintaining a margin for future industrial growth.
Regulation XX: Regional Clean Air Incentives Market (RECLAIM)	RECLAIM is designed to allow facilities flexibility in achieving emission reduction requirements for NOx and SOx through controls, equipment modifications, reformulated products, operational changes, shutdowns, other reasonable mitigation measures or the purchase of excess emission reductions.
Regulation XXX: Title V Permits	The Title V federal program is the air pollution control permit system required by the federal Clean Air Act as amended in 1990. Regulation XXX defines the permit application and issuance as well as compliance requirements associated with the program. Any new or modified major source which qualifies as a Title V facility must obtain a Title V permit prior to construction, operation or modification of that source. Regulation XXX also integrates the Title V permit with the RECLAIM program such that a project cannot proceed without both.
Regulation XXXI Acid Rain Permits	Title IV of the federal Clean Air Act provides for the issuance of acid rain permits for qualifying facilities. Regulation XXXI integrates the Title V program with the RECLAIM program. Regulation XXXI requires a subject facility to obtain emission allowances for SOx emissions as well as monitoring SOx, NOx, and carbon dioxide (CO_2) emissions from the facility.

SETTING

The BP Watson project site is a 2.5-acre brown field site located within the boundary of the existing Watson Cogeneration Facility, which is a 21.7-acre area within the 428-acre parcel further described as Assessor's Parcel Number (APN) 7315-006-003, 1801 Sepulveda Boulevard, Carson, California, 90745 and is integral to Watson's existing Carson Refinery (BP Refinery). The street address of the BP Watson project site is located within the boundary of the existing Watson Cogeneration Facility at 22850 South Wilmington Avenue, Carson, California. An existing warehouse/maintenance shop on a portion of the site will be removed as part of the BP Watson project. The BP

Watson project site is located approximately 0.7 mile south of the 405 Freeway, roughly bounded by Wilmington Avenue to the west, East Sepulveda Boulevard to the south, and South Alameda Street to the east. The site Universal Transverse Mercator (UTM) coordinates are as follows: 384725.7mE, 3742300mN, Zone 11 (NAD27).

The BP Watson project site elevation is approximately 32 feet above mean sea level (MSL). Because the site is located within the existing refinery property boundary, the BP Watson project site and surrounding areas are highly developed, and have been subject to disturbance for many years.

CLIMATE AND METEOROLOGY

Climate

The climate of the South Coast Air Basin (basin) is strongly influenced by the local terrain and geography. The basin is a coastal plain with connecting broad valleys and low hills, bounded by the Pacific Ocean on the west, and relatively high mountains forming the north, south, and east perimeters. The climate is mild, tempered by cool sea breezes and is dominated by the semipermanent high pressure of the eastern Pacific.

Across the 6,600-square-mile basin, there is little variation in the annual average temperature of 62°F (see **Air Quality Table 2**). However, the eastern portion of the basin (generally described as the Inland Empire area), experiences greater variability in annual minimum and maximum temperatures as this area is farther from the coast and the moderating effect on climate from the ocean is weaker. All portions of the basin have recorded temperatures well above 100°F. January is usually the coldest month, while the months of July and August are usually the hottest.

The majority of the rainfall in the basin falls during the period from November through April (see **Air Quality Table 3**). Annual rainfall values range from approximately 9 inches per year in Riverside, to 14 inches per year in downtown Los Angeles. Monthly and annual rainfall totals can vary considerably from year to year. Cloud cover, in the form of fog or low stratus, is often caused by persistent low inversions and the cool coastal ocean water. Downtown Los Angeles experiences sunshine approximately 73% of the time during daylight hours, while the inland areas experience a slightly higher amount of sunshine, and the coastal areas a slightly lower value.

Although the basin is characterized by a semi-arid climate, the air near the surface can often have high relative humidity due to the presence of a shallow marine layer on most days. Except for infrequent periods of off-shore winds, the marine layer strongly influences the local climate. Periods of heavy fog are common, with “high fog” (low stratus clouds) a frequent and characteristic occurrence. The annual average relative humidity ranges from approximately 70% in the coastal areas to 57%in the inland parts of the basin.

Air Quality Table 2
Temperature Data for Long Beach, California

Month	Monthly Temperatures			Extremes		Mean Number of Days			
						Maximum		Minimum	
	Daily Max	Daily Min	Mean	Highest Temp	Lowest Temp	90°F & Above	32°F & Below	32°F & Below	0°F & Below
Jan	66.9	45.6	56.3	93	25	0.1	0	0.2	0
Feb	67.2	47.3	57.3	91	33	0.1	0	0	0
Mar	68.3	49.7	59	98	33	0.3	0	0	0
Apr	71.7	52.3	62	105	38	0.9	0	0	0
May	73.6	56.9	65.2	104	40	1	0	0	0
Jun	77.1	60.3	68.7	109	47	1.5	0	0	0
Jul	82.4	63.8	73.1	107	51	3.6	0	0	0
Aug	83.9	64.9	74.4	105	55	5.3	0	0	0
Sep	82.2	62.8	72.5	110	50	5.5	0	0	0
Oct	78.1	57.9	68	111	39	3.2	0	0	0
Nov	72.2	50.6	61.4	101	34	0.7	0	0	0
Dec	67.1	45.3	56.2	92	28	0	0	0.2	0
Annual	74.2	54.8	64.5	111	25	22.2	0	0.4	0
Winter	67.1	46.1	56.6	93	25	0.2	0	0.4	0
Spring	71.2	53	62.1	105	33	2.2	0	0	0
Summer	81.1	63	72.1	109	47	10.4	0	0	0
Fall	77.5	57.1	67.3	111	34	9.4	0	0	0

Data from 1958 through 2009.
Reference: WRCC 2009.

The basin is characterized by light average wind speeds and poor ventilation. Wind speeds in the downtown Los Angeles area average 5.7 miles per hour (mph), with little seasonal variation. Coastal wind speeds typically average about two mph faster than the downtown wind speeds, with the inland areas showing wind speeds slightly slower than the downtown Los Angeles values.

Summer wind speeds are typically higher than winter wind speeds. The re-circulating sea-breeze is the dominant wind pattern in the basin, characterized by a daytime on-shore flow and a nighttime land breeze. This pattern is broken by the occasional winter storm, or the strong northeasterly flows from the mountains and deserts north of the basin known as “Santa Ana winds.”

Along the southern California coast, surface air temperatures are relatively cool. Coupled with warm, dry subsiding air from aloft, the potential for early morning inversions is high, i.e., approximately 87% of all days. These can affect vertical mixing of pollutants. The basin-wide average occurrence of inversions at ground level (surface) is 11 days per month, and varies from two days per month in June to 22 days per month in December. Upper air inversions, with bases at less than 2,500 feet above MSL occur

approximately 22 days each month, while higher based inversions, up to 3,500 feet above MSL occur approximately 191 days per year.

Air Quality Table 3
Precipitation Data for Long Beach, California

Month	Rainfall							Snowfall inches	
	Inches			Mean Number of Days					
	Mean	Highest Monthly	Highest Daily	0.01" or More	0.10" or More	0.50" or More	1.0" or More	Mean	One-Day Max.
Jan	2.6	12.76	3.75	6	4	2	1	0	0
Feb	2.94	12.09	2.78	6	4	2	1	0	0
Mar	1.85	8.75	3.46	5	4	1	0	0	0
Apr	0.7	4.42	1.61	3	2	0	0	0	0
May	0.19	2.32	2.03	1	0	0	0	0	0
Jun	0.06	0.86	0.86	1	0	0	0	0	0
Jul	0.02	0.34	0.27	0	0	0	0	0	0
Aug	0.07	2.03	1.75	0	0	0	0	0	0
Sep	0.2	1.45	1.39	1	0	0	0	0	0
Oct	0.39	5.34	1.97	2	1	0	0	0	0
Nov	1.24	6.05	2.03	3	2	1	0	0	0
Dec	1.63	5.29	3.17	5	3	1	0	0	0
Annual	11.89	27.67	3.75	34	21	8	3	0	0

Data from 1958 through 2009.
Reference: WRCC 2009.

Representative climatic data for the BP Watson project area was derived from the Long Beach WSCMO Station (#045085, Period of Record 4-1-58 to present) located five miles to the east of the BP Watson project site. A summary of data from this site indicates the following:

- Average maximum daily temperature 74.2°F
- Average minimum daily temperature 54.8°F
- Highest mean maximum annual temperature 90.5°F
- Lowest mean minimum annual temperature 41.8°F
- Mean annual precipitation 12.94 inches

Air quality is determined primarily by the type and amount of pollutants emitted into the atmosphere, the nature of the emitting source, the topography of the air basin, and the local meteorological conditions. In the BP Watson project area, inversions and light winds can result in conditions for pollutants to accumulate in the region.

Ambient Air Quality Standards

The United States Environmental Protection Agency (U.S. EPA) and the California Air Resource Board (CARB) have both established allowable maximum ambient concentrations of criteria air pollutants based on public health impacts, called ambient air quality standards (AAQS). The state AAQS, established by CARB, are typically lower (more stringent) than the federal AAQS, established by the U.S. EPA. The state and federal air quality standards are listed in **Air Quality Table 4**. As indicated, the averaging times for the various air quality standards (the duration over which all measurements taken are averaged) range from one hour to one year (annual). The standards are read as a concentration, in parts per million (ppm), or as a weighted mass of material per unit volume of air, in milligrams (10^{-3} g, 0.001 g, or mg) or micrograms (10^{-6} g, 0.000001 g, or µg) of pollutant in a cubic meter (m^3) of air, averaged over the applicable time period.

In general, an area is designated as attainment for a specific pollutant if the concentrations of that air contaminant do not exceed the standard. Likewise, an area is designated as non-attainment for an air contaminant if that standard is violated. Where not enough ambient data is available to support designation as either attainment or non-attainment, the area can be designated as unclassified. Unclassified areas are normally treated the same as attainment areas for regulatory purposes. An area can be designated as attainment for one air contaminant and non-attainment for another, or attainment for the federal standard and non-attainment for the state standard for the same contaminant. The entire area within the boundaries of an air district is usually evaluated to determine the SCAQMD attainment status.

The ambient air quality standards shown in **Air Quality Table 4** define the maximum amount of a pollutant that can be present in outdoor air without harm to the public's health. These standards are set at levels to adequately protect the health of all members of the public, including those most sensitive to adverse air quality impacts such as the aged, people with existing illnesses, children, and infants, and include a margin of safety.

EXISTING AMBIENT AIR QUALITY

The project is located in the City of Carson and is under the jurisdiction of the SCAQMD. **Air Quality Table 5** lists the attainment and non-attainment status of the district for each criteria pollutant for both the federal and state ambient air quality standards.

Ambient air quality data has been collected extensively in the air basin. **Air Quality Table 6** lists a summary of maximum ambient measurements for the years 2003 through 2009 at the North Long Beach monitoring station closest to the project site.

Comparison of the values in **Air Quality Table 6** to the most restrictive AAQS in **Air Quality Table 4** clearly shows that ozone, PM10, and PM2.5 continue to violate applicable state and federal standards while CO, NO_2 and SO_2 do not violate the standards.

Air Quality Table 4
Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	California Standard	Federal Standard
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m^3)	--
	8 Hour	0.07 ppm (137 µg/m^3)	0.075 ppm (147 µg/m^3)
Respirable Particulate Matter (PM10)	24 Hour	50 µg/m^3	150 µg/m^3
	Annual*	20 µg/m^3	--
Fine Particulate Matter (PM2.5)	24 Hour	--	35 µg/m^3
	Annual*	12 µg/m^3	15 µg/m^3
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)
	8 Hour	9 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)
Nitrogen Dioxide (NO_2)	1 Hour	0.18 ppm (339 µg/m^3)	0.100 ppm**
	Annual*	0.030 ppm (57 µg/m^3)	0.053 ppm (100 µg/m^3)
Sulfur Dioxide (SO_2)	1 Hour	0.25 ppm (655 µg/m^3)	0.075 ppm (196 µg/m^3)***
	3 Hour	--	0.5 ppm (1300 µg/m^3)
	24 Hour	0.04 ppm (105 µg/m^3)	--
Lead	30 Day Average	1.5 µg/m^3	--
	Calendar Quarter	--	1.5 µg/m^3
	Rolling 3-mo Ave		0.15 µg/m^3
Sulfates	24 Hour	25 µg/m^3	--
Hydrogen Sulfide (H_2S)	1 Hour	0.03 ppm (42 µg/m^3)	--
Vinyl Chloride (chloroethene)	24 Hour	0.010 ppm (26 µg/m^3)	--
Visibility Reducing Particulates	8 hours	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70%.	--

* Annual Arithmetic Mean;
**Three-year average of 98th percentile daily maximum 1-hour values, effective April 12, 2010.
*** Effective June 2, 2010, the U.S. EPA established this standard as the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations.

Source: CARB 2010a.

Attainment Criteria Pollutants

Although both NO_2 and SO_2 are classified as in attainment with all state and federal AAQS, they remain of significant concern since they are both precursors to PM10, and NO_2 is a precursor to ozone. Because NO_2 and SO_2 are precursors to non-attainment pollutants, the SCAQMD will require full offset mitigation for both.

Air Quality Table 5
Attainment / Non-Attainment Classification
South Coast Air Quality Management District (SCAQMD)

Pollutants	Federal Classification	State Classification
Ozone	**Non-Attainment**	**Non-Attainment**
PM10	**Non-Attainment**	**Non-Attainment**
PM2.5	**Non-Attainment**	**Non-Attainment**
CO	Attainment	Attainment
NO_2	Attainment [1]	Attainment
SO_2	Attainment	Attainment

1. Attainment status for the new federal 1-hour NO_2 standard is scheduled to be determined by January 2012. The U.S. Environmental Protection Agency's (EPA's) has notified California of its intention to designate all areas of California as unclassifiable/attainment for the revised primary National Ambient Air Quality Standard (NAAQS) for NO_2.

Source: CARB 2010a

Air Quality Table 6
Criteria Pollutant Summary for North Long Beach
Maximum Ambient Concentrations (ppm or µg/m^3)

Pollutant	Averaging Period	Units	2003	2004	2005	2006	2007	2008	2009	Limiting AAQS
Ozone	1 hour	ppm	0.099	0.090	0.091	0.081	0.099	0.093	0.089	0.09
Ozone	8 hour	ppm	0.068	0.074	0.069	0.058	0.073	0.074	0.067	0.07
PM10[a]	24 hours	µg/m^3	63	72	66	78	75	63	62	50
PM10[a]	Annual	µg/m^3	32.8	33.1	29.6	31.1	30.2	29.1	30.5	150
PM2.5[b]	24 hours	µg/m^3	115.2	66.6	41.4	34.9	40.8	38.9	34.2	35
PM2.5[b]	Annual	µg/m^3	18.0	17.6	16	14.2	14.6	14.2	13.0	12
CO	1 hour	ppm	5.5	4.2	4.2	4.2	3.3	3.3	2.9	20
CO	8 hour	ppm	4.7	3.4	3.5	3.4	2.6	2.6	2.17	9
NO2	1 hour	ppm	0.14	0.12	0.14	0.10	0.11	0.13	0.11	0.18
NO2	Annual	ppm	0.0288	0.028	0.0241	0.0215	0.0207	0.0208	0.0185	0.03
SO2	1 hour	ppm	0.033	0.042	0.041	0.027	0.11	0.087	0.017	0.25
SO2	3 hour	ppm	0.020	0.026	0.033	0.023	0.028	0.010	0.011	0.5
SO2	24 hour	ppm	0.008	0.012	0.010	0.010	0.011	0.012	0.009	0.04
SO2	Annual	ppm	0.0025	0.0051	0.0022	0.0012	0.0027	0.0022	0.0015	0.03

Note: a) Maximum PM10 concentration based on California monitoring methodology.
b) Maximum PM2.5 concentration based on national monitoring methodology.

Source: CARB 2010b

Nitrogen Dioxide (NO_2)

Most combustion activities and engines emit significant quantities of nitrogen oxides (NOx), a term used in reference to combined quantities of nitrogen oxide (NO) and NO_2. Most of the NOx emitted from combustion sources is NO. Although only NO_2 is a criteria pollutant, NO is readily oxidized in the atmosphere into NO_2. In urban areas, the ozone concentration level is typically high. That level will drop substantially at night as NO is oxidized into NO_2, and increase again in the daytime as sunlight disassociates NO_2 into NO and ozone. This reaction explains why urban ozone concentrations at ground level can be relatively low near large NO emission sources, while downwind rural areas (without sources of fresh NO emissions) are exposed to higher ozone concentrations as arriving NO_2 dissociates into NO and ozone in the presence of sunlight.

Sulfur Dioxide (SO_2)

Sulfur dioxide is typically emitted as a result of the combustion of fuels containing sulfur. In significant ambient quantities, SO_2 can lead to acid rain and sulfite particulate formation. Natural gas contains very little sulfur and consequently produces very few SO_2 emissions when combusted. By contrast, fuels high in sulfur, such as lignite (a type of coal), emit large amounts of SO_2 when combusted. Sources of SO_2 emissions within the basin come from every economic sector and include a wide variety of gaseous, liquid and solid fuels.

Carbon Monoxide (CO)

CO is generated from most combustion engines and other combustion activities. CO is considered a local pollutant, as it will rapidly oxidize to carbon dioxide. It is thus found in high concentrations only near the source of emissions. Automobiles and other mobile sources are the principal source of CO emissions. High levels of CO emissions can also be generated from fireplaces and wood-burning stoves. Industrial sources, including power plants, typically constitute less than 10% of the ambient CO levels in the South Coast region (CARB 2006).

The highest concentrations of CO occur when low wind speeds and a stable atmosphere trap the pollution emitted at or near ground level in what is known as the stable boundary layer. These conditions occur frequently in the wintertime late in the afternoon, persist during the night and may extend one or two hours after sunrise. Because the mobile sector (ships, cars, trucks, busses and other vehicles) is the main source of CO, ambient concentrations of CO are highly dependent on traffic patterns. Carbon monoxide concentrations in the state have declined significantly due to two state-wide programs: 1) the 1992 wintertime oxygenated gasoline program, and 2) Phases I and II of the reformulated gasoline program. New vehicles with oxygen sensors and fuel injection systems have also contributed to the decline in CO levels in the state. Today, all the counties in California are in compliance with the state and federal CO AAQS.

Non-Attainment Criteria Pollutants

The following sections provide background information for the non-attainment criteria pollutants: ozone, PM10, and PM2.5.

Ozone (O_3)

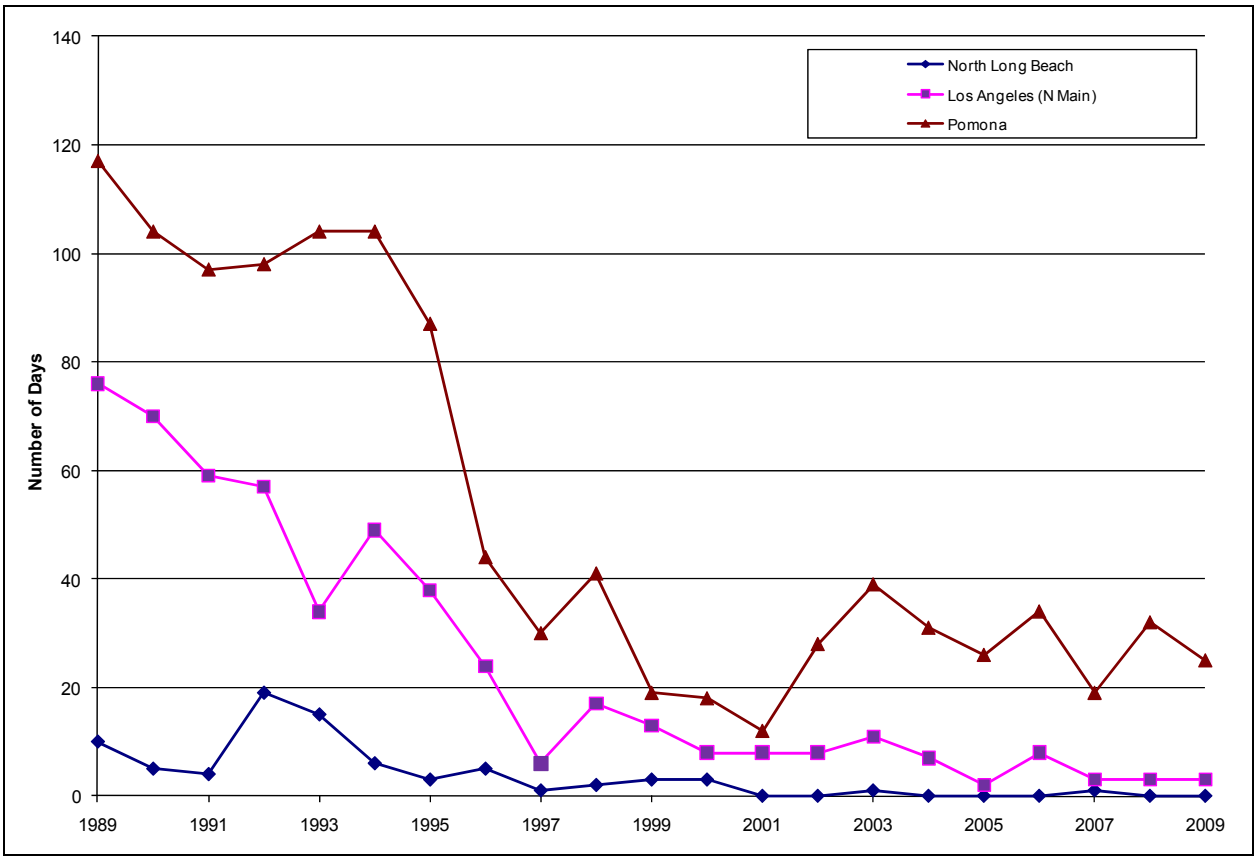
Ozone is not directly emitted from stationary or mobile sources, but is formed as the result of chemical reactions in the atmosphere between precursor air pollutants. The primary ozone precursors are NOx and volatile organic compounds (VOC), both of which interact in the presence of sunlight to form ozone.

The SCAQMD is designated as extreme nonattainment for the federal 8-hour ozone standard. Efforts to achieve ozone attainment typically focus on controlling the ozone precursors NOx and VOC. SCAQMD-published state implementation plans (SIP) largely rely on the CARB to control mobile sources, the U.S. EPA to control emission sources under federal jurisdiction, and SCAQMD to control local industrial sources. Through

these control measures, California and the SCAQMD are required to reach attainment of the federal 8-hour ozone ambient air quality standard by 2024.

Exceedances of the national and state ozone ambient air quality standards occur in the region both up wind and downwind of the project site. **Air Quality Figure 1** shows the number of days each year with exceedances of the state 1-hour ozone standard at three representative monitoring sites. The three monitoring sites were chosen to represent three distinct parts of the air shed: coastal region, proposed project region, and inland region.

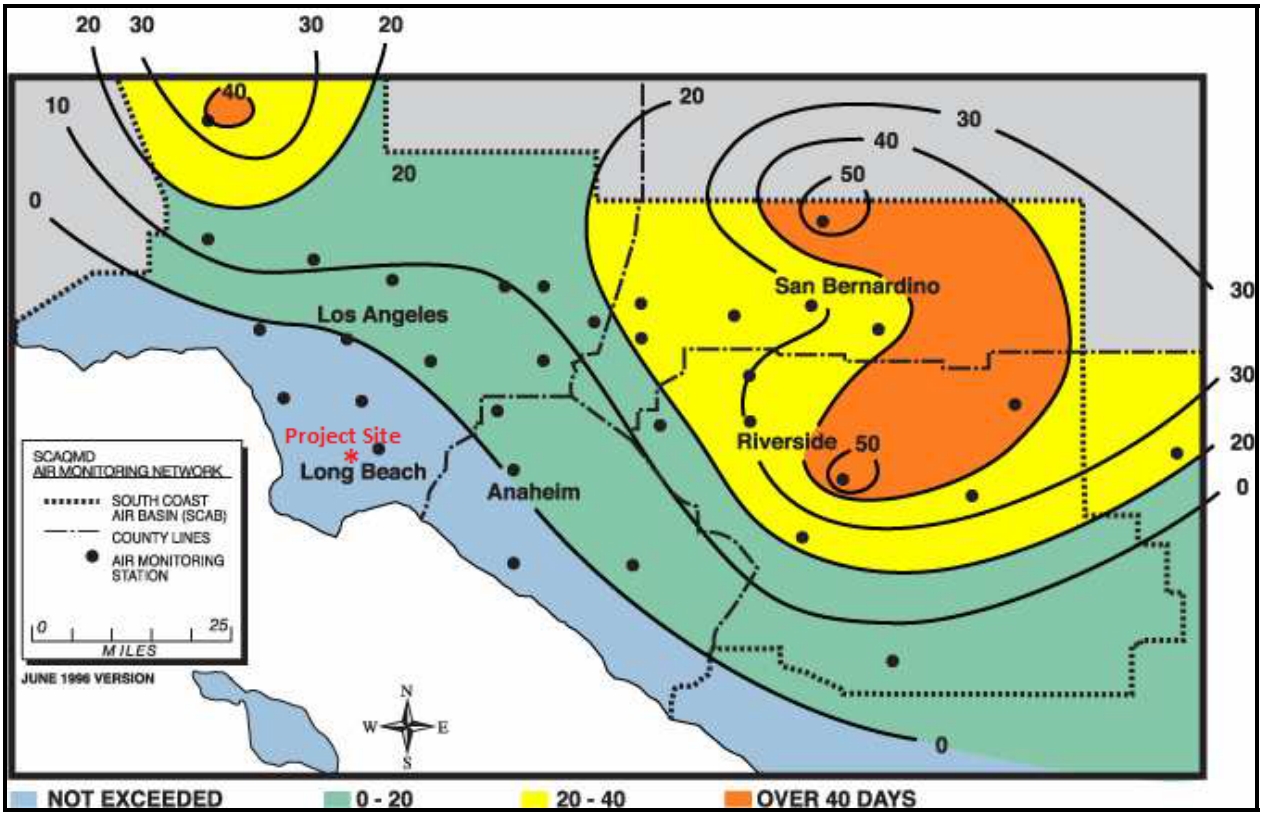
Air Quality Figure 1
OZONE 1989-2009
Number of Days Exceeding the State 1-Hour AAQS



Source: CARB 2010b

The proposed project area is represented in **Air Quality Figure 1** by the North Long Beach monitoring station. The Pomona monitoring station is in an area very near the inland regions of the SCAQMD. The data clearly shows the characteristic trend to higher ambient ozone concentrations farther away from the coast, due to prevailing onshore airflow. **Air Quality Figure 2** provides a graphical representation of this effect for a single year, showing how the onshore airflow pushes pollution inland and thus focuses regional violations away from the coast. The approximate location of the project is shown on the figure.

Air Quality Figure 2
OZONE – 2006 Number of Days Exceeding 8-Hour Federal Standard
(1-hour average ozone > 0.07 ppm)



Source: SCAQMD 2006

Though there are a significant number of exceedances of the 8-hour ozone ambient air quality standards throughout the South Coast air basin, it is important to consider the improvements that have occurred in recent years. The SCAQMD leads the nation in air quality management methods and regulatory programs. These programs have significantly improved the air quality in spite of the growing population and industrial and commercial enterprises. **Air Quality Figure 1** clearly shows the improvements in ozone air quality levels over the past 16 years in the South Coast air basin, especially in the intermediate region near the proposed project site. As shown in **Air Quality Figure 1**, in 2003 there was a slight increase over prior years in the number of exceedances recorded. Since 2003 however, the downward trend has returned, approaching the 2002 lower number of exceedances. However, the trends for inland areas suggest these areas will not meet the original federal attainment date of 2010, but instead may meet the federal 8-hour ozone standard by 2024.

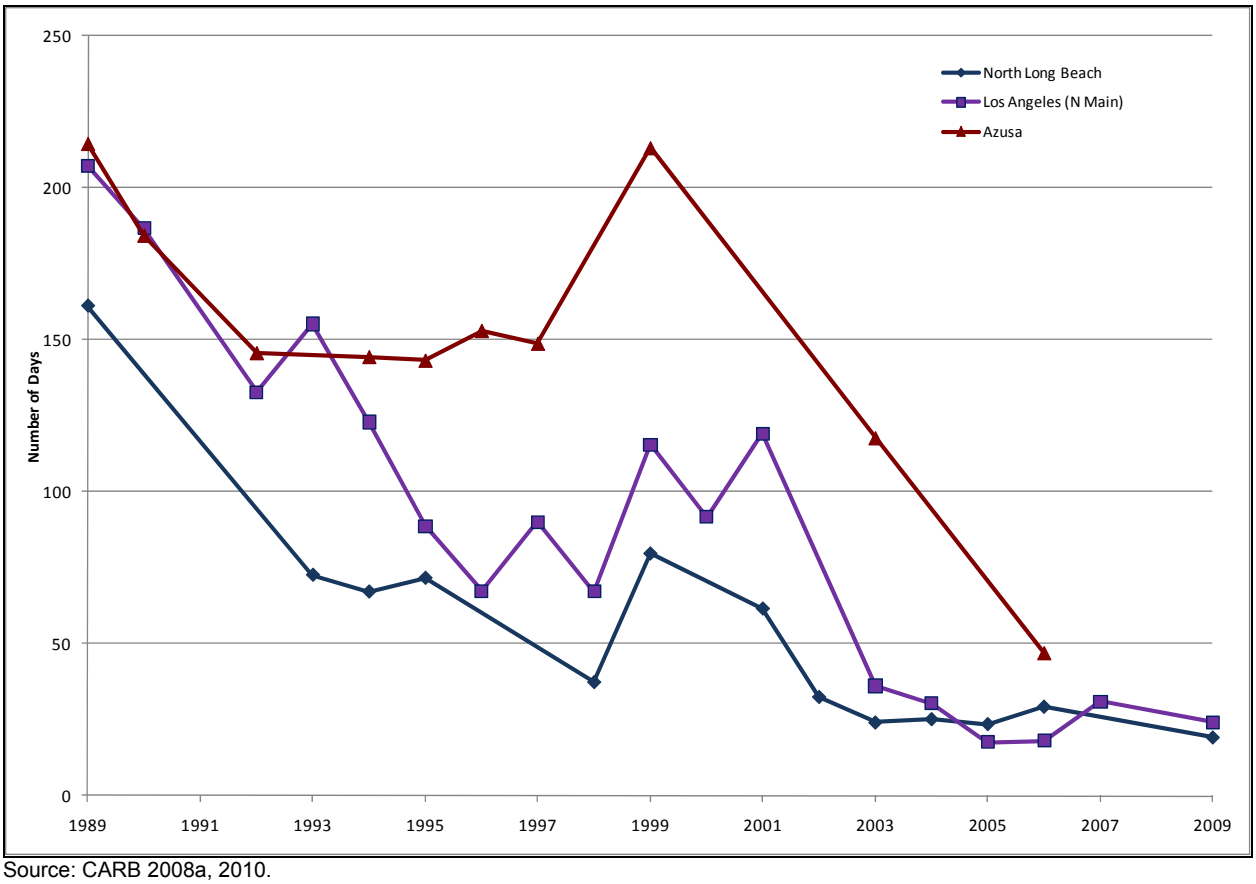
Respirable Particulate Matter (PM10)

PM10 is generated both directly from a combustion process and generated downwind of a source when various emitted precursor pollutants chemically interact in the atmosphere to form solid precipitates. These solids are called secondary particulates, because they are not directly emitted, but are generated as a consequence of facility emissions. Gaseous emissions of pollutants such as NOx, SO_2 and VOC from turbines,

and ammonia (NH_3) from NOx control equipment can form particulate nitrates, sulfates, and organic solids.

The SCAQMD has been designated a non-attainment area for the federal 24-hour and annual PM10 ambient air quality standards. The South Coast air basin has been designated as a non-attainment zone for the state 24-hour and annual PM10 ambient air quality standards. **Air Quality Figure 3** below shows the number of days each year on which exceedances of the state 24-hour PM10 standard occurred for three representative monitoring regions: coastal/project site, mid-basin and inland. The data shows some improvement over the period, but overall the PM10 situation remains a concern.

Air Quality Figure 3
PM10 1989-2009
Number of Days Exceeding the State 24-Hour AAQS



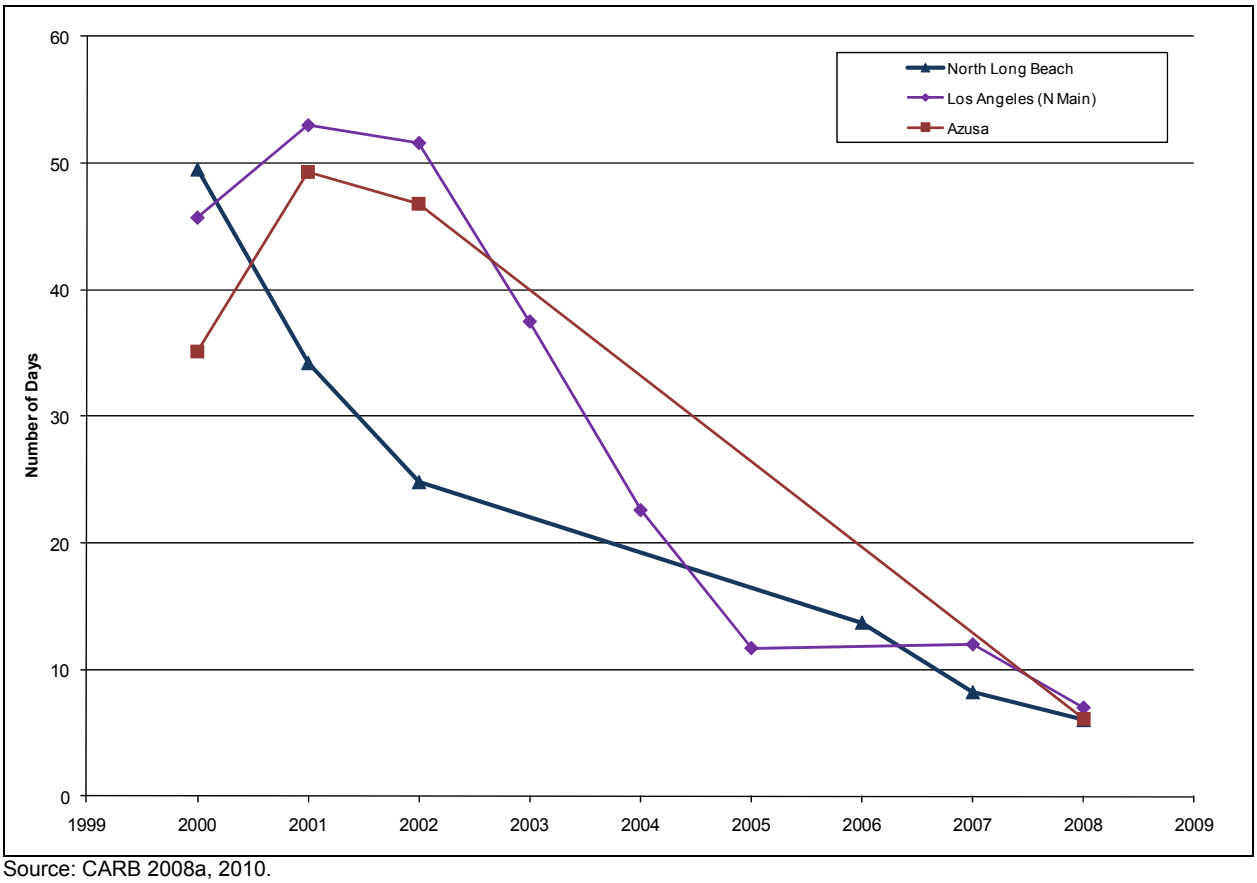
Source: CARB 2008a, 2010.

Fine Particulate Matter (PM2.5)

PM2.5, a subset of PM10, consists of particles with an aerodynamic diameter less than or equal to 2.5 microns. Particles within the PM2.5 fraction penetrate more deeply into the lungs, and can be much more damaging by weight than larger particulates. PM2.5 is primarily a product of combustion and includes nitrates, sulfates, organic carbon (ultra fine dust) and elemental carbon (ultra fine soot). **Air Quality Figure 4** below shows the number of days each year on which exceedances of the new federal 24-hour PM2.5

standard of 35 µg/m^3 (there is no separate short-term state standard) occurred for three representative monitoring regions: coastal, project site, and inland.

Air Quality Figure 4
PM2.5 1999-2008
Number of Days Exceeding the Federal 24-Hour 35 µg/m^3 AAQS



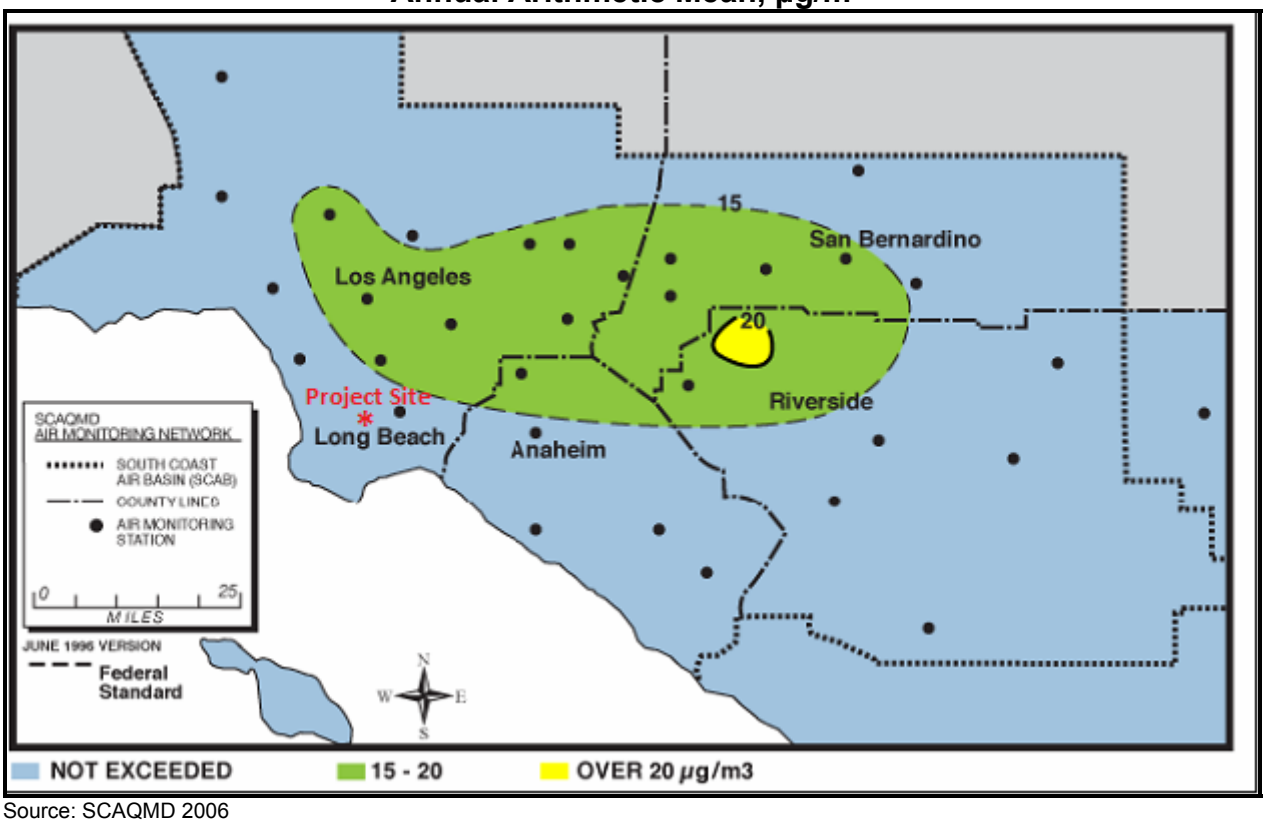
Source: CARB 2008a, 2010.

The highest concentrations of PM2.5 in the South Coast air basin occur in the most highly urbanized inland areas of the air basin. This effect is shown graphically in **Air Quality Figure 5** below.

PM2.5 standards were first adopted by U.S. EPA in 1997, and were upheld by the United States Supreme Court in 2001 over a challenge from the American Trucking Association (ATA et al). The South Coast air basin is designated as non-attainment for all state and federal PM2.5 AAQS. The SCAQMD has submitted a PM2.5 SIP, and has prepared revised NSR rules that require offsetting of PM2.5 emissions. The SCAQMD adopted Rule 1325 (effective June 3, 2011, which requires PM2.5 offsets if a proposed modification, such as BP Watson has a potential to emit 100 tons PM2.5 per year andto offset PM2.5 emissions and PM2.5 precursor emissions if they exceed a threshold.) Although the SCAQMD's Determination of Compliance was finalized before the effective date of this rule and thus did not include an evaluation of Rule 1325, staff has a responsibility under the California Environmental Quality Act (CEQA to address PM2.5 emissions, and will do so, taking into consideration the fact that the proposed project region is not in attainment with adopted PM2.5 standards. Following the assessment procedures defined in Rule 1325, and recent source test data from the Inland Empire

Energy Center using U.S. EPA Test Methods 201A and 202 (Delta 2010), PM2.5 emissions from the existing BP Watson Cogeneration units were estimated to be 15.1 tons/year, which is well below the threshold of 100 tons/year specified in Rule 1325. Total PM2.5 emissions for the facility with the proposed project would be 16.5 tons/year. Therefore, PM2.5 offsets would not be required for the proposed project.

Air Quality Figure 5
PM2.5 – 2006
Annual Arithmetic Mean, µg/m^3



Source: SCAQMD 2006

Existing Ambient Air Quality Summary

Based on the above analysis of background ambient air quality, staff recommends the use of the background ambient air pollutant concentrations in **Air Quality Table 7** for the purpose of modeling and evaluating potential ambient air quality impacts from the proposed project. Pollutants exceeding standards are shown in bold.

Project Description and Proposed Emissions

The Watson Cogeneration Steam and Electric Reliability (BP Watson) Project is a proposed expansion of a steam and electrical generating (cogeneration) facility that is located in the City of Carson in Southern California. The BP Watson project will complete the original design of Watson Cogeneration Facility that has been in continuous operation for more than 20 years. The Watson Cogeneration Company (Watson) has constructed and operated four cogeneration units, since 1988, at a site within the BP Carson Refinery. Watson is a joint partnership between subsidiaries of BP America and Edison Mission Energy. The existing cogeneration facility consists of four General Electric (GE) 7EA Combustion Turbine Generators (CTG), four Heat Recovery

Steam Generators (HRSG) equipped with selective catalytic reduction, and two steam turbine generators (STG).

Air Quality Table 7
Staff Recommended Background Concentrations (µg/m^3)

Pollutant	Averaging Time	Recommended Background[a]	Limiting Standard	Percent of Standard
NO_2	1 hour[b]	264.0	339	78%
	1-hour[c]	139.0	188	74%
	Annual	54.1	57	95%
CO	1 hour	9,600	23,000	42%
	8 hour	7,315	10,000	73%
PM10	24 hour	131.0	50	**262%**
	Annual	45.0	20	**225%**
PM2.5	24 hour	48.5	35	**139%**
	Annual	17.5	12	**146%**
SO_2	1 hour	107.0	655	16%
	24 hour	86.0	105	82%

Note: a) SCAQMD North Long Beach Ambient Air Quality Monitoring Station
b) Maximum observed 1-hour value.
c) Three-year average of 98th percentile daily maximum 1-hour values,

Source: CARB 2010b

The proposed BP Watson project is for a fifth cogeneration train, or "fifth train," which includes a CTG/HRSG and air pollution control system. The new cogeneration unit would increase the electric generating capacity of the facility by approximately 85 MWe, from 385 MWe to 470 MWe. The cogeneration unit would supply electric power and steam to the refinery and would export excess power generated to the electric utility grid. It would increase the reliability of the Watson facility, reducing the risk of refinery upset due to loss of power. The BP Watson project would also ensure that the refinery's steam demand is fully met, even when one or two of the existing CTG/HRSGs are out of service.

The BP Watson project would operate as a base loaded cogeneration unit and is proposed to be permitted for 8,760 hours of operation per year, with an expected facility capacity factor of greater than 95%. The expansion BP Watson project would consist of the following:

- Installation of a nominal 85 megawatt (MW) GE 7EA Dry Low NOx (DLN) combustion turbine with inlet fogging.
- Installation of the HRSG producing up to approximately (~) 659 Klbs steam/hr and equipped with a duct burner with up to 447.9 MMBtu/hr (high heating value [HHV]) heat input at 36ºF.
- Installation of two additional cells to the existing seven cell wet cooling tower to provide cooling and heat rejection from the new power block process.

- Installation of all required auxiliary support systems, none of which are fuel burning equipment.

The BP Watson project design would incorporate air pollution emission controls designed to meet SCAQMD BACT determinations. These controls would include DLN combustors in the CTG to limit nitrogen oxide (NOx) production, Selective Catalytic Reduction (SCR) with aqueous ammonia for additional NOx reduction in the HRSG, an oxidation catalyst to control carbon monoxide (CO) and volatile organic compounds (VOC) emissions. Fuels to be used would be pipeline specification natural gas, refinery gas, or a mix of pipeline specification natural gas and refinery gas. Low NOx burners would be incorporated into the HRSG.

The CTG would fire a blend of natural gas and refinery fuel gas, with the refinery fuel gas accounting for up to 35 % by volume of fuel fired, while the duct burner in the HRSG is expected to fire mostly refinery gas. The refinery gas would be limited to a total sulfur concentration of 40 ppm on a rolling 3-hour averaging period and 30 ppm based on a rolling 24-hour averaging period. Hydrogen sulfide concentrations would be limited to 162 ppm based on a rolling 3-hour averaging period and 60 ppm based on a rolling 365 successive day average.

Other emission control technologies were evaluated as part of the BACT determination. Specifically, the EMx (SCONOX) Catalyst was considered as an alternative to SCR. The EMx Catalyst offers some benefits over SCR, such as avoiding the use of ammonia. However, both SCR and EMx would be expected to achieve the proposed BACT NOx emission limit of 2.0 ppmvd @ 15% O2 averaged over one hour and neither would cause significant energy, economic, or environmental impacts. The concern remains regarding the long-term effectiveness of EMx as a control technology as the technology has not been demonstrated on the turbine used in this project over a long period of time. Since the BP Watson facility already has four identical units operating with SCR and using the more-concentrated anhydrous ammonia, the addition of a fifth unit using SCR with 30% aqueous ammonia would not result in the introduction of new hazards associated with SCR and aqueous ammonia and would simplify integration of the fifth unit into the existing operations.

Construction Emissions

The original design of the BP Watson facility allocated plot space for a new unit at a later date and included provisions to accommodate it. The Construction Laydown and Parking Area is a paved 25-acre parcel located approximately one mile southeast of the project site, at the northeast corner of East Sepulveda Boulevard and South Alameda Street. The area is owned by Watson and is currently used as a truck parking and staging area.

No off-site improvements associated with the BP Watson project, such as water supply, natural gas or wastewater pipelines, are currently planned. The BP Watson project will connect to the existing supply pipelines currently located at the facility.

Facility construction is expected to take about 20 months. The projected maximum daily and annual emissions, based on the highest monthly emissions over the entire construction period, are shown in **Air Quality Table 8**.

Air Quality Table 8
Estimated Maximum Construction Emissions (over 20 months)

	NOx	SO_2	CO	PM10	PM2.5
Maximum Daily Emissions (lb/day)	70.7	0.1	48.5	8.3	5.8
Maximum Annual Emissions (tons/project)	10.0	0.01	6.9	1.0	0.8

Source: BP Watson 2009.

The largest percentage of these construction emissions will likely occur during the first phase of project site activity, mostly due to earth moving, grading activities, large equipment operations, underground utility installation, and as building erection occurs. These types of activities require the use of large earth moving equipment, which generate considerable direct combustion emissions, along with fugitive dust emissions. The mechanical construction phase includes the installation of the heavy equipment such as the gas turbine, compressors, pumps, and associated piping. Although not a large fugitive dust generation activity, the use of large cranes to install such equipment generates significantly more direct combustion emissions than other construction equipment. Lastly, the electrical construction phase involves installation of transformers, switching gear, instrumentation, and all wiring; and is a relatively small source of emissions in comparison to the earlier construction activities.

Initial Commissioning Emissions

New power generation facilities must go through an initial firing and commissioning phase before being deemed commercially available to generate power. During this period, emissions may exceed normal operation permitted levels due to numerous startups and shutdowns, periods of low load operation, lack of pollution control equipment during test periods and other testing required before emission control systems are fine-tuned for optimum performance. Alternative and more lenient permit level emissions are used during the commissioning period.

The applicant anticipates six distinct commissioning phases (BP Watson, 2009), with a total of approximately 500 hours of operation per turbine without full emissions controls, and a further 50 hours per turbine of commissioning tuning under full emissions control. **Air Quality Table 9** presents the predicted maximum short term emissions of NOx, CO, and VOC. PM10 and SO_2 emissions are not included here since they are proportional to fuel use, and fuel use (and thus PM10 and SO_2 emissions) during commissioning is equal to or lower than during full load operations.

Air Quality Table 9
Estimated Maximum Initial Commissioning Emissions

	NOx	CO	VOC
Maximum Hourly Emissions (lb/hour)	211	255	5

Source: BP Watson, 2009, SCAQMD 2011.

Operation Emission Controls

NOx Controls

The new CTG equipment includes compressors, a combustor, and a power turbine. Natural gas from the existing Southern California Gas Company (SoCalGas) system is compressed in two new reciprocating compressors to levels required by the Dry Low NOx (DLN) combustors (350 psig at all times). The DLN combustors are expected achieve a NOx concentration of 9 ppm, corrected to 15% O2. The DLN combustors achieve this by premixing fuel and air, prior to entering the combustion chamber, thus providing greater combustion control. The CTG will also combust refinery fuel gas; the quantity dependent on the manufacturer's requirement for gas quality and how much refinery fuel gas, meeting Best Available Control Technology (BACT) standards for sulfur content, can be produced by the refinery fuel gas system.

The facility will use a Selective Catalytic Reduction (SCR) unit to control nitrogen oxides (NOx) emissions. SCR refers to a process that chemically reduces NOx to elemental nitrogen and water vapor by injecting ammonia into the flue gas stream in the presence of a catalyst and excess oxygen. The process is termed selective because the ammonia preferentially reacts with NOx rather than oxygen. The catalyst material most commonly used is titanium dioxide, but materials such as vanadium pentoxide, zeolite, or noble metals are also used. Regardless of the type of catalyst used, efficient conversion of NOx to nitrogen and water vapor requires uniform mixing of ammonia into the exhaust gas stream and a catalyst surface large enough to ensure sufficient time for the reaction to take place.

The SCR will utilize aqueous ammonia from a new dedicated 12,000 gallon aqueous ammonia storage tank. Based on a capacity factor of 95% and an ammonia concentration of 30 wt%, the annual ammonia requirement will be 114,660 gallons/yr. The ammonia injection system will include a two stage ammonia air blower, vaporizer, and an ammonia injection grid to inject ammonia in front of the SCR catalyst. The air pollution control system will control pollutant emissions to the BACT level of 2.0 ppm NOx (1-hour average, corrected to 15% O2).

VOC and CO Controls

VOC and CO emissions will be controlled in the CTG combustor and by the use of an oxidation catalyst. In an oxidation catalyst system, organic compounds and CO chemically react with excess oxygen to form carbon dioxide and water. Unlike the SCR system for reducing NOx, an oxidation catalyst does not require any additional chemicals. The air pollution control system will control pollutant emissions to the following BACT levels (corrected to 15% O2): 2 ppm CO (3-hour average) and 3.0 ppm CO (1-hour average), 2 ppm VOC (1-hour average), and 5 ppm ammonia (1-hour average).

PM10, PM2.5 and SO_2 Controls

The use of pipeline quality natural gas, an inherently clean fuel that contains very little noncombustible solid residue and low sulfur refinery gas (less than 30 ppm total reduced sulfur) will limit the formation of SO_2 and PM10/PM2.5. For safety purposes, natural gas contains a small amount of a sulfur-based scenting compound known as

mercaptan which produces sulfur dioxide emissions when combusted. However, in comparison to other fuels used in modern thermal power plants, such as fuel oil or coal, the amount of sulfur dioxide produced from the combustion of natural gas is very low. The SOx emissions factor for natural gas is calculated from a fuel sulfur content of 0.29 grains H_2S/100 CF and the SOx emissions factor for refinery gas is calculated from the fuel sulfur content of 30 ppm as H_2S. Resulting SOx emission factors are 0.0008 lbs/MMBtu for natural gas and 0.005 lbs/MMBtu for refinery gas.

Like SO_2, the emission levels of PM10 and PM2.5 from natural gas combustion are also very low compared to the combustion of fuel oil or coal. It is assumed in this assessment that the natural gas has a maximum short term sulfur content of 0.75 gr/100scf (grains per 100 cubic feet at standard temperature and pressure), based on Southern California Gas Company rules for pipeline quality natural gas, and an annual average sulfur content of 0.25 gr/100scf. The refinery gas has a maximum short term H2S content of 100 ppm, based on the SCAQMD permit limitations, and a 24-hour average H_2S content of 30 ppm based on a weekly gas sampling requirement at the BP Watson project. The refinery gas input to the turbine in any hour shall not exceed 35% of the total volume of gas combusted.

The Applicant proposes to mitigate PM10 emissions from the new cogeneration unit by limiting PM10 emissions from this unit and the existing four cogeneration units, to 1,243 lbs/day (equal to the limit of 1,244 lbs/day stated in the Energy Commission license, minus 1 lb PM10/day). As a major facility under Title V, PM10 emissions would remain within the Title V permitted limits. PM2.5 emissions would also follow the same mitigation strategy of remaining below the existing emission limit for the facility.

The majority of the emissions from cooling tower cells are pure water vapor; however, a small amount of liquid water can escape and is known as "drift". Cooling tower drift consists of a mist of very small water droplets, which can generate particulate matter that originates from the dissolved solids in the circulating water once the water droplets evaporate. To limit these particulate emissions, cooling towers use drift eliminators to capture these water droplets, and cooling tower operators are required to monitor the total dissolved solids (TDS) in the cooling tower recirculation water to ensure that it does not exceed a SCAQMD-specified value. The applicant intends to use drift eliminators on the cooling tower cells designed to limit drift to 0.001% of the circulating water volume per unit time. Total Dissolved Solids (TDS) in the cooling tower water would be limited to 3,575 ppmw. These limits are included as part of Condition of Certification **AQ-SC10**.

Proposed Operation Emissions

The proposed maximum criteria air pollutant emissions are based entirely on vendor data for the GE 7EA turbine and the data presented in the SCAQMD Final Determination of Compliance (SCAQMD 2011). **Air Quality Table 10** lists the maximum 1-hour emissions from each piece of equipment on the proposed project site assuming worst-case operating assumptions and refinery gas concentration.

Air Quality Table 10
Equipment Maximum Short-Term Emissions Rates
(pounds per hour [lb/hr], except as noted)

Process Description	NOx	SO_2	CO	VOC	PM10	PM2.5
CTG Cold Startup (180 minute startup, **lb/event**)	211.2	20.5	300.7	10.0	30.0	30.0
CTG Warm Startup (60 minute startup, **lb/event**)	21.3	3.2	58.7	2.6	7.2	7.2
CTG Full Load						
CTG Shutdown (60 minute shutdown, **lb/event**)	12.9	6.0	57.6	4.1	9.3	9.3
Cooling Towers (2 cells)	---	---	---	---	0.33	0.33

Source: BP Watson 2009, SCAQMD 2011.

Based on these emissions rates, the maximum possible 1-hour emissions from the project are shown in **Air Quality Table 11**. The estimated emissions for the CTG depend on the operational assumptions. For example, the NOx and VOC emissions from the CTG are a maximum during startup and operate at full load. Contrast that with the maximum for CO emissions from the CTG, which occurs during shutdown. Finally, the PM10 and SOx emissions from the CTG are at a maximum when the CTG is at full load.

Air Quality Table 11
Facility Maximum 1-hour Emissions
(pounds per hour [lb/hr])

Process Description	NOx	SO_2	CO	VOC	PM10	PM2.5
CTG/HRSG	175.0	6.7	210.0	4.2	9.9	9.9
Cooling Tower	---	---	---	---	0.3	0.3
Total Maximum 1-hour Emissions	175.0	6.7	210.0	4.2	10.2	10.2

Source: BP Watson 2009, SCAQMD 2011.

In general, higher emissions of NOx, VOC and CO will occur during the startup and shutdown of a large CTG than during operation because the turbine combustors and the SCR system are designed for maximum efficiency during full load, steady state operation. During startup, combustion temperatures and pressures change rapidly, resulting in less efficient combustion and higher emissions. Also, flue gas emission controls (the catalysts discussed above), operate most efficiently when a turbine operates at or near full load temperatures.

The maximum daily emission rates for NOx and CO were conservatively estimated as two cold startups (initial cold start failure then a restart for a total of six hours) plus 18 hours of full load operation. The maximum daily emission rates for VOC, PM10 and SO_2 were based instead on 24 hours of full load operation, since these emissions are proportional to fuel use. The total project maximum daily emissions are then conservatively estimated as the sum of the emissions from the CTG/HRSG and the cooling tower. These estimates are presented in **Air Quality Table 12** below.

The expected maximum annual emissions for the total facility are summarized in **Air Quality Table 13**. The calculations assume 8,760 hours per year and 35% refinery gas utilization. The facility annual emissions further assume 8760 hours per year the cooling tower.

Air Quality Table 12
Project Maximum Daily Emissions
(pounds per day [lb/day])

Process Description	NOx	SO_2	CO	VOC	PM10	PM2.5
CTG/HRSG [a,b]	637.4	129.7	732.2	99.8	238.3	238.3
Cooling Tower	---	---	---	---	7.9	7.9
Total Maximum Daily Emissions	637.4	129.7	732.2	99.8	246.2	246.2

[a] The worst case day for NOx and CO is defined as two cold startups (initial cold start failure then a restart for a total of six hours) plus 18 hours of full load operation.
[b] The worst case day for VOC, SO2, and PM10 is based on 24 hours of operation at full load.

Source: BP Watson 2009, SCAQMD 2011.

Air Quality Table 13
Project Maximum Annual Emissions
(tons per year [tpy])

Process Description	NOx	SO_2	CO	VOC	PM10	PM2.5
CTG/HRSG (tpy)[a]	39.9	19.9	37.8	18.2	43.5	43.5
Cooling Towers (tpy)[b]	---	---	---	---	1.45	1.45
Total Maximum Annual Emissions (tpy)	39.9	19.9	37.8	18.2	45.0	45.0

[a] Assumes CTG all Units: 8,695 hours of full load operation, 24 startups and 29 shutdowns.
[b] Assumes the cooling tower operates at full load for 8760 hours per year

Source: BP Watson 2009, SCAQMD 2011.

Ammonia Emissions

To control NOx emissions from the combustion turbines, ammonia is injected into the flue gas stream as part of the SCR system. In the presence of the catalyst, the ammonia and NOx react to form harmless elemental nitrogen and water vapor. However, not all of the ammonia reacts with the flue gases to reduce NOx; a portion of the ammonia passes through the SCR and is emitted unaltered from the stacks. These ammonia emissions are known as ammonia slip. It should be noted that a maximum permitted ammonia slip rate only occurs after significant degradation of the SCR catalyst, usually five years or more after commencing operations. At that point, the SCR catalysts are removed and replaced with new catalysts. During the majority of the operational life of the SCR system, actual ammonia slip will be at 10 to 50% of the permitted limit. The applicant proposes an ammonia emission limit of five ppm at 15% oxygen averaged over one hour. This is consistent with emissions levels used in other projects with heat recovery steam generators and is agreed to by staff.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Energy Commission staff assesses four kinds of primary and secondary impacts: construction, operation, closure and decommissioning, and cumulative. Construction impacts result from the onsite and offsite emissions occurring during site preparation and construction of the proposed project. Operational impacts result from the emissions of the proposed project during operation, which includes all applicable new onsite auxiliary equipment emissions, and the offsite employee and material delivery trip emissions. Closure and decommissioning impacts occur from the onsite and offsite emissions that would result from dismantling the facility and restoring the site. Cumulative impacts result from the proposed project's incremental effect, together with other closely related past, present and reasonably foreseeable future projects whose impacts may compound or increase the incremental effect of the proposed project. (Pub. Resources Code § 21083; Cal. Code Regs., tit. 14, §§ 15064(h), 15065(c), 15130, and15355.)

Method and threshold for determining significance

Energy Commission staff evaluates potential impacts per Appendix G of the CEQA Guidelines (CCR 2006) as appropriate for the project. A CEQA significant adverse impact is determined if potentially significant CEQA impacts cannot be mitigated appropriately through the adoption of Conditions of Certification. Specifically, Energy Commission staff uses health-based ambient air quality standards (AAQS) established by the ARB and the U.S.EPA as a basis for determining whether a project's emissions would cause a significant adverse impact under CEQA. The standards are set at levels that include a margin of safety and are designed to adequately protect the health of all members of the public, including those most sensitive to adverse air quality impacts such as the aged, people with existing illnesses, children, and infants. Staff evaluates the potential for significant adverse air quality impacts by assessing whether the project's emissions of criteria pollutants and their precursors (NOx, VOC, PM10 and SO2) could create a new AAQS exceedance (emission concentrations above the standard), or substantially contributes to an existing AAQS exceedance.

Staff evaluates both direct and cumulative impacts. Staff would find that a project or activity would create a direct adverse impact when it causes an exceedance of an AAQS. Staff would find that a project's effects are cumulatively considerable when the project emissions in conjunction with ambient background, or in conjunction with reasonably foreseeable future projects, substantially contribute to ongoing exceedances of an AAQS. Factors considered in determining whether contributions to ongoing exceedances are substantial include:

1. the duration of the activity causing adverse air quality impacts;

2. the magnitude of the project emissions, and their contribution to the air basin's emission inventory and future emission budgets established to maintain or attain compliance with AAQS;

3. the location of the project site, i.e., whether it is located in an area with generally good air quality where non-attainment of any ambient air quality standard is primarily or solely due to pollutant transport from other air basins;

4. the meteorological conditions and timing of the project impacts, i.e., do the project's maximum modeled pollutant impacts occur when ambient concentrations are high (such as during high wind periods, or seasonally);

5. the modeling methods, and how refined or conservative the impact analysis modeling methods and assumptions were and how that may affect the determined adverse impacts;

6. the project site location and nearest receptor locations; and whether the identified adverse impacts would also occur at the maximum impacted receptor location; and,

7. potential for future cumulative impacts; and whether appropriate mitigation is being recommended to address the potential for impacts associated with likely future projects.

Direct/Indirect Impacts and Mitigation

While the emissions are the actual mass of pollutants emitted from the project, the impacts are the concentration of pollutants from the project that reach ground level. When emissions are expelled at a high temperature and velocity through the relatively tall stack, the pollutants will be significantly diluted by the time they reach ground level. The emissions from the proposed project are analyzed through the use of air dispersion models to determine the probable impacts at ground level.

Air dispersion models provide a means of predicting the location and ground level magnitude of the impacts of a new emissions source. These models consist of a complex series of mathematical equations, which are repeatedly evaluated by a computer for many different sets of ambient conditions and input parameters. The model results are often described as a maximum theoretical concentration of pollutant in the air to which people could be exposed, or units of mass per volume of air, such as micrograms per cubic meter ($\mu g/m^3$).

In general, the input parameters for the modeling include stack information (exhaust flow rate, temperature, and stack dimensions), specific turbine emission data, and meteorological data, such as wind speed, atmospheric conditions, and site elevation. For this project, the meteorological data used as inputs to the model included surface wind hourly wind speeds and directions measured at Long Beach Daugherty Field, upper air radiosonde data from Miramar Naval Air Station north of San Diego, and background criteria pollutant measurements from SCAQMD-maintained North Long Beach ambient monitoring station in the vicinity of the project site (BP Watson 2009). A receptor grid, or points where modeled concentrations will be calculated, was also placed around the facility, starting at the property boundary/fence line, and extending several miles in all directions.

The applicant used the U.S. EPA-approved American Meteorological Society/Environment Protection Agency Regulatory Model Improvement Committee Model (AERMOD), as both a screening and refined model to estimate the direct impacts of the project's NOx, PM10, CO, and SO_2 emissions resulting from project construction and operation. A description of the modeling analysis and its results are provided in the

Application for Certification (AFC) (BP Watson 2009). AERMOD is a generally accepted model for this type of project, and the meteorological input data is sufficient.

Staff added the applicant's modeled impacts to the available highest ambient background concentrations recorded during the previous three years from nearby monitoring stations. Staff then compared the results with the ambient air quality standards for each respective air contaminant to determine whether the project's emission impacts would cause a new violation of the ambient air quality standards or contribute substantially to an existing violation.

Construction Impacts and Mitigation

Construction Impact Analysis

The construction air quality impact analyses prepared by the applicant considered both fugitive dust generated from the construction activity and combustion emissions produced by construction equipment. As a conservative assumption, this includes the following major sources (BP Watson 2009):

- Dust entrained during site preparation and finish grading;
- Dust entrained during onsite travel on paved and unpaved surfaces;
- Dust entrained during aggregate and soil loading and unloading operations;
- Dust caused by wind erosion of areas disturbed during construction;
- Exhaust from diesel construction equipment used for site preparation, grading, excavation, and construction;
- Exhaust from water trucks used for onsite paved and unpaved road fugitive dust control;
- Exhaust from diesel powered welding machines, electric generator, air compressors, and water pumps;
- Exhaust from pickup trucks and diesel trucks used to transport workers and materials around the construction site;
- Exhaust from diesel trucks used to deliver concrete, fuel, and construction supplies to the site; and
- Exhaust from automobiles used by workers to commute to the construction site.

The applicant assessed the maximum 24-hour impacts using the emission rates for the month of maximum activity, and assessed the annual impacts using the average emissions for the entire construction period. They added the results of this modeling effort (shown in **Air Quality Table 14** below) to the assumed maximum background values, and compared the combined values to the most restrictive AAQS.

Air Quality Table 14
Maximum Potential Construction Impacts before Mitigation (μg/m^3)

Pollutant	Averaging Time	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
NO_2	1 hour	90	264	354	339	**105%**
	Annual	1.5	54.1	55.6	57	98%
CO	1 hour	62	9,600	9662	23,000	42%
	8 hour	21	7,315	7336	10,000	73%
PM10	24 hour	4.5	131	135.5	50	**271%**
	Annual	0.39	45	45.39	20	**227%**
PM2.5	24 hour	1.5	48.5	50	35	**143%**
	Annual	0.22	17.5	17.72	12	**148%**
SO_2	1 hour	0.13	107	107.13	655	16%
	3-hour	0.08	107	107.08	1,300	8%
	24 hour	0.02	28.6	28.62	105	27%
	Annual	0.002	7	7.002	80	9%
Includes emissions due to site grading, laydown, building,						

Source: BP Watson 2009.

As the modeling results in **Air Quality Table 14** show, the project's construction emissions will not cause a new violation of the CO and SO_2 ambient air quality standards, and thus staff does not find these impacts to be significant. The applicant modeled a combination of Tier 2 and Tier 3 construction vehicle emissions and the results, as shown in **Air Quality Table 14**, indicate that construction emissions would have the potential to exceed the state 1-hour NO_2 standard if emissions occurred during maximum background conditions; however, staff determined that the impacts would be less than the standard if only Tier 3 vehicles or vehicles with emissions equivalent to Tier 3 were used. Staff is calling for of Condition of Certification **AQ-SC5**, which would require Tier 3 California Emission Standards for Off-Road Compression-Ignition Engines to reduce potential impacts to less than the state 1-hour NO_2 standard. Staff believes that the particulate emissions from the construction of the project create a potentially significant impact because they will contribute to existing violations of the annual and 24-hour average PM10 and the 24-hour federal PM2.5 AAQS. Those emissions can and should be mitigated to a level of insignificance. The NO_2 results in **Air Quality Table 14** are not in the form required to evaluate compliance with the new federal 1-hour NO_2 standard. The new federal short-term NO_2 standard is not evaluated because federal guidance has indicated that short-term construction-related activities are not applicable to the three-year average mandated by the standard.

Construction Mitigation

Applicant's Proposed Mitigation

The applicant proposes a number of mitigation and emissions control measures for use

during the construction of the project. The applicant specifically proposes the following measures:

- The Applicant will have an on-site construction mitigation manager who will be responsible for the implementation and compliance of the construction mitigation program. The documentation of the ongoing implementation and compliance with the proposed construction mitigations will be provided on a periodic basis.
- All unpaved roads and disturbed areas in the BP Watson project and Construction Laydown and Parking Area will be watered as frequently as necessary to control fugitive dust. The frequency of watering will be on a minimum schedule of every two hours during the daily construction activity period. Watering may be reduced or eliminated during periods of precipitation.
- On-site vehicle speeds will be limited to 5 mph on unpaved areas within the project construction site.
- The construction site entrance will be posted with visible speed limit signs.
- All construction equipment vehicle tires will be inspected and cleaned as necessary to be free of dirt prior to leaving the construction site via paved roadways.
- Gravel ramps will be provided at the tire cleaning area.
- All unpaved exits from the construction site will be graveled or treated to reduce track-out to public roadways.
- All construction vehicles will enter the construction site through the treated entrance roadways, unless an alternative route has been provided.
- Construction areas adjacent to any paved roadway will be provided with sandbags or other similar measures as specified in the construction SWPPP to prevent runoff to roadways.
- All paved roads within the construction site will be cleaned on a periodic basis (or less during periods of precipitation), to prevent the accumulation of dirt and debris.
- The first 500 feet of any public roadway exiting the construction site will be cleaned on a periodic basis (or less during periods of precipitation), using wet sweepers or air-filtered dry vacuum sweepers, when construction activity occurs or on any day when dirt or runoff from the construction site is visible on the public roadways.
- Any soil storage piles and/or disturbed areas that remain inactive for longer than 10 days will be covered, or shall be treated with appropriate dust suppressant compounds.
- All vehicles that are used to transport solid bulk material on public roadways and that have the potential to cause visible emissions will be covered, or the materials shall be sufficiently wetted and loaded onto the trucks in a manner to minimize fugitive dust emissions. A minimum freeboard height of 2 feet will be required on all bulk materials transport.
- Wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) will be used on all construction areas that may be disturbed. Any windbreaks installed to comply with this condition will remain in place until the soil is stabilized or permanently covered with vegetation.

- Disturbed areas, which are presently vegetated, will be re-vegetated as soon as practical.

To mitigate exhaust emissions from construction equipment, the Applicant is proposing the following:

- The Applicant will work with the general contractor to utilize to the extent feasible, Environmental Protection Agency (EPA)/Air Resources Board Tier 2/Tier 3 engine compliant equipment for equipment over 100 horsepower.
- Ensure periodic maintenance and inspections per the manufacturers specifications.
- Reduce idling time through equipment and construction scheduling.
- Use California low sulfur diesel fuels (<=15 ppm_w Sulfur).

Staff Proposed Mitigation

Staff agrees with most of the applicant's proposed mitigation measures. However, because of the predicted significant contribution to both the short- and long-term PM10 and PM2.5 problems, staff believes some additional construction mitigation measures are necessary. These additional measures are detailed below.

Staff has determined that the use of oxidizing soot filters is a viable emissions control technology for all heavy diesel powered construction equipment that does not use an ARB certified low emission diesel engine and ultra-low sulfur content diesel fuel. In addition, staff proposes that prior to the commencement of construction, the applicant provide an Air Quality Construction Mitigation Plan (AQCMP) that specifically identifies the mitigation measures that the applicant will employ to limit air quality impacts during construction. Staff calls for Tier 3 diesel engines for all equipment of 50 horsepower or above, rather than the 100 horsepower cut-off proposed by BP Watson. Staff includes proposed staff Conditions of Certification **AQ-SC1** through **AQ-SC5** below to implement the applicant's proposed mitigation measures and staff's additional requirements. These conditions are consistent with conditions of certification adopted in previous licensing cases similar to the BP Watson project. If the proposed project complies with these conditions, it is staff's opinion that the potential for significant air quality impact from the construction of the project is less than significant. Staff recommends that the implementation of all construction mitigation measures be managed by a single person of responsibility (and their delegates), as required in Condition of Certification **AQ-SC1**, to ensure adequate implementation of all mitigation measures.

Compliance with **AQ-SC5** would also result in substantial reductions in construction-related NOx emissions. The requirement for Tier 3 in **AQ-SC5** would substantially reduce NOx emissions over the Tier 2/3 engine combinations that formed the basis for the construction equipment emission calculations. The resulting reductions would result in peak 1-hour NO_2 impacts of 320 $\mu g/m^3$ (modeled impact plus the maximum background) that would be below the AAQS, while minimizing contributions to annual impacts.

Operation Impacts and Mitigation

While the construction and commissioning impacts are both relatively short lived, the operation impacts from the project will continue throughout the life of the facility. The

operation impacts are thus subject to a more refined level of analysis. The following sections discuss the air quality impacts of project operation during normal full load conditions, including startup and shutdown events, the commissioning phase operations, and fumigation meteorological conditions.

Operation and Startup Impact Analysis

The applicant provided a refined modeling analysis (BP Watson 2009), using the AERMOD model to quantify the potential impacts of the project during both full load operation and startup conditions. The worst case (maximum) results of this modeling analysis are shown in **Air Quality Table 15**.

Air Quality Table 15
Refined Modeling Maximum Impacts During Startup and Operation (μg/m^3)

Pollutant	Averaging Time	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
NO_2	1 hour	29	264	293	339	87%
	1-hour Federal	29	139	168	188	**89%**
	Annual	0.1	54.1	54.2	57	95%
CO	1 hour	31.1	9,600	9,631	23,000	42%
	8 hour	23.4	7,315	7,338	10,000	73%
PM10	24 hour	3.9	131	134.9	50	**270%**
	Annual	0.2	45	45.2	20	**226%**
PM2.5	24 hour	1.3	48.5	49.8	35	**142%**
	Annual	0.2	17.5	17.7	12	**148%**
SO_2	1 hour	0.9	107	107.9	655	16%
	3 hour	0.7	107	107.7	1,300	8%
	24 hour	0.2	28.6	28.8	105	27%
	Annual	0.1	7	0	80	0%

[a] modeled 1-hour average impacts during startup event
[b] Modeled annual operational assumptions for all emitting devices (see AIR QUALITY Table 11).

Source: BP Watson 2009

Startup impacts (NOx and CO) are much larger than full load impacts not only because the emissions are greater, but also because the flue gas stream is at a lower velocity and temperature. This reduced emissions velocity means the plume will level off at a lower height and thus have less time to dilute before reaching the ground. Note that the values presented are very conservative, based on worst case startup emission estimates in the form of vendor-guaranteed emissions rates from the turbine manufacturer. Actual startup events are likely to generate significantly fewer emissions and impacts. This analysis is additionally conservative with regard to the assumed background measurements. The assumption is that the highest background measurements from the last four years coincide (in both location and timing) with the maximum project emission impacts. Because such a high background level is unlikely to occur at the same time and location as the maximum impacts from the project, these modeled conditions are considered worst case, conservative, and not likely to occur.

The modeled impact values in **Air Quality Table 15** show that during worst case startup and full load operations, the facility will potentially contribute to the existing PM10 violations. Even without the project's contribution, background values show that violations exceed 200% of the ambient air quality standard. Staff believes that any increases constitute a significant impact if not mitigated. Staff uses the federal and state ambient air quality standards, which are health-based standards, as the indication of possible adverse ambient air quality impacts. Since the project PM10/PM2.5 emission impacts will contribute to an existing exceedance of the PM10 and PM2.5 state and federal ambient air quality standards, staff presumes that these impacts may also contribute to existing human health impacts (generally in the form of respiratory impacts). Thus, staff considers the project PM10/PM2.5 emission impacts to be significant if left unmitigated.

Since the project's impacts alone do not cause a violation of any NO_2, CO, or SO_2 ambient air quality standards under such conservative assumptions, staff concluded that the project impacts for those pollutants are insignificant. Although the direct NO_2 impacts from the BP Watson project do not cause a violation of the NO_2 ambient air quality standard, all NO_2 emissions from the facility will still need to be offset with RECLAIM Trading Credits (RTCs) to maintain district wide progress toward attainment with the ozone ambient air quality standards because NO_2 is a precursor emission to ozone formation (see Conditions of Certification **AQ-2** and **AQ-15**). Similarly, the direct SO_2 impacts from the BP Watson project, which do not cause a violation of the SO_2 ambient air quality standards, will need to be offset with RTCs to maintain district-wide progress toward attainment with the PM10 ambient air quality standards because SO_2 is a precursor pollutant to secondary PM10/PM2.5 formation. Please see the "Operations Mitigation" section below for a detailed discussion of the proposed mitigation.

Fumigation Modeling Impact Analysis

Surface air is usually stable during the early morning hours before sunrise. During such meteorological conditions, emissions from elevated stacks rise through this stable layer and are dispersed and diluted. When the sun first rises, the air at ground level is heated, resulting in turbulent vertical mixing (both rising and sinking) of air within a few hundred feet of the ground. Emissions from a stack that enter this turbulent layer of air will also be vertically mixed, bringing some of those emissions down to ground level before significant dispersion occurs and possibly causing abnormally high short term impacts. As the sun continues to heat the ground, this vertical mixing layer becomes thicker over time, and the emissions plume becomes better dispersed. The early morning air pollution event, called fumigation, usually lasts approximately 30 to 60 minutes.

The applicant used the U.S. EPA approved SCREEN3 model (version 96043) for the calculation of the project's fumigation impacts, without a shoreline assumption, since the proposed facility is a significant distance from the nearest shoreline. **Air Quality Table 16** shows the highest modeled fumigation impacts in comparison with the one-hour NO_2, SO_2 and CO standards. Since fumigation impacts will not typically occur for more than a one-hour period, only the impacts on the one-hour standards are shown. The results of the modeling analysis show that fumigation impacts will not violate any of the one-hour standards. Therefore, staff finds the potential ambient air quality fumigation impacts to be less than significant.

Air Quality Table 16
CTG/HRSG Fumigation Modeling Maximum 1 hour Impacts (µg/m^3)

Pollutant	Modeled Impact from 1 Unit	Background	Total Impact	Limiting Standard	Percent of Standard
NO_2 (State)	6.9	264	271	339	80%
NO_2 (Federal)	6.9	139	146	188	78%
CO	8.4	9,600	9,608	23,000	42%
SO_2	3.9	107	111	655	17%

Commissioning Phase Modeling Impact Analysis

The initial commissioning of a power plant refers to the time frame between completion of construction and the consistent production of electricity for sale on the market. Normal operating emission limits usually do not apply during initial commissioning procedures. The BP Watson project will go through several tests during initial commissioning. During the first set of tests, post-combustion controls will not be operational (i.e., the SCR and oxidation catalyst).

Initial commissioning starts with a Full-Speed, No-Load test. This test runs the turbine at approximately 20% of its maximum heat input rate. Components tested include the ignition system, synchronization with the electric generator, and the turbine-overspeed safety system. Part Load testing runs the turbines at approximately 60% of the maximum heat input rating. During this test, the turbine will be tuned. Full Load testing runs the turbines to their maximum heat input rate. This testing entails further tuning of the turbine. Full Load with partial SCR testing runs the turbines at 100% of their maximum heat input rate and operates the SCR ammonia injection grid for the first time at less than maximum injection rate. Finally, Full Load with full SCR testing runs the turbines at their maximum heat input rate and operates the SCR ammonia inject grid at its full capacity. It is during this test that the SCR system will be completely tuned and operated at design levels (i.e., NOx control at 2.0 ppm).

There is reasonable experience to draw from regarding the initial commissioning of the GE 7EA turbines. The applicant is estimating that it will need approximately 550 hours of actual turbine operation for commissioning purposes. The applicant estimates a maximum NOx emission rate of 211 lbs/hr during the commissioning phase. The maximum CO emission rate will be 255 lbs/hr.

The applicant used the U.S. EPA approved AERMOD model for the calculation of commissioning impacts. **Air Quality Table 17** shows the highest modeled impacts in comparison with the one-hour NO_2 and CO standards and the 8-hour CO standard. The modeled NOx and CO emission rates presented show that there is no reasonable expectation that the emissions from initial commissioning will cause or contribute to an exceedance of the limiting ambient air quality standards.

Air Quality Table 17
CTG Commissioning Modeling
Maximum 1 hour Impacts (µg/m^3)

Pollutant	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
NO_2 State	36.6	264	301	339	89%
NO_2 Federal	36.6	139	176	188	94%
CO 1-HOUR	37.3	9,600	9,637	23,000	42%
CO 8-HOUR	27.8	7,315	7,343	10,000	73%

Source: BP Watson 2009.

Secondary Pollutant Impacts

The project's gaseous emissions of NOx, SO_2, VOC and ammonia can contribute to the formation of secondary pollutants: ozone and PM10/PM2.5. There are air dispersion models that can be used to quantify ozone impacts, but they are used for regional planning efforts where hundreds or even thousands of sources are input into the model to determine ozone impacts. There are no regulatory agency models approved for assessing single source ozone impacts. However, because of the known relationship of NOx and VOC emissions to ozone formation, the emissions of NOx and VOC from the BP Watson project do have the potential (if left unmitigated) to contribute to higher ozone levels in the region.

These impacts would be significant because they would contribute to ongoing violations of the state and federal ozone ambient air quality standards.

Secondary PM10 formation, which is assumed to actually consist of 100% PM2.5 for this project assessment, is the process of conversion from gaseous reactants to particulate products. The process of gas-to-particulate conversion, which occurs downwind from the point of emission, is complex and depends on many factors, including local humidity and the presence of air pollutants. The basic process assumes that the SOx and NOx emissions are converted into sulfuric acid and nitric acid first, and then react with ambient ammonia to form sulfate and nitrate. The sulfuric acid reacts with ammonia much faster than nitric acid does and converts completely to a particulate form. Nitric acid reacts with ammonia to form both a particulate and a gas phase of ammonium nitrate. The particulate phase will tend to fall out, however the gas phase can revert back to ammonia and nitric acid. Thus, under the right conditions, ammonium nitrate and nitric acid establish a balance of concentrations in the ambient air. There are two conditions that are of interest, described as "ammonia rich" and "ammonia poor." In the case of the "ammonia rich" condition, there is more than enough ammonia in the atmosphere to react with all the sulfuric acid and to establish a nitric acid-ammonium nitrate balance. Further ammonia emissions in this case will not necessarily lead to increases in ambient PM2.5 concentrations. In the case of an "ammonia poor" environment, there is insufficient ammonia to establish a nitric acid-ammonium nitrate balance, and thus additional ammonia will tend to increase PM2.5 concentrations.

Studies of ambient air quality in the South Coast Air Basin indicate that the entire Basin is likely to be ammonia rich. The ammonia sources are primarily driven by ammonia emissions from livestock, soil (natural emissions and agricultural additives), motor

vehicles and domestic emissions. These sources exist at various intensities across the basin, giving rise to the transport of ammonia (as ammonium, NH_4, which is more stable than ammonia, NH_3) throughout the basin. Since the ambient air concentrations are likely ammonia rich, further ammonia emissions from the BP Watson project might not lead to further formation of nitric and sulfuric acid, and ultimately conversion to ammonium nitrate or sulfate particulate. While there may be some conversion from the ammonia emitted from the project, the conversion rate might also be zero. Furthermore, there is currently no regulatory model that can predict the conversion rate. Therefore, staff is not able to reasonably estimate what impacts, if any, there will be from the project's ammonia emission.

Additionally, the actual ammonia emissions from the BP Watson project will typically be approximately 10 to 50% of the ammonia limit being imposed (5 ppm at 15% O_2 averaged over one hour). The point at which the project begins to emit at greater than 50% of the limit is typically the indicator to the operator that the SCR catalyst material needs to be replaced. Once this major overhaul is completed the SCR performance is typically returned to near new levels (approximately 1 ppm or better). It is in the best interest of the project owner to perform these overhauls as required so that the cost of ammonia stays low for the project. Thus for the vast majority of the project life, the ammonia emissions are expected to be below 2 ppm. An emission of any type of pollutant at this level has a very low potential to cause a significant impact.

Staff finds that it is not reasonably possible to estimate the impacts from the BP Watson project emissions of ammonia, but that these emissions are small and well controlled so that it is reasonable to assume that they are not likely to cause or contribute to an exceedance of the PM10 or PM2.5 ambient air quality standards or that at least it is reasonably speculative. Thus, staff concludes that the BP Watson project ammonia emissions do not have the potential to cause a significant impact on the ambient air quality.

The emissions of NOx and SOx from the BP Watson project do have the potential (if left unmitigated) to contribute to higher PM2.5 levels in the region. These impacts would be significant because they would contribute to ongoing violations of the state and federal PM2.5 ambient air quality standards. The mitigation of the project NOx and SOx emissions is discussed in the Operations Mitigation section below.

Visibility Impacts

Modeling of plume visibility, as described under SCAQMD Rule 1303(b)(5)(C) is not required because the project does not result in an emissions increase of 15 tons PM10/year or 40 tons NOx/year. Further, the site location is not within the prescribed distances (28 to 32 km) of a Federal Class I Area (note: minimum distance of the BP Watson project to any of the listed Federal Class I Areas is 53 km).

Operations Mitigation

Applicant's Proposed Mitigation

The BP Watson project's air pollutant emissions impacts will be reduced by using emission control equipment on the project and by providing emission offsets. To reduce

NOx emissions, the applicant proposes to use dry, low-NOx combustors and an SCR system with an ammonia injection grid.

Cooling Towers

To reduce the PM10 emissions from the cooling towers, the applicant has committed to using wet, mechanical draft cooling towers with a drift eliminator rated at 0.001% and the cooling tower's water total dissolved solids will be limited to 3,575 ppmw. The SCAQMD does not address cooling towers in its permits to construct or operate. Thus staff proposes that the cooling tower compliance be monitored through Conditions of Certification **AQ-SC9** and **AQ-SC10,** and that mitigation measures be implemented for avoiding chronic exceedances.

Combustion Turbine

To reduce CO emissions, the applicant proposes to use a combination of good combustion and maintenance practices, along with an oxidizing catalyst. The use of a clean-burning fuel (natural gas) and the efficient combustion process of the CTGs will limit VOC and PM10 emissions. The use of natural gas, low sulfur refinery gas, or a blend of natural gas and refinery gas will limit SO_2 emissions.

Flue Gas Controls

To further reduce the emissions from the combustion turbines before they are exhausted into the atmosphere, flue gas controls, primarily catalyst systems, will be installed for the GE 7EA turbine. The applicant is proposing two catalyst systems, an SCR system to reduce NOx, and an oxidizing system to reduce CO and VOC.

Selective Catalytic Reduction (SCR)

SCR refers to a process that chemically reduces NOx by injecting ammonia into the flue gas stream over a catalyst in the presence of oxygen.

The process is termed selective because the ammonia reducing agent preferentially reacts with NOx rather than oxygen, producing inert nitrogen and water vapor. The performance and effectiveness of SCR systems are related to operating temperatures, which may vary with catalyst designs. Flue gas temperatures from a combustion turbine typically range from 950° F to $1,100^{o}$F.

Catalysts generally operate between 600 degrees to 750 degrees F (CARB 1992), and are normally placed inside the exhaust where the flue gas temperature has partially cooled. At temperatures lower than 600 degrees F, the ammonia reaction rate may start to decline, resulting in increasing ammonia emissions, called "ammonia slip." At temperatures above about 800 degrees F, depending on the type of material used in the catalyst, damage to some catalysts can occur. The catalyst material most commonly used is titanium dioxide, but materials such as vanadium pentoxide, zeolite, or a noble metal are also used. These newer catalysts (versus the older alumina-based catalysts) are resistant to fuel sulfur fouling at temperatures below 770 degrees F (EPRI 1990).

Regardless of the type of catalyst used, efficient conversion of NOx to nitrogen and water vapor requires uniform mixing of ammonia into the exhaust gas stream. Also, the

catalyst surface has to be large enough to ensure sufficient time for the reaction to take place.

Oxidizing Catalyst

To reduce the turbine CO and VOC emissions, the applicant proposes to install an oxidizing catalyst, which is similar in concept to catalytic converters used in automobiles. The catalyst is usually coated with a noble metal, such as platinum, which will oxidize unburned hydrocarbons and CO to water vapor and carbon dioxide (CO_2). The catalyst is proposed to limit the CO concentrations exiting the exhaust stack to two ppm, corrected to 15% excess oxygen and averaged over three-hours.

Emission Offsets

The applicant has or will secure sufficient offsets to satisfy SCAQMD Rule 1303 (which requires Emission Reduction Credits (ERCs)) and SCAQMD Regulation XX (which requires participation in the RECLAIM program), as well as to mitigate the project impacts under CEQA. **Air Quality Table 18** summarizes the applicant's proposals to offset or otherwise mitigate the BP Watson project emission impacts.

Air Quality Table 18
Operational Emission Offsets and Mitigation Proposed by the Applicant

Pollutant	Amount of Offsets Required	Offset or Other Mitigation
VOC	187 lb/day[a]	ERCs – supplied by BP Watson.
NOx	Commissioning Year RTCs – 99,850 lbs/year Other Years RTCs – 79,800 lbs/year	RTCs – supplied by BP Watson.
SOx	Commissioning Year – 31,050 lbs/year Other Years – 39,770 lbs/year	RTCs – supplied by BP Watson.
CO	None[b]	
PM10	295	Rule 1304 Exemption – Concurrent Facility Modification
PM2.5[c]	295	Rule 1304 Exemption – Concurrent Facility Modification. Facility emissions below Rule 1325 offset threshold.

[a] Includes 1.2-to-1.0 offset ratio, as per Rule 1303(b)(2)(A.)

[b] SoCAB is classified as Attainment for federal and state ambient air quality standards for CO as shown in Air Quality Table 5.) Therefore, no CO offsets are required. The worst case maximum yearly CO emission of 33 tons/year is below the 250 ton/year threshold for Prevention of Significant Deterioration (PSD) as specified by Rule 1701(b)(2). Therefore, BP Watson does not require a PSD permit.

[c] Assuming all (100%) of PM10 emissions are PM2.5.

The proposed criteria pollutant mitigation strategy for the BP Watson project is summarized below.

- NOx and SOx mitigation, in the form of Regional Clean Air Initiatives Market (RECLAIM Trading Credits [RTCs]) will be achieved via the RECLAIM program either through existing holdings or through purchase.
- VOC mitigation will be achieved by obtaining sufficient purchased Emission Reduction Credits (ERCs) to fully satisfy the Regulation XIII offset requirements.

- PM10 emissions from the new cogeneration unit will be addressed through adoption of an emissions limit for all five cogeneration units, which is equal to the current limit for the existing four units, minus 1 lb PM10/day. The existing CEC license limits PM10 emissions from the four existing cogeneration units to 1244 lbs/day; hence the new limit will be 1243 lbs PM10/day for all five cogeneration units. This is granted since recent source testing indicates that the actual PM10 emissions from the four existing cogeneration units are 436 lbs/day (year 2007 test) and 153 lbs/day (year 2008 test). Thus, the potential emissions of 238 lbs PM10/day from the fifth cogeneration unit should not result in exceedance of the 1,243 lbs/day limit. Proposed SCAQMD condition **AQ-1** will require the facility to calculate PM10 emissions from all five cogeneration units, based on emissions factors for natural gas, butane and refinery gas firing (note: cogeneration units 1 through 4 are permitted to fire butane, while the fifth cogeneration unit is not permitted to fire butane). For this project, an exemption from emissions offsets under District Rule 1304, due to Concurrent Facility Modification, is claimed for PM10 emissions.
- Following the assessment procedures defined in Rule 1325, and recent source test data from the Inland Empire Energy Center using U.S. EPA Test Methods 201A and 202 (Delta 2010), PM2.5 emissions from the existing BP Watson Cogeneration units were estimated to be 15.1 tons/year, which is well below the threshold of 100 tons/year specified in Rule 1325. Total PM2.5 emissions for the facility with the proposed project would be 16.5 tons/year. Therefore, PM2.5 offsets would not be required for the proposed project. Staff determined this result because the SCAQMD's DOC was completed before the rule went into effect in June 2011.
- CO offsets are not required since the air basin is in attainment.

The Regional Clean Air Incentives Market (RECLAIM) is designed to allow facilities flexibility in achieving emission reduction requirements for NOx and SOx through controls, equipment modifications, reformulated products, operational changes, shutdowns, other reasonable mitigation measures or the purchase of excess emission reduction credits. The RECLAIM program established an initial allocation (beginning in 1994) and an ending allocation (which was required to be attained by the year 2003) for each facility within the program (Rule 2002). Additional adjustments to the ending allocation were adopted in 2005. Under the program, each facility then reduces its allocation annually on a straight line from the initial to the ending allocation. The RECLAIM program supersedes other specified district rules, where there are conflicts. As a result, the RECLAIM program has its own rules for permitting, reporting, monitoring (including continuous emission monitoring (CEM)), record keeping, variances, breakdowns and the New Source Review program, which incorporates BACT requirements (Rules 2004, 2005, 2006 and 2012). RECLAIM also has its own banking rule, Rule 2007, for RECLAIM Trading Credits.

Adequacy of Proposed Mitigation

Potential Mitigation for VOC, SOx, PM10 and PM2.5

VOC Emissions and Offsets

The BP Watson project will comply with all of the SCAQMD's VOC offset requirements (at a 1.2-to-1.0 offset ratio) by providing VOC ERCs prior to issuance of the Permit to

Construct (PTC), as specified in Rule 1303(b)(2). As shown in **Air Quality Table 19** below, Watson already controls VOC ERCs to offset 61 lbs/day of VOC emissions and will provide an additional 126 lbs/day of VOC ERCs prior to issuance of the final Title V permit to cover the maximum offset liability of 187 lbs/day of VOC emissions.

Air Quality Table 19
VOC Emission Offsets and Mitigation Proposed by the Applicant

ERC Certificate No.	ERC Certificate Registered Owner	ERC Certificate Amount (lbs/day)
AQ007588	BP West Coast Prod .LLC BP Carson.	4
AQ008748	BP West Coast Prod .LLC BP Carson.	7
AQ010814	BP West Coast Prod .LLC BP Carson.	50

As required by PRC Code Section 25523, the Energy Commission shall require that the applicant obtain all necessary emission offsets within the time required by the applicable district rules, consistent with any applicable federal and state laws and regulations, and prior to the commencement of the operation of the proposed facility. Watson will provide the additional 126 lbs/day of VOC ERCs prior to issuance of the final Title V permit to cover the maximum offset liability of 187 lbs/day of VOC emissions. Since Watson holds 502 lb/day in VOC ERCs in the coastal zone, the BP Watson project should be able to easily obtain the necessary remaining VOC ERCs. Condition of Certification **AQ-SC7** requires these additional VOC ERCs.

NOx Emissions and Offsets

The BP Watson project complies with all of the NOx offset requirements (at a 1.0-to-1.0 offset ratio) by holding sufficient NOx RTCs to offset the annual emission increase for the first year of operation prior to commencement of initial operation, as specified in Rule 2005(b)(2). The SCAQMD provides a programmatic demonstration, as approved by EPA, in March of each year in its Annual RECLAIM Audit report to the Governing Board that the 1.2 to 1 offset ratio required by federal law is met on an aggregate basis for RECLAIM new and modified sources. Watson shall also, at the commencement of each subsequent compliance year, hold NOx RTCs equal to the amount required by permit conditions, as specified in Rule 2005(f)(1).

SOx Emissions and Offsets

The BP Watson project complies with all of the SOx offset requirements (at a 1.0-to-1.0 offset ratio) by holding sufficient SOx RTCs to offset the annual emission increase for the first year of operation prior to commencement of initial operation, as specified in Rule 2005(b)(2). The SCAQMD provides a programmatic demonstration, as approved by EPA, in March of each year in its Annual RECLAIM Audit report to the Governing Board that the 1.2 to 1 offset ratio required by federal law is met on an aggregate basis for RECLAIM new and modified sources. Watson shall also, at the commencement of each subsequent compliance year, hold SOx RTCs equal to the amount required by permit conditions, as specified in Rule 2005(f)(1).

PM10 Emissions, Precursors and Offsets

The SoCAB is in attainment with both federal and state SO_2 and Sulfate ambient air quality standards, as applicable. However, SO_2 is also considered a precursor to PM10.

Presently the SoCAB is still designated as “Nonattainment” with both federal and state PM10 ambient air quality standards.

As noted above, PM10 emissions from the new cogeneration unit will be addressed through adoption of an emissions limit for all five cogeneration units, which is equal to the current limit for the existing four units, minus 1 lb PM10/day. The existing Energy Commission license limits PM10 emissions from the four existing cogeneration units to 1,244 lbs/day; hence the new limit will be 1,243 lbs PM10/day for all five cogeneration units. This is granted since recent source testing indicates that the actual PM10 emissions from the four existing cogeneration units are 436 lbs/day (year 2007 test) and 153 lbs/day (year 2008 test). Thus, the potential emissions of 238 lbs PM10/day from the fifth cogeneration unit should not result in exceedance of the 1,243 lbs/day limit. Proposed SCAQMD condition **AQ-1** will require the facility to calculate PM10 emissions from all five cogeneration units, based on emissions factors for natural gas, butane and refinery gas firing (note: cogeneration units 1 through 4 are permitted to fire butane, while the fifth cogeneration unit is not permitted to fire butane). For this project, an exemption from emissions offsets under District Rule 1304, due to Concurrent Facility Modification, is claimed for PM10 emissions.

PM2.5 Emissions and Offsets

- The SoCAB is classified as “Nonattainment” for federal and state ambient air quality standards for PM2.5. Following the assessment procedures defined in Rule 1325, and recent source test data from the Inland Empire Energy Center using U.S. EPA Test Methods 201A and 202, PM2.5 emissions from the existing BP Watson Cogeneration units were estimated to be 15.1 tons/year, which is well below the threshold of 100 tons/year specified in Rule 1325. Total PM2.5 emissions for the facility with the proposed project would be 16.5 tons/year. Therefore, PM2.5 offsets would not be required for the proposed project. Staff determined this result because the SCAQMD’s DOC was completed before the rule went into effect in June 2011.

Potential Mitigation for CO

The BP Watson project complies with the CO offset requirements on the basis that the SoCAB is not classified as “Nonattainment” for federal and state ambient air quality standards for CO. (SoCAB is classified as Attainment for state and federal standards.) Therefore, offsets are not required. Also, the maximum worst case yearly CO emission is 33.1 tons/year, which is below the PSD threshold of 250 tons/year.

As discussed in the Operation and Impacts section, staff believes that the project’s potential impacts on the CO ambient air quality standards are not significant. Thus, staff does not recommend any further CO mitigation measures.

Quantification of Mitigation

Staff uses the 30-day average daily emission value for characterizing the project emission profile in the South Coast air basin for the purpose of quantifying offset requirements. The 30-day average is different from the estimated worst case daily emissions (**Air Quality Table 12**). For the 30-day average, the SCAQMD sums the facility emissions for the worst case month, then divides that sum by 30 (or 31 depending on the month) to obtain a 30-day average daily emissions (in units of

lbs/day). This calculation methodology does result in a lower value than is presented in **Air Quality Table 12**, but it is the method by which the SCAQMD determines the required amount of offsets for each pollutant.

The ERCs (the offsets) are calculated by the SCAQMD by taking the total emissions for the year and dividing that number by 365 to create the lbs/day annual average. An annual average calculated in this method is always going to be lower than a 30-day average used by the SCAQMD from the same emitting source, since the 30-day average will capture periods when a project, such as a peaker power plant, is operated at a higher load than the annual average. Any emitting source will always have a month in which it operates more than any other month, but in an annual average this peak month is washed out over the year. Thus the lbs/day ERC calculation is more conservative than the 30-day average lbs/day project emission calculation. Therefore, for projects located in the South Coast air basin, staff uses the 30-day average lbs/day value to characterize the project emission profile when comparing it to the ERCs being offered.

The project emissions shown in **Air Quality Table 20** are calculated by the 30-day average lbs/day values shown (with the exception of NOx and SOx which are pounds per year). Staff concludes that the credits are adequate to offset the project emissions.

Air Quality Table 20
CEQA Mitigation (30-day average)

	NOx	SOx	VOC	PM10
	(lbs/year)		(lbs/day)	
Total Project Emissions[3]	79,800	39,779	156	246
Emission Reduction Credits or RECLAIM Trading Credits	99,850[1] 79,800[2]	31,050[1] 39,770[2]	187	None Required
Total Credits	99,850[1] 79,800[2]	31,050[1] 39,770[2]	187	None Required

1 First year of operation includes commissioning emission estimates and operational assumptions made in AIR QUALITY Table 11.

2 Second year (and thereafter) of operation includes the assumptions made in AIR QUALITY Table 11.

3 Total project emissions include only the emissions from non-exempted equipment. In this case it includes only the operation of the eight combustion turbines.

Staff Proposed Mitigation

Staff recommends no further mitigation at this time.

Cumulative impacts and mitigation

"Cumulative impacts" are defined as "two or more individual effects which, when considered together, are considerable or . . . compound or increase other environmental impacts." (CEQA Guidelines, § 15355.) A cumulative impact consists of an impact that is created as a result of a combination of the project evaluated in the EIR together with other projects causing related impacts." (CEQA Guidelines, § 15130(a)(1).) Such impacts may be relatively minor and incremental, yet still be significant because of the existing environmental background, particularly when one considers other closely related past, present, and reasonably foreseeable future projects.

This analysis is primarily concerned with "criteria" air pollutants. Such pollutants have impacts that are usually (though not always) cumulative in nature. Rarely will a project by itself cause a violation of a federal or state criteria pollutant standard. However, a new source of pollution may contribute to violations of criteria pollutant standards because of the existing background sources or foreseeable future projects. Air districts attempt to attain the criteria pollutant standards by adopting attainment plans, which comprise a multi-faceted programmatic approach to such attainment. Depending on the air district, these plans typically include requirements for air pollutant emission "offsets" and the use of "Best Available Control Technology" for new sources of emissions, and restrictions of emissions from existing sources of air pollution.

Much of the preceding discussion is concerned with cumulative impacts. The "Existing Ambient Air Quality" section describes the air quality background in the South Coast Air Basin, including a discussion of historic ambient levels for each of the significant criteria pollutants. The "Construction Impacts and Mitigation" section discusses the project's contribution to the local existing background caused by project construction. This following section includes three additional analyses:

- a summary of projections for ambient criteria pollutant levels by the air district and of the air district's programmatic efforts to abate such pollution levels;
- an analysis of the project's "localized cumulative impacts"; combining the project's direct emissions with the emissions of other local major emission sources; and
- a discussion of the impacts of chemically reactive pollutants: ozone and PM2.5.

Summary of Projections

The SCAQMD is the agency with principal responsibility for analyzing and addressing cumulative air quality impacts, including the impacts of ambient ozone and particulate matter. The SCAQMD has summarized the cumulative impact of ozone and particulate matter on the air basin from the broad variety of its sources. Analyses of these cumulative impacts, as well as the measures the SCAQMD proposes to reduce impacts to air quality and public health, are summarized in four publicly available documents that the SCAQMD has adopted or will soon adopt. These adopted air quality plans are summarized below.

- **Final 2007 Air Quality Management Plan** (adopted 6/1/2007)
  Link: www.aqmd.gov/aqmp/07aqmp/index.html
- **Final 2003 Air Quality Management Plan** (adopted 12/10/1999)
  Link: www.aqmd.gov/aqmp/AQMD03AQMP.htm
- **Final Socioeconomic Report for the Final 2007 AQMP** (adopted 6/1/2007)
  Link: www.aqmd.gov/aqmp/07aqmp/07AQMP_socio.html
- **State of California's SIP for the new federal PM2.5 and 8-hour ozone standards** (adopted June 20, 2011) Link:
  http://www.arb.ca.gov/planning/sip/2007sip/2007sip.htm

2007 Air Quality Management Plan

(*The following paragraphs are excerpts from the Executive Summary of the 2007 Air Quality Management Plan adopted by the SCAQMD June 1, 2007*)

The SCAQMD adopted (June 1, 2007) the 2007 Air Quality Management Plan (AQMP) primarily in response to changes in the federal Clean Air Act (CAA). The CAA requires an 8-hour ozone non-attainment area to prepare a State Implementation Plan (SIP) revision by June of 2007 (which has been completed) and a PM2.5 non-attainment area to submit a SIP revision by late 2007 (which has been completed). The SCAQMD has decided that it is most prudent to prepare a single comprehensive and integrated SIP revision that satisfies both the ozone and PM2.5 requirements. Additionally, the U.S. EPA requires that transportation conformity budgets be established based on the most recent planning assumptions and approved motor vehicle emission model. The AQMP is based on assumptions provided by both the California Air Resources Board (CARB) and the Southern California Association of Governments (SCAG) reflecting their upcoming model (EMFAC) for motor vehicle emissions and demographic updates.

The AQMP relies on a comprehensive and integrated control approach to achieve the PM2.5 standard by 2015 through implementation of short-term and midterm control measures and achieve the 8-hour ozone standard by 2021/2024 based on implementation of additional long-term measures. In order to demonstrate attainment by the prescribed deadlines, emission reductions needed for attainment must be in place by 2014 and 2020/2023 timeframe.

Since PM2.5 in the Basin is overwhelmingly formed secondarily, the overall draft control strategy focuses on reducing precursor emission of SOx, directly-emitted PM2.5, NOx, and VOC instead of fugitive dust. Based on the District's modeling sensitivity analysis, SOx reductions, followed by directly-emitted PM2.5 and NOx reductions, provide the greatest benefits in terms of reducing the ambient PM2.5 concentrations. While VOC reductions are less critical to overall reductions in PM2.5 air quality, they are heavily relied upon for meeting the 8-hour ozone standard. SOx is also the only pollutant that is projected to grow in the future, due to ship emissions at the ports, requiring significant controls.

Directly-emitted PM2.5 emission reductions from ongoing diesel toxic reduction programs and from the short-term and mid-term control measures are also incorporated into the AQMP. NOx reductions primarily based on mobile source control strategies (e.g., add-on control devices, alternative fuels, fleet modernization, repowers, retrofits) are also relied upon for attainment. Adequate VOC controls need to be in place in time for achieving significant VOC reductions needed for the 8-hour ozone standard by 2021/2024. Reducing VOC emissions in early years would also ensure continued progress in reducing the ambient ozone concentrations. The 8-hour ozone control strategy relies on the implementation of the PM2.5 control strategy augmented with additional long-term VOC and NOx reductions for meeting the standard by 2020/2023 timeframe. With respect to PM10, since the Basin did not attain the annual standard by 2006, additional local programs are proposed to address the attainment issue in an expeditious manner.

The AQMP control measures consist of three components: 1) the District's Stationary and Mobile Source Control Measures; 2) State and Federal Control Measures recommended by CARB and/or SCAQMD staff; and 3) Regional Transportation Strategy and Control Measures provided by SCAG.

The SCAQMD control strategy for stationary and mobile sources is based on the following approaches: 1) facility modernization; 2) energy efficiency and conservation; 3) good management practices; 4) market incentives/compliance flexibility; 5) area source programs; 6) emission growth management; and 7) mobile source programs. The AQMP also includes SCAQMD staff's recommended State and federal stationary and mobile source control measures since ARB has only developed an overview of a possible control strategy for PM2.5.

The measures, prepared by SCAQMD staff and recommended for CARB's consideration for inclusion into the final AQMP, include strategies such as Smog Check Program enhancements, extensive fleet modernization of on-road heavy-duty diesel vehicles and off-road diesel equipment, accelerated penetration of advanced technology vehicles, low sulfur fuel for marine engines, accelerated turn-over of high-emitting off-road engines, and gasoline and diesel fuel reformulations.

Finally, the emission benefits associated with the 2004 Regional Transportation Plan and the 2006 Regional Transportation Improvement Program are also reflected in the AQMP.

In order to achieve necessary reductions for meeting air quality standards, all four agencies (i.e., SCAQMD, ARB, U.S. EPA, and SCAG) would have to aggressively develop and implement control strategies through their respective plans, regulations, and alternative approaches for pollution sources within their primary jurisdiction. Even though SCAG does not have direct authority over mobile source emissions, it will commit to the emission reductions associated with implementation of the 2004 Regional Transportation Plan and 2006 Regional Transportation Improvement Program which are imbedded in the emission projections. Similarly, the Ports of Los Angeles and Long Beach have authority they must utilize to assist in the implementation of various strategies if the region is to attain clean air by federal deadlines. **Air Quality Table 21** shows the areas of jurisdiction for each agency.

Although the SCAQMD has completely met its obligations under the 2003 AQMP and stationary sources subject to the District's jurisdiction account for only 11% of NOx and 24% of SOx emissions in the Basin in 2014, the AQMP contains several short-term and mid-term control measures aimed at achieving further NOx and SOx reductions (as well as VOC and PM2.5 reductions) from these already regulated sources.

Air Quality Table 21
Regulatory Agency Attainment Responsibilities and Jurisdiction

Agency	Jurisdiction
U.S. EPA	Forty-nine state mobile vehicle emission standards. Airplanes, trains, and ships. New off-road construction & farm equipment below 175 hp.
ARB	On-road/Off-road vehicles. Motor vehicle fuels. Consumer products.
SCAQMD	Stationary (e.g., industrial/commercial) and area sources. Indirect sources. Some mobile sources (e.g., visible emissions and use regulations from trains and ships).
SCAG	AQMP conformity assessment. Regional Transportation Improvement Program. Transportation Control Measures.
Local Government/CTCs	Transportation and local government actions (i.e., land use approvals & ports). Transportation facilities.

These strategies are based on facility modernization, energy conservation measures and more stringent requirements for existing equipment (e.g., space heaters, ovens, dryers, furnaces). In addition to short-term and mid-term control measures, the SCAQMD is also committing to long-term VOC reductions of 32 tons per day by 2020 for the 8-hour ozone attainment.

Clean air for this region requires CARB to aggressively pursue reductions and strategies for on-road and off-road mobile sources and consumer products. In addition, considering the significant contribution of federal sources such as marine vessels, locomotives, and aircraft in the Basin (i.e., 72% of SOx and 34% of NOx), it is imperative that the U.S. EPA pursue and develop regulations for new and existing federal sources to ensure that these sources contribute their fair share of reductions toward attainment of the federal standards. Unfortunately, regulation of these emission sources has not kept pace with other source categories and as a result, these sources are projected to represent a significant and growing portion of emissions in the Basin. Without a collaborative and serious effort among all agencies, attainment of the federal standards would be seriously jeopardized.

Final 2003 Air Quality Management Plan

(*The following are excerpts from the 2003 Air Quality Management Plan adopted by the SCAQMD December 10, 1999*)

The SCAQMD amended the 1997 Air Quality Management Plan (AQMP) in 1999 to address the U.S. EPA's proposed disapproval of the 1997 Ozone SIP revision to ensure

that the 1997 AQMP complied with or exceeded federal requirements. The 1999 AQMP amendments to the 1997 AQMP were subsequently approved by the U.S. EPA into the SIP in April 2000. The SCAQMD updated the PM10 portion of the 1997 AQMP for both the South Coast Air Basin and Coachella Valley in 2002 as part of the District's request to extend the PM10 attainment date from 2001 to 2006 for these areas as allowed under the federal Clean Air Act (CAA). The U.S. EPA approved the 2002 update on April 18, 2003.

The purpose of the 2003 Revision to the Air Quality Management Plan for the South Coast Air Basin (Basin) and those portions of the Salton Sea Air Basin under SCAQMD jurisdiction are to set forth a comprehensive program that will lead these areas into compliance with all federal and state air quality planning requirements. Specifically, the 2003 AQMP Revision is designed to satisfy the California Clean Air Act (CCAA) tri-annual update requirements and fulfill the District's commitment to update transportation emission budgets based on the latest approved motor vehicle emissions model and planning assumptions. The Plan will be submitted to U.S. EPA as a SIP revision once it is approved by the SCAQMD Governing Board and the California Air Resources Board (CARB).

The 2003 AQMP sets forth programs which require the cooperation of all levels of government: local, regional, state, and federal. Each level is represented in the Plan by the appropriate agency or jurisdiction that has the authority over specific emissions sources. Accordingly, each agency or jurisdiction is associated with specific planning and implementation responsibilities.

At the federal level, the U.S. EPA is charged with regulation of 49-state on-road motor vehicle standards; trains, airplanes, and ships; and non-road engines less than 175 horsepower. The CARB, representing the state level, also oversees on-road vehicle emission standards, fuel specifications, some off-road sources and consumer product standards. At the regional level, the SCAQMD is responsible for stationary sources and some mobile sources. In addition, the SCAQMD has lead responsibility for the development and adoption of the Plan. Lastly, at the local level, Associations of Governments have a dual role of leader and coordinator. In their leadership role, they, in cooperation with local jurisdictions and sub-regional associations, develop strategies for these jurisdictions to implement; as a coordinator, they facilitate the implementation of these strategies. For the South Coast Air Basin, the Southern California Association of Governments is the District's major partner in the preparation of the AQMP. Interagency commitment and cooperation are the keys to success of the AQMP.

Since air pollution physically transcends city and county boundaries, it is a regional problem. No one agency can design or implement the Plan alone and the strategies in the Plan reflect this fact.

Past air quality programs have been effective in improving the Basin's air quality.

Ozone levels have been reduced by half over the past 30 years, nitrogen dioxide, sulfur dioxide, and lead standards have been met, and other criteria pollutant concentrations have significantly declined. The federal and state CO standards were also met as of the

end of 2002. However, the Basin still experiences exceedances of health-based standards for ozone and particulate matter less than ten microns in size (PM10).

Progress in implementing the 1997/1999 SIPs can be measured by the number of control measures that have been adopted as rules and the resulting tons of pollutants targeted for reduction. Emission reduction commitments and reductions achieved in 2010 are based on the emissions inventory from the 1997 SIP. Since October 1999, sixteen control measures or rules have been adopted or amended by the SCAQMD through October 2002. The primary focus of the District's efforts had been the adoption and implementation of VOC control measures. The SCAQMD has achieved 158 tons per day VOC reductions, exceeding its 1997/1999 SIP commitment by approximately 44.5 tons per day.

To date, ARB has committed to VOC and NOx emission reductions of approximately 90 and 106 tons per day, respectively, and has achieved 67 and 140 tons per day, respectively. While exceeding its NOx target by 34 tons per day, ARB fell short of the VOC target by 21 tons per day using the 1997 SIP currency. U.S. EPA was obligated to VOC and NOx emission reductions of approximately 35 and 75 tons per day, respectively, and has achieved 38 and 63 tons per day, respectively.

Final Socioeconomic Report for the Final 2007 AQMP

(*The following are excerpts from the Final Socioeconomic Report for the Final 2007 AQMP adopted by the SCAQMD June, 2007*)

The 2007 Air Quality Management Plan (AQMP or Plan) has been prepared to meet the challenge of achieving healthful air quality in the South Coast Air Basin (Basin) and the Coachella Valley. This report accompanies the 2007 AQMP and presents the potential socioeconomic impacts resulting from implementation of the Plan. The information contained herein is considered by the South Coast Air Quality Management District (District) Governing Board when taking action on the Plan.

The Plan contains several short- and long-term measures designed to achieve federal ambient air quality standards, make progress toward state air quality standards, and meet air quality planning requirements. These measures will be implemented by the District, the California Air Resources Board (CARB), the U.S. Environmental Protection Agency (EPA), the Southern California Association of Governments (SCAG), and other local and regional governments. Implementation of these control strategies will affect the region's economy. This plan relies heavily on mobile source strategies, such as accelerated fleet turnover.

The District relies on a number of methods, tools, and data sources to assess the impact of proposed control strategies on the economy. These tools include the following: air quality models and concentration-response relationships to estimate benefits of clean air; capital, operating and maintenance expenditures on control devices and emission reductions to assess the cost of the Plan; the REMI (Regional Economic Models, Inc.) model to assess potential employment and other socioeconomic impacts (e.g., population and competitiveness); 2000 Census data to assess employment impacts among ethnic groups; and the Consumer Expenditure

Survey from the Bureau of Labor Statistics to examine the impact of changes in product prices on consumer price indexes by household income.

Over the years, there has been an overall trend of steady improvement in air quality in the Basin. Additional emission reductions are still needed in order to bring the Basin into compliance with federal air quality standards. The benefits of better air quality through implementation of the 2007 AQMP include reductions in morbidity and mortality, increases in crop yields, visibility improvements, reduced expenditures on refurbishing building surfaces, and reduced traffic congestion.

The 2007 Plan is projected to comply with the federal PM2.5 and ozone standards with a quantified average annual benefit of $14.6 billion between 2007 and 2025. The $14.6 billion includes approximately $9.8 billion for averted illness and higher survival rates, $3.6 billion for visibility improvements, $966 million for congestion relief, $204 million for reduced damage to materials, and $18 million for increased crop yields.

The total benefit of the Plan is expected to exceed the analyzed $14.6 billion annually since not all of the benefits associated with the implementation of the Plan can be quantified. For example, the quantified health benefits only account for reduced exposure from PM2.5 and ozone, while those from decreased exposure to other pollutants are not included. In addition, reductions in vehicle hours traveled for personal trips and damages to plants, livestock, and forests have not been quantified. Further research is needed before these benefits can be quantified.

The projected annual average implementation cost of the Plan is $2.3 billion between 2007 and 2025. The cost for implementing the Plan was estimated for both quantified and unquantified measures.

The projected cost for 33 quantified short-term measures is approximately $1.8 billion per year. Transportation control measures alone account for 24% of the total quantified cost. The cost of unquantified measures is projected to be approximately $523 million per year. The cost of unquantified measures, mostly long-term measures, was derived from emission reductions as they are implemented and the average cost effectiveness of quantified measures.

The cost of quantified measures represents 47% of total emission reductions needed for attainment. A sensitivity test performed for the unquantified measures shows that their cost could vary from a low of $21 million to a high of $1.1 billion. Thus, the total annual average cost of the Plan could range from a low of $1.8 to a high of $2.8 billion. Additional efforts will be made to better quantify and/or refine the costs associated with all control measures during rulemaking or before the next AQMP revision.

Implementation of the 2007 AQMP is projected to result in air quality improvements sufficient to attain the federal air quality standards in 2014 for PM2.5 and in 2023 for ozone. The eastern and western portions of Los Angeles County and the Chino-Redlands area are projected to have the highest shares of quantified air quality benefits. Central and Eastern Los Angeles County and the Chino-Redlands area of San Bernardino County would benefit the most from reductions in PM2.5. The northern and

coastal portions of Los Angeles County, Southern Orange County, and Riverside and San Bernardino Counties will benefit from reductions in ozone.

When combined PM2.5 and ozone improvements are considered, communities throughout the region will experience net air quality benefits. The 2007 AQMP is designed to meet both federal ozone and PM2.5 standards. PM2.5 has significant mortality impacts and the Basin has a deadline for attainment of the PM2.5 standard in 2014. Ozone has health impacts, including mortality, but current ozone levels do not cause as many premature deaths as PM2.5. Significant NOx reductions are necessary and they are more effective than VOC reductions to attain the PM2.5 standard in 2014. Built upon the PM2.5 strategy, further NOx reductions are still needed even with substantial VOC reductions in order to attain the ozone standard. The NOx-heavy strategy in this Plan was chosen to meet both standards and provide greater certainty to reach attainment due to less total reductions (VOC and NOx) required. Downwind areas also benefit more from this strategy. Moreover, VOC controls at this time are less advanced than NOx controls. Under the NOx-heavy strategy, there is an environmental trade-off where some areas experience increases in ozone levels (but they still remain below the federal standard). This trade-off would occur even with a combined VOC and NOx strategy, which does not meet the air quality goals. Even though ozone increases in some areas, overall health benefits are positive for each of the 19 sub-regions because benefits from PM2.5 are much greater than any dis-benefits from ozone.

The greatest PM2.5 health benefits are in Central and Eastern Los Angeles County and the Chino-Redlands area of San Bernardino County. When compared to the ozone projections under the future baseline condition where no additional control is proposed beyond today's level, ozone concentrations in some more densely populated areas will increase under the 2007 AQMP but will still be below the federal standard in exchange for PM2.5 improvements. This is termed "dis-benefit." The overall regional population-weighted exposure shows that the magnitude of ozone dis-improvements exceeds that of improvements in 2009, 2012, and 2020, thus resulting in a net overall ozone dis-benefit (or increase in symptoms). However, there will be net ozone benefits of $1.4 billion in 2023. The northern and coastal portions of Los Angeles County, southern Orange County, and Riverside and San Bernardino Counties will benefit from reductions in ozone. These areas are dominated by either White or Hispanic residents. Currently, the worst ozone locations are in Santa Clarita and Crestline.

In order to design the most efficient path to clean air, it is imperative that an integrated plan including both PM2.5 and ozone be developed. A plan targeting only a single pollutant may jeopardize the attainment of the other pollutant.

The attainment of the ozone and PM2.5 air quality standards depends on full implementation of control measures that are proposed in the 2007 AQMP. The costs of these measures will ripple throughout various communities. Quantified control measures would impose relatively greater share of costs on the southern portion of Los Angeles County than the rest of the communities. This is because of the significant costs incurred by several mobile source control measures with affected sources located around the ports of Southern Los Angeles County.

All of the 19 sub-regions are projected to have additional jobs created from cleaner air. All ethnic groups are expected to have job gains, as a result. Conversely, implementation of quantified control measures would result in jobs forgone between 2007 and 2025. Because of their large representation in today's workforce, Whites and Hispanics will be affected most by changes in jobs. However, significant uncertainty exists in projecting the job distribution by race and ethnicity due to the rapidly-changing structure of population and workforce in the four county area.

Job gains from cleaner air would benefit all five wage groups comprised of 94 occupations. Conversely, all five groups would experience jobs forgone from quantified control measures. However, there is no significant difference in impacts expected for high- versus low-paying jobs. The same is observed for impacts on the price of consumption goods from one income group to another. These findings require further evaluation during individual rule development efforts.

State of California SIP for the new federal PM2.5 and 8-hour ozone standards (adopted June 20, 2011)

On April 28, 2011, the Air Resources Board considered revisions to the South Coast (and San Joaquin Valley) State Implementation Plans (SIPs) for PM2.5 that accounted for reductions of emissions that contribute to PM2.5 levels. The revisions were formally adopted by the ARB's Executive Officer on May 18, 2011, when Executive Order S-11-010 was signed. The April 2011 PM2.5 SIP Revisions accounted for recent regulatory actions and recessionary impacts on emissions that occurred after the South Coast (and San Joaquin Valley) PM2.5 SIPs were adopted. Those revisions accounted for the impact the recession has had on emissions and the benefits of ARB's in-use diesel truck and off-road equipment regulations. The revisions updated the PM2.5 SIP's reasonable further progress calculations, transportation conformity budgets, and ARB's rulemaking calendar.

Localized Cumulative Impacts

Since the power plant air quality impacts can be reasonably estimated through air dispersion modeling (see Operational Modeling Analysis section) the project's contributions to localized cumulative impacts can be estimated. To represent past and, to an extent, present projects that contribute to ambient air quality conditions, the Commission staff recommends the use of ambient air quality monitoring data (see Environmental Setting section), referred to as the background. The staff undertakes the following steps to estimate what are additional appropriate present projects that are not represented in the background and reasonably foreseeable projects:

First, the Commission staff (or the applicant) works with the air district to identify all projects that have submitted, within the last year of monitoring data, new applications for an authority to construct (ATC) or permit to operate (PTO) and applications to modify an existing PTO within six miles of the project site. Beyond six miles there is little or no measurable cumulative overlap between stationary emission sources. The non-photochemical-reactant pollutant emission impacts of the criteria pollutant emissions (i.e., NOx, SOx, CO, PM10 and PM2.5) have, from staff's experience with air dispersion modeling, had a finite time and distance to remain airborne. In staff's experience of using the USEPA air dispersion models (SCREEN,

ISCST3 and AERMOD), staff has never seen any proposed power plant having non-photochemical-reactant pollutant emission impacts which approach or go beyond 10 kilometers (or six miles). This effectively identifies all new emissions that emanate from a single point (e.g., a smoke stack), referred to as “point sources.” The submittal of an air district application is a reasonable demarcation of what is “reasonably foreseeable”. So, as an example, if the last year of ambient air quality monitoring data from area monitoring stations was 2009, then Commission staff (or the applicant) would ask the air district for all new applications that are not included in the ambient data.

Second, the Energy Commission staff (or the applicant) works with the air district and local counties to identify any new area sources within six miles of the project site. As opposed to point sources, area sources include sources like agricultural fields, residential developments or other such sources that do not have a distinct point of emission. New area sources are typically identified through draft or final Environmental Impact Reports (EIR) that are prepared for those sources. The initiation of the EIR process is a reasonable basis on which to determine what is “reasonably foreseeable” for new area sources.

The data submitted, or generated from the applications with the air district for point sources or initiating the EIR process for area sources provides enough information to include these new emission sources in air dispersion modeling. Thus, the next step is to review the available EIR(s) and permit application(s), determine what sources must be modeled and how they must be modeled.

Sources that are not new, but may not be represented in ambient air quality monitoring are also identified and included in the analysis. These sources are rare but include existing sources that are co-located with the proposed source (such as an existing power plant). In most cases, the ambient air quality measurements are not recorded close to the proposed project, thus a local major source might not be well represented by the background air monitoring. When these sources are included, it is typically a result of there being an existing source on the project site and the ambient air quality monitoring station being more than 2 miles away.

When there are a large number of sources (in some cases 15 to 20 sources) and they are primarily of small emission quantities with higher impacts, the modeling results must be carefully interpreted so that they are not skewed towards the smaller, high-impacting sources. The reason being that while small sources can cause higher impacts, they are typically limited to within a hundred yards or similar close proximity of the source. Therefore, a cumulative interaction with the proposed project emission impacts is unlikely.

Once the modeling results are produced, they are added to the background ambient air quality monitoring data and thus the modeling portion of the cumulative assessment is complete. Due to the use of air dispersion modeling programs in staff’s cumulative impacts analysis, the applicant must submit a modeling protocol, based on informational requirements for an application, prior to beginning the investigation of the sources to be modeled in the cumulative analysis. The modeling protocol is typically reviewed, commented on, and eventually approved in the Data Adequacy phase of the licensing

procedure. Staff typically assists the applicant in finding sources (as described above), characterizing those sources and interpreting the results of the modeling. However, the actual modeling runs are usually left to the applicant to complete. There are several reasons for this; modeling analyses take time to perform and require significant expertise, the applicant has already performed a modeling analysis of the project alone (see Operational Modeling Analysis section), and the applicant can act on its own to modify the project as the results warrant. Once the cumulative project emission impacts are determined, the necessity to mitigate the project emissions can be evaluated, and the mitigation itself can be proposed by staff and/or applicant (see Mitigation section).

The primary sources that would have the potential to result in cumulative impacts are the existing four cogeneration units that are covered by the existing Energy Commission license and SCAQMD Title V permit. Cumulative modeling was conducted to evaluate potential air quality impacts from the five cogeneration units as presented in **Air Quality Table 22**. Cumulative impacts are generally quite similar to the worst-case modeling for the proposed new cogeneration unit since worst-case impacts are based on startup conditions and only one unit can start on any given day.

Air Quality Table 22
Refined Modeling Maximum Impacts During Startup and Operation (μg/m^3)

Pollutant	Averaging Time	Modeled Impact	Background	Total Impact	Limiting Standard	Percent of Standard
NO_2	1 hour	29	264	293	339	87%
	Annual	0.6	59	60	57	**105%**
CO	1 hour	31.1	9,600	9,631	23000	42%
	8 hour	23.4	7,315	7,338	10000	73%
PM10	24 hour	3.9	131	135	50	**270%**
	Annual	0.3	45	45	20	**227%**
PM2.5	24 hour	1.5	49	50	35	**143%**
	Annual	0.3	18	18	12	**148%**
SO_2	1 hour	2.2	107	109	655	17%
	3 hour	1.8	86	88	1300	7%
	24 hour	0.6	29	29	105	28%
	Annual	0.2	7	7	80	9%

[a] modeled 1-hour average impacts during startup event
[b] Modeled annual operational assumptions for all emitting devices (see AIR QUALITY Table 11).

Source: BP Watson 2009

Chemically Reactive Pollutant Impacts

The project's gaseous emissions of NOx, SO_2, VOC and ammonia can contribute to the formation of secondary pollutants: ozone and PM10/PM2.5.

Ozone Impacts

There are air dispersion models that can be used to quantify ozone impacts, but they are used for regional planning efforts where hundreds or even thousands of sources are

input into the modeling to determine ozone impacts. There are no regulatory agency models approved for assessing single source ozone impacts. However, because of the known relationship of NOx and VOC emissions to ozone formation, the emissions of NOx and VOC from the BP Watson project do have the potential (if left unmitigated) to contribute to higher ozone levels in the region. These impacts could be cumulatively significant because they would contribute to ongoing violations of the state and federal ozone ambient air quality standards. However, emission offsets that would be provided by Watson would reduce potential impacts to a level that would be cumulatively less than significant.

PM2.5 Impacts

The emissions of NOx and SOx from the BP Watson project do have the potential (if left unmitigated) to cumulatively contribute to higher PM2.5 levels in the region. These impacts could be considered significant because they would contribute to ongoing violations of the state and federal PM2.5 ambient air quality standards. However, emission offsets that would be provided by Watson would reduce potential impacts to a level that would be cumulatively less than significant.

COMPLIANCE WITH LORS

FEDERAL

The Prevention of Significant Deterioration (PSD) program requires major sources to obtain permits for emissions of attainment pollutants. A major source for a simple-cycle combustion turbine is defined as one whose emissions of attainment pollutants exceed 250 tons per year. Since the emissions of attainment pollutants from the BP Watson project are not expected to exceed 250 tons per year, the PSD program does not apply. Thus the SCAQMD did not issue a PSD permit as part of their Final Determination of Compliance (FDOC) for the project.

However, new PSD requirements for greenhouse gas emissions became effective January 2, 2011 for facilities which exceed emissions thresholds for traditional PSD emissions categories and July 1, 2011 for facilities with the potential to emit greenhouse gas emissions in excess of 75,000 tons of carbon dioxide-equivalent emissions per year. Watson would exceed this limit, according to **Greenhouse Gas Table 3** in the Air Quality Appendix Air-1. Refer to this appendix for staff's analysis.

STATE

The applicant will demonstrate that the project will comply with Section 41700 of the California State Health and Safety Code, which restricts emissions that would cause nuisance or injury, with the SCAQMD FDOC (issued March 16, 2011) and the Energy Commission staff's affirmative finding for the project. The project would also comply with Sections 21080, 39619.8, as noted in the SCAQMD FDOC (SCAQMD 2011).

LOCAL

Compliance with specific SCAQMD rules and regulations is discussed below via excerpts from the FDOC (SCAQMD 2011). For a more detailed discussion of the compliance of the project, please refer to the FDOC (SCAQMD 2011).

SCAQMD Regulation II-Permits

RULE 212-Standards for Approving Permits

Rule 212 requires that a person shall not build, erect, install, alter, or replace any equipment, the use of which may cause the issuance of air contaminants or the use of which may eliminate, reduce, or control the issuance of air contaminants without first obtaining written authorization for such construction from the Executive Officer. A public notice will be issued followed by a 30-day public comment period prior to issuance of a permit. Compliance is expected.

The public notice was distributed to each address, within ¼ mile of the Watson Cogeneration Facility, on October 15, 2010. The SCAQMD reviewed this notice distribution and found it to be inadequate in that the notice should have been distributed to each address within ¼ mile of the BP Carson Refinery. Thus, the applicant re-distributed the public notice (both in English and Spanish language) to each address within ¼ mile of the BP Carson Refinery on October 29, 2010. The public notice was also published in two newspapers serving the area of the facility, La Opinion and Daily News Los Angeles, on October 15, 2010. The 30 day public comment period has concluded and no comments regarding the proposed permit were received from any member of the public. The public notice, project information submitted by the applicant, and the SCAQMD Permit to Construct evaluation were made available for public review at the Carson Public Library, located at 151 E. Carson Street, Carson, CA, 90745.

RULE 218-Continuous Emission Monitoring

Under this rule, the facility is required to install, operate, and maintain in good working order a certified Continuous Emissions Monitoring System (CEMS) for CO. A facility is required to submit an “Application for CEMS” prior to installation of the CEMS. Within 90 days of installation, CEMS certification testing must be undertaken. Data from such tests must be submitted to the SCAQMD within 45 day. If results of testing are found to be satisfactory, the SCAQMD grants final approval of the CEMS. Submission of a CEMS QA/QC Plan within 45 days of installation and no later than 30 days prior to certification is also required. Reporting requirements include submittal to the SCAQMD of CEMS data every six months, reporting of concentrations and/or mass emissions in excess of regulatory limit, and reporting of breakdown or failure of the CEMS. The CO CEMS serving the new cogeneration unit, will be installed and operated in accordance with the requirements of this rule.

SCAQMD Regulation IV-Prohibitions

RULE 401-Visible Emissions

This rule limits visible emissions to an opacity of less than 20% (Ringlemann No.1), as published by the United States Bureau of Mines. It is unlikely, with the use of the SCR /CO catalyst configuration that there will be visible emissions. Compliance is expected.

RULE 402-Nuisance

This rule requires that a person not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which cause, or have a natural tendency to cause injury or damage to business or property. Compliance is expected.

RULE 403-Fugitive Dust

The purpose of this rule is to reduce the amount of particulate matter entrained in the ambient air as a result of man-made fugitive dust sources by requiring actions to prevent, reduce, or mitigate fugitive dust emissions. The provisions of this rule apply to any activity or man-made condition capable of generating fugitive dust such as construction activities. This rule prohibits emissions of fugitive dust beyond the property line of the emission source. The applicant will be taking steps to prevent and/or reduce or mitigate fugitive dust emissions from the project site. Such measures include covering loose material on haul vehicles, watering, and using chemical stabilizers when necessary. The installation and operation of the CTGs is expected to comply with this rule.

RULE 404-Particulate Matter Concentration

This rule states limitations of particulate matter concentration as a function of stack flow rate. However, per section 404(c), this rule does not apply to emissions from combustion of gaseous or liquid fuels in steam generators or gas turbines

RULE 407-Liquid and Gaseous Air Contaminants

This rule states limits for a pollutant source of 2000 ppm CO (by volume on a dry basis averaged over 15 minutes) and 500 ppm SO2 (averaged over 15 minutes). However, as stated in Rule 2001(j), the SOx limitation under Rule 407 is not applicable to sources regulated under the SCAQMD SOx RECLAIM program. Cogeneration Unit Nos. 1 through 4 and the proposed fifth cogeneration unit are designated “Major Sources” of SOx under RECLAIM. The new cogeneration unit will be equipped with a CO oxidation catalyst, which will control the CO to a maximum of 2 ppm @ 15% O2 (3-hour average) and 3 ppm @ 15% O2 (1-hour average). The results of the 2008 source test of Cogeneration Unit Nos. 1 through 4, show that exhaust gases contain CO in the range of 1.03 ppm to 1.39 ppm (as found, dry basis) (Attachment #9 has summary tables for this source test). Compliance with the CO concentration limitation of this rule is expected.

RULE 409-Combustion Contaminants

This rule restricts the discharge of contaminants from the combustion of fuel to 0.1 grain per cubic foot of gas, calculated to 12% CO_2, averaged over 15 minutes. The equipment is expected to meet this limit.

RULE 431.1-Sulfur Content of Gaseous Fuels

The public utility supplied natural gas to be fired in the cogeneration unit is expected to be in compliance with the 16 ppm sulfur limit (calculated as H_2S) imposed by this rule. This rule also limits the sulfur content of refinery fuel gas to a maximum of 40 ppmv sulfur, as H_2S. However, since SOx emissions from the cogeneration units are subject to the SCAQMD SOx RECLAIM program, this limitation does not apply to this equipment. For the new cogeneration unit, the applicant supplied emissions factor for natural gas of 0.75 grains S/100 scf corresponds to a sulfur concentration of 12 ppm sulfur, as H_2S. Further, the applicant states that over the long term, the sulfur content of natural gas fired in the new cogeneration unit is not expected to exceed 0.29 grains/100 scf.

RULE 475-Electric Power Generating Equipment

Requirements of the rule specify that the equipment must comply with a PM10 mass emission limit of 11 lb/hr or a PM10 concentration limit of 0.01 grains/dscf. The potential-to-emit of particulate matter from the new cogeneration unit is 9.93 lbs/hr. This corresponds to a grain loading of 0.0021 grains/scf @ ~ 13.5% O2 (equal to 0.0051 grains/scf @ 3% O2) at full load operation. The results of the 2008 source test of Cogeneration Unit Nos. 1 through 4 show that exhaust gases contain particulate matter with concentrations of 0.000342 to 0.000385 grains/dscf (as found) and mass emissions rates of 1.52 to 1.65 lbs/hr (Attachment #9). Compliance with the requirements of this rule is expected and will be verified by periodic source testing.

RULE 476- Steam Generating Equipment

This rule has requirements for steam generating equipment with a heat input rating of greater than 50 MMBtu/hr. The rule limits emissions of NOx to 125 ppm @ 3% O2, for gaseous fuel fired units. Per Rule 2001(j), since the existing and new cogeneration units are subject to the SCAQMD NOx RECLAIM program, they are not subject to the NOx limit under this rule. The rule also states limits for combustion contaminants of 11 lbs/hr (mass limit) and 0.01 gr/scf @ 3% O2 (concentration limit). Compliance with this rule is achieved if either limitation is met. The potential-to-emit of particulate matter from the new cogeneration unit is 9.93 lbs/hr. This corresponds to a grain loading of 0.0021 grains/scf @ ~ 13.5% O2 (equal to 0.0051 grains/scf @ 3% O2) at full load operation (note: the HRSG – duct burner used in steam generation only contributes a fraction of the cogeneration unit PM mass emissions). The results of the 2008 source test of Cogeneration Unit Nos. 1 through 4 show that exhaust gases contain particulate matter with concentrations of 0.000342 to 0.000385 grains/dscf (as found) and mass emissions rates of 1.52 to 1.65 lbs/hr (Attachment #9). Compliance with the requirements of this rule is expected.

Regulation XIII – New Source Review

RULE 1303(a) and Rule 2005(b)(1)(A)-BACT

These rules state that the Executive Officer shall deny the Permit to Construct for any new source which results in an emission increase of any non-attainment air contaminant, any ozone depleting compound, or ammonia unless the applicant can demonstrate that BACT is employed for the new source. The applicant has provided a performance warranty which accompanied the initial application package which indicates that each GE 7EA can comply with, and for NOx, even exceed the BACT requirements. SCAQMD now considers the more restrictive 1-hour averaging times to be achieved in practice and Watson will therefore be required to comply with the 1-hour averages for NOx, CO, and VOC as opposed to the three hour as was proposed. The proposed project emission characteristics are lower than that required by BACT for the combustion turbines, therefore compliance is expected.

RULE 1303(b)(1) and Rule 2005(b)(1)(B) - Modeling

The applicant has conducted air dispersion modeling using the U.S. EPA AERMOD air dispersion model. The Tier 4 Health Risk Assessment was conducted in accordance with guidelines set forth by the California Office of Environmental Health Hazard Assessment (OEHHA) and the California Air Resources Board (CARB). The OEHHA/CARB computer program (HARP) was used to determine the health risk assessment. SCAQMD staff's review of the modeling and HRA analyses concluded that the applicant used U.S. EPA AERMOD along with the appropriate model options in the analysis for NO_2, CO, PM10, and SO_2. The applicant modeled both the cumulative and individual permit unit impacts for the project. No significant deficiencies in methodology were noted. Therefore, compliance is expected.

RULE 1303(b)(2) and Rule 2005(b)(2)-Offsets

The Applicant seeks to mitigate PM10 emissions from the new cogeneration unit through adoption of an emissions limit for all five cogeneration units, which is equal to the current limit for the existing four units, minus 1 lb PM10/day. The Energy Commission permit limits PM10 emissions from the four existing cogeneration units to 1244 lbs/day; hence the new limit will be 1243 lbs PM10/day for all five cogeneration units. This is granted since recent source testing indicates that the actual PM10 emissions from the four existing cogeneration units are 436 lbs/day (year 2007 test) and 153 lbs/day (year 2008 test). Thus, the potential emissions of 238 lbs PM10/day from the fifth cogeneration unit should not result in exceedance of the 1243 lbs/day limit. Proposed condition A63.X2 will require the facility to calculate PM10 emissions from all five cogeneration units, based on emissions factors for natural gas, butane and refinery gas firing (note: cogeneration units 1 through 4 are permitted to fire butane, while the fifth cogeneration unit is not permitted to fire butane). For this project, an exemption from emissions offsets under District Rule 1304, due to Concurrent Facility Modification, is claimed for PM10 emissions.

ROG ERCs will be provided, either through current holdings or through purchase on the open market. As shown in the Emission Calculation section of this report, the increase in ROG emissions due to the fifth cogeneration unit is 156 lbs/day (30-day average). Using an offset ratio of 1.2, ERCs accounting for 187 lbs ROG/day are required for

permitting of the project. The applicant must hold these ERCs in their account prior to issuance of Permits to Construct. The facility currently holds ERCs for 61 lbs ROG/day (ERC Certificate No. AQ007588 - 4 lbs ROG/day; ERC Certificate No. AQ008748 - 7 lbs ROG/day; ERC Certificate No. AQ010814 – 50 lbs ROG/day). The facility is working with a broker to identify and to purchase the required ERCs, equal to 126 lbs ROG/day.

NOx RTCs will be allocated either through existing holdings or through purchase.

SOx RTCs will be allocated either through existing holdings or through purchase. Compliance with offset requirements of Rules 1303(b)(2) and 2005(b)(2) is expected.

CO Offsets will not be required since the District is designated as “attainment” with ambient CO standards.

RULES 1303(b)(3)-Sensitive Zone Requirements and 2005(e)-Trading Zone Restrictions

Per 1303(b)(3), a facility in zone 1 may only obtain Emissions Reduction Credits originating in zone 1, to demonstrate to the Executive Officer a net air quality benefit in the area impacted by emissions from the subject facility. BP West Coast Products LLC is in zone 1 and thus must obtain ERCs from the same zone. The SCAQMD will ensure that ERCs for the increase in VOC emissions are obtained from facilities in zone 1.

RULE 1303(b)(4)-Facility Compliance

Per 1303(b)(4), a facility must be in compliance with all applicable rules and regulations of the SCAQMD. BP West Coast Products LLC is currently in compliance with all SCAQMD rules. Under Hearing Board Case No. 5357-36, they were granted a variance from the flare gas monitoring requirements under Rule 1118. This is addressed in their Title V permit, in condition I.1.1. They have notified the Hearing Board, in a letter dated January 20, 2010, that final compliance with rule requirements has been achieved for all flares.

RULE 1303(b)(5)-Major Polluting Facilities

Rule 1303(b)(5)(A) – Alternative Analysis

The applicant is required to conduct an analysis of alternative sites, sizes, production processes, and environmental control techniques for the BP Watson project and to demonstrate that the benefits of the proposed project outweigh the environmental and social costs associated with this project. The applicant has performed a comparative evaluation of alternative sites as part of the AFC process and has concluded that the benefits of providing additional electricity and increased employment in the surrounding area will outweigh the environmental and social costs incurred in the construction and operation of the proposed facility. Compliance is expected.

Rule 1303(b)(5)(B) – Statewide Compliance

Per 1303(b)(5)(B), for a major modification at an existing major pollutant facility, the facility must demonstrate that all major sources owned or operated under common control are in compliance or on a schedule for compliance with limitations and standards of the Clean Air Act. BP West Coast Products LLC submitted to the SCAQMD, on

August 25, 2006, a statement that its facilities in California are in compliance or on schedule for compliance with applicable emissions limits and standards of the Clean Air Act. Therefore, compliance is expected.

Rule 1303(b)(5)(C) – Protection of Visibility

Modeling of plume visibility, as described under 1303(b)(5)(C) is not required because the project does not result in an emissions increase of 15 tons PM10/year or 40 tons NOx/year. Further, the site location is not within the prescribed distances (28 to 32 km) of a Federal Class I Area (note: minimum distance of the BP Watson project to any of the listed Federal Class I Areas is 53 km).Compliance is expected.

Rule 1303(b)(5)(D) – Compliance through CEQA

The Energy Commission is the Lead Agency under CEQA. Since the applicant is required to receive a certification from the Energy Commission, the applicable CEQA requirements and deficiencies will be addressed. Compliance is expected.

Rule 1325—PM2.5

This rule was adopted June 3, 2011. It applies to any major source of PM2.5 if baseline annual emissions exceed 100 tons/year of PM2.5. This rule requires PM2.5 (and precursor) offsets if a proposed modification increases emissions of PM2.5 by 10 tons/year, or 40 tons/year for NO2 or 40 tons/year of SO2, unless these increases are offset by a minimum ratio of 1.1:1. The rule also limits PM2.5 increases to less than 100 tons/year of PM2.5 if baseline emissions are less than 100 tons/year.

REGULATION XVII-Prevention of Significant Deterioration

The SCAQMD Governing Board, in its action on February 7, 2003, authorized the Executive Officer, upon withdrawal of the U.S. EPA Prevention of Significant Deterioration (PSD) delegation, not to request any further delegation and to allow the U.S. EPA to terminate the SCAQMD's PSD delegation agreement and for U.S. EPA to become the permitting agency for PSD sources in the SCAQMD.

The Board determined that Regulation XVII is inactive upon U.S. EPA's withdrawal of delegation and shall remain inactive unless and until the U.S. EPA provides the SCAQMD with new delegation of authority to act either in full or on a Facility/Permit-Specific basis. The delegation was rescinded on March 3, 2003, by U.S. EPA.

The SCAQMD Governing Board in its April 1, 2005, meeting reaffirmed its previous action on February 7, 2003, to relinquish PSD analysis back to federal government and render Regulation XVII inactive unless the SCAQMD receives new delegation in part or in full from the U.S. EPA.

Based on the Governing Board's actions, this rule is ineffective and no analysis is required for any pollutant subject to federal PSD requirement. The SCAQMD has sent the applicant a notification to contact the U.S. EPA directly for applicability of PSD to the proposed project. SCAQMD sent a letter to the applicant on December 8, 2005, and instructed the applicant to contact U.S. EPA directly regarding implementation of PSD. PSD requires major sources to obtain permits for attainment pollutants. A major source for a cogeneration combustion turbine is defined as any one pollutant exceeding 250

tons per year. Since the emissions from the BP Watson project are not expected to exceed 250 tons per year, PSD does not apply.

New PSD requirements for greenhouse gas emissions became effective January 2, 2011 for facilitates which exceed emissions thresholds for traditional PSD emissions categories and July 1, 2011 for facilities with the potential to emit greenhouse gas emissions in excess of 75,000 tons of carbon dioxide-equivalent emissions per year. The BP Watson project would exceed this limit, according to **Greenhouse Gas Table 3** in the Air Quality Appendix Air-1.

Regulation XX-RECLAIM

Rule 2005(g) – Additional Requirements

As with Rule 1303(b)(5) for the Non-RECLAIM pollutants, Watson has addressed the alternative analysis, statewide compliance, protection of visibility, and CEQA compliance requirements of this rule for NOx. These requirements are essentially the same as those found in Rule 1303(b)(5), subparts A through D for non-RECLAIM pollutants, and are summarized below. Compliance is expected.

Rule 2005(g)(1) – Statewide Compliance

Per 1303(b)(5)(B), for a major modification at an existing major pollutant facility, the facility must demonstrate that all major sources owned or operated under common control are in compliance or on a schedule for compliance with limitations and standards of the Clean Air Act. BP West Coast Products LLC submitted to the SCAQMD, on August 25, 2006, a statement that its facilities in California are in compliance or on schedule for compliance with applicable emissions limits and standards of the Clean Air Act. Therefore, compliance is expected.

Rule 2005(g)(2) – Alternative Analysis

The applicant is required to conduct an analysis of alternative sites, sizes, production processes, and environmental control techniques for the BP Watson project and to demonstrate that the benefits of the proposed project outweigh the environmental and social costs associated with this project. The applicant has performed a comparative evaluation of alternative sites as part of the AFC process and has concluded that the benefits of providing additional electricity and increased employment in the surrounding area will outweigh the environmental and social costs incurred in the construction and operation of the proposed facility. Compliance is expected.

Rule 2005(g)(3) – Compliance through CEQA

The Energy Commission is the Lead Agency under CEQA. Since the applicant is required to receive certification from the Energy Commission, the applicable CEQA requirements and deficiencies will be addressed. Compliance is expected.

Rule 2005(g)(4) – Protection of Visibility

Modeling of plume visibility, as described under 1303(b)(5)(C) is not required because the project does not result in an emissions increase of 15 tons PM10/year or 40 tons NOx/year. Further, the site location is not within the prescribed distances (28 to 32 km)

of a Federal Class I Area (note: minimum distance of the BP Watson project to any of the listed Federal Class I Areas is 53 km).Compliance is expected.

Rule 2005(h) – Public Notice

Watson complied with the requirements for Public Notice found in Rule 212. Therefore compliance with Rule 2005(h) is demonstrated.

Rule 2005(i) – Rule 1401 Compliance.

Watson complied with Rule 1401 as demonstrated in the Tier 4 analysis and subsequently reviewed and found to be satisfactory by SCAQMD modeling staff. Compliance is expected.

Rule 2005(j) – Compliance with State and Federal NSR.

Watson complied with the provisions of this rule by having demonstrated compliance with SCAQMD NSR Regulations XIII and Rule 2005-NSR for RECLAIM.

REGULATION XXX – Title V

The facility is subject to Reg XXX and a Title V permit was issued on September 1, 2009. The permitting of the new CTG/HRSG is a Significant Permit Revision of the Title V permit issued to BP West Coast Products LLC. BP has submitted A/Ns 496922 and 496924 to address this permit revision. As a Significant Permit Revision, the applications are subject to a 30 day public notice and a 45 day EPA review and comment period.

Rule 3006 addresses public notice requirements. It requires that a public notice be published in a newspaper serving the county where the source is located, or that a notice be sent by mail to those who request in writing to be on a list, and any other means as determined by the Executive Officer to ensure adequate notice to the affected public. This rule requires that the notice contain the following:

i) The identity and location of the affected facility;

ii) The name and mailing address of the facility's contact person;

iii) The identity and address of the South Coast Air Quality Management District as the permitting authority processing the permit;

iv) The activity or activities involved in the permit action;

v) The emissions change involved in any permit revision;

vi) The name, address, and telephone number of a person whom interested persons may contact to review additional information including copies of the proposed permit, the application, all relevant supporting materials, including compliance documents as defined in paragraph (b)(5) of Rule 3000, and all other materials available to the Executive Officer which are relevant to the permit decision;

vii) A brief description of the public comment procedure; and,

viii) The time and place of any proposed permit hearing which may be held, or a statement of the procedure to request a proposed permit hearing if one has not already been requested.

The SCAQMD plans to meet all public notice and EPA review and comment requirements for this project. Compliance with this regulation is expected.

CONCLUSIONS

Staff finds that with the adoption of the attached conditions of certification the proposed Watson Cogeneration Steam and Electric Reliability Project (BP Watson) would comply with all applicable laws, ordinances, regulations, and standards (LORS) and would not result in any significant air quality-related impacts. Staff also finds that:

- The project would comply with applicable South Coast Air Quality Management District (SCAQMD or District) Rules and Regulations, including New Source Review (NSR) requirements (SCAQMD 2011).
- The project would not cause new violations of any NO_2, SO_2, or CO ambient air quality standards, and therefore, the project's direct NOx, SOx and CO emission impacts are not significant.
- Without proper mitigation, the project's NOx and VOC emissions would potentially contribute to existing violations of the state's 1-hour and the federal 8-hour ozone air quality standards. Staff has determined that emission offset credits from the South Coast Air Basin would mitigate the project's contribution to ozone impacts to a level that is not cumulatively considerable (**AQ-SC7**).
- Without mitigation, the project's PM10 emissions and PM10 precursor emissions of SOx would contribute to the existing violations of the state 24-hour PM10 air quality standard. However, staff has determined that PM10 emissions would be within currently permitted levels under Title V and that SOx emission reductions credits would mitigate the project's contribution to PM10 and PM10 precursor emissions impacts to a level that is not cumulatively considerable.
- Without mitigation, the project's PM2.5 emissions and PM2.5 precursor emissions of SOx would contribute to the existing violations of the state 24-hour PM2.5 air quality standard. However, staff has determined that PM2.5 emissions would be within currently permitted levels under Title V and that SOx emission reductions credits would mitigate the project's contribution to PM2.5 and PM2.5 precursor emissions impacts to a level that is not cumulatively considerable.

Staff proposes the following conditions of certification that include the SCAQMD proposed conditions from the FDOC with appropriate staff proposed verification language for each condition.

The Staff has proposed a number of permit conditions that are in addition to the permit conditions that the SCAQMD has proposed in the FDOC. In most cases the staff proposed permit conditions deal with air quality issues that the SCAQMD is not required to address. Conditions **AQ-SC1** through **AQ-SC5** are construction-related permit conditions. Condition **AQ-SC6** deals with the administrative procedures for project modifications. Condition **AQ-SC7** is a reporting requirement for the providing of

emission offsets. Condition **AQ-SC8** is a quarterly emission reporting requirement. Conditions **AQ-SC9** and **AQ-SC10** are cooling tower permit requirements. Staff proposes these conditions for the operation of the cooling towers because the SCAQMD does not consider cooling towers as permit units (see discussion of SCAQMD rule 1303(a)-BACT for Cooling Towers above), and thus they do not include permit conditions. However staff believes that they are potential sources of PM10/PM2.5, as shown in our analysis, and thus permit limits and verifications of those permit limits should be proposed. Conditions **AQ-1** through **AQ-15** are the SCAQMD permit conditions with staff proposed verification language added. Condition **AQ-2** incorporates a SCAQMD rule regarding emissions limit compliance for NOx emissions within the RECLAIM program.

PROPOSED CONDITIONS OF CERTIFICATION

The SCAQMD has a unique system of structuring and numbering their permit conditions. In order for the reader to avoid confusion between how the SCAQMD numbers their permit conditions and how the Energy Commission staff normally numbers permit conditions, the staff prepared the following table that cross references the conditions in the FDOC with the conditions presented by staff in this analysis.

Air Quality Table 23
SCAQMD Permit Conditions with Corresponding Commission Conditions of Certification

SCAQMD Permit Conditions	Energy Commission Condition of Certification	Condition Description
Combustion Turbines		
A63.12, .X1, .X2	AQ-1	Monthly and daily contaminant emission limit (PM10, CO, NOx, SOx & VOC)
S2.X1	AQ-2	Annual contaminant emissions limit (NOx).
A99.X2	AQ-3	Relief from 2.5ppm NOx limit during commissioning, startup and shut down. Commissioning, startup & shutdown time limits. Limit of number of startups per year.
A99.X3	AQ-3	Relief from 2.0 ppm CO limits during commissioning, startup and shut down. Commissioning, startup & shutdown time limits. Limit of number of startups per year.
A99.X4	AQ-3	Relief from 3.0 ppm CO limits during commissioning, startup and shut down. Commissioning, startup & shutdown time limits. Limit of number of startups per

Air Quality Table 23
SCAQMD Permit Conditions with Corresponding Commission Conditions of Certification

SCAQMD Permit Conditions	Energy Commission Condition of Certification	Condition Description
		year.
A99.X5	AQ-3	NOx limit for interim time period of end of commissioning to continuous emission monitoring system (CEMS) certification, not to exceed 12 months.
A99.X6	AQ-3	SOx limit for interim time period of end of commissioning to continuous emission monitoring system (CEMS) certification, not to exceed 12 months.
A99.X7	AQ-3	SOx limit for interim time period of end of commissioning to continuous emission monitoring system (CEMS) certification, not to exceed 12 months.
A195.X1	AQ-4	NOx emission limit of 2.0 ppm @ 15% O2 averaged over 1-hour.
A248.X2	AQ-4	CO emission limit of 2.0 ppm @ 15% O2 averaged over 1-hour.
A248.X3	AQ-4	CO emission limit of 3.0 ppm @ 15% O2 averaged over 1-hour.
A248.X4	AQ-4	VOC emission limit of 2.0 ppm @ 15% O2 averaged over 1-hour.
A327.1	AQ-5	Relief from emission limits, under Rule 475; project may violate either the mass emission limit or concentration emission limit, but not both at the same time.
A433.X1	AQ-3	Emission limit during startup.
B61.X1	AQ-6	H2S concentration limit for refinery gas.
B61.X2	AQ-6	H2S concentration limit for fuel gas.
C1.X1	AQ-6	Limits the turbine firing rate to no more than 1069.9 MM Btu per hour (non-commissioning).
C1.X2	AQ-6	Limits the duct burner firing rate to no more than 510 MM Btu per hour (non-commissioning).
D12.X1	AQ-6	Requires the installation of a fuel flow meter.

Air Quality Table 23
SCAQMD Permit Conditions with Corresponding Commission Conditions of Certification

SCAQMD Permit Conditions	Energy Commission Condition of Certification	Condition Description
D29.X1	AQ-7	Requires source tests for specific pollutants (NOx, CO, SOx, VOC, PM10, NH3) within 180 days of initial startup.
D29.X2	AQ-8	Requires source tests for ammonia (NH3); quarterly for the first year and annually thereafter.
D29.X3	AQ-7	Requires source tests for specific pollutants (SOx and VOC) once every three years.
D29.X4	AQ-7	Requires source tests for specific pollutants (PM10) once every year.
D82.X1	AQ-9	Requires the installation of CEMS for CO emissions.
D82.X2	AQ-9	Requires the installation of CEMS for NOx emissions.
D90.X1	AQ-9	Requires the installation of CEMS for fuel gas Total Reduced Sulfur compounds.
D90.X1	AQ-9	Requires the installation of CEMS for fuel gas H2S compounds.
H23.X1	NA	Establishes the applicability of 40CFR60 Subpart KKKK for the project contaminant NOx and SOx.
H23.X2	NA	Establishes the applicability of 40CFR60 Subpart KKKK for the project contaminant H2S.
I296.X1	AQ-15	Prohibited from operation unless the operator hold sufficient RTCs for the CTGs.
D28.1, D29X4 & K40.X	AQ-7, -8 & -9	Source test reporting requirements.
K67.X1	AQ-10	Requires record keeping of fuel use during commissioning, prior to and after CEMs certification.
I296.X1	AQ-15	Prohibited from operation unless the operator holds sufficient RTCs.
SCR/CO Catalyst		
A99.X1	AQ-11	Relief from 5ppm NH3 limit

Air Quality Table 23
SCAQMD Permit Conditions with Corresponding Commission Conditions of Certification

SCAQMD Permit Conditions	Energy Commission Condition of Certification	Condition Description
		during commissioning, startup and shut down. Commissioning, startup & shutdown time limits. Limit of number of startups per year.
A195.X1	AQ-11	Establishes the 5 ppm ammonia slip limit.
D12.X4	AQ-12	Requires a flow meter for the ammonia injection.
D12.X2	AQ-13	Requires a temperature meter at the SCR inlet.
D12.X3	AQ-14	Requires a pressure gauge to measure the differential pressure across the SCR grid.
D12.X5	AQ-14	Requires a pressure gauge to measure the differential pressure across the CO Catalyst grid.
Ammonia Storage Tank		
C157.X	See Hazardous Material section	Requires the installation of a pressure relief valve.
E144.X	See Hazardous Material section	Requires venting of the storage tank during filling only to the vessel from which it is being filled.
K67.2	See Hazardous Material section	Requires record keeping in the manner approved by the District Executive Officer.

Energy Commission staff understand that the site area for this project is largely paved. However, we include staff conditions normally required for undisturbed sites to maintain consistency and for any work in unpaved areas.

AQ-SC1 Air Quality Construction Mitigation Manager (AQCMM): The project owner shall designate and retain an on-site AQCMM who shall be responsible for directing and documenting compliance with Conditions of Certification **AQ-SC3**, **AQ-SC4** and **AQ-SC5** for the entire project site construction. The on-site AQCMM may delegate responsibilities to one or more AQCMM Delegates. The AQCMM and AQCMM Delegates shall have full access to all areas of construction on the project site, and shall have the authority to stop any or all construction activities as warranted by applicable construction mitigation conditions. The AQCMM and AQCMM Delegates may have other responsibilities in addition to those described in this condition. The AQCMM

shall not be terminated without written consent of the Compliance Project Manager (CPM).

Verification: At least 60 days prior to the start of ground disturbance, the project owner shall submit to the Energy Commission's Compliance Project Manager (CPM) for approval, the name, resume, qualifications, and contact information for the on-site AQCMM and all AQCMM Delegates. The AQCMM and all delegates must be approved by the CPM before the start of ground disturbance.

AQ-SC2 Air Quality Construction Mitigation Plan (AQCMP): The project owner shall provide an AQCMP, for approval, which details the steps that will be taken and the reporting requirements necessary to ensure compliance with Conditions of Certification **AQ-SC3**, **AQ-SC4,** and **AQ-SC5**.

Verification: At least 60 days prior to the start of any ground disturbance, the project owner shall submit the AQCMP to the CPM for approval. The AQCMP shall include effectiveness and environmental data for the proposed soil stabilizer. The CPM will notify the project owner of any necessary modifications to the plan within 30 days from the date of receipt. The AQCMP must be approved by the CPM before the start of ground disturbance.

AQ-SC3 Construction Fugitive Dust Control: The AQCMM shall submit documentation to the CPM in each Monthly Compliance Report that demonstrates compliance with the Air Quality Construction Mitigation Plan (AQCMP) mitigation measures for the purposes of minimizing fugitive dust emission creation from construction activities and preventing all fugitive dust plumes from leaving the project. The following fugitive dust mitigation measures shall be included in the Air Quality Construction Mitigation Plan (AQCMP) required by **AQ-SC2**, and any deviation from the AQCMP mitigation measures shall require prior CPM notification and approval.

A. The main access roads through the facility to the power block areas will be either paved or stabilized using soil binders, or equivalent methods, to provide a stabilized surface that is similar for the purposes of dust control to paving, that may or may not include a crushed rock (gravel or similar material with fines removed) top layer, prior to initiating construction in the main power block area, and delivery areas for operations materials (chemicals, replacement parts, etc.) will be paved prior to taking initial deliveries.

B. All unpaved construction roads and unpaved operation site roads, as they are being constructed, shall be stabilized with a non-toxic soil stabilizer or soil weighting agent that can be determined to be both as efficient or more efficient for fugitive dust control as ARB approved soil stabilizers, and shall not increase any other environmental impacts including loss of vegetation to areas beyond where the soil stabilizers are being applied for dust control. All other disturbed areas in the project construction site shall be watered as frequently as necessary during grading (consistent with **Biology** Conditions of Certification that address the minimization of standing water); and after active construction activities shall be stabilized with a non-toxic soil stabilizer or soil weighting agent, or alternative

approved soil stabilizing methods, in order to comply with the dust mitigation objectives of Condition of Certification **AQ-SC4**. The frequency of watering can be reduced or eliminated during periods of precipitation.

C. No vehicle shall exceed 10 miles per hour on unpaved areas within the construction site, with the exception that vehicles may travel up to 25 miles per hour on stabilized unpaved roads as long as such speeds do not create visible dust emissions.

D. Visible speed limit signs shall be posted at the construction site entrances.

E. All construction equipment vehicle tires shall be inspected and washed as necessary to be cleaned free of dirt prior to entering paved roadways.

F. Gravel ramps of at least 20 feet in length must be provided at the tire washing/cleaning station.

G. All unpaved exits from the construction site shall be graveled or treated to prevent track-out to public roadways.

H. All construction vehicles shall enter the construction site through the treated entrance roadways, unless an alternative route has been submitted to and approved by the CPM.

I. Construction areas adjacent to any paved roadway below the grade of the surrounding construction area or otherwise directly impacted by sediment from site drainage shall be provided with sandbags or other equivalently effective measures to prevent run-off to roadways, or other similar run-off control measures as specified in the Storm Water Pollution Prevention Plan (SWPPP), only when such SWPPP measures are necessary so that this condition does not conflict with the requirements of the SWPPP.

J. All paved roads within the construction site shall be swept daily or as needed (less during periods of precipitation) on days when construction activity occurs to prevent the accumulation of dirt and debris.

K. At least the first 500 feet of any paved public roadway exiting the construction site or exiting other unpaved roads en route from the construction site or construction staging areas shall be swept as needed (less during periods of precipitation) on days when construction activity occurs or on any other day when dirt or runoff resulting from the construction site activities is visible on the public paved roadways.

L. All soil storage piles and disturbed areas that remain inactive for longer than 10 days shall be covered, or shall be treated with appropriate dust suppressant compounds.

M. All vehicles that are used to transport solid bulk material on public roadways and that have potential to cause visible emissions shall be provided with a cover, or the materials shall be sufficiently wetted and

loaded onto the trucks in a manner to provide at least two feet of freeboard.

N. Wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) shall be used on all construction areas that may be disturbed. Any windbreaks installed to comply with this condition shall remain in place until the soil is stabilized or permanently covered with vegetation.

Verification: The AQCMM shall provide the CPM a Monthly Compliance Report (**COMPLIANCE-6**) to include the following to demonstrate control of fugitive dust emissions:

A. A summary of all actions taken to maintain compliance with this condition;

B. Copies of any complaints filed with the District in relation to project construction; and

C. Any other documentation deemed necessary by the CPM or AQCMM to verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion.

AQ-SC4 Dust Plume Response Requirement: The AQCMM or an AQCMM Delegate shall monitor all construction activities for visible dust plumes. Observations of visible dust plumes that have the potential to be transported off the project site and within 400 feet upwind of any regularly occupied structures not owned by the project owner indicates that existing mitigation measures are not resulting in effective mitigation. The AQCMP shall include a section detailing how the additional mitigation measures will be accomplished within the time limits specified. The AQCMM or Delegate shall implement the following procedures for additional mitigation measures in the event that such visible dust plumes are observed:

Step 1: The AQCMM or Delegate shall direct more intensive application of the existing mitigation methods within 15 minutes of making such a determination.

Step 2: The AQCMM or Delegate shall direct implementation of additional methods of dust suppression if Step 1, specified above, fails to result in adequate mitigation within 30 minutes of the original determination.

Step 3: The AQCMM or Delegate shall direct a temporary shutdown of the activity causing the emissions if Step 2, specified above, fails to result in effective mitigation within one hour of the original determination. The activity shall not restart until the AQCMM or Delegate is satisfied that appropriate additional mitigation or other site conditions have changed so that visual dust plumes will not result upon restarting the shutdown source. The owner/operator may appeal to the CPM any directive from the AQCMM or Delegate to shut down an activity, if the shutdown shall go into effect within one hour of the original determination, unless overruled by the CPM before that time.

Verification: The AQCMM shall provide the CPM a Monthly Compliance Report (**COMPLIANCE-6**) to include:

A. a summary of all actions taken to maintain compliance with this condition;

B. copies of any complaints filed with the District in relation to project construction; and

C. any other documentation deemed necessary by the CPM and AQCMM to verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion.

AQ-SC5 Diesel-Fueled Engine Control: The AQCMM shall submit to the CPM, in the Monthly Compliance Report, a construction mitigation report that demonstrates compliance with the AQCMP mitigation measures for purposes of controlling diesel construction-related emissions. The following off-road diesel construction equipment mitigation measures shall be included in the Air Quality Construction Mitigation Plan (AQCMP) required by **AQ-SC2**, and any deviation from the AQCMP mitigation measures shall require prior CPM notification and approval.

A. All diesel-fueled engines used in the construction of the facility shall have clearly visible tags issued by the on-site AQCMM showing that the engine meets the conditions set forth herein.

B. All construction diesel engines with a rating of 50 hp or higher shall meet, at a minimum, the Tier 3 California Emission Standards for Off-Road Compression-Ignition Engines, as specified in California Code of Regulations, Title 13, section 2423(b)(1), unless a good faith effort to the satisfaction of the CPM that is certified by the on-site AQCMM demonstrates that such engine is not available for a particular item of equipment. All efforts to obtain diesel-powered construction equipment shall emphasize this requirement. In the event that a Tier 3 engine is not available for any off-road equipment larger than 50 hp, that equipment shall be equipped with a Tier 2 engine, or an engine that is equipped with retrofit controls to reduce exhaust emissions of nitrogen oxides (NOx) and diesel particulate matter (DPM) to no more than Tier 2 levels unless certified by engine manufacturers or the on-site AQCMM that the use of such devices is not practical for specific engine types. For purposes of this condition, the use of such devices is "not practical" for the following, as well as other, reasons.

1. There is no available retrofit control device that has been verified by either the California Air Resources Board or U.S. Environmental Protection Agency to control the engine in question to Tier 2 equivalent emission levels and the highest level of available control using retrofit or Tier 1 engines is being used for the engine in question; or

2. The construction equipment is intended to be on site for 5 days or less.

3. The CPM may grant relief from this requirement if the AQCMM can demonstrate a good faith effort to comply with this requirement and that compliance is not practical.

C. The use of a retrofit control device may be terminated immediately, provided that the CPM is informed within 10 working days of the termination and that a replacement for the equipment item in question meeting the controls required in item "B" occurs within 10 days of termination of the use, or if the equipment would be needed to continue working at this site for more than 15 days after the use of the retrofit control device is terminated, if one of the following conditions exists :

1. The use of the retrofit control device is excessively reducing the normal availability of the construction equipment due to increased down time for maintenance, and/or reduced power output due to an excessive increase in back pressure.

2. The retrofit control device is causing or is reasonably expected to cause engine damage.

3. The retrofit control device is causing or is reasonably expected to cause a substantial risk to workers or the public.

4. Any other seriously detrimental cause which has the approval of the CPM prior to implementation of the termination.

D. All heavy earth-moving equipment and heavy duty construction-related trucks with engines meeting the requirements of (B) above shall be properly maintained and the engines tuned to the engine manufacturer's specifications.

E. All diesel heavy construction equipment shall not idle for more than five minutes. Vehicles that need to idle as part of their normal operation (such as concrete trucks) are exempted from this requirement.

F. Construction equipment will employ electric motors when feasible.

Verification: The AQCMM shall include in the Monthly Compliance Report the following to demonstrate control of diesel construction-related emissions:

A. A summary of all actions taken to control diesel construction related emissions;

B. A list of all heavy equipment used on site during that month, including the owner of that equipment and a letter from each owner indicating that equipment has been properly maintained; and

C. Any other documentation deemed necessary by the CPM, and the AQCMM to verify compliance with this condition. Such information may be provided via electronic format or disk at the project owner's discretion.

AQ-SC6 The project owner shall provide the CPM copies of all District issued Authority-to-Construct (ATC) and Permit-to-Operate (PTO) documents for the

facility. The project owner shall submit to the CPM for review and approval any modification proposed by the project owner to any project air permit. The project owner shall submit to the CPM any modification to any permit proposed by the District or U.S. Environmental Protection Agency (U.S. EPA), and any revised permit issued by the District or U.S. EPA, for the project.

Verification: The project owner shall submit any ATC, PTO, and proposed air permit modifications to the CPM within five working days of its submittal either by 1) the project owner to an agency, or 2) receipt of proposed modifications from an agency. The project owner shall submit all modified air permits to the CPM within 15 days of receipt.

AQ-SC7 The project owner shall provide emission reduction credits to offset combined-cycle turbine exhaust NOx, VOC and SOx emissions in the form and amount required by the District. RECLAIM Trading Credits (RTCs) shall be provided for NOx and SOx as is necessary to demonstrate compliance with Condition of Certification **AQ-15**.

Emission reduction credits (ERCs) shall be provided for VOC (187 lb/day, includes offset ratio of 1.2:1.0). The project owner shall surrender the ERCs for VOC from among those that are listed in the table below or a modified list, as allowed by this condition. If additional ERCs are submitted, the project owner shall submit an updated table including the additional ERCs to the CPM. The project owner shall request CPM approval for any substitutions, modifications, or additions of credits listed.

The CPM, in consultation with the District, may approve any such change to the ERC list provided that the project remains in compliance with all applicable laws, ordinances, regulations, and standards, the requested change(s) will not cause the project to result in a significant environmental impact, and the SCAQMD confirms that each requested change is consistent with applicable federal and state laws and regulations.

The project owner shall request from the SCAQMD a report of the NSR Ledger Account for the project after the SCAQMD has issued the Permit to Construct. This report is to specifically identify the ERCs used to offset the project emissions.

Certificate Number	Amount (lbs/day)	Pollutant
AQ007588	4	VOC
AQ008748	7	VOC
AQ010814	50	VOC
To be determined (TBD)	126	VOC

Verification: The project owner shall submit to the CPM the NSR Ledger Account, showing that all project offset requirements have been met, 15 days prior to initiating construction for Priority Reserve credits, and 30 days prior to turbine first fire for traditional ERCs. Prior to commencement of construction, the project owner shall obtain sufficient Reclaim Trading Credits (RTCs) to satisfy the District's requirements for the first year of operation as prescribed in Condition of Certification **AQ-15**. If the CPM approves a substitution or modification to the list of ERCs, the CPM shall file a

statement of the approval with the project owner and Energy Commission's docket for BP Watson. The CPM shall maintain an updated list of approved ERCs for the project.

AQ-SC8 The project owner shall submit to the CPM Quarterly Operation Reports, following the end of each calendar quarter, that include operational and emissions information as necessary to demonstrate compliance with the Conditions of Certification herein. The Quarterly Operation Report will specifically note or highlight incidences of noncompliance.

Verification: The project owner shall submit the Quarterly Operation Reports to the CPM and APCO no later than 30 days following the end of each calendar quarter.

AQ-SC9 The project owner shall perform quarterly cooling tower recirculating water quality testing, or shall provide for continuous monitoring of conductivity as an indicator, for total dissolved solids content.

Verification: The project owner shall submit to the CPM cooling tower recirculating water quality tests or a summary of continuous monitoring results and daily recirculating water flow in the Quarterly Operation Report (**AQ-SC8**). If the project owner uses continuous monitoring of conductivity as an indicator for total dissolved solids content, the project owner shall submit data supporting the calibration of the conductivity meter and the correlation with total dissolved solids content at least once each year in a Quarterly Operation Report (**AQ-SC8**).

AQ-SC10 The new cooling tower cells daily PM10 emissions shall be limited to 7.92 lb/day in total for both cooling tower cells. The cooling towers shall be equipped with a drift eliminator to control the drift fraction to 0.001% of the circulating water flow. Total dissolved solids (TDS) shall be limited to 3,575 ppmw . The project owner shall estimate daily PM10 emissions from the cooling towers using the water quality testing data or continuous monitoring data and daily circulating water flow data collected on a quarterly basis. Compliance with the cooling tower PM10 emission limit shall be demonstrated as follows:

PM10 = cooling water recirculation rate * total dissolved solids concentration in the blowdown water * design drift rate.

Verification: The project owner shall submit to the CPM daily cooling tower PM10 emission estimates in the Quarterly Operation Report (**AQ-SC8**).

The following Conditions of Certification incorporate District conditions as required in the Determination of Compliance. Refer to **Air Quality Table 23** above to relate these conditions to the District's conditions.

AQ-1 The project owner shall limit the emissions from the new gas fired combustion turbine train exhaust stack as follows:

Contaminant	Emissions Limit
PM10	1,243 lbs in any one day (total combined emissions from all 5 Watson Cogeneration Units)
VOC	3,095 lbs in any one month

The operator shall initially calculate the daily PM10 emissions using daily fuel use data for each combustion unit, the higher heating value of the fuel burned in each combustion unit, and the following emissions factors: 0.00393 lbs PM10 / MMBTU for Natural Gas and 0.00402 lbs PM10 / MMBTU for Refinery Gas.

The PM10 emission factor for Cogeneration Units 1, 2, 3, 4, and 5 shall be revised annually based on results of individual PM10 source tests performed as specified in permit conditions D28.1 and D29X4 (**AQ-7**). The PM10 emission factor shall be calculated as the average emission rate in lb/MMBtu for all valid source test runs during each individual source test.

For Refinery Gas, the following formula should be used to calculate emissions factors, in units of lbs VOC/MMscf: 2.94E-7 x Fd-Factor x GCV_v; where the Fd-Factor is the ratio of the volume of products of combustion to the fuel heat content, in units of dscf/MMBtu, and GCV_v is gross fuel calorific value, in units of Btu/scf. Monthly averages of Fd-Factor and GCV_v for Refinery Gas shall be used in this calculation.

For the purpose of this condition, the term “normal operations” is defined as the turbine is able to supply electrical energy to the power grid.

Verification: The project owner shall submit all emission calculations, fuel use, CEM records and a summary demonstrating compliance of all emission limits stated in this Condition for approval to the CPM on a quarterly basis in the quarterly emissions report required in (**AQ-SC8**).

AQ-2 The project owner/operator shall not produce emissions of oxides of nitrogen from the facility that exceed the RECLAIM Trading Credits holdings of 39.9 tons/yr required in Condition of Certification **AQ-15** within a calendar year.

Verification: The project owner/operator shall submit to the CPM no later than 60 days following the end of each calendar year, the SCAQMD required (via Rule 2004) Quarterly Certification of Emissions (or equivalent) for each quarter and the Annual Permit Emissions Program report (or equivalent) as prescribed by the SCAQMD Executive Officer.

AQ-3 The commissioning period shall not exceed 550 hours. The time for cold startup shall not exceed 3 hours for each startup. The time for warm startup shall not exceed 1 hour. The time for shutdown shall not exceed 1 hour. The turbine shall be limited to 4 cold startups per year, 24 warm startups per year, and 29 shutdowns per year.

The 5 ppm NH3 limit, 2 ppm NOx emission limit 2 ppm CO emission limit, and 3 ppm CO emission limit shall not apply during commissioning, start-up, and shutdown periods.

The 44 LBS/MMCF NOx emission limit, 0.80 LBS/MMCF SOx emission limit and 5.07 LBS/MMCF SOx emission limit shall only apply during the interim reporting period to report RECLAIM emissions.

The operator shall comply at all times with the 2.0 ppm 1 hour BACT limit for NOx, except as defined in condition A99.X2, (**AQ-3,** this condition) and for the following operating scenarios:

Operating Scenario	***Maximum Hourly Emission Limit***	***Operational Limit***
Cold Start	175.0	NOx emissions shall not exceed 211.24 lbs per cold start-up.
Warm Start	21.32	NOx emissions shall not exceed 21.32 lbs per warm start-up.
Shutdown	12.85	NOx emissions shall not exceed 12.85 lbs per shutdown.

The interim reporting period shall not exceed 12 months from the initial startup date. Written records of commissioning, start-ups and shutdowns shall be kept and made available to SCAQMD and submitted to the CPM for approval.

The project owner/operator shall complete construction and the project shall be fully operational within three years of the issuance of the permit to construct from the SCAQMD.

Verification: The project owner shall provide the SCAQMD and the CPM with the written notification of the initial start-up date no later than 60 days prior to the startup date. The project owner shall submit, commencing one month from the time of gas turbine first fire, a monthly commissioning status report throughout the duration of the commissioning phase that demonstrates compliance with this condition and the emission limits of Condition **AQ-13**. The monthly commissioning status report shall include criteria pollutant emission estimates for each commissioning activity and total commissioning emission estimates. The monthly commissioning status report shall be submitted to the CPM until the report includes the completion of the initial commissioning activities. The project owner shall provide start-up and shutdown occurrence and duration data as part as part of the Quarterly Operation Report (**AQ-SC8**) including records of all aborted turbine startups. The project owner shall make the site available for inspection of the commissioning and startup/shutdown records by representatives of the District, CARB and the Commission.

AQ-4 The new combustion turbine stack shall have the following emission limitations.

- 2.0 PPM NOx emission averaged over 60 minutes at 15% oxygen, dry basis.
- 2.0 ppm CO emission averaged over 60 minutes at 15% oxygen, dry basis.
- 3.0 ppm CO emission averaged over 180 minutes at 15% oxygen, dry basis.
- 2.0 ppm VOC emission averaged over 60 minutes at 15% oxygen, dry basis.

- 5.0 ppm NH_3 emission averaged over 60 minutes at 15% oxygen, dry basis.

Verification: The project owner shall submit to the CPM for approval all emissions and emission calculations on a quarterly basis as part of the quarterly emissions report of Condition of Certification **AQ-SC8**.

AQ-5 The project owner may exceed either the mass or concentration emission limits, but not both limits at the same time, as set forth in Conditions of Certification **AQ-1, -2, -3** or **-4**.

Verification: The project owner shall submit to the CPM for approval all emissions and emission calculations on a quarterly basis as part of the quarterly emissions report of Condition of Certification **AQ-SC8**.

AQ-6 The operator shall not use refinery gas containing the following specified compounds:

Compound	ppm by volume
Total Reduced Sulfur (calculated as H2S) greater than	40
Total Reduced Sulfur (calculated as H2S) greater than	30

The 40 ppm limit shall be based on a rolling 3-hour averaging period. The 30 ppm limit shall be based on a rolling 24-hour averaging period.

Refinery gas is defined as a mixture of refinery fuel gas, produced within the refinery that may be mixed with natural gas obtained from a utility regulated by the Public Utilities Commission (PUC), in order to balance heat content of the fuel gas mixture, (formed at a point upstream of the sampling location for Total Reduced Sulfur concentration) shall not exceed 50% of the total, by Higher Heating Value (HHV) content.

The operator shall not use fuel gas containing the following specified compounds:

Compound	ppm by volume
H2S greater than	162
H2S greater than	60

The 162 ppm limit shall be based on a rolling 3-hour averaging period. The 60 ppm limit shall be based on a rolling 365 successive day average.

The operator shall limit the CTG firing rate to no more than 1069.9 MM Btu per hour. The operator shall limit the HRSG duct burner firing rate to no more than 510 MM Btu per hour.

For the purpose of this condition, firing rate shall be defined as energy or heat input of natural gas and refinery gas to the equipment combustion chamber based on the higher heating value (HHV) of the natural gas and refinery gas used.

The refinery gas input to the turbine in any hour shall not exceed 35% of the total volume of gas combusted. Refinery gas shall be as defined in condition B61.X1 (Condition **AQ-6**).

The operator shall install and maintain a(n) continuous monitoring system to accurately indicate the energy being supplied to the gas turbine by measurement of Higher Heating Value (HHV) of refinery fuel gas.

The operator shall also install and maintain a device to continuously record the parameter being measured. For the purpose of this condition, continuously record shall be defined as recording at least once every hour and shall be calculated based upon the average of the continuous monitoring for that hour. The purpose of this condition is to demonstrate compliance with the limitation of refinery fuel gas, as having natural gas accounting for no more than 50% of the Higher Heating Value (HHV) of the mixture.

The operator shall maintain records in a manner approved by the District to demonstrate compliance with this condition. The operator shall install and maintain a fuel flow meter and recorder to accurately indicate and record the fuel usage being supplied to the turbine.

Verification: The project owner shall submit to the CPM for approval all fuel usage records on a quarterly basis as part of the quarterly emissions report of Condition of Certification **AQ-SC8**.

AQ-7 The project owner shall conduct an initial source test for NOx, CO, SOx, VOC, NH_3, PM10 and PM2.5 and periodic source test every three years thereafter for NOx, CO, SOx, VOC, PM10 and PM2.5 of the new turbine exhaust stack in accordance with the following requirements:

- The project owner shall submit a source test protocol to the SCAQMD and the CPM 45 days prior to the proposed source test date for approval. The protocol shall include the proposed operating conditions of the gas turbine, the identity of the testing lab, a statement from the lab certifying that it meets the criteria of SCAQMD Rule 304, and a description of all sampling and analytical procedures.
- The initial source test shall be conducted no later than 180 days following the date of first fire.
- The SCAQMD and CPM shall be notified at least 10 days prior to the date and time of the source test.
- The source test shall be conducted with the gas turbine operating under maximum, average and minimum loads.
- The source test shall be conducted to determine the oxygen levels in the exhaust.
- The source test shall measure the fuel flow rate, the flue gas flow rate and the turbine generating output in MW.

- The source test shall be conducted for the pollutants listed using the methods, averaging times, and test locations indicated and as approved by the CPM as follows:

Source Test Requirements

Pollutant	Method	Averaging Time	Test Location
NOx	SCAQMD Method 100.1	1 hour	Outlet of SCR
CO	SCAQMD Method 100.1	1 hour	Outlet of SCR
SOx	District Method 307.91	N/A	Fuel Sample
VOC	District Method 25.3 or TO-12	1 hour	Outlet of SCR
PM10	District Method 5	4 hours	Outlet of SCR
PM2.5	EPA Methods 201A and 202	4 hours	Outlet of SCR
Ammonia	SCAQMD Methods 5.3 and 207.1 or U.S. EPA Method 17.	1 hour	Outlet of SCR

- The source test results shall be submitted to the SCAQMD and the CPM no later than 60 days after the source test was conducted.
- All emission data is to be expressed in the following units:
  1. ppmv corrected to 15% oxygen dry basis,
  2. pounds per hour,
  3. pounds per million cubic feet of fuel burned and
  4. additionally, for PM10 only, grains per dry standard cubic feet of fuel burned.
- Exhaust flow rate shall be expressed in terms of dry standard cubic feet per minute and actual cubic feet per minute.
- All moisture concentrations shall be expressed in terms of percent corrected to 15% oxygen.
- For the purpose of this condition, alternative test methods may be allowed for each of the above pollutants upon concurrence of the AQMD, CARB, EPA and the Energy Commission.

Verification: The project owner shall submit the proposed protocol for the initial source tests 45 days prior to the proposed source test date to both the SCAQMD and CPM for approval. The project owner shall submit source test results no later than 60

days following the source test date to both the SCAQMD and CPM. The project owner shall notify the SCAQMD and CPM no later than 10 days prior to the proposed initial source test date and time.

AQ-8 The project owner shall conduct source testing of the turbine exhaust stack in accordance with the following requirements:

- The project owner shall submit a source test protocol to the SCAQMD and the CPM for approval no later than 45 days prior to the proposed source test date. The protocol shall include the proposed operating conditions of the gas turbine, the identity of the testing lab, a statement from the lab certifying that it meets the criteria of SCAQMD Rule 304, and a description of all sampling and analytical procedures.
- Source testing for ammonia slip only shall be conducted quarterly for the first 12 months of operation and annually thereafter.
- NOx concentrations as determined by CEMS shall be simultaneously recorded during the ammonia test. If the NOx CEMS is inoperable, a test shall be conducted to determine the NOx emission by using SCAQMD Method 100.1 measured over a 60 minute time period.
- Source testing shall be conducted to determine the ammonia emissions from the new turbine exhaust stack using SCAQMD Method 5.3 and 207.1 or U.S. EPA Method 17 measured over a 1 hour averaging period at the outlet of the SCR.
- The SCAQMD and CPM shall be notified of the date and time of the source testing at least 7 days prior to the test.
- The source test shall be conducted and the results submitted to the SCAQMD and CPM within 45 days after the test date.
- Source testing shall measure the fuel flow rate, the flue gas flow rate and the gas turbine generating output.
- The test shall be conducted when the equipment is operating at 80% load or greater.
- If the turbine is not in operation during one quarter, then no testing is required during that quarter.
- All emission data is to be expressed in the following units:
  1. ppmv corrected to 15% oxygen,
  2. pounds per hour,
  3. pounds per million cubic feet of fuel burned.

Verification: The project owner shall submit the proposed protocol for the source tests 45 days prior to the proposed source test date to both the SCAQMD and CPM for approval. The project owner shall notify the SCAQMD and CPM no later than 7 days prior to the proposed source test date and time. The project owner shall submit source

test results no later than 60 days following the source test date to both the SCAQMD and CPM.

AQ-9 The project owner shall install and maintain a CEMS in the exhaust stack of the combustion turbine train to measure the following parameters:

- NOx concentration in ppmv and CO concentration in ppmv.
- Concentrations shall be corrected to 15% oxygen on a dry basis.
- The CEMS will convert the actual CO concentrations to mass emission rates (lb/hr) and record the hourly emission rates on a continuous basis.
- The CEMS shall be installed and operated to measure CO concentration over a one and three hour averaging time periods.
- The CEMS shall be installed and operated in accordance with an approved SCAQMD Rule 218 CEMS plan application and the requirements of Rule 2012.
- The CO CEMS shall be installed and operating no later than 90 days after initial start-up of the turbine.
- The NOx CEMS shall be installed and operating no later than 90 days after initial start-up of the turbine.

During the interim period between the initial start-up and the provisional certification date of the CEMS, the project owner shall comply with the monitoring requirements of Rule 2012 (h)(2) and Rule 2012 (h)(3). Within two weeks of the turbine start-up date, the project owner shall provide written notification to the SCAQMD of the exact date of start-up.

Verification: Within 30 days of certification, the project owner shall notify the CPM of the completion of the certification process for the CEMS.

AQ-10 The project owner shall keep records in a manner approved by the SCAQMD for the following items:

- Commissioning hours, type of control, and fuel use
- Date and time of each start-up and shutdown
- In addition to the requirements of a certified CEMS, fuel use records shall be kept during and after the commissioning period and prior to CEMS certification
- Minute by minute data (NOX and O2 concentration and fuel flow at a minimum) for each turbine start-up.

Verification: The project owner shall submit to the CPM for approval all fuel usage records on a quarterly basis as part of the quarterly emissions report of Condition of Certification **AQ-SC8**.

AQ-11 The owner/operator shall determine the hourly ammonia slip emissions from the exhaust stack via both the following formulas:

SCAQMD Requirement

NH3 (ppmv) = [a-b*(c*1.2)/1E6]*1E6/b

Where:

a = NH3 injection rate (lb/hr) / 17(lb/lbmol),

b = dry exhaust flow rate (scf/hr) / 385.5 (scf/lbmol),

c = change in measured NOx across the SCR (ppmvd at 15% O2)

The above described ammonia slip calculation procedure shall not be used for compliance determination or emission information determination without corroborative data using an approved reference method for the determination of ammonia for the District.

Energy Commission Requirement:

NH3 (ppmv @ 15% O2) = ((a-b*(c/1E6))*1E6/b)*d, where:

a = NH3 injection rate (lb/hr)/17(lb/lbmol),

b = dry exhaust gas flow rate (lb/hr)/ (29(lb/lbmol), or

b = dry exhaust flow rate (scf/hr) / 385.5 (scf/lbmol),

c = change in measured NOx concentration ppmv corrected to 15% O2 across catalyst, and

d = correction factor.

The correction factor shall be derived through compliance testing by comparing the measured and calculated ammonia slip. The correction factor shall be reviewed and approved by the CPM on at least an annual basis. The correction factor may rely on previous compliance source test results or other comparable analysis as the CPM finds the situation warrants. The above described ammonia slip calculation procedure shall be used for Energy Commission compliance determination for the ammonia slip limit as prescribed in Condition of Certification **AQ-4** and reported to the CPM on a quarterly basis as prescribed in Condition of Certification **AQ-SC8**.

The 5 ppm NH3 limit(s) shall not apply during commissioning, start-up, and shutdown periods. The commissioning period shall not exceed 550 hours. The time for cold startup shall not exceed three hours for each startup. The time for warm startup shall not exceed one hour. The time for shutdown shall not exceed one hour. The turbine shall be limited to four cold startups per year, 12 warm startups per year, and 16 shutdowns per year.

An exceedance of the ammonia slip limit as demonstrated by the above Energy Commission formula shall not in and of itself constitute a violation of the limit. An exceedance of the ammonia slip limit shall not exceed 6 hours in duration. In the event of an exceedance of the ammonia slip limit exceeding 6

hours duration, the project owner shall notify the CPM within 72 hours of the occurrence. This notification must include, but is not limited to: the date and time of the exceedance, duration of the exceedance, estimated emissions as a result of the exceedance, the suspected cause of the exceedance and the corrective action taken or planned. Exceedances of the ammonia limit that are less than or equal to 6 hours in duration shall be noted in a specific section within the Quarterly Report (**AQ-SC8**). This section shall include, but is not limited to: the date and time of the exceedance, duration of the exceedance, and the estimated emissions as a result of the exceedance. Exceedances shall be deemed chronic if they total more than 10% of the operation. Chronic exceedances must be investigated and redressed in a timely manner and in conjunction with the CPM through the cooperative development of a compliance plan. The compliance plan shall be developed to bring the project back into compliance first and foremost and shall secondly endeavor to do so in a feasible and timely manner, but shall not be limited in scope.

The owner/operator shall maintain compliance with the ammonia slip limit, redress exceedances of the ammonia slip limit in a timely manner, and avoid chronic exceedances of the ammonia slip limit. Exceedances shall be deemed a violation of the ammonia slip limit if they are not properly redressed as prescribed herein.

The owner/operator shall install a NOx analyzer to measure the SCR inlet NOx ppm accurate to within +/- 5% calibrated at least once every 12 months.

Verification: The project owner shall include ammonia slip concentrations averaged on an hourly basis calculated via both protocols provided as part of the Quarterly Operational Report required in Condition of Certification **AQ-SC8**. The project owner shall submit all calibration results performed to the CPM within 60 days of the calibration date. The project owner shall submit to the CPM for approval a proposed correction factor to be used in the Energy Commission formula at least once a year but not to exceed 180 days following the completion of the annual ammonia compliance source test. Exceedances of the ammonia limit shall be reported as prescribed herein. Chronic exceedances of the ammonia slip limit shall be identified by the project owner and confirmed by the CPM within 60 days of the fourth quarter Quarterly Operational Report (**AQ-SC8**) being submitted to the CPM. If a chronic exceedance is identified and confirmed, the project owner shall work in conjunction with the CPM to develop a reasonable compliance plan to investigate and redress the chronic exceedance of the ammonia slip limit within 60 days of the above confirmation.

AQ-12 The operator shall install and maintain an ammonia injection flow meter and recorder to accurately indicate and record the ammonia injection flow rate being supplied the turbine. The device or gauge shall be accurate to within plus or minus 5% and shall be calibrated once every twelve months.

Continuously recording is defined for this condition as at least once every hour and is based on the average of the continuous monitoring for that hour.

Verification: The project owner shall submit to the CPM no less than 30 days after installation, a written statement by a California registered Professional Engineer stating

that said engineer has reviewed the as-built-designs or inspected the identified equipment and certifies that the appropriate device has been installed and is functioning properly. The project owner shall submit annual calibration results within 30 days of their successful completion.

AQ-13 The operator shall install and maintain a temperature gauge and recorder to accurately indicate and record the temperature in the exhaust at the inlet of the SCR reactor. The gauge shall be accurate to within plus or minus 5% and shall be calibrated once every twelve months. The catalyst temperature range shall remain between 740 degree F and 840 degree F.

Continuously recording is defined for this condition as at least once every hour and is based on the average of the continuous monitoring for that hour.

Verification: The project owner shall submit to the CPM no less than 30 days after installation, a written statement by a California registered Professional Engineer stating that said engineer has reviewed the as-built-designs or inspected the identified equipment and certifies that the appropriate device has been installed and is functioning properly. The project owner shall submit annual calibration results within 30 days of their successful completion.

AQ-14 The operator shall install and maintain a pressure gauge and recorder to accurately indicate and record the pressure differential across the SCR catalyst bed in inches of water column. The gauge shall be accurate to within plus or minus 5% and shall be calibrated once every twelve months. The operator shall install and maintain a(n) pressure gauge to accurately indicate the differential pressure across the CO catalyst reactor in inches water column.

Continuously recording is defined for this condition as at least once every month and is based on the average of the continuous monitoring for that month.

Verification: The project owner shall submit to the CPM no less than 30 days after installation, a written statement by a California registered Professional Engineer stating that said engineer has reviewed the as-built-designs or inspected the identified equipment and certifies that the appropriate device has been installed and is functioning properly. The project owner shall submit annual calibration results within 30 days of their successful completion.

AQ-15 The project equipment shall not be operated unless the project owner demonstrates to the SCAQMD Executive Officer that the facility holds sufficient Reclaim Trading Credits (RTCs) to offset the prorated annual emissions increase for the first compliance year of operation. In addition, this equipment shall not be operated unless the project owner demonstrates to the Executive Officer that, at the commencement of each compliance year after the first compliance year of operation, the facility holds sufficient RTCs in an amount equal to the annual emission increase. The project owner shall submit all such information to the CPM for approval.

To comply with this condition, the operator shall, prior to the 1st compliance year hold a minimum NOx RTCs of 99,850 lbs/yr and a minimum SOx RTCs of 31,050 lbs/yr. This condition shall apply during the 1st 12 months of operation, commencing with the initial operation of the gas turbine/heat recovery steam generator.

ACRONYMS

AQCMM	Air Quality Construction Mitigation Manager
AQCMP	Air Quality Construction Mitigation Plan
CARB	California Air Resources Board
BACT	Best Available Control Technology
bhp	brake horse power
CEC	California Energy Commission (or Energy Commission)
CEQA	California Environmental Quality Act
CO	Carbon Monoxide
CPM	(CEC) Compliance Project Manager
ERC	Emission Reduction Credit
FDOC	Final Determination Of Compliance
gr	Grains (1 gr $\cong$ 0.0648 grams)
HRSG	Heat Recovery Steam Generator
ISCST3	Industrial Source Complex Short Term, version 3
MMBtu	Million British thermal units
MW	Megawatts (1,000,000 Watts)
NH_3	Ammonia
NO_2	Nitrogen Dioxide
NOx	Oxides of Nitrogen *or* Nitrogen Oxides
NSR	New Source Review
PDOC	Preliminary Determination Of Compliance
PM10	Particulate Matter less than 10 microns in diameter
PM2.5	Particulate Matter less than 2.5 microns in diameter
ppm	Parts Per Million
ppmv	Parts Per Million by Volume
ppmvd	Parts Per Million by Volume, Dry
PRC	Priority Reserve Credit
PSA	Preliminary Staff Assessment (this document)
PSD	Prevention of Significant Deterioration
RECLAIM	Regional Clean Air Incentives Market
ROG	Reactive Organic Gases
RTC	RECLAIM Trading Credit
SCAQMD	South Coast Air Quality Management SCAQMD (also: District)
scf	Standard Cubic Feet
SCR	Selective Catalytic Reduction
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SO_3	Sulfate
SOx	Oxides of Sulfur
SoCAB	South Coast Air Basin
U.S. EPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds

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IR QUALITY APPENDIX AIR-1

Greenhouse Gas Emissions

Testimony of Steve Radis, Matthew Layton, Gerry Bemis and David Vidaver

SUMMARY OF CONCLUSIONS

The Watson Cogeneration Steam and Electric Reliability Project (BP Watson) is a proposed addition to the state's electricity system that would produce greenhouse gas (GHG) emissions. And, more importantly, BP Watson would cogenerate steam to improve the operations at an existing petroleum oil refinery and burn waste refinery gas while generating electricity. The proposed BP Watson project will add a nominal 85 megawatt (MW) combustion turbine generator (CTG) with a single-pressure heat recovery steam generator (HRSG) to provide additional process steam to the BP Carson refinery. The additional unit is sized and designed to provide reliable base load operations with supplemental duct firing in the HRSG. The project includes one General Electric (GE) 7EA CTG, with an inlet fogging system, one duct fired HRSG, two redundant natural gas compressors, one boiler feedwater (BFW) pump, one circulating water pump, two new cells added to an existing cooling tower, electrical distribution system, instrumentation and controls, and all necessary auxiliary equipment as described herein. The Applicant's objectives are to cogenerate additional process steam in response to the refinery's process steam demand, burn waste refinery gases, and generate electricity.

Electricity is produced by operation of an inter-connected system of generation resources. Operation of one power plant, like the BP Watson project, affects all other power plants in the interconnected system. But, the operation of the BP Watson cogeneration project would also affect (i.e., displace) the use of an industrial steam boiler too. The operation of BP Watson would affect both the overall electricity system operation industrial steam boiler operation, and, therefore, GHG emissions in several ways:

- The BP Watson project would contribute to the Air Resources Board's goal of adding new combined heat and power (CHP or cogeneration) resources by 2020 as part of their strategy to meet the greenhouse gas emissions reduction goals of AB 32. CHP, by "using" fuel energy twice to generate both electric power and process heat, dramatically increases the net efficiency of the fuel use and reduces California GHG emissions.
- The BP Watson project would provide replacement energy for high GHG emitting (e.g., out-of-state coal) electricity generation that must be phased out to meet the State's new Emissions Performance Standard implemented as required by SB 1368.
- The BP Watson project would replace generation capacity provided by aging and once-through cooling power plants in the Los Angeles Basin Local Capacity Area. It is presently anticipated that replacement capacity will be needed for a share of the once-through cooling capacity in the area.
- The BP Watson project would help to meet local and system-wide resource adequacy (RA) requirements. The project's net qualifying capacity (NQC) will be

determined by its exports to the grid during peak hours in each month.[1] Average on-site electricity consumption during the peak hour of the year reduces forecasted demand by a similar amount (plus avoided transmission and distribution losses), and thus reduces system-wide and local capacity requirements through its impact on the demand forecast.

As proposed, BP Watson would be used in a base load mode of operation to provide for process steam to an adjacent thermal host – BP Carson Refinery. The high reliability of the BP Watson facility would significantly reduce the possibility of refinery upsets due to loss of steam or power. With an expected capacity factor of up to 95 percent, BP Watson would continue the trend of newer, more efficient natural gas facilities displacing electrical energy production from older, less efficient facilities. However, BP Watson will not be able to run at this very high utilization rate unless it is either providing on-site power or it can arrange contract terms to accommodate such a high usage rate. The Applicant has not provided any information to demonstrate that such a high utilization rate is likely, but for purposes of GHG calculations and estimates, staff used 100 percent capacity factor, or 8,760 hour of operation per year.

Staff concludes that the short-term minor emission of greenhouse gases during construction that are necessary to create this new low GHG-emitting facility would be sufficiently reduced by “best practices” and would, therefore, not be significant.

The project would meet the Greenhouse Gases Emission Performance Standard (EFS; Title 20, California Code of Regulations, section 2900 et seq.) that applies to utility purchases of base load power from power plants. Any utility that enters into a contract with the BP Watson project would need to seek a finding that the project meets the EPS based on the operation of the project at that time, under a proposed PPA, and any other conditions that dictate the operation of the BP Watson project. The BP Watson cogeneration facility as proposed meets the EPS of 0.500 metric tonnes CO_2 per megawatt-hour, with a rating of no more than 0.318 metric tonnes CO_2 per megawatt-hour. Because the cogeneration unit can operate over a range of ambient conditions, burning a mixture of natural gas and waste refinery gas, and generating a range of steam delivery rates, the amount of fuel chargeable to the electricity generation can vary.

Staff notes that mandatory reporting of the GHG emissions provides the necessary information for the California Air Resources Board to develop greenhouse gas regulations and/or trading markets required by the California Global Warming Solutions Act of 2006 (AB 32 Núñez, Statutes of 2006, Chapter 488, Health and Safety Code sections 38500 et seq.). The project is subject to reporting requirements and will be subject to GHG reductions or trading requirements as part of California’s GHG cap-and-trade program as these regulations are more fully developed. On a federal level, 40 CFR 98 requires mandatory reporting of GHG emissions for facilities that emit more than 25,000 metric tons of CO_2 equivalent emissions per year.

[1] The NQC (MW) is the amount of RA capacity provided by the project, based on average exports during the hours ending 14:00 to 18:00 for April to October; hours ending 17:00 to 21:00 for November to March.

INTRODUCTION

Generation of electricity and steam using any fossil fuel, including natural gas, can produce greenhouse gases along with the criteria air pollutants that have been traditionally regulated under the federal and state Clean Air Acts. For fossil fuel-fired power plants, the GHG emissions include primarily carbon dioxide, with much smaller amounts of nitrous oxide (N_2O, not NO or NO_2, which are commonly known as NOx or oxides of nitrogen), and methane (CH_4 – often from unburned natural gas). Also included are sulfur hexafluoride (SF_6) from high voltage equipment and hydrofluorocarbons (HFCs) and perfluorocarbons (PFCs) from refrigeration/chiller equipment. GHG emissions from the electricity sector are dominated by CO_2 emissions from the carbon-based fuels; other sources of GHG emissions are small and also are more likely to be easily controlled or reused or recycled, but are nevertheless documented here as some of the compounds have very high relative global warming potentials.

Global warming potential is a relative measure, compared to carbon dioxide, of a compound's residence time in the atmosphere and ability to warm the planet. Mass emissions of GHGs are converted into carbon dioxide equivalent (CO2E) metric tonnes (MT) for ease of comparison (e.g., one ton of methane converts to 21 tons of CO2E).

GHG emissions are not criteria pollutants, but are discussed in the context of cumulative impacts. In December 2009, the U.S. Environmental Protection Agency (EPA) declared that greenhouse gases (GHGs) threaten the public health and welfare of the American people (the so-called "endangerment finding"), and this became effective on January 14, 2010. Regulating GHGs at the federal level is required by the Prevention of Significant Deterioration Program (PSD) that began July 1, 2011 for new facilities that exceed an annual emissions rate of 100,000 tons[2] per year (tpy) of carbon dioxide-equivalent (CO2E) emissions, or for additions to an existing facility, like BP Watson project, if they exceed 75,000 tpy CO2E. BP Watson is estimated to emit about 700,000 tpy CO2, which should be about the same in CO2E.

Federal rules that became effective December 29, 2009 (40 CFR 98) already require federal reporting of GHGs. As federal rulemaking evolves, staff at this time focuses on analyzing the ability of the project to comply with existing federal- and state-level policies and programs for GHGs. The State has demonstrated a clear willingness to address global climate change though research, adaptation[3], and GHG inventory reductions. In that context, staff evaluates the GHG emissions from the proposed project, presents information on GHG emissions related to electricity generation, and describes the applicable GHG standards and requirements.

[2] The US EPA promulgated its GHG rules in short tons (2000 pounds per ton). The EPS standard and most other GHG regulations and discussions are in metric tonnes, or 1000 kilograms per tonne. The conversion is 1.10231 short tons per 1 metric tonne.

[3] While working to understand and reverse global climate change, it is prudent to also adapt to potential changes in the state's climate (for example, changing rainfall patterns).

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following federal, state, and local laws and policies in **Greenhouse Gas Table 1** pertain to the control and mitigation of greenhouse gas emissions. Staff's analysis examines the project's compliance with these requirements.

Greenhouse Gas Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
40 Code of Federal Regulations (CFR) Parts 51, 52, 70 and 71	This rule "tailors" GHG emissions to PSD and Title V permitting applicability criteria.
40 Code of Federal Regulations (CFR) Part 98	This rule requires mandatory reporting of GHG emissions for facilities that emit more than 25,000 metric tons of CO_2 equivalent emissions per year.
40 Code of Federal Regulations (CFR) Parts 51 and 52	Effective July 1, 2011, a stationary source that emits more than 100,000 TPY of greenhouse gases (GHGs) is also considered to be a major stationary source. A major modification is any project at a major stationary source that results in a significant increase in emissions of any PSD pollutant. A PSD pollutant is a criteria pollutant for which the area is not nonattainment (for SCAQMD, the PSD pollutants are SO2, PM10, PM2.5, NOx, CO, lead, and GHGs).
State	
California Global Warming Solutions Act of 2006, AB 32 (Stats. 2006; Chapter 488; Health and Safety Code sections 38500 et seq.)	This act requires the California Air Resource Board (ARB) to enact standards that will reduce GHG emission to 1990 levels by 2020. Electricity production facilities will be regulated by the ARB.A cap-and-trade program is being developed to achieve approximately 20 percent of the GHG reductions expected by 2020.
California Code of Regulations, tit. 17, Subchapter 10, Article 2, sections 95100 et. seq.	These ARB regulations implement mandatory GHG emissions reporting as part of the California Global Warming Solutions Act of 2006 (Stats. 2006; Chapter 488; Health and Safety Code sections 38500 et seq.)
Title 20, California Code of Regulations, section 2900 et seq.; CPUC Decision D0701039 in proceeding R0604009	The regulations prohibit utilities from entering into long-term contracts with any base load facility that does not meet a greenhouse gas emission standard of 0.5 metric tonnes carbon dioxide per megawatt-hour (0.5 $MTCO_2$/MWh) or 1,100 pounds carbon dioxide per megawatt-hour (1,100 lbs CO_2/MWh)

GLOBAL CLIMATE CHANGE AND ELECTRICITY PRODUCTION

There is general scientific consensus that climate change is occurring and that human activity contributes in some measure (perhaps significantly) to that change. Man-made emissions of greenhouse gases, if not sufficiently curtailed, are likely to contribute further to continued increases in global temperatures. Indeed, the California Legislature finds that "[g]lobal warming poses a serious threat to the economic well-being, public health, natural resources, and the environment of California" (Cal. Health & Safety Code, sec. 38500, division 25.5, part 1).

In 1998, the Energy Commission identified a range of strategies to prepare for an uncertain climate future, including a need to account for the environmental impacts associated with energy production, planning, and procurement (CEC 1998, p.5). In

2003, the Energy Commission recommended that the state require reporting of greenhouse gases or global climate change[4] emissions as a condition of state licensing of new electric generating facilities (CEC 2003, IEPR p. 42). In 2006, California enacted the California Global Warming Solutions Act of 2006 (AB 32). It requires the California Air Resources Board (ARB) to adopt standards that will reduce statewide GHG emissions to statewide GHG emissions levels in 1990, with such reductions to be achieved by 2020. To achieve this, ARB has a mandate to define the 1990 emissions level and achieve the maximum technologically feasible and cost-effective GHG emission reductions.

Examples of strategies that the state might pursue for reducing GHG emissions in California, in addition to those recommended by the Energy Commission and the Public Utilities Commission, were identified in the California Climate Action Team's Report to the Governor (CalEPA 2006).

The ARB adopted early action GHG reduction measures in October 2007, adopted mandatory reporting requirements and the 2020 statewide target in December 2007, and adopted a statewide Scoping Plan in December 2008 to identify how emission reductions will be achieved from significant sources of GHG via regulations, market mechanisms, and other actions. ARB staff is developing regulatory language to implement its plan and holds ongoing public workshops on key elements of the recommended GHG reduction measures, including market mechanisms (ARB 2006). The proposed regulations to adopt a cap-and-grade program will be considered by ARB at its October 20 and 21, 2011 Board meeting.

Beginning for the 2008 calendar year, the mandatory reporting requirements were effective for electric generating facilities over 1 megawatt (MW) capacity. GHG reports are available to the public online and provide a basis for tracking individual sources of emissions. ARB is in the process of revising its mandatory reporting regulations and is also scheduled to consider adopting these regulations at its October 20 to 21, 2011 Board meeting.

The Scoping Plan approved by ARB in December 2008 and re-approved on August 24, 2011builds upon the overall climate policies of the Climate Action Team report and shows the recommended strategies to achieve the goals for 2020 and beyond. The Scoping Plan also includes a strategy to greatly expand use of combined heat and power (CHP or cogeneration) facilities by adding new CHP capacity by 2020. Some strategies focus on reducing consumption of petroleum across all areas of the California economy. Improvements in transportation energy efficiency (fuel economy) and land use planning and alternatives to petroleum-based fuels are slated to provide substantial reductions by 2020 (CalEPA 2006). The Scoping Plan includes a 33% Renewables Portfolio Standard (RPS), aggressive energy efficiency targets, and a cap-and-trade system that includes the electricity sector (ARB 2008). Mandatory compliance with cap-and-trade requirements commences on January 1, 2012, although enforcement has been delayed until 2013. Senate Bill 2 (Simitian, Chapter 1, Statutes of 2011-12)

[4] Global climate change is the result of greenhouse gases, or air emissions with global warming potentials, affecting the global energy balance, and thereby, climate of the planet. The terms greenhouse gases (GHG) and global climate change (GCC) gases are used interchangeably.

expresses the intent to meet a target of 33 percent of California's electricity supplies to be provided by renewable sources by 2020.

It is possible that GHG reductions mandated by ARB will be non-uniform or disproportional across emitting sectors, in that most reductions will be based on cost-effectiveness (i.e., the greatest effect for the least cost). For example, the ARB proposes a 40 percent reduction in GHG from the electricity sector, even though that sector currently only produces about 25 percent of the state's GHG emissions. The Energy Commission's *2007 Integrated Energy Policy Report* (IEPR) also addressed climate change within the electricity, natural gas, and transportation sectors (CEC 2007). For the electricity sector, it recommends such approaches as pursuing all cost-effective energy efficiency measures and meeting the Governor's stated goal of a 33% renewable portfolio standard. The Energy Commission's *2009 Integrated Energy Policy Report* continues to emphasize the importance of meeting greenhouse gas emissions reduction goals along with other important statewide issues such as backing out use of once-through cooling in coastal California power plants (CEC 2009c).

SB 1368,[5] enacted in 2006, and regulations adopted by the Energy Commission and the Public Utilities Commission pursuant to the bill, prohibits California utilities from entering into long-term commitments with any base load facilities that exceed the Emission Performance Standard (EPS) of 0.500 metric tonnes CO_2 per megawatt-hour[6] (1,100 pounds CO_2/MWh). Specifically, the SB 1368 Emission Performance Standard (EPS) applies to base load power from new power plants, new investments in existing power plants, and new or renewed contracts with terms of five years or more, including contracts with power plants located outside of California.[7] If a project, instate or out of state, plans to sell base load electricity to California utilities that utility will have to demonstrate that the project meets the EPS. *Base load* units are defined as units that are expected to operate at a capacity factor higher than 60 percent. As a project applying to operate as a base load facility, BP Watson would have to meet the SB 1368 EPS if its power is sold to a California utility. As shown in **Greenhouse Gas Table 3**, GHG emissions from the BP Watson project would meet SB 1368 requirements.

In addition to these programs, California is involved in the Western Climate Initiative, a multi-state and international effort to establish a cap-and-trade market to reduce greenhouse gas emissions in the Western United States and the Western Electricity Coordinating Council (WECC). The timelines for the implementation of this program are similar to those of AB 32, with full roll-out beginning in 2012. And as with AB 32, the electricity sector has been a major focus of attention.

ELECTRICITY AND STEAM PRODUCTION GREENHOUSE GAS EMISSIONS

Electricity use can be as simple as turning on a switch to operate a light or fan. The system to deliver adequate and reliable electricity supply is complex and variable. But it

[5] Public Utilities Code § 8340 et seq.
[6] The Emission Performance Standard only applies to carbon dioxide and does not include emissions of other greenhouse gases converted to carbon dioxide equivalent.
[7] See Rule at http://www.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/64072.htm

operates as an integrated whole to meet demand, such that the dispatch of a new source of generation generally curtails or displaces one or more less efficient or less competitive existing sources. Within the system, generation resources provide electricity, or energy, generating capacity, and ancillary services to stabilize the system and facilitate electricity delivery, or movement, over the grid. *Capacity* is the instantaneous output of a resource, in megawatts. *Energy* is the capacity output over a unit of time, for example an hour or year, generally reported as megawatt-hours or gigawatt-hours (GWh). Ancillary services[8] include regulation, spinning reserve, non-spinning reserve, voltage support, and black start capability. Individual generation resources can be built and operated to provide only one specific service. Alternatively, a resource may be able to provide one or all of these services, depending on its design and constantly changing system needs and operations.

Steam production is generally accomplished by burning one of a myriad of fossil fuels in a boiler. Modern steam boilers convert 80 to 90 percent of the fuel energy into steam, while meeting current air pollutant emission standards. Since steam quality and energy content degrade if the steam is transported any distance from the boiler, most steam boilers are located adjacent to the industrial users of the steam. In CHP applications, the electricity is either used on site or transmitted off-site to the grid. While most CHP applications supply steam to an adjacent industrial user, some CHP applications supply heated water or gases to an industrial process.

California is actively pursuing policies to reduce GHG emissions, and combined heat and power projects like the BP Watson cogeneration project that improve energy use efficiency will contribute to these policies. Additionally, California continues to add modern power plants to generate electricity more efficiently, thereby reducing GHG emissions. Lastly, California is adding non-GHG emitting renewable generation resources to the system mix.

In this context, and because fossil-fueled resources produce GHG emissions, it is important to consider the role and necessity of also adding fossil-fuel resources such as the BP Watson project. On October 8, 2008, the Energy Commission adopted an order initiating an informational (OII) proceeding (08-GHG OII-1) to solicit comments on how to assess the greenhouse gas impacts of proposed new power plants in accordance with the California Environmental Quality Act (CEQA). A report prepared as a response to the GHG OII (CEC 2009a) defines five roles that gas-fired power plants are likely to fulfill in a high-renewables, low-GHG system (CEC 2009b, pp 93 and 94):

1. Intermittent generation support
2. Local capacity requirements
3. Grid operations support
4. Extreme load and system emergency
5. General energy support.

[8] See page CEC 2009b, page 95.

The Energy Commission staff-sponsored report reasonably assumes that non-renewable power plants added to the system would almost exclusively be natural gas-fueled, given that gas generally is dispatchable, can meet local and federal air pollutant standards, and is relatively low-GHG emitting. Nuclear, geothermal, and biomass plants are generally base load and not dispatchable and can be more difficult to permit. Solid fueled projects are also generally base load, not dispatchable, and carbon sequestration technologies needed to reduce the GHG emission rates to meet the EPS are not yet developed (CEC 2009b, p. 92). Further, California has almost no sites available to add highly dispatchable hydroelectric generation.

This analysis provides the staff's conclusions concerning greenhouse gas emissions for this siting case. Future power plant siting and amendment cases are likely to be reviewed with the benefit of new information and policy direction from the Energy Commission. This analysis recognizes that the "prudent use" of natural gas for electricity generation will serve to optimize the system (CHP, integrating intermittent renewable generation and providing reliability), but, without further analysis and policy direction by the Commission to refine this general understanding, this analysis leaves the implications for optimizing the system to future cases (CEC 2009a).

The Energy Commission established a precedent decision in the Final Commission Decision for the Avenal Energy Project. This precedent decision requires all new natural gas fired power plants certified by the Energy Commission to: (a) not increase the overall system heat rate for natural gas plants, (b) not interfere with generation from existing renewable facilities nor interfere with the integration of new renewable generation, and (c) take into account these factors to ensure a reduction of systemwide GHG emissions and support the goals and policies of AB 32 (CEC 2009e).

The proposed project is a combined heat and power facility and not purely a power plant but it would meet conditions (a) and (c) while it is not clear if BP Watson would meet condition (b). As a base load facility with a proposed 95 percent capacity factor, the BP Watson project is not expected to be dispatchable, especially if it is able to achieve this hoped-for very high capacity factor. However, it does not follow that BP Watson will interfere with development or integration of renewable generation into the electricity system.

The Avenal precedent decision may not be appropriate for this project because BP Watson is a combined heat and power (CHP) natural gas/refinery gas project, not a conventional natural gas power plant. Given the project's location in a heavy load pocket, the need to provide the refinery with a reliable steam source, and the likelihood that the facility would significantly reduce the possibility of refinery upsets due to loss of steam or power, staff believes that these other attributes rather than the Avenal precedent decision should apply. Furthermore, to the degree that electricity produced by BP Watson reduces the demand for electricity sales from SCE to the refinery located onsite, the project would assist in the attainment of the renewables target of 33 percent renewables sales by reducing sales to the host site, just as an efficiency improvement helps meet the RPS goal by reducing electricity sales. In addition, BP Watson will be consistent with the GHG reduction goals in the AB32 Scoping Plan.

BP Watson will be required to participate in California's greenhouse gas cap-and-trade program once the program begins to operate, expected to begin in January 2012. This cap-and-trade program is part of a broad effort by the State of California to reduce GHG emissions as required by AB32, which is being implemented by the Air Resources Board (ARB). As currently implemented, market participants such as BP Watson are already required to report their GHG emissions. Once enabling regulations are implemented in the fall of 2011, they will be required to obtain GHG emissions allowances (and offsets) for those reported emissions by purchasing GHG allowances from the capped market and offsets from outside the AB32 program. As new participants enter the market, and the market cap is ratcheted down over time, GHG emission allowance and offset prices will increase, encouraging innovation by market participants to reduce their GHG emissions. Thus, BP Watson as a GHG cap and trade participant will be consistent with California's landmark AB 32 Program, which is intended to reduce California's GHG emissions to 1990 levels by 2020.

The ARB's AB32 Scoping Plan to implement AB32 describes the 2020 goal as "an interim step to put California on a path of meeting a goal of 80 percent below that level by 2050," an intent expressed by Governor Schwarzenegger in a 2005 Executive Order (S-3-05). Furthermore, the Scoping Plan includes cogeneration/combined heat and power and BP Watson will be part of this effort by being a more efficient means of producing both electricity and refinery fuel products, which will become part of the cap-and-trade program beginning in 2015. Thus, BP Watson and the entire refinery is expected to be part of a statewide programmatic effort to reduce California's GHG emissions. If and when the California program is incorporated into a larger regional or national GHG reduction program, BP Watson would likewise contribute to those GHG reduction goals.

Project Construction

Construction of industrial facilities such as power plants requires coordination of numerous equipment and personnel. The concentrated on-site activities result in short-term, unavoidable increases in vehicle and equipment emissions that include greenhouse gases. Construction of the BP Watson project would involve 20 months of activity (not including start-up or commissioning). The project owner provided a GHG emission estimate for the entirety of the construction phase. The GHG emissions estimate, presented below in **Greenhouse Gas Table 2**, includes the total emissions for the 20 months of construction activity in terms of CO_2-equivalent (CO2E).

Greenhouse Gas Table 2
BP Watson project, Estimated Potential Construction Greenhouse Gas Emissions

Construction Source [a]	Construction-Phase GHG Emissions (over 20 months) (MTCO2E) [b]
Diesel Combustion	3,158
Gasoline Combustion	308
Construction Total	**3,466**

Source: BP Watson 2009.

NOTES:
a. Includes emissions from workers commuting to work site.
b. One metric tonne (mt) equals 1.10231 short tons or 2,204.6 pounds or 1,000 kilograms.

Construction of the new combustion turbine/HRSG facility and addition of the cooling tower cells is expected to result in the temporary disturbance of approximately 2.5 acres. A 25 acre Construction Laydown and Parking Area would also be used for materials storage and craft labor parking.

Project Operations

The project site is a 2.5-acre brown field site located within the boundary of the existing Watson Cogeneration Facility, which is a 21.7-acre area within the 428-acre BP Carson Refinery (BP Refinery).The BP Watson project would operate as a base load cogeneration unit and is proposed to be permitted for 8,760 hours of operation per year, with an expected facility capacity factor of greater than 95 percent. The BP Watson project would consist of the following:

- Installation of a nominal 85 megawatt (MW) GE 7EA Dry Low NOx (DLN) combustion turbine with inlet fogging (74 MW summer, 94 MW winter).
- Installation of the HRSG producing up to approximately 659 Klbs steam/hr and equipped with a duct burner with up to 447.9 MMBtu/hr (high heating value [HHV]) heat input at 36°F.
- Installation of two additional cells to the existing seven cell wet cooling tower to provide cooling and heat rejection from the new power block process.

Greenhouse Gas Table 3 shows what the proposed project, as permitted, could potentially emit in greenhouse gases on an annual basis. Electricity generation and fossil-fueled industrial processes GHG emissions are generally dominated by CO_2 emissions from the carbon-based fuels; other sources of GHG are typically small and some (SF_6 and fluorocarbons) also are more likely to be easily controlled or reused/recycled.

The table shows the calculated CO_2 emissions for 4 of the 12 cases in AFC Table 3-2. Case 6 is most representative of the annual maximum of both electricity and steam production, where steam production is equivalent to the maximum water use for steam of 2,100 acre feet per year. Case 1 represents maximum instantaneous electricity output, where Case 4 is a peak steam production case. Case 12 is the high ambient temperature case where CTG output is degraded, such that steam production dominates the metrics of overall thermal efficiency for the entire cogeneration facility, and the “corrected” EPS is the lowest at 0.219 mt/MWhr. The other 8 cases all fall within the values calculated for these representative cases.

The proposed project could, on an annual basis, emit approximately 600,000 metric tonnes of CO_2 per year if operated at its maximum permitted level and burning approximately 65 percent natural gas and 35 percent refinery gas. The proposed BP Watson project would emit at approximately 0.230 MTCO2/MWh (Case 6), but no more than 0.318 MTCO2/MWh, which would meet the SB 1368 Greenhouse Gas Emission Performance Standard of 0.500 MTCO2/MWh. The new BP Watson facility would be more GHG-efficient than most existing power plants in the Los Angeles Basin Local Capacity Requirements Area, which has facilities with GHG EPS performance ranging from 0.432 to 0.944 MTCO2/MWh as shown below in **Greenhouse Gas Table 4**.

Greenhouse Gas Table 3
BP Watson project, Estimated Potential Greenhouse Gas (GHG) Emissions

BP Watson Cogeneration			Case 1	Case 4	Case 6	Case 12
	Ambient Temperature	Deg F	36	59	59	102
	Fogger Condition:		Off	On	On	On
INPUTS	Natural Gas Total	LHV mmBtu/hr	684.4	627.4	627.4	589.7
	Refinery Gas Total	LHV mmBtu/hr	308.4	298.5	682.1	635.2
	Fuel Totals	LHV mmBtu/hr	992.8	925.9	1309.5	1224.9
OUTPUTS	Steam to Refinery	LHV mmBtu/hr	468.4	465.3	903.2	863.2
	CTG output	LHV mmBtu/hr	321.8	305.4	305.4	284.3
	CTG output	MW net	90.737	85.77	85.263	79.154
METRICS	Efficiency CTG only	%	32.41%	32.98%	32.98%	32.67%
	Heat Rate CTG only (LHV)	Btu/kWh	10,942	10,795	10,859	10,995
	Heat Rate CTG only (HHV)	Btu/kWh	12,036	11,875	11,945	12,095
With Corrections for Cogeneration:						
	Efficiency Cogeneration Facility - correction	%	79.59%	83.24%	92.29%	93.68%
	Heat Rate LHV CTG less Steam - correction	Btu/kWh	5779	5370	4765	4570
	Heat Rate HHV CTG less Steam - correction	Btu/kWh	6,357	5,907	5,242	5,027
GHG OUTPUTS at 8,760 hrs / yr			Natural Gas	Refinery Gas		
	Fuel Emissions Factor (HHV)	lb CO2/mmBtu	116.4	109.45		
		metric tonne/yr	476,793	443,665	603,617	564,881
	Electricity EPS	mt/MWh	0.600	0.590	0.808	0.815
With Corrections for Cogeneration:						
	Electricity EPS less Steam prod. w/spec. EF - corr.	mt/MWh-eq	0.318	0.294	0.230	0.219
SEPARATE PRODUCTION OF ELECTRICITY / STEAM						
Electricity CO2	Baseload NG CC 6,940 HHV Heat Rate	MWh	794,856	751,345	746,904	693,389
		mt/yr	217,564	205,655	204,439	189,791
Steam CO2	90% Efficient Boiler	mt/yr	264,783	263,030	510,572	487,960
CO2	Total- separate	mt/yr	482,347	468,685	715,011	677,751
	Difference	mt/yr	5,554	25,020	111,394	112,871
	% difference		1.2%	5.6%	18.5%	20.0%

However, the cogeneration corrections are imprecise and may not be accurately or consistently included for the cogeneration facilities show in **Greenhouse Gas Table 4**. A better estimate of GHG impacts from a cogeneration facility like BP Watson with its use of waste refinery gases, is a direct comparison to the GHG emissions from separate electricity and steam production. The bottom portion of **Greenhouse Gas Table 3** compares total GHG emissions from BP Watson to “grid” electricity GHG emissions. In

the separate electricity production case, we assume 33% renewable electricity, with the rest of the separate electricity used coming from modern efficient natural gas-fired combined cycles with a heat rate of 6,940 Btu/kWh HHV (6,310 Btu/kWh LHV). We also include 7.7 percent transmission losses (i.e., you have to generate more to achieve the same onsite delivered electricity that BP Watson provides). Separate steam production is assumed to be 100 percent natural gas-fired in a 90 percent efficiency boiler. BP Watson, cogenerating steam and electricity while using waste refinery gas, would produce approximately 18.5 percent less GHGs per year (Case 6) than separate, but still highly efficient production of steam and electricity.

In Case 1 on **Greenhouse Gas Table 3** the difference in total calculated CO_2 between BP Watson cogeneration project and the separate production of heat and power is very small. This is due to the fact that steam production is at a minimum and does not include any supplemental duct firing. And, because of low ambient temperatures, CTG fuel input and electricity output are higher, dominating the calculations. However, Case 1 is an outlier and not representative of likely project operations.

The proposed project would increase the available energy and capacity to the electricity system. The Los Angeles Basin Local Capacity Requirements Area would benefit from the incremental increase in energy and capacity provided by the BP Watson project. As a project currently located inside a major load pocket, the BP Watson project would be likely to provide local reliability support and could facilitate the retirement of other less-efficient power plants.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Staff assesses the cumulative effects of GHG emissions caused by both construction and operation. As the name implies, construction impacts result from the emissions occurring during the construction of the project. The operation impacts result from the emissions of the proposed project during operation. Staff is continuing to monitor development of AB 32 Scoping Plan implementation efforts and general trends and developments affecting GHG regulation in the construction and electricity sectors.

The impact of GHG emissions caused by this natural gas/refinery gas-fired facility is characterized by comparing the cogeneration project to separate electricity and stem production. Additionally, the integrated electricity system depends on fossil-fueled generation resources to provide energy and satisfy local capacity needs. As directed by the OII (CEC 2009a), staff is refining and implementing the concept of a “blueprint” that describes the long-term role of fossil-fueled power plants in California’s electricity system. The five separate roles that gas-fired power plants are most likely to fulfill in the future of a high-renewables, low-GHG system include: 1) Intermittent generation support; 2) Local capacity requirements; 3) Grid operations support; 4) Extreme load and system emergencies support; and 5) General energy support (CEC 2009b, p. 93). BP Watson is analyzed here for its role in providing local capacity and generation and general energy support for expected generation retirements or replacements.

Construction Impacts

Staff believes that the small GHG emission increases from construction activities would not be significant for several reasons. First, the period of construction will be short-term and the emissions intermittent during that period, not ongoing during the life of the project. Additionally, control measures that staff recommends to address criteria pollutant emissions, such as limiting idling times and requiring, as appropriate, equipment that meets the latest criteria pollutant emissions standards, would further minimize greenhouse gas emissions to the extent feasible. The use of newer equipment will increase efficiency and reduce GHG emissions and be compatible with low-carbon fuel (e.g., bio-diesel and ethanol) mandates that will likely be part of future ARB regulations to reduce GHG from construction vehicles and equipment.

Direct/Indirect Operation Impacts And Mitigation

New, efficient, natural gas-fired cogeneration and generation promotes the state's efforts to improve GHG electrical generation efficiencies and, therefore, reduces greenhouse gas emissions and the amount of natural gas used by electricity generation. As the *2007 Integrated Energy Policy Report* (CEC 2007, p. 184) noted:

> New natural gas-fueled electricity generation technologies offer efficiency, environmental, and other benefits to California, specifically by reducing the amount of natural gas used—and with less natural gas burned, fewer greenhouse gas emissions. Older combustion and steam turbines use outdated technology that makes them less fuel- and cost-efficient than newer, cleaner plants…. The 2003 and 2005 IEPRs noted that the state could help reduce natural gas consumption for electric generation by taking steps to retire older, less efficient natural gas power plants and replace or repower them with new, more efficient power plants.

Thus, in the context of the Energy Commission's *Integrated Energy Policy Report*, the BP Watson project's use of energy more efficiently, and the likely replacement of older existing plant capacity and higher GHG-emitting energy facilities furthers the state's strategy to promote efficiency and reduce fuel use and GHG emissions. As stated in the 2009 *Framework for Evaluating Greenhouse Gas Implications of Natural Gas-Fired Power Plants in California* (CEC 2009b, p.20):

> When one resource is added to the system, all else being held equal, another resource will generate less power. If the new resource has a lower cost or fewer emissions than the existing resource mix, the aggregate system characteristics will change to reflect the cheaper power and lower GHG emissions rate.

Net GHG emissions for the integrated electric system will decline when new gas-fired power plants are added to: 1) permit the penetration of renewable generation to the 33% target; 2) improve the overall efficiency of the electric system; or 3) serve load growth or capacity needs more efficiently than the existing fleet (CEC 2009b, p. 98). The BP Watson project, with its lower heat rate than the existing Los Angeles Basin Local Capacity Requirements Area power plants that it would displace and most dispatchable gas-fired generation in the state, would be more efficient and lower GHG-emitting than the existing fleet, as shown in **Greenhouse Gas Table 4**. Staff derived these GHG performance values using GHG emissions data from ARB's mandatory reporting process and energy data from the Energy Commission's Quarterly Fuels

Energy Report data base. The reported value for the Total Energy Facilities site is low because it excludes biofuels emissions, based on ARB policy.

Trend of reducing operations at older, existing power plants

Energy Commission staff have evaluated the role of new, efficient natural gas-fired power plants in displacing electrical energy production from older, less efficient power plants in California (CEC 2011). For example, the trend from 2001 to the present is for electrical energy produced from large, new combined cycles (those with a capacity greater than 100 MW and built since 2000) to replace electrical energy produced from aging power plants (those built before 1980). The electrical energy production from aging power plants has declined from 73,131 GWh in 2001 to 6,219 GWh in 2010. At the same time, electrical energy production from new combined cycles has increased from 2,730 GWh in 2001 to 71,373 GWh in 2010, essentially replacing the electrical energy produced from the aging power plants. More importantly, at the same time, California's natural gas use efficiency ($MWh_{OUT}/Fuel_{IN}$) in the electricity sector has increased approximately 17 percent over this time.

The Role of the BP Watson project in Local Generation Displacement

The proposed BP Watson project would have a net heat rate of 5,027 to 6,357 Btu/kWh[9] under normal operating conditions. The heat rate, energy output and GHG emissions of local generation resources near the BP Watson project are listed in **Greenhouse Gas Table 4**. Compared to most other new and existing units in the Los Angeles Basin Local Capacity Requirements Area, the BP Watson project would be more efficient, and emit fewer GHG emissions per MWh of generation. Local generating units with the best (lowest) heat rate or lowest GHG performance factor generally operate more than other units with higher heat rates, as shown by the relative amount of energy (GWh) produced in 2010 from the local units. However, dispatch order can change, or deviate from economic or efficiency dispatch, in any one year or due to other concerns such as permit limits, contractual obligations, local reliability needs or emergencies.

The Role of the BP Watson project in the Renewable Goals/Load Growth

The BP Watson project is not expected to provide flexible, dispatchable or fast ramping[10] power. The BP Watson project will be a base loaded cogeneration facility that operates up to 24 hours per day, 7 days per week in response to steam demands at the refinery. The GE 7EA CTG ramp rate for the proposed cogeneration configuration will be less than 10 MW per minute.[11] However, the BP Watson project is not expected to provide this service due to the steam needs of the refinery at which it would be located.

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[9] Based on the High Heating Value (HHV) of the fuel(s) used. HHV is used for all heat rate and fuel conversions to GHG mass emissions that are discussed in this document.

[10] The CAISO categorizes *fast-ramping* as a generator capable of going from lowest power to highest in under 20 minutes, or greater than 10 MW per minute.

[11] Of the 2,821 MW of thermal resources providing Ancillary Services to the CAISO, most (2,441 MW) have ramp rates between 10 and 31 MW/min. The bulk of the resources providing Ancillary Services with ramp rates greater than 10 MW/min (7,141 MW) are hydroelectric facilities (ISO 2007).

Greenhouse Gas Table 4
Los Angeles Basin Local Capacity Requirements Area, Local Generation Heat Rates and 2010 Energy Outputs

Plant Name	Heat Rate (Btu/kWh) [a]	2010 Energy Output (GWh)	GHG Performance (MTCO2/MWh)
Power Plants [d]:	**11,416**	**2,150**	**0.631**
Alamitos (AES)	10,964	879	0.614
El Segundo Power (NRG)	13,052	167	0.705
Huntington Beach (AES)	11,264	932	0.614
Long Beach Generating Station (NRG)	15,917	36	0.938
Redondo Beach (AES)	12,166	135	0.689
CHP facilities [d]:	**9,995**	**4,916**	**0.538**
BP West Coast Product Wilmington Calciner	17,070	217	0.944
Carson Cogeneration Co.	8,777	348	0.433
Civic Center Cogeneration (LA County)	14,494	110	0.832
Corona Cogeneration	9,447	137	0.497
Harbor Cogeneration Company	11,331	21	0.765
San Gabriel (Ripon Cogeneration)	9,511	141	0.506
Oxy-THUMS Long Beach	9,947	356	0.542
Torrance Refinery (ExxonMobil)	14,071	150	0.432
Total Energy Facilities (LACSD)[c]	13,617	135	0.144
UCLA Energy Systems Facility	12,947	286	0.737
Watson Cogen. (BP Watson West Coast Ref.)	8,862	3,016	0.361
BP Watson project	5,027 to 6,357	747[e]	0.219 to 0.318

Sources:
(1) Heat rate and GWh data from Energy Commission staff work based on Quarterly Fuel and Energy Report (QFER);
(2) GHG data from ARB's California GHG Reporting Tool;
(3) BP Watson data from Energy Commission staff analysis based upon maximum utilization rate.

Notes:
a. Based on the Higher Heating Value or HHV of the fuel.
b. Thermal/electrical partitioning for CHP facilities based upon ARB's Mandatory Reporting procedure.
c. Joint Water Pollution Control Plant; excludes biomass-related emissions based upon ARB's Mandatory Reporting procedure.
d. Central tendency is weighted by annual GWh.
e. Greenhouse Gas Table 3, Case 6.

As California moves towards an increased reliance on renewable energy, the bulk of renewable energy generation available to and used in California in the near to intermediate future will be intermittent wind generation with widespread deployment of both utility-scale and small scale distributed solar (CEC 2009b, p.3). To accommodate the increased variability in generation due to increasing renewable penetration, compounded by increasing load variability, control authorities such as the California Independent System Operator (CAISO) need increased flexibility from other generation resources such as hydro generation, dispatchable pump loads, energy storage systems, and fast ramping and fast starting fossil fuel generation resources (CAISO 2007, p. 14).

These assumptions are conservative in that the forecasted growth in retail sales assumes that the impacts of planned increases in expenditures on (uncommitted)

energy efficiency are already embodied in the current retail sales forecast.[12] Energy Commission staff estimates that as much as 18,000 GWh of additional savings due to uncommitted energy efficiency programs may be forthcoming.[13] This would reduce non-renewable energy needs by a further 12,000 GWh given a 33% RPS.

The Role of the BP Watson Project in Retirements/Replacements

The BP Watson project would be capable of annually providing 708 GWh of natural gas/refinery gas-fired energy at permitted levels to replace resources that are or will likely be precluded from serving California loads. State policies, including GHG goals, are discouraging or prohibiting new contracts and new investments in high GHG-emitting facilities such as coal-fired generation, generation that relies on water for once-through cooling, and aging power plants (CEC 2007). Some of the existing plants that are likely to require significant capital investments to continue operation in light of these policies may be unlikely to undertake the investments and instead will retire and, if necessary, be replaced.

Replacement of High GHG-Emitting Generation

High GHG-emitting resources, such as coal, are effectively prohibited from entering into new contracts for California electricity deliveries as a result of the Emissions Performance Standard adopted in 2007 pursuant to SB 1368. Between now and 2020, more than 18,000 GWh of energy procured by California utilities under these contracts will have to reduce GHG emissions or be replaced; these carbon-intense facilities owned by California utilities and those with contracts are presented in **Greenhouse Gas Table 5**. Ownership is included because some of these owners have indicated they intend to sell their interests.

This represents almost half of the energy associated with California utility contracts with coal-fired resources that will expire by 2030. If the State enacts a carbon adder[14], all the coal contracts (including those in **Greenhouse Gas Table 5**, which expire by 2020, and other contracts that expire beyond 2020 and are not shown in the table) may be retired at an accelerated rate as coal-fired energy becomes uncompetitive due to the carbon adder or the capital needed to capture and sequester the carbon emissions. Also shown are the approximate 400 MW of in-state coal and petroleum coke-fired capacity that will not be able to contract with California utilities for baseload energy due to the SB1368 Emission Performance Standard. As these contracts expire, new and existing generation resources will replace the lost energy and capacity. Some will come from

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[12] Energy efficiency savings are already represented in the current Energy Commission demand forecast adopted December 2009 (CEC 2009c).

[13] See *Incremental Impacts of Energy Efficiency Policy Initiatives Relative to the 2009 Integrated Energy Policy Report Adopted Demand Forecast* (CEC-200-2010-001-D, January, 2010), page 2. Table 1 indicates that additional conservation for the three investor-owned utilities may be as high as 14,374 GWh. Increasing this value by 25% to account for the state's publicly-owned utilities yields a total reduction of 17,967 GWh.

[14] A carbon adder or carbon tax is a specific value added to the cost of a project per ton of associated carbon or carbon dioxide emissions. Because it is based on, but not limited to, actual operations and emission and can be trued up at year end, it is considered a simple mechanism to assign environmental costs to a project.

renewable generation; some will come from new and existing natural gas fired generation. All will emit significantly less GHG than the coal and petroleum coke-fired

Greenhouse Gas Table 5
Expiring Long-term Contracts with Coal-fired Generation 2010 – 2020

Utility	Facility [a]	Dependable MW in 2010	Dependable MW in 2020	GWh in 2010	GWh Forecast for 2020	Ownership or Contract Expiration Date
PG&E, SCE	Misc. In-State QFs [a]	406	0	3,406		Varies
LADWP	Intermountain	1,045	913	7,741	4,933	6/15/2027
Burbank	Intermountain	75	75	499	538	6/15/2027
Glendale	Intermountain	35	35	245	245	6/15/2027
Pasadena	Intermountain	94	94	721	727	6/15/2027
Riverside	Intermountain	137	137	953	956	6/15/2027
Anaheim	Intermountain 1 & 2	236	236	1,727	1,860	12/31/2024
Azusa	San Juan 3	30	N/R [b]	159	N/R [b]	12/31/2030
Banning	San Juan 3	19	N/R [b]	108	N/R [b]	(ownership)
Colton	San Juan 3	30	N/R [b]	165	N/R [b]	10/31/2030
Glendale	San Juan 3	20	20	104	110	10/31/2030
Anaheim	San Juan 4	50	50	329	370	(ownership)
Modesto ID	San Juan 4	72	78	464	599	10/22/2030
Redding	San Juan 4	0	22	23	256	(ownership)
Silicon Valley Power	San Juan 4	51	51	360	425	(ownership)
Dept. of Water Resources	Reid Gardner	72	0	912	0	7/25/2013
SDG&E	Boardman	86	0	604	0	12/31/2013
SCE	Four Corners	720	0	4,738	0	(ownership)
Turlock ID	Boardman	56	0	426	0	12/31/2018
LADWP	Navajo	477	0	5,401	0	12/31/2019 [c]
Totals		**3,711**	**1,711**	**29,084**	**11,018**	

Source: Energy Commission staff based upon Quarterly Fuel and Energy Report (QFER) filings and electricity supply forms submitted by utilities to the Energy Commission in early 2011 for the 2011 Integrated Energy Policy Report.

a. Miscellaneous Qualifying Facilities are in-state; all outher resources are out-of-state coal facilities.

b. Not Reported (N/R). Adding proxy data for these three data entries, Dependable MW in 2020 total would increase from 1,711 MW to 1,790 MW and GWh Forecast for 2020 total would increase from 11,018 GWh to 11,450 GWh.

c. LADWP plans to divest itself of this contract 5 years earlier; that is, by 2014.

generation, which average about 1.0 MTCO2/MWh without carbon capture and sequestration, or almost three times more than a natural gas/refinery gas-fired turbine project like the BP Watson project, resulting in a significant net reduction in GHG emissions from the California electricity sector. The steam produced from BP Watson is expected to displace steam generated from less efficient methods, further contributing to overall GHG reductions.

Retirement of Generation Using Once-Through Cooling

New resources in the Los Angeles Basin Local Capacity Area like the BP Watson project would also be required to provide generation capacity in the likely event that facilities utilizing once-through cooling (OTC) are retired. The State Water Resources Control Board (SWRCB) has proposed significant changes to OTC units, which will require the retirement of the OTC generation in the Los Angeles Basin LCA and a replacement of a share of the retired capacity in order to ensure local reliability.[15] Any additional costs associated with complying with the SWRCB regulation would be amortized over a limited revenue stream today and into the foreseeable future. Their energy and much of their dispatchable, load-following capability will have to be replaced, although the energy produced by these facilities is decreasing as they continue to age. These merchant-owned units constitute over 15,000 MW of capacity and 7,000 GWh of energy. Of this, much but not all of the capacity and energy are in local reliability areas, requiring a share them to be replaced – absent transmission upgrades – by plants located in the same local reliability area. **Greenhouse Gas Table 6** provides a summary of the statewide utility and merchant energy supplies affected by the OTC regulations.

New generation resources that can either provide local support or energy will emit significantly less GHGs than existing OTC natural gas generation. Existing aging and OTC natural gas generation averages 0.6 to 0.7 MTCO2/MWh, which is less efficient and higher GHG emitting, than a new, natural gas/refinery gas-fired turbine project like the BP Watson project. When a project can provide energy and capacity, given its location, it can provide a significant net reduction in GHG emissions from the California electricity sector. A project located in a coastal load pocket, like the Los Angeles Local Reliability Area, would more likely provide local reliability support as well as facilitate the retirement of aging and/or OTC power plants. The BP Watson project would contribute to meeting the goal of replacing facilities that use once through cooling.

CUMULATIVE IMPACTS

Cumulative impacts are defined as “two or more individual effects which, when considered together, are considerable or . . . compound or increase other environmental impacts” (CEQA Guidelines § 15355). “A cumulative impact consists of an impact that is created as a result of a combination of the project evaluated in the EIR together with other projects causing related impacts” (CEQA Guidelines § 15130[a][1]). Such impacts may be relatively minor and incremental, yet still be significant because of the existing environmental background, particularly when one considers other closely related past, present, and reasonably foreseeable future projects.

[15] The OTC policy compliance plans filed by the owners of OTC capacity in the LA Basin LCA indicate that replacement capacity, rather than modifications to existing facilities, will be the method of compliance.

Greenhouse Gas Table 6
Aging and Once-Through Cooling Units: 2010 Capacity and Energy Output [a]

Plant, Unit Name	Owner	Local Reliability Area	Aging Plant?	Capacity (MW)	2010 Energy Output (GWh)	GHG Performance (MTCO2/MWh)
Diablo Canyon 1, 2	Utility	None	No	2,232	18,431	Nuclear
San Onofre 2, 3	Utility	L.A. Basin	No	2,246	13,784	Nuclear
Broadway 3 [a]	Utility	L.A. Basin	Yes	75	38	0.680
El Centro 3, 4 [a]	Utility	None	Yes	132	61	0.344
Grayson 3-5 [a]	Utility	LADWP	Yes	108	162	0.320
Grayson 8ABC[a]	Utility	LADWP	Yes	130	3	0.888
Harbor 1,2 & 5	Utility	LADWP	No	227	172	0.508
Haynes 1, 2, 5 & 6	Utility	LADWP	Yes	1,046	957	0.567
Haynes 8 to 10	Utility	LADWP	No	560	3,436	0.375
Olive 1, 2 [a]	Utility	LADWP	Yes	110	14	0.793
Scattergood 1 to 3	Utility	LADWP	Yes	803	1,015	0.541
Utility-Owned				7,776	38,073	0.460 [c]
Alamitos 1 to 6	Merchant	L.A. Basin	Yes	1,970	879	0.785
Contra Costa 6, 7	Merchant	S.F. Bay	Yes	680	38	0.663
Coolwater 1-4 [a]	Merchant	None	Yes	727	15	0.573
El Segundo 3 & 4	Merchant	L.A. Basin	Yes	670	167	0.619
Encina 1 to 5	Merchant	San Diego	Yes	951	317	0.720
Etiwanda 3 & 4 [a]	Merchant	L.A. Basin	Yes	666	221	0.624
Huntington Beach 1& 2	Merchant	L.A. Basin	Yes	430	491	0.590
Huntington Beach 3 &4	Merchant	L.A. Basin	No	450	440	0.561
Mandalay 1 & 2	Merchant	Ventura	Yes	436	82	0.531
Morro Bay 3 & 4	Merchant	None	Yes	600	93	0.521
Moss Landing 6 & 7	Merchant	None	Yes	1,404	273	0.634
Moss Landing 1 &2	Merchant	None	No	1,080	3,234	0.377
Ormond Beach 1 & 2	Merchant	Ventura	Yes	1,612	117	0.564
Pittsburg 5 to 7	Merchant	S.F.Bay	Yes	1,332	58	0.663
Potrero 3[c]	Merchant	S.F.Bay	Yes	207	429	0.585
Redondo Beach 5 to 8	Merchant	L.A. Basin	Yes	1,343	135	0.621
South Bay 1 to 4[c]	Merchant	San Diego	Yes	696	72	0.611
Merchant-Owned				15,254	7,062	0.560 [d]
Total In-State OTC				23,030	45,135	

Source: Energy Commission staff based on Quarterly Fuel and Energy Report (QFER) filings.

Notes:

a. Units are considered "aging" but are not once-through cooled.
b. Unit 7 is considered "aging" but is not once-through cooled.
c. Retired.
d. GHG performance central tendency is weighted by GWh.

This entire assessment is a cumulative impact assessment. The project alone would not be sufficient to change global climate, but would emit greenhouse gases and therefore has been analyzed as a potential cumulative impact in the context of existing GHG regulatory requirements and GHG energy policies.

COMPLIANCE WITH LORS

Ultimately, ARB's AB 32 regulations may address both the degree of electricity generation sector emissions reductions (through cap-and-trade), and the method by which those reductions will be achieved (e.g., through cap-and-trade or command-and-control). However, the exact approach is currently under development. That regulatory approach may address emissions not only from the newer, more efficient, and lower emitting facilities licensed by the Commission, but also the older, higher-emitting facilities not subject to Energy Commission jurisdiction. This programmatic approach is likely to be more effective in reducing GHG emissions overall from the entire electricity sector than one that merely relies on displacing out-of-state coal plants ("leakage") or older, "dirtier" facilities.

The Energy Commission and the Public Utilities Commission provided recommendations (CPUC 2008) to ARB on how to achieve such reductions through both programmatic and regulatory approaches and identified the regulation points should ARB decide that a multi-sector cap-and-trade system is warranted. As ARB codifies improved GHG inventories and methods, it may become apparent that emission reductions from the generation sector are less cost-effective than other sectors, and that other sectors of sources can achieve reductions with relative ease and cost-effectiveness.

The project would be subject to ARB's mandatory reporting requirements and potentially other future requirements mandating compliance with AB 32 that are being developed by ARB. How the project would comply with these ARB requirements is speculative at this time, but compliance would be mandatory. The project may have to provide additional reports and GHG reductions, depending on the future regulations expected from ARB. Similarly, this project would be subject to federal mandatory reporting of GHG emissions.

Reporting of GHG emissions would enable the project to demonstrate consistency with the policies described above and the regulations that ARB adopts and to provide the information to demonstrate compliance with any future AB 32 requirements that could be enacted in the next few years. Since this power project would be permitted for more than a 60% annual capacity factor, the project is subject to the requirements of SB 1368 and the current Emission Performance Standard. The BP Watson project's GHG emission performance would be well below the SB 1368 EPS.

The Energy Commission established a precedent decision in the Final Commission Decision for the Avenal Energy Project. This precedent decision requires all new natural gas fired power plants certified by the Energy Commission to: (a) not increase the overall system heat rate for natural gas plants, (b) not interfere with generation from existing renewable facilities nor interfere with the integration of new renewable generation, and (c) take into account these factors to ensure a reduction of systemwide GHG emissions and support the goals and policies of AB 32 (CEC 2009e). The proposed project, with its low heat rate, would meet conditions (a) and (c). As a base load facility operating at a 95 percent capacity factor, the BP Watson project would not meet condition (b) by potentially not helping to integrate renewable generation; however, BP Watson as proposed by the Applicant is not purely a power plant. It is

proposed as a combined heat and power facility that has other attributes. Given the project's location in a heavy load pocket, the need to provide the refinery with a reliable steam source, and significantly reducing the possibility of refinery upsets due to loss of steam or power, it is unlikely that the project would result in any measurable interference with integration of renewable generation into the overall grid.

NOTEWORTHY PUBLIC BENEFITS

Electricity is produced by operation of inter-connected generation resources and by knowing the fuel used by the generation sector, the resulting GHG emissions can be known. Operation of one power plant, like the BP Watson project, affects all other power plants in the interconnected system. The operation of BP Watson facility will have an impact upon system operation and GHG emissions in several ways:

- BP Watson will be consistent with CHP goals in the AB32 Scoping Plan.
- The BP Watson project would facilitate to some degree the replacement of high GHG emitting (e.g., out-of-state coal) electricity generation that must be phased out to meet the State's new Emissions Performance Standard.
- The BP Watson project could facilitate to some extent the replacement of generation provided by aging and once-through cooling power plants.
- The BP Watson project would help a load-serving entity (LSE) meet resource adequacy (RA) requirements.

The BP Watson project would be used in a base load mode of operation to provide for onsite process steam needs. By cogenerating steam and electricity, BP Watson would emit less GHG emissions than separate production of the same steam and electricity. BP Watson would not provide flexible, dispatchable power necessary to integrate some of the growing generation from intermittent renewable sources, such as wind and solar generation. And, the high reliability of the BP Watson facility would significantly reduce the possibility of refinery upsets due to loss of steam or power.

Despite the lack of dispatchability, as a new increment of power production the project would provide competitively priced electricity in the form of baseload energy for sale to electric service providers to help meet expected electrical demand growth in Southern California.

The project would likely lead to a net reduction in GHG emissions from entities providing energy and capacity to California. Thus, staff believes that the project would result in a cumulative overall reduction in GHG emissions, would not worsen current conditions, and would thus not result in impacts that are cumulatively significant. Moreover, it would be consistent with AB 32 goals.

The BP Watson project would result in a reduction in GHG emissions from the electricity system. In addition, in other system roles, as described in **Greenhouse Gas Table 7**, the BP Watson project would serve approximately half of the system roles identified in the table.

CONCLUSIONS

The BP Watson project, as an addition to the California electricity system, would be an efficient, new, but not dispatchable natural gas-fired turbine combined heat and power plant that would cause GHG emissions while generating electricity for California consumers, process steam for the host refinery, and the use of waste refinery gases. AB 32 emphasizes that GHG emission reductions must be “big picture” reductions that do not lead to “leakage” of such reductions to other states or countries, and as such, the cogeneration project would produce approximately 18 to 20 percent less GHG emissions than the separate production of steam and electricity. The project’s GHG emissions per MWh would be lower than the separate production of steam and electricity compared to other steam and electricity production that the project would replace and, thus, would contribute to continued improvement of the California and overall Western Electricity Coordinating Council system greenhouse gas (GHG) emissions and GHG emission rate average.

The project would lead to a net reduction in GHG emissions from the system that provides energy and capacity to California. Thus, staff believes that the project would result in a cumulative overall reduction in GHG emissions from the state, would not worsen current conditions, and would thus not result in impacts that are cumulatively significant. While BP Watson would also provide potential GHG benefits, it would not address all of the expected future roles for fossil fuel-fired generation, in a high-renewables, low-GHG system. Additionally, the high reliability of the BP Watson facility would significantly reduce the possibility of refinery upsets due to loss of steam or power.

Staff notes that mandatory reporting of GHG emissions per federal government and Air Resources Board greenhouse gas regulations would occur, and these reports will enable these agencies to gather the information needed to regulate the BP Watson project in trading markets, such as those that are expected to be required by regulations implementing the California Global Warming Solutions Act of 2006 (AB 32) by the end of October 2011. The project may be subject to additional reporting requirements and GHG reduction and will be required to comply with AB32 trading requirements as these regulations are more fully developed and implemented.

Staff does not believe that the minor GHG emission increases from construction activities would be significant for several reasons. First, the period of construction would be short-term and the emissions intermittent during that period, not ongoing during the life of the project. Additionally, control measures or best practices, that staff recommends such as limiting idling times and requiring, as appropriate, equipment that meet the latest emissions standards, would further minimize greenhouse gas emissions since staff believes that the use of newer equipment will increase efficiency and reduce GHG emissions and be compatible with low-carbon fuel (e.g., bio-diesel and ethanol) mandates that will likely be part of the ARB regulations to reduce GHG from construction vehicles and equipment. For all these reasons, staff concludes that the minor short-term emission of greenhouse gases during construction would be sufficiently reduced and would, therefore, not be significant.

Greenhouse Gas Table 7
BP Watson project, Summary of Role in Providing Energy and Capacity Resources

Services Provided by Generating Resources	Discussion, BP Watson
Integration of Renewable Energy	• Would not provide fast startup capability (within 2 hours). • Would not provide rapid ramping capability. • Would have ability to provide regulation and reserves, and energy when renewable resources are unavailable.
Local Generation Displacement	• Would be able to satisfy/partially satisfy local capacity area (LCA) resource requirements. • Would provide voltage support. • Would not provide black start capability.
Ancillary Services, Grid System, and Emergency Support	• Would not provide fast startup capability (within 2 hours). • Would not have low minimum load levels. • Would not provide rapid ramping capability. • Would have ability to provide regulation and reserves. • Would not provide black start capability.
General Energy Support	• Would provide general energy support. • Could facilitate some retirements and replacements • Would provide cost-competitive energy. • Would be able to help a load-serving entity (LSE) meet resource adequacy (RA) requirements.

Source: Energy Commission staff; based on: Expected Roles for Gas-Fired Generation (CEC2009b, p. 7).

The project would meet the Greenhouse Gases Emission Performance Standard (Title 20, California Code of Regulations, section 2900 et seq.) that applies to utility purchases of base load power from power plants, should the BP Watson facility sell its power to a California electric utility. Any utility that enters into a contract with the BP Watson project would be required to seek a finding that the project meets the EPS based on the operation of the project at that time, under a proposed PPA, and any other conditions that dictate the operation of the BP Watson project. The BP Watson project as currently proposed meets the EPS of 0.500 metric tonnes CO_2 per megawatt-hour.

The BP Watson project would be consistent with two of the three main conditions in the precedent decision regarding GHG emissions established by the Avenal Energy Project's Final Energy Commission Decision (not increase the overall system heat rate for natural gas plants and ensure a reduction of systemwide GHG emissions), while the high reliability of the BP Watson facility would significantly reduce the possibility of refinery upsets due to loss of steam or power.

PROPOSED CONDITIONS OF CERTIFICATION

No Conditions of Certification related to greenhouse gas emissions are proposed. The project owner would comply with mandatory ARB GHG emissions reporting regulations (California Code of Regulations, tit. 17, Subchapter 10, Article 2, sections 95100 et.

seq.) and/or future GHG regulations formulated by the U. S. EPA or the ARB, such as GHG emissions cap and trade markets.

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BIOLOGICAL RESOURCES

Testimony of Andrea Martine

SUMMARY OF CONCLUSIONS

The Watson Cogeneration Company (Watson) has proposed the construction of the Watson Cogeneration Steam and Electric Reliability (BP Watson) project on the site of the existing Watson Cogeneration Facility site located in the City of Carson, California. The proposed BP Watson project would consist of adding a fifth combustion turbine generator/heat recovery steam generator and two steam turbine generators. The proposed BP Watson project would complement the existing Watson Cogeneration Facility (Facility) and would provide additional process steam in response to the refinery's process steam demand. The proposed BP Watson project site would occur on a 2.5-acre "brownfield" site which is within the 21.7-acre existing Facility site on a 428-acre parcel. The proposed BP Watson project site occurs in a highly developed and industrial area of Los Angeles County. No improvements to existing water supply, natural gas, or wastewater pipelines would be necessary.

Due to the proposed BP Watson project site's location in a highly disturbed, urbanized, and industrial area, there are no natural or native habitats that provide suitable habitat for protected plant or wildlife species. California Energy Commission staff (staff) has evaluated the potential for impacts to occur to protected biological resources that have the potential to occur during construction and operation of the proposed BP Watson project. There has been past sightings of western burrowing owls in the project vicinity (Watson 2009a). Staff concluded that the potential for direct and indirect construction impacts to western burrowing owls can be reduced to less than significant levels as outlined in staff's proposed Conditions of Certification **BIO-1 through 5.** Condition of Certification **BIO-5** would require preconstruction surveys for western burrowing owls, and if any are present onsite, would require implementation of impact avoidance and minimization measures. The Designated Biologist and/or Biological Monitor (Conditions of Certification **BIO-1** and **BIO-3**) would conduct the preconstruction surveys. The duties and authority of the Designated Biologist and Biological Monitor are described in staff's proposed Conditions of Certification **BIO-2** (Designated Biologist Duties) and **BIO-4** (Designated Biologist and Biological Monitor Authority), respectively. Staff has concluded that due to the lack of biological resources and habitat value at the proposed BP Watson project site and immediate vicinity, the proposed BP Watson project would not have any significant direct, indirect, or cumulative impacts to biological resources with the implementation of staff's proposed conditions of certification.

INTRODUCTION

This section provides staff analysis of potential biological resource impacts from the construction and operation of the BP Watson project in the City of Carson. This analysis would determine if there would be any impacts to state and federally listed species, species of special concern, wetlands, surface waters, and other critical and sensitive areas of biological concern. This analysis presents information regarding the affected biotic environment, the potential environmental impacts to biological resources with the construction and operation of the proposed BP Watson project. Where determined

necessary, specific mitigation planning and compensation measures to reduce potential impacts to non-significant levels have been identified. This analysis is based on, in part, on information provided in the Watson Cogeneration Company's Application for Certification (Watson 2009a) for the proposed BP Watson project and staff's observation from informal, reconnaissance-level site visits of the proposed BP Watson project site and off-site construction staging area performed on October 24, 2009 and May 20, 2010.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The Applicant would need to abide by the following laws, ordinances, regulations, and standards (LORS) during project construction and operation.

Biological Resources Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
Federal Endangered Species Act (Title 16, United States Code, sections 1531 et seq.; Title 50, Code of Federal Regulations, part 17.1 et seq.)	Designates and provides for the protection of threatened and endangered plant and animal species and their critical habitat. The administering agency is the U. S. Fish and Wildlife Service (USFWS).
Migratory Bird Treaty Act (Title 16, United States Code, sections 703–711)	Prohibits the take or possession of any migratory nongame bird (or any part of such migratory nongame bird), including nests with viable eggs. As defined, this includes nearly every nongame bird in the state. The administering agency is USFWS.
State	
California Endangered Species Act (Fish and Game Code, sections 2050 et seq.)	Protects California's rare, threatened, and endangered species. The administering agency is the California Department of Fish and Game (CDFG).
California Code of Regulations (Title 14, sections 670.2 and 670.5)	Lists the plants and animals that are classified as rare, threatened, or endangered in California. The administering agency is CDFG.
Fully Protected Species (Fish and Game Code, sections 3511, 4700, 5050, and 5515)	Designates certain bird, mammal, reptile, amphibian, and fish species as fully protected, and prohibits take of such species. The administering agency is CDFG.
Nest or Eggs (Fish and Game Code, section 3503)	Prohibits take, possession, or needless destruction of the nest or eggs of any bird. The administering agency is CDFG.
Migratory Birds (Fish and Game Code, section 3513)	Prohibits take or possession of any migratory nongame bird as designated in the Migratory Bird Treaty Act or any part of such migratory nongame bird. The administering agency is CDFG.
Local	
City of Carson General Plan, Conservation Element and Open Space Element	The City of Carson Planning Department achieves to conserve and enhance its key natural resources including, but not limited to, trees and vegetation, open space, water, and other natural resources. The City of Carson's 2004 General Plan Conservation and Open Space Element outlines goals and policies to provide for the long-term preservation, enhancement, and enjoyment of plant, wildlife, and aquatic resources in the City of Carson by protecting and restoring these resources. The City works to ensure that proposed development projects demonstrate a high degree of compatibility with any threatened or endangered species and sensitive biological resources among other natural resources and environment that

Applicable Law	Description
	occur in the City's jurisdiction and general vicinity.

SETTING

REGIONAL SETTING

The proposed BP Watson project site is located in the City of Carson, approximately five miles north of San Pedro Bay, in the southwestern portion of the Los Angeles Basin. The Los Angeles Basin covers an area that extends from the Santa Monica Mountains to the north, San Gabriel Mountains on the east, the Santa Ana Mountains on the south, and the Pacific Ocean on the west. The proposed BP Watson project site is located in the West Coast Sub-basin of the South Coast Hydrologic Region. The principle drainage feature in the Project vicinity, the Dominguez Channel with primarily rip-rapped banks, is located approximately 0.40 miles to the east which drains approximately 80 square miles west of the Los Angeles River basin. The Dominguez Channel originates southeast of the Los Angeles International Airport and flows southward to the point where it meets the East Channel of the Los Angeles Harbor. Historically, the Los Angeles Basin native habitat included native woodlands, coastal scrubs, chaparral, and grasslands which steadily over time have been replaced by urban development and invasive, non-native vegetation.

LOCAL

The City of Carson is primarily a mixture of developed and urbanized land uses (RBF Consulting 2002). Residential uses and industrial uses account for more than 80% of developed land in the City limits. Residential housing densities consist of low, moderate, and high dwelling unit densities. Industrial (light and heavy) areas consist of areas that support manufacturing, processing, warehousing, and distribution functions of the community and such facilities are situated for easy access to truck access via highways or railroads.

PROJECT SITE AND VICINITY DESCRIPTION

The proposed BP Watson project site consists of the existing refinery facility which is essentially devoid of vegetation. The proposed BP Watson project site occurs within the boundary of the existing Watson Cogeneration Facility (Facility) at 22850 South Wilmington Avenue, Carson, California and is surrounded by the 405 Freeway and Dominguez Channel to the north, South Alameda Street on the east, East Sepulveda Boulevard on the south, and Wilmington Avenue to the west. The sparse vegetation that is present on-site consists of ruderal invasive species and ornamental plantings. The construction laydown and parking area is located approximately one mile southeast of the proposed BP Watson project site on a paved 25-acre parcel that is currently used as a truck parking and staging area.

Existing Conditions

Power Plant Site, Construction Laydown, and Parking Area.
A biological resources field survey was conducted June 4, 2008 and a staff reconnaissance-level site visit May 20, 2010. The area surveyed included the cogeneration facility, construction laydown, and parking area. A one mile radius buffer surrounding the proposed BP Watson project site was surveyed for botanical and wildlife resources. The proposed BP Watson project site and surrounding refinery are hardscaped with road base, rock, asphalt, or concrete with no natural vegetation. Plant species observed included ruderal vegetation with very few native species. The construction laydown and parking area is completely devoid of vegetation, however scattered ruderal plant species are found along the asphalt berm such as mulefat (*Baccharis salicifolia*), tumbleweeds (*Amaranthus albus*), and ornamental grasses. These plant species and fan palms (*Washingtonia filifera*) were also observed along the dirt access road, which follows the Dominguez Channel east of the Construction Laydown and Parking Area. The only wildlife observed was a rock dove (*Columba livia*) within the proposed project site. There was no evidence of avian breeding activity and no sign of other wildlife such as reptiles or mammals.

Plants and Wildlife

Special-Status Species include those listed as threatened or endangered under the federal or state endangered species acts, species proposed for listing, California species of special concern, other species that have been identified by the US Fish and Wildlife Service (USFWS), California Department of Fish and Game (CDFG), or other agency as unique or rare.

Biological Resources Table 2 identifies the special-status species based on field surveys and searches of CDFG's California Natural Diversity Database (CNDDB) (CDFG 2011) and California Native Plant Society's (CNPS) Inventory of Rare and Endangered Plants (CNPS 2011) for the nine-quad area (641 square miles) centered on the proposed BP Watson project site.

Biological Resources Table 2
Special Status Species Potentially Occurring Within Watson Cogeneration Steam and Electric Reliability Project Area

Species	Status	Habitat	Potential to Occur in the Project Area
Plants			
Aphanisma (*Aphanisma blitoides*)	G3G4, S3, List 1B.2	Coastal bluff scrub, coastal dunes, and coastal scrub	None
Ventura marsh milk-vetch (*Astragalus pycnostachyus* var. *lanosissimus*)	FE, G2T1, S1, List 1B.1	Coastal saltmarsh and brackish waters, salt marsh and wetland	None
Coastal dunes milk-vetch (*Astragalus tener* var. *titi*)	FE, G1T1, S1.1, List 1B.1	Coastal bluff scrub and coastal dunes	None
Coulter's saltbush (*Atriplex coulteri*)	G2, S2.2, List 1B.2	Coastal bluff scrub, coastal dunes, coastal scrub, valley and foothill grassland in alkaline or clay soils	None
South coast saltscale (*Atriplex pacifica*)	G3G4, S2.2, List 1B.2	Coastal bluff scrub, coastal dunes, coastal scrub, and playas	None
Parish's brittlescale (*Atriplex parishii*)	G1G2, S1.1, List 1B.1	Chenopod scrub, playas and vernal pool with alkaline soils	None
Davidson's saltscale (*Atriplex serenana* var. *davidsonii*)	G5T2?, S2?, List 1B.2	Coastal bluff scrub and coastal scrub	None
Plummer's mariposa-lily (*Calochortus plummerae*)	G3, S3, List 1B.2	Chaparral, cismontane woodland, coastal scrub, lower montane coniferous forest, valley and foothill grassland	None
Intermediate mariposa-lily (*Calochortus weedii* var. *intermedius*)	G3G4T2, S2.2, List 1B.2	Chaparral, coastal scrub, valley and foothill grassland	None
Santa Barbara morning-glory (*Calystegia sepium* spp. *binghamiae*)	G5TH, SH, List 1A	Chaparral, coastal scrub, valley and foothill grassland	None
Southern tarplant (*Centromadia parryi* ssp. *australis*)	G4T2, S2.1, List 1B.1	Salt marsh, valley and foothill grassland and vernal pools, alkaline soils	None
Salt marsh bird's-beak (*Chloropyron maritimum* spp. *maritimum*)	FE, SE, G4?T2?, S2.1, List 1B.2	Coastal dunes, and salt marshes	None
Catalina crossosoma (*Crossosoma californicum*)	G2, S2, List 1B.2	Chaparral and coastal scrub	None
Island green dudleya (*Dudleya virens* spp. *insularis*)	G2T2, S2.2, List 1B.2	Coastal bluff scrub and coastal scrub	None
Coulter's goldfields (*Lasthenia glabrata* spp. *coulteri*)	G4T3, S2.1, List 1B.1	Alkali playa, coastal salt marsh, valley and foothill grassland, vernal pool and wetlands	None
Santa Catalina Island desert-thorn (*Lycium*	G1Q, S1.1, List 1B.1	Coastal bluff scrub and coastal scrub	None

brevipes var. *hassei*)			
Mud nama (*Nama stenocarpum*)	G4G5, S1S2, List 2.2	Marsh and wetlands	None
Gambel's water cress (*Nasturtium gambelii*)	FE, ST, G1, S1, List 1B.1	Brackish marsh, freshwater marsh, and wetlands	None
Spreading navarretia (*Navarretia fossalis*)	FT, G1, S1, List 1B.1	Alkali playa, chenopod scrub, freshwater marsh, vernal pool and wetlands	None
Prostrate vernal pool navarretia (*Navarretia prostrata*)	G2?, S2.1?, List 1B.1	Coastal scrub, meadows and seeps, valley and foothill grassland with alkaline soils and vernal pools with mesic soils	None
Coast woolly-heads (*Nemacaulis denudata* var. *denudata*)	G2G4T3, S2.2, List 1B.2	Coastal dunes	None
California Orcutt grass (*Orcuttia californica*)	FE, SE, G2, S2.1, List 1B.1	Vernal pool and wetlands	None
Lyon's pentachaeta (*Pentachaeta lyonii*)	FE, SE, G2, S2, List 1B.1	Chaparral (openings), Coastal scrub, valley and foothill grassland in rocky, clay soils	None
Hubby's phacelia (*Phacelia hubbyi*)	G3, S1, List 4.2	Rocky slopes of chaparral and grassland	None
Brand's star phacelia (*Phacelia stellaris*)	FC, G2?, S1, List 1B.1	Coastal dunes and scrub	None
Parish's gooseberry (*Ribes divaricatum* var. *parishii*)	G4TH, SH, 1A	Riparian	None
Sanford's arrowhead (*Sagittaria sandfordii*)	G3, S3, List 1B.2	Freshwater marsh and ponds	None
Salt spring checkerbloom (*Sidalcea neomexicana*)	G4?, S2S3, List 2.2	Alkali playa, brackish marsh, chaparral, coastal scrub, lower montane coniferous forest, alkali springs and marshes Mojavean desert scrub and wetlands	None
Estuary seablite (*Suaeda esteroa*)	G3, S2, List 1B.2	Coastal salt marsh	None
San Bernardino aster (*Symphyotrichum defoliatum*)	G2, S2, List 1B.2	Cismontane woodland, coastal scrub, lower montane coniferous forest, marsh and swamp, meadow and seep, valley and foothill grassland and wetlands	None
Wildlife	**Status**	**Habitat**	**Potential to Occur in the Project Area**
Invertebrates			
Western tidal-flat tiger beetle (*Cicindela gabbii*)	G4, S1	Estuary, mud shores and flats	None
Sandy beach tiger beetle (*Cicindela hirticollis gravida*)	G5T2, S1	Coastal dunes	None
Western beach tiger beetle (*Cicindela latesignata latesignata*)	G4T1T2, S1	Mud shores and flats	None
Senile tiger beetle (*Cicindela senilis frosti*)	G4T1, S1	Mud shores and flats	None

Monarch butterfly (*Danaus plexippus*)	G5, S3	Closed-cone coniferous forest	None
Palos Verdes blue butterfly (*Glaucopsyche lygdamus palosverdesensis*)	FE, G5T1, S1	Coastal scrub	None
Wandering (saltmarsh) skipper (*Panoquina errans*)	G4G5, S1	Marshes and swamps	None
Dorthy's El Segundo Dune weevil (*Trigonoscuta dorothea dorothea*)	G1T1, S1	Coastal dunes	None
Mimic tryonia (California brackishwater snail) (*Tryonia imitator*)	G2G3, S2S3	Brackish marsh, estuaries, lagoons, salt marshes and swamps	None
Fish			
Mohave tui chub (*Siphateles bicolor mohavensis*)	FE, SE, G4T1, S1, FP	Artificial standing and flowing waters	None
Amphibians			
Western spadefoot (*Spea hammondii*)	G3, S3, SSC	Vernal pools and wetlands in cismontane woodland, coastal scrub, valley and foothill grasslands	None
Reptiles			
Silvery legless lizard (*Anniella pulchra pulchra*)	G3G4T3T4Q, S3, SSC	Chaparral, coastal dunes, coastal scrub	None
Coastal whiptail (*Aspidoscelis tigris stejnegeri*)	G5T3T4, S2S3	Coastal chaparral	None
Green turtle (*Chelonia mydas*)	FT, G3, S1	Marine bay	None
Western pond turtle (*Emys marmorata*)	G3G4, S3, SSC	Aquatic, standing or flowing waters, marshes and wetlands	None
Coast horned lizard (*Phrynosoma blainvilli*)	G4G5, S3S4, SSC	Chaparral, cismontane woodland, coastal bluff scrub, coastal scrub, desert wash, pinyon and juniper woodlands, riparian scrub, riparian woodland, valley and foothill grassland	None
Birds			
Tricolored blackbird (*Agelaius tricolor*)	G2G3, S2, SSC	Emergent wetland vegetation, especially cattails and tules; also in trees and shrubs	None
Western burrowing owl (*Athene cunicularia*)	G4, S2, SSC	Rodent burrows in sparse grassland, desert, and agricultural habitats	Moderate: has occurred in the proposed Project site vicinity, last occurrence seen nearby in 2006
Ferruginous hawk (*Buteo regalis*)	G4, S3S4, WL	Open grasslands, sagebrush flats, desert scrub, low foothills surrounding valleys, and fringes of pinyon-juniper habitats	None
Western Snowy Plover (*Charadrius alexandrinus*	FT, G4T3, S2, SSC	Great Basin standing waters, sand shore and wetlands	None

nivosus)			
Western yellow-billed cuckoo (*Coccyzus americanus occidentalis*)	FC, SE, G5T3Q, S1	Riparian forest	None
Southwestern willow flycatcher (*Empidonax trailii extimus*)	FE, SE, G5T1T2, S1	Riparian woodland	None
Belding's savannah sparrow (*Passerculus sandwichensis beldingi*)	SE, G5T3, S3	Marshes and wetlands	None
California brown pelican (*Pelecanus occidentalis californicus*)	Federal and State Delisted, G4T3, S1S2, FP	coastal salt water, beaches, bays, marshes and on the open ocean	None
coastal California gnatcatcher (*Polioptila californica californica*)	FT, G3T2, S2, SSC	Coastal sage scrub/ chaparral	None
Light-footed clapper rail (*Rallus longirostris levipes*)	FE,SE, G5T1T2, S1, FP	Coastal salt marsh and wetlands	None
Black skimmer (*Rynchops niger*)	G5, S1S3, SSC	Alkali playa and sandy shores	None
California least tern (*Sternula antillarum browni*)	FE, SE, G4T2T3Q, S2S3, FP	Sandy soils with little vegetation along the ocean, lagoons, and bays	None
Mammals			
Western mastiff bat (*Eumops perotis californicus*)	G5T4, S3?, SSC, WBWG-H	Roosts are often found under large exfoliating slabs of granite, sandstone slabs or in columnar basalt, on cliff faces or in large boulders and some in buildings	None
Silver-haired bat (*Lasionycteris noctivagans*)	G5, S3S4, WBWG-M	Lower montane coniferous and riparian forests including old growth forests	None
Western yellow bat (*Lasiurus xanthinus)*	G5, S3, SSC, WBWG-H	Dry, thorny vegetation on the Mexican Plateau and in desert regions of the southwest and are particularly associated with palms	None
South coast marsh vole (*Microtus californicus stephensi*)	G5T1T2, S1S2, SSC	Tidal marshes	None
San Diego desert woodrat (*Neotoma lepida intermedia)*	G5T3?, S3?, SSC	Coastal scrub	None
Pocketed free-tailed bat (*Nyctinomops femorosaccus*)	G4, S2S3, SSC, WBWG-M	Prefers rock crevices in cliffs as roosting sites, but has been found in caves and in buildings	None
Big free-tailed bat (*Nyctinomops macrotis*)	G5, S2, SSC, WBWG-MH	Rock crevices, buildings, caves, and tree hollows	None
Pacific pocket mouse (*Perognathus longimembris pacificus*)	FE, G5T1, S1, SSC	Coastal scrub	None
southern California saltmarsh shrew (*Sorex ornatus salicornicus*)	G5T1?, S1, SSC	Salt marsh	None

American badger (*Taxidea taxus*)	G5, S4, SSC	variety of open, arid habitats, but are most commonly associated with grasslands, savannas, mountain meadows, and open areas of desert scrub	None

Federal FC= Candidate species for listing
FE = Federally listed endangered: species in danger of extinction throughout a significant portion of its range
FT = Federally listed, threatened: species likely to become endangered within the foreseeable future

State SSC = California Species of Special Concern - Species of concern to CDFG because of declining population levels, limited ranges, and/or continuing threats have made them vulnerable to extinction
FP = State fully protected
SE = State listed as endangered
ST = State listed as threatened
WL = State watch list

Western Bat Working Group
WBWG-H = High Priority: are imperiled or are at high risk of imperilment based on available information on distribution, status, ecology and known threats
WBWG-MH = Medium-High Priority: lack of adequate data to assess species' status and indicates the need for closer evaluation, research and conservation actions
WBWG-M = Medium Priority: medium risk of imperilment based on available information on distribution, status, ecology and known threats

California Native Plant Society
List 1B = Rare, threatened, or endangered in California and elsewhere
List 2 = Rare, threatened, or endangered in California but more common elsewhere
List 3 = Plants which need more information
List 4 = Limited distribution – a watch list
List 1A = Presumed extinct because they have not been seen or collected in the wild in California for many years. This list also includes plants which are presumed extirpated

Threat Rank
0.1 = Seriously threatened in California (high degree/immediacy of threat)
0.2 = Fairly threatened in California (moderate degree/immediacy of threat)
0.3 = Not very threatened in California (low degree/immediacy of threats or no current threats known)

Global Rank/State Rank
Global rank (G-rank) and State rank (S-rank) is a reflection of the overall condition of an element throughout its global (or State) range. Subspecies are denoted by a T-rank; multiple rankings indicate a range of values. State rank (S-rank) is assigned much the same way as the global rank, except state ranks in California often also contain a threat designation attached to the S-rank. An H-rank indicates that all sites are historical.
G1 or S1 = Critically imperiled – At very high risk of extinction due to extreme rarity (often 5 or fewer populations), very steep declines, or other factors.
G2 or S2 = Imperiled – At high risk of extinction or elimination due to very restricted range, very few populations, steep declines, or other factors.
G3 or S3 = Vulnerable – At moderate risk of extinction or elimination due to a restricted range, relatively few populations, recent and widespread declines, or other factors.
G4 or S4 = Apparently Secure – Uncommon but not rare; some cause for long-term concern due to declines or other factors.
G5 or S5 = Secure – Common; widespread and abundant.
G#G# and S#S# = Range Rank is used to indicate the range of uncertainty about the exact status of a taxon or ecosystem type.
Q = Questionable taxonomy that may reduce conservation priority.
H = Possibly extinct
? = Inexact numeric rank
T# = Infraspecific taxon refer to subspecies, varieties and other designations below the level of species.

None of the rare plant species listed in **Biological Resources Table 2** would occur at the proposed BP Watson project site because they were not detected during the 2009

survey, and no suitable habitat exists at the proposed BP Watson project site (Watson 2009a). Of the wildlife species listed in **Biological Resources Table 2**, only the western burrowing owl has a potential to occur at the proposed BP Watson project site.

Special Status Wildlife

Western Burrowing Owl (Athene cunicularia)

The western burrowing owl is a small, terrestrial owl of open country. Western burrowing owls favor flat, open grassland or gentle slopes and sparse shrubland ecosystems. These owls prefer annual and perennial grasslands, typically with sparse, or nonexistent, tree or shrub canopies (Clark and Plumpton 2005). In California, western burrowing owls are found in close association with California ground squirrels (Coulombe 1971). Owls use the burrows of ground squirrels and other rodents for shelter and nesting (Martin 1973). Ground squirrels provide nesting and refuge burrows, and maintain areas of short vegetation height, which provide foraging habitat and allow for visual detection of avian predators by burrowing owls (Haug et al. 1993). In the absence of ground squirrel populations, habitats soon become unsuitable for occupancy by owls. Burrowing owls are semi-colonial nesters, and group size is one of the most significant factors contributing to site constancy by breeding burrowing owls (Haug et al. 1993). The nesting season, as recognized by the California Burrowing Owl Consortium (CBOC 1993), is from 1 February through 31 August.

There have been three occurrences of western burrowing owls on the Facility property surrounding the proposed BP Watson project site in the past (Watson 2009a). One occurrence was 0.25-mile southwest of the proposed BP Watson project site at the 503 Reservoir where owls occupied burrows within dirt mounds in the bottom of the reservoir. In 2005 an owl was observed at the stormwater drain in the refinery parking lot north of the proposed BP Watson project site. A third wounded owl was recovered by facility workers in 2006. It was given to the BP Environmental Field Coordinator and taken to a Long Beach rehabilitation center (Watson 2009a). Since 2006, no western burrowing owls have been observed in the proposed BP Watson project vicinity. No suitable habitat or occupied burrows were observed during the field survey.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Staff reviews the best scientific and factual data available for a project to make a determination of whether a project would have a significant effect on biological resources. The biological significance of impacts is based primarily on the habitat characteristics of the particular project site under review. Disturbance on a “brownfield” or developed site may not be significant due to lack of biological resources and valuable habitat for special-status species; however, construction on an undeveloped site may result in significant impacts due to the greater possibility of biological resources within the area.

Significant impacts to biological resources would occur if special status species are

likely to be impacted by construction or operation of the proposed project. Special status species include:

- state- or federally-listed species;
- state Fully Protected species;
- candidates for state or federal listing; and
- Species of Special Concern.

Other potential impacts staff considers to be significant include:

- interruption of species migration;
- reduction of native fish, wildlife and plant habitat;
- causing a fish or wildlife population to drop below self-sustaining levels; and
- disturbance of wetlands, marshes, riparian areas, or other wildlife habitat.

Harassment of a protected species regardless of whether or not loss of habitat or reduction in population occurs, and substantial degradation of the quality of the environment or environmental effects that are individually limited, but cumulatively considerable, would also be considered significant. **Biological Resources Table 2** lists the special status biological resources known to occur within 641 square miles encompassing the project at its center.

DIRECT AND INDIRECT IMPACTS AND MITIGATION

This Final Staff Assessment will discuss and assess impacts to biological resources from BP Watson project site preparation, construction activities, plant operation, maintenance, and closure. Direct impacts result at the same time and place as the project. Indirect impacts are caused by the project, but can occur later in time or farther removed in distance and are still reasonably foreseeable and related to the project.

Projects in developed sites typically have less of an impact on sensitive biological resources because they lack suitable habitat on site. However, such projects are evaluated for the impacts they could have on surrounding areas that remain in natural conditions and support sensitive biological resources, primarily in terms of indirect impacts or cumulative impacts.

To avoid and minimize impacts related to western burrowing owls staff recommends Conditions of Certification **BIO-1** through **BIO-5**. Staff's proposed Condition of Certification **BIO-5** would require preconstruction surveys for western burrowing owls, and if any are present onsite, would require implementation of impact avoidance and minimization measures. The Designated Biologist and/or Biological Monitor (see Conditions of Certification **BIO-1** and **BIO-3**) would conduct the preconstruction surveys. The duties and authority of the Designated Biologist and Biological Monitor are described in staff's proposed Conditions of Certification **BIO-2** (Designated Biologist Duties) and **BIO-4** (Designated Biologist and Biological Monitor Authority), respectively. Conditions of Certification **BIO-1** through **BIO-5** are to ensure protection of sensitive

biological resources that may potentially occur at the proposed BP Watson project site prior to construction.

Construction Impacts and Mitigation

Power Plant Site, Construction Laydown, and Parking Area

The proposed Project site is a 2.5-acre developed site located within the existing Facility. Construction laydown and parking area is a paved 25-acre site located approximately one mile southeast of the proposed BP Watson project site and is currently used as a truck parking and staging area. The proposed BP Watson project site and the surrounding refinery are part of the industrial facility and therefore devoid of native vegetation. The proposed BP Watson project site disturbance would be limited to the areas designated for the additional power train and two additional cooling tower cells. The proposed BP Watson project construction laydown and parking area would be used for storage and equipment parking with no ground disturbance.

No off-site improvements (i.e. water supply and discharge, natural gas, and transmission facilities) are associated with the proposed BP Watson project. The proposed project would connect to the existing supply pipelines currently located at the facility. An analysis of the existing transmission system's residual capacity determined that no upgrades to existing transmission lines would be required.

Even though no habitat for wildlife species occurs at the proposed BP Watson project site due to the highly disturbed and developed facility, western burrowing owls may be present. The occasional western burrowing owl has been known to occur in the vicinity of the proposed BP Watson project site. Preconstruction surveys are recommended by staff to avoid impacts to this species.

Western burrowing owls have occurred in the Facility property surrounding the proposed BP Watson project site. They have been observed at the nearby 503 Reservoir and in a stormwater drain in the refinery parking and in 2005, a wounded western burrowing owl was taken to a Long Beach rehabilitation center. No owls have been seen in the BP Watson project vicinity since 2006 (Watson 2009a). Although the site itself provides no foraging or nesting habitat value for western burrowing owl, this species still has the potential to occur on the proposed BP Watson project site. Due to the past occurrences of owls in the proposed BP Watson project site vicinity the proposed BP Watson project could potentially have significant impacts on owls during construction activities. Preconstruction surveys for western burrowing owls would be required (see staff's proposed Condition of Certification **BIO-5** Western Burrowing Owl Impact Avoidance and Minimization Measures) to reduce the potential for impacts to this species to a less than significant level.

Light

Construction activities would result in a short-term temporary increase in lighting. Lights can disorient migratory birds flying at night or attract wildlife such as insects and insect-eaters in some cases. Since the project is located within an industrial area in which there is already night lighting from existing surrounding industrial uses and there is no habitat for wildlife, the additional light from the proposed BP Watson project will not adversely affect any local wildlife.

Noise
Construction activities would result in a short-term temporary increase in the ambient noise level. Such activities have the potential to disrupt the nesting, roosting, or foraging activities of local wildlife. However, the existing refineries, intermodal transit yards, several freight rail lines, and other industrial facilities in the immediate vicinity of the proposed BP Watson project site create an elevated ambient noise level to which local wildlife species have acclimated. As such, construction noise will not adversely impact any local wildlife.

Operation Impacts

Potential operation-related impacts include impacts to birds due to collision with the addition of an exhaust stack and disturbance to wildlife due to increased lighting and noise.

Collision
Birds are known to collide with exhaust stacks, and other tall structures, causing mortality to the birds. The addition of a 100-feet tall exhaust stack would be unlikely to pose a collision risk because it will be shorter than those typically associated with bird collision events (i.e. communication lines with guy wires and tall building with reflective sides), it would not have any lighting, bird densities are already low in the project area due to lack of available habitat to attract birds (i.e. wetlands), and the proposed BP Watson project site is not within a known migratory bird flyway. Therefore, staff concludes that the additional exhaust stack would not pose a significant collision threat beyond the existing cogeneration facility to resident or migratory bird populations.

Light
Existing facilities adjacent to the proposed BP Watson project site provide an elevated ambient level of lighting to which local wildlife, including nocturnal species, have acclimated. Although operation of the proposed BP Watson project would create additional light, it will not adversely affect any local wildlife.

Noise
Wildlife species near the proposed BP Watson project site are accustomed to elevated ambient (existing) noise levels as a result of the vehicular traffic caused by trucks and rail line operations, existing refineries, intermodal transit yards, several freight rail lines, and other industrial facilities. Although operation of the proposed BP Watson project could create additional noise, it will not adversely impact any local wildlife.

CUMULATIVE IMPACTS

A cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. A project could result in a significant cumulative impact where its effects are cumulatively considerable. “Cumulatively considerable” means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, other current projects, and probable future projects (California Code of Regulations, Title 14, Section 15130).

The proposed BP Watson project site would only affect previously developed land in an industrial area and thus does not contain any habitat for sensitive species and there is no habitat surrounding the project site for sensitive species. There would be no impact to habitat suitable to support sensitive species and therefore staff concludes that the proposed BP Watson project would have no cumulative impacts to biological resources.

COMPLIANCE WITH LORS

This section is based on the laws, ordinances, regulations, and standards (LORS) provided in **Biological Resources Table 1** above. Construction and operation of the proposed BP Watson project would take place entirely within areas previously disturbed for construction and operation, no wildlife habitat exists in these areas, and impacts to wildlife can be avoided by implementation of staff's proposed conditions of certification, so the proposed BP Watson project would be in compliance with all federal, state, and local LORS related to biological resources during construction and operation.

NOTEWORTHY PUBLIC BENEFITS

Biological resources staff concludes the public benefit of the proposed BP Watson project is that only existing industrial land would be developed and there would not be any significant impacts to sensitive habitats or species if the project is constructed in accordance with staff's proposed conditions of certification.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

None received.

CONCLUSIONS

The proposed BP Watson project is an expansion of the Watson Cogeneration Facility on already developed lands. The proposed BP Watson project construction and operation impacts would avoid all biological resources by choosing a location that currently contains no biological resources and is not located near any natural habitat areas. Staff concludes that impacts to western burrowing owls during construction would not occur provided that staff's proposed Conditions of Certification **BIO-1 through 5** are is implemented.

Staff concludes that the proposed BP Watson project would not have any significant biological resources impacts and would be built and operated in compliance with all federal, state, and local laws, ordinances, regulations, and standards.

PROPOSED CONDITIONS OF CERTIFICATION

Staff proposes the following Biological Resources conditions of certification:

DESIGNATED BIOLOGIST SELECTION

BIO-1 The project owner shall submit the resume, at least three references and

contact information of the proposed Designated Biologist (DB) to the Compliance Project Manager (CPM) for approval.

The Designated Biologist must at least meet the following minimum qualifications:

1. Bachelor's Degree in biological sciences, zoology, botany, ecology, or a closely related field; and

2. Three years of experience in field biology or current certification of a nationally recognized biological society, such as The Ecological Society of America or The Wildlife Society; and

3. At least one year of field experience with biological resources found in or near the project area.

In lieu of the above requirements, the resume shall demonstrate to the satisfaction of the CPM, that the proposed DB or alternate has the appropriate training and background to effectively implement the conditions of certification.

Verification: The project owner shall submit the specified information at least 45 days prior to the start of any site (or related facilities) mobilization. No site or related facility activities shall commence until an approved Designated Biologist is available to be on site.

If a Designated Biologist needs to be replaced, the specified information of the proposed replacement must be submitted to the CPM at least ten working days prior to the termination or release of the preceding Designated Biologist. In an emergency, the project owner shall immediately notify the CPM to discuss the qualifications and approval of a short-term replacement while a permanent Designated Biologist is proposed to the CPM for consideration.

DESIGNATED BIOLOGIST DUTIES

BIO-2 The project owner shall ensure that the Designated Biologist performs the following during any site (or related facilities) mobilization, ground disturbance, grading, construction, operation, and closure activities. The Designated Biologist may be assisted by the approved Biological Monitor(s), but remains the contact for the project owner and CPM.

1. Advise the project owner's Construction and Operation Managers on the implementation of the biological resources Conditions of Certification;

2. Be available to supervise, conduct, and coordinate mitigation, monitoring, and other biological resources compliance efforts, particularly in areas requiring avoidance or containing sensitive biological resources, such as special status species or their habitat;

3. Clearly mark sensitive biological resource areas and inspect these areas at appropriate intervals for compliance with regulatory terms and conditions;

4. Notify the project owner and the CPM of any non-compliance with any

biological resources Condition of Certification;

5. Respond directly to inquiries of the CPM regarding biological resource issues; and

6. Maintain written records of the tasks specified above. Summaries of these records shall be submitted in the Monthly Compliance Report during project construction.

Verification: The Designated Biologist shall submit in the Monthly Compliance Report to the CPM copies of all written reports and summaries that document biological resources activities. If actions may affect biological resources during operation a Designated Biologist shall be available for monitoring and reporting.

BIOLOGICAL MONITOR SELECTION

BIO-3 The project owner's CPM-approved Designated Biologist shall submit the resume, at least three references, and contact information for the proposed biological monitors to the CPM for approval. The resume shall demonstrate to the satisfaction of the CPM the appropriate education and experience to accomplish the assigned duties.

Verification: The project owner shall submit the specified information to the CPM for approval at least 30 days prior to the start of any site mobilization. The Designated Biologist shall submit a written statement to the CPM confirming that individual Biological Monitor(s) have been trained, including the date when training was completed. If additional Biological Monitors are needed during construction, the specified information shall be submitted to the CPM for approval 10 days prior to their first day of monitoring activities.

DESIGNATED BIOLOGIST AND BIOLOGICAL MONITOR AUTHORITY

BIO-4 The project owner's Construction/Operation Manager shall act on the advice of the Designated Biologist and Biological Monitor(s) to ensure conformance with the biological resources Conditions of Certification.

If required by the Designated Biologist or Biological Monitor(s) the project owner's Construction/Operation Manager shall halt all site mobilization, ground disturbance, grading, construction, and operation activities in areas specified by the Designated Biologist.

The Designated Biologist or Biological Monitor(s) shall:

1. Require a halt to all activities in any area when determined that there would be an unauthorized adverse impact to biological resources if the activities continued;

2. Inform the project owner and the Construction/Operation Manager when to resume activities; and

3. Notify the CPM if there is a halt of any activities, and advise the CPM of any corrective actions that have been taken, or would be instituted, as a result of the work stoppage.

Verification: The project owner shall ensure that the Designated Biologist or Biological Monitor notifies the CPM immediately (and no later than the following morning of the incident, or Monday morning in the case of a weekend) of any non-compliance or a halt of any site mobilization, ground disturbance, grading, construction, and operation activities. The project owner shall notify the CPM of the circumstances and actions being taken to resolve the problem.

Whenever corrective action is taken by the project owner, a determination of success or failure would be made by the CPM within five working days after receipt of notice that corrective action is completed, or the project owner would be notified by the CPM that coordination with other agencies would require additional time before a determination can be made.

WESTERN BURROWING OWL IMPACT AVOIDANCE AND MINIMIZATION MEASURES

BIO-5 The project owner shall implement the following measures to manage their construction site, construction laydown and parking area, in a manner to avoid or minimize impacts to western burrowing owls.

Preconstruction surveys shall be conducted for western burrowing owls for any areas subject to disturbance from construction prior to the start of site mobilization. Surveys shall be conducted by walking the entire project site and in areas within 500 feet of anticipated ground disturbance, construction laydown areas, and parking area. In the event that owls or owl sign are identified during the survey(s), the project owner shall identify the date and time of owl survey visit(s) and a map depicting location(s) of owls and owl sign.

If owls are found and need to be relocated, only passive relocation of the owls would occur prior to the start of construction and only during the non-breeding season (September 1 through January 31).

During the breeding season (February 1 through August 31) occupied burrows shall not be disturbed and shall be provided with a 250-foot protective buffer until the young have fledged.

Verification: Pre-construction burrowing owl surveys shall be conducted at least 30 days prior to any pre-site mobilization and/or construction activities. At least 10 days after burrowing owl surveys, but prior to any work activities associated with the project, the project owner shall submit a report to the CPM and CDFG that describes when these survey(s) were conducted, duration of the survey(s), a map depicting the results of the survey(s), and if owls are present, the measures to be implemented to avoid and minimize impacts to owls in and near the construction and laydown areas. If owls are present, the project owner shall immediately coordinate with the CPM in consultation with CDFG for approval of proposed impact avoidance and minimization measures.

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CULTURAL RESOURCES

Testimony of Beverly Bastian

SUMMARY OF CONCLUSIONS

Staff has concluded that the proposed Watson Cogeneration Steam and Electric Reliability Project (BP Watson) would not have any direct or indirect significant impacts on known historical resources. Over 97% of the 2.5-acre project site has been disturbed through on-going industrial in-fill and industrial operational use, and the physical footprint of the planned fifth turbine to the existing Watson Cogeneration Facility (Facility) would be on existing engineered fill. Therefore, if the project were built as proposed in the Application for Certification, staff anticipates no adverse impact to historical resources.

As part of the procedures and objectives required by the California Environmental Quality Act (CEQA), pursuant to Public Resources Code section 21082,and California Code of Regulations., Title 14, Sections 15064.5 (f), staff recommends the adoption of Conditions of Certifications **CUL-1** through **CUL-7** for the accidental discovery of historical or unique archaeological resources during construction, and Condition of Certification **CUL-8** to comply with the City of Carson's historic preservation standards. By adopting these conditions of certification any unanticipated discovery of a historical or unique archaeological resource would be mitigated below a level of significance and the BP Watson project would be in conformance with all applicable laws, ordinances, regulations, and standards.

INTRODUCTION

This cultural resources assessment identifies the potential impacts of the BP Watson project on cultural resources. Cultural resources are defined under state law as buildings, sites, structures, objects, and historic districts. Three kinds of cultural resources, classified by their origins, are considered in this assessment: prehistoric, ethnographic, and historic.

Prehistoric archaeological resources are associated with the human occupation and use of California prior to prolonged European contact. These resources may include sites and deposits, structures, artifacts, rock art, trails, and other traces of Native American human behavior. In California, the prehistoric period began over 12,000 years ago and extended through the eighteenth century until 1769, when the first Europeans settled in California.

Ethnographic resources represent the heritage of a particular ethnic or cultural group, such as Native Americans or African, European, Latino, or Asian immigrants. They may include traditional resource collecting areas, ceremonial sites, topographic features, cemeteries, shrines, or ethnic neighborhoods and structures.

Historic-period resources, both archaeological and architectural, are associated with Euro-American exploration and settlement of an area and the beginning of a written historical record. They may include archaeological deposits, sites, structures, traveled

ways, artifacts, or other evidence of human activity. Groupings of historic-period resources are also recognized as historic districts and as historic vernacular landscapes. Under federal and state historic preservation law, cultural resources must be at least 50 years old to have the potential to be of sufficient historical importance to merit consideration of eligibility for listing in the California Register of Historical Resources (CRHR). A resource less than 50 years of age must be of exceptional historical importance to be considered for listing.

For the BP Watson project, staff provides an overview of the environmental setting and history of the project area, an inventory of the cultural resources identified in the project vicinity, and an analysis of the potential impacts to cultural resources from the proposed project using criteria from CEQA.

If cultural resources are identified, staff determines which are historically significant (defined as eligible for the CRHR) and whether the BP Watson project would have a significant impact on those that are CRHR eligible. Staff's primary concern is to ensure that all potentially CRHR-eligible cultural resources are identified, that all potential significant impacts to those resources are identified and assessed, and that conditions are proposed that ensure that all significant impacts that cannot be avoided are mitigated to a less-than-significant level or to the extent feasible.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Projects licensed by the Energy Commission are reviewed to ensure compliance with all applicable laws. For this project, in which there is no federal involvement,[1] the applicable laws are primarily state laws. Although the Energy Commission has pre-emptive authority over local laws, it typically ensures compliance with local laws, ordinances, regulations, standards, plans, and policies (**Cultural Resources Table 1)**.

Cultural Resources Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
State	
Public Resources Code 5097.98(b) and (e)	Requires a landowner on whose property Native American human remains are found to limit further development activity in the vicinity until he/she confers with the Native American Heritage Commission-identified Most Likely Descendents (MLDs) to consider treatment options. In the absence of MLDs or of a treatment acceptable to all parties, the landowner is required to reinter the remains elsewhere on the property in a location not subject to further disturbance.

[1] Cultural resources in California are also protected under provisions of the federal Antiquities Act of 1906 (Title 16, United States Code, Section 431, et seq.) and subsequent related legislation, policies, and enacting responsibilities, e.g., federal agency regulations and guidelines for implementation of the Antiquities Act.

Applicable Law	Description
State	
California Health and Safety Code, Section 7050.5	This code makes it a misdemeanor to disturb or remove human remains found outside a cemetery. This code also requires a project owner to halt construction if human remains are discovered and to contact the county coroner.
Local	
Los Angeles County General Plan, 2008	Policy C/OS 12.1: Support an inter-jurisdictional collaborative system that protects and enhances the County's cultural heritage resources. Policy C/OS 12.2: Support the preservation and rehabilitation of historic buildings. Policy C/OS 12.3: Ensure proper notification procedures to Native American tribes in accordance with Senate Bill 18 (2004). Policy C/OS 12.4: Promote public awareness of the County's cultural heritage resources.
City of Carson General Plan, Parks, Recreation, and Human Services Element (City of Carson 2004)	Goal P-9: Protection of historic resources within the City. Policy P-9.1 Promote the preservation of historic resources in the City through the Fine Arts and Historical Commission. Policy P-9.2 Coordinate with the Departments of History and Anthropology at California State University, Dominguez Hills (CSUDH), to mutually enrich both the educational and general communities. Policy P-9.3 Create an oral history program that would archive the City's history from long-time Carson residents. Implementation Measure P-IM-9.1: Encourage the Fine Arts and Historical Commission to work with local historic societies and CSUDH to preserve important historic resources. Work with the City's Public Information Office to promote local and regional historic resources. Implementation Measure P-IM-9.2: Encourage all development or redevelopment occurring in areas identified as a potential historic archaeological site to be surveyed for historic archaeological resources prior to initiation of site preparation for development. Implementation Measure P-IM-9.3: Ensure that documentation of all historic archaeological surveys conducted in the City of Carson be provided to the Planning and Environmental Services Division.

SETTING

Information provided regarding the setting of the proposed project places it in its geographic and geologic context and specifies the technical description of the project. Additionally, the prehistoric, ethnographic, and historical background provides the context for the evaluation of the CRHR eligibility of any identified cultural resources within staff's area of analysis for this project.

REGIONAL SETTING

The proposed BP Watson project area is located in the City of Carson, which is located in the South Bay/Harbor area of the County of Los Angeles, approximately 13 miles south of downtown Los Angeles. Carson is surrounded by the City of Los Angeles on the northwest, south, and southeast. The City of Compton is adjacent to the northeast and the City of Long Beach is adjacent to the east. Unincorporated areas of Los Angeles County are located on the north, southwest, and east. The City of Carson is approximately 19.2 square miles in area, making it the eighth largest city in land area within Los Angeles County. Most elevations in the city range from 20 to 40 feet above mean sea level (amsl). With the exception of Dominguez Hill in the northeast area of the city, where elevations reach 179 feet amsl, the city mostly is flat. The city's lowest points are at Del Amo Park with an elevation of five feet below mean sea level (bmsl), and underwater in the Dominguez Channel, with an elevation of almost 15 feet bmsl.

PROJECT, SITE, AND VICINITY DESCRIPTION

The project, as proposed, is an expansion of a steam and electrical generating (cogeneration) facility, which completes the facility's original design. The facility has been in operation for over 20 years. The original plant design included plans for a new unit at a later date and also allocated a physical land parcel for this expansion. The project, an 85-megawatt (MW) combustion turbine generator with a single-pressure heat recovery steam generator (HRSG), also referred to as the fifth train, would provide additional steam for the BP Carson refinery (Watson 2009a, p. 1-1). The steam produced by the fifth train will be delivered to the existing steam header systems shared by the four existing cogeneration trains.

The baseline environmental condition of the project site is one of an industrial development within an urban setting. On the premises of the existing Watson Cogeneration facility, the location of the proposed project, there has been much ground disturbance through extensive development, dredging, and fill activities, in addition to added hardscape and pavement. Overall, the existing topography no longer resembles its original natural environment (Watson 2009a, p. 5.7-4). The project site is surrounded by existing refineries and other industrial infrastructure; the entire project site is zoned by the City of Carson as Heavy Manufacturing. The existing landscape in the vicinity of the planned project is characterized by buildings and structures associated with power generation and petroleum production, processing, and storage.

The BP Watson project site is located approximately 0.7 mile south of Interstate 405, roughly bounded by Wilmington Avenue to the west, East Sepulveda Boulevard to the south, South Alameda Street to the east, and the Dominguez Channel to the north, in an area characterized by oil refineries, warehouses, and railroad infrastructure. The project site is a 2.5-acre brownfield, part of the 21.7-acre Watson Cogeneration facility, which is itself on the 428-acre parcel of the existing Carson Refinery, owned by British Petroleum. The elevation of the project site is approximately 32 feet amsl (Watson 2009a, p. 7-2). Located on the existing refinery property, the proposed project site has been subject to years of heavy industrial development and use. The project footprint is the former location of a crude oil reservoir, which can be identified on aerial photographs as early as 1928. Between 1987 and 1988, most of that reservoir was replaced with asphalt paving (Watson 2009f, DPR 523A, p. 1).

The BP Watson project has two primary components: the project site, where the direct physical improvements would occur, and a construction laydown and parking area. The construction laydown and parking area, a paved 25-acre parcel at 2149 East Sepulveda Boulevard, is approximately one mile southeast of the project site and is currently used as a truck parking and staging area by the Carson Refinery. There would be no ground disturbance on the construction laydown, and parking area.

The construction excavation planned for the 2.5-acre project site would not be deeper than 10 feet below existing grade. There are no off-site improvements planned for the project, such as water supply, natural gas, or wastewater pipelines. The proposed project would instead connect to the supply pipelines on the extant facility (Watson 2009a, p. 5.7-3). There is presently a maintenance shop/warehouse on a portion of the proposed project site that would be removed prior to project construction. Additional demolition would consist of the removal of known underground man-made structures on the site, such as warehouse foundations, piping systems, and maintenance access roads. Asphalt or asphaltic concrete covers the paved area of the project site, which is at the same level with the existing facilities and would be removed, and approximately 7,000 cubic yards of existing fill material would be removed and stockpiled (Watson 2009a, p. 3-51).

Environmental Setting

Geomorphology and Geology

The project site sits on an alluvial coastal plain, extending north from present-day Los Angeles and the Long Beach harbors (Watson 2009a, p. 5.7-3). The plain is flat and marshy, dominated by two prominences, Dominguez Hill in the north, with an elevation of 179 feet amsl, and the Palos Verde Hills to the southwest, which rise over 1,400 feet amsl. Other than these two landmarks and several small marshy lakes, the Harbor Lakes, the Dominguez Channel, and the Los Angeles River, the plain is featureless, reaching a maximum elevation of 35 to 40 feet amsl.

The plain has developed over a period of 20 million years. The plain originally was submerged under the sea with only the Palos Verde Hills above sea level. The Palos Verde Hills and the Santa Monica Hills were incorporated into a seacoast highland during a time when volcanoes were very active, depositing extensive beds of lava on the floor of the Los Angeles Basin (LA Basin). Today, the floor of the LA Basin contains stratified layers of lava and sediments over 10,000 feet thick. In addition, marine sediments have accumulated on the floors of the Torrance Plain, including the LA Basin. The formation of the coastal bar occurred during the Pliocene period (dating from 13 million to 2 million years ago), establishing a wide delta at the mouth of the southward-flowing Los Angeles River. The mouth of the Los Angeles River has alternated between a tidal salt water marsh and a fresh water marsh for the last few thousand years and has extended from the present San Pedro Bay shoreline northwards to Sepulveda Boulevard (Watson 2009a, p. 5.7-3).

The project is located in the Peninsular Ranges Geomorphic Province of California, which consist of a series of ranges separated by northwest-trending valleys that are sub-parallel to faults branching from the San Andreas Fault. More specifically, the

project is located on the southwest edge of the LA Basin, an alluvial plain created by tectonic subsidence and the subsequent filling by sediments eroded from surrounding mountains. The LA Basin is a coastal plain of low relief that slopes gradually seaward (Watson 2009a, p. 5.3-2). The surface deposits of the project vicinity are identified as late-to-middle Pleistocene alluvial floodplain deposits.

The topographic elevations in the project area range from approximately 20 feet to 35 feet above MSL. The high groundwater level contours indicate groundwater at a depth of approximately 20 feet below the existing ground surface (Watson 2009a, p. 5.3-3).

Pedology

Expansive soils exist on the project site, with the native soils consisting of Zamora and Ramona series soils; however, most soils on the plant site consist of engineered fill material, with native soils below the fill. According to a geotechnical investigation conducted at the Carson Refinery in 1986, the existing fill soils on the plant site are 8.5 to 20 feet in thickness, with the fill consisting of silt and clay, varying from only moderately stiff to stiff. There was no occurrence of subsurface water within the 65-foot depth explored in the study (Watson 2009a, vol. II, app. L, p. 5-6).

Prehistoric Background

California may provide some of the more ancient evidence of the human presence on the North American continent, perhaps dating as early as 30,000 years ago. According to many archaeological researchers, Southern California's prehistory has been divided into a basic four-stage chronology. A chronology in common use today for prehistoric analyses was developed by William Wallace (1955; 1978).

Wallace established a culture history sequence for Southern California in 1955, positing several broad cultural horizons based on changing tool and ornament styles. According to Wallace the four cultural horizons for coastal Southern California are:

Horizon I Early Man	before 7,000 years ago
Horizon II Millingstone	7,000 to 3,500 years ago
Horizon III Intermediate	3,500 to 1,500 years ago
Horizon IV Late Prehistoric	1,500 to historic contact, about 200 years ago

When Wallace developed the Horizon I Early Man chronology he assumed a late Pleistocene occupation, but no artifact finds had substantiated this assumption in 1955. However, since then, Clovis-style fluted projectile points at least 11,000 years old (dated through radiocarbon testing) have been found in places such as the San Joaquin Valley, the Mojave Desert, and the Tehachapi Mountains, thus providing strong supporting evidence for Wallace's theory of a late Pleistocene occupation (Moratto 1984, pp. 79–88). The Early Man Horizon has been documented in Orange County by a female skeleton known as Laguna Woman, which apparently dates to the Early Man period. Remains such as leaf-shaped knives and scrapers imply that the early tradition seems to have emphasized hunting.

The Millingstone period (Horizon II) is characterized by small groups relying on seasonal settlements, possibly in both coastal and inland residential locations. The

assemblages of Millingstone sites are, as the name indicates, characterized by seed grinding tools (manos, metates, and hammerstones); usually in large numbers. In coastal regions, these seed grinding tools are usually found with shell middens, but few projectile points, bone, or shell artifacts have been found in this period (Moratto, 1984, p. 159). The staple foods of this period seemed to have been buckwheat, sage, and other grasses, with less reliance on hunting. The flaked stone tools from this period are commonly coarsely grained, durable lithic materials.

During Horizon III, the Intermediate Culture, the presence of many projectile points and the varied faunal remains show the reliance on both land and sea mammals, clearly distinguishing Horizon III from the Millingstone period. And while shellfish contributed to the diet, fishing, by and large, did not. In addition, during this period a shift occurred from the use of manos and metates to the use of mortars and pestles because of the increased reliance on acorns in the diet. Cremation was one of the diverse forms of burial customs in this period (Moratto 1984, p. 159).

The Late Prehistoric Culture, Horizon IV, is characterized by dense populations and cultural elaboration with a broader material culture, such as more skillfully crafted artifacts, made out of bone and shells, and the use of asphaltum. There was an increase in the use of the bow and arrow in addition to intensive fishing (Moratto, 1985, p.159). In general, Late Prehistoric archaeology today is better understood because of the surviving late nineteenth- and early twentieth-century Native Americans who provided information to early anthropologists beginning to record information about California Native American tribes.

Ethnographic Background

The Gabrielino were the Native Americans associated with the area that today includes the project site and most of Los Angeles and Orange County. “Generally, the Gabrielino territory included the watersheds of the Los Angeles, San Gabriel, and Santa Ana rivers, several smaller intermittent streams in the Santa Monica and Santa Ana mountains, all of the Los Angeles basin, the coast from Aliso Creek in the south to Topanga Creek in the north and the islands of San Clemente, San Nicholas, and Santa Catalina” (Bean and Smith, 1978, p. 538).

The Gabrielino are one of the least well documented of the native peoples of California because they were one of the first groups to suffer the effects of foreign diseases and the influx of foreigners arriving in the region. But ethnographic studies conducted by Alfred Kroeber (1925) and J. P Harrington (1942) and others in the early twentieth century have provided some insight into the culture of the Gabrielino (Bean and Smith, 1978, p. 538). The name “Gabrielino” originates from one of the Los Angeles-area missions, San Gabriel, with which they came to be associated. The other established mission in the region was San Fernando, and most of the Indians living in the coastal regions of Southern California were moved to these two missions (Bean and Smith, 1978, p. 538).

From linguistic studies it has been determined that the Gabrielino language was derived from one of the Cupan languages in the Takic family, and that they and their ancestors migrated from the Great Basin area. Based on linguistic analysis, it is presumed that at

one time the entire southern California coastal region was populated by Hokan speakers who were gradually displaced by Takic-speaking immigrants from the Great Basin area. Since the timing and extent of the migrations and their effects on indigenous peoples is not well understood, any data related to it represent a valuable contribution to the understanding of local prehistory (Bean and Smith, 1978). The Gabrielino arrived at the coast around 500 BC.

The Gabrielino occupied one of the richest habitats in all of California, which included four macro-environments: the Interior Mountains/Adjacent Foothills, Prairie, Exposed Coast, and Sheltered Coast (Bean and Smith 1978). The existing abundance of resources provided the Gabrielino with many opportunities to use native plants and animals and, due to the resources contained within the diverse region, develop one of the most complex cultures of any native California groups. The abundance of resources allowed the Gabrielino to settle permanently in small villages throughout the area.

The Gabrielino erected permanent villages in resource-rich areas near rivers and streams, and along the coast, and they founded secondary, or satellite, villages in the vicinity of the permanent ones. The preponderance of named villages around what is now Long Beach Harbor attests to the density of settlement in the area (Watson 2009f, p. 4-3). Ethnographic evidence documents that the village of Sua-nga (Suangna), recorded as archaeological site CA-LAn-98, was located directly southwest of the Carson Refinery.

The traditional dwellings of the Gabrielino were both the subterranean pithouse and the thatched lean-to (wickiup). The pithouse was constructed by excavating about two feet below the surface and constructing the walls and roof with wooden beams and earth around the excavation pit. The wickiup was made out of thatched walls and a thatched roof over large converging poles. A hearth inside the lean-to provided warmth. The cooking hearths were outdoors. *Temescals,* or sweathouses were used as meeting places for the men.

The material culture of the Gabrielino is characterized both by an adaptation to the various environments within their territory and by an elaborately developed artistic style. Their artistic style was often manifested in elaborate shell bead and asphaltum ornamentation on many utilitarian items, such as bone awl handles, bowl or mortar rims, etc. Spear, atlatl and dart, and bow and arrow were used for hunting, while manos and metates, as well as mortars and pestles, were used for processing plant and animal material into food. The Gabrielino were also known for their high quality of basketry work. The Gabrielino weapons consisted of wooden war clubs, sinew-backed bows, tipped (stone or bone) and untipped cane arrows and throwing clubs and slings used for hunting birds and smaller animals.(Bean and Smith, 1978, p. 542)

Historic Background

Spanish Period (1769 to 1821)

The Spanish period in California spans from 1769 to 1821. While California was a Spanish province, it was very sparsely populated by Spanish soldiers, settlers and Catholic missionaries. During this time, California supported a much larger number of

Native Americans than in other regions of comparable size in North America north of Mexico (Rawls and Bean, 1968, p. 3). Spanish exploration began as early as 1540 with Juan Cabrillo's voyage to Monterey Bay in 1542–1543. It was Cabrillo who called what today is known as San Pedro Bay "Bahia de los Fumos" because of the smoke from Native American campfires along the harbor and on the slopes of the Palos Verde Hills (Watson 2009f, p. 4-4). The next Spanish expedition to land near the project area was not until 1602, under the leadership of Sebastian Vizcaino. The Don Gaspar de Portola expedition, which included Father Junípero Serra, the founder of the California missions, crossed the Los Angeles coastal plain in the summer of 1769. At that time, Portola was Military Governor of Alta California, and Juan Jose Dominguez was a soldier in this expedition.

The rancho movement began in 1784 in Los Angeles County and is understood as the settlement of tracts of land by individuals outside pueblo and presidio boundaries. Dominguez, as one of the "veterans, probably around 1784 received permission from Governor Fages to put [his] their cattle on land of their own choosing. It was probably in the fall of 1784 that he drove his herd of horses and 200 head of cattle from San Diego to a site near the mouth of the Los Angeles River. On the slope of a hill he built several huts and corrals and established what came to be known as Rancho San Pedro" (W. W. Robinson, 1979, pp. 46–47).

The founding of the San Gabriel Mission and El Pueblo de Nuestra Señora la Reina de Los Angeles also occurred during the Spanish Period. The San Gabriel Mission was founded in 1771 by Father Serra near present-day Montebello. As religious conversion was one of the pivotal objectives of the missions, the over 25,000 Native American baptisms that took place at San Gabriel speak to the mission's prolific record (Watson 2009f, p. 4-4). It was common practice to remove the Native American converts from their villages and place them in neophyte quarters on the mission grounds. This displacement of the neophytes from their villages and lands occurred across the Los Angeles Basin, including at the Gabrielino village of Suangna. Suangna, which is located less than a mile west of the project site, was at least still partially occupied until the early 1800s. By 1781, due to the successes of the Mission San Gabriel, a new Spanish pueblo was founded 9 miles west of the mission, in the vicinity of San Pedro Harbor. The pueblo was named El Pueblo de Nuestra Señora la Reina de Los Angeles and would evolve into the present day city of Los Angeles.

During the first third of the nineteenth century, ranching became the new way of life. "Native Americans living in the village of Suangna were forced into work as vaqueros, showing that the village of Suangna was still partially inhabited even after the devastation of European colonialization and the mission system" (Watson 2009f, p. 4-5) A major part of the rapid decline of Native American populations must have been linked to the dramatic increase in cattle ranching, causing a substantial change in the local environment through the foraging herds that reduced the green coastal plain to a barren landscape.

Mexican Period (1821 to 1848)

The so-called Mexican Period of California is generally considered to last from 1821 to 1848. In 1810 the Mexican Revolution began but the fact that Mexico had become

independent from Spain did not become news in California until 1822. A historic consequence of the independence from Spain was the initiation of the secularization of all the missions of Alta and Baja California. With the church as the predominant land holder in California, secularization released vast amounts of land into new ownership. These lands became the large lands grants awarded to Mexican, European, and American settlers and also provided the basis for new civilian "pueblos."

By 1834 the Mission San Gabriel had been secularized and within 10 years after secularization, the mission had failed, the neophytes had left, and the buildings had fallen into disrepair (Watson 2009f, p. 4-6). By 1852, San Gabriel became one of the first townships in Los Angeles County, with the San Gabriel Mission as a parish.
In 1822, all land grants issued by the Spanish were reconfirmed by the Mexican government, including the San Pedro Rancho land grant. San Pedro Bay developed into a port for passengers and merchandise goods, and the first road was a dirt road connecting the port with the Pueblo of Los Angeles, known as San Pedro Road. A "second road was built from the mission to the port in the 1820s, which later became the route of Wilmington Avenue, passing through the San Pedro Rancho." When the war between the United States and Mexico ended the Mexican Period, the port and the road between the port and Mission San Gabriel were used by General Stockton's troops during the battle of Dominguez Hill (Watson 2009f, p. 4-6).

American Period (1848 to the present)

California became a state in 1850, but it was the Gold Rush of 1849 which brought a huge influx of Americans to California and contributed to the expansion of the Los Angeles area. The Land Act of 1851, a consequence of statehood, required landowners who had received titles to land from either the Spanish or Mexican governments to present and prove the legality of their titles before a U.S. Land Commission. Although Manuel Dominguez's (Juan Jose's heir) title was confirmed in 1858, the Rancho San Pedro was subsequently broken up, and acreage was sold to developers. "One of the sales involved 2,400 acres of property bordering San Pedro Bay which was acquired by Phineas Banning to found the community of Wilmington" (Watson 2009f, p. 4-7).

The next changes within the area resulted from the arrival of the first transcontinental railroad in 1869 in Los Angeles, extending through Rancho San Pedro to reach the San Pedro Harbor. The Southern Pacific added lines between 1869 and 1876, one with a track parallel to Alameda Street. Increased overall developmental growth in the area was due to the arrival of the railroad. By 1870, 2,000 acres of the Rancho San Pedro were sold and subdivided into the Dominguez Colony tract, south of Dominguez Hill and west of the Los Angeles River (Watson 2009f, p. 4-8).

While the time around the 1880s was a boom time of development for the Los Angeles area, with economic advancements, land improvements, and new development, the present-day City of Carson still consisted of lands originally part of the Rancho San Pedro and was characterized by a dry and dusty landscape with minimal vegetation. By 1911, the need for a regular water supply for the expanding agriculture and developing communities resulted in the formation of the Dominguez Water Company, as a subsidiary of the Dominguez Estates Company. "This greatly promoted the

development of the southwest portion of present-day Carson, resulting in an increased sale of Rancho San Pedro lands for development and farming" (Watson 2009f, p. 4-9).

A time of heavy flooding causing extensive damage to farms and rural properties occurred between 1914 and 1916, severely inundating the Watson Lakes, which were formerly adjacent to the project area. "During this period, earthen levees were created, as well as raised roadways and railroad tracks, which affected the drainage of the natural environment" (Watson 2009f, p. 4-9).

In 1917 the Dominguez Channel was created by filling the marshes and ponds north of Sepulveda Boulevard and then redirecting the drainages. The work replaced the inundated Watson Lakes with an improved channel (Watson 2009f, p. 4-9). In 1958 work began on the channelization of the Los Angeles River and Compton Creek, which resulted in major alterations of the Dominguez Channel.

The discovery of oil at Signal Hill in 1921 preceded the oil discovery in 1922 on Dominguez Hill (north of the project site). In 1927, Shell Oil had developed the Dominguez Hill site into a refinery, and other sections of the original Rancho San Pedro were sold for oil production. Towards the late 1920s, many oil companies owned former ranch land, and oil prospecting and drilling proliferated.

The pre-World War II development of the present-day Carson area was slow, with the area dominated by agriculture on one end and petroleum processing and production on the other. But after the war, rapid industrial change began to displace the agricultural activities. Around the late 1950s, the Carson area had begun to take on its contemporary form.

The largest physical change in the area (and near the project site) occurred in 1967, when the Dominguez Estate Company offered 1,400 acres of property for $58,500,000. This was considered the biggest real estate offering in the history of Southern California. The land was purchased by the Union Pacific Railroad, Northwestern Mutual, Watson Land Company, the State of California (for the formation of the State College at Dominguez Hill), and others (Jerrils 1972, pp. 83–84). In 1968, the City of Carson was incorporated. It embarked on a number of city activities as much to improve its image as its environment. Significant road widening occurred. For example, in 1968 the road next to the project site, Wilmington Avenue, was widened to four lanes and curbed, and 223rd Street between Wilmington and Alameda was also widened to four lanes (Watson 2009f, p. 4-11).

The BP Watson project site is located in the City of Carson, but historically this area, where petroleum processing had proliferated and tank farms had been built, was part of Los Angeles County. Between 1922 and 1925, Pan American Petroleum established a tank farm just south of the project site. "This tank farm held about 30 tanks capable of storing 2,000 to 150,000 barrels…of gasoline, and the tanks sat on berms constructed of fill." North of these Pan American tanks were two crude oil reservoirs that were

partially removed in the 1980s. “The tank farm in the APE[2] was essentially one of the numerous tank farms in the Carson area” (Watson 2009f, p. 4-11).

Before Carson’s incorporation, much of the area’s land was controlled by many large industrial companies, such as Richfield Oil, which became Atlantic Richfield Oil, then ARCO, and then British Petroleum (BP). As BP, this company established an oil refinery in the project’s location. The existing project site was developed between 1951 and 1953, but between 1956 and today, according to the review of photographs and maps, has experienced a huge amount of change and in-fill. The Watson Cogeneration facility, which was built in 1987 and 1988 and consists of four identical combustion turbine generators (CTGs), is located south of the refinery.

Another tank farm, built between 1922 and 1924, called the Carson Terminal, is located directly south of the construction laydown and parking area, east of the Southern Pacific Railroad and Alameda Street, and has been used for over 70 years. Additional tanks were added to the Carson Terminal until the 1980s. In addition, between 1936 and 1957, a refinery was located in the Carson Terminal area (Watson 2009f, p. 4-12).

CULTURAL RESOURCES INVENTORY

A project-specific cultural resources inventory is a necessary step in staff’s effort to determine whether the proposed project may cause significant impacts to historically significant cultural resources and would therefore, under CEQA, have an adverse effect on the environment.

The development of a cultural resources inventory entails working through a sequence of investigatory phases. Generally the research process proceeds from the known to the unknown. These phases typically involve doing background research to identify known cultural resources, conducting fieldwork to collect requisite primary data on not-yet-identified cultural resources in the vicinity of the proposed project, assessing the results of any geotechnical studies or environmental assessments completed for the proposed project site, and compiling recommendations or determinations of historical significance (see “Determining the Historical Significance of Cultural Resources,” below) for any cultural resources that are identified.

This subsection describes the research methods used by the applicant and Energy Commission staff for each phase and provides the results of the research, including literature and records searches (California Historical Resources Information System (CHRIS) and local records), Native American consultation, and field investigations. Staff provides a description of each identified cultural resource, its historical significance, and the basis for its significance evaluation. Assessments of the project’s impacts on historically significant cultural resources, potential impacts on previously unidentified, buried archaeological resources, and proposed mitigation measures for all significant impacts are presented in a separate subsection below.

[2] APE stands for Area of Potential Effects, a term used in federal cultural resources analysis. For this study, the equivalent term, under CEQA, is project area of analysis (see below).

Project Area of Analysis

The inventorying of cultural resources within what staff defines as the appropriate area for the analysis of a project's potential impacts is the first step in the assessment of whether the proposed project may cause a significant impact to a CRHR-eligible cultural resource and therefore have an adverse effect on the environment. The area that staff considers when identifying and assessing impacts to historical resources, called the "area of analysis" for the project, is usually defined as the area within and surrounding the project site and associated linear facility corridors. The area varies in extent depending on whether the cultural resource is an archaeological, ethnographic, or built environment resource.

The project area of analysis is a composite geographic area that accommodates the analysis of each:

- For archaeological resources, the area of analysis is minimally defined as the project site footprint, plus a buffer of 200 feet, and the project linear facilities routes, plus 50 feet to either side of the routes. For its archaeological area of analysis, staff has used the above surface parameters.
- For ethnographic resources, the area of analysis is expanded to take into account traditional use areas and traditional cultural properties which may be far-ranging, including views that contribute to the historical significance of the properties. The Native American Heritage Commission (NAHC) assists project cultural resources consultants and staff in identifying these resources, and consultation with Native Americans and other ethnic or community groups may contribute to defining the area of analysis. For the BP Watson project, staff identified no ethnographic resources.
- For built-environment resources, the area of analysis is minimally defined as one parcel deep from the project site footprint in urban areas, but in rural areas is expanded to include a half-mile buffer from the project site, and from any above-ground linear facilities, to encompass resources whose setting could be adversely affected by industrial development. The area of analysis for the built environment is that minimum.
- For a historic district or a cultural landscape, staff defines the area of analysis based on the particulars of each siting case. No historic districts or cultural landscapes were identified for the BP Watson project.

As used by staff, the term "project areas" means the footprints of the several project components, including the plant site and the laydown and parking area.

Background Inventory Research

Various repositories in California hold compilations of information on the locations and descriptions of cultural resources older than 45 years that have been identified and recorded in past cultural resources surveys. The Energy Commission's Data Adequacy Regulations require applicants to acquire information specific to the vicinity of their project from certain repositories and to provide it to staff as part of the AFC. Additionally, to acquire further information on potential cultural resources in the vicinity of a proposed project, the applicant is required to consult with knowledgeable individuals in local agencies and organizations and with Native Americans who have

expressed an interest in being informed about development projects in areas to which they have traditional ties.

CHRIS Records Search

The California Historical Resources Information System (CHRIS) is a federation of 11 independent cultural resources data repositories governed by the California State Office of Historic Preservation. These centers are located around the state, and each holds information about the cultural resources of several surrounding counties. Qualified cultural resources specialists obtain data on known resources from these centers and in turn submit new data from their ongoing research to the centers.

URS, the cultural resources consultant for the BP Watson project, requested an expedited records search from the South Central Coastal Information Center (SCCIC) in Fullerton. The purpose of the search was to identify all previously recorded cultural resources and previous cultural resources investigations completed within a one-mile radius of the project areas. The records search included a review of the California Points of Historical Interests (PHI), the California Historical Landmarks (CHL), the California Register of Historical Resources (CRHR), the National Register of Historic Places (NRHP), the California State Historic Resources Inventory (HRI), and the City of Los Angeles Historic-Cultural Monuments listings.

CHRIS Results

The applicant's CHRIS search identified 45 reports of previous cultural resources investigations known to be or potentially located within 1 mile of the BP Watson project areas (Watson 2009f, p. 5-1). **Cultural Resources Table 2** lists the five reports of investigations covering parts of the project areas.

Cultural Resources Table 2
Previous Cultural Resources Investigations Covering Parts of the BP Watson Project Areas

ID	Author & Date	Title	Type of Investigation
LA2644	Robert J. Wlodarski, 1992	The Results of a Phase I Archaeological Study for the Proposed Alameda Transportation Corridor Project, Los Angeles County, California	Phase I pedestrian archaeological survey and records search
LA2751	Beth Padon, 1992	Archaeological Survey Results: Proposed Arco Los Angeles Refinery Clean Fuels Project, Carson, California	pedestrian archaeological survey
LA4512	A.V. Eggers, 1977	Cultural Resources Inventory of the City of Carson, California	archaeological survey & inventory
LA5971	Curt Duke, 2002	Cultural Resources Assessment of AT&T Wireless Services Facility No. 05220A-01, Los Angeles County, California	archaeological survey
LA7952	David M. Livingstone, Dennis McDougall, Susan K. Goldberg, and Wendy M. Nettles, 2006	Trails to Rails: Transformation of a Landscape: History and Historical Archaeology of the Alameda Corridor, Vol.1	Treatment report with DPR 523a forms

Investigation LA2644 (1992) covered the southern and western boundary of the laydown and parking area. The investigation was an archaeological survey of a proposed 20-mile-long transportation corridor.

Investigation LA2751 (1992) covered the entire project plant site. The investigation was a reconnaissance archaeological survey of a previously recorded archaeological site within the BP Carson Refinery. The site, the ethnohistoric Native American village of Suangna, is also a prehistoric archaeological site that formerly consisted of shell midden and burials.

Investigation LA4512 (1977) covered the project areas. The built-environment investigation included preparation of a historic context, walkover survey of undeveloped portions of the city, and the creation of policies and procedures for the city.

Investigation LA5971 (2001) covered the project plant site. The investigation was an archaeological field survey in support of the BP Fifth Train Project at the BP Carson Refinery.

Investigation LA7952 (2006) covered an area alongside the western boundary of the

laydown and parking area. The investigation reported on the treatment of historical archaeological resources encountered during construction of the Alameda Corridor.

These reports identified no cultural resources in the BP Watson project areas.

The applicant's CHRIS records search identified 11 cultural resources located within a 1-mile radius of the project areas. Those 11 resources consist of seven archaeological sites and four built-environment resources, none of which is located within the project areas (see **Cultural Resources Table 3**, below). Nor is any of the sites listed on the Archaeological Determination of Eligibility (DOE) list, and no archaeological isolates have been identified within a one-mile radius of the project areas. Brief descriptions of the 11 cultural resources located within one mile of the project areas are provided in **Cultural Resources Table 3**, below.

The records search further identified one California Point of Historical Interest, Suangna Indian Village (Point No. LAN-013), which is located within 500 feet of the project plant site and is counted as an archaeological site in the summary of 11 cultural resources located within one mile of the project areas. The CRHR lists 42 historic properties within a one-mile radius of the project areas that either have been determined eligible for the NRHP or eligible to be listed in it. Additionally, according to the California Historic Resources Inventory (HRI), 57 properties have been evaluated for historical significance within a one-mile radius of the project areas. The CHRIS records search did not produce site forms, reports, or locations for any of the NRHP or HRI resources (Watson 2009a, pp. 5.7-26–5.7-27), but none of them is located in the BP Watson project areas.

Cultural Resources Table 3
Previously Recorded Cultural Resources Located Within One Mile of the BP Watson Project Site, for which Location Data were Available

Primary No.	Trinomial No.	Resource Age	Resource Type
19-000098	LAn-098	Prehistoric	Prehistoric archaeological site, Suangna, Native American village site and shell midden
19-000795	---	Prehistoric	Prehistoric archaeological site, debitage scatter
19-002682	---	Prehistoric	Prehistoric archaeological site, proto-historic midden with more than 25 burials
19-002788	---	Prehistoric	Prehistoric archaeological site, partial human burial
19-0002942	---	Historic	Historic-period archaeological site, 22 subsurface wooden posts, associated with the Southern Pacific Railroad
19-003063 (previously assigned 19-003042	---	Historic	Historic-period archaeological site, a 1920s redwood box culvert with contemporary, abandoned oil pipeline
19-003067	---	Historic	Historic-period archaeological site with two un-reinforced concrete features, located where railroad tracks used to be present; most likely associated with the Southern Pacific Railroad

Primary No.	Trinomial No.	Resource Age	Resource Type
19-180783	---	Historic	Built-environment resource, circa 1905 passenger & railroad depot for Pacific Electric Railway, with a one-story addition from 1920s
19-186868	---	Historic	Built-environment resource, 1920s storage tank facility for oil production
19-187733	---	Historic	Built-environment resource, 1920s storage tank facility for oil production
36-010330	CA-SBR-10330H	Historic	Built-environment resource, Union Pacific Railroad section with standard-gauge trackage and features such as spurs, yards, stations, and sidings

Archival Research

The applicant's consultant conducted additional primary and secondary research on the history of the project area at the following repositories. The repositories consulted were:

- Los Angeles County Library, Carson Branch;
- City of Carson Planning and Building Departments;
- California State University, Fullerton, Library;
- Los Angeles County Assessor-Recorder;
- Historical Society of Long Beach;
- *Los Angeles Times* photographic archives;
- San Diego State University Library;
- University of California, San Diego, Geisel Library and Mandeville Special Collections; and
- San Diego Public Library.

In addition, various online resources, such as Calisphere: A World of Digital Resources and the California Historic Topographic Map Collection, were consulted. Historic-period aerial photographs were obtained from Environmental Data Resources, Inc.

Archival Research Results

The research results from the literary research, from historic maps and aerial images, were used to provide insight into the historical background of the proposed project site, to refine the historical themes for the historical resources context, and to provide specific information about properties within the project vicinity, but not additional cultural resources were identified as a result of this research.

Local Agency and Organization Consultation

On June 30, 2008, the applicant's consultant contacted the Wilmington Historical Society and the City of Carson's Planning Department for information about any known cultural resources, either listed locally or recognized locally, by the city's museum or by the local historical society.

Results of Inquiries to Local Agencies and Organizations

There was no response from the Wilmington Historical Society. There are no locally listed cultural or historical resources in a 1-mile radius, according to the City of Carson.

Native American Consultation

The Native American Heritage Commission (NAHC) maintains two databases to assist cultural resources specialists in identifying cultural resources of concern to California Native Americans, referred to by staff as Native American ethnographic resources. The NAHC's Sacred Lands database has records for places and objects that Native Americans consider sacred or otherwise important, such as cemeteries and gathering places for traditional foods and materials. Their Contacts database has the names and contact information for individuals, representing a group or themselves, who have expressed an interest in being contacted about development projects in specified areas. An information request on the presence of sacred lands in the vicinity of a proposed project should be made and a request for a list of Native American contacts should also be made to identify both additional cultural resources and any concerns the Native Americans may have about a proposed project.

On behalf of the applicant, URS contacted the NAHC with a request to search the Native American Sacred Lands File. The NAHC responded on June 16, 2008, that a search of the Sacred Lands File (SLF) for the project area site "failed to indicate the presence of Native American cultural resources in the immediate project area. The absence of specific site information in the Sacred Lands File does not guarantee the absence of cultural resources in any area of potential effect" (Watson 2009f). The NAHC provided a list of seven Native American contacts. URS subsequently contacted these persons.

Results of Inquiries Made to Native Americans

Not all Native Americans contacted by URS responded to the letter or to the follow-up phone calls, but five responses were received. Mr. Qun-tan Shop, of the Chumash Clan, indicated that he would respond via email by the end of the day on July 14, 2008. There appears to be no further response from him.

Mr. Johntommy Rosas, of the Gabrielino/Tongva, Administrator to the Ancestral

Territorial Tribal Nation, responded in an email, dated July 12, 2008. Mr. Rosas stated that "we object to the proposed project under the grounds and basis due to numerous of violations to our indigenous rights. This proposed project will impose severe negative impacts on our territorial resources and that is unacceptable." He stated further that he would provide more comments at a later date. To date, and to staff's knowledge, no further comments have been received.

Mr. Anthony Morales, Gabrielino/Tongva, San Gabriel Band of Mission Indians, called Mr. Jeremy Hollins, URS, on July 30, 2008, wanting to know about the project's time line and the extent of the ground disturbance. Information was provided to Mr. Morales about recent investigations and the excavations associated with the possible construction. Further discussion revolved around the cultural sensitivity of the area and some of the recent findings discovered from previous projects over the past 20 years. Mr. Morales requested to be involved in future phases of the project.

Mr. Sam Dunlap, Tribal Secretary, of the Gabrielino/Tongva Council, responded in an email dated February 21, 2009, that, due to the proximity of a recorded archaeological site with burials and the project's close proximity to the Dominguez Channel, the project's site has an increased potential to contain buried archaeological deposits and human remains and, therefore, may have the potential to create an adverse impact to the cultural resources of his tribe. Mr. Dunlap recommended an archaeological and Native American monitoring component as a mitigation measure with the Native American monitor to be selected from the Gabrielino Tongva Nation.

Mr. Robert Dorame, Tribal Chair/Cultural Resources, Gabrielino/Tongva Indians of California Tribal Council, spoke with URS staff on July 15, 2008, and expressed concern regarding the project and asked to be involved in all future aspects of the project.

In summary, the Native American consultation generally conveyed concern regarding the project's potential to impact buried prehistoric deposits, including burials. Three of the five respondents were concerned about this possibility, and two of them expressed a desire to be kept informed as the project progresses. One recommended construction monitoring. A fourth respondent was severely critical of the project as a trespass on Native American rights. The fifth respondent provided no details of his group's concerns. None of the respondents identified any cultural resources known by them to be located on the proposed project site.

Field Inventory Investigations

The Energy Commission's Data Adequacy Regulations require applicants to conduct surveys to identify previously unrecorded cultural resources in or near their proposed project areas. These surveys include a pedestrian archaeological survey and a built-environment windshield survey. The applicant includes the acquired new survey information as part of the information provided to staff in the AFC and may undertake additional field research, including geoarchaeological studies and site testing, to respond to staff's Data Requests. Staff may also undertake additional field research to supplement information provided by the applicant.

URS conducted two field surveys in conjunction with the BP Watson project: an archaeological field survey and a built-environment field survey using the following methodologies.

Archaeological Field Survey

URS performed an archaeological field survey on July 8, 2008, of the archaeological APE. This survey covered the project site and the laydown and parking area, plus 200 feet beyond all project boundaries. This entire area was inspected on foot, with an interval of less than 10 meters between transects. The survey focused on the inspection of areas of visible soil (most of the project site and the laydown and parking area are covered with extensive hardscape and are paved). Due to restricted access to the adjacent Coke Barn, and because the "vast majority of the Project Site and Construction Laydown and Parking Area are overlain with asphalt, hardscape, gravels and existing structures" (Watson 2009f, p. 6-1) and so could not be surveyed, just a reconnaissance walkover of the construction laydown and parking area was performed.

Results of Pedestrian Archaeological Survey

The pedestrian archaeological survey did not identify any archaeological sites. "Over 97% of the archaeological APE had been previously disturbed and consisted of hardscape, industrial equipment and buildings, and structures used for petroleum production. Overall, virtually no visibility existed within the archaeological APE for the archaeological survey" (Watson 2009f, p. 6-2).

Built-Environment Field Survey

URS conducted an intensive built-environment survey within the built-environment project area of analysis on July 8, 2008, to identify any properties that appeared to be older than 45 years (built in 1963 or earlier). The built-environment project area of analysis extends one parcel's distance from the project area boundary (Watson 2009f, p. 6-1). The properties that either were older or appeared to be older than 45 years were recorded on Department of Parks and Recreation (DPR) 523 series forms and were evaluated using the criteria of the CRHR for purposes of CEQA. Properties that did not appear to be older than 45 years or were not known to be older than 45 years were not recorded on DPR 523 forms. Where access to a property was restricted or obstructed, existing information for recording the property was used; for the remainder of the survey, public vantage points were used.

Results of the Intensive-Level Survey for Built-Environment Resources

Three properties, one previously recorded and two newly identified, were recorded as potential cultural resources on DPR 523 forms: the BP Carson Refinery, constructed from 1922 to 1925, a portion of the Dominguez Channel, constructed in 1917, and a segment of the Southern Pacific Railroad (36-0101330 or CA-SBR-10330H), constructed from 1869 to 1876. The BP Carson Refinery is located within the project site parcel; the two other properties, a segment of the Southern Pacific railroad and part of the Dominguez Channel, are located within one parcel's distance of the project site.

The BP Carson Refinery

The BP Carson Refinery is located in Los Angeles County in an area that historically

was used for petroleum processing and for tank farm petroleum storage. The refinery is situated on approximately 200 acres in an urban setting that is characterized by production, processing, and storage of petroleum products and power generation. The entire property was recorded and evaluated by URS in connection with the preparation of the BP Watson project AFC.

Originally, the BP Carson Refinery was built between 1922 and 1925 as a gasoline tank farm, with approximately 30 tanks and five reservoirs that were used to store crude oil. The facility's layout generally follows an axial plan, with most structures and buildings arranged latitudinally along the northern perimeter of the plant. The parcel is almost entirely covered with hardscape and pavement. Since in-fill has occurred from the 1930s to the present, the refinery's original plan is no longer recognizable.

The oldest portion of the refinery is located immediately south of the proposed project site, but in the past 30 years this area has seen the most change. Originally, the 100,000-barrel, cylindrical, gasoline storage tanks sat on berms constructed of fill. Of the approximately 30 tanks and other associated/ancillary structures, such as pipelines, foundations, and support and scaffolding systems, the majority are not over 45 years old (Watson 2009f, DPR 523L, p. 1).

North of the tank farm is the non-historic cogeneration portion of the refinery, built in 1987 and 1988 and consisting of four identical CTGs that occupy an area of nearly a quarter-mile in size. West of the CTGs is the warehouse that currently is used as a maintenance shop for the CTGs; it is to be replaced by the fifth turbine. The area north of the proposed project site is where the refinery operation occurs. While this space was first developed between 1951 and 1953, with additional heavy in-fill from 1956 to the present, and some of the early structures are still extant, most of the original structures have been surrounded by new in-fill, and the original circulation pattern has been altered. Also, the visual appearance of the original refinery equipment has been altered, as the height and exterior of the stacks have been changed (Watson 2009f, DPR 523L, p. 2). The original period of construction is 1922–1953, and it appears that due to heavy in-fill and substantial alterations, the BP Carson Refinery no longer resembles its original plan.

Historically, the refinery is located within a portion of the county that was used for petroleum processing and tank storage farms as early as 1922, when oil refinery and petroleum-related activities began in the Dominguez Hill region, one mile north of the proposed BP Watson project. It was Pan American Petroleum which originally established the tank farm that is located within the built-environment APE, a company with substantial holdings in the oil industry that also controlled numerous tank farms outside of the Carson area (Watson 2009f, DPR 523L, p. 4).

Richfield Oil appears to have added the oil refinery to the existing tank farm in 1953, before the incorporation of the City of Carson. Around this time, much of the land was held by large industrial companies such as Shell, Texaco, Mobile Oil, and others, who opposed a cityhood movement because these businesses were afraid that their taxes would increase (Watson 2009f, DPR 523L, p. 4).

The Dominguez Channel

The Dominguez Channel is a man-made stream draining the Dominguez Watershed of 110 square miles, 96% of which is developed. It is approximately 15 miles long and runs via the City of Hawthorne into the Cerritos Channel and into the Inner Harbor of Los Angeles. The portion of the Dominguez Channel examined and recorded is bordered to the south and west by the Southern Pacific Railroad, and to the west it is bordered by the BP Carson Refinery. The recorded part of the Dominguez Channel, which is located about a half-mile east of the proposed BP Watson project site, is an open earthen and concrete-lined flood control channel, approximately 500 feet wide and 2 miles in length. Historically, the area that now is the Los Angeles and Long Beach Harbors consisted of marshes and mudflats, with Dominguez Slough, a large marshy area to the north, resulting from the Los Angeles River entering the marshes and mudflats. In 1917 the channel was dredged and improved by the Los Angeles County Flood Control District. "Originally, the banks were earthen. It has a deep trapezoidal shape and form and features associated with control and erosion structures, such as box and wing wall culverts, gauge stations, pumps, and valves" (Watson 2009f, DPR 523L, p. 1). The portion of the recorded Dominguez Channel is located in an urban industrial setting characterized by an oil refinery and power generation facilities, manufacturing plants, warehouses, and railroad infrastructure. The channel displays vegetation features along its banks and rock ballasts, which also are located on top of the concrete linings. URS describes the property's condition as fair, with some concrete portions having experienced water ponding, cracking, spalling, chipping, and fretting (Watson 2009f, DPR 523A, p. 2).

Based on a review of historic maps and photographs, it is evident that an alteration of the channel's original alignment occurred between 1942 and 1946. "Before 1942, the channel crossed the railroad tracks at the intersection of Alameda and Long Beach and Redondo Road (now Sepulveda Boulevard). The channel was then altered to cross Alameda Street a half-mile north of Sepulveda, and travel in a more pronounced west-east direction" (Watson 2009f, DPR 523L, p. 4). In 1956, the next alteration of the channel occurred, changing its shape and form, and by 1965, after an additional widening and the addition of more infrastructure elements, crossings, and gage stations, the Dominguez Channel had changed substantially from its original design and form.

The Southern Pacific Railroad (previously recorded as 36-10330/CA-SBR-10330H)

URS recorded and evaluated a portion of the Southern Pacific Railroad which is located outside of the BP Watson project footprint, within the built-environment project area of analysis. The evaluated segment is located north of Sepulveda Boulevard, east of the BP Carson Refinery, and south of the Dominguez Channel. This portion of the railroad was built between 1869 and 1876. On the 1902 "Downey" U. S. Geological Survey (USGS) map it appears originally as a single track railroad. "Between 1903 and 1930, the area…held multiple tracks used by the Pacific Electric, Southern Pacific, and Santa Fe railroads. Between 1951 and 1964, more tracks were added to the area" (Watson 2009f, DPR 523L, p. 1). These railroads provided transportation from the port areas and Wilmington north to Los Angeles and serviced the adjacent refineries and tank farms.

The resource appears to have five to seven standard gauge tracks running north to south parallel to Alameda Avenue, with typical associated auxiliary equipment such as

railroad switches, signals, and storage areas. The tracks sit on small-to-medium rock ballasts. URS stated that most of the materials appear to be recent replacement materials, not from the nineteenth-century construction period.

Summary of Cultural Resources Identified In or Near the Proposed Project Site

Within a one-mile radius of the proposed project site, the CHRIS records search identified 11 cultural resources, consisting of seven archaeological sites and four built-environment resources. Within the same area, no additional cultural resources were identified through other archival research, inquiries to local planning and historical agencies and organizations, consultation with Native Americans, or archaeological field survey. The 11 previously identified cultural resources were not located where the project could have either a direct or indirect impact on any aspect of their integrity, so staff does not need to evaluate their eligibility for the CRHR.

The applicant's built-environment field survey identified three built-environment resources located where the project could have a direct impact on their integrity of setting and integrity of feeling, so staff must evaluate their CRHR eligibility.

Determining the Historical Significance of Cultural Resources

CEQA requires the Energy Commission, as a lead agency, to evaluate the historical significance of cultural resources by determining whether they meet several sets of specified criteria. Under CEQA, the definition of a historically significant cultural resource is that it is eligible for listing in the CRHR, and such a cultural resource is referred to as a "historical resource, which is a "resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the CRHR", or "a resource listed in a local register of historical resources or identified as significant in a historical resource survey meeting the requirements of section 5024.1 (g) of the Public Resources Code," or "any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, provided the agency's determination is supported by substantial evidence in light of the whole record" (Cal. Code Regs., tit. 14, § 15064.5(a)). The term, "historical resource," therefore, indicates a cultural resource that is historically significant and eligible for the CRHR.

Consequently, under the CEQA Guidelines, to be historically significant, a cultural resource must meet the criteria for listing in the CRHR. These criteria are essentially the same as the eligibility criteria for the NRHP. In addition to being at least 50 years old,[3] a resource must meet at least one (and may meet more than one) of the following four criteria (Pub. Resources Code, § 5024.1):

- Criterion 1, is associated with events that have made a significant contribution to the broad patterns of our history;
- Criterion 2, is associated with the lives of persons significant in our past;
- Criterion 3, embodies the distinctive characteristics of a type, period, or method of

[3] The Office of Historic Preservation's Instructions for Recording Historical Resources (1995) endorses recording and evaluating resources over 45 years of age to accommodate a potential five-year lag in the planning process.

construction, or represents the work of a master, or possesses high artistic values; or

- Criterion 4, has yielded, or may be likely to yield, information important to history or prehistory.

Historical resources must also possess sufficient integrity of location, design, setting, materials, workmanship, feeling, and association to convey their historical significance (Cal. Code Regs., tit. 14, § 4852(c)).

Additionally, cultural resources listed in or formally determined eligible for the National Register of Historical Places (NRHP) and California Registered Historical Landmarks numbered No. 770 and up are automatically listed in the CRHR and are therefore also historical resources (Pub. Resources Code, § 5024.1(d)). Even if a cultural resource is not listed or determined to be eligible for listing in the CRHR, CEQA allows a lead agency to make a determination as to whether it is a historical resource (Pub. Resources Code, § 21084.1).

The assessment of potentially significant impacts to historical resources and the mitigation that may be required of a proposed project to ameliorate any such impacts depend on CRHR-eligibility evaluations.

CRHR Evaluations

Under CEQA, only CRHR-eligible cultural resources that the proposed project could potentially impact need be considered in staff's recommendations for mitigation measures for project impacts. Consequently staff seeks CRHR eligibility recommendations for those cultural resources subject to possible project impacts. The existing documentation for previously known cultural resources may include CRHR eligibility recommendations, and the applicant's cultural resources specialists often make CRHR eligibility recommendations for newly identified cultural resources they discover and record in their project-related surveys. Staff considers these prior CRHR eligibility evaluations and may accept them or conclude that additional information is needed before making its own recommendations.

When the available information on known or newly identified resources that could be impacted by the proposed project is not sufficient for staff to make a recommendation on CRHR eligibility, staff may ask an applicant to conduct additional research to gather the information needed to make such a recommendation, or staff may gather the additional information. For an archaeological resource, the additional research usually entails some degree of field excavation, called a "Phase II" investigation. For an ethnographic resource, the additional research may be an ethnographic study. For built-environment resources, the additional research would probably be archival. The object of this additional research is to obtain sufficient information to enable staff to validate or make a recommendation of CRHR eligibility for each cultural resource that the proposed project could impact.

Evaluated Cultural Resources

No archaeological resources were identified on or near the proposed project site or laydown and parking area. The three built-environment resources that URS identified within the built-environment project area of analysis included the BP Carson Refinery (constructed 1922–1925), a portion of the Dominguez Channel (constructed in 1917), and a segment of the Southern Pacific Railroad (constructed 1869–1876).

The BP Carson Refinery was previously unevaluated. URS concluded that the refinery does not qualify for the CRHR and therefore is not a historical resource for the purposes of CEQA. URS states that Richfield Oil's establishment and operation of its refinery in Carson is not associated with events that made a significant contribution to the history of industrial oil production, nor is the company's opposition to the incorporation of the City of Carson associated with a significant contribution to that city's history (CRHR Criterion 1). No persons significant in our past have been associated with the refinery, so it would not qualify under CRHR Criterion 2. The refinery has seen substantial infill and alteration which has resulted in changes to the visual appearance and to the original plan, which also disqualify it (CRHR Criterion 3). The refinery represents common, utilitarian industrial design and construction that can be found in similar industrial sites of the Carson area, so the refinery cannot yield information important in history (Criterion 4). Energy Commission staff agrees with this analysis.

The Dominguez Channel also was previously unevaluated. URS concluded that the portion of the channel which is located within the built-environment project area of analysis for the BP Watson project, is not eligible for the CRHR because it does not have an association with a significant event, pattern of events, or person (Criteria 1 and 2). Also, being an example of the most common type of water conveyance system in California, an open canal, it does not embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic values (Criterion 3). Finally, again, because its design and construction are common, it does not have the potential to yield information important to history (Criterion 4). Staff agrees with their conclusion that the recorded portion of the Dominguez Channel is not eligible for the CRHR. Additionally, URS points out that the resource has been heavily altered from its original 1917 design (Watson 2009f, DPR 523A, p. 4).

The URS-recorded segment of the Southern Pacific Railroad near the project site is an element of a larger resource, the Union Pacific Railroad (originally the Southern Pacific Railroad). The Union Pacific Railroad was recorded and evaluated in 1999 by Jones & Stokes, who found it to be eligible for the NRHP under Criteria A and B (Watson 2009f, DPR 523A, P36-010330). URS evaluated the segment of the Southern Pacific railroad located within the project area of analysis and concluded that this segment did not appear to be a contributing element to the larger Southern Pacific railroad and also that it was not individually eligible for the CRHR because the recorded segment is not a distinctive railroad element and does not convey the significance of the entire Southern Pacific Railroad (Criterion 1); it is not associated with the lives of historical figures (Criterion 2); it does not embody the work of a master or embody distinctive style characteristics, as it is a modest example of a siding area lacking any distinguishing features, materials, and arrangements (Criterion 3); and it does not appear to be able to

yield any information important to history as the original materials no longer appear to be present (Watson 2009f DPR 523L, p. 1). Staff agrees with that conclusion.

All CRHR-Eligible Resources Subject To Potential Project Impacts

Staff has concluded that there are no historical resources in the BP Watson project areas. Staff has not found the three newly recorded resources within the built-environment area of analysis to be historical resources for purposes of CEQA, as they are not eligible for the CRHR, and there are no archaeological resources in the BP Watson project's archaeological area of analysis.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Method and Threshold for Determining Significance of Impacts to Historical Resources

Under CEQA, "a project that may cause a substantial adverse change in the significance of an historical resource is a project that may have a significant effect on the environment" (Pub. Resources Code, § 21084.1). Thus, staff analyzes whether a proposed project would cause a substantial adverse change in the significance, that is, the CRHR eligibility, of all historical resources identified in the Cultural Resources Inventory as CRHR eligible. The degree of significance of an impact depends on:

- the cultural resource impacted;
- the nature of the resource's historical significance;
- how the resource's historical significance is manifested physically and perceptually;
- appraisals of those aspects of the resource's integrity that figure importantly in the manifestation of the resource's historical significance; and
- how much the impact will change those integrity appraisals.

DIRECT AND INDIRECT IMPACTS

In the abstract, direct impacts to cultural resources are those associated with project development, construction, and co-existence. Construction usually entails surface and subsurface disturbance of the ground, and direct impacts to archaeological resources may result from the immediate disturbance of the deposits, whether from vegetation removal, vehicle travel over the surface, earth-moving activities, excavation, or demolition of overlying structures. Construction can have direct impacts on historic built-environment resources when those structures must be removed to make way for new structures or when the vibrations of construction impair the stability of historic structures nearby. New structures can have direct impacts on historic structures when the new structures are stylistically incompatible with their neighbors and the setting, and when the new structures produce something harmful to the materials or structural integrity of the historic structures, such as emissions or vibrations.

Generally speaking, indirect impacts to archaeological resources are those which may result from increased erosion due to site clearance and preparation, or from inadvertent damage or outright vandalism to exposed resource components due to improved accessibility. Similarly, historic structures can suffer indirect impacts when project

construction causes obsolescence and demolition or creates improved accessibility, making vandalism or greater weather exposure possible.

Ground disturbance accompanying construction at a proposed plant site, along proposed linear facilities, and at a proposed laydown area has the potential to directly impact archaeological resources, unidentified at this time. The potential direct, physical impacts of the proposed construction on unknown archaeological resources are commensurate with the extent of ground disturbance entailed in the particular mode of construction. This varies with each component of the proposed project. Placing the proposed plant into this particular setting could have a direct impact on the integrity of association, setting, and feeling of nearby standing historic structures.

Construction Impacts and Mitigation

Identification and Assessment of Direct Impacts and Recommended Mitigation

The applicant concluded that the project is not anticipated to affect significant cultural resources but is recommending archaeological construction monitoring and Native American monitoring and testing or data recovery in the event that an archaeological site is identified during construction.

The applicant has stated that human remains are not anticipated within the project site "given the absence of a prehistoric deposit" but recommends the following provisions to be followed in case human remains are encountered: immediate halting of construction activities within vicinity of discovery; immediate contacting of County Coroner and project applicant by project supervisor; contacting of the NAHC if the remains are Native American with the NAHC determining the Most Likely Descendant (MLD) to notify this identified MLD with the request to inspect the burial and make recommendation for treatment and removal (Watson 2009f, p. 7-3).

Staff has concluded that the proposed construction and construction-related activities of the BP Watson project, the expansion of the existing facility by the addition of a fifth combustion turbine generator, would not have any direct impact on known cultural resources if the construction would be implemented as proposed. Because buried archaeological deposits are unlikely in the fill underlying the project site and because no ground disturbance is anticipated at the laydown and parking area, staff is not recommending full-time monitoring of construction activities in those locations. Fill material can sometimes contain artifacts, but the applicant described the fill at the project site as "engineered" fill, and fill of that nature has been processed for homogeneity, so no artifacts would be expected in engineered fill.

Staff also has concluded that finding any human remains is not anticipated but recommends in the case of any accidental discovery or recognition of any human remains to follow the provisions of CEQA (Cal. Code Regs., tit. 14, § 15064.5, subd. (e)).

CEQA advises a lead agency to make provisions for archaeological resources unexpectedly encountered during construction, and a project owner may be required to train workers to recognize cultural resources, fund mitigation, and delay construction in

the area of the find (Pub. Resources Code, § 21083.2; Cal. Code Regs., tit. 14, §§ 15064.5(f) and 15126.4(b)).

Although staff identified no known CRHR-eligible cultural resources that the construction of the proposed BP Watson project would impact, and staff also considers it unlikely that previously unidentified buried archaeological deposits would be encountered during construction-related excavations, due to the extensive presence of fill on the project site, still staff considers it prudent, as does the applicant, to recommend archaeological monitoring that would be initiated if any buried deposits should be discovered. Consequently, staff recommends that the Commission adopt the following cultural resources Conditions of Certification **CUL-1** through **CUL-7**. These measures are intended to facilitate the identification and assessment of previously unidentified archaeological resources encountered during construction and to mitigate any significant impacts from the project on any newly found resources assessed as significant. These conditions also address concerns expressed by Native Americans

To accomplish this, cultural resources Conditions of Certification **CUL-1** through **CUL-7** provide for the hiring of a Cultural Resources Specialist (CRS) who will develop and oversee the cultural resources awareness training program for construction workers and write a Cultural Resources Monitoring and Mitigation Plan (CRMMP) for the project. Staff received one comment from the applicant, requesting that the following language be added to CUL-3:"Specification of the manner in which human remains and grave associated artifacts, if discovered during construction, will be treated according to the applicable laws and regulations, and in consultation with the wishes of the consulting Native Americans." Staff concurs with the applicant's request and has inserted the recommended language, with minor modifications, as item #5 of CUL-3. If workers identify buried archaeological deposits that the CPM determines are CRHR eligible, the conditions also provide for archaeological and possibly Native American monitoring of ground-disturbing activities in areas where additional resources could be found; for the recovery of data from discovered CRHR-eligible archaeological deposits; for the writing of a technical archaeological report on all archaeological activities and findings, to be submitted to the CPM and to interested Native Americans and others; and for the curation of recovered artifacts and other data. When properly implemented and enforced, staff believes that these conditions of certification would reduce to less than significant any impacts to previously unknown CRHR-eligible cultural resources encountered during construction.

Staff also recommends the adoption of Condition of Certification **CUL-8** to comply with the City of Carson's historic preservation standards. By complying with this condition of certification the BP project would be in conformance with all applicable LORS.

Identification and Assessment of Indirect Impacts and Recommended Mitigation

The proposed project would result in architectural in-fill consisting of an additional industrial unit with a proposed turbine tower not taller than 100 feet. As the surroundings of the proposed BP Watson project are similar to the proposed industrial addition, the project would not cause a significant change in the setting of any built-environment resources in the project's vicinity.

Moreover, the in-fill construction that has been going on since the 1950s has disrupted the original skyline. “Numerous overbearing monumental-sized stacks now dot the sky-line (as opposed to the approximately eight originally). The majority of the new stacks are guyed, free-standing, or feature lattice support structures, and are generally much larger than the original stacks” (Watson 2009f, DPR 523L, p. 2). Therefore, no indirect impact of a visual nature would add to the already compromised existing view.

Staff has thus concluded that the project would not have any significant indirect impacts and recommends that no mitigation measures for indirect impacts would be required. Staff proposes no cultural resources conditions of certification addressing indirect impacts.

Operation Impacts and Mitigation

Because any ground disturbance that might occur due to maintenance or repairs during operation would be in the fill known to underlie the proposed project area, staff has concluded that the operation of the project would have no adverse impacts on cultural resources. Therefore no mitigation measures would be required, and staff proposed no conditions of certification addressing operation impacts.

Cumulative Impacts and Mitigation

A cumulative impact refers to a proposed project's incremental effects considered over time and together with those of other, nearby, past, present, and reasonably foreseeable future projects whose impacts may compound or increase the incremental effect of the proposed project (Pub. Resources Code sec. 21083; Cal. Code Regs., tit. 14, secs. 15064(h), 15065(a)(3), 15130, and 15355).

The applicant’s cultural resources consultant has concluded that the project would not have a significant cumulative effect on historical resources (Watson 2009f p. 5.7-35). Staff concurs with this conclusion because staff’s analysis has also indicated that, as no unique cultural resources or historical resources of an archaeological nature were identified in the project areas of analysis, the project would have no significant impacts on known CRHR-eligible cultural resources. Therefore, the project would not contribute to an incremental impact on cultural resources and thus would not have a cumulatively considerable impact on cultural resources. Hence, staff has recommended no cultural resources mitigation measures for cumulative impacts.

COMPLIANCE WITH LORS

If the BP Watson project is built as proposed there would be no impact on historical and cultural resources. Therefore, the project would be in compliance with applicable state laws, ordinances, regulations, and standards as listed in **Cultural Resources Table 1**.

The City of Carson does not have a local historic preservation ordinance. But the city’s general plan policies encourage project proponents to provide the results of such historic preservation activities as historic resource surveys to the City’s Planning and Environmental Services Division. For the BP Watson project, resource surveys have been completed. To ensure that the BP Watson project is consistent with the goals of the City of Carson’s General Plan Implementation Measure P-IM-9.3, staff has included

a condition of certification requiring the applicant to provide their cultural resources survey reports to the City's Planning and Environmental Services Division. With the fulfillment of this condition, the BP Watson project would be in conformance with the goals of the City of Carson's General Plan.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff received no comments from agencies or the public.

CONCLUSIONS AND RECOMMENDATIONS

Based on the present cultural resources analysis, staff concludes that the proposed project would have no direct or indirect significant impacts to any historical resources. The three newly recorded resources within the built-environment project area of analysis have not been found to be historical resources for purposes of CEQA, as they have not been found to be eligible to the California Register of Historical Resources. There are no archaeological or cultural resources in the project's area of analysis. The construction of the fifth cogeneration unit and its operation would not result in an indirect impact to any historical or cultural resources.

As part of the procedures and objectives required by CEQA, pursuant to Pub. Resources Code sec. 21082, Cal. Code Regs., tit. 14, secs. 15064.5 (f) staff recommends the adoption of Conditions of Certifications **CUL-1** through **CUL-7** for the accidental discovery of historical or unique archaeological resources during construction, and Condition of Certification **CUL-8** to comply with the City of Carson's historic preservation standards. By adopting these conditions of certification any unanticipated discovery of a historical or unique archaeological resource could be mitigated below a level of significance, and the BP Watson project would be in conformance with all applicable LORS.

PROPOSED CONDITIONS OF CERTIFICATION

CUL-1 Prior to the start of ground disturbance (includes "preconstruction site mobilization"; "construction ground disturbance"; and "construction grading, boring, and trenching" as defined in the General Conditions for this project), the project owner shall obtain the services of a Cultural Resources Specialist (CRS), and one or more alternate CRS(s), if alternates are needed. The CRS shall manage all monitoring, mitigation, curation and reporting activities required in accordance with the Conditions of Certification (Conditions). The CRS may elect to obtain the services of Cultural Resource Monitors (CRMs) and other technical specialists, if needed, to assist in monitoring, mitigation, and curation activities. The project owner shall ensure that the CRS makes recommendations regarding the eligibility for listing in the California Register of Historical Resources (CRHR) of any cultural resources that are newly discovered or that may be affected in an unanticipated manner. No ground disturbance shall occur prior to CPM approval of the CRS, unless such activities are specifically approved by the CPM. Approval of a CRS may be

denied or revoked for non-compliance on this or other projects. After all ground disturbance is completed and the CRS has fulfilled all responsibilities specified in these cultural resources conditions, the project owner may discharge the CRS, if the CPM approves. With the discharge of the CRS, these cultural resources conditions no longer apply to the activities of this power plant.

CULTURAL RESOURCES SPECIALIST

The resumes for the CRS and alternate(s) shall include information demonstrating to the satisfaction of the CPM that their training and backgrounds conform to the U.S. Secretary of Interior's Professional Qualifications Standards, as published in the Code of Federal Regulations, 36 CFR Part 61. In addition, the CRS shall have the following qualifications:

1. qualifications appropriate to the needs of the project, including a background in anthropology, archaeology, history, architectural history, or a related field;

2. at least three years of archaeological or historic, as appropriate(per nature of predominate cultural resources on the project site), resource mitigation and field experience in California; and

3. at least one year of experience in a decision-making capacity on cultural resources projects in California and the appropriate training and experience to knowledgably make recommendations regarding the significance of cultural resources.

The resumes of the CRS and alternate CRS shall include the names and telephone numbers of contacts familiar with the work of the CRS/alternate CRS on referenced projects and demonstrate to the satisfaction of the CPM that the CRS/alternate CRS has the appropriate training and experience to implement effectively the Conditions of Certification.

CULTURAL RESOURCES MONITORS

CRMs shall have the following qualifications:

1. a BS or BA degree in anthropology, archaeology, historical archaeology or a related field and one year experience monitoring in California; or

2. an AS or AA degree in anthropology, archaeology, historical archaeology or a related field, and four years experience monitoring in California; or

3. enrollment in upper division classes pursuing a degree in the fields of anthropology, archaeology, historical archaeology or a related field, and two years of monitoring experience in California.

CULTURAL RESOURCES TECHNICAL SPECIALISTS

The resume(s) of any additional technical specialists, e.g., historical

archaeologist, historian, architectural historian, and/or physical anthropologist, shall be submitted to the CPM for approval.

Verification: At least 45 days prior to the start of ground disturbance, the project owner shall submit the resume for the CRS, and alternate(s) if desired, to the CPM for review and approval.

1. At least 10 days prior to a termination or release of the CRS, or within 10 days after the resignation of a CRS, the project owner shall submit the resume of the proposed new CRS to the CPM for review and approval. At the same time, the project owner shall also provide to the proposed new CRS the AFC and all cultural resources documents, field notes, photographs, and other cultural resources materials generated by the project. If there is no alternate CRS in place to conduct the duties of the CRS, a designated, qualified monitor may serve in place of a CRS so that project-related ground disturbance may continue up to a maximum of 3 days without a CRS. If cultural resources are discovered then ground disturbance will remain halted until there is a CRS or alternate CRS to make a recommendation regarding significance.

2. As soon as the CPM requires monitoring, the CRS, if CRMS are to be used, shall provide a letter naming anticipated CRMs for the project and stating that the identified CRMs meet the minimum qualifications for cultural resources monitoring required by this Condition.

3. As soon as the CRS determines that additional CRMs will be needed, the CRS shall provide letters to the CPM identifying the new CRMs and attesting to their qualifications.

4. As soon as the CRS determines that any technical specialists will be needed, the resume(s) of the specialists shall be provided to the CPM for review and approval.

5. At least 10 days prior to the start of ground disturbance, the project owner shall confirm in writing to the CPM that the approved CRS will be available for onsite work and is prepared to implement the cultural resources Conditions.

CUL-2 Prior to the start of ground disturbance, if the CRS has not previously worked on the project, the project owner shall provide the CRS with copies of the AFC, data responses, confidential cultural resources reports for the project, and the Energy Commission Final Staff Assessment. The project owner shall also provide the CRS and the CPM with maps and drawings showing the footprints of the power plant, all linear facility routes, all access roads, and all laydown areas. Maps shall include the appropriate USGS quadrangles and a map at an appropriate scale (e.g., 1:2000 or 1” = 200’) for plotting cultural features or materials. If the CRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the CRS and CPM. The CPM shall review map submittals and, in consultation with the CRS, approve those that are appropriate for use in cultural resources planning activities. No ground disturbance shall occur prior to CPM approval of maps and drawings, unless such activities are specifically approved by the CPM.

If construction of the project would proceed in phases, maps and drawings not previously provided shall be submitted prior to the start of each phase. Written notification identifying the proposed schedule of each project phase shall be provided to the CRS and CPM.

Weekly, until construction-related ground disturbance is completed, the project construction manager shall provide to the CRS and CPM a schedule of project activities for the following week, including the identification of area(s) where construction-related ground disturbance will occur during that week..

The project owner shall notify the CRS and CPM of any changes to the scheduling of the construction phases.

Verification: At least 40 days prior to the start of ground disturbance, the project owner shall provide the AFC, data responses, confidential cultural resource documents, and the Energy Commission Final Staff Assessment to the CRS, if needed, and the subject maps and drawings to the CRS and CPM. The CPM will review submittals in consultation with the CRS and approve maps and drawings suitable for cultural resources planning activities.

1. At least 15 days prior to the start of ground disturbance, if there are changes to any project-related footprint, the project owner shall provide revised maps and drawings for the changes to the CRS and CPM.

2. At least 15 days prior to the start of each phase of a phased project, the project owner shall submit the appropriate maps and drawings, if not previously provided, to the CRS and CPM.

3. Weekly, during ground disturbance, a current schedule of anticipated project activity shall be provided to the CRS and CPM by letter, e-mail, or fax.

4. Within five days of changing the scheduling of phases of a phased project, the project owner shall provide written notice of the changes to the CRS and CPM.

CUL-3 Prior to the start of ground disturbance, the project owner shall submit the Cultural Resources Monitoring and Mitigation Plan (CRMMP), as prepared by or under the direction of the CRS, to the CPM for review and approval. The CRMMP shall follow the content and organization of the draft model CRMMP, provided by the CPM, and the authors' name(s) shall appear on the title page of the CRMMP. The CRMMP shall identify general and specific measures to minimize potential impacts to sensitive cultural resources. Implementation of the CRMMP shall be the responsibility of the CRS and the project owner. Copies of the CRMMP shall reside with the CRS, alternate CRS, each CRM, and the project owner's on-site construction manager. No ground disturbance shall occur prior to CPM approval of the CRMMP, unless such activities are specifically approved by the CPM.

The CRMMP shall include, but not be limited to, the following elements and measures:

1. The following statement included in the Introduction: “Any discussion, summary, or paraphrasing of the Conditions of Certification in this CRMMP is intended as general guidance and as an aid to the user in understanding the Conditions and their implementation. The conditions, as written in the Commission Decision, shall supersede any summarization, description, or interpretation of the conditions in the CRMMP. The Cultural Resources Conditions of Certification from the Commission Decision are contained in Appendix A.”

2. A proposed general research design that includes a discussion of archaeological research questions and testable hypotheses specifically applicable to the project area, and a discussion of artifact collection, retention/disposal, and curation policies as related to the research questions formulated in the research design. The research design will specify that the preferred treatment strategy for any buried archaeological deposits is avoidance. A specific mitigation plan shall be prepared for any unavoidable impacts to any CRHR-eligible (as determined by the CPM) resources. A prescriptive treatment plan may be included in the CRMMP for limited data types.

3. Specification of the implementation sequence and the estimated time frames needed to accomplish all project-related tasks during the ground-disturbance and post-ground–disturbance analysis phases of the project.

4. Identification of the person(s) expected to perform each of the tasks, their responsibilities, and the reporting relationships between project construction management and the mitigation and monitoring team.

5. A description of the manner in which Native American observers or monitors, if needed, will be included; the procedures to be used to select them; and their role and responsibilities.

6. Specification of the manner in which human remains and grave associated artifacts, if discovered during construction, will be treated, consistent with applicable laws and regulations and input from Native American Tribal Representatives.

7. A description of all impact-avoidance measures (such as flagging or fencing) to prohibit or otherwise restrict access to sensitive resource areas identified during construction ground disturbance. The description shall address how these measures would be implemented once sensitive areas are identified and how long they would be needed to protect the resources from project-related effects.

8. A statement that all encountered cultural resources over 50 years old shall be recorded on a DPR form 523 and mapped and photographed. In addition, all archaeological materials retained as a result of the

archaeological investigations (survey, monitoring, testing, data recovery) shall be curated in accordance with the California State Historical Resources Commission's *Guidelines for the Curation of Archaeological Collections*, into a retrievable storage collection in a public repository or museum.

9. A statement that the project owner will pay all curation fees for artifacts recovered and for related documentation produced during cultural resources investigations conducted for the project. The project owner shall identify three possible curation facilities that could accept cultural resources materials resulting from project activities.

10. A statement that the CRS has access to equipment and supplies necessary for site mapping, photography, and recovery of any cultural resource materials that are encountered during ground disturbance and cannot be treated prescriptively.

11. A description of the contents and format of the final Cultural Resource Report (CRR), which shall be prepared according to ARMR guidelines.

Verification: Upon approval of the CRS proposed by the project owner, the CPM will provide to the CRS an electronic copy of the draft model CRMMP.

1. At least 30 days prior to the start of ground disturbance, the project owner shall submit the CRMMP to the CPM for review and approval.

2. At least 30 days prior to the start of ground disturbance, a letter shall be provided to the CPM indicating that the project owner agrees to pay curation fees for any materials collected as a result of the archaeological investigations (survey, monitoring, testing, data recovery).

CUL-4 The project owner shall submit the Cultural Resources Report (CRR), if required by the CPM, to the CPM for approval. The CRR shall be written by or under the direction of the CRS and shall be provided in the ARMR format. The CRR shall report on all field activities including dates, times and locations, findings, samplings, and analyses. All survey reports, Department of Parks and Recreation (DPR) 523 forms, data recovery reports, and any additional research reports not previously submitted to the California Historical Resource Information System (CHRIS) and the State Historic Preservation Officer (SHPO) shall be included as appendices to the CRR.

If the project owner requests a suspension of ground disturbance and/or construction activities, then a draft CRR that covers all cultural resources activities associated with the project shall be prepared by the CRS and submitted to the CPM for review and approval on the same day as the suspension/extension request. The draft CRR shall be retained at the project site in a secure facility until ground disturbance and/or construction resumes or the project is withdrawn. If the project is withdrawn, then a final CRR shall be submitted to the CPM for review and approval at the same time as the withdrawal request.

Verification: Within 90 days after completion of ground disturbance (including landscaping), the project owner shall submit the CRR to the CPM for review and approval. If any reports have previously been sent to the CHRIS, then receipt letters from the CHRIS or other verification of receipt shall be included in an appendix.

1. Within 90 days after completion of ground disturbance (including landscaping), the project owner shall provide to the CPM a copy of an agreement with, or other written commitment from, a curation facility that meets the standards stated in the California State Historical Resources Commission's *Guidelines for the Curation of Archaeological Collections*, to accept cultural materials, if any, from this project. Any agreements concerning curation will be retained and available for audit for the life of the project.

2. Within 10 days after CPM approval, the project owner shall provide documentation to the CPM confirming that copies of the CRR have been provided to the SHPO, the CHRIS, the curating institution, if archaeological materials were collected, and to the Tribal Chairpersons of any Native American groups requesting copies of project-related reports.

3. Within 30 days after requesting a suspension of ground disturbance and/or construction activities, the project owner shall submit a draft CRR to the CPM for review and approval.

CUL-5 Prior to and for the duration of ground disturbance, the project owner shall provide Worker Environmental Awareness Program (WEAP) training to all new workers within their first week of employment. The training shall be prepared and conducted by the CRS and may be presented in the form of a video. The CRS shall be available (by telephone or in person) to answer questions posed by employees. The training may be discontinued when ground disturbance is completed or suspended, but must be resumed when ground disturbance, such as landscaping, resumes. The training shall include:

1. a discussion of applicable laws and penalties under the law;

2. samples or visuals of artifacts that might be found in the project vicinity;

3. a discussion of what such artifacts may look like when partially buried, or wholly buried and then freshly exposed;

4. a discussion of what prehistoric and historical archaeological deposits look like at the surface and when exposed during construction, and the range of variation in the appearance of such deposits, with particular emphasis given to distinguishing primary deposits from the general dispersal of artifacts seen in fill;

5. instruction that the CRS, alternate CRS, and CRMs, if any, have the authority to halt project-related ground disturbance in the area of a discovery to an extent sufficient to ensure that the resource is protected from further impacts, as determined by the CRS;

6. instruction that employees are to halt work on their own in the vicinity of a potential cultural resources discovery and shall contact their supervisor and the CRS or CRM, and that redirection of work would be determined by the construction supervisor and the CRS;

7. an informational brochure that identifies reporting procedures in the event of a discovery;

8. an acknowledgement form signed by each worker indicating that they have received the training; and

9. a sticker that shall be placed on hard hats indicating that environmental training has been completed.

No ground disturbance shall occur prior to implementation of the WEAP program, unless such activities are specifically approved by the CPM.

Verification: At least 30 days prior to the beginning of pre-construction site mobilization, the CRS shall provide the training program draft text and graphics and the informational brochure to the CPM for review and approval.

1. At least 15 days prior to the beginning of ground disturbance, the CPM will provide to the project owner a WEAP Training Acknowledgement form for each WEAP-trained worker to sign..

2. Monthly, until ground disturbance is completed, the project owner shall provide in the Monthly Compliance Report (MCR) the WEAP Training Acknowledgement forms of workers who have completed the training in the prior month and a running total of all persons who have completed training to date.

CUL-6 At the direction of the CPM, the project owner shall ensure that the CRS, alternate CRS, or CRMs monitor full time all ground disturbance in the area where a CRHR-eligible (as determined by the CPM) cultural resources discovery has been made. The level, duration, and spatial extent of monitoring shall be determined by the CPM. In the event that the CRS believes that a current level of monitoring is not appropriate, a letter or e-mail detailing the justification for changing the level of monitoring shall be provided to the CPM for review and approval prior to any change in the level of monitoring.

Full-time archaeological monitoring for this project shall be the archaeological monitoring of the earth-removing activities in the areas specified in the previous paragraph, for as long as the CPM requires. Where excavation equipment is actively removing dirt and hauling the excavated material farther than fifty feet from the location of active excavation, full-time archaeological monitoring shall require at least two monitors per excavation area. In this circumstance, one monitor shall observe the location of active excavation and a second monitor shall inspect the dumped material. For excavation areas where the excavated material is dumped no farther than fifty feet from the

location of active excavation, one monitor shall both observe the location of active excavation and inspect the dumped material.

A Native American monitor shall be obtained to monitor ground disturbance in areas where Native American artifacts may be discovered. Contact lists of interested Native Americans and guidelines for monitoring shall be obtained from the Native American Heritage Commission. Preference in selecting a monitor shall be given to Native Americans with traditional ties to the area that shall be monitored. If efforts to obtain the services of a qualified Native American monitor are unsuccessful, the project owner shall immediately inform the CPM. The CPM will either identify potential monitors or will allow ground disturbance to proceed without a Native American monitor.
The research design in the CRMMP shall govern the collection, treatment, retention/disposal, and curation of any archaeological materials encountered during archaeological monitoring.

If monitoring should be needed, as determined by the CPM, CRMs shall keep a daily log of any monitoring and other cultural resources activities and any instances of non-compliance with the Conditions and/or applicable LORS on forms provided by the CPM. Copies of the daily monitoring logs shall be provided by the CRS to the CPM, if requested by the CPM. From these logs, the CRS shall compile a monthly monitoring summary report to be included in the MCR. If there are no monitoring activities, the summary report shall specify why monitoring has been suspended.

The CRS or alternate CRS shall report daily to the CPM on the status of the project's cultural resources-related activities, unless reducing or ending daily reporting is requested by the CRS and approved by the CPM.

The CRS, at his or her discretion, or at the request of the CPM, may informally discuss cultural resource monitoring and mitigation activities with Energy Commission technical staff.

Cultural resources monitoring activities are the responsibility of the CRS. Any interference with monitoring activities, removal of a monitor from duties assigned by the CRS, or direction to a monitor to relocate monitoring activities by anyone other than the CRS shall be considered non-compliance with these Conditions.

Upon becoming aware of any incidents of non-compliance with the Conditions and/or applicable LORS, the CRS and/or the project owner shall notify the CPM by telephone or e-mail within 24 hours. The CRS shall also recommend corrective action to resolve the problem or achieve compliance with the Conditions. When the issue is resolved, the CRS shall write a report describing the issue, the resolution of the issue, and the effectiveness of the resolution measures. This report shall be provided in the next MCR for the review of the CPM.

Verification: At least 30 days prior to the start of ground disturbance, the CPM will provide to the CRS an electronic copy of a form to be used as a daily monitoring log.

1. Monthly, while monitoring is on-going, the project owner shall include in each MCR a copy of the monthly summary report of cultural resources-related monitoring prepared by the CRS and shall attach any new DPR 523A forms completed for finds treated prescriptively, as specified in the CRMMP.

2. At least 24 hours prior to implementing a proposed change in monitoring level, the project owner shall submit to the CPM, for review and approval, a letter or e-mail (or some other form of communication acceptable to the CPM) detailing the CRS's justification for changing the monitoring level.

3. Daily, as long as no cultural resources are found, the CRS shall provide a statement that "no cultural resources over 50 years of age were discovered" to the CPM as an e-mail or in some other form of communication acceptable to the CPM.

4. At least 24 hours prior to reducing or ending daily reporting, the project owner shall submit to the CPM, for review and approval, a letter or e-mail (or some other form of communication acceptable to the CPM) detailing the CRS's justification for reducing or ending daily reporting.

5. No later than 30 days following the discovery of any Native American cultural materials, the project owner shall submit to the CPM copies of the information transmittal letters sent to the Chairpersons of the Native American tribes or groups who requested the information. Additionally, the project owner shall submit to the CPM copies of letters of transmittal for all subsequent responses to Native American requests for notification, consultation, and reports and records.

6. Within 15 days of receiving them, the project owner shall submit to the CPM copies of any comments or information provided by Native Americans in response to the project owner's transmittals of information.

CUL-7 The project owner shall grant authority to halt project-related ground disturbance to the CRS, alternate CRS, and the CRMs in the event of a discovery. Redirection of ground disturbance shall be accomplished under the direction of the construction supervisor in consultation with the CRS.

In the event cultural resources over 50 years of age (or, if younger, determined exceptionally significant by the CPM) are found, or impacts to such resources can be anticipated, ground disturbance shall be halted or redirected in the immediate vicinity of the discovery sufficient to ensure that the resource is protected from further impacts. Monitoring and daily reporting as provided in other conditions shall continue during all ground-disturbing activities elsewhere on the project site. The halting or redirection of ground disturbance shall remain in effect until the CRS has visited the discovery, and all of the following have occurred:

1. The CRS has notified the project owner, and the CPM has been notified within 24 hours of the discovery, or by Monday morning if the cultural

resources discovery occurs between 8:00 AM on Friday and 8:00 AM on Sunday morning, including a description of the discovery (or changes in character or attributes), the action taken (i.e. work stoppage or redirection), a recommendation of CRHR eligibility, and recommendations for mitigation of any cultural resources discoveries, whether or not a determination of CRHR eligibility has been made.

2. If the discovery would be of interest to Native Americans, the CRS has notified all Native American groups that expressed a desire to be notified in the event of such a discovery.

3. The CRS has completed field notes, measurements, and photography for a DPR 523 primary form. Unless the find can be treated prescriptively, as specified in the CRMMP, the "Description" entry of the DPR 523 form shall include a recommendation on the CRHR eligibility of the discovery. The project owner shall submit completed forms to the CPM.

4. The CRS, the project owner, and the CPM have conferred, and the CPM has concurred with the recommended eligibility of the discovery and approved the CRS's proposed data recovery, if any, including the curation of the artifacts, or other appropriate mitigation; and any necessary data recovery and mitigation have been completed.

Ground disturbance may resume only with the approval of the CPM.

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall provide the CPM and CRS with a letter confirming that the CRS, alternate CRS, and CRMs have the authority to halt project-related ground disturbance in the vicinity of a cultural resources discovery, and that the project owner shall ensure that the CRS notifies the CPM within 24 hours of a discovery, or by Monday morning if the cultural resources discovery occurs between 8:00 AM on Friday and 8:00 AM on Sunday morning.

1. Within 48 hours of the discovery of an archaeological or ethnographic resource, the project owner shall ensure that the CRS notifies all Native American groups that expressed a desire to be notified in the event of such a discovery.

2. Unless the discovery can be treated prescriptively, as specified in the CRMMP, completed DPR 523 forms for resources newly discovered during ground disturbance shall be submitted to the CPM for review and approval no later than 24 hours following the notification of the CPM, or 48 hours following the completion of data recordation/recovery, whichever the CRS decides is more appropriate for the subject cultural resource.

CUL-8 The project owner shall submit copies of the archaeological and built-environment survey reports, and all associated forms produced for the BP Watson Cogeneration Steam and Electric Reliability Project's Energy Commission Application for Certification, to the City of Carson's Planning and Environmental Services Division, in compliance with the City's General Plan Implementation Measure P-IM-9.3.

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall provide documentation to the CPM confirming that copies of the archaeological and built-environment survey reports, and all associated forms produced for the BP Watson Cogeneration Steam and Electric Reliability Project's Energy Commission Application for Certification, have been provided to the City of Carson's Planning and Environmental Services Division. Documentation may consist of a letter of receipt from the Planning and Environmental Services Division.

CULTURAL RESOURCES ACRONYM GLOSSARY

WATSON COGNENERATION STEAM AND ELECTRIC RELIABILITY PROJECT

AFC	Application for Certification
Area of Analysis	The area within and around a project site that staff considers when compiling an inventory of cultural resources and when assessing potential impacts
AD	After the Birth of Christ
ARMR	Archaeological Resource Management Report
BC	Before the Birth of Christ
BP Watson	Watson Cogeneration Steam and Electric Reliability Project
CEQA	California Environmental Quality Act
CHRIS	California Historical Resources Information System
Conditions	Conditions of Certification
CRHR	California Register of Historical Resources
CRM	Cultural Resources Monitor
CRMMP	Cultural Resources Monitoring and Mitigation Plan
CRR	Cultural Resources Report
CRS	Cultural Resources Specialist
DPR 523	Department of Parks and Recreation cultural resource inventory form
FSA	Final Staff Assessment
LORS	laws, ordinances, regulations, and standards
MLD	Most Likely Descendent
NAHC	Native American Heritage Commission
NRHP	National Register of Historic Places
OHP	Office of Historic Preservation

PSA	Preliminary Staff Assessment
Project Site	The bounded area identified by the applicant as the area within which they propose to build the project
SHPO	State Historic Preservation Officer
Staff	Energy Commission cultural resources technical staff
Watson	Watson Cogeneration Company

REFERENCES

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HAZARDOUS MATERIALS MANAGEMENT

Testimony of Geoff Lesh, P.E. and Rick Tyler

SUMMARY OF CONCLUSIONS

Staff's evaluation of the proposed Watson Cogeneration Steam and Electric Reliability (BP Watson) project, along with staff's proposed mitigation measures, indicates that hazardous materials use at the site would not present a significant impact to the public. With adoption of the proposed conditions of certification, the proposed project will comply with all applicable laws, ordinances, regulations, and standards. In response to Health and Safety Code, section 25531 et seq., the applicant would be required to develop a risk management plan (or modify an existing one). To ensure the adequacy of this plan, staff's proposed conditions of certification require that the risk management plan be submitted for concurrent review by the Energy Commission staff. In addition, staff's proposed conditions of certification require that staff review and approve the risk management plan prior to delivery of any hazardous materials to the BP Watson project site. Other proposed conditions of certification address the issue of the transportation, storage, and use of aqueous ammonia.

INTRODUCTION

The purpose of this hazardous materials management analysis is to determine if the proposed Watson Cogeneration Steam and Electric Reliability Project (BP Watson) has the potential to cause significant impacts on the public as a result of the use, handling, storage, or transportation of hazardous materials at the proposed site. If significant adverse impacts on the public are identified, Energy Commission staff must also evaluate the potential for facility design alternatives and additional mitigation measures to reduce those impacts to the extent feasible.

This analysis does not address the potential exposure of workers to hazardous materials used at the proposed facility. Employers must inform employees of hazards associated with their work and provide them with special protective equipment and training to reduce the potential for health impacts associated with the handling of hazardous materials. The **Worker Safety and Fire Protection** section of this document describes applicable requirements for the protection of workers from these risks.

Hazardous materials used during construction would include gasoline, diesel fuel, motor oil, hydraulic fluid, welding gases, lubricants, solvents, paint, and paint thinner. No acutely toxic hazardous materials will be used on site during construction. None of these materials pose significant potential for off-site impacts as a result of the quantities on site, their relative toxicity, their physical state, and/or their environmental mobility. Handling of hazardous materials during construction would comply with all applicable regulations and would be guided by A Hazardous Materials Business Emergency Plan and a Chemical Inventory Program developed by the construction contractor (Watson 2009a, Section 5.12.2.1).

During operations, aqueous ammonia (30% ammonia in aqueous solution) is the only acutely hazardous material proposed to be either used or stored at the BP Watson

project in quantities exceeding the reportable amounts defined in the California Health and Safety Code, section 25532 (j) (Watson 2009a, Table 5.12-1, thru 5.12-4; URS 2010i). Aqueous ammonia will be used to control oxides of nitrogen (NO_x) emissions through selective catalytic reduction. The use of aqueous ammonia significantly reduces the risk that would otherwise be associated with the use of the more hazardous anhydrous form of ammonia. Use of the aqueous form eliminates the high internal energy associated with the anhydrous form, which is stored as a liquefied gas at high pressure. The high internal energy associated with the anhydrous form of ammonia can act as a driving force in an accidental release, which can rapidly introduce large quantities of the material to the ambient air and result in high down-wind concentrations. Spills associated with the aqueous form are much easier to contain than those associated with anhydrous ammonia, and emissions from such spills are limited by the slow mass transfer from the surface of the spilled material.

Other hazardous materials, such as mineral and lubricating oils, cleaning detergents, welding gasses, and water treatment chemicals will be present at the proposed BP Watson project.

Although no natural gas is stored, the project will also involve the handling of large amounts of natural gas. Natural gas poses some risk of both fire and explosion. The proposed BP Watson project would connect to existing gas pipeline already on site so that no new off-site gas pipeline will be required. The BP Watson project operations would also require the transportation of aqueous ammonia to the facility. This document addresses all potential impacts associated with the use and handling of hazardous materials.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following federal, state, and local laws and policies apply to the protection of public health and hazardous materials management. Staff's analysis examines the project's compliance with these requirements.

HAZARDOUS MATERIALS MANAGEMENT Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal	
The Superfund Amendments and Reauthorization Act of 1986 (42 USC §9601 et seq.)	Contains the Emergency Planning and Community Right To Know Act (also known as SARA Title III).
The Clean Air Act (CAA) of 1990 (42 USC 7401 et seq. as amended)	Established a nationwide emergency planning and response program and imposed reporting requirements for businesses that store, handle, or produce significant quantities of extremely hazardous materials.
The CAA section on risk management plans (42 USC §112(r))	Requires states to implement a comprehensive system informing local agencies and the public when a significant quantity of such materials is stored or handled at a facility. The requirements of both SARA Title III and the CAA are reflected in the California Health and Safety Code, section 25531, et seq.
49 CFR 172.800	The U.S. Department of Transportation (DOT) requirement that suppliers of hazardous materials prepare and implement security plans.
49 CFR Part 1572, Subparts A and B	Requires suppliers of hazardous materials to ensure that all their hazardous materials drivers are in compliance with personnel background security checks.
The Clean Water Act (CWA) (40 CFR 112)	Aims to prevent the discharge or threat of discharge of oil into navigable waters or adjoining shorelines. Requires a written spill prevention, control, and countermeasures (SPCC) plan to be prepared for facilities that store oil that could leak into navigable waters.
Title 49, Code of Federal Regulations, Part 190	Outlines gas pipeline safety program procedures.
Title 49, Code of Federal Regulations, Part 191	Addresses transportation of natural and other gas by pipeline: annual reports, incident reports, and safety-related condition reports. Requires operators of pipeline systems to notify the DOT of any reportable incident by telephone and then submit a written report within 30 days.
Title 49, Code of Federal Regulations, Part 192	Addresses transportation of natural and other gas by pipeline and minimum federal safety standards, specifies minimum safety requirements for pipelines including material selection, design requirements, and corrosion protection. The safety requirements for pipeline construction vary according to the population density and land use that characterize the surrounding land. This part also contains regulations governing pipeline construction (which must be followed for Class 2 and Class 3 pipelines) and the requirements for preparing a pipeline integrity management program.
Federal Register (6 CFR Part 27) interim final rule	A regulation of the U.S. Department of Homeland Security that requires facilities that use or store certain hazardous materials to submit information to the department so that a vulnerability assessment can be conducted to determine what certain specified security measures shall be implemented.
State	
Title 8, California Code of Regulations, section 5189	Requires facility owners to develop and implement effective safety management plans that ensure that large quantities of hazardous materials are handled safely. While such requirements primarily provide for the protection of workers, they also indirectly improve public safety and are coordinated with the Risk Management Plan (RMP) process.
Title 8, California Code of Regulations, section 458 and sections 500 to 515	Sets forth requirements for the design, construction, and operation of vessels and equipment used to store and transfer ammonia. These sections generally codify the requirements of several industry codes, including the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, the American National Standards Institute (ANSI) K61.1 and the National Boiler and

	Pressure Vessel Inspection Code. These codes apply to anhydrous ammonia but are also used to design storage facilities for aqueous ammonia.
California Health and Safety Code, section 25531 to 25543.4	The California Accidental Release Program (CalARP) requires the preparation of a Risk Management Plan (RMP) and off-site consequence analysis (OCA) and submittal to the local Certified Unified Program Agency for approval.
California Health and Safety Code, section 41700	Requires that "No person shall discharge from any source whatsoever such quantities of air contaminants or other material which causes injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property."
California Safe Drinking Water and Toxic Enforcement Act (Proposition 65)	Prevents certain chemicals that cause cancer and reproductive toxicity from being discharged into sources of drinking water.
California Public Utilities Commission General Order 112-E and 58-A	Contains standards for gas piping construction and service.
Hazardous Substance Information and Training Act, 8 CCR Section 339; Section 3200 et seq., 5139 et seq., and 5160 et seq.	Requires listing and implementation of specified control measures for management of hazardous substances.
California HSC Sections 25270 through 25270.13	Requires the preparation of a Spill Prevention, Control, and Countermeasures (SPCC) Plan if 10,000 gallons or more of petroleum is stored on-site. The above regulations would also require the immediate reporting of a spill or release of 42 gallons or more to the California Office of Emergency Services and the Certified Unified Program Authority (CUPA).
Process Safety Management: Title 8 CCR Section 5189	Requires facility owners to develop and implement effective process safety management plans when toxic, reactive, flammable, or explosive chemicals are maintained on site in quantities that exceed regulatory thresholds
Local	
Los Angeles County Fire Department, Health and Hazardous Materials Division	Requires new/modified businesses to complete a Hazardous Materials Business Plan and Chemical Inventory forms when handling hazardous materials in excess of threshold quantities.

The Certified Unified Program Agency (CUPA) with the responsibility to review Risk Management Plans (RMPs) and Hazardous Materials Business Plans (HMBPs) is the Los Angeles County Fire Department (Watson 2009a, Table 5.15-5).

With regard to seismic safety issues, design and construction of buildings and vessels storing hazardous materials will meet the seismic requirements of the current 2007 California Building Standards Code (CBSC).

SETTING

Several factors associated with the area in which a project is to be located affect the potential for an accidental release of a hazardous material that could cause public health impacts. These include:

- local meteorology;
- terrain characteristics; and
- location of population centers and sensitive receptors relative to the project.

METEOROLOGICAL CONDITIONS

Meteorological conditions, including wind speed, wind direction, and air temperature, affect both the extent to which accidentally released hazardous materials would be dispersed into the air and the direction in which they would be transported. This affects the potential magnitude and extent of public exposure to such materials, as well as their associated health risks. When wind speeds are low and the atmosphere stable, dispersion is severely reduced but can lead to increased localized public exposure.

Recorded wind speeds and directions are shown in Figure 5.13-10 of the Application for Certification (AFC) (Watson 2009a). Staff agrees with the applicant that use of F stability (stagnated air, very little mixing), wind speed of 1.5 meters per second, and an ambient temperature of 111°F are appropriate for conducting the worst-case off-site consequence analysis (URS 2010i).

TERRAIN CHARACTERISTICS

The project site is a 2.5-acre brown field site located within the boundary of the existing Watson Cogeneration Facility, which is a 21.7-acre area within the 428-acre parcel located at 1801 Sepulveda Boulevard, Carson, California, 90745 and is integral to BP's existing Carson Refinery. The street address of the project site is located within the boundary of the existing Watson Cogeneration Facility at 22850 South Wilmington Avenue, Carson, California (Watson 2009a, Figure 3-5). In **Project Description Figure 1**, the Regional Map depicts the project site and surrounding area. An existing warehouse/maintenance shop on a portion of the site will be removed as part of the project. The project site is located approximately 0.7 mile south of the 405 Freeway, roughly bounded by Wilmington Avenue to the west, East Sepulveda Boulevard to the south, and South Alameda Street to the east.

The project site elevation is approximately 32 feet above mean sea level. Because the site is located within the existing refinery property boundary, the project site and surrounding areas are highly developed with tank farms, industrial buildings, and pump and piping arrays, and have been subject to disturbance for many years.

LOCATION OF EXPOSED POPULATIONS AND SENSITIVE RECEPTORS

The general population includes many sensitive subgroups that may be at greater risk from exposure to emitted pollutants. These sensitive subgroups include the very young, the elderly, and those with existing illnesses. In addition, the location of the population in

the area surrounding a project site may have a major bearing on health risk. Sensitive receptors and residences in the project vicinity are listed in **Table O-6** of the AFC (Watson 2009a). There are no sensitive receptors within one kilometer of the ammonia storage area (URS 2010i, Table 2). The nearest sensitive receptor is Bonita Elementary School, located approximately 1.9 kilometers from the site.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Staff reviewed and assessed the potential for the transportation, handling, and use of hazardous materials to impact the surrounding community. All chemicals and natural gas were evaluated. Staff's analysis addresses the potential impacts on all members of the population including the young, the elderly, and people with existing medical conditions that may make them more sensitive to the adverse effects of hazardous materials. In order to accomplish this goal, staff utilized the most current public health exposure levels (both acute and chronic) that are established to protect the public from the effects of an accidental chemical release.

In order to assess the potential for released hazardous materials to travel off site and affect the public, staff analyzed several aspects of the proposed use of these materials at the facility. Staff recognizes that some hazardous materials must be used at power plants. Therefore, staff conducted its analysis by examining the choice and amount of chemicals to be used, the manner in which the applicant will use the chemicals, the manner by which they will be transported to the facility and transferred to facility storage tanks, and the way the applicant plans to store the materials on site.

Staff reviewed the applicant's proposed engineering and administrative controls concerning hazardous materials usage. Engineering controls are the physical or mechanical systems, such as storage tanks or automatic shut-off valves, that can prevent the spill of hazardous material from occurring, or which can either limit the spill to a small amount or confine it to a small area. Administrative controls are the rules and procedures that workers at the facility must follow that will help to prevent accidents or to keep them small if they do occur. Both engineering and administrative controls can act as methods of prevention or as methods of response and minimization. In both cases, the goal is to prevent a spill from moving off site and causing harm to the public.

Staff reviewed and evaluated the applicant's proposed use of hazardous materials as described by the applicant (Watson 2009a, Section 5.15). Staff's assessment followed the five steps listed below.

- Step 1: Staff reviewed the chemicals and the amounts proposed for on-site use as listed in Tables 5.15-1 through 5.15-4 of the AFC with addition of aqueous ammonia as listed in the revised off-site consequence analysis (URS 2010i) and determined the need and appropriateness of their use.
- Step 2: Those chemicals proposed for use in small amounts or whose physical state is such that there is virtually no chance that a spill would migrate off site and impact the public were removed from further assessment.
- Step 3: Measures proposed by the applicant to prevent spills were reviewed and

evaluated. These included engineering controls such as automatic shut-off valves and different-sized transfer-hose couplings and administrative controls such as worker training and safety management programs.

- Step 4: Measures proposed by the applicant to respond to accidents were reviewed and evaluated. These mitigation measures also include engineering controls such as catchment basins and methods to keep vapors from spreading and administrative controls such as training emergency response crews.
- Step 5: Staff analyzed the theoretical impacts on the public of a worst-case spill of hazardous materials, as reduced by the mitigation measures proposed by the applicant. When mitigation methods proposed by the applicant are sufficient, no further mitigation is recommended. If the proposed mitigation is not sufficient to reduce the potential for adverse impacts to an insignificant level, staff will propose additional prevention and response controls until the potential for causing harm to the public is reduced to an insignificant level. It is only at this point that staff can recommend that the facility be allowed to use hazardous materials.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Small Quantity Hazardous Materials

Hazardous chemicals such as mineral and lubricating oils, cleaning detergents, welding gasses, and other various chemicals would be used and stored in relatively small amounts. (See **Hazardous Materials Appendix B** for a list of all chemicals proposed for use and storage at the BP Watson project site). In conducting the analysis, staff determined in Steps 1 and 2 that these materials, although present at the proposed facility, pose a minimal potential for off-site impacts since they will be stored in small quantities, have low mobility/volatility, or have low levels of toxicity. These hazardous materials are eliminated from further consideration.

After removing from consideration those chemicals that pose no risk of off-site impact in Steps 1 and 2, staff continued with Steps 3, 4, and 5 to review the remaining large quantity hazardous materials: natural gas and aqueous ammonia. However, the project will be limited to using, storing, and transporting only those hazardous materials listed in Appendix B of this document as per staff's proposed condition **HAZ-1**.

Large Quantity Hazardous Materials

Natural Gas

Natural gas poses a fire and/or possible explosion risk because of its flammability. Natural gas is composed mostly of methane, but also contains ethane, propane, nitrogen, butane, isobutene, and isopentane. It is colorless, odorless, and tasteless and is lighter than air. Natural gas can cause asphyxiation when methane is 90% in concentration. Methane is flammable when mixed in air at concentrations of 5 to 14%, which is also the detonation range. Natural gas, therefore, poses a risk of fire and/or possible explosion if a release occurs under certain specific conditions. However, it should be noted that, due to its tendency to disperse rapidly (Lees 1998), natural gas is less likely to cause explosions than many other fuel gases such as propane or liquefied

petroleum gas, but can explode under certain conditions (as demonstrated by the natural gas detonation in Belgium in July 2004).

While natural gas would be used in significant quantities, it would not be stored on site. It would be delivered via an existing on-site gas pipeline at the BP Watson project site. The risk of a fire and/or explosion on site can be reduced to insignificant levels through adherence to applicable codes and the development and implementation of effective safety management practices. The National Fire Protection Association (NFPA) code 85A requires both the use of double-block and bleed valves for gas shut off and automated combustion controls. These measures will significantly reduce the likelihood of an explosion in gas-fired equipment. Additionally, start-up procedures would require air purging of the gas turbines prior to start up, thereby precluding the presence of an explosive mixture. The safety management plan proposed by the applicant would address the handling and use of natural gas and would significantly reduce the potential for equipment failure because of either improper maintenance or human error. No new off-site gas pipeline will be required.

Aqueous Ammonia

Aqueous ammonia would be used to control the emission of oxides of nitrogen (NO_x) from the combustion of natural gas at the BP Watson project. The accidental release of aqueous ammonia without proper mitigation can result in significant down-wind concentrations of ammonia gas. BP Watson would store 30% aqueous ammonia solution in an above-ground storage tank with a maximum capacity of 12,000 gallons (URS 2010i, pg. 2). The tank would be surrounded by a secondary containment basin capable of holding the full contents of the tank plus the rainfall associated with a 24-hour 25-year storm (Watson 2009a Section 5.15.4.3). As required by Condition of Certification **HAZ-3**, the truck unloading area would be constructed with a sloped concrete pad that would drain into a containment area

Based on staff's analysis described above, aqueous ammonia is the only hazardous material that may pose a significant risk of off-site impact. The use of aqueous ammonia can result in the release of ammonia vapor in the event of a spill. This is a result of its moderate vapor pressure and the large amounts of aqueous ammonia that will be used and stored on site. However, the use of aqueous ammonia poses far less risk than the use of the far more hazardous anhydrous ammonia (ammonia that is not diluted with water).

To assess the potential impacts associated with an accidental release of aqueous ammonia, staff uses four benchmark exposure levels of ammonia gas occurring off site. These include:

1. the lowest concentration posing a risk of lethality, 2,000 parts per million (ppm);

2. the concentration immediately dangerous to life and health level of 300 ppm;

3. the emergency response planning guideline level 2 of 150 ppm, which is also the RMP level 1 criterion used by U.S. Environmental Protection Agency (EPA) and California; and

4. the level considered by the Energy Commission staff to be without serious adverse effects on the public for a one-time exposure of 75 ppm.

If the potential exposure associated with a potential release exceeds 75 ppm at any public receptor, staff will also assess the probability of occurrence of the release, the severity of the consequences, and the nature of the potentially exposed population in determining whether the likelihood and extent of potential exposure are sufficient to support a finding of potentially significant impact. A detailed discussion of the exposure criteria considered by staff, as well as their applicability to different populations and exposure-specific conditions, is provided in **Hazardous Materials Appendix A**.

The applicant's revised off-site consequence analysis (OCA) (URS 2010i) describes the modeling parameters used for the worst-case and the alternative accidental releases of aqueous ammonia. Pursuant to the California Accidental Release Program (CalARP) regulations, the OCA was performed for the worst-case release scenario, which involved the failure and complete discharge of the storage tank, as well as an alternative release scenario involving a spill during truck unloading. Ammonia emissions from the two potential release scenarios were calculated following methods provided in the RMP off-site consequence analysis guidance, U.S. EPA, April 1999. The default meteorological data necessary for emission and dispersion calculations were supplemented by historical climate records for Carson. A temperature of 111°F, a wind speed of 1.5 meters per second, and atmospheric stability class F were used for emission and dispersion calculations for the worst-case scenario. Potential off-site ammonia concentrations were estimated using the SLAB numerical dispersion model (URS 2010i).

Modeling results indicate that in none of the cases modeled would ammonia concentrations exceeding 75 ppm extend beyond the facility fence line for either scenario.

Since the applicant's modeling is very conservative and most likely overestimates the airborne concentration of ammonia should an accidental release occur from the storage tank or during transfer operations, staff concludes that the applicant's modeling demonstrates no off-site impact. Staff therefore believes that the applicant's proposed engineering controls will ensure protection of public health.

Mitigation

The potential for accidents resulting in the release of hazardous materials is greatly reduced through implementation of a safety management program that would include the use of both engineering and administrative controls. Elements of both facility controls and the safety management plan are summarized below.

Engineering Controls

Engineering controls help to prevent accidents and releases (spills) from moving off site and affecting communities by incorporating engineering safety design criteria in the

design of the project. The engineered safety features proposed by the applicant for use at the BP Watson project include:

- storage of containerized hazardous materials in their original containers which are designed to prevent releases and are appropriately labeled;
- construction of secondary containment areas surrounding each of the hazardous materials storage areas designed to contain accidental releases that might happen during storage or delivery;
- physical separation of stored chemicals in isolated containment areas in order to prevent accidental mixing of incompatible materials, which could result in the evolution and release of toxic gases or fumes;
- construction of a containment area surrounding the aqueous ammonia storage tank, capable of holding the entire contents of the tank plus the volume of rainfall associated with a 24-hour 25-year storm;
- process protective systems including continuous tank level monitors with automatic alarms that are triggered at set high and low level points, automated leak detectors, temperature and pressure monitors, alarms, and emergency block valves.

Additionally, Condition of Certification **HAZ-3**, would require construction of a sloped concrete pad surrounding the aqueous ammonia truck unloading area that drains into a secondary containment structure;

Administrative Controls

Administrative controls also help prevent accidents and releases (spills) from moving off site and affecting neighboring communities by establishing worker training programs, process safety management programs, and complying with all applicable health and safety laws, ordinances, and standards.

A worker health and safety program will be prepared by the applicant and include (but not be limited to) the following elements (see the **Worker Safety and Fire Protection** section for specific regulatory requirements):

- worker training regarding chemical hazards, health and safety issues, and hazard communication;
- procedures to ensure the proper use of personal protective equipment;
- safety operating procedures for the operation and maintenance of systems utilizing hazardous materials;
- fire safety and prevention; and
- emergency response actions including facility evacuation, hazardous material spill clean-up, and fire prevention.

At the facility, the project owner will be required to designate an individual with the responsibility and authority to ensure a safe and healthful work place. The project health and safety official will oversee the health and safety program and have the authority to halt any action or modify any work practice to protect the workers, facility, and the surrounding community in the event of a violation of the health and safety program.

The applicant will also prepare a risk management plan for aqueous ammonia, as required by both CalARP regulations and Condition of Certification **HAZ-2**. This condition also includes the requirement for a program for the prevention of accidental releases and responses to an accidental release of aqueous ammonia. A hazardous materials business plan will also be prepared by the applicant that would incorporate state requirements for the handling of hazardous materials (Watson 2009a, Section 5.15.5.2). Other administrative controls would be required in proposed Conditions of Certification **HAZ-1** (limitations on the use and storage of hazardous materials and their strength and volume) and **HAZ-3** (development of a safety management plan). Proposed Condition **HAZ-4** would require that the aqueous ammonia storage tank be designed to certain specifications.

On-Site Spill Response

In order to address the issue of spill response, the facility will prepare and implement an emergency response plan that includes information on hazardous materials contingency and emergency response procedures, spill containment and prevention systems, personnel training, spill notification, on-site spill containment, and prevention equipment and capabilities, as well as other elements as required by state law (Health and Safety Code sections 25500 to 25541) and local law regarding Hazardous Materials Business Plans (see section on **Worker Safety and Fire Protection** for a more detailed discussion of the requirements of these emergency response plans). Emergency procedures will be established which include evacuation, spill cleanup, hazard prevention, and emergency response.

The Los Angeles County Fire Department (LACOFD) would be the first responder for hazardous materials incidents. The LACOFD Hazardous Materials Response Team would respond from LACOFD Station # 105 located at 18915 S. Santa Fe, Compton, California, approximately 5.3 miles from the project site (LACOFD 2010a). Staff communicated with officials of the LACOFD, who stated that the LACOFD was adequately staffed and equipped to respond to a hazardous materials emergency call from the BP Watson project (LACOFD 2010b, LACOFD 2010c). Staff finds that the available local hazmat team is capable of responding to a hazardous materials emergency call from the BP Watson project with an adequate response time. (See staff's section on **Worker Safety and Fire Protection** in this staff analysis.)

Transportation of Hazardous Materials

Hazardous materials, including aqueous ammonia will be transported to the facility by tanker truck. While many types of hazardous materials will be transported to the site, staff believes that transport of aqueous ammonia poses the predominant risk associated with hazardous materials transport.

Staff reviewed the shortest available transportation route for hazardous materials delivery. Trucks would travel on Interstate 405, exit at Wilmington Ave., and follow Wilmington south to the project site. There are no schools located along this route (Watson 2009a, Figure 5.16-1 and Appendix O, Table O-6) and the street is a designated hazardous materials transportation route.

Ammonia can be released during a transportation accident and the extent of impact in

the event of such a release would depend upon the location of the accident and the rate of dispersion of ammonia vapor from the surface of the aqueous ammonia pool. The likelihood of an accidental release during transport is dependent upon three factors:

- the skill of the tanker truck driver;
- the type of vehicle used for transport; and
- accident rates.

To address this concern, staff evaluated the risk of an accidental transportation release in the project area. Staff's analysis focused on the project area after the delivery vehicle leaves the main highway (I-405). Staff believes it is appropriate to rely upon the extensive regulatory program that applies to the shipment of hazardous materials on California highways to ensure safe handling in general transportation (see Federal Hazardous Materials Transportation Law 49 USC §5101 et seq, DOT regulations 49 CFR subpart H, §172–700, and California Department of Motor Vehicles (DMV) regulations on hazardous cargo). These regulations also address the issue of driver competence. See AFC section 5.11 for additional information on regulations governing the transport of hazardous materials.

To address the issue of tanker truck safety, aqueous ammonia will be delivered to the proposed facility in DOT-certified vehicles with design capacities of 6,500 gallons. These vehicles will be designed to DOT Code MC-307. These are high-integrity vehicles designed to haul caustic materials such as ammonia. Staff has, therefore, proposed Condition of Certification **HAZ-5** to ensure that, regardless of which vendor supplies the aqueous ammonia, delivery will be made in a tanker that meets or exceeds the specifications described by these regulations.

To address the issue of accident rates, staff reviewed the technical and scientific literature on hazardous materials transportation (including tanker trucks) accident rates in the United States and California. Staff relied on six references and three federal government databases to assess the risk of a hazardous materials transportation accident.

Staff used the data from the Davies and Lees (1992) article, which references both the 1990 Harwood et al. and 1993 Harwood studies, to determine that the frequency of release for the transportation of hazardous materials in the U.S. is between 0.06 and 0.19 releases per 1,000,000 miles traveled on well-designed roads and highways. The maximum use of aqueous ammonia each year of the operation of the proposed BP Watson project will require about 50 tanker truck deliveries of aqueous ammonia per year, each delivering about 6,500 gallons. Each delivery will travel approximately 0.6 miles from I-405 along Wilmington Ave. to the facility.

This would result in about 30 miles of delivery tanker truck travel in the project area per year (with a full load). Staff believes that the risk over this distance is insignificant. Data from the U.S. DOT show that the actual risk of a fatality over the past five years from all modes of hazardous material transportation (rail, air, boat, and truck) is approximately 0.1 in 1,000,000.

In addition, staff used a transportation risk assessment model (developed by staff) in

order to calculate the probability of an accident resulting in a release of a hazardous material due to delivery from the freeway to the facility. Results show a risk of 0.06 in 1,000,000 for one trip from I-405 and a total annual risk of 3.0 in 1,000,000 for 50 deliveries. This risk was calculated using accident rates on various types of roads (in this case, urban multilane undivided) with distances traveled on each type of road computed separately. Although it is an extremely conservative model in that it includes risk of accidental release from all modes of hazardous materials transportation and does not distinguish between a high-integrity steel tanker truck and other less secure modes, the results still show that the risk of a transportation accident is insignificant.

Staff therefore believes that the risk of exposure to significant concentrations of aqueous ammonia during transportation to the facility is insignificant because of the remote possibility that an accidental release of a sufficient quantity could be dangerous to the public. The transportation of similar volumes of hazardous materials on the nation's highways is neither unique nor infrequent. Staff's analysis of the transportation of aqueous ammonia to the proposed facility (along with data from the U.S. DOT) demonstrates that the risk of accident and exposure is less than significant.

In order to further ensure that the risk of an accident involving the transport of aqueous ammonia to the power plant is insignificant, staff proposes an additional administrative control in proposed Condition of Certification **HAZ-6** that would require the use of only one specific route to the site, that being the shortest route from an interstate (I-405 to Wilmington Ave. to the facility).

Based on the environmental mobility, toxicity, the quantities at the site, and frequency of delivery, it is staff's opinion that aqueous ammonia poses the predominate risk associated with both use and hazardous materials transportation. Staff concludes that the risk associated with the transportation of other hazardous materials to the proposed project does not significantly increase the risk of ammonia transportation.

Seismic Issues

It is possible that an earthquake could cause the failure of a hazardous materials storage tank. An earthquake could also cause failure of the secondary containment system (berms and dikes), as well as the failure of electrically controlled valves and pumps. The failure of all of these preventive control measures might then result in a vapor cloud of hazardous materials that could move off site and affect residents and workers in the surrounding community. The effects of the Loma Prieta earthquake of 1989, the Northridge earthquake of 1994, the earthquake in Kobe, Japan, in January 1995, and the recent earthquake in Japan 2010 have all heightened concerns about earthquake safety.

Information obtained after the January 1994 Northridge earthquake showed that some damage was caused both to several large storage tanks and to smaller tanks associated with the water treatment system of a cogeneration facility. The tanks with the greatest damage, including seam leakage, were older tanks, while the newer tanks sustained displacements and failures of attached lines. Therefore, staff conducted an analysis of the codes and standards which should be followed when designing and building storage tanks and containment areas to withstand a large earthquake. Staff also reviewed the impacts of the February 2001 Nisqually earthquake near Olympia,

Washington, a state with similar seismic design codes as California. No hazardous materials storage tanks failed as a result of that earthquake. Referring to the sections on **Geologic Hazards and Resources** and **Facility Safety Design** in the AFC, staff notes that the proposed project will be designed and constructed to the standards of the most recent California Building Code. Therefore, on the basis of what occurred in Northridge with older tanks and the lack of failures during the Nisqually earthquake (with newer tanks), staff determined that tank failures during seismic events are not probable and do not represent a significant risk to the public.

Site Security

The applicant proposes to use hazardous materials identified by the U.S. EPA as requiring the development and implementation of special site security measures to prevent unauthorized access. The U.S. EPA published a Chemical Accident Prevention Alert regarding site security (EPA 2000a), the U.S. Department of Justice published a special report entitled *Chemical Facility Vulnerability Assessment Methodology* (US DOJ 2002), the North American Electric Reliability Council published *Security Guidelines for the Electricity Sector* in 2002 (NERC 2002), and the U.S. Department of Energy (DOE) published the draft *Vulnerability Assessment Methodology for Electric Power Infrastructure* in 2002 (DOE 2002). The energy generation sector is one of 14 areas of critical infrastructure listed by the U.S. Department of Homeland Security. On April 9, 2007, the U.S Department of Homeland Security published in the Federal Register (6 CFR Part 27) an interim final rule requiring that facilities that use or store certain hazardous materials conduct vulnerability assessments and implement certain specified security measures. This rule was implemented with the publication of Appendix A, the list of chemicals, on November 2, 2007. The rule applies to aqueous ammonia solutions of 20% or greater and this proposed facility plans to utilize a 30% aqueous ammonia solution. Staff believes that all power plants under the jurisdiction of the Energy Commission should implement a minimum level of security consistent with the guidelines listed here.

In order to ensure that neither this project nor a shipment of hazardous material is the target of unauthorized access, staff's proposed Conditions of Certification **HAZ-7** and **HAZ-8** address both construction security and operation security plans. These plans would require implementation of site security measures consistent with the above-referenced documents.

The goal of these conditions of certification is to provide for the minimum level of security for power plants necessary for the protection of California's electrical infrastructure from malicious mischief, vandalism, or domestic/foreign terrorist attacks. The level of security needed for the BP Watson project is dependent upon the threat imposed, the likelihood of an adversarial attack, the likelihood of success in causing a catastrophic event, and the severity of the consequences of that event. The results of the off-site consequence analysis prepared as part of the RMP will be used, in part, to determine the severity of consequences of a catastrophic event.

In order to determine the level of security, the Energy Commission staff used an internal vulnerability assessment decision matrix modeled after the U.S. Department of Justice Chemical Vulnerability Assessment Methodology (July 2002), the North American Electric Reliability Council's (NERC) 2002 guidelines, the U.S. DOE VAM-CF model,

and the U.S. Department of Homeland Security regulations published November 2007 in the Federal Register (Interim Final Rule 6 CFR Part 27). Staff determined that this project would fall into the category of low vulnerability. Staff therefore proposes that certain security measures be implemented but does not propose that the project owner conduct its own vulnerability assessment.

These security measures include perimeter fencing and breach detectors, alarms, site access procedures for employees and vendors, site personnel background checks, and law enforcement contacts in the event of a security breach. Site access for vendors shall be strictly controlled. Consistent with current state and federal regulations governing the transport of hazardous materials, hazardous materials vendors will have to maintain their transport vehicle fleet and employ only properly licensed and trained drivers. The project owner will be required, through the use of contractual language with vendors, to ensure that vendors supplying hazardous materials strictly adhere to the U.S. DOT requirements for hazardous materials vendors to prepare and implement security plans (as per 49 CFR 172.800) and to ensure that all hazardous materials drivers are in compliance through personnel background security checks (as per 49 CFR Part 1572, Subparts A and B). The compliance project manager (CPM) may authorize modifications to these measures or may require additional measures in response to additional guidance provided by the U.S. Department of Homeland Security, the U.S. DOE, or the NERC, after consultation with both appropriate law enforcement agencies and the applicant.

CUMULATIVE IMPACTS AND MITIGATION

Staff analyzed the potential for the existence of cumulative impacts. A significant cumulative hazardous materials impact is defined as the simultaneous uncontrolled release of hazardous materials from multiple locations in a form (gas or liquid) that could cause a significant impact where the release of one hazardous material alone would not cause a significant impact.

Existing locations that use or store gaseous or liquid hazardous materials and locations where such facilities might likely be built were both considered. The nearby area to the BP Watson project site is comprised of power plants, a petroleum refinery, heavy industrial and commercial establishments, with some residential areas at distances beyond a half mile.

The applicant’s modeling of a worst-case release of aqueous ammonia from the proposed project site predicts that significant levels of ammonia vapors would not occur off-site, i.e.: beyond the nearest project fenceline (URS 2010i). Therefore no cumulative impacts would be expected even if a nearby facility were to store and use hazardous materials and have an accidental release concurrent with that from the proposed BP Watson project. Staff believes that while cumulative impacts are theoretically possible, they are not probable because of the many safeguards implemented to both prevent and control an uncontrolled release. The chances of one uncontrolled release occurring are remote (about one in one million per year). The chance of two or more occurring simultaneously at the BP Watson project site and another facility at the same time, with resulting airborne plumes commingling to create a significant impact, are even more remote. Staff believes the risk to the public is insignificant.

The applicant will develop and implement a hazardous materials handling program for the BP Watson project independent of any other projects considered for potential

cumulative impacts. Staff believes that the facility, as proposed by the applicant and with the additional mitigation measures proposed by staff, poses a minimal risk of accidental release that could result in off-site impacts. Therefore, staff concludes that the facility would not contribute to a significant hazardous materials-related cumulative impact.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No hazardous materials-related comments have been received.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Staff concludes that construction and operation of the BP Watson project would be in compliance with all applicable laws, ordinances, regulations, and standards (LORS) regarding long-term and short-term project impacts in the area of hazardous materials management.

CONCLUSIONS

Staff's evaluation of the proposed project (with proposed mitigation measures) indicates that hazardous material use will pose no significant impact to the public. Staff's analysis also shows that there will be no significant cumulative impact. With adoption of the proposed conditions of certification, the proposed project will comply with all applicable LORS. In response to Health and Safety Code, section 25531 et seq., the applicant will be required to update the existing Risk Management Plan (RMP). To ensure the adequacy of the RMP, staff's proposed conditions of certification require that the RMP be submitted for concurrent review by the Los Angeles County Fire Department and by Energy Commission staff. In addition, staff's proposed conditions of certification require the review and approval of the RMP by staff prior to the delivery of any hazardous materials to the facility. Other proposed conditions of certification address the issue of the transportation, storage, and use of aqueous ammonia, in addition to site security matters.

Staff has considered the minority population as identified in **Socioeconomics Figure 1** of the AFC in its impact analysis and has found no potential significant adverse impacts for any receptors, including environmental justice populations. Staff believes that it incorporated conservative assumptions for establishing methods for analyzing public impacts. The results of that analysis indicate that there would be no direct nor cumulative significant public impact to any population in the area. Therefore, given the absence of any significant impacts, there are no disparate impacts and there are no environmental justice issues associated with hazardous materials management.

Staff recommends that the Energy Commission impose the proposed conditions of certification, presented herein, to ensure that the project is designed, constructed, and operated to comply with all applicable LORS and to protect the public from significant risk of exposure to an accidental ammonia release. If all mitigation proposed by the

applicant and staff are required and implemented, the use, storage, and transportation of hazardous materials will not present a significant risk to the public.

Staff proposes eight conditions of certification mentioned throughout the text (above), and listed below. Condition of Certification **HAZ-1** ensures that no hazardous material would be used at the facility except as listed in **Appendix B** of the staff assessment, unless there is prior approval by the Energy Commission compliance project manager. Condition of Certification **HAZ-2** requires that an updated RMP be prepared and submitted prior to the delivery of aqueous ammonia.

Staff believes that an accidental release of aqueous ammonia during transfer from the delivery tanker to the storage tank is the most probable accident scenario and therefore proposes Condition of Certification **HAZ-3** requiring the development of a safety management plan for the delivery of all liquid hazardous materials, including aqueous ammonia. The development of a safety management plan addressing the delivery of all liquid hazardous materials during construction, commissioning, and operations will further reduce the risk of any accidental release not addressed by the proposed spill-prevention mitigation measures and the required RMP. This plan would additionally prevent the mixing of incompatible materials that could result in toxic vapors. Condition of Certification **HAZ-4** requires that the aqueous ammonia storage tank be designed to certain specifications. The transportation of hazardous materials is addressed in Conditions of Certification **HAZ-5** and **HAZ-6**. Site security during both the construction and operations phases is addressed in Conditions of Certification **HAZ-7** and **HAZ-8.**

PROPOSED CONDITIONS OF CERTIFICATION

HAZ-1 The project owner shall not use any hazardous materials not listed in Appendix B, below, or in greater quantities or strengths than those identified by chemical name in Appendix B, below, unless approved in advance by the Compliance Project Manager (CPM).

Verification: The project owner shall provide to the CPM, in the Annual Compliance Report, a list of hazardous materials contained at the facility.

HAZ-2 The project owner shall concurrently provide a new or updated Business Plan and a Risk Management Plan (RMP) prepared pursuant to the California Accidental Release Program (CalARP) to the Los Angeles County Fire Department (LACOFD) and the CPM for review. After receiving comments from the LACOFD and the CPM, the project owner shall reflect all recommendations in the final documents. Copies of the final Business Plan and RMP shall then be provided to the LACOFD for information and to the CPM for approval.

Verification: At least thirty (30) days prior to receiving any hazardous material on the site for commissioning or operations, the project owner shall provide a copy of a final Business Plan to the CPM for approval.

At least thirty (30) days prior to delivery of aqueous ammonia to the site, the project owner shall provide the final RMP to the Certified Unified Program Agency for information and to the CPM for approval.

HAZ-3 The project owner shall develop and implement a Safety Management Plan for delivery of aqueous ammonia and other liquid hazardous materials by tanker truck. The plan shall include procedures, protective equipment requirements, training, and a checklist. It shall also include a section describing all measures to be implemented to prevent mixing of incompatible hazardous materials including provisions to maintain lockout control by a power plant employee not involved in the delivery or transfer operation. This plan shall be applicable during construction, commissioning, and operation of the power plant.

Verification: At least thirty (30) days prior to the delivery of any liquid hazardous material to the facility, the project owner shall provide a Safety Management Plan as described above to the CPM for review and approval.

HAZ-4 The aqueous ammonia storage facility shall be designed to either the ASME Pressure Vessel Code and ANSI K61.6 or to API 620. In either case, the storage tank shall be protected by a secondary containment basin capable of holding 125% of the storage volume or the storage volume plus the volume associated with 24 hours of rain assuming the 25-year storm. The final design drawings and specifications for the ammonia storage tank and secondary containment basins shall be submitted to the CPM.

Verification: At least sixty (60) days prior to delivery of aqueous ammonia to the facility, the project owner shall submit final design drawings and specifications for the ammonia storage tank and secondary containment basin to the CPM for review and approval.

HAZ-5 The project owner shall direct all vendors delivering aqueous ammonia to the site to use only tanker truck transport vehicles which meet or exceed the specifications of DOT Code MC-307. The project owner shall provide this direction in a letter to the vendor(s) at least thirty (30) days prior to the receipt of aqueous ammonia on site.

Verification: At least thirty (30) days prior to receipt of aqueous ammonia on site, the project owner shall submit copies of the notification letter to supply vendors indicating the transport vehicle specifications to the CPM for review and approval.

HAZ-6 At least thirty (30) days prior to receipt of any hazardous materials on site, the project owner shall direct all vendors delivering any hazardous material to the site to use only the route approved by the CPM. Trucks will travel on I-405 to Wilmington Avenue to the plant site. The project owner shall obtain approval of the CPM if an alternate route is desired.

Verification: At least thirty (30) days prior to receipt of any hazardous materials on site, the project owner shall submit to the CPM for review and approval copies of notices to hazardous materials vendors describing the required transportation route.

HAZ-7 Prior to commencing construction, a site-specific Construction Site Security Plan for the construction phase shall be prepared and made available to the

CPM for review and approval. The Construction Security Plan shall include the following:

1. perimeter security consisting of fencing enclosing the construction area;

2. security guards;

3. site access control consisting of a check-in procedure or tag system for construction personnel and visitors;

4. written standard procedures for employees, contractors and vendors when encountering suspicious objects or packages on site or off site;

5. protocol for contacting law enforcement and the CPM in the event of suspicious activity or emergency; and

6. evacuation procedures.

Verification: At least thirty (30) days prior to commencing construction, the project owner shall notify the CPM that a site-specific Construction Security Plan is available for review and approval.

HAZ-8 The project owner shall also prepare a site-specific security plan (or an update to an existing security plan) for the commissioning and operational phases that will be available to the CPM for review and approval. The project owner shall implement site security measures that address physical site security and hazardous materials storage. The level of security to be implemented shall not be less than that described below (as per NERC 2002).

The Operation Security Plan shall include the following:

1. permanent full perimeter fence or wall, at least 8 feet high;

2. main entrance security gate, either hand operated or motorized;

3. evacuation procedures;

4. protocol for contacting law enforcement and the CPM in the event of suspicious activity or emergency;

5. written standard procedures for employees, contractors, and vendors when encountering suspicious objects or packages on site or off site;

6. a. a statement (refer to sample, **Attachment A**), signed by the project owner certifying that background investigations have been conducted on all project personnel. Background investigations shall be restricted to determine the accuracy of employee identity and employment history and shall be conducted in accordance with state and federal laws regarding security and privacy;

   b. a statement(s) (refer to sample, **Attachment B**), signed by the contractor or authorized representative(s) for any permanent

contractors or other technical contractors (as determined by the CPM after consultation with the project owner), that are present at any time on the site to repair, maintain, investigate, or conduct any other technical duties involving critical components (as determined by the CPM after consultation with the project owner) certifying that background investigations have been conducted on contractors who visit the project site;

7. site access controls for employees, contractors, vendors, and visitors;

8. a statement(s) (refer to sample, **Attachment C**), signed by the owners or authorized representative of hazardous materials transport vendors, certifying that they have prepared and implemented security plans in compliance with 49 CFR 172.880, and that they have conducted employee background investigations in accordance with 49 CFR Part 1572, subparts A and B;

9. closed circuit TV (CCTV) monitoring system, recordable, and viewable in the power plant control room and security station (if separate from the control room) capable of viewing, at a minimum, the main entrance gate and the ammonia storage tank; and

10. additional measures to ensure adequate perimeter security consisting of either:

    a. security guard(s) present 24 hours per day, 7 days per week;

    <u>or</u>

    b. power plant personnel on site 24 hours per day, 7 days per week, **or** if power plant personnel are not on-site 24 hours per day, 7 days per week, all plant alarms, intrusion detectors, and CCTV systems shall be monitored at all times from a remote location when the site is unmanned, and **all** of the following:

        1. the CCTV monitoring system required in item 9, above, shall include cameras able to pan, tilt, and zoom; that have low-light capability, are recordable, and are able to view 100% of the perimeter fence, the ammonia storage tank, the outside entrance to the control room, and the front gate from a monitor in the power plant control room; **and**

        2. perimeter breach detectors **<u>or</u>** on-site motion detectors.

The project owner shall fully implement the security plans and obtain CPM approval of any substantive modifications to those security plans. The CPM may authorize modifications to these measures, or may require additional measures such as protective barriers for critical power plant components—transformers, gas lines, and compressors—depending upon circumstances unique to the facility or in response to industry-related standards, security concerns, or additional guidance provided by the U.S. Department of

Homeland Security, the U.S. Department of Energy, or the North American Electrical Reliability Council, after consultation with both appropriate law enforcement agencies and the applicant.

Verification: At least thirty (30) days prior to the initial receipt of hazardous materials on site, the project owner shall notify the CPM that a site-specific operations site security plan is available for review and approval.

In the annual compliance report, the project owner shall include a statement that all current project employee and appropriate contractor background investigations have been performed and that updated certification statements have been appended to the operations security plan.

In the annual compliance report, the project owner shall include a statement that the operations security plan includes all current hazardous materials transport vendor certifications for security plans and employee background investigations.

SAMPLE CERTIFICATION (Attachment A)

Affidavit of Compliance for Project Owners

I,

_____

(Name of person signing affidavit)(Title)

do hereby certify that background investigations to ascertain the accuracy of the identity and employment history of all employees of

_____

(Company name)

for employment at

_____

(Project name and location)

have been conducted as required by the California Energy Commission Decision for the above-named project.

_____

(Signature of officer or agent)

Dated this _____ day of _____, 20 _____.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

SAMPLE CERTIFICATION (Attachment B)

Affidavit of Compliance for Contractors

I,

_____

(Name of person signing affidavit)(Title)

do hereby certify that background investigations to ascertain the accuracy of the identity and employment history of all employees of

_____

(Company name)

for contract work at

_____

(Project name and location)

have been conducted as required by the California Energy Commission Decision for the above-named project.

_____

(Signature of officer or agent)

Dated this _____ day of _____, 20 _____.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

SAMPLE CERTIFICATION (Attachment C)

Affidavit of Compliance for Hazardous Materials Transport Vendors

I,

_____

(Name of person signing affidavit)(Title)

do hereby certify that the below-named company has prepared and implemented security plans in conformity with 49 CFR 172.880 and has conducted employee background investigations in conformity with 49 CFR 172, subparts A and B,

_____

(Company name)

for hazardous materials delivery to

_____

(Project name and location)

as required by the California Energy Commission Decision for the above-named project.

_____

(Signature of officer or agent)

Dated this _____ day of _____, 20 _____.

THIS AFFIDAVIT OF COMPLIANCE SHALL BE APPENDED TO THE PROJECT SECURITY PLAN AND SHALL BE RETAINED AT ALL TIMES AT THE PROJECT SITE FOR REVIEW BY THE CALIFORNIA ENERGY COMMISSION COMPLIANCE PROJECT MANAGER.

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HAZARDOUS MATERIALS
Appendix A

Basis for Staff's Use of 75 Parts Per Million Ammonia Exposure Criteria

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BASIS FOR STAFF'S USE OF 75 PARTS PER MILLION AMMONIA EXPOSURE CRITERIA

Staff uses a health-based airborne concentration of 75 parts per million (PPM) to evaluate the significance of impacts associated with potential accidental releases of ammonia. While this level is not consistent with the 200-ppm level used by the U.S. Environmental Protection Agency and the California Environmental Protection Agency in evaluating such releases pursuant to the Federal Risk Management Program and State Accidental Release Program, it is appropriate for use in staff's analysis of the proposed project. The Federal Risk Management Program and the State Accidental Release Program are administrative programs designed to address emergency planning and ensure that appropriate safety management practices and actions are implemented in response to accidental releases. However, the regulations implementing these programs do not provide clear authority to require design changes or other major changes to a proposed facility. The preface to the Emergency Response Planning Guidelines states that "these values have been derived as planning and emergency response guidelines, **not** exposure guidelines, they do not contain the safety factors normally incorporated into exposure guidelines. Instead they are estimates, by the committee, of the thresholds above which there would be an unacceptable likelihood of observing the defined effects." It is staff's contention that these values apply to healthy adult individuals and are levels that should not be used to evaluate the acceptability of avoidable exposures for the entire population. While these guidelines are useful in decision making in the event that a release has already occurred (for example, prioritizing evacuations), they are not appropriate for and are not binding on discretionary decisions involving proposed facilities where many options for mitigation are feasible. The California Environmental Quality Act requires permitting agencies making discretionary decisions to identify and mitigate potentially significant impacts through feasible changes or alternatives to the proposed project.

Staff has chosen to use the National Research Council's 30-minute Short Term Public Emergency Limit (STPEL) for ammonia to determine the potential for significant impact. This limit is designed to apply to accidental unanticipated releases and subsequent public exposure. Exposure at this level should not result in serious effects but would result in "strong odor, lacrimation, and irritation of the upper respiratory tract (nose and throat), but no incapacitation or prevention of self-rescue." It is staff's opinion that exposures to concentrations above these levels pose significant risk of adverse health impacts on sensitive members of the general public. It is also staff's position that these exposure limits are the best available criteria to use in gauging the significance of public exposures associated with potential accidental releases. It is, further, staff's opinion that these limits constitute an appropriate balance between public protection and mitigation of unlikely events and are useful in focusing mitigation efforts on those release scenarios that pose real potential for serious impacts on the public. **Appendix A Table-1** provides a comparison of the intended use and limitations associated with each of the various criteria that staff considered in arriving at the decision to use the 75-ppm STPEL.

Hazardous Materials Appendix A Table-1
Acute Ammonia Exposure Guidelines

Guideline	Responsible Authority	Applicable Exposed Group	Allowable Exposure Level	Allowable* Duration of Exposures	Potential Toxicity at Guideline Level/Intended Purpose of Guideline
IDLH[2]	NIOSH	Workplace standard used to identify appropriate respiratory protection.	300 ppm	30 minutes	Exposure above this level requires the use of "highly reliable" respiratory protection and poses the risk of death, serious irreversible Injury, or impairment of the ability to escape.
IDLH/10[1]	EPA, NIOSH	Work place standard adjusted for general population factor of 10 for variation in sensitivity	30 ppm	30 minutes	Protects nearly all segments of general population from irreversible effects.
STEL[2]	NIOSH	Adult healthy male workers	35 ppm	15 minutes, 4 times per 8-hour day	No toxicity, including avoidance of irritation.
EEGL[3]	NRC	Adult healthy workers, military personnel	100 ppm	Generally less than 60 minutes	Significant irritation, but no impact on personnel in performance of emergency work; no irreversible health effects in healthy adults. Emergency conditions one-time exposure.
STPEL[4]	NRC	Most members of general population	50 ppm 75 ppm 100 ppm	60 minutes 30 minutes 10 minutes	Significant irritation, but protects nearly all segments of general population from irreversible acute or late effects. One-time accidental exposure.
TWA[2]	NIOSH	Adult healthy male workers	25 ppm	8 hours	No toxicity or irritation on continuous exposure for repeated 8-hour work shifts.
ERPG-2[5]	AIHA	Applicable only to emergency response planning for the general population (evacuation) (not intended as exposure criteria) (see preface attached)	200 ppm	60 minutes	Exposures above this level entail** unacceptable risk of irreversible effects in healthy adult members of the general population (no safety margin).

1) (EPA 1987) 2) (NIOSH 1994) 3) (NRC 1985) 4) (NRC 1972) 5) (AIHA 1989)
* The (NRC 1979), (WHO 1986), and (Henderson and Haggard 1943) all conclude that available data confirm the direct relationship to increases in effect with both increased exposure and increased exposure duration.
** The (NRC 1979) describes a study involving young animals, which suggests greater sensitivity to acute exposure in young animals. The WHO (1986) warned that the young, elderly, asthmatics, those with bronchitis, and those that exercise should also be considered at increased risk based on their demonstrated greater susceptibility to other non-specific irritants.

REFERENCES FOR HAZARDOUS MATERIALS APPENDIX A, TABLE 1

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ABBREVIATIONS FOR HAZARDOUS MATERIALS APPENDIX A, TABLE 1

ACGIH, American Conference of Governmental and Industrial Hygienists
AIHA, American Industrial Hygienists Association
EEGL, Emergency Exposure Guidance Level
EPA, Environmental Protection Agency
ERPG, Emergency Response Planning Guidelines
IDLH, Immediately Dangerous to Life and Health Level
NIOSH, National Institute of Occupational Safety and Health
NRC, National Research Council
STEL, Short Term Exposure Limit
STPEL, Short Term Public Emergency Limit
TLV, Threshold Limit Value
WHO, World Health Organization

HAZARDOUS MATERIALS
Appendix B

Hazardous Materials Proposed for Use at the BP WATSON

Material	Hazardous Characteristics1	Purpose	Storage Location	Maximum Stored	Storage Type
Diesel Fuel	Ignitability	Refueling truck	Laydown Area	4,000 gallons	Truck
Acetylene, Oxygen,Other Welding Gases	Ignitability	Maintenance Welding	Temporary Gas Cylinder Storage Area	400 cubic feet	Cylinders of various volumes
Lead/acid and Alkaline batteries	Corrosivity, Toxicity	Power for Equipment	Laydown Area	50	Unit
Solvents, Adhesives, etc.	Toxicity	Maintenance	Temporary Chemical Storage Area	660 gallons	Drum
Paint	Toxicity	Painting	Temporary Chemical Storage Area	1,000 gallons	Can
Gasoline	Ignitability, Toxicity	Refueling Construction Vehicles and Equipment	Laydown Area	4,000 gallons	Tank
Lubricating Oil	Mildly Toxic	Lubricating Equipment Parts	Laydown area	1,000 gallons	Tanks
Pipeline Natural Gas	Ignitability	Fuel	Supply piping only	Utility supply on demand	Pipelines
Acetylene, Oxygen, Other Welding Gases	Ignitability	Maintenance Welding	Indoor gas cylinder storage in warehouse	Minimal	Cylinders of various volumes
HRSG Cleaning Chemicals (e.g., HCl, Citric Acid, EDTA Chelant, Sodium Nitrate)	Toxic, Reactive, Corrosive,	HRSG Chemical Cleaning	Chemicals are contractor provided.	Multiyear cleaning requirement/temp storage only	Small original containers
Mineral Insulating Oil	Mildly Toxic	Electrical Transformers	Outdoor in Transformers	18,000 gallons	Transformers with secondary containment. Substance is not regulated.
Lubricating Oil	Mildly Toxic	Lubricating Equipment Parts	Within Rotating Equipment	4,000 gallons	Within Rotating Equipment
Combustion Turbine Wash Chemicals (specialty detergents and surfactants)	Toxic, Irritants	Combustion Turbine Cleaning	Chemicals are contractor provided and are either not stored on-site or are stored only temporarily in a chemical storage area.	Intermittent use/cleaning by contractor	Small original containers
Aqueous Ammonia (30% concentration)	Corrosive, Toxic	Air Pollution Controls	Above ground outdoor storage tank	12,000 gallons	Steel tank with secondary containment basis

Source: Watson 2009a, Tables 5.15-1 through 5.15-4, and URS 2010i

LAND USE

Testimony of Candace M. Hill

SUMMARY OF CONCLUSIONS

The proposed Watson Cogeneration Steam and Electric Reliability Project would be consistent with the applicable laws, ordinances, regulations, and standards pertaining to land use planning and would not generate a significant impact under the California Environmental Quality Act guidelines. The proposed project is consistent with the current development patterns for the area established by the City of Carson General Plan, Land Use Element and the City of Carson Zoning Ordinance.

The proposed project would not result in conversion of any farmland (as classified by the Farmland Mapping and Monitoring Program) to non-agricultural use, conflict with existing agricultural zoning or Williamson Act contracts or result in conversion of forest land to non-forest use. In addition, the proposed project would be compatible with existing on-site and nearby land uses, consistent with the planned industrial development for the city of Carson, and would not divide an established community.

INTRODUCTION

The land use analysis of the proposed Watson Cogeneration Steam and Electric Reliability (BP Watson) Application for Certification (09-AFC-01) focuses on the project's consistency with land use plans, ordinances, regulations, and policies, and the project's compatibility with existing and planned land uses. In general, a power plant and its related facilities have the potential to be incompatible with surrounding land uses if they cause unmitigated impacts in the areas of air quality, noise and vibration, hazardous materials management, public health, traffic and transportation, and visual resources. These individual resource areas are discussed in detail in separate sections of this document. In addition, a power plant may also create a significant land use impact if it converts prime farmland, unique farmland, or farmland of statewide or local importance to non-agricultural uses or the conversion of forest land to non-forest use.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS (LORS)

Land Use Table 1 provides a general description of the land use LORS applicable to the proposed project. The proposed BP Watson project's consistency with these LORS is discussed in **Land Use Table 2**. The project site does not involve federally managed lands nor County of Los Angeles managed lands, therefore, there are no identified applicable federal or county land use related LORS. In addition, no applicable state land use LORS have been identified for the proposed project.

Land Use Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable LORS	Description
Federal	**None**
State	**None**
Local	
City of Carson General Plan-Land Use Element-Chapter 2	The General Plan is a policy document which guides future growth and development. The City of Carson's General Plan consists of ten elements, seven of which are required under state law and three optional elements. The state mandated elements consist of the Land Use, Transportation and Infrastructure, Housing, Safety, Noise, and Open Space and Conservation. The three optional elements consist of Economic Development, Parks, Recreation and Human Services and Air Quality. Each element is closely interrelated and must be internally consistent with one another. The Land Use Element serves as the central element for the general plan related to the physical development of the city. This element addresses the location, compatibility and intensity of land uses.
General Plan Designation Heavy Industrial (HI)	The purpose of the Heavy Industrial designation is to provide areas for the full range of industrial uses which are acceptable within the community, but whose operations are more intensive and may have nuisance or hazardous characteristics, which for reasons of health, safety, environmental effects, or general welfare, are best segregated from other less intensive uses. Permitted uses within this designation consist of manufacturing products, industrial processing, food manufacturing and processing, transportation, communication, utilities and public services.
City of Carson Municipal Code	The Municipal Code consists of the regulatory ordinances of the city, codified pursuant to the provisions of Articles 1-10, Sections 1100-10011.
Division 1 Section 9141.1-Uses Permitted in the Manufacturing, Heavy (MH) Zoning District	The purpose of the Manufacturing, Heavy Zoning District is to designate areas for the full range of industrial uses which are acceptable within the community as a whole, with provisions for controlling any adverse effects upon the more sensitive areas of the city.

SETTING

The proposed BP Watson project site would be located in the city of Carson, which is located approximately 16 miles south of downtown Los Angeles. The city is bordered to the east by the city of Long Beach, the west by the city of Torrance and the northeast by the city of Compton.

The proposed BP Watson project would occupy a 2.5-acre brown field site located within the boundary of the existing Watson Cogeneration Facility; a 21.7 acre site located within the overall 428-acre BP Carson refinery site (Assessor Parcel Number 7315-006-003). The proposed project site is located approximately 0.7 mile south of the 405 Freeway, bounded by East 223rd Street to the north, Wilmington Avenue to the west, East Sepulveda Boulevard to the south, and South Alameda Street to the east. The street address of the project site, located within the confines of the Watson Cogeneration Facility, is 22850 South Wilmington Avenue. Refer to the AFC Project Description Section, Figure 3-1, Regional Map which depicts the project site and surrounding area.

The proposed project is an intensification of the existing Watson Cogeneration Facility (Facility) as it would add a nominal 85-megawatt (MW) combustion turbine generator (CTG), with a single-pressure heat recovery steam generator (HRSG) to provide additional process steam to the existing Facility in response to the refinery's process steam demand. The existing Facility was licensed by the California Energy Commission in 1986 (85-AFC-1). In operation since 1988, the existing cogeneration facility is owned by the Watson Cogeneration Company and operated by BP West Coast Products, LLC – BP Carson Refinery.

The refinery site and the proposed project site are industrial in nature and the area is dominated by industrial structures, equipment, machines, and paved surfaces. The project site contains four general electric (GE) 7EA CTG's, four HRSGs and two steam turbine generators (STG) commonly referred to as "cogeneration trains". The original facility design envisioned a "fifth-train" on site of the proposed BP Watson project site.

The proposed BP Watson project would operate in conjunction with the existing four cogeneration units and would increase the existing capacity of the 385-MW Watson Cogeneration Facility to an output of 470-MW. A portion of the proposed project site is currently developed with a warehouse/maintenance shop that would be removed to accommodate the "fifth-train". In addition, no linear facilities would be constructed as the existing linear infrastructure for electric, sewer and water would be utilized. Refer to the AFC Project Description, Figure 3-6, Simulated Aerial Site Plan for a depiction of the "fifth-train".

The proposed construction laydown and parking area would be a paved 25-acre parcel (Assessor Parcel Number 7315-020-019) located approximately one mile southeast of the proposed project site, at the northeast corner of East Sepulveda Boulevard and South Alameda Street. The site is owned by BP and is utilized as a truck parking and staging area. The street address is 2149 East Sepulveda Boulevard.

SURROUNDING AREA

The city of Carson, incorporated February 20, 1968, encompasses 19.2 square miles within Los Angeles County. The city is built-out at approximately 83% with the bulk of development comprised of industrial uses at approximately 54%; residential development at 28%; public facilities at 12%and commercial at 6%. Existing land uses immediately adjacent to, and nearby, the proposed BP Watson project site include:

- North: the Watson Cogeneration Facility, BP Carson Refinery, light industrial

business park; an automobile dealership. The closest residential area to the project site is located at 0.61 mile northwest of the project site at the intersection of 223rd Street and Lucerne Avenue.

- South: BP Carson Refinery and commercial; Residential area approximately 0.79 mile from the project site
- East: the Watson Cogeneration Facility and the Dominguez Channel
- West: Watson Cogeneration Facility; "Watson Center" a light industrial office complex.

GENERAL PLAN LAND USE AND ZONING DESIGNATIONS

The project site, construction laydown and parking area are located entirely on private property within the city of Carson. The proposed project sites are designated Heavy Industrial by the City of Carson General Plan, and zoned Manufacturing, Heavy (MH) by the City of Carson Zoning Ordinance. The project sites are not located within a redevelopment project area, a design overlay or in any unincorporated communities of Los Angeles County.

The City of Carson's General Plan, Land Use Element, Chapter 2, describes the Heavy Industrial designation as an area that provides for the full range of industrial uses which are acceptable within the community, but whose operations are more intensive and may have nuisance or hazardous characteristics, which for reasons of health, safety, environmental effects, or general welfare, are best segregated from other less intensive uses.

The City of Carson's Zoning Ordinance, Division 1, Section 9141.1 (Manufacturing, Heavy Zone), delineates specific industrial uses which are acceptable within the community as a whole, with provisions for controlling any adverse effects upon the more sensitive areas of the city.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

Energy Commission staff has analyzed the information provided in the AFC and has acquired information from other sources to evaluate consistency of the proposed BP Watson project with applicable land use LORS and the proposed project's potential to create significant adverse land use-related impacts. In addition, staff proposes mitigation measures (condition of certification) to reduce any potential impacts to a less than significant level where necessary.

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Significance criteria used in this document are based on the California Environmental Quality Act (CEQA) guidelines (CCR 2006) and performance standards or thresholds identified by the Energy Commission staff, based on applicable LORS and utilized by other governmental regulatory agencies.

An impact may be considered significant if the proposed project results in:

- Conversion of Farmland[1] or Forest Land.
  - Conversion of Prime Farmland, Unique Farmland, or Farmland of Statewide or Local Importance (Farmland) as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use.[2]
  - Conflict with existing zoning for agricultural use, or a Williamson Act contract.
  - Conflict with existing zoning for, or cause rezoning of, forest land [as defined in PRC §12220 (g)], timberland (as defined by PRC §4526), or timberland zoned Timberland Production [as defined by GC §51104(g)].
  - Result in the loss of forest land or conversion of forest land to non-forest use.
  - Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use[3] or conversion of forest land to non-forest use.
- Physical disruption or division of an established community.
- Conflict with any applicable habitat conservation plan, natural community conservation plan, or biological opinion.
- Increase the use of existing neighborhood and regional parks or other recreational facilities, such that substantial physical deterioration of the facility would occur or be accelerated.
- Include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment.
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction, or that would normally have jurisdiction, over the project. This includes, but is not limited to, a General Plan, redevelopment plan, or zoning ordinance.
- Result in incremental impacts that, although individually limited, are cumulatively

[1] In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment (LESA) Model prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland (CCR2006). The intent of the LESA Model is to provide land use analysts with a quantitative means of determining agricultural land and Farmland disturbance acreages and quantitative thresholds to determine the level of severity of those land disturbance impacts. The results of the LESA Model are then used to determine the occurrence of significant impacts on agricultural lands and Important Farmlands based on the CEQA Guidelines Appendix G thresholds of significance. Note that the California Energy Commission uses the LESA Model to assess impacts to agricultural lands for proposed power generation facilities.

[2] FMMP defines "land committed to non-agricultural use" as land that is permanently committed by local elected officials to non-agricultural development by virtue of decisions which cannot be reversed simply by a majority vote of a city council or county board of supervisors.

[3] Non-agricultural uses in this context refers to land where agriculture (the production of food and fiber) does not constitute a substantial commercial use.

considerable when viewed in connection with other project-related effects or the effects of past projects, other current projects, and probable future projects.[4]

In general, a power plant and its related facilities may also be incompatible with existing or planned land uses, resulting in potentially significant impacts, if they create unmitigated noise, dust, or a public health or safety hazard or nuisance; result in adverse traffic or visual impacts; or precludes, interferes with, or unduly restricts existing or future uses. Refer to other sections of this document for a detailed discussion of any additional project impacts and recommended mitigation measures (conditions of certification).

DIRECT/INDIRECT IMPACTS AND MITIGATION

CONVERSION OF FARMLAND OR FOREST LAND

The Farmland Mapping and Monitoring Program (FMMP) produce *Important Farmland Maps* and statistical data used for analyzing impacts on California's agricultural resources. The *Important Farmland Maps* depict categories of Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Farmland of Local Importance, Grazing Land, Urban and Built-up Land, Other Land and Water.

The FMMP designates the proposed BP Watson project site and the construction laydown and parking area as "Urban and Built-Up Land" which is defined as structures with a building density of at least one unit to one and half acres or approximately six structures to a 10-acre parcel. The "Urban and Built-Up Land" designation generally includes industrial, commercial, residential and institutional facilities. Based on the historic and current industrial use on site, and the FMMP designation of "Urban and Built-Up Land" for both sites, the proposed BP Watson project would not convert any farmland with FMMP designations of Prime Farmland, Unique Farmland, or Farmland of Statewide or Local Importance to non-agricultural use. Therefore, neither the construction nor operation of the proposed BP Watson project would result in the conversion of farmland to non-agricultural use and would have no impact with respect to farmland conversion

The California Land Conservation Act, commonly referred to as the Williamson Act, enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space uses. The landowner commits this parcel to an annually renewing ten-year period whereby no conversion of agricultural use is permitted. In return, the land is taxed at a rate based on the actual use of the land for agricultural purposes, as opposed to its unrestricted market value. The proposed BP Watson project is not located in an area that is under a Williamson Act Contract and as a result would not conflict with any Williamson Act Contract. In addition, based on the historic and current industrial use on site and the surrounding industrial zoning the proposed project would not conflict with existing zoning for agricultural use.

[4] Cumulative impacts refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts. The individual effects may be changes resulting from a single project or a number of separate projects and can result from individually minor, but collectively significant actions taking place over a period of time (CEQA Guidelines §15355; 40 CFR 1508.7)

The California Department of Forestry and Fire Protection's Fire and Resource Assessment Program (FRAP) assesses the amount and extent of California's forests and rangelands, analyzes their conditions and identifies alternative management and policy guidelines. FRAP has produced the *Land Cover Map – Multi-Source Data Compiled for Forest and Range 2003 Assessment* statewide map which depicts13 land cover classes. The FRAP designates the proposed BP Watson project site and construction laydown and parking area as Urban which is defined as lands having housing densities greater than one unit per acre or classified as commercial. Based on the historic and current industrial use on site and the surrounding industrial zoning the proposed project would not conflict with existing zoning for, or cause rezoning or conversion of forest land, timberland or timberland zoned for Timberland Production and therefore, mitigation would not be required.

Physical Disruption or Division of an Established Community

The proposed BP Watson project would be located entirely on private property within the city of Carson. The site is adjacent to industrial uses and located within the industrial zoned 428-acre boundary of the existing BP Carson Refinery. The proposed project involves the construction and operation of an 85-MW CTG, ("fifth train"). The nearest residential areas are located approximately 3,000 feet north, 4,700 feet southwest and 5,800 feet east. Based on the "fifth-train" would be located entirely within the Watson Cogeneration Facility, the project would not physically divide or disrupt any community within the city of Carson. In addition, the proposed project would not involve the displacement of any existing development or result in new development that would physically divide an existing community.

Access from the construction laydown and parking area to the proposed project site would occur via existing paved public roadways, with all construction related trips traveling south on South Alameda Street to East Sepulveda Boulevard, then north on Wilmington Avenue to the project site, a total travel distance of approximately two miles. Therefore, no existing roadways or pathways would be blocked or removed from service based on the proposed traffic pattern. In addition, no linear facilities would be constructed as the existing linear infrastructure for electric, sewer and water would be utilized. Therefore, the proposed construction laydown and parking area would not result in any impacts associated with the physical disruption or division of an existing or established community. Refer to the **Traffic and Transportation** section for a discussion of construction and operation traffic and transportation impacts.

CONFLICT WITH ANY APPLICABLE HABITAT OR NATURAL COMMUNITY CONSERVATION PLAN

The **Biological Resources** section provides a detailed discussion of LORS applicable to wildlife and plants on site and the surrounding area. The project site does not fall within a habitat or a natural community conservation plan. Based on the historic and current industrial use on site and the surrounding industrial zoning the proposed BP Watson project site is devoid of native vegetation and as a result would not conflict with any habitat, natural community conservation plan or biological opinion as there are no listed threatened or endangered species on site.

RECREATIONAL FACILITIES

The city of Carson Parks and Recreation Department manages 16 public parks, one county park and two public golf courses encompassing approximately 354 acres. The County of Los Angeles Department of Parks and Recreation manages over 63,000 acres of parks, gardens, lakes, trails, natural areas, and the world's largest public golf course system.

The construction workforce would peak during month 12 with approximately 80 workers per day and average approximately 41 workers during the course of construction. During the operational period no additional workers would be required.

Given the local labor force and the two hour commuting time within Ventura, Kern, San Bernardino and Orange counties to the project site, staff does not expect employees to relocate to the immediate project area during the construction period. Staff concludes that based on the quantity and variety of parks within the local and regional project area the proposed project would not require construction of new parks or expansion of recreational facilities nor substantially increase the use of existing and regional parks. Therefore, impacts to recreational facilities from the proposed BP Watson project would be less than significant and mitigation would not be required.

CONFLICT WITH ANY APPLICABLE LAND USE PLAN, POLICY OR REGULATION

As required by California Code of Regulations, Title 20, Section 1744, Energy Commission staff evaluates the information provided by the project owner in the AFC (and any amendments), project design, site location, and operational components to determine if elements of the proposed project would conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project, or that would normally have jurisdiction over the project except for the Energy Commission's exclusive authority. As part of the licensing process, the Energy Commission must determine whether a proposed facility complies with all applicable state, regional, and local LORS (Public Resources Code section 25523[d][1]). The Energy Commission must either find that a project conforms to all applicable LORS or make specific findings that a project's approval is justified even where the project is not in conformity with all applicable LORS (Public Resources Code section 25525). When determining LORS compliance, staff is permitted to rely on a local agency's assessment of whether a proposed project is consistent with that agency's zoning and general plan. On past projects, staff has requested that the local agency provide a discussion of the findings and conditions that the agency would make when determining whether a proposed project would comply with the agency's LORS, were they the permitting authority. Any conditions recommended by an agency are considered by Energy Commission staff for inclusion in the proposed conditions of certification for the project.

As part of staff's analysis of local LORS compliance and to determine the city's view of the project's consistency with its general plan and zoning code, staff contacted the city of Carson on March 10, 2010, detailing the potential LORS compliance issues associated with the proposed BP Watson project. Staff requested that the city provide its position on the proposed project's consistency with its general plan, zoning ordinance, and other applicable LORS. The city of Carson responded on March 25,

2010 and stated that based on the proposed project General Plan designation of Heavy Industrial and the zoning designation of Manufacturing, Heavy (MH), the proposed project is consistent with the land uses intended for the area and consistent with the General Plan. In addition, the refinery facility, which contains the 21.7 acre cogeneration facility, was legally developed prior to the city's incorporation and as a result the refinery facility is nonconforming to certain development standards, specifically landscaping requirements (COC 2010d). Based on the city of Carson's recommendation to provide landscaping, staff in the **Visual Resources** section of this document is proposing Condition of Certification **VIS-1.** This condition would require a landscape plan to implement landscaping along the BP Carson Refinery property line on Wilmington Avenue.

COMPLIANCE WITH LORS

The proposed BP Watson project would comply with all applicable LORS. **Land Use Table 2** summarizes the BP Watson project conformance with these LORS.

Land Use Table 2
Project Compliance with Adopted and Applicable LORS

Applicable LORS	Description of Applicable LORS	Consistent?	Consistency Determination
Federal	None		
State	None		
Local			
City of Carson General Plan, Land Use Element – Chapter 2, Heavy Industrial Designation	The Heavy Industrial designation provides for the full range of industrial uses which are acceptable within the community, but whose operations are more intensive and may have nuisance or hazardous characteristics, which for reasons of health, safety, environmental effects, or general welfare, are best segregated from other less intensive uses. Permitted uses within this designation consist of manufacturing products, industrial processing, food manufacturing and processing, transportation, communication, utilities and public services. This land designation is implemented by the Manufacturing, Heavy Zone	Yes	The proposed BP Watson project would be consistent with the City of Carson's General Plan designation of Heavy Industrial. Given the site's designation, the existing on-site and the surrounding heavy industrial land uses the proposed project would be consistent and compatible with the development pattern of the area. In addition, because the proposed BP Watson project represents an intensification (5th-train) of the same existing on-site land use, staff concludes the proposed project to be appropriately sited and consistent with the

	(MH).		Heavy Industrial designation.
Division 1 – Uses Permitted - Section 9111.1 - City of Carson Zoning Ordinance - MH Manufacturing, Heavy Zone (Section 9141.1)	Division 1, Section 9141.1 (Manufacturing, Heavy Zone) of the Carson Zoning Ordinance, delineates specific industrial uses which are acceptable within the community as a whole, with provisions for controlling any adverse effects upon the more sensitive areas of the city.	Yes	The proposed BP Watson project would be consistent with the City of Carson's Zoning Ordinance for the Manufacturing, Heavy Zone. Electricity generating uses such as the 85-MW combustion turbine generator (CTG) (5th train) are consistent with the land uses intended for the area and consistent with the zoning of Manufacturing, Heavy. In addition, the proposed project would be located within and adjacent to other heavy industrial uses including petroleum refining.
City of Carson Municipal Code Division 2, Section 9162.52	The Carson Municipal Code consists of the regulatory ordinances of the city, codified pursuant to the provisions of Articles 1-10, Sections 1100-10011. Division 2. Vehicular Parking, Loading and Maneuvering Areas - Section 9162.52 Landscaping Requirements, (A) Interior Parking Lot Facilities.	Yes	The LORS consistency analysis in the **Visual Resources** section provides a detailed discussion of the proposed BP Watson project's compliance with Section 9162.52. The proposed BP Watson project would adhere to the development standards with the implementation of Condition of Certification **VIS-1** which would render the project consistent with the landscaping requirements. Refer to Condition **VIS-1.**

Land Use Compatibility

This section addresses the proposed BP Watson project's physical compatibility with other existing and planned land uses in the same setting.

When a jurisdictional authority, such as the city of Carson, establishes zoning designations to implement its general plan, it is that agency's responsibility to ensure the compatibility of adjacent zoning and permitted uses and incorporate conditions and restrictions that ensure those uses will not result in a significant adverse impact to surrounding properties. As noted in the discussion above under the section titled **Physical Disruption or Division of an Established Community** and in **Land Use Table 2,** development of the proposed project and its associated facilities would be compatible with existing surrounding land uses because the proposed project site is an intensification of the existing Watson Cogeneration Facility and is located entirely within the existing BP Carson Refinery site.

Once the project construction is completed the proposed construction laydown and parking area would revert back to the existing use of truck parking and storage. Therefore, the temporary use of the laydown area would be considered incidental, and land use impacts resulting from activities at the construction laydown area would be less than significant. The **Traffic and Transportation** section provides a discussion of vehicular access to the proposed BP Watson project and the construction laydown and parking area.

The proposed BP Watson project is consistent with applicable LORS, the General Plan Land Use Element and the Zoning designation as well as the surrounding industrial land uses such as the existing "4-trains" and the BP Carson refinery. Therefore, the proposed project would not result in any physical land use incompatibilities with the existing surrounding land uses.

SENSITIVE RECEPTORS

A proposed siting location may be considered inappropriate if a new source of pollution or hazard is located within proximity to a sensitive receptor. From a land use perspective, sensitive receptor sites are those locations where people who would be more adversely affected by pollutants, toxins, noise, dust, or other project-related consequence or activity are likely to live or gather. Children, those who are ill or immune-compromised, and the elderly are generally considered more at risk from environmental pollutants. Therefore, schools, along with day-care facilities, hospitals, nursing homes, and residential areas, are considered to be sensitive receptor sites for the purposes of determining a potentially significant environmental impact.

Depending on the applicable code, proximity is defined as "within 1000 feet" of a school (California Health & Safety Code §§42301.6–9) or within 0.25 mile of a sensitive receptor, under CEQA (CCR2006; CCR 2008). Proximity is not necessarily a determining factor for a potentially significant impact, but is the threshold generally used to require further evaluation.

The proposed BP Watson project would be within one mile of residential neighborhoods, ten schools, three parks, four day care centers, 12 churches, one nursing home and one fire department. Existing permitted industrial uses in the project area include the BP Carson refinery and the Watson Cogeneration Facility.

Once project construction is completed (26 months), the proposed construction laydown and parking area would revert back to the existing use of truck parking and storage.

Therefore, land use impacts resulting from activities at the project site would be temporary and would not result in a significant project-related impact to any sensitive receptor location.

From a land use perspective, the siting of the proposed BP Watson project at the existing location would be compatible with surrounding sensitive receptors. The **Air Quality, Hazardous Materials Management, Noise and Vibration, Public Health, Traffic and Transportation,** and **Visual Resources** sections provide detailed analyses of the dust, noise, public health hazards or nuisance, and adverse traffic or visual impacts on surrounding sensitive receptors. The analyses for these sections conclude that, with implementation of staff's proposed conditions of certification, there would be no unmitigated adverse impacts at any sensitive receptor location. In addition, based on the land use designation, zoning, and surrounding industrial developments the proposed project would not result in a significant project-related impact to any sensitive receptor location.

CUMULATIVE IMPACTS AND MITIGATION

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. "Cumulatively considerable" means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (CCR, 2006,§15065(a)(3).

As noted in the AFC, existing projects in the vicinity of the BP Watson project site include industrial facilities and uses. The city of Carson has identified two long range projects in the vicinity of the proposed project site: the Alameda Corridor Improvement Study and the Shell Oil Products U.S. Carson Revitalization Project Specific Plan. In addition, the Housing Element Update project would affect the city as a whole.

The Alameda Corridor is a 20-mile rail and traffic route linking the to the ports of Los Angeles and Long Beach to the transcontinental rail lines near downtown Los Angeles and borders the project site to the east. The Study would improve Alameda Street to improve safety and enhance traffic flows. Potential improvements include the installation of sound walls to mitigate noise impacts for train and truck traffic along Alameda Street between Dominguez Street and the 405 Freeway.

The Shell Oil Products U.S. Carson Revitalization Project Specific Plan proposes the redevelopment of the 448-acre Shell Carson Terminal facility to permit development of additional product storage tanks, mixed industrial and retail uses, a municipal services yard and warehousing/distribution facilities. The street address is 20945 South Wilmington Avenue, approximately one and half miles north of the project site. The Shell's Specific Plan Notice of Preparation (SCH# 2010-101015) was released on October 6, 2010 for review and comment. The Draft Environmental Impact Report (DEIR) is scheduled to be released in the fall of 2011 for public review and comment.

The Housing Element Update examines Carson's present and future housing needs per Sections 65580-65589.8 of the Government Code. The Housing Element is currently

being reviewed for consistency with applicable housing laws by the California Housing and Community Development (HCD). Since the Preliminary Staff Assessment Publication, HCD certified on December 20, 2010 the city of Carson's 2006-2014 Housing Element in full compliance with the State's housing element law.

The area in the vicinity of the proposed project site is essentially built out. The proposed BP Watson project would be constructed on a site with four existing combustion turbine generators within a refinery and would represent a similar land use type to the existing on-site and adjacent uses. Because the proposed project ("fifth-train") is an allowable land use, discretionary land use entitlements such as a General Plan Amendment, zone change or a conditional use permit would not be required. Therefore, the proposed BP Watson project would not result in significant direct or indirect adverse land use impacts and would not likely combine with those from the projects being processed within the city to result in significant cumulative impacts.

The proposed BP Watson project would not make a significant contribution to regional impacts related to new development and growth. The project is planned to serve the existing and anticipated electrical needs of the region by connecting to the existing electric system and other utility infrastructure. The land use effects of the proposed project in combination with past, present and reasonably foreseeable projects in the area would not be cumulatively considerable. Therefore, cumulative land use impacts would be less than significant.

In the Socioeconomics section of this staff assessment, staff presents census information that shows that there are minority populations within six-miles of the project. For the proposed BP Watson project, the total population within the six-mile radius of the site is 778,090 persons, and the total minority population is 646,789 persons or 83.12% of the total population (see Socioeconomics Figure 1). Energy Commission staff has not identified any significant adverse direct or cumulative Land Use impacts resulting from the construction or operation of the proposed project. Therefore, there are no Land Use environmental justice issues related to this project and no minority or low-income populations would be significantly or adversely impacted.

RESPONSE TO PUBLIC AGENCY COMMENTS

The land use issues cited in the city of Carson March 25, 2010 correspondence to the Energy Commission are addressed by staff in the Preliminary Staff Assessment (PSA). No other comments were received.

CONCLUSIONS AND RECOMMENDATIONS

1. The Watson Cogeneration Steam and Electric Reliability Project would not result in conversion of any Farmland (as classified by the Farmland Mapping and Monitoring Program) to non-agricultural use, conflict with existing agricultural zoning or Williamson Act contracts or convert forest land to non-forest use.

2. The Watson Cogeneration Steam and Electric Reliability Project would not disrupt or divide the physical arrangement of an established community.

3. The Watson Cogeneration Steam and Electric Reliability Project would not require construction of new parks or expansion of recreational facilities nor substantially increase the use of existing and regional parks.

4. The Watson Cogeneration Steam and Electric Reliability Project would not be incompatible with existing on-site or nearby land uses with the implementation of Condition of Certification **VIS-1**, as it is consistent with the character of these permitted uses and development in the area.

5. The Watson Cogeneration Steam and Electric Reliability Project cumulative land use impacts would be less than significant.

6. The Watson Cogeneration Steam and Electric Reliability Project would not create a significant adverse impact on low income and minority populations with the implementation of staff's proposed conditions of certification in the Air Quality, Hazardous Materials Management, Noise and Vibration, Public Health, Traffic and Transportation, and Visual Resources sections of this staff assessment.

PROPOSED CONDITONS OF CERTIFICATION

The land use impacts of the proposed project are less than significant, and therefore do not require any specific land use conditions to help mitigate project impacts. Therefore, no conditions of certification are proposed.

REFERENCES

CCR 2006. California Code of Regulations, Title 14, CEQA Guidelines

CDOC, 2006, California Department of Conservation, Farmland Mapping and Monitoring Program, website accessed March, 2010 http://www.conservation.ca.gov/dlrp/FMMP/Pages/Index.aspx

COC 2004a City of Carson, General Plan. Chapter 1: Introduction. Adopted October 11, 2004 Resolution 04-089.

COC 2004b City of Carson, General Plan. Chapter 2: Land Use Element. Adopted October 11, 2004 Resolution 04-089.

COC 2004c City of Carson, General Plan. Chapter 3: Economic Development Element. Adopted October 11, 2004 Resolution 04-089.

COC 2010d City of Carson Planning Division correspondence, Landscaping requirements (tn 56035), March 25, 2010

COC 2009d Carson Zoning Ordinance, Division 1 Section 9111.1 . Adopted October 7, 2009, Ordinance 09-1436U

USC, School of Policy, Planning and Development, 2004 – The Alameda Corridor, A

White Paper, Agarwal, Ajay; Giuliano, Genevieve; Rdefearn, Christian.

Watson 2009a – Watson Cogeneration Company/Thomas A. Lu (tn 50584). Application for Certification Volume I&II, dated 3/19/09. Submitted to CEC/Docket Unit on 3/19/09

NOISE AND VIBRATION

Testimony of Shahab Khoshmashrab

SUMMARY OF CONCLUSIONS

The Watson Cogeneration Steam and Electric Reliability project (BP Watson), if built and operated in conformance with the proposed conditions of certification below, would comply with all applicable noise and vibration laws, ordinances, regulations and standards, and would produce no significant adverse noise impacts on people, including the minority population, within the affected area, directly, indirectly, or cumulatively. The applicant has proposed appropriate mitigation, in the form of good design practice and selection of appropriate project equipment that would avoid any significant adverse impacts.

INTRODUCTION

The construction and operation of any power plant creates noise or unwanted sound. The character and loudness of this noise, the times of day or night that it is produced, and the proximity of the facility to sensitive noise receptors[1] all combine to determine whether the facility would meet applicable noise control laws and ordinances and whether it would cause significant adverse environmental impacts. In some cases, vibration may be produced as a result of power plant construction practices such as blasting or pile driving. The ground-borne energy of vibration has the potential to cause structural damage and annoyance.

The purpose of this analysis is to identify and examine the likely noise and vibration impacts from the construction and operation of the BP Watson project, and to recommend procedures to ensure that the resulting noise and vibration impacts would be adequately mitigated to comply with applicable laws, ordinances, regulations and standards (LORS). For an explanation of technical terms used in this section, please refer to **Noise Appendix A**, immediately following.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Noise Table 1
Laws, Ordinances, Regulations and Standards

Applicable Law	Description
Federal:	
Occupational Safety & Health Act (OSHA): 29 U.S.C. § 651 et seq.	Protects workers from the effects of occupational noise exposure
U.S. Environmental Protection Agency (USEPA)	Assists state and local government entities in development of state and local LORS for noise

[1] A sensitive noise receptor, also referred to as a noise-sensitive receptor, is a receptor at which there is a reasonable degree of sensitivity to noise (such as residences, schools, hospitals, elder care facilities, libraries, cemeteries, and places of worship).

Applicable Law	Description
State:	
California Occupational Safety & Health Act (Cal-OSHA): 29 U.S.C. § 651 et seq., Cal. Code Regs., tit. 8, §§ 5095-5099	Protects workers from the effects of occupational noise exposure
Local:	
City of Carson General Plan	This requirement is applicable to noise generated during operation and sets limits on the maximum level of facility noise at residential, commercial and industrial land uses.
City of Carson Noise Control Ordinance	This requirement is applicable to noise generated during operation and sets limits on the maximum level of facility noise at residential, commercial and industrial land uses.

FEDERAL

Under the Occupational Safety and Health Act of 1970 (OSHA) (29 U.S.C. § 651 et seq.), the Department of Labor, Occupational Safety and Health Administration, (OSHA) adopted regulations (29 C.F.R. § 1910.95) designed to protect workers against the effects of occupational noise exposure. These regulations list permissible noise exposure levels as a function of the amount of time during which the worker is exposed (see **Noise Appendix A, Table A4**, immediately following this section). The regulations further specify a hearing conservation program that involves monitoring the noise to which workers are exposed, assuring that workers are made aware of overexposure to noise, and periodically testing the workers' hearing to detect any degradation. Guidelines are available from the U.S. Environmental Protection Agency (USEPA) to assist state and local government entities in developing state and local LORS for noise. Because there are existing local LORS that apply to this project, the USEPA guidelines are not applicable.

There are no federal laws governing off-site (community) noise.

The Federal Transit Administration (FTA) has published guidelines for assessing the impacts of ground-borne vibration associated with construction of rail projects, which have been applied by other jurisdictions to other types of projects. The FTA-recommended vibration standards are expressed in terms of the "vibration level," which is calculated from the peak particle velocity measured from ground-borne vibration. The FTA measure of the threshold of perception is 65 vibrational decibel (VdB), which correlates to a peak particle velocity of about 0.002 inches per second (in/sec). The FTA measure of the threshold of architectural damage for conventional sensitive structures is 100 VdB, which correlates to a peak particle velocity of about 0.2 in/sec.

STATE

California Government Code Section 65302(f) encourages each local governmental entity to perform noise studies and implement a noise element as part of its general plan. In addition, the California Office of Planning and Research has published guidelines for preparing noise elements, which include recommendations for evaluating the compatibility of various land uses as a function of community noise exposure.

The State of California, Office of Noise Control, prepared the Model Community Noise Control Ordinance, which provides guidance for acceptable noise levels in the absence of local noise standards. This model also defines a simple tone, or "pure tone," as one-third octave band sound pressure levels that can be used to determine whether a noise source contains annoying tonal components. The Model Community Noise Control Ordinance further recommends that, when a pure tone is present, the applicable noise standard should be lowered (made more stringent) by five A-weighted decibels (dBA).

The California Occupational Safety and Health Administration (Cal-OSHA) has promulgated occupational noise exposure regulations (Cal. Code Regs., tit. 8, §§ 5095-5099) that set employee noise exposure limits. These standards are equivalent to federal OSHA standards (see **Noise Appendix A, Table A4**).

LOCAL

City of Carson General Plan

The City of Carson General Plan (GP) provides a blueprint for how the city anticipates directing and managing growth while minimizing potential effects for existing and future generations. The City of Carson GP has adopted community noise exposure levels based on the Department of Housing and Urban Development Guidelines and State of California Standards (City of Carson 2006).

City of Carson Noise Control Ordinance

In 1995, the City of Carson adopted, with amendments, the Los Angeles County Noise Control Ordinance as the City of Carson Noise Control Ordinance. The City of Carson Noise Control Ordinance limits noise exposure by receiver categories (zones) or limits noise emission levels by noise-producing activities. This ordinance limits exterior noise levels at receptor locations (City of Carson 1995). The maximum exterior noise levels in terms of receptor category are shown in Noise Table 2, below.

Noise Table 2
City of Carson Noise Control Ordinance – Exterior Noise Limits

Land Use	Time Interval	Exterior Noise Limits, dBA
Noise-sensitive Areas	Anytime	45
Residential Properties	10 p.m. to 7 a.m.	45
	7 a.m. to 10 p.m.	50
Commercial Properties	10 p.m. to 7 a.m.	55
	7 a.m. to 10 p.m.	60
Industrial Properties	Anytime	70

Also, the Noise Ordinance limits noisy construction activities to between the hours of 7 a.m. and 8 p.m. Monday through Saturday.

SETTING

The project site is located approximately 0.7 mile south of the 405 Freeway, roughly bounded by Wilmington Avenue to the west, East Sepulveda Boulevard to the south, and South Alameda Street to the east. Because the site is located within the existing refinery property boundary, the project site and surrounding areas are highly developed, and have been subject to disturbance for many years (Watson 2009a, AFC § 5.12.1).

There is a residential neighborhood approximately 3,000 feet to the north of the project site (Watson 2009a, AFC § 5.12.1.3). The project area is zoned Heavy Manufacturing and is surrounded by existing refineries, intermodal transit yards, several freight rail lines, and other industrial facilities. Land uses of adjoining and nearby properties within one mile of the project site are varied, consisting of industrial, commercial, and residential properties (see **Noise Figure 1**).

Noise sources in the vicinity of the project site consist of roadways, airports (Compton and Long Beach Airports), stationary sources (including industrial, commercial, and construction activity), and railways (including Union Pacific Railroad, Burlington Northern Santa Fe, the Alameda Corridor, and the Los Angeles Metro Blue Line). According to the City of Carson General Plan Noise Element (City of Carson 2006), the most pervasive noise source within the city, including the project area, is vehicular traffic due to large volumes of truck traffic and rail line operations. Field noise measurements, conducted in 1999 and documented in the General Plan, indicate noise levels from vehicular traffic greater than 65 dBA L_{eq} at all measured locations.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHODS AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

California Environmental Quality Act

The California Environmental Quality Act (CEQA) requires that significant environmental impacts be identified and either eliminated or mitigated to the extent feasible. Section XII of Appendix G of CEQA's guidelines (Cal. Code Regs., tit. 14, App. G) describes some characteristics that could signify a potentially significant impact. Specifically, a significant effect from noise may exist if a project would result in:

1. exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;

2. exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels;

3. substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or

4. substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

The Energy Commission staff, in applying Item three, above, to the analysis of this and other projects, has concluded that a potential for a significant noise impact may exist where the noise of the project plus the background exceeds the background by more than 5 dBA at the nearest sensitive noise receptor, including those receptors that represent the area's minority population.

Staff has concluded that an increase in background noise levels up to and including 5 dBA in a residential setting is insignificant; an increase of more than 10 dBA, however, is typically significant. An increase of between 5 and 10 dBA should be considered adverse, but could be either significant or insignificant, depending upon the particular circumstances of a particular case.

Factors to be considered in determining the significance of an adverse impact as defined above include:

1. the resulting noise level;[2]

2. the duration and frequency of the noise;

3. the number of people affected;

[2] For example, a noise level of 40 dBA would be considered quiet in many locations. A noise limit of 40 dBA would be consistent with the recommendations of the California Model Community Noise Control Ordinance for rural environments, and with industrial noise regulations adopted by European jurisdictions. If the project would create an increase in ambient noise no greater than 10 dBA at nearby sensitive receptors, and the resulting noise level would be 40 dBA or less, the project noise level would likely be insignificant.

4. the land use designation of the affected receptor sites; and

5. public concern or controversy as demonstrated at workshops or hearings, or by correspondence.

Noise due to construction activities is usually considered to be insignificant in terms of CEQA compliance if:

- the construction activity is temporary; and
- the use of heavy equipment and noisy[3] activities is limited to daytime hours.
- all industry-standard noise abatement measures are implemented for noise-producing equipment.

Staff uses the above method and threshold to protect the most sensitive populations, including the area's minority population.

Ambient Noise Monitoring

In order to establish a baseline for the comparison of predicted project noise with existing ambient noise, the applicant has presented the results of an ambient noise survey (Watson 2009a, AFC § 5.12.1.3; Tables 5.12-2, 5.12-3, 5.12-4, 5.12-5, 5.12-6, 5.12-7). This survey was performed from Tuesday, July 8 through Wednesday, July 9, 2008, using acceptable equipment and techniques. The noise survey monitored existing noise levels at the following five locations, shown in **Noise Figure 2**:

1. Location LT-1: Near the residence located at 918 East Sepulveda Boulevard, approximately 4,000 feet southwest of the project site. This location was monitored continuously from 4:00 p.m. on July 8 through 4:59 p.m. on July 9, 2008.

2. Location LT-2: Near the wall separating Avalon Village from the adjacent industrial/business complexes off of Banning, near Squaw Peak Lane. This location is approximately 4,400 feet west of the project site. This location was monitored continuously from 4:30 p.m. on July 8 through 5:29 p.m. on July 9, 2008.

3. Location LT-3: Near the closest residential receptor at 1260 east 222nd Street, approximately 3,300 feet northwest of the project site. This location was monitored continuously from 4:30 p.m. on July 8 through 5:29 p.m. on July 9, 2008.

4. Location ST-1: In the parking lot of the Stephens Middle School, located at 1830 West Columbia Street, over 1,500 feet from the project's construction laydown and parking area and over one mile from the project site. This is the nearest school to the project site. This location is also the nearest noise-sensitive receptor to the project construction laydown and parking area. Three15-minute measurements were taken at this location during the survey period.

5. Location ST-2: This measurement location was situated at the dead end of Hesperian Avenue. This location represents the nearest residential location east of the project site, over one mile from the project site. It also represents the second

[3] Noise that draws legitimate complaint.

closest noise receptor to the project construction laydown and parking area. Three15-minute measurements were taken at this location during the survey period.

As explained above, the noise environment in the vicinity of the project site is dominated by transportation-related and industrial/commercial sources.

Noise Table 3 summarizes the ambient noise measurements (Watson 2009a, AFC § 5.12.1.3; Tables 5.12-4, 5.12-5, 5.12-6, 5.12-7).

Noise Table 3
Summary of Measured Noise Levels

Measurement Sites	Measured Noise Levels, dBA		
	Lowest Level L_{50}[1]	Average During Daytime Hours[2] L_{eq}	Nighttime Hours L_{90}
LT-1, Residence at 918 East Sepulveda Boulevard, Approximately 4,000 Feet Southwest of Project Site	50[3]	62	48[3]
LT-2, Avalon Village, Approximately 4,400 Feet West of Project Site	48[3]	63	46[3]
LT-3, Residence at 1260 East 222nd Street, Approximately 3,300 Feet Northwest of Site	55[3]	65	55[3]
ST-1, Stephens Middle School, more than One Mile East of Project Site	50	52	48
ST-2, Approximately One Mile East of Project Site	50	54	55

Source: Watson 2009a, AFC § 5.12.1.3; Tables 5.12-4, 5.12-5, 5.12-6, 5.12-7, 5.12-17
1. The noise levels that are exceeded 50% of the time.
2. Staff calculation of average of the daytime hours (7 a.m. to 10 p.m.)
3. Staff calculations of average of four quietest consecutive hours of the nighttime (see NOISE APPENDIX A)

DIRECT IMPACTS AND MITIGATION

Noise impacts associated with the project can be created by short-term construction activities and normal long-term operation of the project.

Construction Impacts and Mitigation

Construction noise is usually a temporary phenomenon. Construction of the BP Watson project is expected to be typical of similar projects in terms of schedule, equipment used, and other types of activities, approximately 18 months (Watson 2009a, AFC §§ 1.2.5, 5.12.2.2).

Compliance with LORS

Construction of an industrial facility such as a power plant is typically noisier than permissible under usual noise ordinances. In order to allow the construction of new

facilities, construction noise during certain hours of the day is commonly exempt from enforcement by local ordinances.

The applicant has predicted the highest construction-related noise levels to range between approximately 49 to 52 dBA at the above residential receptors. They are summarized here in **Noise Table 4**.

Noise Table 4: Predicted Construction-Related Noise Levels

Receptor	Highest Construction Noise Level (dBA) [1]	Measured Existing Ambient, Average Daytime L_{eq} (dBA) [2]	Project Plus Ambient	Change
LT-1	50	62	62	0
LT-2	49	63	63	0
LT-3	52	65	65	0
ST-1	51	52	55	+3
ST-2	49	54	55	+1

Sources: [1] Watson 2009a, AFC Table 5.12-14
[2] NOISE Table 3, above

The City of Carson Noise Ordinance limits noisy construction activities to between the hours of 7 a.m. to 8 p.m. Monday through Saturday. To ensure that these hours are, in fact, enforced, staff proposes Condition of Certification **NOISE-6**.

Also, the strictest construction noise level limit set forth by the City of Carson's noise LORS is 60 dBA at single-family residential receptors during the above daytime hours (Watson 2009a, AFC Table 5.12-19). As seen in **Noise Table 4**, the project's loudest construction work would not exceed 52 dBA at the project's noise-sensitive receptors.

Therefore, the noise impacts of the BP Watson project construction activities would comply with the noise LORS.

CEQA Impacts

Since construction noise typically varies with time, it is most appropriately measured by, and compared with, the L_{eq} (energy average) metric. As seen in **Noise Table 4** above, last column, construction noise would increase the existing ambient noise level at the project's identified noise-sensitive receptors by 0-3 dBA. An increase of 3 dBA is barely noticeable; staff considers this increase to be less than significant. Also, staff proposes Conditions of Certification **NOISE-1** and **NOISE-2**, which would establish a public notification and noise complaint process to resolve any complaints regarding demolition and construction noise.

Therefore, the noise impacts of the BP Watson project construction activities would be less than significant.

Steam Blows

Typically, the loudest noise encountered during construction, inherent in building any project incorporating a steam turbine, is created by the steam blows. After erection and assembly of the feed water and steam systems, the piping and tubing that comprise the steam path have accumulated dirt, rust, scale, and construction debris such as weld spatter, dropped welding rods, and the like. If the plant were started up without thoroughly cleaning out these systems, all this debris would find its way into the steam turbine, quickly destroying the machine.

In order to prevent this, before the steam system is connected to the turbine, the steam line is temporarily routed to the atmosphere. Traditionally, high pressure steam is then raised in the boiler or a temporary boiler and allowed to escape to the atmosphere through the steam piping. This flushing action, referred to as a *high pressure steam blow*, is quite effective at cleaning out the steam system. A series of short steam blows, lasting two or three minutes each, are performed several times daily over a period of two or three weeks. At the end of this procedure, the steam lines are connected to the steam turbine, which is then ready for operation. Alternatively, high pressure compressed air can be substituted for steam.

High pressure steam blows, if unsilenced, can typically produce noise levels as high as 129 dBA at a distance of 50 feet; this would amount to roughly 92 dBA at LT-3, the nearest sensitive receptor. Unsilenced steam blows could be disturbing at the nearest noise-sensitive receptor, depending on the frequency, duration, and noise intensity of venting. With a silencer installed on the steam blow piping, noise levels are commonly attenuated to 89 dBA at 50 feet; this would yield approximately 52 dBA at LT-3. Note that a silencer installed on the steam blow piping would effectively reduce the noise at all sensitive receptors.

A quieter steam blow process, referred to as *low pressure steam blow* and marketed under names such as QuietBlow™ or Silentsteam™, has become popular. This method utilizes lower pressure steam over a continuous period of about 36 hours. Resulting noise levels reach about 86 dBA at 50 feet.

To ensure steam blow would not create a significant adverse noise impact at the noise-sensitive receptors, staff proposes Conditions of Certification **NOISE-7**.

Linear Facilities

Construction of linear facilities typically moves along at a rapid pace, thus not subjecting any one receptor to noise impacts for more than two or three days. Further, noisy construction activities would be limited to daytime hours. To ensure that these hours are, in fact, adhered to, in compliance with the LORS, staff proposes Condition of Certification **NOISE-6**.

Vibration (Pile Driving)

The only construction operation likely to produce vibration that could be perceived off

site would be pile driving. Pile driving will not cause perceptible vibration at any of the project's receptors, because they are located relatively far from where construction would occur. The applicant anticipates that pile driving, using traditional techniques, would be required for construction of the BP Watson project. Noise from pile driving is projected to be approximately 77 dBA at LT-3, the nearest sensitive receptor (Watson 2009a, AFC § 5.12.2.2). Thus, pile driving using traditional techniques can potentially cause a significant noise impact at the nearest noise-sensitive receptor. Staff recommends that pile driving be performed using a quieter process. Staff has identified several commercially available technologies that reduce pile driving noise by 20 to 40 dBA compared to traditional pile driving techniques. These include padded hammers, "Hush" noise-attenuating enclosures, vibratory drivers, and hydraulic techniques that press the piles into the ground instead of hammering them (Eaton 2000, Gill 1983, Ken-Jet, Kessler & Schomer 1980, NCT, WOMA 1999, Yap 1987). To ensure that pile driving noise will not cause annoyance, staff proposes Condition of Certification **NOISE-8**.

Worker Effects

The applicant has acknowledged the need to protect construction workers from noise hazards and has recognized applicable LORS that would protect construction workers (Watson 2009a, AFC § 5.12.5.1). To ensure that construction workers are, in fact, adequately protected, staff has proposed Condition of Certification **NOISE-3**.

Operation Impacts and Mitigation

The primary noise source of the project would be the turbine generators, cooling tower, electric transformer, and various pumps and fans. The overall noise generated by these various noise sources would be based on the configuration of the sources, the number and power rating of the equipment, and any noise-reducing measures incorporated.

Staff compares the projected project noise with applicable LORS, in this case the City of Carson LORS. In addition, staff evaluates any increase in noise levels at sensitive receptors due to the project in order to identify any significant adverse impacts.

The project's proposed noise mitigation measures include the following (Watson 2009a, AFC § 5.12.3):

- gas turbine acoustical enclosure;
- exhaust stack silencing;
- gas turbine inlet air silencing;
- fuel gas compressor enclosures; and
- property line acoustical barriers.

In addition, the project would avoid the creation of annoying tonal (pure-tone) noises by balancing the noise emissions of various power plant features during plant design (Watson 2009a, AFC § 5.12.2.1).

Compliance with LORS

The applicant performed noise modeling to determine the project's noise impacts on sensitive receptors (Watson 2009a, AFC § 5.12.2.1, Tables 5.12-11, 5.12-12). The applicant has predicted operational noise levels; they are summarized in **Noise Table 5** below.

Noise Table 5: Predicted Operational Noise Levels at all Identified Sensitive Residential Receptors and LORS

Receptor/ Distance	Operational Noise Level (dBA) [1]	Applicable LORS Limit (Lowest Existing Ambient) L_{50},	Project in Excess of LORS
LT-1	44	50	0
LT-2	45	48	0
LT-3	48	55	0
ST-1	38	50	0
St-2	40	50	0

Sources: [1] Watson 2009a, AFC Table 5.12-11, 5.12-12, 5.12-17
[2] NOISE Table 3, above

As seen in **Noise Table 5**, the lowest ambient noise levels at the sensitive receptors are in excess of the strictest LORS standard of 45 dBA shown in **Noise Table 2**. BP Watson project's operational noise level must not exceed the existing ambient noise levels at the above receptors. Because the LORS limits have been exceeded by the existing environment, these existing ambient levels set the new standard for comparison to the project noise levels.

As seen in **Noise Table 5**, project operational noise levels would not exceed the LORS limits (ambient levels) at the noise-sensitive receptors. Therefore, project operation complies with the noise LORS.

To ensure compliance, staff proposes Condition of Certification **NOISE-4**. This condition states that if the project's noise levels alone exceed the predicted project noise levels at the project's noise-sensitive receptors, mitigation measures must be implemented to bring the noise levels into compliance with these limits. Also to ensure compliance, staff proposes Conditions of Certification **NOISE-1** and **NOISE-2**, which would establish a public notification and noise complaint process requiring the applicant to resolve any complaints caused by operational noise.

With implementation of the following conditions of certification, noise due to the operation of the BP Watson project would be in compliance with the applicable LORS.

CEQA Impacts

Power plant noise is unique. A power plant operates as, essentially, a steady,

continuous, broadband noise source, unlike the intermittent sounds that make up most of the noise environment. Power plant noise therefore contributes to, and becomes a part of, background noise levels, or the sound heard when most intermittent noises stop. Where power plant noise is audible, it tends to define the background noise level. For this reason, staff typically compares projected power plant noise to existing ambient background (L_{90}) noise levels at affected sensitive receptors. If this comparison identifies a significant adverse impact, then feasible mitigation must be applied to the project to either reduce or remove that impact.

In most cases, a power plant can be expected to operate around the clock for much of the year. For residential receptors, staff evaluates project noise emissions by comparing them with nighttime ambient background levels; this evaluation assumes that the potential for public annoyance from power plant noise is greatest at night when residents are trying to sleep. Nighttime ambient noise levels are typically lower than daytime levels; differences in background noise levels of 5 to 10 dBA are common. Staff believes it is prudent to average the lowest nighttime hourly background noise levels to arrive at a reasonable baseline for comparison with the project's predicted noise level.

Adverse impacts on residential receptors can be identified by comparing predicted power plant noise levels with the nighttime ambient background noise levels at the nearest sensitive residential receptors.

The applicant has predicted operational noise levels; they are summarized here in **Noise Table 6**.

Noise Table 6: Predicted Operational Noise Levels at all Identified Sensitive Residential Receptors and CEQA

Receptor/Distance	Operational Noise Level (dBA) [1]	Ambient Nighttime Hours L_{90} [2]	Lowest Ambient Daytime level L_{eq} At School [2]	Project Plus Ambient	Change
LT-1	44	48		49	+1
LT-2	45	46		49	+3
LT-3	48	55		56	+1
ST-1	38		52	52	0
ST-2	40	55		55	0

Sources: [1] Watson 2009a, AFC Table 5.12-11
[2] NOISE Table 3, above

Combining the ambient noise level of 48 dBA L_{90} (**Noise Table 6**, above) with the project noise level of 44 dBA at LT-1 would result in 49 dBA L_{eq}, 1 dBA above the ambient. As described above (in **Method and Threshold for Determining Significance**), staff always regards an increase of up to five dBA as a less-than-

significant impact. Therefore, staff considers the above noise impact at LT-1 to be less than significant.

Combining the ambient noise level of 46 dBA L_{90} (**Noise Table 6**) with the project noise level of 45 dBA at LT-2 would result in 49 dBA L_{eq}, three dBA above the ambient. Staff considers this impact to be less than significant.

Combining the ambient noise level of 55 dBA L_{90} (**Noise Table 6**) with the project noise level of 48 dBA at LT-3 would result in 56 dBA L_{eq}, one dBA above the ambient. Staff considers this impact to be less than significant.

Combining the ambient noise level of 52 dBA L_{eq} (**Noise Table 6**) with the project noise level of 38 dBA at ST-1 would result in 52 dBA L_{eq}, resulting in no change in the ambient. Thus, project operation would have no impact at this receptor. (Staff uses the average daytime ambient noise level at the school for comparison, because a school is typically occupied during the day.)

Combining the ambient noise level of 55 dBA L_{90} (**Noise Table 6**) with the project noise level of 40 dBA at ST-2 would result in 55 dBA L_{eq}, resulting in no change in the ambient. Thus, project operation would have no impact at this receptor.

Staff proposes Condition of Certification **NOISE-4** to ensure that the noise levels due to project operation would not exceed the above levels in **Noise Table 6**, second column.

Tonal Noises

One possible source of annoyance could be strong tonal noises. Tonal noises are individual sounds (such as pure tones) which, while not louder than permissible levels, stand out in sound quality. The applicant plans to address overall noise in project design, and to take appropriate measures, as needed, to eliminate tonal noises as possible sources of annoyance (Watson 2009a, AFC § 5.12.2.1). To ensure that tonal noises do not cause public annoyance, staff proposes Condition of Certification **NOISE-4**, which would require mitigation measures, if necessary, to ensure the project would not create tonal noises.

Linear Facilities

All water pipes and gas pipes would be underground and therefore silent during plant operation. Noise effects from electrical interconnection lines typically do not extend beyond the lines' right-of-way easements and would be inaudible to receptors.

Vibration

Vibration from an operating power plant could be transmitted through two primary means: ground (ground-borne vibration), and air (airborne vibration).

The operating components of the project consist of a high-speed gas turbine, compressors, and various pumps. All of these pieces of equipment must be carefully balanced in order to operate; permanent vibration sensors are attached to the turbines and generators. Gas turbine generator facilities using the GE 7EA machine have not

resulted in ground-borne or airborne vibration impacts. Based on experience with numerous previous projects employing similar equipment, staff agrees with the applicant that ground-borne vibration from the BP Watson project would be undetectable by any likely receptor.

Airborne vibration (low frequency noise) can rattle windows and objects on shelves and can rattle the walls of lightweight structures. However, none of the project equipment is likely to produce noticeable low frequency noise beyond the project site boundaries. This makes it highly unlikely that the BP Watson project would cause perceptible airborne vibration effects at any offsite noise-sensitive receptor.

Worker Effects

The applicant acknowledges the need to protect plant operating and maintenance workers from noise hazards and commits to compliance with all applicable LORS (Watson 2009a, AFC § 5.12.2.1). Signs would be posted in areas of the plant with noise levels exceeding 85 dBA (the level that OSHA recognizes as a threat to workers' hearing), and hearing protection would be required and provided. To ensure that plant operation and maintenance workers are adequately protected, Energy Commission staff has proposed Condition of Certification **NOISE-5**. For further discussion of proposed worker safety conditions of certification, please see the **Worker Safety and Fire Protection** section of this document.

CUMULATIVE IMPACTS AND MITIGATION

Section 15130 of the CEQA guidelines (Cal. Code Regs., tit. 14) requires a discussion of cumulative environmental impacts. Cumulative impacts are two or more individual impacts that, when considered together, compound or increase other environmental impacts. CEQA guidelines require that this discussion reflect the severity of the impacts and the likelihood of their occurrence, but does not need to provide as much detail as the discussion of impacts solely attributable to the project.

According to the City of Carson, five other projects are either proposed or approved within one mile of the project site: the Alameda Corridor Improvement Study; the Shell Oil Products U.S. Redevelopment; the BP Safety, Compliance and Optimization Project; Mixed-use office, parking and recreational area located at 2254 East 223rd Street; and the expansion of an existing industrial facility located at 2116 E 220th Street. These projects have the potential to increase the existing noise levels in the area. The BP Watson project would increase the existing nighttime ambient noise levels during the four quietest consecutive hours of the nighttime by 0-1 dBA at four of the five sensitive receptors, and by 3 dBA at the fifth receptor location. Therefore, the future contribution of the BP Watson project to the noise environment would be relatively minor. It is unlikely that all of the above projects would increase the late night and early morning ambient levels at a rate that would combine with the BP Watson project to create a significant noise impact. Therefore, the project's cumulative noise impact is considered to be less than significant.

Additionally, staff proposes Conditions of Certification **NOISE-1** and **NOISE-2**, which would establish a public notification and noise complaint process to resolve any complaints regarding noise throughout the life of the project.

FACILITY CLOSURE

All operational noise from the project would cease when the BP Watson project closes, and no further adverse noise impact from its operation would be possible. The remaining potential temporary noise source would be the dismantling of the project structures and equipment, as well as any site restoration work that may be performed. Since this noise would be similar to that caused by the original construction, it could be similarly treated -- that is, noisy work could be performed during daytime hours with machinery and equipment that are properly equipped with mufflers. Any noise LORS in existence at that time would apply. Unless modified, applicable conditions of certification included in the Energy Commission decision would also apply.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

None received.

CONCLUSIONS

In the Socioeconomics section of this document, staff presents census information that shows that 83.12% of the total population within six miles of the project site consists of minority population (see Socioeconomics Figure 1). Staff has identified potentially significant adverse noise impacts resulting from the construction and operation of the proposed project. However, the applicant's proposed appropriate mitigation, in the form of good design practice and selection of appropriate project equipment, and the staff's proposed mitigation measures in the following Conditions of Certification will reduce any significant adverse direct or cumulative impacts on all population, including the minority population, to less than significant. Thus, there are no environmental justice issues related to noise impacts.

Staff concludes that the BP Watson project, if built and operated in conformance with the proposed conditions of certification below, would comply with all applicable noise and vibration LORS and would produce no significant direct or cumulative adverse noise impacts on people within the project area.

PROPOSED CONDITIONS OF CERTIFICATION

PUBLIC NOTIFICATION PROCESS

NOISE-1 Prior to the demolition of the existing structures at the project site, the project owner shall notify all residents and business owners within one mile of the project site boundaries and within ½-mile of the linear facilities, by mail or by other effective means, of the commencement of project construction. At the same time, the project owner shall establish a telephone number for use by the public to report any undesirable noise conditions associated with the construction and operation of the project. If the telephone is not staffed 24 hours a day, the project owner shall include an automatic answering feature, with date and time stamp recording, to answer calls when the phone is unattended. This telephone number shall be posted at the project site during

construction where it is visible to passersby. This telephone number shall be maintained until the project has been operational for at least one year.

Verification: At least 15 days prior to the start of demolition, the project owner shall transmit to the compliance project manager (CPM) a statement, signed by the project owner's project manager, stating that the above notification has been performed, and describing the method of that notification. This communication shall also verify that the telephone number has been established and posted at the site, and shall provide that telephone number.

NOISE COMPLAINT PROCESS

NOISE-2 Throughout the demolition, construction and operation of the project, the project owner shall document, investigate, evaluate, and attempt to resolve all project-related noise complaints. The project owner or authorized agent shall:

- use the Noise Complaint Resolution Form (below), or a functionally equivalent procedure acceptable to the CPM, to document and respond to each noise complaint;
- attempt to contact the person(s) making the noise complaint within 24 hours;
- conduct an investigation to determine the source of noise in the complaint;
- if the noise is project related, take all feasible measures to reduce the source of the noise; and
- submit a report documenting the complaint and actions taken. The report shall include: a complaint summary, including the final results of noise reduction efforts and, if obtainable, a signed statement by the complainant stating that the noise problem has been resolved to the complainant's satisfaction.

Verification: Within five days of receiving a noise complaint, the project owner shall file a Noise Complaint Resolution Form, shown below, with both the local jurisdiction and the CPM, that documents the resolution of the complaint. If mitigation is required to resolve the complaint, and the complaint is not resolved within a three-day period, the project owner shall submit an updated Noise Complaint Resolution Form when the mitigation is performed and complete.

EMPLOYEE NOISE CONTROL PROGRAM

NOISE-3 The project owner shall submit to the CPM for review and approval a noise control program. The noise control program shall be used to reduce employee exposure to high (above permissible) noise levels during construction in accordance to the applicable OSHA and Cal-OSHA standards.

Verification: At least 30 days prior to the start of demolition, the project owner shall submit the noise control program to the CPM. The project owner shall make the program available to Cal-OSHA upon request.

NOISE RESTRICTIONS

NOISE-4 The project design and implementation shall include appropriate noise

mitigation measures adequate to ensure that the operation of the project will not cause the noise levels due to plant operation alone, during the four quietest consecutive hours of the nighttime, to exceed an average of 44 dBA measured at or near monitoring location LT-1 (918 East Sepulveda Boulevard), an average of 45 dBA measured at or near monitoring location LT-2 (Avalon Village), an average of 48 dBA measured at or near monitoring location LT-3 (1260 East 222nd Street), and an average of 40 dBA measured at or near monitoring location ST-2 (as shown in **Noise Figure 2**). Also, the project owner shall ensure that the operation of the project will not cause the noise levels due to plant operation alone, during the daytime hours of 7 a.m. and 10 p.m., to exceed an average of 38 dBA measured at or near monitoring location ST-1 (Stephens Middle School),

No new pure-tone components shall be caused by the project. No single piece of equipment shall be allowed to stand out as a source of noise that draws legitimate complaints.

A. When the project first achieves a sustained output of 90% or greater of rated capacity, the project owner shall conduct a 25-hour community noise survey at monitoring locations LT-1, LT-2, LT-3, or at a closer location acceptable to the CPM. This survey shall include short-term measurements twice during the daytime hours, and a four-hour continuous measurement during the four quietest consecutive hours of the nighttime, at monitoring location ST-2. This survey shall also include continuous measurements from 7 a.m. to 10 p.m. at monitoring location ST-1 (Stephens Middle School).

   Additionally, this survey shall include measurement of one-third octave band sound pressure levels to ensure that no new pure-tone noise components have been caused by the project.

   The measurement of power plant noise for the purposes of demonstrating compliance with this condition of certification may alternatively be made at a location, acceptable to the CPM, closer to the plant (e.g., 400 feet from the plant boundary) and this measured level then mathematically extrapolated to determine the plant noise contribution at the affected residence. The character of the plant noise shall be evaluated at the affected receptor locations to determine the presence of pure tones or other dominant sources of plant noise.

B. If the results from the noise survey indicate that the power plant noise at the affected receptor sites exceeds the above values during the above specified period(s) of time, mitigation measures shall be implemented to reduce noise to a level of compliance with these limits.

C. If the results from the noise survey indicate that pure tones are present, mitigation measures shall be implemented to eliminate the pure tones.

Verification: The survey shall take place within 30 days of the project first achieving a sustained output of 90% or greater of rated capacity. Within 15 days after completing

the survey, the project owner shall submit a summary report of the survey to the CPM. Included in the survey report will be a description of any additional mitigation measures necessary to achieve compliance with the above listed noise limit, and a schedule, subject to CPM approval, for implementing these measures. When these measures are in place, the project owner shall repeat the noise survey.

Within 15 days of completion of the new survey, the project owner shall submit to the CPM a summary report of the new noise survey, performed as described above and showing compliance with this condition.

OCCUPATIONAL NOISE SURVEY

NOISE-5 Following the project's attainment of a sustained output of 90% or greater of its rated capacity, the project owner shall conduct an occupational noise survey to identify any noise hazardous areas in the facility.

The survey shall be conducted by a qualified person in accordance with the provisions of Title 8, California Code of Regulations, sections 5095-5099 (Article 105) and Title 29, Code of Federal Regulations, section 1910.95. The survey results shall be used to determine the magnitude of employee noise exposure.

The project owner shall prepare a report of the survey results and, if necessary, identify proposed mitigation measures to be employed in order to comply with the applicable California and federal regulations.

Verification: Within 30 days after completing the survey, the project owner shall submit the noise survey report to the CPM. The project owner shall make the report available to OSHA and Cal-OSHA upon request.

CONSTRUCTION RESTRICTIONS

NOISE-6 Heavy equipment operation and noisy construction work relating to any project features shall be restricted to the times delineated below, unless a special permit has been issued by the City of Carson:

Mondays through Saturdays:	7 a.m. to 8 p.m.

Haul trucks and other engine-powered equipment shall be equipped with adequate mufflers. Haul trucks shall be operated in accordance with posted speed limits. Truck engine exhaust brake use shall be limited to emergencies.

Verification: Prior to demolition, the project owner shall transmit to the CPM a statement acknowledging that the above restrictions will be observed throughout the construction of the project.

STEAM BLOW RESTRICTIONS

NOISE-7 If a traditional, high-pressure steam blow process is used, the project owner shall equip steam blow piping with a temporary silencer that quiets the noise of steam blows to no greater than 89 dBA measured at a distance of 50 feet. The steam blows shall be conducted between 8:00 a.m. and 5:00 p.m. unless

arranged with the CPM such that offsite impacts would not cause annoyance to noise receptors. If a low-pressure, continuous steam blow process is used, the project owner shall submit to the CPM a description of the process, with expected noise levels and planned hours of steam blow operation.

Verification: At least 15 days prior to the first steam blow, the project owner shall notify all residents and business owners within one mile of the project site. The notification may be in the form of letters, phone calls, fliers, or other effective means as approved by the CPM. The notification shall include a description of the purpose and nature of the steam blow(s), the planned schedule, expected sound levels, and explanation that it is a one-time activity and not part of normal plant operation.

PILE DRIVING MANAGEMENT

NOISE-8 The project owner shall perform pile driving using a quieter process than the traditional pile driving techniques to ensure that noise from these operations does not cause annoyance at monitoring locations LT-1, LT-2, LT-3, ST-1, and ST-2.

Verification: At least 15 days prior to first pile driving, the project owner shall submit to the CPM a description of the pile driving technique to be employed, including calculations showing its projected noise impacts at monitoring locations LT-1, LT-2, LT-3, ST-1, and ST-2.

EXHIBIT 1 - NOISE COMPLAINT RESOLUTION FORM

Watson Cogeneration Steam and Electric Reliability Project (09-AFC-1)
NOISE COMPLAINT LOG NUMBER _____ Complainant's name and address: Phone number: _____
Date complaint received: _____ Time complaint received: _____
Nature of noise complaint:
Definition of problem after investigation by plant personnel: Date complainant first contacted: _____
Initial noise levels at 3 feet from noise source _____ dBA Date: _____ Initial noise levels at complainant's property: _____ dBA Date: _____ Final noise levels at 3 feet from noise source: _____ dBA Date: _____ Final noise levels at complainant's property: _____ dBA Date: _____
Description of corrective measures taken: Complainant's signature: _____ Date: _____
Approximate installed cost of corrective measures: $ _____ Date installation completed: _____ Date first letter sent to complainant: _____ (copy attached) Date final letter sent to complainant: _____ (copy attached)
This information is certified to be correct: Plant Manager's Signature: _____

(Attach additional pages and supporting documentation, as required).

REFERENCES

City of Carson 1995 – Municipal Code, Article V, Chapter 5: Noise Control Ordinance.

City of Carson 2006 – General Plan. Noise Element.

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NOISE APPENDIX A
FUNDAMENTAL CONCEPTS OF COMMUNITY NOISE

To describe noise environments and to assess impacts on noise sensitive area, a frequency weighting measure, which simulates human perception, is customarily used. It has been found that A-weighting of sound intensities best reflects the human ear's reduced sensitivity to low frequencies and correlates well with human perceptions of the annoying aspects of noise. The A-weighted decibel scale (dBA) is cited in most noise criteria. Decibels are logarithmic units that conveniently compare the wide range of sound intensities to which the human ear is sensitive. **Noise Table A1** provides a description of technical terms related to noise.

Noise environments and consequences of human activities are usually well represented by an equivalent A-weighted sound level over a given time period (L_{eq}), or by average day and night A-weighted sound levels with a nighttime weighting of 10 dBA (L_{dn}). Noise levels are generally considered low when ambient levels are below 45 dBA, moderate in the 45 to 60 dBA range, and high above 60 dBA. Outdoor day-night sound levels vary over 50 dBA depending on the specific type of land use. Typical L_{dn} values might be 35 dBA for a wilderness area, 50 dBA for a small town or wooded residential area, 65 to 75 dBA for a major metropolis downtown (e.g., San Francisco), and 80 to 85 dBA near a freeway or airport. Although people often accept the higher levels associated with very noisy urban residential and residential-commercial zones, they nevertheless are considered to be levels of noise adverse to public health.

Various environments can be characterized by noise levels that are generally considered acceptable or unacceptable. Lower levels are expected in rural or suburban areas than what would be expected for commercial or industrial zones. Nighttime ambient levels in urban environments are about seven decibels lower than the corresponding average daytime levels. The day-to-night difference in rural areas away from roads and other human activity can be considerably less. Areas with full-time human occupation that are subject to nighttime noise, which does not decrease relative to daytime levels, are often considered objectionable. Noise levels above 45 dBA at night can result in the onset of sleep interference effects. At 70 dBA, sleep interference effects become considerable (Effects of Noise on People, U.S. Environmental Protection Agency, December 31, 1971).

In order to help the reader understand the concept of noise in decibels (dBA), **Noise Table A2** has been provided to illustrate common noises and their associated sound levels, in dBA.

Noise Table A1
Definition of Some Technical Terms Related to Noise

Terms	Definitions
Decibel, dB	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a Sound Level Meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this testimony are A-weighted.
L_{10}, L_{50}, & L_{90}	The A-weighted noise levels that are exceeded 10%, 50%, and 90% of the time, respectively, during the measurement period. L_{90} is generally taken as the background noise level.
Equivalent Noise Level, L_{eq}	The energy average A-weighted noise level during the Noise Level measurement period.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 4.8 decibels to levels in the evening from 7 p.m. to 10 p.m., and after addition of 10 decibels to sound levels in the night between 10 p.m. and 7 a.m.
Day-Night Level, L_{dn} or DNL	The Average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10 p.m. and 7 a.m.
Ambient Noise Level	The composite of noise from all sources, near and far. The normal or existing level of environmental noise at a given location (often used for an existing or pre-project noise condition for comparison study).
Intrusive Noise	That noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.
Pure Tone	A pure tone is defined by the Model Community Noise Control Ordinance as existing if the one-third octave band sound pressure level in the band with the tone exceeds the arithmetic average of the two contiguous bands by five decibels (dB) for center frequencies of 500 Hz and above, or by 8 dB for center frequencies between 160 Hz and 400 Hz, or by 15 dB for center frequencies less than or equal to 125 Hz.

Source: Guidelines for the Preparation and Content of Noise Elements of the General Plan, Model Community Noise Control Ordinance, California Department of Health Services 1976, 1977.

Noise Table A2
Typical Environmental and Industry Sound Levels

Noise Source (at distance)	A-Weighted Sound Level in Decibels (dBA)	Noise Environment	Subjective Impression
Civil Defense Siren (100')	140-130		Pain Threshold
Jet Takeoff (200')	120		Very Loud
Very Loud Music	110	Rock Music Concert	
Pile Driver (50')	100		
Ambulance Siren (100')	90	Boiler Room	
Freight Cars (50')	85		
Pneumatic Drill (50')	80	Printing Press Kitchen with Garbage Disposal Running	Loud
Freeway (100')	70		Moderately Loud
Vacuum Cleaner (100')	60	Data Processing Center Department Store/Office	
Light Traffic (100')	50	Private Business Office	
Large Transformer (200')	40		Quiet
Soft Whisper (5')	30	Quiet Bedroom	
	20	Recording Studio	
	10		Threshold of Hearing
Source: Handbook of Noise Measurement, Arnold P.G. Peterson, 1980			

Subjective Response to Noise

The adverse effects of noise on people can be classified into three general categories:

- Subjective effects of annoyance, nuisance, dissatisfaction.
- Interference with activities such as speech, sleep, and learning.
- Physiological effects such as anxiety or hearing loss.

The sound levels associated with environmental noise, in almost every case, produce effects only in the first two categories. Workers in industrial plants can experience noise

effects in the last category. There is no completely satisfactory way to measure the subjective effects of noise, or of the corresponding reactions of annoyance and dissatisfaction, primarily because of the wide variation in individual tolerance of noise. One way to determine a person's subjective reaction to a new noise is to compare the level of the existing (background) noise, to which one has become accustomed, with the level of the new noise. In general, the more the level or the tonal variations of a new noise exceed the previously existing ambient noise level or tonal quality, the less acceptable the new noise will be, as judged by the exposed individual.
With regard to increases in A-weighted noise levels, knowledge of the following relationships can be helpful in understanding the significance of human exposure to noise.

6. Except under special conditions, a change in sound level of one dB cannot be perceived.

7. Outside of the laboratory, a three dB change is considered a barely noticeable difference.

8. A change in level of at least five dB is required before any noticeable change in community response would be expected.

9. A ten dB change is subjectively heard as an approximate doubling in loudness and almost always causes an adverse community response. (Kryter, Karl D., The Effects of Noise on Man, 1970).

Combination of Sound Levels

People perceive both the level and frequency of sound in a non-linear way. A doubling of sound energy (for instance, from two identical automobiles passing simultaneously) creates a three dB increase (i.e., the resultant sound level is the sound level from a single passing automobile plus three dB). The rules for decibel addition used in community noise prediction are:

Noise Table A3 Addition of Decibel Values	
When two decibel values differ by:	Add the following amount to the larger value
0 to 1 dB	3 dB
2 to 3 dB	2 dB
4 to 9 dB	1 dB
10 dB or more	0
Figures in this table are accurate to ± 1 dB.	

Source: Architectural Acoustics, M. David Egan, 1988

Sound and Distance

Doubling the distance from a noise source reduces the sound pressure level by six dB. Increasing the distance from a noise source 10 times reduces the sound pressure level by 20 dB.

Worker Protection

OSHA noise regulations are designed to protect workers against the effects of noise exposure, and list permissible noise level exposure as a function of the amount of time to which the worker is exposed:

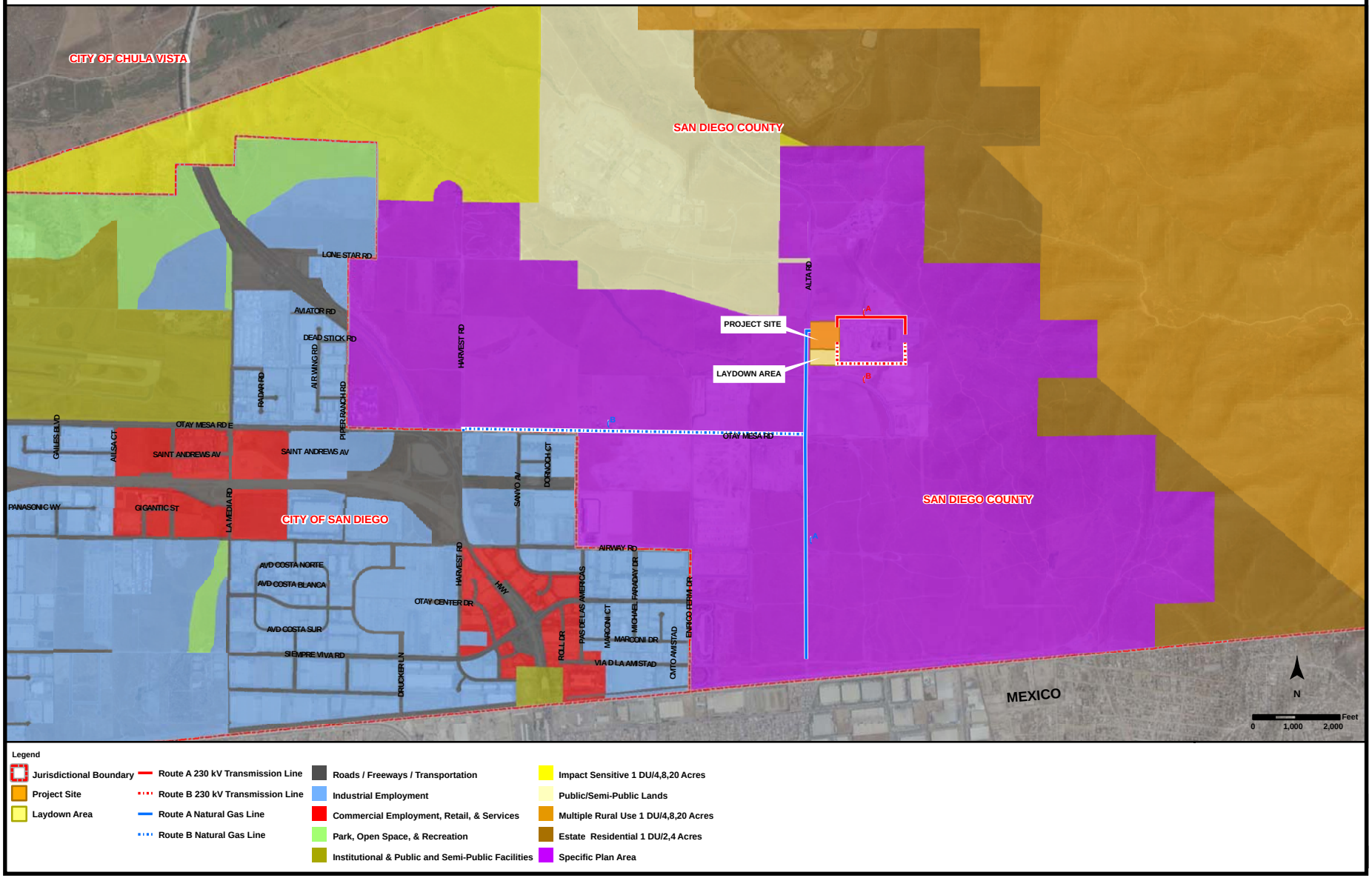
Noise Table A4
OSHA Worker Noise Exposure Standards

Duration of Noise (Hrs/day)	A-Weighted Noise Level (dBA)
8.0	90
6.0	92
4.0	95
3.0	97
2.0	100
1.5	102
1.0	105
0.5	110
0.25	115

Source: 29 C.F.R. § 1910.

NOISE AND VIBRATION - FIGURE 1

Pio Pico Energy Center - Existing Land Use Surrounding Project Site



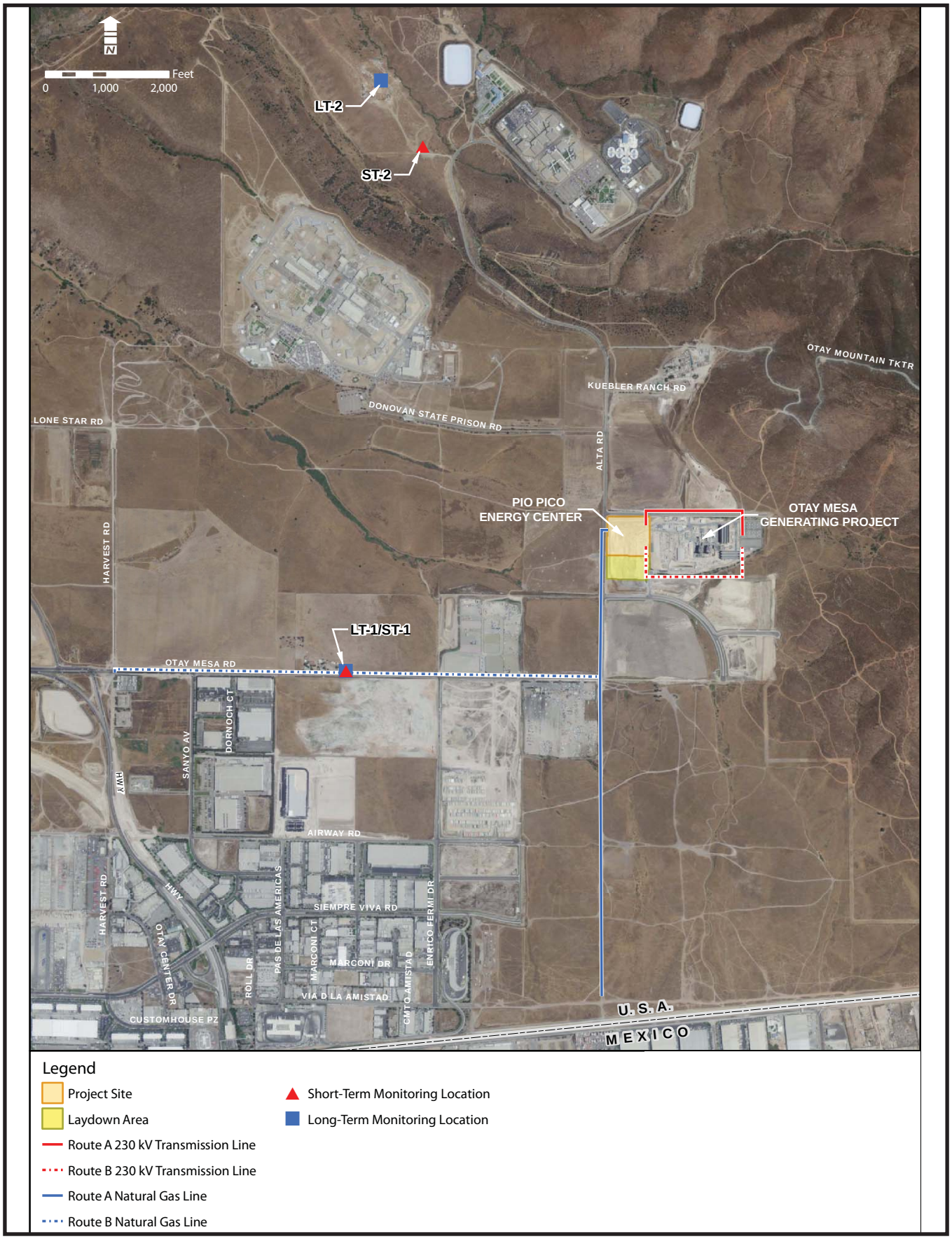
NOISE AND VIBRATION

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: AFC Figure 5.12-2

NOISE AND VIBRATION - FIGURE 2

Pio Pico Energy Center - Ambient Noise Measurement Locations



Legend

- Project Site
- Laydown Area
- Route A 230 kV Transmission Line
- Route B 230 kV Transmission Line
- Route A Natural Gas Line
- Route B Natural Gas Line
- Short-Term Monitoring Location
- Long-Term Monitoring Location

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: AFC Figure 5.12-1

PUBLIC HEALTH

Testimony of Alvin Greenberg, Ph.D.

SUMMARY OF CONCLUSIONS

Staff has analyzed potential public health risks associated with construction and operation of the Watson Cogeneration Steam and Electric Reliability (BP Watson) project and does not expect any significant adverse cancer or short- or long-term noncancer health effects from project toxic emissions. Staff's analysis of potential health impacts from the proposed BP Watson project uses a conservative health-protective methodology that accounts for impacts to the most sensitive individuals in a given population, including newborns and infants. According to the results of staff's health risk assessment, emissions from the proposed project would not contribute significantly to morbidity or mortality in any age or ethnic group residing in the project area. Furthermore, staff also found that the proposed project would not contribute to significant cumulative impacts on public health.

INTRODUCTION

The purpose of this Final Staff Assessment (FSA) is to determine if emissions of toxic air contaminants (TACs) from the proposed Watson Cogeneration and Electric Reliability project (BP Watson) would have the potential to cause significant adverse public health impacts or to violate standards for public health protection. If potentially significant health impacts are identified, staff will evaluate mitigation measures to reduce such impacts to insignificant levels.

California Energy Commission (Energy Commission) staff addresses potential impacts of regulated or criteria air pollutants in the **Air Quality** section of this PSA, and impacts on public and worker health from accidental releases of hazardous materials are examined in the **Hazardous Materials Management** section. Health effects from electromagnetic fields are discussed in the **Transmission Line Safety and Nuisance** section. Pollutants released from the project in wastewater streams to the public sewer system are discussed in the **Soil and Water Resources** section. Plant releases in the form of hazardous and nonhazardous wastes are described in the **Waste Management** section.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Public Health Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
Clean Air Act section 112 (Title 42, U.S. Code section 7412)	The National Emissions Standards for Hazardous Air Pollutants (NESHAP) requires new sources that emit more than 10 tons per year of any specified Hazardous Air Pollutant (HAP) or more than 25 tons per year of any combination of HAPs to apply Maximum Achievable Control Technology.
State	
California Health and Safety Code section 25249.5 et seq. (Proposition 65)	These sections establish thresholds of exposure to carcinogenic substances above which Prop 65 exposure warnings are required.
California Health and Safety Code section 41700	This section states that “no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property.”
California Code of Regulations, Title 22, Section 60306	Requires that whenever a cooling system uses recycled water in conjunction with an air conditioning facility and a cooling tower that creates a mist that could come into contact with employees or members of the public, a drift eliminator shall be used and chlorine, or other, biocides shall be used to treat the cooling system recirculating water to minimize the growth of Legionella and other micro-organisms.
California Public Resource Code section 25523(a); Title 20 California Code of Regulations (CCR) section 1752.5, 2300–2309 and Division 2 Chapter 5, Article 1, Appendix B, Part (1); California Clean Air Act, Health and Safety Code section 39650, et seq.	These regulations require a quantitative health risk assessment for new or modified sources, including power plants that emit one or more toxic air contaminants (TACs).
California Health and Safety Code, Sections 44360 to 44366 (Air Toxic Hot Spots Information and Assessment	Establishes acceptable levels for toxic contaminants based on the results of an Health Risk Assessment (HRA).

Act)	
Local	
South Coast Air Quality Management District (SCAQMD) Rule 1401	This rule discusses the requirements for new source review for air toxics, the use of Best Available Control Technology (BACT) and Toxics-BACT, and the preparation of an HRA.

SETTING

This section describes the environment in the vicinity of the proposed BP Watson project site from the public health perspective. Characteristics of the natural environment, such as meteorology and terrain, affect the project's potential for causing impacts on public health. An emissions plume from a facility may affect elevated areas before lower terrain areas due to a reduced opportunity for atmospheric mixing. Consequently, areas of elevated terrain can often be subjected to increased pollutant impacts. Also, the types of land use near a site influence the surrounding population distribution and density, which, in turn, affect public exposure to project emissions. Additional factors affecting potential public health impacts include existing air quality, existing health concerns, and environmental site contamination.

SITE AND VICINITY DESCRIPTION

The BP Watson project would be located within the site of the existing Watson Cogeneration Facility in the City of Carson, California. Land use at the proposed project site is zoned heavy industrial and heavy manufacturing, while the surrounding area is zoned for a range of industrial, commercial, and residential uses. The immediate vicinity of the BP Watson site is developed with uses such as the BP Carson Refinery and other heavy industrial facilities (Watson 2009a, Section 5.9.1.3). Sensitive receptors and residences in the project vicinity (within a 6-mile radius) are listed in **Appendix O, Table O-6** and shown in **Figure O-1** (Watson 2009a). The nearest sensitive receptor is the Bonita Elementary School, located approximately 1.2 miles (6253 feet) from the BP Watson project site. The nearest residence is located about 0.65 miles (3455 feet) north and the nearest hospital is the Harbor UCLA Center located about 2.9 miles from the BP Watson project site.

The location of elevated terrain (above the stack height of 100 feet) is important in assessing potential exposure, as an emission plume may impact high elevations before impacting lower elevations. The site's elevation is about 32 feet above mean sea level, and the topography of the immediate vicinity is generally flat. The nearest terrain above stack height exists about three miles southwest of the BP Watson project site (Watson 2009a, Section 5.16.1 and Appendix O).

METEOROLOGY

Meteorological conditions, including wind speed, wind direction, and atmospheric stability, affect the extent to which pollutants are dispersed into ambient air as well as the direction of pollutant transport. This, in turn, affects the level of public exposure to emitted pollutants and associated health risks. When wind speeds are low and the

atmosphere is stable, for example, dispersion is reduced, and localized exposure may be increased.

The climate at the BP Watson project site is dominated by the influence of the Pacific Ocean and the Pacific high-pressure system, a semi-permanent, subtropical high-pressure system located off the west coast of the United States. The annual average temperature is 62°F and the majority of the region's annual rainfall occurs between November and April. The region often experiences a shallow marine layer which contributes to relatively high humidity (an average of about 70%). The project's air basin is characterized by strong inversions, light winds, and poor ventilation except for occasional winter storms or strong northeasterly winds known as the "Santa Ana winds." Due to the generally light winds and high frequency of inversions in the region, the potential for air pollution accumulation is high (Watson 2009a, Section 5.2.2.3).

Atmospheric stability is a measure related to turbulence, or the ability of the atmosphere to disperse pollutants due to convective air movement. Mixing heights (the height above ground level through which the air is well mixed and in which pollutants can be dispersed) are lower during mornings due to temperature inversions and increase during the warmer afternoons. Staff's **Air Quality** section presents more detailed meteorological data.

EXISTING AIR QUALITY

The proposed site is within the jurisdiction of the South Coast Air Quality Management District (SCAQMD). By examining average toxic concentration levels from representative air monitoring sites with cancer risk factors specific to each contaminant, lifetime cancer risk can be calculated to provide a background risk level for inhalation of ambient air. For comparison purposes, it should be noted that the overall lifetime cancer risk for the average individual in the United States is about one in three, or 333,000 in one million.

The closest SCAQMD monitoring site that actively reports toxic air contaminants is the North Long Beach Monitoring Station, located approximately five miles east of the project site. This monitoring station provides a good representation of the quality of air at the project site. In 2008, the background cancer risk calculated by California Air Resources Board (ARB) for the North Long Beach site was 110 in one million (ARB 2009). The pollutants 1,3-butadiene and benzene, emitted primarily from mobile sources, were the two highest contributors to risk and together accounted for over half of the total risk. The risk from 1,3-butadiene was about 35 in one million, while the risk from benzene was about 41 in one million. Formaldehyde accounts for about 16% of the 2008 average calculated cancer risk based on air toxics monitoring results, with a risk of about 17 in one million. Formaldehyde is emitted directly from vehicles and other combustion sources, such as the proposed facility. The risk from hexavalent chromium was about eight in one million, or ~7% of the total risk.

The use of reformulated gasoline, beginning in the second quarter of 1996, as well as other toxics reduction measures, have led to a decrease of ambient levels of toxics and associated cancer risk during the past few years in all areas of the state and the nation. For example, in the San Francisco Bay Area, cancer risk was 342 in one million based on 1992 data, 315 in one million based on 1994 data, and 303 in one million based on

1995 data. In 2002, the most recent year for which data is available, the average inhalation cancer risk decreased to 162 in one million (BAAQMD 2004b, p. 12).

EXISTING PUBLIC HEALTH CONCERNS

When evaluating a new project, staff conducts a detailed study and analysis of existing public health issues in the project vicinity. This analysis is prepared in order to identify the current status of respiratory diseases (including asthma), cancer, and childhood mortality rates in the population located near the proposed project. Assessing existing health concerns in the project area will provide staff with a basis on which to evaluate the significance of any additional health impacts from the proposed BP Watson project and evaluate any proposed mitigation.

In response to Data Request #11, the applicant provided a summary of health studies conducted by the SCAQMD in the region including the proposed project (URS 2009b, Appendix B-2). The most recent study is the Multiple Air Toxics Exposure Studies (MATES) III study, conducted between 2004 and 2005, which consisted of measuring TACs throughout the South Coast Air Basin (SCAB) at both fixed and mobile sites. The results of the study found that the average carcinogenic risk from air toxic concentrations in the SCAB is about 1,200 in one million. About 94% of this risk is attributed to mobile source emissions (predominantly diesel PM) and 6% to stationary sources (such as the proposed project). The air toxic concentrations were also compared to their respective chronic reference exposure levels (RELs) to assess noncancer health impacts. All air toxics were found at concentrations below their REL except for formaldehyde.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

The **Public Health** section of this staff assessment discusses toxic emissions to which the public could be exposed during project construction and routine operation. Following the release of toxic contaminants into the air or water, people may come into contact with them through inhalation, dermal contact, or ingestion via contaminated food or water.

Air pollutants for which no ambient air quality standards have been established are called noncriteria pollutants. Unlike criteria pollutants such as ozone, carbon monoxide, sulfur dioxide, or nitrogen dioxide, noncriteria pollutants have no ambient (outdoor) air quality standards that specify levels considered safe for everyone.

Since noncriteria pollutants do not have such standards, a health risk assessment is used to determine if people might be exposed to those types of pollutants at unhealthy levels. The risk assessment consists of the following steps:

- identify the types and amounts of hazardous substances that the BP Watson project could emit to the environment;
- estimate worst-case concentrations of BP Watson project emissions in the environment using dispersion modeling;

- estimate amounts of pollutants that people could be exposed to through inhalation, ingestion, and dermal contact; and
- characterize potential health risks by comparing worst-case exposure to safe standards based on known health effects.

Staff relies upon the expertise of the California Environmental Protection Agency (Cal/EPA) Office of Environmental Health Hazard Assessment (OEHHA) to identify contaminants that are known to the state to cause cancer or other noncancer toxicological endpoints and to calculate the toxicity and cancer potency factors of these contaminants. Staff also relies upon the expertise of the ARB and the local air districts to conduct ambient air monitoring of toxic air contaminants and the state Department of Public Health to conduct epidemiological investigations into the impacts of pollutants on communities. It is not within the purview or the expertise of the Energy Commission staff to duplicate the expertise and statutory responsibility of these agencies.

Initially, a screening level risk assessment is performed using simplified assumptions that are intentionally biased toward protection of public health. That is, an analysis is designed that overestimates public health impacts from exposure to project emissions. In reality, it is likely that the actual risks from the power plant will be much lower than the risks as estimated by the screening level assessment. The risks for screening purposes are based on examining conditions that would lead to the highest, or worst-case, risks and then using those conditions in the study. Such conditions include:

- using the highest levels of pollutants that could be emitted from the plant;
- assuming weather conditions that would lead to the maximum ambient concentration of pollutants;
- using the type of air quality computer model which predicts the greatest plausible impacts;
- calculating health risks at the location where the pollutant concentrations are estimated to be the highest;
- assuming that an individual's exposure to cancer-causing agents occurs continuously for 70 years; and
- using health-based standards designed to protect the most sensitive members of the population (i.e., the young, elderly, and those with respiratory illnesses).

A screening level risk assessment will, at a minimum, include the potential health effects from inhaling hazardous substances. Some facilities may also emit certain substances that could present a health hazard from noninhalation pathways of exposure (OEHHA 2003, Tables 5.1, 6.3, 7.1). When these substances are present in facility emissions, the screening level analysis includes the following additional exposure pathways: soil ingestion, dermal exposure, and mother's milk (OEHHA 2003, p. 5-3).

The risk assessment process addresses three categories of health impacts: acute (short-term) health effects, chronic (long-term) noncancer effects, and cancer risk (also long-term). Acute health effects result from short-term (one-hour) exposure to relatively

high concentrations of pollutants. Acute effects are temporary in nature and include symptoms such as irritation of the eyes, skin, and respiratory tract.

Chronic health effects are those that arise as a result of long-term exposure to lower concentrations of pollutants. The exposure period is considered to be approximately from 12% to 100% of a lifetime, or from 8 to 70 years (OEHHA 2003, p. 6-5). Chronic health effects include diseases such as reduced lung function and heart disease.

The analysis for noncancer health effects compares the maximum project contaminant levels to safe levels called *Reference Exposure Levels*, or RELs. These are amounts of toxic substances to which even sensitive people can be exposed and suffer no adverse health effects (OEHHA 2003, p. 6-2). These exposure levels are designed to protect the most sensitive individuals in the population, such as infants, the aged, and people suffering from illness or disease which makes them more sensitive to the effects of toxic substance exposure. The RELs are based on the most sensitive adverse health effect reported in the medical and toxicological literature and include margins of safety. The margin of safety addresses uncertainties associated with inconclusive scientific and technical information available at the time of standard setting and is meant to provide a reasonable degree of protection against hazards that research has not yet identified. The margin of safety is designed to prevent pollution levels that have been demonstrated to be harmful, as well as to prevent lower pollutant levels that may pose an unacceptable risk of harm, even if the risk is not precisely identified as to nature or degree. Health protection is achieved if the estimated worst-case exposure is below the relevant reference exposure level. In such a case, an adequate margin of safety exists between the predicted exposure and the estimated threshold dose for toxicity.

Exposure to multiple toxic substances may result in health effects that are equal to, less than, or greater than effects resulting from exposure to the individual chemicals. Only a small fraction of the thousands of potential combinations of chemicals have been tested for the health effects of combined exposures. In conformity with the California Air Pollution Control Officers Association (CAPCOA) guidelines, the health risk assessment assumes that the effects of each substance are additive for a given organ system (OEHHA 2003, pp. 1-5, 8-12). Other possible mechanisms due to multiple exposures include those cases where the actions may be synergistic or antagonistic (where the effects are greater or less than the sum, respectively). For these types of substances, the health risk assessment could underestimate or overestimate the risks.

For carcinogenic substances, the health assessment considers the risk of developing cancer and assumes that continuous exposure to the cancer-causing substance occurs over a 70-year lifetime. The risk that is calculated is not meant to project the actual expected incidence of cancer, but rather a theoretical upper-bound number based on worst-case assumptions.

Cancer risk is expressed in chances per million and is a function of the maximum expected pollutant concentration, the probability that a particular pollutant will cause cancer (called *potency factors* and established by OEHHA), and the length of the exposure period. Cancer risks for each carcinogen are added to yield total cancer risk. The conservative nature of the screening assumptions used means that actual cancer risks due to project emissions are likely to be considerably lower than those estimated.

The screening analysis is performed to assess worst-case risks to public health associated with the proposed BP Watson project. If the screening analysis predicts no significant risks, then no further analysis is required. However, if risks are above the significance level, then further analysis, using more realistic site-specific assumptions, would be performed to obtain a more accurate assessment of potential public health risks.

Significance Criteria

Energy Commission staff determines the health effects of exposure to toxic emissions based on impacts to the maximum exposed individual. This is a person hypothetically exposed to project emissions at a location where the highest ambient impacts were calculated using worst-case assumptions, as described above.

As described earlier, noncriteria pollutants are evaluated for short-term (acute) and long-term (chronic) noncancer health effects, as well as cancer (long-term) health effects. The significance of project health impacts is determined separately for each of the three categories.

Acute and Chronic Noncancer Health Effects

Staff assesses the significance of noncancer health effects by calculating a *hazard index*. A hazard index is a ratio comparing exposure from facility emissions to the reference (safe) exposure level. A ratio of less than 1.0 signifies that the worst-case exposure is below the safe level. The hazard index for every toxic substance that has the same type of health effect is added to yield a Total Hazard Index. The Total Hazard Index is calculated separately for acute and chronic effects. A Total Hazard Index of less than 1.0 indicates that cumulative worst-case exposures are less than the reference exposure levels. Under these conditions, health protection from the project is likely to be achieved, even for sensitive members of the population. In such a case, staff presumes that there would be no significant noncancer project-related public health impacts.

Cancer Risk

Staff relied upon regulations implementing the provisions of Proposition 65, the Safe Drinking Water and Toxic Enforcement Act of 1986, (Health & Safety Code, §§25249.5 et seq.) for guidance to determine a cancer risk significance level. Title 22, California Code of Regulations section 12703(b) states that “the risk level which represents no significant risk shall be one which is calculated to result in one excess case of cancer in an exposed population of 100,000, assuming lifetime exposure.” This level of risk is equivalent to a cancer risk of 10 in one million, which is also written as 10×10^{-6}. An important distinction is that the Proposition 65 significance level applies separately to each cancer-causing substance, whereas staff determines significance based on the total risk from all cancer-causing chemicals. Thus, the manner in which the significance level is applied by staff is more conservative (health-protective) than that applied by Proposition 65. The significant risk level of 10 in one million is consistent with the level of significance adopted by many air districts. In general, these air districts would not approve a project with a cancer risk exceeding 10 in one million. The SCAQMD also uses 10 in one million as the level of “Significant Health Risk”.

As noted earlier, the initial risk analysis for a project is typically performed at a screening level, which is designed to overstate actual risks, so that health protection can be ensured. Staff's analysis also addresses potential impacts on all members of the population including the young, the elderly, people with existing medical conditions that may make them more sensitive to the adverse effects of toxic air contaminants, and any minority or low-income populations that are likely to be disproportionately affected by impacts. To accomplish this goal, staff uses the most current acceptable public health exposure levels (both acute and chronic) set to protect the public from the effects of airborne toxics. When a screening analysis shows cancer risks to be above the significance level, refined assumptions would likely result in a lower, more realistic risk estimate. Based on refined assumptions, if risk posed by the facility exceeds the significance level of 10 in one million, staff would require appropriate measures to reduce the risk to less than significant. If, after all risk reduction measures had been considered, a refined analysis identifies a cancer risk greater than 10 in one million, staff would deem such risk to be significant and would not recommend project approval.

DIRECT/INDIRECT IMPACTS AND MITIGATION

CONSTRUCTION IMPACTS AND MITIGATION

Potential risks to public health during construction may be associated with exposure to toxic substances in contaminated soil disturbed during site preparation, as well as diesel exhaust from heavy equipment operation. Criteria pollutant impacts from the operation of heavy equipment and particulate matter from earth moving are examined in staff's **Air Quality** analysis.

Site disturbances occur during facility construction from excavation, grading, and earth moving. Such activities have the potential to adversely affect public health through various mechanisms, such as the creation of airborne dust, material being carried off site through soil erosion, and uncovering buried hazardous substances. The Phase I Environmental Site Assessment conducted for this site in 2008 found several "Recognized Environmental Conditions" (RECs) as per the American Society for Testing and Materials Standards (ASTM) definition. The RECs found include areas with potential subsurface contamination resulting from the site's use as a refinery (Watson 2009a, Appendix A).

In the event that contamination is encountered during construction of the project, proposed Conditions of Certification **WASTE-1** and **WASTE-2** require a registered professional engineer or geologist to be available during soil excavation and grading to ensure proper handling and disposal of contaminated soil. See the staff assessment section on **Waste Management** for a more detailed analysis of this topic.

The operation of construction equipment will result in air emissions from diesel-fueled engines. Diesel emissions are generated from sources such as trucks, graders, cranes, welding machines, electric generators, air compressors, and water pumps. Although diesel exhaust contains criteria pollutants such as nitrogen oxides, carbon monoxide, and sulfur oxides, it also includes a complex mixture of thousands of gases and fine particles. These particles are primarily composed of aggregates of spherical carbon particles coated with organic and inorganic substances. Diesel exhaust contains over 40

substances that are listed by the U.S. Environmental Protection Agency (U.S. EPA) as hazardous air pollutants and by the ARB as toxic air contaminants.

Exposure to diesel exhaust may cause both short- and long-term adverse health effects. Short-term effects can include increased coughing, labored breathing, chest tightness, wheezing, and eye and nasal irritation. Long-term effects can include increased coughing, chronic bronchitis, reductions in lung function, and inflammation of the lung. Epidemiological studies also strongly suggest a causal relationship between occupational diesel exhaust exposure and lung cancer.

Based on a number of health effects studies, the Scientific Review Panel on Toxic Air Contaminants recommended a chronic reference exposure level (see discussion of reference exposure levels in Method of Analysis section above) for diesel exhaust particulate matter of five micrograms of diesel particulate matter per cubic meter of air ($\mu g/m^3$) and a cancer unit risk factor of $3x10^{-4}$ $(\mu g/m^3)^{-1}$ (SRP 1998, p. 6). The Scientific Review Panel did not recommend a value for an acute Reference Exposure Level since available data in support of a value was deemed insufficient. On August 27, 1998, ARB listed particulate emissions from diesel-fueled engines as a toxic air contaminant and approved the panel's recommendations regarding health effect levels.

Appendix I-D of the AFC (Watson 2009a) presents the maximum daily and annual on-site and off-site emissions from construction of all project components (including fugitive dust and equipment exhaust). The total emissions from both on-site and off-site activities estimated by the applicant for the duration of construction (20 months) are 3.4 tons of particulate matter 10 (PM10) (Watson 2009a, Table I-D-3). As noted earlier, assessment of chronic (long-term) health effects assumes continuous exposure to toxic substances over a significantly longer time period, typically from eight to 70 years.

In response to staff's Data Request #13, the applicant has prepared a screening health risks assessment for construction emissions according to methods prescribed by the SCAQMD (URS 2009b, Data Response #13). A lifetime exposure adjustment value of 0.0052 was used in order to scale the exposure to the duration of construction activities (20 months, 1.67 years). A worst case risk was also computed using a lifetime exposure adjustment value of 0.0281 to adjust exposure to nine years, as required by OEHHA guidelines. The cancer risk predicted at the maximum impact receptor (MIR) was calculated to be 0.23 in one million for a 20-month exposure and 1.26 in one million for a nine-year exposure. The chronic hazard index at the MIR was calculated to be 0.000155 for a 20-month exposure and 0.00084 for a nine-year exposure (URS 2009b, Table 13-1). The results of the applicant's HRA indicate that public health impacts from construction activities would be less than significant.
Nevertheless, mitigation measures are proposed by Energy Commission staff to reduce the maximum calculated particulate matter emissions. These include the use of extensive fugitive dust control measures. The fugitive dust control measures are assumed to result in up to a 90% reduction of emissions. Additionally, in order to mitigate potential impacts from particulate emissions during the operation of diesel-powered construction equipment, staff notes that the use of ultra-low sulfur diesel fuel, an oxidation catalyst and soot filters on diesel equipment is required. The catalyzed diesel particulate filters are passive, self-regenerating filters that reduce particulate matter, carbon monoxide, and hydrocarbon emissions through catalytic oxidation and

filtration. The degree of particulate matter reduction is comparable for both mitigationmeasures in the range of approximately 85–92%. Such filters will reduce diesel emissions during construction and reduce any potential for significant health impacts.

OPERATION IMPACTS AND MITIGATION

Emissions Sources

The emissions sources at the proposed BP Watson project include one combustion turbine generator and two cooling tower cells. As noted earlier, the first step in a health risk assessment is to identify potentially toxic compounds that may be emitted from the facility.

AFC Appendix I-A (Watson 2009a) list toxic air contaminants expected to be emitted from all sources listed above as combustion byproducts along with their anticipated amounts (emission factors). Toxic Air Contaminant emission factors were obtained from the Environmental Protection Agency (EPA) AP-42 database of emission factors and from CARB. Table 5.16-4 of the AFC lists toxicity values used to characterize cancer and noncancer health impacts from the BP Watson project pollutants. The toxicity values include Reference Exposure Levels, which are used to calculate short-term and long-term noncancer health effects, and cancer unit risks, which are used to calculate the lifetime risk of developing cancer, as published in the OEHHA Guidelines (OEHHA 2003). **Public Health Table 2** lists the toxic emissions potentially emitted by the BP Watson project and shows how each contributes to the health risk analysis.

Public Health Table 2:
Types of Health Impacts and Exposure Routes Attributed to Toxic Emissions

Substance	Oral Cancer	Oral Noncancer	Inhalation Cancer	Noncancer (Chronic)	Noncancer (Acute)
Acetaldehyde			✔	✔	
Acrolein				✔	✔
Ammonia				✔	✔
Arsenic	✔	✔	✔	✔	✔
Benzene			✔	✔	✔
PAHs			✔		
1,3-Butadiene			✔	✔	
Cadmium			✔	✔	
Chromium VI			✔	✔	
Copper					✔
Cyanide					
Ethylbenzene			✔	✔	✔
Formaldehyde			✔	✔	✔
Hexane				✔	
Lead			✔		
Mercury				✔	✔
Manganese				✔	
Naphthalene		✔	✔	✔	
Nickel			✔	✔	✔
Propylene				✔	
Propylene oxide			✔	✔	✔
Toluene				✔	✔
Xylene				✔	✔

Source: OEHHA 2003, Appendix L and Watson 2009a, Table 5.16-4

Emissions Levels

Once potential emissions are identified, the next step is to quantify them by conducting a “worst case” analysis. Maximum hourly emissions are required to calculate acute (one-hour) noncancer health effects, while estimates of maximum emissions on an annual basis are required to calculate cancer and chronic (long-term) noncancer health effects.

The next step in the health risk assessment process is to estimate the ambient concentrations of toxic substances. This is accomplished by using a screening air dispersion model and assuming conditions that result in maximum impacts. The applicant’s screening analysis was performed using the ARB/OEHHA Hotspots Analysis and Reporting Program (HARP). Ambient concentrations were used in conjunction with Reference Exposure Levels and cancer unit risk factors to estimate health effects that might occur from exposure to facility emissions. Exposure pathways, or ways in which

people might come into contact with toxic substances, include inhalation, dermal (through the skin) absorption, soil ingestion, consumption of locally grown plant foods, and mother's milk.

The above method of assessing health effects is consistent with OEHHA's Air Toxics Hot Spots Program Risk Assessment Guidelines (OEHHA, 2003) referred to earlier and results in the following health risk estimates.

Impacts

The applicant's screening health risk assessment for the BP Watson project including emissions from all sources resulted in an acute Hazard Index (HI) of 0.00288 and a chronic HI of 0.0297 at the location of the maximum impact receptor (MIR), which represents the location with the highest concentration of TACs according to the dispersion modeling. The maximum impact receptors for the acute and chronic HI were located approximately 0.75 miles northwest of the project site (Watson 2009a, Table 5.16-6 and Figure 0-5). As **Public Health Table 3** shows, both acute and chronic hazard indices are less than 1.0, indicating that no short- or long-term adverse health effects are expected.

As shown in **Public Health Table 3**, cancer risk at the maximum impact receptor was calculated by the applicant to be 0.7 in one million (at a location approximately 0.75 miles northwest of the project site).

Public Health Table 3
Operation Hazard/Risk at Maximum Exposed Individual Resident

Type of Hazard/Risk	Hazard Index/Risk	Significance Level	Significant?
Acute Noncancer	0.00288	1.0	No
Chronic Noncancer	0.0297	1.0	No
Individual Cancer	0.7 in a million	10.0 in a million	No

Source: Watson 2009a, Table 5.16-6

Staff conducted a quantitative in-depth evaluation of the risk assessment results presented in the Watson Cogeneration Steam and Electric Reliability Project AFC (09-AFC-01). Also reviewed were the documents "Responses to California Energy Commission Data Request Set 1-39" dated September 2009, "Remainder of Responses to CEC Data Requests #1-39" dated October 2009, and a memo from Gregory Darvin of Atmospheric Dynamics, Inc. dated March 23, 2010. Modeling files provided by the applicant, dated September 2009, were also evaluated.

Construction Phase Analysis

For the construction phase analysis, atmospheric dispersion modeling of diesel particulate matter (DPM) emissions from construction equipment and vehicles was conducted by the applicant using AERMOD (the most recent Cal-EPA and U.S. EPA approved air dispersion model for use in estimating ground level airborne concentrations of toxic air contaminants emitted from a facility an from mobile sources).

Total on-site PM emissions from diesel construction equipment exhaust were estimated by the applicant to be 1,500 lbs over an approximately 20-month construction period (Table I-D-5 of the AFC; Watson 2009a). The corresponding annual DPM emission rate for exhaust emissions from onsite construction equipment and vehicles is 900 lb/yr for residential exposure over a 70 year lifetime.

The maximum predicted offsite concentration of diesel particulate matter, on a 70-year basis, was reported by the applicant to be 0.14936 ug/m^3 (Table 13-1 of URS 2009b). Cancer risk due to diesel exhaust emissions was determined by multiplying the DPM concentration by the diesel cancer inhalation unit risk of 0.0003 (ug/m^3)$^{-1}$ and adjusting by the construction schedule (10 hours/day, 5 days/week, 22 days/month for 20 months or 0.0052). Cancer risk at the location of the maximum offsite concentration was determined to be 0.23 in a million and chronic HI to be 0.00016 (noncancer chronic REL is 5 ug/m^3).

Operations Phase Analysis

For the operations phase analysis, atmospheric dispersion modeling of facility emissions was conducted by the applicant using AERMOD. Local meteorological data were used, building downwash effects were included for 59 buildings, and 9,950 grid receptors were modeled.

The ten emitting units modeled by staff include the following:

- one new combustion turbine generator (CTG), with associated heat recovery steam generator (HRSG)
- two new cells added to the existing cooling tower
- seven cells of the existing cooling tower

In contrast, the applicant added the four existing CTGs of the Watson facility in their analysis. Fuels proposed to be used in the new CTG and duct burners of the HRSG include pipeline specification natural gas, refinery gas, or a mixture of natural gas and refinery gas. The primary fuel for the CTG is 100% natural gas while its secondary fuel is a blend comprised of 65% natural gas and 35% refinery gas. The primary fuel for the HRSG is 100% refinery gas while its secondary fuel is 100% natural gas. In the emissions calculations conducted in the AFC, the highest potential emissions based on either natural gas or refinery gas were used in determining one-hour and average annual emission factors (i.e., for the HRSG, emissions were based on a worst-case assumption of 100% refinery gas; for the CTG, emissions were based on the higher of the emission factors resulting from 100% natural gas or a blend of 65/35 natural/refinery gas).

Staff used the HARP On-Ramp program to load the applicant's AERMOD results into the CARB/OEHHA Hotspots Analysis and Reporting Program (HARP), Version 1.4a for the risk analysis. Exposure pathways assessed include inhalation, ingestion of home-grown produce, dermal absorption, soil ingestion and mother's milk. Emission factors obtained from AFC Appendix I Tables I-A-4, I-A-7a and I-A-7b and from the applicant's modeling files were used in this analysis and are listed in **Public Health Tables 5 and 6**. For risk calculations using the HARP model, the "Derived (Adjusted) Method" was

used for cancer risk and the “Derived (OEHHA) Method” was used for chronic noncancer hazard.

Cancer risk and chronic and acute hazard index values obtained by staff are compared to results reported by the applicant in the September 2009 modeling files in **Public Health Table 7**. Risk and hazard were determined at the point of maximum impact (PMI) under the 70 year residential scenario. In staff’s analysis, 10 sources are evaluated (the new CTG and the new and existing cooling tower cells). In the applicant’s analysis, 14 sources are evaluated (the 10 sources evaluated by staff plus the 4 existing CTGs); staff also reports risk at the PMI from the applicant’s modeling for the 10 sources only. The PMI is located on the western facility fenceline. The nearest residence, located about 3,400 feet north of the facility (north of Highway I-405), nearest school, nearest hospital, nearest church, nearest park and nearest worker were also evaluated.

Public Health Table 8 presents substance- and source-specific cancer risks at the PMI from staff’s modeling. Analysis of this table indicates that 99% of the cancer risk at the PMI is attributed to emissions from the new CTG/HRSG. Additional analysis indicates that 19% of cancer risk at the PMI is attributed to cadmium, 20% from hexavalent chromium, 25% from nickel and 17% from PAHs. **Public Health Table 9** presents a similar analysis of risk reported by the applicant at the PMI.

Public Health Table 5
Operation Phase Annual Emission Rates (lb/yr)

Substance	New CTG/HRSG	Existing CTGs (each of 4 units)	New Cooling Tower Cells (each of 2 cells)	Existing Cooling Tower (each of 7 cells)
Annual Emissions (lb/yr)				
Cr(VI)	1.02E+00	1.02E+00		
Antimony	1.97E-01	1.97E-01		
Barium	1.94E+01	1.94E+01	1.51E-01	8.25E-04
Benzene	1.33E+03	1.33E+03		
Beryllium	6.72E+00	6.72E+00		
1,3-Butadiene	1.15E+00	1.15E+00		
Cadmium	3.14E+01	3.14E+01	1.02E-01	5.58E-04
Cobalt	7.82E-01	7.82E-01		
Copper	1.97E+02	1.97E+02	1.02E-01	5.58E-04
Ethyl Benzene	1.62E+02	1.62E+02		
Formaldehyde	6.62E+03	6.62E+03		
Hexane	1.31E+01	1.31E+01		
Naphthalene	1.58E+01	1.58E+01		
PAHs	3.78E+00	3.78E+00		
Lead	1.28E+02	1.28E+02	2.04E-01	1.12E-03
Manganese	5.46E+02	5.46E+02	1.02E-01	5.58E-04
Nickel	7.16E+02	7.16E+02	1.02E-01	5.58E-04
Propylene	6.98E+03	6.98E+03		
Propylene Oxide	2.68E+02	2.68E+02		
Selenium	2.42E+01	2.42E+01		
Silver	4.08E-01	4.08E-01		
Thallium	9.86E-02	9.86E-02		
Toluene	6.98E+03	6.98E+03		
Vanadium	8.78E+00	8.78E+00	1.02E-01	5.58E-04
Xylenes	9.54E+03	9.54E+03		
Zinc	1.35E+04	1.35E+04	1.02E-01	5.58E-04
H2S	1.57E+03	1.57E+03		
Acetaldehyde	3.84E+02	3.84E+02		
Acrolein	5.90E+01	5.90E+01		
Ammonia	6.84E+04	6.84E+04	1.83E-02	1.00E-04
Arsenic	2.96E+00	2.96E+00		
Chromium	7.18E-01	7.18E-01	1.02E-01	5.58E-04
Aluminum			2.04E-01	1.12E-03
Mercury	6.54E+01	6.54E+01		

Source: Applicant's modeling files dated September 2009

Public Health Table 6
Operation Phase Annual Emission Rates (lb/hr)

Substance	New CTG/HRSG	Existing CTGs (each of 4 units)	New Cooling Tower Cells (each of 2 cells)	Existing Cooling Tower (each of 7 cells)
Annual Emissions (lb/hr)				
Cr(VI)	1.16E-04	1.16E-04		
Antimony	2.25E-05	2.25E-05		
Barium	2.21E-03	2.21E-03	1.72E-05	3.44E-05
Benzene	1.52E-01	1.52E-01		
Beryllium	7.67E-04	7.67E-04		
1,3-Butadiene	1.31E-04	1.31E-04		
Cadmium	3.59E-03	3.59E-03	1.16E-05	2.32E-05
Cobalt	8.93E-05	8.93E-05		
Copper	2.25E-02	2.25E-02	1.16E-05	2.32E-05
Ethyl Benzene	1.85E-02	1.85E-02		
Formaldehyde	7.55E-01	7.55E-01		
Hexane	1.50E-03	1.50E-03		
Naphthalene	1.81E-03	1.81E-03		
PAHs-w/o	4.32E-04	4.32E-04		
Lead	1.47E-02	1.47E-02	2.33E-05	4.65E-05
Manganese	6.23E-02	6.23E-02	1.16E-05	2.32E-05
Nickel	8.17E-02	8.17E-02	1.16E-05	2.32E-05
Propylene	7.97E-01	7.97E-01		
Propylene Oxide	3.06E-02	3.06E-02		
Selenium	2.77E-03	2.77E-03		
Silver	4.66E-05	4.66E-05		
Thallium	1.13E-05	1.13E-05		
Toluene	7.97E-01	7.97E-01		
Vanadium	1.00E-03	1.00E-03	1.16E-05	2.32E-05
Xylenes	1.09E+00	1.09E+00		
Zinc	1.54E+00	1.54E+00	1.16E-05	2.32E-05
H2S	1.79E-01	1.79E-01		
Acetaldehyde	4.39E-02	4.39E-02		
Acrolein	6.75E-03	6.75E-03		
NH3	7.80E+00	7.80E+00	2.09E-06	4.18E-06
Arsenic	3.38E-04	3.38E-04		
Chromium	8.20E-05	8.20E-05	1.16E-05	2.32E-05
Aluminum			2.33E-05	4.65E-05
Mercury	7.46E-03	7.46E-03		

Source: Applicant's modeling files dated September 2009

Public Health Table 7
Results of Staff's Analysis and the Applicant's Analysis for Cancer Risk and Chronic and Acute Hazard

	Staff's Analysis (10 sources)[1]			Applicant's Analysis (14 sources)[2]		
	Cancer Risk (per million)	Chronic HI	Acute HI	Cancer Risk (per million)	Chronic HI	Acute HI
PMI	0.79	0.030	0.0028	3.8 *for 14 sources* 0.72 *for 10 sources*	0.104	0.038
MEIR	0.46	0.017	0.0015	2.4	0.066	0.021
MEIW	0.06	0.011	0.0027	0.90	0.024	0.036
Nearest school	0.10	0.0037	0.0015	0.27	0.0074	0.023
Nearest hospital	0.089	0.0033	0.0018	0.20	0.0053	0.029
Nearest church	0.10	0.0038	0.0017	0.24	0.0066	0.023
Nearest park	0.11	0.0040	0.0016	0.36	0.0098	0.024

Note:
PMI = point of maximum impact (or maximally impacted receptor, MIR); the PMI for cancer risk and chronic hazard index is located on the facility fenceline, Receptor #9889 in staff's modeling and #9882 in the applicant's modeling
MEIR = maximally exposed individual, residential is located approximately 3,400 feet north of the facility (north of Highway I-405); Receptor #1171
MEIW = maximally exposed individual, worker is located approximately 1,000 feet west of the facility; Receptor #1012; evaluated under the worker exposure scenario in staff's analysis and under the 70 year residential scenario in applicant's analysis
Nearest school = located approximately 6,400 feet northwest of the project site; Rec #499
Nearest hospital = located approximately 15,000 feet east of the project site; Rec #8122
Nearest church = located approximately 7,530 feet northwest of the project site; Rec #346
Nearest park = located approximately 5,700 feet northwest of the project site; Rec #701

[1] Staff's analysis included 10 sources for the proposed project: the new CTG, two new cooling tower cells and the existing seven cooling tower cells

[2] Applicant's analysis included 14 sources for the proposed project: the new CTG, four existing CTGs, two new cooling tower cells and the existing 7 cooling tower cells. In addition to the applicant's results for the PMI, staff analyzed the applicant's results and determined risk for the 10 sources only

Public Health Table 8
Results of Staff's Analysis: Contribution to Total Cancer Risk by Individual Substances from All Sources at the Point of Maximum Impact (PMI)

Substance	New CTG/HRSG	New Cooling Tower Cells (2 cells)	Existing Cooling Tower (7 cells)	**Total Risk**
Cr(VI)	1.56E-07			1.56E-07
Benzene	3.99E-08			3.99E-08
Beryllium	1.69E-08			1.69E-08
1,3-Butadiene	2.07E-10			2.07E-10
Cadmium	1.41E-07	1.60E-10	8.51E-09	1.50E-07
Ethyl Benzene	4.23E-10			4.23E-10
Formaldehyde	4.17E-08			4.17E-08
Naphthalene	5.69E-10			5.69E-10
PAHs-w/o	1.32E-07			1.32E-07
Lead	6.75E-09	3.76E-12	1.99E-10	6.95E-09
Nickel	1.95E-07	9.66E-12	5.16E-10	1.96E-07
Propylene Oxide	1.04E-09			1.04E-09
Acetaldehyde	1.15E-09			1.15E-09
Arsenic	5.08E-08			5.08E-08
SUM	7.84E-07	1.73E-10	9.22E-09	7.93E-07

Public Health Table 9.
Contribution to Total Cancer Risk by Individual Substances from All Sources at the PMI (Applicant's modeling)

Substance	New CTG/HRSG	New Cooling Tower Cells (2 cells)	Existing Cooling Tower (7 cells)	Existing CTGs (4 units)	Total Risk
Cr(VI)	1.41E-07			6.18E-07	7.59E-07
Benzene	3.62E-08			1.58E-07	1.94E-07
Beryllium	1.53E-08			6.70E-08	8.23E-08
1,3-Butadiene	1.88E-10			8.20E-10	1.01E-09
Cadmium	1.28E-07	1.80E-10	9.73E-09	5.59E-07	6.97E-07
Ethyl Benzene	3.83E-10			1.67E-09	2.06E-09
Formaldehyde	3.78E-08			1.65E-07	2.03E-07
Naphthalene	5.15E-10			2.25E-09	2.77E-09
PAHs-w/o	1.19E-07			5.21E-07	6.40E-07
Lead	6.12E-09	4.24E-12	2.29E-10	2.67E-08	3.31E-08
Nickel	1.77E-07	1.09E-11	5.90E-10	7.74E-07	9.52E-07
Propylene Oxide	9.47E-10			4.14E-09	5.08E-09
Acetaldehyde	1.04E-09			4.56E-09	5.60E-09
Arsenic	4.61E-08			2.01E-07	2.48E-07
SUM	7.10E-07	1.95E-10	1.06E-08	3.10E-06	3.82E-06

Source: Applicant's modeling files dated September 2009

The maximum cancer risk for operations emissions from the proposed project (as calculated by staff) at the point of maximum impact is 0.79 in 1,000,000, which is well below the level of significance. Similarly, the maximum chronic HI calculated by staff is 0.03 and the maximum acute HI is 0.0028. Staff also modeled several sensitive receptor locations and residential areas. All risks and hazards are well below the level of significance. Therefore, staff concludes that the proposed project would not contribute to a significant public health impact.

Cooling Tower

In addition to being a source of potential toxic air contaminants, the possibility exists for bacterial growth to occur in the cooling tower, including Legionella. Legionella is a bacterium that is ubiquitous in natural aquatic environments and is also widely distributed in man-made water systems. It is the principal cause of legionellosis, otherwise known as Legionnaires' Disease, which is similar to pneumonia. Transmission to people results mainly from inhalation or aspiration of aerosolized contaminated water. Untreated or inadequately treated cooling systems, such as industrial cooling towers and building heating, ventilating, and air conditioning systems, have been correlated with outbreaks of legionellosis.

Legionella can grow symbiotically with other bacteria and can infect protozoan hosts. This provides Legionella with protection from adverse environmental conditions,

including making it more resistant to water treatment with chlorine, biocides, and other disinfectants. Thus, if not properly maintained, cooling water systems and their components can amplify and disseminate aerosols containing Legionella.

As noted in the LORS section above, the State of California regulates recycled water for use in cooling towers in Title 22, Section 60303, California Code of Regulations. This section requires that, in order to protect workers and the public who may come into contact with cooling tower mists, chlorine or another biocide must be used to treat the cooling system water to minimize the growth of Legionella and other micro-organisms. This regulation applies to the BP Watson project since it intends to use recycled water provided by the West Basin Water Treatment Plant for cooling (Watson 2009a, Section 3.4.8).

The U.S. EPA published an extensive review of Legionella in a human health criteria document (EPA 1999). The U.S. EPA noted that Legionella may propagate in biofilms (collections of microorganisms surrounded by slime they secrete, attached to either inert or living surfaces) and that aerosol-generating systems such as cooling towers can aid in the transmission of Legionella from water to air. The U.S. EPA has inadequate quantitative data on the infectivity of Legionella in humans to prepare a dose-response evaluation. Therefore, sufficient information is not available to support a quantitative characterization of the threshold infective dose of Legionella. Thus, the presence of even small numbers of Legionella bacteria presents a risk - however small - of disease in humans.

In February of 2000 the Cooling Technology Institute (CTI) issued its own report and guidelines for the best practices for control of Legionella (CTI 2000). The CTI found that 40-60% of industrial cooling towers tested were found to contain Legionella. More recently, staff has received a 2005 report of testing in cooling towers in Australia that found the rate of Legionella presence in cooling tower waters to be extremely low, approximately three to six percent. The cooling towers all had implemented aggressive water treatment and biocide application programs similar to that required by proposed Condition of Certification **PUBLIC HEALTH-1**.

To minimize the risk from Legionella, the CTI noted that consensus recommendations included minimization of water stagnation, minimization of process leads into the cooling system that provide nutrients for bacteria, maintenance of overall system cleanliness, the application of scale and corrosion inhibitors as appropriate, the use of high-efficiency mist eliminators on cooling towers, and the overall general control of microbiological populations.

Good preventive maintenance is very important in the efficient operation of cooling towers and other evaporative equipment (ASHRAE 1998). Preventive maintenance includes having effective drift eliminators, periodically cleaning the system if appropriate, maintaining mechanical components in working order, and maintaining an effective water treatment program with appropriate biocide concentrations. Staff notes that most water treatment programs are designed to minimize scale, corrosion, and biofouling and not to control Legionella.

The efficacy of any biocide in ensuring that bacterial and in particular Legionella growth,

is kept to a minimum is contingent upon a number of factors including but not limited to proper dosage amounts, appropriate application procedures and effective monitoring.

In order to ensure that Legionella growth is kept to a minimum, thereby protecting both nearby workers as well as members of the public, staff has proposed Condition of Certification **PUBLIC HEALTH-1**. The condition would require the project owner to prepare and implement a biocide and anti-biofilm agent monitoring program to ensure that proper levels of biocide and other agents are maintained within the cooling tower water at all times, that periodic measurements of Legionella levels are conducted, and that periodic cleaning is conducted to remove bio-film buildup. Staff believes that with the use of an aggressive antibacterial program coupled with routine monitoring and biofilm removal, the chances of Legionella growing and dispersing would be reduced to insignificance. The applicant has stated that an appropriate biocide program and anti-biofilm agent monitoring program would be implemented for the entire cooling tower, including the two new cells proposed for this project (Watson 2009a, Section 5.16.1.9).

CUMULATIVE IMPACTS

Cumulative impacts of the proposed BP Watson project and other projects within a six-mile radius were not evaluated by the applicant in the AFC. However, in response to staff's data requests, the applicant provided an analysis combining the most recent HRA prepared in September 2009 for the entire BP Carson Refinery, which included emissions from the existing Watson Cogeneration Facility but not from the proposed project. [This comprehensive HRA was submitted to the South Coast Air Quality Management District for review and thus staff considers this HRA to be an unapproved draft.] The applicant then combined those risks with the results of their project HRA (URS 2009e, Data Response #12).

Combining the data from the applicant's facility HRA and the Watson Co-gen HRA resulted in an acute Hazard Index (HI) of 0.04, a chronic HI of 0.15, and a cancer risk of 8.7 in one million at the location of the Maximum Exposed Individual Resident (MEIR). The Refinery HRA estimated a cancer risk of 20.9 in one million at the refinery point of maximum impact (at the southern refinery fenceline); however this area contains heavy industry and was not considered by the applicant to be a reasonable location for modeling a 70-year residential exposure. The refinery HRA also found cancer risks ranging from 10 to 20 in one million at offsite receptors that are mostly worker locations. When modeling was adjusted by the applicant to reflect worker exposure, the risks at these locations fell below 10 in one million, the level of significant risk. This adjustment was performed for the refinery's Maximum Impacted Receptor (MIR), resulting in a cumulative acute HI of 0.0.043, chronic HI of 0.18, and cancer risk of 4.3 in one million at the MIR (URS 2009e, Data Response #12).

When staff conducted its cumulative assessment, staff examined existing and proposed future sources of TACs located within a few blocks of the proposed project. Staff has found through numerous air dispersion modeling efforts for past projects that unless sources of TAC emissions are located extremely close to each other – within a block or two – the plumes will not combine to produce a significant cumulative impact where no significant individual project impact exists. Staff determined that the only sources of TAC emissions that could potentially combine with emissions from the proposed project

to produce a significant cumulative impact would be the existing Watson Cogeneration facility and the entire BP Carson refinery.

Staff assessed cumulative impacts from the existing Watson cogeneration and refinery facility and the proposed expansion at both the location of the PMI for the existing facility and at the location of the PMI for the proposed project. Staff determined that risk due to project expansion at the location of the refinery PMI would be approximately 0.25 per million under the 70-year residential exposure scenario which does not represent a significant increase in the existing risk due to existing refinery operations. Cumulative risk at the location of the project expansion PMI, which is located on the western facility fenceline, was determined to be 4.4 in a million (3.6 in a million due to refinery emissions plus 0.79 in a million derived by staff due to project expansion emissions). Results of staff's cumulative impacts analysis are presented in **Public Health Table 10**.

Public Health Table 10
Results of Staff's Cumulative Impacts Analysis

Receptor	Cancer Risk (per million)
Refinery PMI *(located at southern fenceline, 70 year exposure scenario)*	
Refinery emissions	20.9
Expansion emissions	0.25
Cumulative risk	21.1
Expansion PMI *(located at western fenceline, 70 year exposure scenario)*	
Refinery emissions	3.6
Expansion emissions	0.79
Cumulative risk	4.4

The maximum cancer risk for operations emissions from the proposed project (as calculated by staff) is 0.79 in 1,000,000, which is well below the level of significance. And, as described above, the contribution of the project to both cancer risk and chronic and acute noncancer disease are comparatively very small. Staff therefore concludes that the proposed project would not contribute to significant cumulative impacts on public health.

COMPLIANCE WITH LORS

Staff has considered the minority population as identified in **Socioeconomics Figure 1** in its impact analysis and has found no potential significant adverse impacts for any

receptors, including environmental justice populations. In arriving at this conclusion, staff notes that its analysis complies with all directives and guidelines from the Cal/EPA Office of Environmental Health Hazard Assessment and the California Air Resources Board. Staff's assessment is biased toward the protection of public health and takes into account the most sensitive individuals in the population. Using extremely conservative (health-protective) exposure and toxicity assumptions, staff's analysis demonstrates that members of the public potentially exposed to toxic air contaminant emissions of this project—including sensitive receptors such as the elderly, infants, and people with pre-existing medical conditions—will not experience any acute or chronic significant health risk or any significant cancer risk as a result of that exposure. Staff believes that it incorporated every conservative assumption called for by state and federal agencies responsible for establishing methods for analyzing public health impacts. The results of that analysis indicate that there would be no direct or cumulative significant public health impact to any population in the area. Therefore, given the absence of any significant health impacts, there are no disparate health impacts and there are no environmental justice issues associated with public health.

Staff concludes that construction and operation of the BP Watson project will be in compliance with all applicable LORS regarding long-term and short-term project impacts in the area of public health.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No comments were received from the public, local government, or agencies on the topic of public health other than those contained in the Final Determination of Compliance (FDOC) issued by the South Coast AQMD (SCAQMD 2011). In the FDOC, the SCAQMD stated that the health risk assessment (HRA) prepared by the applicant was consistent with the SCAQMD HRA procedures and that it showed that the cancer risk and non-cancer hazard index at the maximally exposed residential receptor was below the regulatory threshold. The SCAQMD also found that the new gas turbine equipped with an oxidation catalyst meets the T-BACT standard (the Best Available Control Technology for toxics). Additionally, while the FDOC did not contain a requirement for source testing for Toxic Air Contaminants, it did include a number of requirements to ensure that refinery gas and fuel gas used as fuel for the turbine does not contain high levels of sulfur or hydrogen sulfide (Conditions B61.1, B61.2, B61.3, B61.4, B61.X1, and B61.X2) and also included requirements for analyzing for sulfur and hydrogen sulfide in the fuel gas (Conditions D90.3, D90.4, and D90.17).

CONCLUSIONS

Staff has analyzed potential public health risks associated with construction and operation of the BP Watson project and does not expect any significant adverse cancer, short-term, or long-term health effects to any members of the public, including low income and minority populations, from project toxic emissions. Staff also concludes that its analysis of potential health impacts from the proposed project uses a conservative health-protective methodology that accounts for impacts to the most sensitive individuals in a given population, including newborns and infants. According to the results of staff's health risk assessment, emissions from the project would not contribute

significantly or cumulatively to morbidity or mortality in any age or ethnic group residing in the project area.

PROPOSED CONDITIONS OF CERTIFICATION

Public Health-1 The project owner shall develop and implement a Cooling Water Management Plan to ensure that the potential for bacterial growth in cooling water is kept to a minimum. The plan shall be consistent with either staff's "Cooling Water Management Program Guidelines" or with the Cooling Technology Institute's "Best Practices for Control of Legionella" guidelines. In either case, the Plan must include sampling and testing for the presence of Legionella bacteria at least every six months. After two years of power plant operations, the project owner may ask the Compliance Project Manager (CPM) to re-evaluate and revise the Legionella bacteria testing requirement.

Verification: At least 60 days prior to the commencement of cooling tower operations, the Cooling Water Management Plan shall be provided to the CPM for review and approval.

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SOCIOECONOMICS

Testimony of Kristin Ford

SUMMARY OF CONCLUSIONS

California Energy Commission staff (hereafter referred to as staff) concludes that construction and operation of the Watson Cogeneration Steam and Electric Reliability Project (BP Watson) would not cause significant direct, indirect, or cumulative adverse socioeconomic impacts on the study area's housing, schools, law enforcement, and parks.

Staff considered the demographic screening of minority population and below-poverty-level within six miles of the proposed project. Staff concludes that the proposed project would not result in adverse direct, indirect, or cumulative socioeconomics impacts to environmental justice populations. Staff also concludes that the project would not induce substantial growth or concentration of population, result in substantial increases in demand for housing or public services, or displace a large number of people.

INTRODUCTION

Staff's socioeconomics impact analysis evaluates the project's induced changes on existing population and employment patterns, and community services. Staff discusses the estimated impacts of the construction and operation of the BP Watson Application for Certification (AFC) on local communities, community resources, and public services, and provides a discussion of the estimated beneficial economic impacts of the construction and operation of the proposed project.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Socioeconomics Table 1 contains socioeconomics laws, ordinances, regulations, and standards (LORS) applicable to the proposed project.

Socioeconomics Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

California Education Code, Section 17620	The governing board of any school district is authorized to levy a fee, charge, dedication, or other requirement for the purpose of funding the construction or reconstruction of school facilities.
California Government Code, Sections 65996-65997	Except for a fee, charge, dedication, or other requirement authorized under Section 17620 of the Education Code, state and local public agencies may not impose fees, charges, or other financial requirements to offset the cost for school facilities.

SETTING

The BP Watson plant site is located in the City of Carson, approximately 0.7 mile south of the 405 Freeway, in Southern California. The proposed project is a 2.5-acre brown field site located within the boundary of the existing Watson Cogeneration Facility, which is a 21.7-acre area within the 428-acre parcel. The project address is 1801 Sepulveda Boulevard, Carson, California. The proposed plant site is bound by East 223rd Street to the north, Wilmington Avenue to the west, East Sepulveda Boulevard to the south, and South Alameda Street to the east. The project is owned by the Watson Cogeneration Company and would be operated by BP West Coast Products, LLC – BP Carson Refinery. The project area is surrounded by existing refineries and industrial facilities (Watson 2009a, p.1-2).

The City of Carson is located approximately 16 miles south of downtown Los Angeles. Carson is bordered to the east by the city of Long Beach and of Los Angeles, to the west by the City of Torrance and to the south by the Los Angeles Harbor (Watson 2009a, p.5.9-1). The closest residential neighborhood exists approximately 3,000 feet from the project site (Watson 2009a, p.5.9-7).

DEMOGRAPHIC SCREENING

Energy Commission staff's demographic screening is designed to determine the existence of a minority or below-poverty-level population or both within a six-mile area of the proposed project site. The demographic screening process is based on information contained in two documents: *Environmental Justice: Guidance Under the National Environmental Policy Act* (Council on Environmental Quality, 1997) and *Final Guidance for Incorporating Environmental Justice Concerns in EPA's Compliance Analyses National* (Council on Environmental Quality, 1998).

Since the publication of the Preliminary Staff Assessment, 2010 U.S. Census data has been released for minority populations. **Socioeconomics Figure 1** has been updated to include the 2010 Census minority population within the 6-mile radius. The screening process for the below-poverty level populations relies on the 2000 U.S. Census data.

Minority Populations

According to *Environmental Justice: Guidance Under the National Environmental Policy Act*, minority individuals are defined as members of the following groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. A minority population is identified when the minority population of the potentially affected area is greater than 50% or meaningfully greater than the percentage of the minority population in the general population or other appropriate unit of geographical analysis.

For the BP Watson project, the total population within the six-mile radius of the proposed site is 778,090 persons, and the total minority population is 646,789 persons or 83.12% of the total population (see **Socioeconomics Figure 1**).

Below-Poverty-Level Populations

California Energy Commission staff also identified the below-poverty-level population based on Year 2000 U.S. Census block group data within a six-mile radius of the project site (2010 census block group data was not yet available). Based on the U.S. Census definition, poverty status excludes institutionalized people, people in military quarters, people in college dormitories, and unrelated individuals under 15 years old. The below-poverty-level population within a six-mile radius of the BP Watson project consists of 161,414 people or 21.37% of the total population in that area.

Staff has reviewed the **Socioeconomics Figure 1** which shows the environmental justice population is greater than fifty percent within a six-mile radius of the proposed BP Watson project. Staff in the Executive Summary and the technical areas of Air Quality, Hazardous Materials, Land Use, Noise, Public Health, Soils and Water, Traffic/Transportation, Transmission Line Safety/Nuisance, Visual Resources, and Waste Management has considered environmental justice in their environmental impact analyses.

Staff has not identified any significant, adverse, direct, or cumulative socioeconomic impacts from the construction or operation of the proposed project. There are no environmental justice issues related to this project and no minority or low-income populations would be significantly or adversely impacted.

ASSESSMENT OF IMPACTS

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

The socioeconomic resource areas evaluated by staff are based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines and shown in **Socioeconomics Table 2**. Staff's assessment of impacts on population, housing, emergency medical services, police protection, schools, and parks and recreation, are based on professional judgments, input from local and state agencies, and the industry-accepted two-hour commute range for construction workers. Typically, substantial long-term relocation due to employment of people from regions outside the study area would have the potential to result in significant adverse socioeconomic impacts. Criteria for subject areas such as utilities, fire protection, water supply, and wastewater disposal are analyzed in the **Reliability**, **Worker Safety and Fire Protection**, and **Water Resources** sections of this document.

Socioeconomics Table 2
CEQA Environmental Checklist Form

	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
POPULATION AND HOUSING — Would the project:				
A. Induce substantial population growth in a new area, either directly or indirectly.				X
B. Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				X
C. Displace substantial numbers of people, necessitating construction of replacement housing elsewhere?				X
PUBLIC SERVICES —Would the project:				
D. Result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities, need for new of physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services: Emergency medical services Police protection Schools Parks				 X X X X
RECREATION—Would the project:				
Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?				X
Include recreational facilities or require				X

the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?				

DIRECT/INDIRECT/INDUCED IMPACTS

Induce Substantial Population Growth

For the purpose of this analysis, staff defines "induce substantial population growth" as workers permanently moving into the project area because of project construction and operation, thereby encouraging construction of new homes or extension of roads or other infrastructure. To determine whether the project would induce population growth, staff analyzes the availability of the local workforce and the population within the region. Staff defines "local workforce" as the Los Angeles County Statistical Area (MSA). The proposed project is neighbored by Kern, Orange, San Bernardino, and Ventura Counties. **Socioeconomics Table 3** shows the historical and projected populations of the study area.

Socioeconomics Table 3
Historical and Projected Populations

Area	**2000 Population**	**2008 Population**	**2020 Population**
City of Carson	89,730	97,960	N/A
Los Angeles County	9,519,330	10,363,850	11,214,237
Kern County	661,653	817,517	1,086,113
Orange County	2,846,289	3,121,251	3,520,265
San Bernardino County	1,710,139	2,055,766	2,581,371
Ventura County	753,197	831,587	956,392
Source: AFC, Table 5.10-12, BP Watson, 2009			

Socioeconomics Tables 4 and 5 show that the total labor by skill for the Los Angeles, Kern, Orange, San Bernardino, and Ventura Counties MSAs would be more than adequate to provide construction labor for the proposed project.

Socioeconomics Table 4
Total Labor by Skill in
MSA Annual Average for 2016

Discipline	Los Angeles County MSA Annual Average Employment	Peak # of Workers for Project Construction by Craft
Maintenance Supervisor	16,440	1
Carpenter	30,050	6
Electricians	13,700	9
Piledriver	150	1
Ironworkers	770	6
Laborer	9,500	7
Cement Mason	4,530	2
Operator	4,780	7
Pipefitter	12,900	28
Boilermakers	820	15
Teamster[1]	37,110	1
Millwright	210	1
Insulation/Sheetmetal/Painter	810	12
Surveyors	7,030	2
Management	5,180	18

[1] The Occupational Employment Projection does not have a title for Teamsters. The closest related title is "Truck Driver, Heavy and Tractor Trailer.

As stated in the AFC, the applicant expects project construction to begin in May 2010 and last over a 26 - month period. Should project construction begin the first month after project certification, the construction period is still expected to occur over 26 months. The greatest number of construction workers (peak) would occur in the 12th month of construction. The number of construction workers would range from about one in the last month of construction to approximately 80 workers at peak construction. The average workers per month would be 41 persons during construction (Watson 2009a, p.5.10-30).

Project operation would not require additional full-time employees at the BP Watson plant site (Watson 2009a, p.5.10-30). The operation workers would commute to the project site from Los Angeles County and the surrounding communities of Ventura, Kern, San Bernardino and Orange County.

Staff concludes that because of the availability of a local workforce, the construction and operation workforce would not induce substantial growth or concentration of population, and the BP Watson project would not cause people to permanently move to the area. The proposed project would have no direct or indirect impact on population growth in a new area.

Housing Supply

For January 2008, there were approximately 3,403,480 housing units in Los Angeles

County. The vacancy rate for this housing averages about 4.2%, approximately 142,946 housing units and includes single-family, multi-family, and mobile homes. In Carson, there are 255 hotel and motel rooms. Assuming a similar vacancy rate of 75% for the Los Angeles area then would yield 191 hotels and motel rooms (Watson 2009a, p.5.10-33).

Eighty percent of the average construction workforce of 41 or approximately 33 workers is expected to be hired from Los Angeles County. It was assumed by the Watson Cogeneration Company and staff agrees 25% (two workers) of the non-local workers would relocate and 75% (six workers) would commute on a daily or weekly basis (Watson 2009a, p.5.10-32). Staff finds the supply of available permanent and temporary housing adequate to accommodate the construction workers expected to relocate. Staff does not expect the BP Watson project to cause any housing displacement as a result of this project.

Operation of the BP Watson project would not require any new workers. Staff concludes that there would be no significant adverse socioeconomic impacts related to housing resources as a result of the BP Watson project.

Displace Existing Housing and Substantial Numbers of People

The approximately 2.5-acre proposed BP Watson project brown field site is located within the boundary of the existing Watson Cogeneration Facility. The surrounding area is highly developed and disturbed. The project site is designated as Heavy Industrial by the Land Use Element of the City of Carson General Plan and is accordingly zoned Heavy Manufacturing (MH). The City of Carson General Plan designates the MH zone to allow for petroleum refining, oil reclaiming, and coal or coal tar distillation (with a Director Classification) (Watson 2009a, p.5.9-2).

The proposed project would be located in an existing industrial area, within the boundary of an existing refinery property. Because the 2.5-acre BP Watson project site would be located within the existing 21.7-acre Watson Cogeneration Facility, there would be no displacement of existing housing or necessitate construction of replacement housing elsewhere.

Result in Substantial Physical Impacts to Government Facilities

Medical Services

For emergency medical service (EMS), the BP Watson project would be served by the Los Angeles County Fire Department. There are two fire stations that can provide EMS in Carson that have response times of five to six minutes and eight minutes. Gerber Ambulance Service is located in Torrance, which is approximately seven miles from the project site, would provide patient care and transportation services to the BP Watson project. Gerber Ambulance Company provides basic life support ambulances, paramedics, critical care transport nurses, neonatal and pediatric services, wheelchair van service, and training programs (Watson 2009a, p.5.10-23). EMS response time is 15 to 30 minutes (CEC 2009d). There are 11 hospitals with 3,148 beds within 10 miles of the BP Watson project site (Watson 2009a, p.5.10-24).

As discussed in AFC Sections 3.1, **Project Description**, 5.17, **Worker Safety and Fire Protection**, and 5.15, **Hazardous Materials Handling**, the BP Watson project would be designed to meet all applicable standards to reduce the risk of an accidental hazardous materials release and operate in a manner that complies with safety standards and practices to provide a safe workplace for plant personnel. Therefore, the BP Watson project would minimize the potential for unsafe work conditions and the need for outside emergency medical response. Staff concludes that because of the on-site health and safety procedures taken by the applicant, the emergency medical services provided by Gerber Ambulance Service and the 11 surrounding hospitals would be adequate during construction and operation. Thus, the project would not require construction of new or physically altered emergency medical facilities.

Law Enforcement

As stated in the AFC and verified by staff, the project site is within the Los Angeles Sheriff Department jurisdiction. The Los Angeles County Sheriff's Department would provide police protection and public safety services (traffic and neighborhood police control, emergency calls, and crime prevention) to the surrounding area of the BP Watson project. Los Angeles County Sheriff's Department has 10,000 full time employees. The closest Sheriff station is located in Carson, approximately 4.3 miles northwest of the project site. The Carson station has two police vehicles that patrol the surrounding area. Response times might vary depending on the type of incident, time of day, number of other calls at the time, and location of the patrol cars at the of the call. For emergency calls, response time might be three minutes or less and for non-emergency or routine calls, service has response times of less than 20 minutes (Watson 2009a, p.5.10-25).

The California Highway Patrol (CHP) is the primary law enforcement agency for state highways and roads. Services include law enforcement, traffic control, accident investigation and the management of hazardous material spill incidents. The nearest CHP office is located approximately seven miles (http://www.chp.ca.gov) from the project site in Torrance, California.

In comparison to residential or commercial developments, power plants do not attract large numbers of people and thus require little in the way of law enforcement. Because of this factor and the proposed onsite safety and security measures, staff concludes that the existing law enforcement resources would be adequate to provide services to the BP Watson during construction and operation. Thus, the project would not require the construction of new or physically altered law enforcement facilities.

Education

For California's K-12 public school system, Los Angeles County had 2,011 schools and 1,648,102 students in 2007-2008. The Los Angeles Unified School District (LAUSD) had 3,269 students in 2007-2008. The LAUSD is slightly below the California average pupil-teacher ratio (CDE 2007-2008 a, b, c).

Students living near the proposed project site attend Del Amo Elementary (kindergarten through fifth grade), Andrew Carnegie Middle School (sixth through eighth grade), Wilmington Middle School (sixth through eighth grade) and Phineas Banning Senior

High School (ninth through twelfth grade). Enrollment during the 2007-2008 school year exceeded estimated operating capacity at two of the four schools.
Although non-local workers do not typically relocate permanently due to the temporary nature of construction, it is possible that workers could relocate to communities near the proposed project site due to the length of the site preparation, construction, and commissioning period (26 months). The Watson Cogeneration Company stated in the AFC, as a worst-case scenario, that one-quarter of the non-local workers (two workers) would relocate to Los Angeles County. The remaining 75% (six workers, on average) of the non-local workers would commute on a daily or weekly basis (Watson 2009a, p.5.10-32).

Assuming the worse-case scenario, if the proposed two construction workers relocated within the Los Angeles Unified School District, with an average family size of 2.98 persons per household, (U.S. Census Bureau, Household and Families, 2000 for Los Angeles County) the result would be the addition of approximately one child to local schools. No additional workers would be required for operation of the BP Watson project (Watson 2009a, p.5.10-33). Given the small number who potentially could relocate to schools within the LAUSD, staff does not expect the construction or operation of the project to have a significant adverse impact on schools.

As previously noted in **Socioeconomics Table 1**, other than the requirement authorized under Section 17620 of the Education Code, the Energy Commission cannot impose developer fees to mitigate the cost of school facilities. Los Angeles Unified School District would charge the Watson Cogeneration Company a one-time school impact fee of approximately $4,183 for new industrial development (Watson 2009a, p. 5.10-46). Staff has proposed Condition of Certification **SOCIO-1** below to ensure payment of this one-time school impact fee as a requirement for LORS compliance.

Given the small number of students who could potentially relocate to schools within the Los Angeles Unified School District, staff does not expect the construction or operation of the project to have a significant adverse impact on schools.

Increase the Use of Existing Recreation Facilities

The County of Los Angeles Department of Parks and Recreation (http://parks.lacounty.gov) manages over 63,000 acres of parks, gardens, lakes, trails, natural areas, and the world's largest public golf course system.

Given the labor force and two hour commuting time within Ventura, Kern, San Bernardino and Orange counties, staff does not expect employees to relocate to the immediate project area. Staff concludes that there are a number and variety of parks within the regional project area and the project would not require construction of new parks nor substantially increase the use of existing parks. The construction and operation workforce would not have a significant adverse impact on parks and recreation.

CUMULATIVE IMPACTS

A project may result in significant adverse cumulative impacts when its effects are

cumulatively considerable; that is, when the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, other current projects, and probable future projects [*Public Resources Code* Section 21083; *California Code of Regulations*, Title 14, Sections 15064(h); 15065 (c); 15130; and 15355]. Mitigation requires taking feasible measures to avoid or substantially reduce the impacts.

In a socioeconomic analysis, cumulative impacts could occur when more than one project in the same area has an overlapping construction schedule, thus creating a demand for workers that cannot be met locally. An increased demand for labor could result in an influx of non-local workers and their dependents, resulting in a strain on housing, schools, parks and recreation, law enforcement, and emergency services. As shown in **Socioeconomics Table 5,** the total construction labor force by MSA for the region is more than sufficient to accommodate the labor needs for construction of power generation facilities and other large industrial projects. Because of the robust local and regional construction labor force, staff does not expect an influx of non-local workers and their dependents to the project area. Staff does not expect any significant and adverse impacts on housing, schools, parks and recreation, law enforcement, and emergency services. Staff does not expect construction or operation of the BP Watson to contribute to any significant adverse cumulative socioeconomic impacts.

Socioeconomics Table 5
Occupational Employment Projections by MSA

Construction and Extraction Occupations for Selected MSAs	Average Annual Employment for 2006	Average Annual Employment for 2016
Los Angeles County MSA	174,940	187,580
Ventura County MSA	21,970	22,700
San Bernardino County MSA ‘ (Part of Riverside-San Bernardino-Ontario MSA)	137,160	155,250
Kern County MSA	27,690	31,410
Orange County MSA	110,580	121,460
Source: EDD 2009 Projections of Employment by Industry and Occupation		

NOTEWORTHY PUBLIC BENEFITS

Noteworthy public benefits include the direct, indirect, and induced impacts of a proposed power plant. For example, the dollars spent on or resulting from the construction and operation of the BP Watson project would have a ripple effect on the local economy. This ripple effect is measured by an input-output economic model. The model relies on a series of multipliers to provide estimates of the number of times each dollar of input or direct spending cycles through the economy in terms of indirect and

induced output, or additional spending, personal income, and employment. The typical input-output model used by economists and the one used for this analysis by the Watson Cogeneration Company is the IMPLAN model. IMPLAN multipliers indicate the ratio of direct impacts to indirect and induced impacts. Staff reviewed the results of the IMPLAN model and found them to be reasonable. BP Watson project owners would employ workers and purchase supplies and services for the life of the BP Watson project. Employees would use salaries and wages to purchase goods and services from other businesses. Those businesses make their own purchases and hire employees, who also spend their salaries and wages throughout the local and regional economy. This effect of indirect (jobs, sales, and income generated) and induced (employees' spending for local goods and services) spending continues with subsequent rounds of additional spending, which is gradually diminished through savings, taxes, and expenditures made outside the area.

For purposes of this analysis, direct impacts were said to exist if the project resulted in permanent jobs and wages; indirect impacts, if jobs, wages, and sales resulted from project construction; induced impacts, from the spending of wages and salaries on food, housing, and other consumer goods, which in turn creates jobs. The direct and induced economic impacts from construction as stated in the AFC on page 5.10-30, would take place over an estimated 26 months, and are estimated by the applicant to begin in May of 2010 to and end in January of 2012. Regardless of when actual construction would begin, the construction period is still expected to last an estimated 26 months. Indirect and induced economic impacts from operation would begin in January 2012. All indirect and induced operation impacts would result from annual operations and maintenance expenditures. The economic benefits of the proposed project, as required by the California Energy Commission regulations and resulting from the IMPLAN model are shown below in **Socioeconomics Table 6**.

Socioeconomics Table 6, BP Watson Economic Benefits (2008 dollars)	
Fiscal Benefits	
Estimated annual property taxes	$1.7 million to $2.0 million
State and local sales taxes: Construction	$536,250
State and local sales taxes: Operation	$25,000 annually
School Impact Fee	$4,183 to the Los Angeles Unified School District
Non-Fiscal Benefits	
Total capital costs	$125.5 million to $155.5 million
Construction payroll	$14.5 million
Annual Operations and Maintenance	
Construction materials and supplies	$6.5 million
Operations and maintenance supplies	$300,000 annually
Direct, Indirect, and Induced Benefits	
Estimated Direct	
Construction	41 workers (average per month)
Operation	N/A
Estimated Indirect and Induced	
Construction Jobs	109
Construction Income	$5.5 million
Construction Output	$15.8 million
Operation Jobs	0.5 jobs
Operation Income	$28,000
Operation Output	$85,000
Source: AFC, 5.10-32, BP Watson, 2009	

PROPERTY TAX

The current property tax rate for the proposed project is approximately 1.2%. The current assessed value is $146 million. Los Angeles County collected $1.8 million in property taxes from the existing project site. The $1.8 million represents 0.02%of the county's total property tax revenue for the 2006-2007 fiscal year. Project construction would add $140 million to $170 million to the current assessed value of $146 million. Using the property tax rate of 1.2%, the estimated increase in property tax revenue that would accrue to Los Angeles County annually would be approximately $1.7 million to $2.0 million (Watson 2009a, p.5.10-36).

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff has received no agency or public socioeconomic comments on this project.

CONCLUSIONS

Estimated gross public benefits from the BP Watson project include employment and income for the project area and region. Staff concludes that construction and operation of the BP Watson project would not cause significant direct, indirect or cumulative adverse socioeconomic impacts on the study area's housing, schools, law enforcement, emergency services and parks.

Staff concludes that the project would not cause significant direct or cumulative adverse impacts to emergency services. Staff also concludes that the BP Watson project would not induce substantial growth or concentration of population; induce substantial increases in demand for housing or public services; or displace a large number of people. Staff considered the demographic screening of minority population and below-poverty-level within six miles of the proposed project. Staff concludes that the proposed project would not result in adverse, direct, indirect, or cumulative socioeconomics impacts to environmental justice populations.

PROPOSED CONDITION OF CERTIFICATION

SOCIO-1 The project owner shall pay the one-time statutory school development fee to the Los Angeles Unified School District as required by Education Code Section 17620.

Verification At least 30 days prior to start of project construction, the project owner shall provide the Compliance Project Manager (CPM) proof of payment of the statutory development fee.

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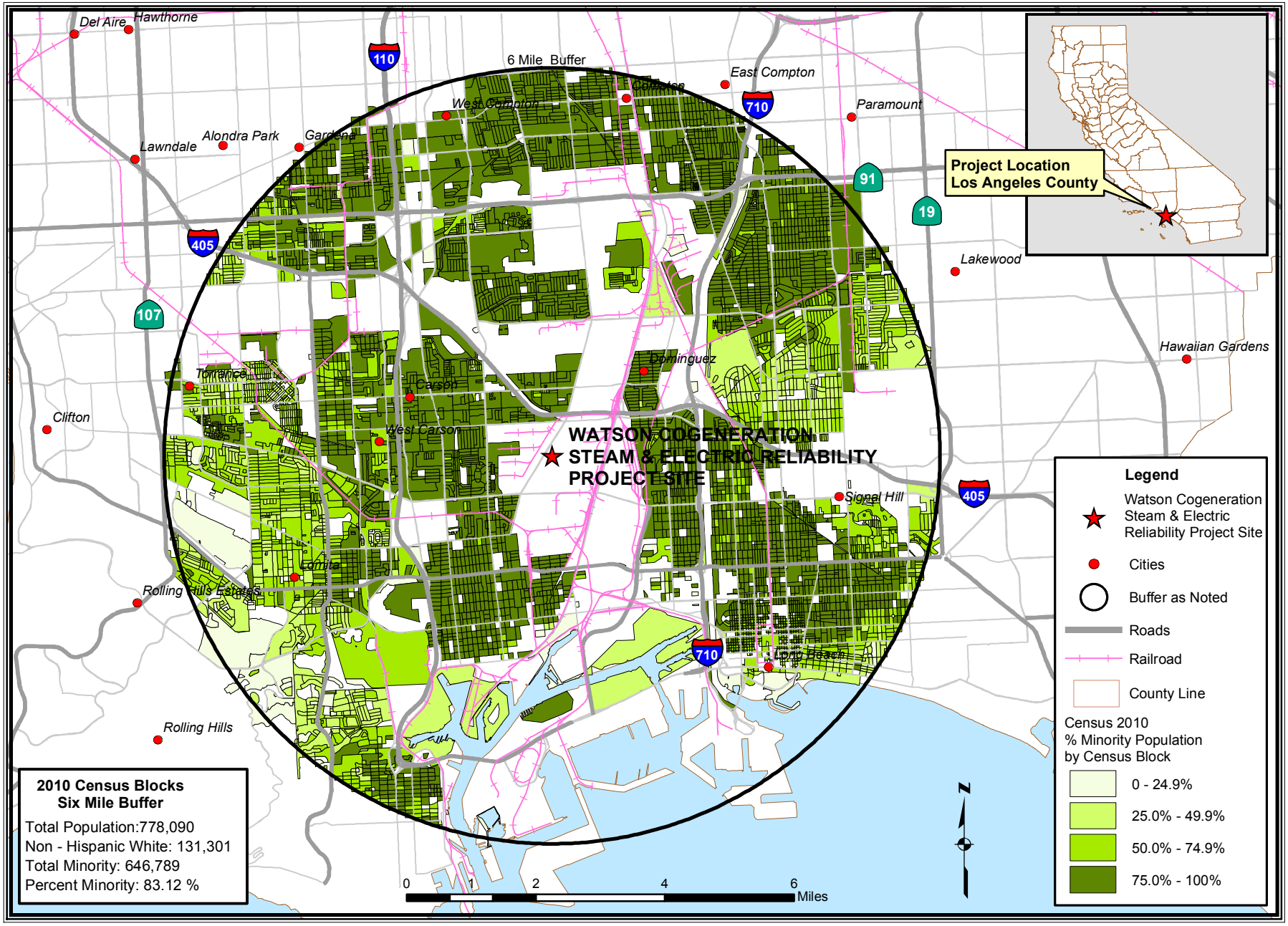
SOCIOECONOMICS - FIGURE 1

Watson Cogeneration Steam and Electric Reliability Project - Census 2010 Minority Population by Census Block - Six Mile Buffer



SOCIOECONOMICS

CALIFORNIA ENERGY COMMISSION, SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: California Energy Commission Statewide Power Plant Maps 2011 - Census 2010 PL 94-171 Data

SOIL AND WATER RESOURCES

Testimony of Mark Lindley, P.E.

SUMMARY OF CONCLUSIONS

The California Energy Commission (Energy Commission) staff has not identified any immitigable potentially significant impacts to Soil and Water Resources for Watson Cogeneration Steam and Electric Reliability (BP Watson) Project and believes that the BP Watson project would comply with all applicable Laws, Ordinances, Regulations and Standards (LORS) provided the proposed conditions of certification are implemented.

Energy Commission staff concludes the following:

- Implementation of Best Management Practices during the BP Watson project construction and operation in accordance with effective Storm Water Pollution Prevention Plans, a Drainage Erosion and Sediment Control Plan, and Standard Urban Stormwater Management Plan would avoid significant adverse effects that could otherwise result in significant transport of sediments or contaminants from the site by wind or water erosion.
- Capping combined freshwater use at rates at or below 4,219 AFY for both BP Watson and the existing Watson Cogeneration Steam and Electrical Generating facility (Watson Cogeneration) would result in no net increase of combined pumped groundwater and purchased municipal freshwater use associated with the BP Watson Project.
- The combined cap over freshwater use at BP Watson and Watson Cogeneration is based on recent freshwater use at Watson Cogeneration, with the three most recent years (2008 – 2010) being the most representative of baseline conditions in the water basin.
- Any water use at the combined BP Watson and Watson Cogeneration projects above the capped 4,219 AFY shall be reclaimed water from a local waste water treatment facility, and shall be a supply above and beyond reclaimed water already being supplied to either Watson Cogeneration or the BP Refinery. Staff finds that the use of reclaimed water associated with the BP Watson project is consistent with Energy Commission Policy and the California Water Code.
- Condensate return to BP Watson from Watson Cogeneration or the BP Refinery shall be from steam supplied from BP Watson or Watson Cogeneration, and shall not be augmented with additional freshwater at Watson Cogeneration or the BP Carson Refinery.
- The project would not be located within the 100-year flood plain, and would not increase flood conditions downstream of the project.
- The discharge of wastewater under the conditions stipulated in the BP Carson Refinery's Industrial Wastewater Discharge Permit would meet Los Angeles County Sanitation District's wastewater standards.
- At the Preliminary Staff Assessment Workshop in January 2011, the LARWQCB presented data that indicates that there is up to 14 feet of floating non-aqueous

phase hydrocarbons on the groundwater surface at the project site and indicated that there may be a source area at the project site. These site conditions and potential impacts are addressed in the Waste Management section of this analysis.

Where the project as proposed would cause significant impacts, staff is proposing mitigation measures to reduce the impact to less than significant. The mitigation measures, as well as specifications for LORS conformance, are included as conditions of certification.

INTRODUCTION

This section analyzes potential impacts to soil and water resources from the construction and/or operation of the BP Watson project proposed by the Watson Cogneration Company). The analysis specifically focuses on the potential for the project to cause impacts in the following areas:

- Whether the project's use of water would deplete existing supplies and impact current users or the environment.
- Whether project construction or operation would lead to degradation of surface or groundwater quality including through the alteration of runoff patterns.
- Whether construction or operation would lead to accelerated wind or water erosion and sedimentation including through the alteration of runoff patterns.
- Whether the project would increase runoff or otherwise exacerbate flood conditions in the vicinity of the project.
- Whether the project would comply with all applicable LORS (including Waste Discharge Requirements).

Where the potential for impacts are identified, California Energy Commission (Energy Commission) staff has proposed mitigation measures to reduce the significance of the impact, and as appropriate, has recommended conditions of certification.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Federal, state, and local LORS that apply to the BP Watson project related to soil and water resources are summarized below in **Soil and Water Table 1**. Energy Commission staff has reviewed the project as proposed by the Watson Cogeneration Company to determine if the proposed project will meet the requirements set forth in the federal, state, and local LORS.

Soil & Water Table 1
Laws, Ordinances, Regulations, and Standards

Federal LORS	
Clean Water Act (33 U.S.C. Section 1251 et seq.)	The Clean Water Act (33 USC § 1251 et seq.) allows states to set standards to protect water quality, which includes regulation of stormwater and wastewater discharges during construction and operation of a facility. California established its regulations to comply with the Clean Water Act under the Porter-Cologne Water Quality Control Act of 1967. These are normally addressed through a general National Pollutant Discharge Elimination System (NPDES) permit. For BP Watson, regulation of water quality is administered by the Los Angeles Regional Water Quality Control Board (LARWQCB).
Resource Conservation and Recovery Act	The Resource Conservation Recovery Act (RCRA) of 1976 (42 USC § 6901 et seq., implemented at 40 Code of Federal Regulations (CFR) Part 260 et seq.) seeks to prevent surface and groundwater contamination, sets guidelines for determining hazardous wastes, and identifies proper methods for handling and disposing of those wastes.
40 Code of Federal Regulations, Part 423	The provisions of this part of the CFR are applicable to discharges resulting from the operation of a generating unit by an establishment primarily engaged in the generation of electricity for distribution and sale which results primarily from a process utilizing fossil-type fuel (coal, oil, or gas) or nuclear fuel in conjunction with a thermal cycle employing the steam water system as the thermodynamic medium.
State LORS	
California Constitution, Article X, Section 2	This section requires that the water resources of the State be put to beneficial use to the fullest extent possible and states that the waste, unreasonable use or unreasonable method of use of water is prohibited.
The California Safe Drinking Water and Toxic Enforcement Act	This Act (California Health & Safety Code Section 25249.5 et seq.) prohibits actions contaminating drinking water with chemicals known to cause cancer or possessing reproductive toxicity. The Regional Water Quality Control Board (RWQCB) administers the requirements of the Act.
The Porter-Cologne Water Quality Control Act of 1967, California Water Code Sec 13000 et seq.	Requires the State Water Resources Control Board (SWRCB) and the nine RWQCBs to adopt water quality criteria to protect state waters. Those regulations require that the RWQCBs issue Waste Discharge Requirements specifying conditions for protection of water quality as applicable.
California Water Code Section 13260	Requires filing with the appropriate RWQCB a report of waste discharge that could affect the water quality of the state, unless the requirement is waived pursuant to Water Code section 13269.
California Water Code Section 13550	Identifies the use of potable domestic water for industrial uses as a waste or unreasonable use of water if a suitable supply of reclaimed water is available. The availability of reclaimed water is determined provided that the quality and quantity of the reclaimed water are suitable for the use, the cost is reasonable, the use is not detrimental to public health, and the use will not impact downstream users or biological resources.
California Water Code Section 13552.6	Specifically identifies the use of potable domestic water for cooling towers, if suitable reclaimed water is available, as a waste or unreasonable use of water. The availability of reclaimed water is determined based on criteria listed in Section 13550 by the SWRCB. Those criteria include provisions that the quality and quantity of the reclaimed water are suitable for the use,

	the cost is reasonable, the use is not detrimental to public health, and the use will not impact downstream users or biological resources.
California Code of Regulations, Title 17	Title 17, Division 1, Chapter 5, addresses the requirements for backflow prevention and cross connections of potable and non-potable water lines for projects that utilize reclaimed water.
California Code of Regulations, Title 22	Title 22, Division 4, Chapter 15, requires the California Department of Public Health (DPH) to review and approve the wastewater treatment systems to ensure they meet tertiary treatment standards allowing use of recycled water for industrial processes such as steam production and cooling water. DPH also specifies Secondary Drinking Water Standards in terms of Consumer Acceptance Contaminant Levels, including TDS ranging from a recommended level of 500 mg/l, an upper level of 1,000 mg/l and a short term level of 1,500 mg/l.
California Code of Regulations, Title 23	Title 23, Division 3, Chapter 15, requires the RWQCB to issue Waste Discharge Requirements specifying conditions for protection of water quality as applicable.
Local LORS	
Los Angeles County, Municipal Storm Water NPDES permit	Requires the development of a Standard Urban Stormwater Mitigation Plan (SUSMP).
Los Angeles County Grading Guidelines	Provides regulations and submittal requirements for grading projects.
Los Angeles County Building Code, Title 26	Provides regulations for building permits.
City of Carson General Plan, Water Quality Policies and Programs	These policies are intended to control the potentially significant impacts of development including non-point sources of water pollution, urban runoff, grading, construction, and agricultural activities.
State Policies and Guidance	
SWRCB Res. 2009-0011 (Recycled Water Policy)	This policy supports and promotes the use of recycled water as a means to achieve sustainable local water supplies and reduction of greenhouse gases. This policy encourages the beneficial use of recycled water over disposal of recycled water. This policy states the following recycled water use goals: • Increase the use of recycled water over 2002 levels by at least one million acre-feet per year (AF/y) by 2020 and by at least two million AF/y by 2030; • Increase the use of stormwater over use in 2007 by at least 500,000 AF/y by 2020 and by at least one million AF/y by 2030; • Increase the amount of water conserved in urban and industrial uses by comparison to 2007 by at least 20 percent by 2020; and • Included in these goals is the substitution of as much recycled water for potable water as possible by 2030.
SWRCB Resolutions 75-58 and 88-63	The policy of the SWRCB that addresses the specific siting of energy facilities is the Water Quality Control Policy on the Use and Disposal of Inland Waters Used for Power Plant Cooling (adopted by the Board on June 19, 1976, by Resolution 75-58). This policy states that use of fresh inland waters should only be used for power plant cooling if other sources or other methods of cooling would be environmentally undesirable or economically

	unsound. Resolution 75-58 defines brackish waters as “all waters with a salinity range of 1,000 to 30,000 mg/l” and fresh inland waters as those “which are suitable for use as a source of domestic, municipal, or agricultural water supply and which provide habitat for fish and wildlife”. In a May 23, 2002 letter from the Chairman of the SWRCB to Energy Commission Commissioners, the principal of the policy was confirmed “that the lowest quality cooling water reasonably available from both a technical and economic standpoint should be utilized as the source water for any evaporative cooling process utilized at these facilities.” Resolution 88-63 defines suitability of sources of drinking water. The total dissolved solids must exceed 3,000 mg/L for it not to be considered suitable, or potentially suitable, for municipal or domestic water supply.
Integrated Energy Policy Report (Public Resources Code, Div. 15, Section 25300 et seq)	In the 2003 IEPR, consistent with SWRCB Policy 75-58 and the Warren-Alquist Act, the Energy Commission adopted a policy stating they will approve the use of fresh water for cooling purposes by power plants only where alternative water supply sources and alternative cooling technologies are shown to be “environmentally undesirable” or “economically unsound.” Additionally, the Energy Commission will require zero liquid discharge technologies unless such technologies are shown to be “environmentally undesirable” or “economically unsound”.
California Water Code Section 461	Encourages the conservation of water resources and the maximum reuse of wastewater, particularly in areas with limited water supply.
National Resources Conservation Service (NRCS), National Engineering Handbook, Sections 2 and 3 (1983)	Sections 2 and 3 of the USDA-NRCS National Engineering Handbook (1983) provide standards for soil conservation and erosion prevention during construction activity.

REGIONAL SETTING

The BP Watson project is located in the City of Carson, in Los Angeles County. The project is located on the southwest edge of the Los Angeles Basin, which is an alluvial plain bounded by mountains to the north and east and the Pacific Ocean to the south and west. The elevation at the BP Watson site is approximately 32 feet above mean sea level (MSL). The project is located within the existing BP Carson Refinery and the surrounding areas are highly developed.

Regional Water Resources

The BP Watson site is situated between the Santa Monica Mountains to the north; Santa Ana Mountains and the San Joaquin Hills to the east; and the Pacific Ocean to the south and west. The Pacific Ocean is approximately 8.5 miles west of the project site, with Long Beach Harbor approximately 5 miles south of the site.

Municipal water in the project vicinity is provided by California Water Services Company. The water supply for the Carson area includes a combination of imported water from the Colorado River and State Water Project (70 to 80 percent) and groundwater pumped from local wells (20 to 30 percent).

Climate

The California South Coastal area surrounding the Watson site is characterized as semi-arid with long, dry summers and mild winters. The average annual precipitation, recorded at the Long Beach weather station, is 12.6 inches, with the majority of rainfall occurring between November and April. The average annual temperature is approximately 63 degrees Fahrenheit (Watson, 2009a). The average annual reference evapotranspiration as measured at Long Beach is approximately 46 inches (CIMIS 2009a). The length of the growing season in the South Coast area is 365 days.

Surface Water

The primary drainage system in the area is the Dominguez Channel, which is located approximately 0.4 mile east of the BP Watson site. The Dominguez Channel originates southeast of Los Angeles International Airport. From its origin, it flows south, past the project site until it joins the East Channel of the Los Angeles Harbor, north of Terminal Island. The drainage basin of Dominguez Channel is approximately 80 square miles and includes the entire project site.

The average annual discharge into the Dominguez Channel from the basin is estimated to be about 16,000 acre-feet. In the vicinity of the project, the channel has a bottom width of 80 feet with a flood depth capacity of approximately 27 feet. The channel banks are lined with rip rap. Additionally, the portion of this channel adjacent to the BP Carson Refinery is classified as an estuary. This portion of the channel exhibits strong marine water quality influence during drier months and fresh water quality during periods of storm runoff (Watson, 2009a). The project site is designated by the City of Carson as a zone “C” flood zone for flood management indicating the potential for flooding is low with shallow flooding possible during runoff events exceeding a 100-year return period (Carson, 2004). Directly adjacent to the site, the Dominguez Channel is designated as a zone AR floodway by the City of Carson indicating that the Dominguez Channel has capacity for the 100-year flood flow.

Groundwater

The BP Watson site is located in the South Coast Hydrologic Region and the West Coast Subbasin of the Coastal Plain of the LA Basin (West Coast Basin). The West Coast Basin is bounded by the Ballona Escarpment to the north, the Newport-Inglewood fault zone to the east and the Pacific Ocean to the south and west. The total surface area of the West Coast Basin is approximately 91,300 acres. The Los Angeles River and San Gabriel River cross the surface of this subbasin before emptying into San Pedro Bay (DWR, 2003).

The water-bearing deposits include unconsolidated and semi-consolidated marine and alluvial sediments. The Silverado aquifer, which underlies most of the subbasin is the most productive and yields 80-90 percent of annual groundwater extractions. The storage capacity of this aquifer is estimated to be 6.5 million acre-feet. The average specific yield for the subbasin is 13 percent. The West Coast Basin was adjudicated in 1961 (DWR, 2003).

The primary source of groundwater replenishment in the West Coast Basin is underflow across the Newport-Inglewood fault zone from the Central Basin. The regional groundwater flow pattern is southward and westward from the Central Coastal Plain toward the Pacific Ocean. Water levels in the subbasin have risen approximately 30 feet since the basin was adjudicated (DWR, 2003). Groundwater is pumped throughout the basin for municipal and industrial uses by both public and private entities.

The quality of groundwater in the subbasin is variable. The groundwater in the Gaspur zone is sodium bicarbonate in character. The Gardena zone has a calcium-sodium bicarbonate character and is of good quality. The Silverado zone is highly variable, calcium chloride in character near the coast to sodium bicarbonate towards inland areas (DWR, 2003).

Seawater intrusion has degraded the water quality in the Gaspur and Silverado zones. Injection wells are used to limit the landward movement of seawater into the basin. Two seawater barrier projects are currently in operation. The West Coast Basin Project creates a north-south trending mound of freshwater from the LA International Airport to the Palos Verde Hills and the Dominguez Gap Barrier Project (located directly adjacent to BP Refinery) creates a mound of freshwater near Wilmington. In total, over 20,500 acre-feet were injected in 2008-09 and over 23,650 acre-feet were injected in 2009-10 to mitigate sea water intrusion impacts in the basin. Additional replenishment is provided by infiltration from the Los Angeles and San Gabriel Rivers (DWR, 2003).

PROJECT, SITE AND VICINITY DESCRIPTION

The proposed BP Watson project would be an expansion of the existing 385 megawatt Watson Cogeneration steam and electrical generating facility (Watson Cogeneration) located within the BP Carson Refinery. The BP Watson project would add one 85 megawatt General Electric combustion gas turbine (CTG) with a heat recovery steam generator (HRSG) to provide additional process steam to the BP Carson Refinery. The proposed CTG and HRSG would be constructed adjacent to the four existing CTG and HRSG systems to operate as a “fifth train” in parallel with the four existing generating trains. The fifth train would complete the original design of the Watson Cogeneration facility. Additional auxiliary equipment would include inlet air filters with foggers, one Boiler Feed Water Pump (BFW), one circulating water pump, two natural gas compressors, and generator step-up transformers and auxiliary transformers. Two new cells would also be added to the existing mechanical draft cooling tower to provide heat rejection for the two existing condensing steam turbine generators (STG). The auxiliary equipment would be located within the existing Watson Cogeneration facility (Watson, 2009a).

The primary objective of the BP Watson project is to improve the reliability and to provide additional steam and electrical energy supply to the BP Carson Refinery. The project would be a base loaded cogeneration facility with operations planned for 24 hours per day, 7 days per week. A portion of the electricity would be used by the BP Carson Refinery, while excess power produced by the project would be exported to the power grid. Since power generation is a secondary objective to steam generation, the BP Watson project would operate to maximize steam production by incorporating heavily fired duct burners in the HRSG to maximize steam production for the BP Carson

Refinery. However, as currently proposed, the project does not have additional water supply secured beyond operating BP Watson under a combined Watson Cogeneration / BP Watson cap on freshwater use, as conditioned. Any increases in combined use water would be reclaimed water, but BP Watson has not identified a reclaimed water supplier or secured a reclaimed water supply, and so the project may not able to meet its primary objective to provide additional (beyond quantities already supplied by Watson Cogeneration) steam to the BP Carson Refinery.

The BP Watson site is located in the City of Carson in Los Angeles County, approximately 0.7 mile south of the 405 Freeway. The site is roughly bounded by East 223rd Street to the north, Wilmington Avenue to the west, East Sepulveda Boulevard to the south and South Alameda Street to the east. The project site is a discontiguous 2.5 acre brown field site located within the boundary of the existing Watson Cogeneration facility. The project site is currently paved and graveled with minimal slope. The existing Watson Cogeneration facility is approximately 22 acres within the larger 428 acre BP Carson Refinery.

The construction laydown and parking area would be located approximately 1 mile southeast of the project site at 2149 East Sepulveda Boulevard. This 25-acre parcel is paved and currently used as a truck parking and staging area. The project area is zoned as Heavy Industrial and is surrounded by refineries and industrial facilities. No agricultural uses exist within the one-mile radius surrounding the BP Watson site and laydown area (Watson, 2009a).

The BP Watson project would rely on existing supply and delivery lines. No offsite improvements such as water and gas supply lines or transmission lines are proposed for the BP Watson project.

Soils

The soils at the proposed BP Watson site are primarily sandy loam and fine sandy loam with loam, silt loam or light clay loam. The soils at the project site are in Hydrologic Soil Group C, well-drained with moderately slow permeability (Watson, 2009a). The soils descriptions are based upon soil mapping units developed by the Natural Resources Conservation Service (NRCS). The BP Watson site consists of the Zamora and Ramona series soils. The construction laydown and parking area includes the Sorrento and Hanford series soils. The soils within both the BP Watson site and laydown area are Urban Land soils that have been modified with several feet of additional fill material to accommodate large industrial, housing, or other types of urban development. The construction laydown area is paved and is not expected to require any soil disturbance. The primary soil types located at the proposed project site and laydown area are described below in **Soil & Water Table 2.** Additional soil characteristic data can be found in Table 5.4-1 of the Application for Certification (AFC) (Watson, 2009a).

The project site and construction laydown area are both relatively flat. Some excavation and grading would be required at the relatively flat 2.5 acre project site while no land disturbance is planned for the paved 25 acre construction laydown and parking area. The relatively flat condition and minimal grading required at the BP Watson site would limit the potential for soil erosion due to water. Approximately 7,000 cubic yards of

material will be excavated for foundations. This material would be removed and stockpiled for use as fill material onsite. No imported fill material is anticipated as onsite material is expected to be adequate for construction.

Soil & Water Table 2
Primary Soil Types Potentially Affected & Characteristics

Primary Soil Name	Slope Class	Water Erosion Potential	Wind Erosion Potential	Permeability	Land Capability Class
Hanford sandy loam or fine sandy loam	0 to 15%	Moderate	Moderate	Moderately rapid	3e (non-irrigated)
Ramona sandy loam or fine sandy loam	0 to 5%	Moderate	Moderate	Moderately slow	3e (non-irrigated)
Sorrento heavy loam	0 to 15%	Moderate	Moderate	Moderate to moderately slow	3e (non-irrigated)
Zamora Fine sandy loam, loam, silt loam, or light clay loam	0 to 9%	Moderate	Moderate	Moderately slow	3e (non-irrigated)

Watson, 2009a, Section 5.4.1.1

There are no major limitations and few overall limitations for the soils at the project site. A geotechnical investigation was performed at the site in 1986 prior to construction of the Watson Cogeneration facility. An additional site-specific geotechnical investigation will be performed prior to construction activities for the BP Watson project.

Expansive soils are known to exist in the project area and have the potential to impact the suitability of existing soil as a bearing surface for the foundations. It may be necessary to amend these soils to mitigate potential impacts related to the expansive soils. It may also be necessary to import fill material to stabilize these soils prior to construction of the fifth train. Watson has not identified a source or volume of imported fill planned for grading activities at the site at this time. It is anticipated that the planned geotechnical investigation will directly address the presence of expansive soils at the project site and identify any required amendments to the existing soils (Watson, 2009a).

Soil and Groundwater Contamination

The BP Watson project site was developed with a retention basin for BP Carson Refinery use prior to its current use as a maintenance area for the existing Watson Cogeneration facility. A Phase I Environmental Site Assessment (ESA) was conducted for the BP Watson site in 2008 and completed in January 2009.

The Phase I ESA found recognized environmental conditions for the BP Watson site, both onsite and offsite. The current and historical uses of the BP Watson site within the larger Watson Cogeneration facility and BP Carson Refinery indicate that contaminants of concern include but are not limited to hazardous substances used in petroleum

refining and maintenance operations. A limited soil investigation at the site in 1985 found evidence of hydrocarbons in the fill and underlying native soils. The findings of the Phase I ESA recommended a Phase II ESA be performed on the project site.

The Phase II ESA has not been completed and/or presented by Watson at this time. At the Preliminary Staff Assessment Workshop in January 2011, the Regional Water Quality Control Board presented data that indicated that groundwater below the project site is significantly impacted by hydrocarbons including up to 14 feet of non-aqueous liquid phase petroleum hydrocarbons on the groundwater surface above the shallow water table. Prior to the January 2011 Preliminary Staff Assessment Workshop, Watson had not acknowledged the extent of existing groundwater impacts at the project site. Energy Commission staff has requested additional data on existing soil and groundwater contamination at the project site and detailed plans for the remediation of the existing contamination including how construction of the fifth train would impact remediation plans.

Watson indicates that they will provide soil and groundwater data collected in the vicinity of the Watson site in response to the Los Angeles Regional Water Quality Control Board's June 30, 2011 response to the CEC's request for participation (URS, 2011c). Watson did indicate that data from a Rapid Optical Screen Test (ROST) borings indicate that the non-aqueous liquid phase hydrocarbon zone may be thinner than 5 feet in depth, however, they did not provide any data illustrating the locations and results of the ROST borings (URS, 2011c).

Prior to the Preliminary Staff Assessment, Watson recognized the likelihood of encountering impacted soils during excavation and construction activities. Watson indicated that the investigation of soil and groundwater contamination is part of a separate ongoing investigation/remediation by the BP Refinery Project as part of the Refinery's Cleanup and Abatement Order (CAO). During the project geotechnical assessment activities, soil samples will be collected in areas where ground disturbance is planned within the project footprint (PAL-1). The samples will be analyzed to investigate the potential petroleum hydrocarbon impacts on the subsurface soils. During the project geotechnical assessment and construction activities, any excavated soil will be managed pursuant to applicable BP Refinery soils management plans, and health and safety of site personnel will be managed in accordance with the site specific health and safety plan and applicable BP Refinery procedures. Watson indicates that contaminated soils, if encountered, will be stockpiled onsite and later removed for disposal or treatment and recycling. Watson plans to conduct a pre-assessment to determine if existing soils are subject to additional Federal and State regulations that control excavation of soils impacted by volatile organic compounds (Watson, 2009a). If necessary, engineered fill will be imported to replace excavated materials that are not suitable for reuse. These site conditions, the applicant's proposed actions, and potential impacts, are addressed in the Waste Management section of this analysis.

Stormwater

The Watson site is located in the Dominguez Channel watershed. The Dominguez Channel is located approximately 0.4 miles east of the project site and just east of the construction laydown and parking area. The Dominguez Channel is the primary drainage in the vicinity of the project and is classified as an estuary in the reach

adjacent to the BP Carson Refinery. The flows in the Dominguez Channel are primarily comprised of stormwater runoff during winter months and industrial runoff effluents made up mostly of cooling water and treated wastewater (Watson, 2009a). Due to the largely industrial and highly urbanized area draining to the Dominguez Channel, the quality of surface water is impaired and the Dominguez Channel estuary is identified as impaired (Watson, 2009a).

The BP Watson site is located within the existing Watson Cogeneration facility and is graveled and paved. Stormwater runoff from the existing Watson Cogeneration facility including the Watson site currently drains to a storm drain network that flows easterly toward the Dominguez Channel. The storm drain network is connected to the BP Carson Refinery's existing "clean water system." Runoff collected in this system is discharged directly to the Dominguez Channel under the BP Carson Refinery's NPDES permit. This system includes a valve in the main storm drain line near the discharge point that remains closed during dry weather. Prior to discharge during storm events, the accumulated water is visually inspected for contaminants. If contamination is noted, the water is removed using a vacuum truck and disposed of offsite. Following removal of potentially contaminated water, the valve is opened and stormwater is discharged directly to the Dominguez Channel without additional treatment (Watson, 2009a).

Watson has provided results of water quality sampling and analysis for "clean water system" discharge from the existing Watson Cogeneration facility to the Los Angeles Regional Water Quality Control Board in compliance with the facilities operational NPDES permit. The sample analysis results from 2007 and 2008 indicate that stormwater discharged from the existing Watson Cogeneration facility had elevated levels of metals (chromium, lead, and zinc), polynuclear aromatic hydrocarbons (PAHs), and fecal coliform and e-coli (BP Carson, 2007 and 2008). These analysis results indicate that the current system relying upon "visual inspection" is not adequate to address hydrocarbon, metals, and other potential contamination that may impact stormwater discharged to the Dominguez Channel.

The BP Watson project would modify the surface drainage of the existing site in the area of the fifth train components. The fifth train would be located within a drivable berm to prevent stormwater run-on from adjacent areas (Watson, 2009a). The area of the fifth train island would be approximately 1.8 acres. Surface runoff from this area would be directed to a number of catch basins distributed around the fifth train island. All collected stormwater runoff would be directed to the existing BP Carson Refinery's oily water treatment system. This system includes treatment processes to remove free oil and suspended solids which are reclaimed and reused within the BP Carson Refinery. The treated wastewater is ultimately discharged to the Los Angeles County Sanitation District's joint treatment facility in Carson under the BP Carson Refinery's Industrial Wastewater Discharge Permit No. 16631 (Watson, 2009a).

The southern-most portion of the fifth train island would be separated from the power block by an earth berm and runoff from this area (0.55 acres) would continue to drain to the existing clean water system. In addition, the remainder of the BP Watson site, including the auxiliary equipment (cooling tower cells, transformers, boiler feed water pump) and maintenance shop, would also continue to drain to the clean water system and subsequently discharge to the Dominguez Channel (URS, 2010j). Watson has not

identified any water quality treatment BMPs to treat stormwater discharged to the Dominguez Channel during operations.

The BP Watson project would result in a small increase in total stormwater runoff generated at the site by paving areas that are currently covered with gravel. Runoff delivered to the existing Watson Cogeneration facility's clean water system would decrease while the runoff delivered to the BP Carson Refinery's oily water system would increase as surface runoff that is currently directed to clean water system is routed to the oily water system. Watson has indicated that the existing oily water system has sufficient additional storage and treatment capacity to handle the surface runoff generated by the project (URS, 2010j).

The construction laydown and parking area is currently paved and slopes from the north and south ends towards the center at approximately one percent grade. Catch basins collect stormwater runoff and convey it easterly where it is discharged directly to the Dominguez Channel. The proposed project does not include any modifications to the existing drainage at this area. Runoff from the construction laydown and parking area will continue to flow to the Dominguez Channel during and following construction (URS, 2010j).

Groundwater

The existing Watson Cogeneration facility currently uses groundwater to meet a portion of its water supply needs. An average of 1.4 million gallons per day (mgd) or about 1,534 acre-feet per year of groundwater provides about one third of the raw water supplied to the existing Watson Cogeneration facility (URS, 2011b). This water is combined with municipal water for use at the existing Watson Cogeneration facility (Watson, 2009a). There are nine wells located within the BP Carson Refinery, with three currently in service. Groundwater is supplied to the existing Watson Cogeneration facility from Well 13, located at northern end of the BP Carson Refinery (Watson, 2009a).

The groundwater basin was adjudicated in the by the Los Angeles County Superior Court. The initial legal action regarding declining groundwater levels and sea water intrusion impacts in the basin was filed in 1945. The Los Angeles County Superior Court named the Department of Water Resources as water master for the basin in an interim adjudication in 1955 and a final adjudication in 1961 (DWR, 2010).
The BP Carson Refinery utilizes groundwater within the original water rights assigned to the site. In addition, the BP Carson Refinery leases groundwater rights from surrounding properties. During the rainy season, pumping from onsite wells is curtailed to allow for increased groundwater recharge in the basin, and the existing Watson Cogeneration facility relies on additional municipal supply derived from surface water supplied by the State Water Project and the Colorado River and local groundwater (Watson, 2009a).

The BP Watson project proposes to continue to utilize the mix of municipal water and groundwater rates to provide water supply for the project. The applicant proposes that use of freshwater for the five train facility would not increase over baseline rates used by the existing four-train Watson Cogeneration Facility (URS, 2011b).

The groundwater table ranges from 10 to 40 feet below MSL across the BP Carson Refinery site. At the BP Watson site, the water table is approximately -25 to -29 feet MSL, which is approximately 60 feet below the ground surface. The average gradient across the site is approximately 0.003 feet/feet (Watson, 2009a). A geotechnical report performed for the project site in 1986 indicated that water was not found during subsurface investigations to a depth of 65 feet. It is not anticipated that groundwater will be encountered during construction of the BP Watson project and dewatering will not likely be required. An additional geotechnical investigation is planned for the project site to support detailed design activities (Watson, 2009a).

Project Water Supply

The BP Watson project will require water for construction and operational uses.

During construction, water would be required for dust control, moisture conditioning (for compaction), and other uses. This water would be provided by freshwater from the BP Carson Refinery. Watson estimates that about 20,000 gallons per month would be required over a 15-month construction period for dust suppression. Potable water would be provided from the existing Watson Cogeneration facility by a bottled water purveyor (Watson, 2009a).

During operations, the BP Watson project would utilize freshwater under a combined BP Watson / Watson Cogeneration cap for fire protection, plant service water, cooling tower cell makeup, and CTG inlet air fogger makeup, and feedwater to the HRSG.

In the original AFC and subsequent data responses, Watson indicated that the proposed BP Watson project would use, combined with Watson Cogeneration, a total of 7,371 AFY (URS, 2010a) with about 5,806 AFY supplied by reclaimed water and the balance by freshwater from the existing municipal supplies. Following publication of the Preliminary Staff Assessment, Watson submitted a revised Water Resources AFC Section in March 2011. The revised AFC Section indicated that the proposed water supply for the project had changed from reclaimed water to the continued use of the Watson Cogeneration's blend of freshwater supplied by groundwater and municipal water. The existing Watson Cogeneration facility used an average of 4,219 AFY over the previous three years (2008-2010) and an average of 4,609 AFY over the previous 11 years (2000-2010) of operation (URS, 2011b). In the revised AFC Water Resources Section, Watson indicates that the expanded five train facility could operate with the existing baseline water supply and that any additional water that exceeded the freshwater cap for the combined BP Watson and Watson Cogeneration would be supplied by reclaimed water "if and when" it becomes available (URS, 2011b). Thus, BP Watson and Watson Cogeneration (including all five trains) would utilize municipal water from the California Water Service Company and groundwater from on-site wells as the project's primary water supply at volumes up to the baseline levels for the existing four-train Watson Cogeneration Project.

The BP Carson Refinery is implementing a program, separate from the BP Watson project, to convert industrial water uses to reclaimed supplies. The applicant asserts that the BP Carson Refinery is pursuing a program to receive additional nitrified and reverse osmosis (RO) reclaimed water from the West Basin Municipal Water District (WBMWD) for a portion of operational water needs at the existing Watson

Cogeneration facility, BP Watson project, and the BP Carson Refinery. The BP Watson project proposes to use tertiary treated water (reclaimed water) that is further treated through single pass reverse osmosis or nitrification supplied by the WBMWD to augment and replace (to the extent possible) the use of freshwater for operations at BP Watson (all five trains) (URS, 2011b). However, BP Carson Refinery and WBMWD have been in negotiations since June 2008, and WBMWD indicates they have not been successful in reaching an agreement with BP Carson Refinery to supply additional reclaimed water supplies to the refinery and Watson in over three years of negotiations (CEC, 2011e).

Since the primary purpose of the BP Watson project is to provide steam to the BP Carson Refinery, total water supply for the BP Watson project would be significantly greater than for a combined cycle generating facility of a similar capacity that primarily generates electricity. The average annual water demand for the BP Watson fifth train would be approximately 2,724 acre-feet (URS, 2011b). This total demand includes approximately 2,286 AFY of treated process water (1,279 AFY of treated freshwater and 1,007 AFY of condensate return) and 439 AFY of cooling tower makeup (URS, 2011c). The BP Watson fifth train would have an average daily consumption of 2.43 million gallons and a maximum daily consumption of 2.66 million gallons of freshwater (URS, 2011b). The BP Watson project would supply approximately 1.88 mgd or 2,111 AFY of process steam and 0.07 mgd or 79 AFY of high pressure water to the BP Carson Refinery (Watson, 2011b). The water use efficiency for BP Watson project generation, i.e. total water supply less the steam and water supplied to the BP Carson Refinery, is about 534 AFY or about 6.3 AFY/MW, which is typical for wet cooled combined cycle power plants in California.

The BP Watson project would also utilize about 30 gpm or about 48 AFY for evaporative cooling of inlet air for the combustion turbine generators to increase power output. The proposed two additional mechanical draft cooling tower cells would use approximately 272 gpm or 439 AFY of freshwater. There will be approximately 3.4 cycles of concentration of the combined cooling tower makeup (Watson, 2009a).

Water usage rates are summarized below in **Soil & Water Table 3.**

Watson indicates that the Watson Cogeneration facility currently receives approximately 45 percent of water supplied as steam to its HRSG as returned condensate from its STGs and the BP Carson Refinery. This condensate displaces the use of treated water by the cogeneration facility. The BP Watson project would also utilize this condensate supply to reduce project water consumption (URS, 2010a). Watson indicates that about 1,007 AFY of condensate return would be utilized for process water (URS, 2011c).

Soil & Water Table 3
BP Watson Fifth Train Water Usage Rates

Water Use	Average Daily (mgd)	Maximum Daily (mgd)	Average Annual (acre-feet)
Treated Makeup Water	1.14	1.17	1,279
Condensate Return	0.90	0.90	1,007
Total Treated Process Water	2.07	2.04	2,286
Nitrified Reclaimed Water	0.39	0.59	439
Total Water Use	**2.43**	**2.66**	**2,724**
Process Steam to BP Carson Refinery	1.88	1.88	2,111
High Pressure Water to BP Carson Refinery	0.07	0.07	79
Evaporation – Cooling Tower Cells	0.28	0.41	310
Evaporation – CTG Inlet Air Coolers	0.07	0.4	48
Net Water Use for Generation (Supply less Steam & Water to Refinery)	0.48	0.71	534

BPW, 2009a Table 5.5-4,
[1] Evaporation from Cooling Towers includes both steam and drift (water droplets) discharged from cooling towers

The water supply for the BP Watson project will be provided using the BP Carson Refinery's existing supply lines for groundwater (pumped from onsite wells), blended water (onsite groundwater blended with municipal water) and municipal water. Raw freshwater would be treated by Watson's dedicated water treatment system prior to use as process water. Energy Commission staff requested information regarding Watson's dedicated water treatment facility including the efficiency of the treatment processes and costs for operations and maintenance. However, the Applicant objected to providing information regarding the onsite water treatment processes that would be utilized for the proposed project because the onsite treatment for the existing Watson Cogeneration and for the proposed BP Watson project was "not relevant to the proposed project and unduly burdensome" (URS, 2011c). Lacking the details of the onsite water treatment processes proposed for use to treat water for the proposed fifth train, staff will analyze raw water amounts and use rates.

When delivery of RO water and nitrified water from WBMWD is increased to supply the BP Watson project at levels above a combined 5 train cap, the additional reclaimed water would be routed to the BP Carson Refinery in existing recycled water supply lines from the Carson Regional Water Recycling Facility. The RO water would augment, and to the extent possible, replace freshwater as the primary source of process water for the project. The RO water would require additional treatment by second pass RO prior to use for steam generator (HRSG) makeup and CTG inlet fogger supplies. This water may also require conditioning prior to its use. Cooling tower makeup water would be provided by second pass RO treatment reject water augmented by nitrified reclaimed water. Cooling tower water would be chemically conditioned with sulfuric acid to reduce alkalinity and to control scaling, polymeric dispersant to further inhibit scale, and sodium hypochlorite to prevent bio-fouling.

Potable water would be provided from the connection at the existing Watson Cogeneration facility. The potable water is supplied by California Water Services Company. Potable water will be utilized for eye wash stations, safety showers, and domestic uses. Watson did not provide an estimate of the anticipated potable water use by the BP Watson project. However, it is not expected that potable supply would be considerably higher than potable use at the existing Watson Cogeneration facility.

Process and Sanitary Wastewater

Wastewater streams from the existing Watson Cogeneration facility including process wastewater, cooling tower blowdown, boiler blowdown, boiler feedwater reject, and stormwater runoff from contact areas are routed to the BP Carson Refinery's oily-water treatment system. The oily-water treatment system removes free oil and suspended solids, which are recovered and reused at the BP Carson Refinery. Treated wastewater is delivered to a storage tank at the BP Carson Refinery before being discharged to the LA County Sanitation District's joint treatment facility in Carson. Solids remaining from the hydrocarbon recovery process are disposed of offsite as a hazardous waste at a Resource Conservation and Recovery Act (RCRA) approved incineration facility (Watson, 2009a).

The BP Watson project would also discharge wastewater to the BP Carson Refinery oily-water treatment system. The primary source of wastewater would be cooling tower blowdown water which will consist of nitrified reclaimed water and RO reject water concentrated through evaporative losses in the cooling towers. The wastewater would also include residual chemicals used to control scaling and bio-fouling of the cooling towers (Watson, 2009a).

Process wastewater from the boiler feedwater treatment system would also be discharged to the BP Carson Refinery oily-water treatment system. The boiler feedwater system would use a lime/zeolite softening process that generates a lime slurry that would be routed to holding tanks to allow solids to settle out of suspension. The remaining liquids would be returned to the process wastewater stream. A brine solution utilized to regenerate the zeolite softener would be discharged to the process wastewater stream.

As discussed above, stormwater from the power block area would also be discharged to the BP Carson Refinery oily-water treatment system. In addition, wastewater and stormwater from equipment drains that may contain oil would be discharged to the oily-water treatment system.

The industrial wastewater generated by the BP Watson project would be approximately 80 gpm on average and 138 gpm as a maximum. The daily volume of industrial wastewater would be approximately 134,000 gallons on average with a maximum of approximately 199,000 gallons (Watson, 2009a).

The stormwater runoff from the BP Watson project discharged to the BP Carson Refinery's oily-water system would be highly variable depending on rainfall. The estimated 100-year, 24 hour peak discharge from the fifth train is approximately 9.1 cfs or 4,090 gpm. The total volume generated by the 100-year event is estimated to be 42,983 cubic feet or 320,839 gallons. The maximum discharge condition would occur

with the maximum daily wastewater production coupled with the 100-year storm. The peak discharge to the oily water treatment system would be approximately 4,229 gpm. The storage capacity of the existing tanks, basins, and reservoirs associated with BP Carson Refinery's oily water treatment system is approximately 115 million gallons or about 15.4 million cubic feet (URS, 2010a).

The wastewater discharge limits are set forth in the industrial waste discharge permit for the BP Carson Refinery. The BP Carson Refinery has provided a letter to Watson acknowledging that the oily water treatment system has sufficient capacity to accept the waste stream from the fifth train while meeting its permitted discharge requirements (Watson, 2009a).

The existing sanitary system for the Watson Cogeneration facility discharges to a sanitary sewer that delivers wastewater to the LA County Sanitation District. This connection is designed for the sanitary flow from the administration and control building and will not change as part of the BP Watson project (Watson, 2009a). The sanitary waste drains for the project will connect to the existing system at the Watson Cogeneration facility.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This section provides an evaluation of the expected direct, indirect and cumulative impacts to soil and water resources caused by construction, operation and maintenance of the project. Energy Commission staff's analysis of potential impacts consists of a brief description of the potential effect, an analysis of the relevant facts, and application of the threshold criteria for significance to the facts. If mitigation is warranted, Energy Commission staff provides a summary of Watson's proposed mitigation and a discussion of the adequacy of the proposed mitigation. If necessary, Energy Commission staff presents additional or alternative mitigation measures and refers to specific conditions of certification related to a potential impact and the required mitigation measures. Mitigation is designed to reduce potentially significant project impacts to a level that is less than significant.

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

The proposed BP Watson project was evaluated to determine whether its construction or operation would result in erosion of soils, the discharge of sediments into surface waters or the contamination of either groundwater or surface water. Staff also evaluated the potential of the project's proposed freshwater use to cause a significant depletion or degradation of local and regional water resources.

There are extensive regulatory programs in effect designed to prevent or minimize these types of impacts. Compliance with these programs, absent unusual circumstances, will ensure that significant impacts do not occur. The regulatory procedures typically offer a suite of options for addressing the potential impacts and include performance standards so that impact avoidance or minimization is ensured.

To evaluate potential significant impacts to soil or water resources, staff assessed:

- If construction or operation would lead to accelerated wind or water erosion and sedimentation.
- If the project would exacerbate flood conditions in the vicinity of the project.
- If the project's proposed freshwater supply including locally pumped groundwater would cause a substantial, or potentially substantial, adverse impact to the quantity or quality of local groundwater including due to sea water intrusion.
- If the project's proposed freshwater supply including imported surface water would cause a potentially significant adverse impact to regional water supplies derived from the State Water Project and the Colorado River.
- If project construction or operation would lead to degradation of surface or groundwater quality.
- If the project would comply with all applicable LORS.

These criteria are based on the California Environmental Quality Act (CEQA) Guidelines and performance standards. The threshold of significance for project impacts is based on the ability of the project to be built and operated without violating applicable erosion, sedimentation, flood, surface or groundwater quality, water supply, or wastewater discharge standards.

The federal, state, and local LORS and policies presented in **Soil & Water Table 1** represent the applicable standards used for the OGS analysis. These LORS support a comprehensive regulatory system, with adopted standards and established practices designed to prevent or minimize adverse impacts to soil and water resources. For those project impacts that exceed standards or result in a significant adverse impact, conditions of certification may be necessary to ensure compliance with standards or require mitigation measures to reduce the impacts to a less than significant level.

DIRECT/INDIRECT IMPACTS AND MITIGATION

The direct and indirect impact and mitigation discussion presented below is divided into a discussion of impacts related to construction and operation. For each potential impact evaluation, Energy Commission staff briefly describes the potential effect and applies the threshold criteria for significance to its analysis. If mitigation is warranted, Energy Commission staff provides a summary of Watson's proposed mitigation and a discussion of the adequacy of the proposed mitigation. In the absence of an Applicant-proposed mitigation or if mitigation proposed by Watson is inadequate, Energy Commission staff mitigation measures are recommended. Energy Commission staff also provides specific conditions of certification related to a potential impact and the required mitigation measures.

Construction Impacts and Mitigation

Construction of the BP Watson project will include asphalt removal, demolition of existing structures, soil excavation, soil stockpiling, grading, and connection to existing utility lines. Water will be used primarily for dust suppression and moisture conditioning during construction. Potential impacts to soils related to increased erosion or the

release or migration of hazardous materials are possible during construction activities. Potential stormwater impacts could result if increases in the runoff flow rate and volume discharged from the site were to increase flooding downstream. Water quality could be impacted by the discharge of eroded sediments from the site or hazardous materials released during construction. Project water demand could affect quantity of water resources. Potential construction related impacts to soil, stormwater, water quality and quantity, including Watson's and Energy Commission staff's proposed mitigation measures are discussed below.

Soil Erosion Potential

Construction activities can lead to adverse impacts to soil resources including increased soil erosion, soil compaction, loss of soil productivity, and disturbance of soils crucial for supporting vegetation. Activities that expose and disturb the ground surface leave soil particles vulnerable to detachment by wind and water. Soil erosion could result in increased sediment loading to nearby receiving waters including the Dominguez Channel.

The magnitude, extent and duration of those impacts would depend on several factors, including the proximity of the BP Watson site to surface water, the type of soils affected, and the method, duration, and time of year of construction activities. Prolonged periods of precipitation, or high intensity and short duration runoff events coupled with earth disturbance activities can result in on-site erosion. In addition, high winds during grading and excavation activities can result in wind borne erosion leading to increased particulate emissions that adversely impact air quality. The implementation of appropriate erosion control measures will help conserve soil resources, maintain water quality, prevent accelerated soil loss, and protect air quality.

Construction of the BP Watson project would permanently disturb approximately 2.5 acres within the existing Watson Cogeneration facility. The construction laydown and parking area is currently paved and will not require additional land disturbance during construction. BP Watson does not include the construction of any off-site linear utilities.

The project site is flat and approximately level with the adjacent existing facilities. During construction activities the existing paving and gravel at the project site would be removed to prepare for the installation of the foundations and other underground facilities. This area would have an increased potential for erosion while the soil is exposed.

In the absence of proper BMPs and due to the soil types, the project earthwork could cause significant fugitive dust and erosion. In reference to **Soil & Water Table 2**, the predominant surface soil classifications on the BP Watson site are coarse to medium in texture and range from sandy loam to light silty clay loam. The soil types have low water erosion potential and moderate wind erosion potential (Watson, 2009a).

Water and Wind Erosion

The BP Watson project site will be subject to wind and water erosion during construction. Project construction is planned over a period of about 24-months (URS,

2010a). Watson anticipates that dust suppression measures will be required during 15 months of the construction period.

Earthwork activities at the site would include removal of existing asphalt and gravel surface material, topsoil, vegetation, and debris; excavation and compaction of earth for the site grades; foundation excavation, and trenching for underground systems. The total volume of soil excavation at the site would be approximately 7,000 cubic yards. This material would be stockpiled on site to be used for fill. Material that is unsuitable for fill due to hazardous material impacts will be disposed of off-site. The potential soil disposal location has not been identified at this time.

The project site is expected to include the presence of expansive soils. Watson indicates that these soils will either be amended (by import of additional soils) to be suitable for construction or be removed and replaced with suitable material. The extent of the expansive soils is unknown at this time. An additional site-specific geotechnical investigation will be performed prior to construction activities for the BP Watson project to help identify areas of expansive soils (Watson, 2009a). Watson estimates that up to 7,000 cubic yards of engineered fill may need to be imported to the site (URS, 2010a).

Watson prepared a preliminary draft Drainage Erosion and Sediment Control Plan (DESCP) that provides conceptual plans for erosion and drainage control measures, including BMPs to be implemented during the construction phase of the BP Watson project. Watson has proposed the following erosion control measures: scheduling to minimize disturbed areas exposed during the rainy season; application of water or dust palliatives to provide dust control at disturbed areas, haul roads, and parking areas; stockpile management including covering; and perimeter sediment barriers. Watson has also proposed the following sediment treatment control measures to trap eroded sediments: use of silt fences; straw bale barriers; storm drain inlet protection; stabilized construction and site entrance/exits; and street sweeping and vacuuming (URS, 2010a). During construction, stormwater runoff from the fifth train power block area would be directed to the BP Carson Refinery's oily water treatment system. Runoff from the southern portion of the fifth train and the remainder of the existing Watson Cogeneration facility, including areas redeveloped as part of BP Watson, would continue to drain to the existing storm drain system and subsequently the Dominguez Channel. The construction laydown area would be separated from the parking area using Jersey barriers (or K-rails) and sand bags. Storm drain inlet protection measures would be used at the existing inlets in the laydown area to prevent sediments from being discharged directly to the Dominguez Channel.

Watson believes that the relatively flat site, the existing stormwater collection system, and the use of construction BMPs will reduce the potential for soil loss and erosion to a negligible level. Watson has indicated that large scale measures such as sediment traps, retention basins and drainage diversions would not be necessary at the project site.

Energy Commission staff agrees that proper application of erosion control and sediment control BMPs can reduce the impact to soil resources from wind and water erosion to a level that is less than significant. During active excavation and along construction roads, watering would need to be applied several times per hour to limit significant wind

erosion and fugitive dust emissions, especially during periods of high winds. Routing stormwater runoff from the power block area to the BP Carson Refinery's oily-water treatment system would help limit discharge of eroded sediment to adjacent waterways. The final DESCP should identify the quantities of soil that may be imported or exported from the site, and provide specific BMPs to limit impacts related to wind and water erosion during loading and transport activities. Proper implementation and maintenance of the BMPs outlined in an approved DESCP would limit erosion and migration of soils from the BP Watson site and into downstream waterways including the Dominguez Channel.

Energy Commission staff believes the proposed plans are reasonable at this level of project planning to avoid significant adverse impacts due to wind and water erosion. Condition of Certification **SOIL&WATER-1** would require Watson to prepare a final DESCP for both construction and operations, to assure these BMPs are implemented, and to identify post-construction BMPs to stabilize the project site. Similar to the DESCP and in accordance with federal law, the RWQCB specifies that Watson is to prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) for construction activity which is required under Condition of Certification **SOIL&WATER-2**.

Soil and Groundwater Contamination

The Phase I ESA found that current and historic uses of the existing Watson Cogeneration facility and surrounding area within the BP Carson Refinery indicate that soil and groundwater at the BP Watson site could potentially be impacted by hazardous substances used in petroleum and maintenance operations. A limited soil investigation at the site in 1985 found evidence of hydrocarbons in the fill and underlying native soils. The Los Angeles Regional Water Quality Control Board (LARWQCB) has indicated that groundwater below the project site is significantly impacted by hydrocarbons including up to 14 feet of non-aqueous liquid phase petroleum hydrocarbons on the groundwater surface above the shallow water table. The data presented by the LARRWQCB indicate that there may be a hydrocarbon source area at or in the near vicinity of the fifth train project site.

Watson indicates that during the project geotechnical assessment activities, soil samples will be collected in areas where ground disturbance is planned within the project footprint, and analyzed to investigate the subsurface soils for petroleum hydrocarbon impacts. During the project geotechnical assessment and during construction activities, any excavated soil would be managed pursuant to applicable Refinery soils management plans, and health and safety of site personnel will be managed in accordance with the site specific health and safety plan and applicable refinery procedures. Watson has indicated that any contaminated materials encountered during construction would be temporarily stockpiled onsite and disposed of offsite in accordance with all applicable LORS. Prior to excavation at the site, a pre-assessment would be conducted to determine if any excavation will need to follow regulations (40 CFR 63 Subpart GGGGG and Air Quality Management District Rule 116) for air emission from excavated soil contaminated with volatile organic compounds (Watson, 2009a). Workers would be instructed on proper BMP management as well as common sense practices to minimize the risk of exposure to soil contaminants. This

includes instruction to recognize evidence of contaminated soil and avoiding handling of potentially contaminated material without proper training (Watson, 2009a).

Watson indicates that they will submit information on hydrocarbon impacts to soils and groundwater in the vicinity of the Watson site in response to the LARWQCB's June 30, 2011 response to the CEC's request for LARWQCB participation (URS, 2011c). Watson did indicate that the BP Refinery has been monitoring groundwater via a network of more than 300 monitoring wells (URS, 2011c). However, thus far Watson has not submitted any groundwater monitoring data either related to groundwater depths or analyses in response to multiple Energy Commission staff requests.

There has been no specific detail provided on how and if hydrocarbon impacted soil and groundwater below the project site would be remediated. Watson did indicate that there are 22 recovery wells throughout the BP Carson Refinery used to remove hydrocarbon freeproduct and contaminated groundwater (URS, 2011c). Watson indicates that some of the recovery system is focused on the area directly downgradient of the project site. This limited information supports Energy Commission staff's concern that there could be a significant hydrocarbon source area at the proposed fifth train site.

It is not clear if additional excavation beyond the minimum required for project construction will be required to remove hydrocarbon impacted soils. Energy Commission staff has requested that Watson provide detailed information on the extent of soil and groundwater contamination at the site and Watson's plans to remediate the existing soil and groundwater contamination (CEC, 2011b).

Of particular concern is that construction of the fifth train could limit options for remediation of soil and groundwater impacted by hydrocarbons including the capture of floating hydrocarbons on the groundwater surface. If existing levels of hydrocarbon impacts are significant, soils and groundwater may need to be remediated to acceptable levels as needed to manage human health risks, ecological risks, and to prevent the existing hydrocarbons from migrating off site and causing significant adverse impacts to neighboring properties.

A Phase II ESA (potentially performed with the project geotechnical assessments) would provide more detailed information regarding the extent and location of any existing soil and/or groundwater contamination. Following completion of the soils and groundwater investigation or Phase II ESA, Watson would need to prepare a site-specific Soil Management Plan (SMP) which would address soil and groundwater contamination and the level of associated risks to workers and nearby environments. The SMP should include an ecological risk screening to help guide decisions on the levels of soil contamination that require removal or remediation to protect the environment including the Dominguez Channel adjacent to the site and San Pedro Bay. The SMP would provide instructions for soil handling, stockpiling, and dust and erosion control during construction including BMPs to specifically address impacted soils. Please refer to the **Waste Management** section for more detailed analysis of the existing hydrocarbon impacts and requirements for remediation to mitigate potentially significant adverse impacts.

The implementation and routine maintenance of erosion control measures as required by the DESCP, SWPPP, and SMP would limit the potential for existing contaminants to migrate offsite through wind and water borne erosion. See the **Waste Management** Section for further discussion of potential soil and groundwater contamination and conditions of certification proposed for mitigation of any potential impacts due to existing soil and groundwater contamination.

During construction, there is also the potential for hazardous chemicals to be released from construction equipment or materials storage areas which could cause potentially significant soil or groundwater contamination impacts. Watson identified a number of BMPs related to construction equipment in the draft DESCP including: use of a temporary fueling area for construction equipment and use of drip pans or absorbent pads in maintenance areas. Watson indicated that hazardous liquids would be stored in a separate enclosed building within one or more containment facilities. The diesel storage tank will be double walled with the capacity to store 100 percent of the tank volume to prevent a release in the event of a leak (URS, 2010a).

Energy Commission staff believes that these measures will be effective in preventing migration of existing soil and groundwater contamination and to limit the potential for a release of hazardous materials to cause adverse impacts to soil and groundwater during construction of the proposed BP Watson project. Condition of Certification **SOIL&WATER-2** requires Watson to prepare and implement a SWPPP for construction activity as specified by the RWQCB. The Construction SWPPP would provide details on BMPs for soil stockpile management, construction equipment maintenance and fueling, and hazardous materials storage.

Stormwater

Construction of the BP Watson project could lead to flooding or water quality impacts related to stormwater runoff during the construction period. Flooding in the vicinity of the project site could also increase if peak runoff flow rates discharged from the BP Watson project increase. Water quality could also be adversely impacted if the stormwater drainage pattern concentrates runoff in areas that are not properly protected with BMPs causing erosion of soils and discharge of sediment into down-gradient surface waters. Potentially significant water quality impacts could occur during construction, excavation, and grading activities if contaminated soil or other hazardous materials used during construction were to contact stormwater runoff and drain off-site.

The BP Watson site is located in a highly developed industrial and commercial area within the City of Carson. The project site is located within the existing Watson Cogeneration facility and is covered pavement and gravel. Currently, stormwater runoff from the existing Watson Cogeneration facility including the BP Watson site flows to the existing onsite storm drain system which discharges to Dominguez Channel east of the existing Watson Cogeneration facility.

The construction of the BP Watson project will change the drainage patterns at the existing site. The fifth train power block is approximately 1.8 acres and would be isolated from the remainder of the existing site by the construction of a drivable earthen berm (URS, 2010a). The BP Watson project would utilize both the existing storm water drainage system and existing oily water treatment system during construction. During

the initial phases of construction, stormwater would be routed away from the fifth train and the proposed storm drain system would be installed. Stormwater runoff from the fifth train power block area would be captured in a number of catch basins and subsequently routed to the BP Carson Refinery's oily water treatment system. Runoff from the remainder of the power block area, as well as the maintenance shop and transformer areas included in the BP Watson project, approximately 0.7 acres, would continue to discharge to the existing storm drain system during and following construction.

Watson has indicated that there is sufficient capacity in the BP Carson Refinery's existing oily water treatment system to accept the stormwater runoff generated from the BP Watson project. It is estimated that 10-year and 100-year peak runoff from the BP Watson site would increase by approximately 2.5 percent as compared to existing conditions. The peak discharge to the oily water treatment system is estimated to be 5.92 cfs and 9.11 cfs for the 10-year and 100-year events, respectively. The estimated volume of runoff to the oily water system would be approximately 27,500 cubic feet and 42,900 cubic feet for the 10-year and 100-year events, respectively. Runoff discharged to the Dominguez Channel would be reduced because runoff from the fifth train power block area would be discharged to the oily water system rather than the storm drain system. This would prevent flooding related impacts downstream of the BP Watson site due to an increase in stormwater runoff.

The construction laydown area will not require any land disturbance and the drainage pattern will not be modified from existing during or following construction. Runoff currently flows to catch basins in the parking lot area which are connected to a storm drain system that discharges to the Dominguez Channel. Stormwater runoff from the laydown area would not increase or cause any flood related impacts along the Dominguez Channel.

Watson prepared a preliminary draft DESCP in response to Energy Commission staff's comments, providing conceptual plans for stormwater management measures during the construction and operation phases of the BP Watson project. Sediment trapping BMPs including: silt fences; straw bale barriers; storm drain inlet protection; stabilized construction and site entrance/exits; and street sweeping and vacuuming would limit discharge of eroded sediment into stormwater runoff (URS, 2010a). Stock pile management BMPs would limit erosion of sediments potentially impacted by hazardous materials into stormwater runoff. Implementation of vehicle fueling and maintenance BMPs and hazardous materials storage BMPs will limit the potential for hazardous materials used during construction to be released into stormwater at the site. Routing of stormwater runoff from the fifth train power block area to the BP Carson Refinery's oily water treatment system will also limit the potential for sediments and hazardous materials to be discharged in stormwater leaving the BP Watson project during construction. The final DESCP will need to identify specific locations for proposed BMPs and provide calculations to demonstrate that numerically sized BMPs meet CASQA and Los Angeles County standards.

Energy Commission staff has reviewed Watson's stormwater management plans and believes that Watson has identified a reasonable conceptual level BMP plan that will avoid significant adverse impacts related stormwater drainage and water quality during

construction. Condition of Certification **SOIL&WATER-1** would require Watson to prepare a Final DESCP for both construction and operations. The Regional Water Quality Control Board (RWQCB), in implementing federal law, requires that Watson prepare and implement a SWPPP for construction activity; this is reflected in Condition of Certification **SOIL&WATER-2**. Additionally, Condition of Certification **SOIL&WATER-3** requires Watson to prepare and submit for approval a Standard Urban Stormwater Mitigation Plan (SUSMP) as required under Los Angeles County's MS4 NPDES Permit. The SUSMP will identify pollutants of concern and identify the means to minimize the discharge of these pollutants from the project site including the use of numerical design standards for water quality treatment BMPs.

Energy Commission staff believes that through the proper sequencing construction activities and the application of BMPs, impacts to soil and water resources from stormwater drainage during construction will be reduced to a less than significant level.

Construction Water Supply

Watson has indicated that water will be required for dust suppression and miscellaneous activities during construction. It is estimated that the total water use would be 20,000 gallons per month during the 15-month construction period for a total of 300,000 gallons (Watson, 2009a). The existing reclaimed water system at the BP Carson Refinery will be used to provide construction water. Potable water for the construction workforce will be provided from the existing Watson Cogeneration facility from a bottled water purveyor.

Energy Commission staff believes that construction water supply may be underestimated for periods of significant grading activities. 20,000 gallons per month equates to about 115 gallons per hour which may not be sufficient to control dust at the site and provide moisture for soil compaction during major grading operations. Watson should be prepared to deliver additional water as necessary for dust control and other construction needs. Energy commission staff believes that up to 2,000 gallons per hour may be required to control dust emissions during active grading with moderate to high winds. Energy Commission staff believes that there is adequate water supply available at the existing Watson Cogeneration facility to suppress dust during construction, and do not expect significant wind erosion impacts due to limited construction water supplies. Energy Commission staff believes that the use of reclaimed water from the existing on-site facilities for dust suppression and miscellaneous construction activities will have a less than significant impact on the existing water supply resources.

Groundwater – Dewatering

A geotechnical report performed for the project site in 1986 indicated that water was not found during subsurface investigations to a depth of 65 feet. It is not anticipated that groundwater would be encountered during construction of the BP Watson project facilities and dewatering would not be required during construction. An additional geotechnical investigation is planned for the project site to support detailed design activities (Watson, 2009a). Information gathered during the planned geotechnical investigation would be utilized to further address the potential for groundwater to be encountered during construction activities.

The final DESCP and SWPPP would need to address potential dewatering during construction of BP Watson, including any information obtained during the Phase II site investigation regarding groundwater contamination and required treatment. Watson would need to address any potential groundwater dewatering in the final DESCP and SWPPP above documents in order to meet the Conditions of Certification **SOIL&WATER-1** and **-2.**

Wastewater

Construction wastewater generated onsite would include equipment washdown water, water from pressure testing the service utilities, and concrete washout wastewater. Watson has not provided an estimate of the volume of wastewater generated onsite resulting from construction activities. Equipment washdown water and utility pressure testing water would be discharged to BP Carson Refinery's oily water treatment system. Concrete washout water and slurries would be discharged to an onsite facility for drying. The facility would provide sufficient capacity to contain all concrete washout wastes and wastes collected from any saw cutting operations (URS, 2010a).

Sanitary facilities would consist of portable chemical toilets and a holding tank at the construction office building. It is estimated that during construction, the project would generate approximately 450 gallons of sanitary waste per week (Watson, 2009a).

Improper handling or containment of construction wastewater could cause a broader dispersion of contaminants to soil, groundwater or surface water. The final DESCP and SWPPP should address the total estimated wastewater to be generated during construction, both for discharge to the existing oily water system and for the concrete washout containment. During construction, wastewater (including any groundwater generated by dewatering activities) would be managed with BMPs identified and implemented in accordance with the DESCP consistent with Condition of Certification **SOIL&WATER-1** and the construction SWPPP required by the RWQCB, consistent with Condition of Certification **SOIL&WATER-2**. Energy Commission staff concludes that no significant impacts from construction wastewater will occur provided that all construction wastewater is handled in accordance with BMPs described in the project's construction SWPPP and DESCP.

Operation Impacts and Mitigation

Operation of BP Watson could lead to potential significant impacts to soil, stormwater runoff, water quality, and water supply. Soils may be potentially significantly impacted through erosion or the release of hazardous materials used in the operation of BP Watson. Stormwater runoff from BP Watson could result in potential significant impacts if increased runoff discharged from the site leads to increases in downstream flooding. Water quality could be significantly impacted by discharge of eroded sediments or hazardous materials released during operation. Water supply for plant processes, fire protection, and potable uses could lead to potential significant impacts to quantity or quality of regional water resources. Of particular concern is the potential for the project's use of groundwater to cause significant sea water intrusion impacts to the aquifer. Wastewater discharge could cause impacts to downstream receiving waters if the quantity or quality of wastewater discharged exceeded the limitations of the wastewater treatment system. Potential significant impacts to soil, stormwater, water quality,

flooding, water supply, and wastewater related to the operation of BP Watson including Watson's proposed mitigation measures and Energy Commission staff's proposed mitigation measures, are discussed below.

Soil

During operation of the BP Watson project, the site would be covered with impervious surfaces and gravel leaving no soil exposed. Hazardous materials used in operations of the BP Watson project will be stored at the existing Watson Cogeneration facility in storage areas equipped with curbs or containment dikes to contain spills or leaks. As a result, impacts to soils related to erosion or hazardous materials handling during operations will not be significant.

Condition of Certification **SOIL&WATER-1** requires the implementation and maintenance of drainage and erosion control measures during operations according to plans as specified in the DESCP. Condition of Certification **SOIL&WATER-4** requires the preparation and implementation of an Industrial SWPPP as specified by the RWQCB. The Industrial SWPPP would include BMPs to protect stormwater from impacts related to soil erosion and hazardous materials release. With implementation and maintenance of the BMPs detailed in the required plans, Energy Commission staff believes there would be no significant impacts to soil resources during operation of the BP Watson project.

Stormwater

Energy Commission staff examined several potential significant impacts to stormwater. The proposed stormwater management plans were examined to determine if the BP Watson project could cause significant flooding or water quality impacts for stormwater discharged from the site. Significant flooding impacts could occur along the Dominguez Channel downstream of the site if runoff peak flow rates or volumes discharged from the BP Watson project increased as compared to existing conditions. Water quality impacts could occur if hazardous materials or eroded sediments were released in runoff discharged from the site.

During operations, the BP Watson site will be paved with asphalt, concrete, and gravel. Stormwater runoff from the 1.8 acre fifth train power block would be routed to the BP Carson Refinery's oily water treatment system and ultimately discharged to Los Angeles County Sanitation District's Wastewater Treatment Plant. Stormwater runoff from the remaining component areas (approximately 0.7 acres) of the BP Watson site would be routed to the existing storm drain system and discharged to the Dominguez Channel.

Energy Commission staff reviewed the storm water runoff calculations provided by Watson to evaluate the potential for flooding impacts along the Dominguez Channel downstream of the BP Watson project. The post development runoff coefficient for the project site will increase slightly over existing conditions due to additional paving planned at the project site. Watson provided runoff calculations for the existing Watson Cogeneration facility for pre-, post-development conditions including the fifth train power block. The pre- and post development discharges for the 10-year and 100-year events are summarized in **Soil & Water Table 4,** below. Based on the hydrology calculations presented, stormwater runoff (peak flow rates and volumes) discharged to the

Dominguez Channel from the existing Watson Cogeneration facility would decrease as a result of the BP Watson project because the proposed project would remove 1.8 acres from the area contributing runoff to the existing storm drain system. Energy Commission staff concluded that the BP Watson project would not create significant flooding related impacts along the Dominguez Channel.

A Will Serve letter from BP Carson Refinery indicates that the oily water treatment system has sufficient capacity to accept and treat the additional stormwater runoff from the fifth train area (URS, 2010a). The Refinery's oily water treatment system includes storage tanks and reservoirs with a total storage capacity of about 15.4 million cubic feet. The 100-year stormwater runoff volume (42,890 cubic feet) is about 0.28 percent of the total storage capacity in Refinery's oily water treatment system (URS, 2010a). Based on the Will Serve letter and storage volume available, Energy Commission staff concluded that the Refinery's oily water treatment system would have adequate capacity to handle runoff from the fifth train power block at the BP Watson project.

Energy Commission staff also reviewed Watson's conceptual BMPs for hazardous materials management to limit potentially significant water quality impacts. Secondary containment structures would be built around the oil-filled equipment to prevent dispersion in case of a spill. Hazardous materials would be stored at the existing Watson Cogeneration facility in storage areas equipped with curbs or containment dikes to contain spills or leaks. Solid wastes and small amounts of hazardous waste that are generated at the BP Watson project would be properly accounted for, tracked, handled, and disposed of off-site using licensed transporters and disposal facilities. Based on the proposed BMPs for hazardous materials management, Energy Commission staff concluded that the BP Watson project would not result in significant water quality impacts related to a release of hazardous materials.

Soil & Water Table 4
Predevelopment and Post-Development Stormwater Runoff

Site Condition	Area (ac)	Q10 Discharge (cfs)	Q100 Discharge (cfs)	Q10 Volume (ft^3)	Q100 Volume (ft^3)
Pre-development					
Discharge to Storm Drain System	21.7	68.6	105.8	319,650	500,070
Discharge to Oily Water System	0.0	0.0	0.0	0	0
Total	21.7	68.6	105.8	319,650	500,070
Post-development					
Discharge to Storm Drain System	19.9	64.5	99.2	299,500	467,140
Discharge to Oily Water System	1.8	5.9	9.1	27,500	42,890
Total	21.7	70.4	108.3	327,000	510,030

(URS, 2010a)

Energy Commission staff also reviewed Watson's proposed water quality treatment plans to determine if the proposed plans would meet the standards set forth in the Los Angeles County's Municipal Stormwater NPDES Permit (MS4 Permit). The BP Watson project includes about 0.7 acres of development that would route stormwater to the existing Watson Cogeneration facility's storm drain system with discharge to the Dominguez Channel. Currently, the existing Watson Cogeneration facility incorporates a visual inspection program prior to discharge into the Dominguez Channel. There is a valve upstream of the storm drain outfall that remains closed during dry weather. During storm conditions, personnel from the existing Watson Cogeneration facility inspect the accumulated water in the storm drain. If the water appears clean and clear, the valve is opened and storm water is discharged to the Dominguez Channel. If the water quality is questionable, a vacuum truck is used to remove the water from the sewer box until it is running clear.

Energy Commission staff obtained analysis results for water quality samples collected from the existing Watson Cogeneration facility's storm drain outfall from the Los Angeles RWQCB. The sample analysis results from January, April and November 2007, and January 2008 indicate that stormwater discharged from the existing Watson Cogeneration facility had levels of metals (chromium, lead, and zinc) above California MCLs, low level detections of several polynuclear aromatic hydrocarbons (PAHs), and elevated levels of fecal coliform and e-coli (BP Carson, 2007 and 2008). All samples contained levels of zinc (1.3 to 3.9 mg/l) above the U.S. EPA Benchmark Value for stormwater (0.117 mg/l). Two of the four samples contained levels of copper (0.09 to 0.093 mg/l) above the stormwater benchmark (0.0636 mg/l). One sample contained pyrene at 0.0068 mg/l, just below the benchmark of 0.01 mg/l. The Dominguez Channel Estuary is listed as an impaired water body due to high levels of a number of contaminants including chromium, lead, zinc, and PAHs (RWQCB, 2009).

The MS4 Permit requires all new development and redevelopment projects to minimize the discharge of pollutants of concern. Development projects are required to include water quality treatment BMPs to treat stormwater the "maximum extent practicable" to limit discharge of pollutants of concern. The MS4 Permit includes a numerical design standard for post-construction treatment BMPs to treat stormwater runoff from the first ¾ inch of rainfall (or for a flow rate generated by a rainfall intensity of 0.2 inches per hour) prior to discharge to a receiving water (RWQCB, 2009).

The stormwater sample analysis results indicate pollutants of concern are currently being discharged from the existing Watson Cogeneration facility including several at or above the EPA stormwater benchmark values. Energy Commission staff is concerned that the proposed stormwater discharge approach at the existing Watson Cogeneration facility and the BP Watson project (visual inspection and discharge) does not meet the "maximum extent practicable" standard. The MS4 Permit identifies a clear numerical treatment standard for a treatment control BMP for stormwater prior to discharge to the Dominguez Channel. Without implementation of a treatment control BMP, the BP Watson project could lead to potentially significant adverse impacts to stormwater quality in the Dominguez Channel. As part of the development of the BP Watson project, Watson should install a treatment BMP to target suspended sediment, metals, hydrocarbons, and PAHs in stormwater runoff discharged from all areas redeveloped as

part of the BP Watson project to comply with the MS4 Permit and to mitigate potentially significant adverse stormwater quality impacts.

The City of Carson has requested that Watson voluntarily implement water quality treatment BMPs that address the entire existing Watson Cogeneration facility (CEC, 2010f). The RWQCB is expected to adopt Total Maximum Daily Loads (TMDLs) for the Dominguez Channel within the next couple of years to address numerous pollutants of concern (CEC, 2010f). Once the TMDLs are adopted, the existing Watson Cogeneration facility and BP Carson Refinery will be required to install water quality treatment BMPs to address discharge of pollutants of concern under the Refinery's Industrial Stormwater NPDES permit (CEC, 2010f). Given the impending requirement for treatment, Energy Commission staff recommends that Watson implement water quality treatment for the entire existing Watson Cogeneration facility as part of the BP Watson project.

Given the highly industrial nature of the project site including existing impacts to soils and groundwater, Energy Commission staff recommends that Watson consider use of subsurface media filtration system sized to treat the runoff from the combined BP Watson project and existing Watson Cogeneration facility site. Provided that an appropriately sized treatment BMP that meets the MS4 Permit requirements is implemented with the BP Watson project, Energy Commission staff believes that potentially significant stormwater quality impacts would be mitigated to a less than significant level.

Conditions of Certification **SOIL&WATER-1**, **-3**, and **-4** require the project owner to prepare plans for implementing, monitoring and maintaining BMPs appropriate for the operating phase in the form of a DESCP, SUSMP, and SWPPP for Industrial activity. The goal of the DESCP as required by the Energy Commission is to provide detailed storm drainage and erosion control plans and to identify and implement appropriate BMPs to limit stormwater and erosion related impacts. The goal of the Industrial SWPPP as required by the RWQCB is to identify potential sources of contaminants that could be present during project operations, assure adequate BMPs for preventing pollution of soil and water resources are incorporated into the project's final design and implemented. Condition of Certification **SOIL&WATER-3** requires Watson to prepare and submit for approval a SUSMP as required under Los Angeles County's MS4 Permit. The SUSMP would identify pollutants of concern and the means to minimize the discharge of these pollutants from the project site using numerically sized BMPs. Compliance with Conditions of Certifications **SOIL&WATER-2**, **-3**, and **-4** will ensure there are no significant impacts or conveyance of pollutants to soil and water resources down-gradient of the project site.

Surface Water Flooding

The BP Watson site is designated as a "C" flood zone for flood management indicating that the project site is outside of the designated 100-year floodplain and the potential for flooding is low (Watson, 2009a). As discussed above, the peak discharge to the Dominguez Channel from the existing Watson Cogeneration facility would decrease as a result of the BP Watson project for both the 10-year and 100-year storm events. The proposed project would not alter drainage patterns or increase flow rates in Dominguez Channel. Energy Commission staff believes that the operation of the BP Watson project

would not adversely affect surface waters or increase flooding in the vicinity of the project site.

Project Operations Water Supply

Watson proposes to use the Watson Cogeneration Project's freshwater supply for the existing four train plant to supply the combined five trains. Watson proposes to maintain annual water supply at baseline levels of up to 4,609 AFY based on the previous 11 years of operation (2000-2010) of the Watson Cogeneration Project. Watson would utilize reclaimed water if combined Watson Cogeneration and BP Watson water use increased above the cap to allow the combined units to provide additional steam and high pressure water to the BP Carson Refinery. However, as currently proposed, the project does not have additional water supply secured beyond operating BP Watson under a combined Watson Cogeneration / BP Watson cap on freshwater use. Any increases in combined use water would be reclaimed water. The BP Watson fifth train would utilize about 1,718 AFY of water (URS, 2011b). However, Watson has not identified a reclaimed water supplier or secured a reclaimed water supply, and so the project may not able to meet its primary objective to provide additional (beyond quantities already supplied by Watson Cogeneration) steam to the BP Carson Refinery. Energy Commission staff examined the proposed freshwater supply to determine if the water use would result in significant impacts to existing water supplies or other users. The freshwater supply includes a blend of groundwater pumped at the BP Carson Refinery and municipal water comprised of 70-80 percent imported water and 20-30 percent groundwater. Energy Commission staff identified four areas of concern related to the proposed freshwater supply:

1. The "baseline" supply proposed by the applicant is based on the previous 11 years of water use at the existing four-train Watson Cogeneration Project including several years of significantly higher water use in the early 2000's and lower levels of water use during the past three to five years. Using the 11-year period of record to define "baseline" water use actually results in a significant increase in freshwater use as compared to the previous three to five years. Given the recent changes in water policy and the significant allocation reductions for the State Water Project over the past three years, increasing water supply as compared to the previous three years could cause significant impacts to other users who could face additional allocation reductions to make up for an increase in supply. However, the applicant does not adequately explain why it limited the water consumption information to the most recent 11 years.

2. The groundwater pumping in the West Coast Basin including pumping at the BP Carson Refinery contributes to sea water intrusion impacts to the West Coast Basin groundwater aquifer. To address these impacts, all pumpers in the basin (including BP Carson Refinery) pay fees to the Water Replenishment District of Southern California to operate the Dominguez Gap Water Replenishment Project with injection wells along the Dominguez Channel only 2,000 feet from the BP Watson project site. Energy Commission staff examined how the project's groundwater pumping contributes to the sea water intrusion impacts.

3. The California Constitution, California Water Code, State Water Resources Control Board policies, and Energy Commission Policies require industrial users such as the

BP Watson project to utilize reclaimed water if it is available at a cost comparable to existing freshwater supplies. Energy Commission staff worked with the West Basin Municipal Water District to compare the costs of providing reclaimed water for the BP Watson Project as compared to the proposed freshwater supply.

4. The proposed water supply rates for the fifth train are significantly higher than for a conventional gas fired, wet cooled facility because the primary purpose of the BP Watson project is to provide steam to the BP Carson Refinery. Energy Commission staff has identified efficiency targets for delivery of steam and high pressure water to the BP Carson Refinery that ensure that the BP Watson project efficiently utilizes water supplies required for electrical power generation while providing for the steam requirements at the BP Carson Refinery.

Energy Commission staff also examined the use of reclaimed water supply to augment the proposed freshwater supply to determine if the use of reclaimed water would result in significant impacts to existing water supplies or users or the environment. In addition, the use of reclaimed water, particularly for evaporative cooling, could pose a public health hazard if not treated to adequate standards. Finally, use of reclaimed water could lead to potentially significant impacts if the reclaimed water was to cross contaminate existing potable supply lines.

Baseline Water Supply

Watson has proposed to utilize the current freshwater supply for the existing Watson Cogeneration Project (four train plant) with no net increase in the average annual freshwater use for the BP Watson Project including all five trains. Annual water usage for the existing four-train Watson Cogeneration Project is presented below in **Soil & Water Table 5.**

Watson has identified the average annual raw freshwater use over the previous 11-years (2000-2010) of 4,609 AFY as the “baseline” water use for the Watson Cogeneration Project. The applicant arbitrarily chose to use an 11-year record and did not adequately explain why it chose an 11-year record. The plant has been operating since 1988, and water use data for a much longer period should be available to evaluate what the representative freshwater use is at the site. Staff requested all water use data for plant operations so a reasonable estimate of average or typical water use could be developed however, the applicant only provided water use data from the past 11 years of operations.

As seen in **Soil & Water Table 5**, average annual raw water use over the more recent three- and five-year periods (4,219 and 4,346 AFY) was significantly lower than earlier in the decade. The Applicant’s estimate of “baseline” water supply would actually result in an increase in total freshwater supply as compared to 2008-2010 period of 390 AFY or over a nine percent increase over the most recent three-year period.

CEQA guidelines (Section 15162) indicate that proposed projects with a previous Environmental Impact Report (i.e. the CEQA equivalent Energy Commission Staff Assessment) should be considered against the impacts considered in the original EIR. Thus, anticipated impacts for a currently proposed project should be compared to impacts analyzed in the original CEQA document. The Energy Commission staff

analysis for the Watson Cogeneration Project published in March 1986, considered the use of 2,577 gpm or about 4,157 AFY of freshwater for the Watson Cogeneration Plant (CEC, 1986). Thus, the Applicant's estimate of current baseline water supply at Watson Cogeneration is about 11 percent higher than the baseline water supply considered in the original licensing proceeding for the Watson Cogeneration Project.

Energy Commission staff is concerned that the proposed increase in freshwater supply would require an increase in groundwater pumping and/or an increase in imports from the State Water Project (SWP) and the Colorado River. Both the SWP and Colorado River have been experiencing historic shortages, and the groundwater basin is already significantly over pumped requiring an extensive water replenishment program to address sea water intrusion and local management through an adjudicated plan.

The SWP has experienced frequent reductions in water allocations to water supply districts due to regulatory restrictions during drought periods. During periods of limited allocations, water users serviced by SWP contractors are required to limit their use of water. South of the Delta, agricultural users have had full allocations only one of the past ten years and have had their allocations cut by 25-60 percent in seven of the past ten years and cut by 90 percent in 2009. In 2011, even with record levels of snowpack, allocations to agricultural users are currently only set at 80 percent, illustrating the new reality of ongoing reduced water supply allocations.

In Resolution 2010-0039, the State Water Resources Control Board recently determined that the Sacramento-San Joaquin Delta is in ecological crisis and that recent Delta flows have been inadequate to support aquatic habitat for endangered native fish species (SWRCB 2010). Returns of salmon on the Sacramento River have declined by 97 percent since 2002, reaching critical levels that required the suspension of commercial and recreational fishing in 2008 and 2009 (PMFC, 2010). The Delta Stewardship Council's Draft Delta Plan concluded that California's total water supply is oversubscribed (DSC, 2011). When water exports from the Delta are reduced, the consequence is increased demand on an already overused and unsustainable groundwater system (DSC, 2011). The Stewardship Council also concluded that the Delta system has already been altered to the extent that some native species may not survive (DSC, 2011).

In addition, as required in the Delta Reform Act (SBX7 1), the SWRCB released new flow criteria for the Delta in Resolution 2010-0039 designed to protect federal and state listed endangered species that depend upon aquatic habitat in the Delta for survival (SWRCB 2010). These criteria indicate that the Delta outflows should be increased to about 75 percent of natural unimpaired flows from November through June to support endangered fish species (SWRCB 2010). By comparison, during drought years in the early 1990s and early 2000s (coinciding with the highest water use at the Watson Cogeneration Project), outflows were reduced to about 30 percent of natural flows (SWRCB 2010). Thus, the SWRCB is recommending that Delta diversions would need to be cut by about 65 percent from the historic levels during drought years to address the significant impacts to the Delta.

Soil & Water Table 5
Average Annual Water Use – Watson Cogeneration Project (four trains)

Year	Average Daily Water Use (mgd)	Annual Water Use (acre-feet)
2000	4.0	4,481
2001	4.4	4,929
2002	4.5	5,041
2003	4.5	5,041
2004	4.2	4,705
2005	4.3	4,817
2006	4.0	4,481
2007	4.1	4,593
2008	3.8	4,257
2009	3.8	4,257
2010	3.7	4,145
11-year average (2000 – 2010)	4.12	4,609
5-year average (2006 – 2010)	3.88	4,346
3-year average (2008 – 2010)	3.77	4,219
1986 Staff Assessment	3.71	4,157

Table 5.5-3A (URS, 2011b)

The SWRCB indicated that the determinations in Resolution 2010-0039 do not have regulatory or adjudicatory effect (SWRCB 2010). When the SWRCB develops Delta flow objectives with regulatory effect, it must ensure the reasonable protection of beneficial uses, which may entail balancing of competing beneficial uses of water, including municipal and industrial uses, agricultural uses, and other environmental uses (SWRCB 2010). The SWRCB will evaluate the effect of any changes in flow objectives on the environment of the Delta, the upgradient watersheds, and the areas where Delta water is used, as well as, an evaluation of economic impacts (SWRCB 2010). The SWRCB indicated that it may amend the terms and conditions of water right permits and licenses to impose further limitations on the diversion and use of water by water rights holders to protect the Delta or to meet water quality and flow objectives in Water Quality Control Plans it has adopted (SWRCB 2010). The SWRCB also indicated that it may impose

restrictions in diversions by the CVP and SWP when the Department of Water Resources and US Bureau of Reclamation seek to change points of diversion for the CVP and SWP as part of a proposed peripheral canal (SWRCB 2010). The report will also be used for development of the 'Delta Plan', also required in the Delta Reform Act, which will identify policies and actions responsible resource agencies must implement for improved water supply reliability and protection of the Delta ecosystem.

As new Delta flow criteria or other regulatory means are adopted in the future to protect the environment within the Delta, SWP allocations are likely to significantly decline to levels at or below the allocation restrictions seen over the past 10 years. As SWP restrictions on water allocations to municipal, industrial and agricultural users become more frequent and significant due to pumping restrictions in the Delta, Staff believes that other existing water users may be impacted by the proposed increase in the use of freshwater for BP Watson operations.

In addition the Colorado River has also been experiencing a historic drought. The U.S. Bureau of Reclamation's June 2011 Colorado River Basin Water Supply and Demand Study indicates that water supplies on the Colorado River are anticipated to further decrease by about 9 percent over the next fifty years due to climate change with a projected increase in both drought frequency and duration (USBR, 2011). Droughts lasting 5 years or more are projected to occur 40 percent of the time over the next 50 years (USBR, 2011). Meanwhile consumptive uses derived from the Colorado River have increased by 23 percent between 1971 and 1999 (USBR, 2011). Energy Commission staff is concerned that as demand outstrips supply in the future, supplies of Colorado River water imported into the Los Angeles Basin will be reduced.

Given the reality of water supplies imported from the SWP and Colorado River and the policies and goals identified by the SWRCB over the past three years, Energy Commission staff believes that any increase in freshwater supply at BP Watson over the prior three year average could exacerbate an already critical situation and cause significant impacts to other users. Therefore, Energy Commission staff recommends that the baseline water use be set at 4,219 AFY based on the most recent, most representative, three years of operation at the Watson Cogeneration Project. Energy Commission staff's recommended baseline water use would allow an increase of 62 AFY above than the annual water use analyzed in the original 1986 Watson Cogeneration Staff Analysis (CEC, 1986). Condition of Certification **SOIL&WATER-5** requires that total raw freshwater use including municipal water provided by California Water Services Company and groundwater from onsite wells for all five trains at BP Watson not exceed 4,219 AFY.

Seawater Intrusion

Pumping in the West Coast Basin, particularly close to the Pacific Ocean, has resulted in significant sea water intrusion impacts to the aquifer.

Energy Commission staff requested information including pumping rates, groundwater levels, and groundwater quality data related to sea water intrusion impacts caused by the groundwater pumping used to supply Watson Cogeneration and proposed to supply the fifth train in several data requests. In response, Watson provided pumping records for Well 13 that supplies the Watson Cogeneration Facility and other BP Refinery uses.

The pumping records indicate that between 2000 and 2009, pumping at Well 13 averaged 1,476 AFY and ranged between a low of 667 AFY in 2007 to a maximum of 2,160 AFY in 2001. Watson declined to provide any data on historic water level trends or on water quality which staff could use to help assess sea water intrusion impacts associated with the groundwater pumping used to supply the Watson Cogeneration Facility and proposed for BP Watson. Watson indicated that providing information on groundwater levels or water quality was objectionable because it would be "regarding operation of the existing BP Refinery rather than the proposed project… Information regarding the BP Refinery is beyond the scope of this proceeding, not relevant, and unduly burdensome" (URS, 2011c).

Energy Commission staff contacted the Water Replenishment District and reviewed a technical bulletin by Ted Johnson, Chief Hydrogeologist, at the Water Replenishment District to develop a better understanding of the sea water intrusion impacts associated with pumping groundwater from onsite wells at the BP Carson Refinery (CEC, 2011f and Johnson, 2007).

In the early half of the 20th century, groundwater extractions in the West Coast Basin were double natural replenishment, causing severe overdraft and lowering groundwater elevations to over 100 feet below sea level, greatly increasing the extent of sea water intrusion inland. (Johnson, 2007). This impact is mitigated through groundwater recharge at the West Coast Basin Barrier Project along Santa Monica Bay and the Dominguez Gap Barrier Project along San Pedro Bay. The groundwater recharge projects are operated by the Water Replenishment District of Southern California and have been successfully protecting the West Coast Basin aquifer for over 50 years (Johnson, 2007).

The Dominguez Gap Barrier Project is adjacent to the BP Watson site, within about 1 mile of the pumping wells at the BP Carson Refinery that supply water to the Watson Cogeneration Project. The Dominguez Gap Barrier Project covers about 6 miles with 94 injection wells and 232 observation wells (Johnson, 2007). In 2008, operational costs for the Dominguez Gap Barrier and West Coast Basin Barrier Projects included about $14 million for recycled and imported water and about $4 to $5 million in maintenance costs (Johnson, 2007). Due to aging infrastructure, rising water and maintenance costs, and the uncertainty of long-term potable water availability, the local agencies that cooperate on the management of the barrier projects are working together to develop alternatives to optimize barrier performance while minimizing costs. In particular, if regional groundwater levels rose in response to reduced pumping, barrier efforts and costs would be reduced. One of the primary methods identified to address these increasing mitigation costs would be to replace groundwater from wells along the coast that is used only for industrial purposes (specifically including at BP Carson Refinery) with recycled water (Johnson, 2007).

In 2010, water replenishment efforts required 23,619 acre-feet as compared to a total of 43,669 acre-feet pumped from the West Coast Basin. Thus, a replenishment rate of about 54 percent is required across the basin to address the sea water intrusion impacts. However, since the BP Watson project site is adjacent to the Dominguez Gap Barrier, the groundwater pumped to supply BP Watson is primarily comprised of water pumped into the Dominguez Gap Barrier Project. The Water Replenishment District

estimates that about 70 percent of the water pumped by the BP Carson Refinery to supply the Watson Cogeneration Project is water pumped into the Dominguez Gap Barrier Project (CEC, 2011f).

In addition, pumpers within the West Coast Basin pay below market rates to support the Water Replenishment District's efforts. Groundwater users currently pay a replenishment fee of $244 per acre foot pumped. However, at the Dominguez Gap Barrier Project 5,644 acre feet of imported potable water purchased at market rates was required to augment 2,055 acre feet of recycled water pumped into the project in 2010. Beginning in January 2012, the market rate for imported water supplied by the WBMWD for the Dominguez Gap Barrier Project will be $1,024 per acre-foot.

Watson indicates that an average of 1,534 AFY of groundwater pumped from onsite wells is utilized to supply the Watson Cogeneration Project (URS, 2011b). To fully mitigate sea water intrusion impacts caused by this pumping, Watson would need to contribute $1.1 million to purchase imported water (0.7 * 1,534 acre feet * $1,024/acre-foot) plus an additional $390,000 to fund maintenance activities ($5 million * $1.1 million/$14 million). By comparison, Watson only contributes about $375,000 for water replenishment activities to mitigate its groundwater pumping (based on 1,534 AFY). Thus, the local agencies that finance and operate the water replenishment program and other water users (i.e. rate payers) within the West Coast Basin are subsidizing mitigation of the impacts caused by groundwater use at the Watson Cogeneration Project. Watson's contribution to the Water Replenishment District's costs covers maintenance of the replenishment barrier project infrastructure, but does not cover the costs of the water used to support the replenishment efforts.

Energy Commission staff understands, however, the BP Carson Refinery is pumping groundwater to supply the Watson Cogeneration in accordance with their adjudicated right and rights leased from other properties in the Basin, and is paying for replenishment water in accordance with local agreements.

Reclaimed Water – Economic Feasibility

Watson proposes to utilize reclaimed water to augment the primary freshwater supply for BP Watson "if and when" it becomes available. Additional reclaimed water supplies are required for BP Watson to satisfy the project's primary objective to increase steam supplies to the BP Cason Refinery. Watson is relying upon the BP Carson Refinery to complete negotiations and to implement a reclaimed water supply for the project with the West Basin Municipal Water District. BP Carson Refinery has been in negotiations with WBMWD to secure additional reclaimed water supplies for the Watson Cogeneration Project since June of 2008, and have yet to come to an agreement after more than three years of negotiations.

Under the California Constitution (Section 2, Article X), the California Water Code encourages the conservation of water resources and the maximum reuse of wastewater particularly in areas of limited supply such as the West Coast Basin which imports about 65 percent of all water used within the Basin. The Water Code (Sections 13550 and 13552.6) indicates that use of potable water for industrial uses including power plant cooling and refinery operations is a waste and unreasonable use of water if sources of reclaimed water are available at costs "comparable" to that of potable freshwater.

Energy Commission staff examined the viability of providing reclaimed water from the WBMWD to supply some or all of the water supply requirements at BP Watson. The WBMWD receives secondary treated wastewater water from the Hyperion Wastewater Treatment Plant owned by the City of Los Angeles. The WBMWD further treats the wastewater to meet its customer's needs. The secondary treated wastewater is treated to tertiary standards in El Segundo at the Edward C. Little Water Recycling Facility. The WBMWD maintains hundreds of miles of pipelines to deliver various levels of treated wastewater to its customers. For the BP Carson Refinery, WBMWD currently provides approximately 1,000 AFY of nitrified reclaimed water and 4,000 AFY of Single Pass Reverse Osmosis (RO) reclaimed water produced at the Carson Regional Water Recycling Facility about 1.5 miles from the BP Carson Refinery (CEC, 2011e).

WBMWD is currently in negotiations with BP Carson Refinery for a project to increase production and delivery of recycled water by about 2,100 AFY including about 800 AFY of nitrified treated reclaimed water and 1,300 AFY of single pass RO reclaimed water (CEC, 2011e). The proposed project would add additional micro-filtration capacity to the existing micro-filtration system at the Carson Regional Water Recycling Facility to match the capacity of the existing single pass RO system already in use to supply the BP Carson Refinery. The micro-filtration expansion project is expected to cost about $18.3 million of which about $4.5 million would be paid for by WBMWD, $2.4 million would be paid for via a grant from Cal Water, leaving $11.3 million in capital costs to pass through to BP (CEC, 2011e). The capital costs would be financed either through a 6 percent, 25 year bond issue by WBMWD or via a 2.5 percent, 20 year financing package through the SWRCB (CEC, 2011e). All capital costs would be subject to a 1.6 debt recovery ratio (CEC, 2011e).

Reclaimed water rates for the BP Carson Refinery would include both capital costs and commodity costs. Current commodity costs include: $964/AF for potable water ($1,024/AF beginning in January 2012), $1,003/AF for single pass RO reclaimed water, and $755 for nitrified reclaimed water (CEC, 2011e). BP Carson Refinery currently pays capital costs of $1,127/AF for single pass RO reclaimed and $847/AF for nitrified reclaimed water (CEC, 2011e). Commodity costs for single pass RO and nitrified reclaimed water include energy costs and maintenance associated with operating the micro-filtration and RO systems.

A breakdown of the capital and commodity costs for single pass RO and nitrified reclaimed water for the proposed expansion of the micro-filtration system is provided below in **Soil & Water Table 6.** The reclaimed water provided by the proposed expansion of the micro-filtration system at the Carson Regional Water Recycling Facility would result in an estimated total cost of $1,308 per acre-foot for nitrified reclaimed water and $1,556 for single pass RO treated reclaimed water including both capital and commodity costs.

The recycled water provided by WBMWD would be of much higher quality than BP Watson's current raw freshwater supplies of groundwater and municipal water. TDS would be reduced from about 900 parts per million (ppm) in BP Watson's existing freshwater supplies to about 60 parts per thousand for single pass RO reclaimed water. BP Watson would utilize second pass RO onsite, to further reduce TDS down to about 5

ppm. Reject water from the second pass RO process would be utilized for cooling tower make up.

Energy Commission staff requested information on the efficiency of water treatment processes utilized at Watson's dedicated water treatment facility to treat raw freshwater with reverse osmosis and micro-filtration. Energy Commission staff also requested the maintenance and operational costs of the onsite treatment of raw freshwater proposed for use at the proposed fifth train. Energy Commission staff requested this information to develop a realistic comparison of the actual costs of freshwater supply to the proposed reclaimed water project through WBMWD. However, Watson indicated that providing information on the efficiency or operations and maintenance costs of the onsite water treatment system that is proposed to treat the water supply for BP Watson is "beyond the scope of this proceeding, not relevant, and unduly burdensome" (URS, 2011c).

Based on information provided by Watson, Energy Commission staff assumes that the onsite water treatment processes include reverse osmosis for process water that is about 80 percent efficient (URS, 2011b). Thus, to provide the 1,279 AFY of treated process for the fifth train, up to 1,598 AFY of raw freshwater would be required. In negotiations with WBMWD, the BP Carson Refinery indicated that the costs for onsite treatment of groundwater and municipal water are about $200 per acre-foot (CEC, 2011e). However, the WBMWD's consultants specializing in industrial water treatment estimated that the costs of onsite treatment were likely as high as $400 - $500 per acre-foot, which are more in line with the costs of industrial scale water treatment processes utilized by WBMWD (CEC, 2011e). Given a market rate of $1,024 per acre-foot for potable municipal water and an 80 percent efficient treatment process, the additional onsite treatment costs bring the costs of treated fresh water to about $1,480 per acre-foot ($1,480 = $1,024/0.8+$200) based on BP Carson Refinery's negotiating position. Using WBMWD's estimated costs for Watson's onsite treatment, the costs for reverse osmosis treated raw freshwater are a more likely $1,680 to $1,780 per acre-foot. In addition, the costs for municipal potable water are rapidly increasing – between July 2011 and January 2012, the cost will increase by 6 percent from $964 to $1,024 per acre-foot. Over time, these cost increases will further increase the cost of potable water supplied to BP Watson.

Thus, reclaimed water provided by the proposed expansion of the micro-filtration system at the Carson Regional Water Recycling Facility with an estimated total cost of $1,308 per acre-foot for nitrified reclaimed water and $1,556 for single pass RO treated reclaimed water is "comparable" to the current costs of BP Watson's existing freshwater supply including the costs for treatment and losses to reverse osmosis reject. Once the 20-year capital recovery period is completed, the costs for both single pass RO treated reclaimed water and nitrified reclaimed water will decline.

WBMWD indicated that they could implement the additional 2,100 AFY of reclaimed water capacity within 24-30 months of executing an agreement with BP Carson Refinery (CEC, 2011e).

Soil & Water Table 6
Reclaimed Water Costs for Additional Supply from the Carson Regional Water Recycling Facility

Additional Capacity for Single Pass RO	1,300 AFY
Additional Capacity for Nitrified Water	800 AFY
Total Additional Reclaimed Capacity	2,100 AFY
Expanded Micro-Filtration – Total Capital Costs	$18.3 Million
Capital Costs covered by WBMWD	$4.5 Million
Capital Costs covered by Cal Water Grant	$2.4 Million
Capital Costs passed on to BP	$11.3 Million
Annual Finance Costs (SWRCB Financing – 20 years at 2.5% interest)	$725,500
Debt Recovery Ratio (1.6 x Annual Capital Costs)	$1.16 Million
Capital Cost (per acre foot based on 2,100 AFY)	$553 per acre-foot
Total Cost – Single Pass RO (including $1,003/AF commodity costs)	$1,556 per acre-foot
Total Cost – Nitrified Water (including $755/AF commodity costs)	$1,308 per acre-foot

Energy Commission staff also examined the potential to implement a large reclaimed water project to replace all fresh water use at the Watson Cogeneration Project. However, the WBMWD is also expanding nitrified capacity to serve an additional 9,000 AFY to the City of Los Angeles from the Carson Regional Water Recycling Facility. Thus, major additional infrastructure would be required either at the Carson Regional Water Recycling Facility or at the Joint Water Pollution Control Plant. If micro-filtration and single pass RO was added to the Joint Water Pollution Control Plant to provide additional water to the Watson Cogeneration Project, new pipelines would be required to deliver the additional reclaimed water to the BP Watson/Watson Cogeneration project. The WBMWD examined the potential to develop a 5,806 AFY project at the Joint Water Pollution Control Plant including additional pipelines to the BP Carson Refinery in their 2009 Capital Improvement Master Plan (WBMWD, 2009).

Projected capital costs include about $86 million for implementation of micro-filtration and single pass RO including the required pipelines and pump stations to deliver the

reclaimed water to the BP Carson Refinery (WBMWD, 2009). For implementation of the nitrified treated reclaimed water including micro-filtration and the associated pipelines and storage reservoir would be about $48 million (WBMWD, 2009). Total capital costs for a larger capital improvement to provide at least 5,806 AFY to BP Carson and Watson Cogeneration Project would be $134 million. With favorable financing from the SWRCB and the 1.6 debt recovery ratio, the capital costs would be about $2,370 per acre-foot over the twenty year finance period. While these costs are not currently "comparable" to the costs of municipal potable water, Energy Commission staff recommends that the BP Carson Refinery and Watson continue to examine the potential to develop a large reclaimed water project to replace all industrial uses of freshwater at BP Watson and the BP Carson Refinery.

Thus, Energy Commission staff determined that up to 2,100 AFY of reclaimed water is economically feasible and will be available within 24-30 months of executing an agreement with WBMWD to provide reclaimed water to BP Watson. Condition of Certification **SOIL&WATER-5** requires that Watson submit a fully executed agreement to provide new reclaimed water to supply BP Watson prior to commencing operation of BP Watson.

Water Supply Efficiency

The total proposed water supply for the BP Watson project would be significantly greater than for a combined cycle generating facility of a similar capacity that primarily generates electricity because the primary purpose for the project is to provide steam to the BP Carson Refinery. The average annual water demand for the fifth train at BP Watson project would be approximately 2,724 acre-feet including approximately 2,286 AFY of treated process water and 439 AFY of cooling tower makeup water. This annual water demand is about 32 AFY/MW, which is significantly higher than atypical wet cooled, combined cycle power plant in California. However, about 2,190 AFY of the total water supplied to the BP Watson project would be delivered to the BP Carson Refinery as steam and high pressure water supplies. Thus, about 80.4 percent of the total water supplied to the BP Watson project or about 95.8 percent of the process water supplied to the Fifth Train would be delivered to the BP Carson Refinery in the form of steam and high pressure water. The water use efficiency for the BP Watson project generation, i.e. total water supply less the steam and water supplied to the BP Carson Refinery, would be about 534 AFY or about 6.3 AFY/MW, which is typical for wet cooled combined cycle power plants in California.

To monitor water use, the BP Watson project is required to install and maintain metering devices as part of the water supply and distribution system to monitor the use of raw groundwater pumped from onsite wells, raw potable municipal water, and raw reclaimed water supplied to the project for process, cooling water, domestic potable water, and other plant uses. Condition of Certification **SOIL&WATER-5** requires installation and monitoring of metering devices on all water supply lines at BP Watson. To limit the use of the municipal and groundwater water supplies beyond the quantities evaluated in this Staff Assessment, Condition of Certification **SOIL&WATER-5** requires BP Watson to limit total freshwater use to 4,219 AFY.

To help demonstrate that the BP Watson project is efficiently utilizing the water supplied to the project, delivery of steam and high pressure water to BP Carson Refinery should

also be monitored with a goal of delivering a minimum of 95.8 percent of all process water supplied to the Fifth Train to the BP Carson Refinery as steam or high pressure water. This goal of 95.8 percent delivery, will ensure that the BP Watson project is efficiently utilizing the water supplied to the power plant in line with other wet cooled, combined cycle power plants in California. In addition, to ensure there is no net increase in raw water use at the Watson Cogeneration facilities staff recommends the condensate return to BP Watson from Watson Cogeneration or the BP Refinery should be from steam supplied from BP Watson or Watson Cogeneration, and should not be augmented with additional water at Watson Cogeneration or the BP Carson Refinery. Conditions of Certification **SOIL&WATER-6** and **-9** require installation and monitoring of metering devices on the process supply lines to BP Watson and the steam and high-pressure water lines that deliver water to the BP Carson Refinery and to BP Watson. All metering devices should be operational for the life of the project. An annual summary of water use and delivery of steam and water to BP Carson Refinery shall be submitted to the Compliance Project Manager in the annual compliance report.

Reclaimed Water – Impacts and Conditions

Watson indicates that the BP Watson project would use reclaimed water from WBMWD if water use at the combined BP Watson and Watson Cogeneration facilities exceeded the cap. Energy Commission staff have determined that a minimum of 2,100 AFY of reclaimed water can be available for the BP Watson project within three years of the start of construction.

The reclaimed water supply will be available in two forms. About 800 AFY of nitrified water would be available for the cooling towers for the existing Watson Cogeneration facility and the two additional towers proposed for the BP Watson project. About 1,300 AFY of single pass RO water would be available for inlet evaporative cooling, HRSG supply, and steam supply for the BP Carson Refinery.

The proposed reclaimed water supply is wastewater treatment plant effluent from WBMWD's Carson Regional Water Recycling Facility that has received tertiary treatment to Title 22 standards, micro-filtration and either nitrification or single pass RO treatment. Unused wastewater in the region is discharged to the Pacific Ocean. Use of the proposed reclaimed supply to provide additional water supplies would prevent any increase in the combined use of municipal water and groundwater at BP Watson, the existing Watson Cogeneration facility, and at the BP Carson Refinery (URS, 2011b). While the use of reclaimed water supply reduces reliance on fresh water sources, reclaimed water has numerous beneficial uses including for agricultural and landscape irrigation, industrial uses, and other non-potable purposes and reclaimed water should also be utilized as efficiently as possible.

The use of disinfected tertiary treated recycled water produced from reclaimed wastewater could pose a public health hazard and must meet the California Code of Regulations, Title 22, Division 4 requirements for "unrestricted use." All recycled water pipelines, storage tanks, and ancillary facilities would be constructed in compliance with Titles 17 and 22.

Title 17 addresses the requirements for back flow prevention and cross connections. Dual plumbing would be required for plant water that may be supplied from either

tertiary treated nitrified or RO reclaimed water or municipal supplies. Use of tertiary treated nitrified or RO reclaimed water could lead to significant adverse impacts to municipal water supplies if the reclaimed water cross-contaminates the municipal supply pipelines. To address the potential for impacts to municipal supplies, a dual plumbing plan shall be prepared in accordance with Title 17 requirements. The California Department of Public Health would also perform and inspection of the implementation of the dual plumbing to confirm that the project would not lead to cross contamination of municipal supplies. Condition of Certification **SOIL&WATER-7** requires Watson to receive approval from the California Department of Public Health for a dual plumbing plan for the use of tertiary treated recycled water at the BP Watson site.

Title 22 addresses public health and use restrictions related to using tertiary treated recycled water at the BP Watson site. Title 22 is intended to address the potential for public health impacts related the use of recycled water potentially contaminated by pathogens within the project's cooling towers. The WBMWD currently produces and distributes tertiary treated recycled water processed at the Carson Regional Water Recycling Facility under an existing Water Recycling Requirements permit from the Los Angeles RWQCB (URS, 2009e). The WBMWD will need to update two Engineer's Reports to expand the Carson Regional Water Recycling Facility to provide additional recycled water for the BP Watson project, one for the Carson Regional Water Recycling Facility and one for the BP Carson Refinery (URS, 2009e). Both Engineer's Reports will need to be reviewed and approved by the California Department of Public Health and the Los Angeles RWQCB as part of the design process for the expansion of the Carson Regional Water Recycling Facility. Condition of Certification **SOIL&WATER-8** requires Watson to submit documentation of the approval from California Department of Public Health and the Los Angeles RWQCB for the Engineer's Reports covering the use of recycled water at the BP Watson site including an updated Water Recycling Requirements permit.

Provided that the BP Watson project adheres to the standards for the use of tertiary treated recycled water, Energy Commission staff believes that there will be no significant impacts related to the project's use of reclaimed wastewater.

Project Wastewater

The wastewater generated by the BP Watson project during operations would include both industrial wastewater and stormwater runoff from the fifth train power block area. The primary source of wastewater would be cooling tower blowdown. These wastewater streams would be directed to the BP Carson Refinery's oily water treatment system and ultimately discharged to Los Angeles County Sanitation District's wastewater treatment plant. Energy Commission staff evaluated the potential impact on the existing treatment system and reviewed the storage and treatment capacity of the existing system to handle the wastewater discharge from BP Watson.

The BP Watson project would increase the wastewater flow rate from the existing Watson Cogeneration facility (not including stormwater) by approximately 90 gpm on average from approximately 0.81 mgd to 0.94 mgd. Maximum wastewater discharge would increase by about 139 gpm from approximately 1.21 mgd to 1.41 mgd (Watson, 2009a).

The estimated 100-year, 24 hour peak stormwater discharge to the BP Carson Refinery's oily water treatment system from the BP Watson project is approximately 9.1 cfs or 4,100 gpm. The total volume generated by the 100-year event is estimated to be 42,900 cubic feet or 320,840 gallons.

The discharge limits for the BP Carson Refinery are set forth in the industrial waste discharge permit for the BP Carson Refinery. The oily water system can discharge 5,081,000 gallons per day on average. The enforceable limits of the permit are set for wet weather discharges for two periods during the day. The enforceable limits are 5,210 gpm between 10 a.m. and 2 a.m. and 10,000 gpm for 2 a.m. to 10 a.m. The 10,000 gpm is the maximum rate that may be discharged and is measured as the highest average for a five minute period.

The BP Carson Refinery has provided a letter to the Watson Cogeneration facility acknowledging that the oily water treatment system has sufficient capacity to accept the waste stream (including stormwater runoff) from the BP Watson project while meeting its permitted discharge requirements (URS, 2010b). The oily water system currently processes approximately 4,000 gpm on average and peaks at 8,000 gpm (URS, 2009b).

Watson provided information regarding the available storage capacity of the existing tanks, basins, and a reservoir associated with the oily water treatment system. The total storage capacity available is approximately 207.5 million gallons. Currently two basins and a reservoir are empty with a combined storage capacity of 92 million gallons. It is anticipated that these storage facilities would be utilized in the event of a large runoff event to temporarily store additional runoff and allow the oily water treatment system to operate within the permitted limits. The estimated additional volume generated by the 100-year storm from the BP Watson project is approximately 520,840 gallons (URS, 2010a).

Energy Commission staff believes that there would be sufficient on-site storage and treatment capacity within the BP Carson Refinery's existing oily water treatment system to handle the industrial wastewater and stormwater generated by the proposed project. Additionally, Energy Commission staff believes that the by meeting the requirements of the existing industrial waste discharge requirements set forth for the BP Carson Refinery, the impact of the proposed project on existing wastewater treatment systems and water quality downstream of the site would be less than significant.

CUMULATIVE IMPACTS AND MITIGATION

Cumulative impacts consist of impacts that may occur as a result of the proposed project in combination with impacts from other past, present and reasonably foreseeable future projects. Cumulative impacts can result from individually minor, but collectively significant actions taking place over time.

Surface Water / Stormwater

The BP Watson site is outside of the 100-year floodplain and stormwater runoff from the existing Watson Cogeneration facility would decrease as a result of the BP Watson project. In addition, the implementation of a water quality treatment BMP numerically

sized to treat runoff from the existing Watson Cogeneration facility including the redeveloped portions that are part of the BP Watson project would improve water quality for stormwater discharged from the site. The BP Watson project is expected to decrease flood flows and improve water quality within the Dominguez Channel and no significant cumulative impacts to surface water resources are expected.

Groundwater

By replacing existing groundwater supply at the BP Carson Refinery with reclaimed water supply, groundwater pumping in the basin is not expected to increase significantly. This is expected to limit or maintain existing drawdown impacts in the vicinity of the BP Watson site and help to limit additional sea water intrusion into the aquifer below the BP Watson site. No significant cumulative impacts related to groundwater quantity or quality are anticipated as a result of the BP Watson project.

Project Water Supply

The use of the existing freshwater supplies at or below baseline rates for the most recent three-year period will prevent an increase in the demands on freshwater supplies in the project area including both surface water diversions from the Colorado River and State Water Project and groundwater pumped at the project site and at municipal wells in the Carson area. Provided that freshwater use does not increase above 4,219 AFY no significant cumulative impacts related to water supply are expected as a result of the BP Watson project.

Project Wastewater

Wastewater including cooling tower blowdown and stormwater from the BP Watson would be routed to BP Carson Refinery's oily water treatment system and ultimately discharged to the Los Angeles County Sanitation District's wastewater treatment plant under an existing Industrial Wastewater Discharge Permit. While wastewater discharge would increase as a result of the BP Watson project, total discharge from the BP Carson Refinery's oily water treatment system would remain within the limitation set forth in the Refinery's Industrial Wastewater Discharge Permit. No significant cumulative impacts related to wastewater discharge are anticipated as a result of the BP Watson project.

PUBLIC AND AGENCY COMMENTS

Unnamed Public Comment – Data Response Workshop, October 14, 2009
During the October 2009 Data Response Workshop, a member of the public expressed concern about past water discharge violations at the existing Watson Cogeneration facility.

Energy Commission staff followed up with Watson in Data Requests 40 and 41 regarding any past violations for all water discharges (stormwater and wastewater) related to systems that the BP Watson project would utilize at the existing Watson Cogeneration facility or the BP Refinery (CEC, 2009ac). Watson responded by providing a detailed list of all violations related to the clean water system and oily-water system. Watson reported that there had been numerous NPDES permit exceedances

for stormwater discharges between 2003 and 2008, although some of the noted exceedances were disputed (URS, 2010a). Additional stormwater related violations were administrative related to an inadequate SWPPP, missing sample analysis data, and late report filings (URS, 2010a). Related to industrial wastewater discharge, there was one substantive violation in April 2007 related to a leaking valve on Tank 95 (URS, 2010a).

Energy Commission staff reviewed the reported violations and stormwater discharge sample analysis results from the outfall at the existing Watson Cogeneration facility. Stormwater analysis results indicate that low levels of metals, PAHs, and coliforms have been detected in stormwater discharge from the existing facility. Energy Commission staff has required Watson to include water quality treatment BMPs for all stormwater streams that will be altered through the BP Watson project.

City of Carson – April 19, 2010

The City of Carson indicated that they would require a SUSMP including a water quality treatment BMP for the 0.7 acres of the BP Watson site that will discharge to the existing Watson Cogeneration facility's clean water system and stormwater outfall. The City also encouraged Watson to address water quality treatment for the entire existing Watson Cogeneration facility during the implementation of BP Watson. The City noted that the RWQCB would adopt TMDLs for the Dominguez Channel within the next couple of years, and Watson would need to provide water quality treatment to meet TMDLs (CEC, 2010f).

In response, Energy Commission staff has required Watson to develop a SUSMP and implement a water quality treatment BMP covering all stormwater discharged from BP Watson in Condition of Certification **SOIL&WATER-3**. In addition, Energy Commission staff is similarly encouraging Watson to address all stormwater runoff from the existing Watson Cogeneration facility with water quality treatment BMPs to provide a comprehensive stormwater treatment plan for the site to address the upcoming TMDLs.

COMPLIANCE WITH LORS

Energy Commission staff reviewed the proposed project to determine if the project would adhere to the requirements of LORS and state and local policies related to soils and water resources.

Water Supply

Of particular concern to Energy Commission staff was BP Watson's proposed water supply and determination that the proposed water supply met state laws and policies. Under the California Constitution (Section 2, Article X), California Water Code encourages the conservation of water resources and the maximum reuse of wastewater particularly in areas of limited supply. The Water Code (Sections 13550 and 13552.6) indicates that use of potable water for industrial uses including power plant cooling is a

waste and unreasonable use of water if sources of recycled water are available. Water Code Section 13550 includes conditions for the requirement to utilize recycled water:

1. Source of the water is of adequate quality and available. Also, the state shall consider the impact of the use of recycled water on the quality of wastewater discharge.

2. Recycled water may be furnished at a reasonable cost. The state shall consider whether the present and projected cost of the use of recycled water is comparable to or less than the cost of potable, domestic water.

3. The use of recycled water would not be detrimental to public health.

4. The use of recycled water shall not impact downstream water rights.

SWRCB Resolutions 75-58 and 2009-0011 support and promote the use of recycled water and encourage the substitution of recycled water for potable sources to the extent possible. The SWRCB indicates that the lowest quality cooling water reasonably available from technical and economic standpoint should be utilized for industrial processes including evaporative cooling processes. The Energy Commission in its 2003 IEPR adopted a policy pursuant to SWCRB Resolution 75-58, indicating that approval of fresh water sources for power plant cooling would only be acceptable if alternative water supply sources are economically unsound or environmentally undesirable. The 2003 IEPR also requires the use of Zero Liquid Discharge technologies to limit waste water discharge from power plants unless it is shown to be economically unsound or environmentally undesirable. The Energy Commission has indicated that it interprets the term “economically unsound” to be equivalent to economically infeasible.

BP Watson has proposed the use of potable water supplied by California Water Services Company and groundwater pumped from onsite wells under a combined BP Watson and Watson Cogeneration cap. The WBMWD indicates that they can implement an expansion project to provide about 2,100 AFY of additional reclaimed water to the BP Carson Refinery to supply the BP Watson project within 24 to 30 months of receiving a fully executed agreement. This reclaimed water supply would meet the four primary tests included in the California Water Code requiring the use of reclaimed water:

1. As discussed under Water Supply, the reclaimed water supplied by the WBMWD would be of much higher quality than the currently utilized blend of municipal and groundwater supplies. Tertiary treatment followed by micro-filtration and either nitrification or reverse osmosis would result in reclaimed water with superior water quality as compared to Watson Cogeneration’s existing freshwater supplies.

2. The reclaimed water supplied by WBMWD would be comparable in cost to that of freshwater utilized by Watson when factoring the costs of treatment. The analysis under Water Supply, indicates that the implementation of additional micro-filtration capacity at the Carson Regional Water Recycling Facility would provide both reverse osmosis and nitrified reclaimed water at costs that are comparable to Watson Cogeneration’s existing freshwater supply. The additional micro-filtration capacity

would provide about 2,100 AFY of new reclaimed water which is more than adequate to meet the 1,718 AFY water supply required for BP Watson.

3. Implementation of the requirements of Conditions of Certification **SOIL&WATER-7** and **SOIL&WATER-8,** would ensure that the use of reclaimed water would not be detrimental to public health. Condition of Certification **SOIL&WATER-7** requires the project owner to prepare, implement and adhere to a dual plumbing plan approved by the California Department of Public Health to prevent the cross-contamination of potable water supply with reclaimed wastewaters. Condition of Certification **SOIL&WATER-8** requires the project owner to submit WBMWD's updated Engineer's Report for the distribution and use of reclaimed water supplies at BP Watson. The Engineer's Report would be reviewed and approved by the Los Angeles RWQCB and California Department of Public Health to ensure that the use of reclaimed water at BP Watson would not result in any impacts or risk to public health.

4. Finally, use of reclaimed water would not impact downstream water rights, as all wastewater from the West Coast Basin is discharged directly to the Pacific Ocean. The BP Watson project's proximity to the Pacific Ocean makes it an ideal location for the use of reclaimed water. As compared to other facilities further inland, wastewater in the Carson area is discharged directly to the Pacific Ocean. This allows for brine wastewater generated from reclaimed water treatment to be efficiently discharged to the ocean without negatively impacting freshwater supplies for downstream users. Also, since Carson is adjacent to the ocean, there are no users with water rights to the receiving waters or wastewater from the project vicinity.

Thus, the reclaimed water supply proposed by the WBMWD meets all of the requirements of CA Water Code 13550. Use of potable water and groundwater by BP Watson without implementing the reclaimed water supply proposed by the WBMWD, would be a waste and unreasonable of water under State Law and the California Constitution. Therefore, Energy Commission staff included a requirement for the BP Watson and Watson Cogeneration combined utilize reclaimed water for any water use above the cap in Condition of Certification **SOIL&WATER-5.**

The BP Watson project would comply with all applicable LORS associated with soil and water resources, including:

- The Clean Water Act through the authority granted to the State to enforce coverage under the NPDES by the Los Angeles Regional Water Quality Control Board through the requirements for the preparation and implementation of the SWPPPs, Drainage Erosion and Sedimentation Control Plan, and Standard Urban Stormwater Mitigation Plan as required in Conditions of Certification **SOIL&WATER-1**, **-2**, and **-3**;
- The Resource Conservation Recovery Act of 1976 by the proper handling and discharge of wastewater and potentially contaminated soils;
- The Porter-Cologne Water Quality Control Act by the use of reclaimed water and through the implementation of the DESCP and SWPPP;
- The California Safe Drinking Water and Toxic Enforcement Act by establishing secondary containment in chemical storage areas;

- The California Constitution, Article X, Section 2 by using reclaimed water for plant process water within three years of construction as required in Condition of Certification **SOIL&WATER-5**;
- California Water Code 13550 by using reclaimed water for plant process and cooling uses to the extent feasible as required in Condition of Certification **SOIL&WATER-5**;
- The Water Recycling Act by using reclaimed water for plant process and cooling uses as required in Condition of Certification **SOIL&WATER-5**;
- The Energy Commission's 2003 Integrated Energy Policy Report, and SWRCB Resolutions 75-58, by using reclaimed wastewater for power plant cooling and process water demands to the extent feasible as required in Condition of Certification **SOIL&WATER-5**;
- Title 17 of the California Code of Regulations by ensuring that the California Department of Public Health confirms the requirements of backflow prevention and cross connections of potable and non-potable lines;
- Title 22 of the California Code of Regulations by ensuring that the California Department of Public Health and Los Angeles Regional Water Quality Control Board review and approve the wastewater treatment system to ensure that the proposed systems meet tertiary treatment standards for the protection of public health;
- Title 23 of the California Code of Regulations requiring the Regional Board to specify conditions for protection of water quality as applicable: In the case of the BP Watson project, the project would be permitted under the General NPDES Permits for Discharge of Stormwater associated with both construction and industrial activity.

CONCLUSIONS

In the Socioeconomics section of this staff assessment, staff presents census information that shows that there are minority populations within six miles of the project. For the proposed BP Watson project, the total population within the six-mile radius of the site is 778,090 persons, and the total minority population is 646,789 persons or 83.12 percent of the total population (see Socioeconomics Figure 1). Energy Commission staff has identified significant adverse direct or cumulative soil and water impacts resulting from the construction or operation of the proposed project; however, mitigation measures to reduce these impacts have been developed.

Staff concludes that the BP Watson Project would not result in significant soil and water impacts from construction or operation of the power plant on minority population if the proposed Conditions of Certification are implemented. Therefore, there are no environmental justice issues for soil and water.

The California Energy Commission (Energy Commission) staff has not identified any immitigable potentially significant impacts to Soil and Water Resources for Watson Cogeneration Steam and Electric Reliability Project (BP Watson) and believes that the Watson project would comply with all applicable Laws, Ordinances, Regulations and Standards (LORS) provided the proposed conditions of certification are implemented.

Energy Commission staff concludes the following:

- Implementation of Best Management Practices during the BP Watson project construction and operation in accordance with effective Storm Water Pollution Prevention Plans, a Drainage Erosion and Sediment Control Plan, and Standard Urban Stormwater Management Plan would avoid significant adverse effects that could otherwise result in significant transport of sediments or contaminants from the site by wind or water erosion.
- Capping combined freshwater use at rates at or below 4,219 AFY for both BP Watson and the existing Watson Cogeneration Steam and Electrical Generating facility (Watson Cogeneration) would result in no net increase of combined pumped groundwater and purchased municipal freshwater use associated with the BP Watson Project.
- The combined cap over freshwater use at BP Watson and Watson Cogeneration is based on recent freshwater use at Watson Cogeneration, with the three most recent years (2008 – 2010) being the most representative of baseline conditions in the water basin.
- Any water use at the combined BP Watson and Watson Cogeneration projects above the capped 4,219 AFY shall be reclaimed water from a local waste water treatment facility, and shall be a supply above and beyond reclaimed water already being supplied to either Watson Cogeneration or the BP Refinery. Staff finds that the use of reclaimed water associated with the BP Watson project is consistent with Energy Commission Policy and the California Water Code.
- Condensate return to BP Watson from Watson Cogeneration or the BP Refinery shall be from steam supplied from BP Watson or Watson Cogeneration, and shall not be augmented with additional freshwater at Watson Cogeneration or the BP Carson Refinery.
- The project would not be located within the 100-year flood plain, and would not increase flood conditions downstream of the project.
- The discharge of wastewater under the conditions stipulated in the BP Carson Refinery's Industrial Wastewater Discharge Permit would meet Los Angeles County Sanitation District's wastewater standards.
- At the Preliminary Staff Assessment Workshop in January 2011, the LARWQCB presented data that indicates that there is up to 14 feet of floating non-aqueous phase hydrocarbons on the groundwater surface at the project site and indicated that there may be a source area at the project site. These site conditions and potential impacts are addressed in the Waste Management section of this analysis.

Where the potential for impacts has been identified, staff is proposing mitigation measures to reduce the impact to less than significant. The mitigation measures, as well as specifications for LORS conformance, are included as conditions of certification.

PROPOSED CONDITIONS OF CERTIFICATION

SOIL&WATER-1: Prior to site mobilization, the project owner shall obtain CPM approval for a site-specific Drainage, Erosion and Sedimentation Control Plan (DESCP) that ensures protection of water quality and soil resources of the project site for both the construction and operational phases of the project. This plan shall address appropriate methods and actions, both temporary and permanent, for the protection of water quality and soil resources, demonstrate no increase in off-site flooding potential, meet local requirements (including MS4 Permit requirements), and identify all monitoring and maintenance activities. The plan shall be consistent with the grading and drainage plan as required by Condition of Certification **CIVIL-1** and may incorporate by reference any SWPPP developed in conjunction with any NPDES permit.

The DESCP shall contain elements 1 through 9 below outlining site management activities and erosion- and sediment-control BMPs to be implemented during site mobilization, excavation, construction, and post construction (operating) activities.

1. **Vicinity Map** – A map(s) at a minimum scale 1”=100’ shall be provided indicating the location of all project elements (construction site, laydown area, pipelines) with depictions of all significant geographic features including swales, storm drains, and sensitive areas.

2. **Site Delineation** – All areas subject to soil disturbance for the BP Watson project (project site, laydown and parking area, , and any other project elements) shall be delineated showing boundary lines of all construction areas and the location of all existing and proposed structures, pipelines, roads, and drainage facilities.

3. **Watercourses and Critical Areas** – The DESCP shall show the location of all nearby watercourses including swales, storm drains, and drainage ditches. It shall indicate the proximity of those features to the BP Watson site construction, laydown and parking areas.

4. **Drainage Map** – The DESCP shall provide a topographic site map(s) at a minimum scale of 1”=100’ showing existing, interim, and proposed drainage swales and drainage systems and drainage-area boundaries. On the map, spot elevations are required where relatively flat conditions exist. The spot elevations and contours shall be extended off site for a minimum distance of 100 feet.

5. **Narrative of Project Site Drainage** – The DESCP shall include a narrative of the drainage measures necessary to protect the site and potentially affected soil and water resources within the drainage downstream of the site. The narrative shall include the summary pages from the hydraulic analysis prepared by a professional engineer and erosion control specialist. The narrative shall state the watershed size(s) in acres that was used in the calculation of drainage features. The hydraulic analysis shall be used to support the selection of BMPs and

structural controls to divert off-site and on-site drainage around or through the BP Watson site and laydown areas.

6. **Clearing and Grading Plans** – The DESCP shall provide a delineation of all areas to be cleared of vegetation and areas to be preserved. The plan shall provide elevations, slopes, locations, and extent of all proposed grading as shown by contours, cross sections, or other means. The locations of any disposal areas, fills, or other special features shall also be shown. Existing and proposed topography shall be illustrated by tying in proposed contours with existing topography.

7. **Clearing and Grading Narrative** – The DESCP shall include a table with the quantities of material excavated or filled for the site and all project elements (project site, laydown area, transmission and pipeline corridors, roadways, and bridges) whether such excavation or fill is temporary or permanent, and the amount of such material to be imported or exported.

8. **Best Management Practices Plan** – The DESCP shall identify on the topographic site map(s) the location of the site specific BMPs to be employed during each phase of construction (initial grading, project element excavation and construction, and final grading/stabilization). The DESCP shall identify an appropriate water quality treatment BMP to target sediment, metals, hydrocarbons, and PAHs numerically sized to meet the requirements of the LARWQCB.

9. **Best Management Practices Narrative** – The DESCP shall show the location (as identified in 8 above), timing, and maintenance schedule of all erosion- and sediment-control BMPs to be used prior to initial grading, during all project element (site, pipelines) excavations and construction, final grading/stabilization, and operation. Separate BMP implementation schedules shall be provided for each project element for each phase of construction. The maintenance schedule shall include post-construction maintenance of structural-control BMPs, or a statement provided about when such information will be available.

Verification: No later than 90 days prior to start of site mobilization, the project owner shall submit a copy of the DESCP for construction activity and operations to the City of Carson and the Los Angeles Regional Water Quality Control Board (LA RWQCB) for review and comment. No later than 60 days prior to start of site mobilization, the project owner shall submit the DESCP with the City's and LA RWQCB's comments to the CPM for review and approval. The CPM shall consider comments by the City and LA RWQCB before approval of the DESCP. The DESCP shall be consistent with the grading and drainage plan as required by condition of certification **CIVIL-1**, and relevant portions of the DESCP shall clearly show approval by the chief building official. During construction, the project owner shall provide an analysis in the monthly compliance report on the effectiveness of the drainage, erosion and sediment control measures and the results of monitoring and maintenance activities. Once operational, the project owner shall provide in the annual compliance report information on the results of monitoring and maintenance activities.

SOIL&WATER-2: The project owner shall comply with the requirements of the general National Pollutant Discharge Elimination System (NPDES) permit for discharge of stormwater associated with construction activity. The project owner shall develop and implement a construction stormwater pollution prevention plan (construction SWPPP) for the construction of the BP Watson site, laydown area, and all linear facilities.

Verification: The project owner shall submit to the compliance project manager (CPM) a copy of the construction SWPPP prior to site mobilization and retain a copy on site. The project owner shall submit copies to the CPM of all correspondence between the project owner and the Los Angeles Regional Water Quality Control Board regarding the NPDES permit for the discharge of stormwater associated with construction activity within 10 days of its receipt or submittal. Copies of correspondence shall include the notice of intent sent to the State Water Resources Control Board, and the board's confirmation letter indicating receipt and acceptance of the notice of intent.

SOIL&WATER-3: The project owner shall submit to the CPM a copy of the Standard Urban Stormwater Mitigation Plan (SUSMP) as required under Los Angeles County's Municipal Stormwater NPDES Permit (MS4 Permit) prior to commencement of construction of the BP Watson project. The SUSMP shall identify and implement an appropriate water quality treatment Best Management Practice targeted to the pollutants of concern at the site and receiving water and sized according the numerical sizing guidelines included in the MS4 Permit.

Verification: The project owner shall submit to the compliance project manager (CPM) a copy of SUSMP prior to site mobilization. The project owner shall submit copies to the CPM of all correspondence between the project owner, the Los Angeles Regional Water Quality Control Board, and the City of Carson regarding the SUSMP for the discharge of stormwater from the Watson Cogeneration facility within 10 days of its receipt or submittal. Copies of correspondence shall include all comments on the SUSMP. The project owner shall revise the SUSMP to address all comments from the Los Angeles Regional Water Quality Control Board and the City of Carson and submit the final SUSMP for approval by the CPM prior to operation.

SOIL&WATER-4: The project owner shall comply with the requirements of the general NPDES permit for discharges of stormwater associated with industrial activity. The project owner shall develop and implement an industrial stormwater pollution prevention plan for the operation of the BP Watson project.

Verification: The project owner shall submit to the CPM a copy of the industrial SWPPP for operation of the BP Watson project prior to commercial operation, and shall retain a copy on site. The project owner shall submit copies to the CPM of all correspondence between the project owner and the LA RWQCB regarding the general NPDES permit for discharge of stormwater associated with industrial activity within 10 days of its receipt or submittal. Copies of correspondence shall include the Notice of Intent sent by the project owner to the State Water Resources Control Board.

SOIL&WATER-5: Total use of raw freshwater by BP Watson and the Watson Cogeneration Project (all five trains), including raw groundwater pumped from

wells at the BP Carson Refinery and raw potable water supplied by the California Water Services Company, shall not exceed 4,219 acre-feet per year (AFY) for the life of the project. All water used above the cap of 4,219 AFY shall be reclaimed water.

Prior to commercial operation of BP Watson, the project owner shall install and maintain metering devices as part of the project water supply and distribution system, to monitor and record in gallons per month the total volumes of water supplied to the project from each water source (nitrified reclaimed water, reverse osmosis reclaimed water, raw municipal water, and raw groundwater). The metering devices shall be operational for the life of the project.

The project owner shall prepare an Annual Water Use Summary, which will include the monthly range and monthly average of daily non-potable water usage in gallons per day, and total water used by the project on a monthly and annual basis in acre feet. Potable water use on-site shall be recorded on a monthly basis. For subsequent years, the Annual Water Use Summary shall also include the yearly range and yearly average water use by the project. The annual summary shall be submitted to the CPM as part of the annual compliance report.

Prior to commencing operation of BP Watson (the fifth train), the project owner shall submit a fully executed agreement between either the project owner or the BP Carson Refinery and the reclaimed water purveyor West Basin Municipal Water District or its successor to provide new reclaimed water, above and beyond that already being supplied to either Watson Cogeneration or the BP Refinery. Prior to using water in excess of the cap, the new reclaimed water supply must be online and plumbed to supply BP Watson and the Watson Cogeneration Project (all five trains).

Verification: At least 30 days prior to commencing operation, the project owner shall submit documentation to the CPM of a fully executed agreement between the project owner or BP Carson Refinery and a reclaimed water purveyor to implement a new reclaimed water project to supply the project. At least 30 days prior to commercial operation of BP Watson, the project owner shall submit documentation to the CPM that metering devices for the project have been installed on each water source (raw municipal water and raw groundwater).

At least 30 days prior to the project owner using water in excess of the cap, the project owner shall submit documentation to the CPM indicating that the new reclaimed water supply project is completed and plumbed to deliver reclaimed water to the Watson Cogeneration Project/BP Watson Project. At least 30 days prior to delivery of reclaimed water, the project owner shall submit documentation to the CPM that metering devices have been installed on each source or reclaimed water (nitrified reclaimed water and single-pass reverse osmosis reclaimed water).

The project owner shall submit the Water Use Summary to the CPM in the annual compliance report. The summary report shall distinguish between recorded water use of nitrified reclaimed water, reverse osmosis reclaimed water, municipal water, and groundwater. Included in the summary report of water use, the project owner shall submit copies of meter records from the West Basin Municipal Water District

documenting the quantities of tertiary treated recycled water provided (in gallons per day) by the West Basin Carson Regional Facility. The project owner shall provide a report on the annual servicing, testing, and calibration of the metering devices.

SOIL&WATER-6: Prior to commercial operation, the project owner shall install and maintain metering devices as part of the project water supply and distribution system, to monitor and record in gallons per month the total volumes of process water supplied to the Fifth Train (Lines C and D - AFC Figure 5.5-1, Water Balance Flow Diagram) and volumes of water supplied by the Fifth Train to Watson Cogeneration Company's steam header and high pressure water system (Lines J and M - AFC Figure 5.5-1, Water Balance Flow Diagram). The metering devices shall be operational for the life of the project. The project owner shall attempt in good faith to ensure that no less than 95 percent of the total volume of process water supplied to the Fifth Train shall be delivered to the Watson Cogeneration Company's steam header and/or high-pressure water system on an annual basis. This percentage is a voluntary, non-binding goal and the project owner shall not be deemed out-of-compliance with this condition for failure to achieve this percentage, provided the project owner: 1) installs and maintains the metering devices described above; 2) attempts in good faith to achieve the non-binding percentage goal described above; and 3) provides the information set forth in the verification below.

Verification: At least 30 days prior to commercial operation of the project, the project owner shall submit documentation to the California Energy Commission (Energy Commission) Compliance Project Manager (CPM) that metering devices for the project have been installed on lines C, D, J, and M (AFC Figure 5.5-1, Water Balance Flow Diagram) and are operational. The project owner shall prepare an annual water usage summary giving the monthly total and annual total of water delivered to the Fifth Train via lines C and D, and from the Fifth Train to the Watson Cogeneration Company's steam header and/or high-pressure water system. The summary shall also state the annual percentage of the volume of water supplied to the Fifth Train that is delivered to the Watson Cogeneration Company's steam header and/or high-pressure water system. The percentage shall be computed as (J+M)/(C+D). The annual summary shall be included in the Annual Compliance Report. To the extent that the reported percentage for any year falls below the 95 percent goal, the project owner shall include a detailed discussion of the reasons for failing to achieve the goal and any steps that it has taken or intends to take to improve the percentage over the next year.

SOIL&WATER-7: No later than one year following a fully executed agreement between the project owner or BP Carson Refinery and a reclaimed water purveyor to implement a new reclaimed water project to supply the project, the project owner shall submit a Dual Plumbing Plan for utilizing disinfected tertiary treated recycled water for plant process and cooling uses to the California Department of Public Health for review and comment and to the Chief Building Official (CBO) for review and approval. The Dual Plumbing Plan shall be prepared in accordance with Title 17 of the State Water Code. This plan may be consolidated with the Engineer's Report for the Production, Distribution and Use of Recycled Water as specified in **SOIL&WATER-8**. The project owner shall

comply with any reporting and inspection requirements set forth by the California Department of Public Health to fulfill statutory requirements.

Verification: No later than one year following a fully executed agreement between the project owner or BP Carson Refinery and a reclaimed water purveyor to implement a new reclaimed water project to supply the project, the project owner shall submit the Dual Plumbing Plan to the California Department of Public Health and the CBO. The project owner shall submit copies to the CPM of all correspondence between the project owner and the California Department of Public Health related to the Dual Plumbing Plan within 10 days of its receipt or submittal. Copies of correspondence shall include the California Department of Public Health approval of the Dual Plumbing Plan.

SOIL&WATER-8: The project owner shall submit an Engineer's Report for the Production, Distribution and Use of Recycled Water at BP Watson to the California Department of Public Health and Los Angeles Regional Water Quality Control Board for review and approval. The Engineer's Report for the Production, Distribution and Use of Recycled Water at BP Watson shall be prepared in accordance with Titles 17 and 22 of the California Code of Regulations, the Health and Safety Code, and the Water Code. The project shall comply with any reporting and inspection requirements set forth by the California Department of Public Health and Los Angeles Regional Water Quality Control Board.

Verification: No later than one year following a fully executed agreement between the project owner or BP Carson Refinery and a reclaimed water purveyor to implement a new reclaimed water project to supply the project, the project owner (in conjunction with West Basin Municipal Water District) shall submit an updated Water Recycling Requirements permit from the Los Angeles Regional Water Quality Control Board and approval of the Engineer's Report for the Production, Distribution and Use of Recycled Water at BP Watson from the California Department of Public Health to the CPM. The project owner shall submit copies to the CPM of all correspondence between the project owner and the California Department of Public Health and/or the Los Angeles Regional Water Quality Control Board related to the Water Recycling Requirements permit or the Engineer's Report for the Production, Distribution and Use of Recycled Water at BP Watson within 10 days of its receipt or submittal.

SOIL&WATER-9: Condensate return to BP Watson from Watson Cogeneration or the BP Refinery shall be from steam supplied from BP Watson or Watson Cogeneration, and shall not be augmented with additional water at Watson Cogeneration or the BP Carson Refinery.

Verification: The project owner shall submit the Water Use Summary to the CPM in the annual compliance report. The summary report shall distinguish between recorded water use of nitrified reclaimed water, reverse osmosis reclaimed water, municipal water, condensate return, and groundwater. Included in the summary report of water use, the project owner shall submit copies of meter records from the West Basin Municipal Water District documenting the quantities of tertiary treated recycled water provided (in gallons per day) by the West Basin Carson Regional Facility. The project owner shall provide a report on the annual servicing, testing, and calibration of the metering devices.

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TRAFFIC AND TRANSPORTATION

Testimony of Scott Debauche

SUMMARY OF CONCLUSIONS

California Energy Commission (Energy Commission) staff has analyzed the traffic-related information provided in the Application for Certification and other sources to determine the potential for the Watson Cogeneration Steam and Electric Reliability Project (referred to as BP Watson, proposed project, or project herein) to have adverse traffic- and transportation-related impacts. Staff has also assessed the availability of mitigation measures that could reduce or eliminate the significance of these impacts. Staff concludes that the proposed project would not result in significant adverse direct or indirect traffic or transportation impacts.

The proposed project is the expansion of the existing steam and electrical generating (cogeneration) Watson Cogeneration Facility (Facility) that is located in the city of Carson. Construction of the proposed project will add traffic to local roadways during the construction period. However, this short-term increase in traffic would not impact existing traffic load and capacity of the street system. Construction activities could result in damage to public roadways and introduce oversize and overweight vehicles on the local street system. Once the proposed project is operational, no traffic would be generated and no impact would occur to the local transportation network. If the Energy Commission elects to grant certification for this project, staff is proposing four conditions of certification. These conditions of certification are recommended to prevent significant adverse traffic and transportation-related impacts from project construction and to ensure that the project would comply with all applicable laws, ordinances, regulations, and standards pertaining to traffic and transportation. Energy Commission staff concludes that with implementation of proposed Conditions of Certification **TRANS-1** through **TRANS-3**, the proposed project would not generate a significant impact under the California Environmental Quality Act guidelines with respect to California Environmental Quality Act Appendix G issues, “Transportation and Traffic.”

INTRODUCTION

In the **Traffic and Transportation** section, staff addresses the extent to which the proposed project may affect the traffic and transportation system within the vicinity of the project site. This analysis focuses on whether construction and operation of the proposed project would cause traffic and transportation impact(s) under California Environmental Quality Act (CEQA) and whether the project complies with the applicable laws, ordinances, regulations, and standards (LORS).

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Traffic and Transportation Table 1 provides a general description of adopted federal, state, and local LORS pertaining to traffic and transportation relevant to the proposed project.

Traffic and Transportation Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal	
Aeronautics and Space Title 14 Code of Federal Regulations (CFR), part 77 Objects Affecting Navigable Airspace (14 CFR 77)	Establishes standards for determining physical obstructions to navigable airspace; sets noticing and hearing requirements; and provides for aeronautical studies to determine the effect of physical obstructions on the safe and efficient use of airspace.
49 CFR, Subtitle B	Includes procedures and regulations pertaining to interstate and intrastate transport (including hazardous materials program procedures) and provides safety measures for motor carriers and motor vehicles that operate on public highways.
State	
California Vehicle Code (CVC), division 2, chapter 2.5; div. 6, chap. 7; div. 13, chap. 5; div. 14.1, chap. 1 & 2; div. 14.8; div. 15	Includes regulations pertaining to licensing, size, weight, and load of vehicles operated on highways; safe operation of vehicles; and the transportation of hazardous materials.
California Streets and Highway Code, division 1 & 2, chapter 3 & chapter 5.5	Includes regulations for the care and protection of state and county highways and provisions for the issuance of written permits.
California Street and Highway Code §§117, 660-711	Requires permits from California Department of Transportation (Caltrans) for any roadway encroachment during truck transportation and delivery.
California Street and Highway Code §§660-711	Requires permits for any load that exceeds Caltrans weight, length, or width standards for public roadways.
Local	
Metropolitan Transportation Authority 2004 Los Angeles County Congestion Management Plan	Designates that a minimum levels of service (LOS) E performance measurement is designated for highway segments and key roadway intersections in the CMP system.
City of Carson General Plan – Transportation and Infrastructure Element	Policy TI-2.1: Require that new projects not cause the Level of Service for intersections to drop more than one level if it is at Level A, B or C, and not drop at all if it is at D or below, except when necessary to achieve substantial City development goals.

SETTING

The project will complete the original design of the Facility that has been in continuous operation for more than 20 years. The project will add a nominal 85 megawatt (MW) via a combustion turbine generator (CTG) with a single-pressure heat recovery steam generator (HRSG) to provide additional process steam to the BP Refinery. The street address of the project site is located within the boundary of the existing facility at 22850 South Wilmington Avenue, Carson, California, located approximately 0.7 mile south of

the I-405 Freeway, roughly bounded by Wilmington Avenue to the west, East Sepulveda Boulevard to the south, and South Alameda Street to the east. The proposed Facility will not require any off-site utility service facilities, with all electrical transmission, natural gas, and water connections required for the project occurring on-site (Watson 2009a, pp. 3-1 through 3-3). **Traffic and Transportation Figure 1** shows the local roadway system.

CRITICAL ROADS AND FREEWAYS

The transportation network within the project area consists primarily of city arterials, collectors, local roadways, and state-maintained freeways. The following describes the main regional and local roadways that would be used for construction and operational related traffic accessing the proposed project site.

Existing Regional and Local Transportation Facilities

I-405 Freeway

Interstate 405 (I-405) is a major north-south freeway within the BP Watson vicinity, that runs through Los Angeles and Orange Counties and extends from northern Los Angeles County toward south Orange County where it merges with I-5. The I-405 Freeway provides four general purpose and one high-occupancy vehicle mainline lanes in each direction with wide shoulders and a center median. In the vicinity of the project site, the I-405 Freeway has separate acceleration/ deceleration lanes at the interchange of the I-405 Freeway/South Alameda Street and I-405 Freeway/Wilmington Avenue (Watson 2009a, p. 5.11-2). The posted speed limit is 70 miles per hour (mph) (Watson 2009a, p. 5.11-2). The average daily traffic (ADT) on the I-405 Freeway in the vicinity of the project site is 294,000 vehicles per day with 6% being truck traffic (Watson 2009a, p. 5.11-2).

Alameda Street

Alameda Street is a major north-south arterial that is located east of the project site and is one of the primary access routes to the site. The roadway provides three traffic lanes in each direction and has a posted speed limit of 45 mph in the vicinity of the project site (Watson 2009a, p. 5.11-2). The ADT on Alameda Street just south of the I-405 Freeway is 23,175 vehicles per day (Watson 2009a, p. 5.11-2).

Wilmington Avenue

Wilmington Avenue is a north-south four-lane primary road to the west of the project site starting at Lomita Street to the south and ending at Firestone Boulevard (State Route 42) to the north. In the project area, this roadway has four through lanes (two in each direction) with 6-feet of shoulder on the east side (Watson 2009a, p. 5.11-2). Currently, the segment of Wilmington Avenue near the project site carries a high percentage of heavy truck traffic (Watson 2009a, p. 5.11-2). In the vicinity of the project site, the intersection of Wilmington Avenue and the BP Carson Refinery access road is unsignalized, with stop signs on the access road and a posted speed limit of 40 mph (Watson 2009a, p. 5.11-3).

Sepulveda Boulevard

Sepulveda Boulevard is a four-lane, east-west local roadway located south of the project site, starting at Prospect Avenue on the west and ending at the Terminal Island Freeway (103) on the east, where it changes name to Willow Street. In the vicinity of the project site, the intersection of Sepulveda Boulevard and Wilmington Avenue is controlled by a traffic signal and has a posted speed limit of 40 mph (Watson 2009a, p. 5.11-3).

East 223rd Street

East 223rd Street is a four-lane, east-west local roadway located north of the project site starting at Plaza Del Amo on the west and ending near Santa Fe Avenue to the east, where its name changes to Wardlow Road. In the vicinity of the project site the intersection of 223rd Street and Wilmington Avenue is controlled by a traffic signal and has a posted speed limit of 45 mph (Watson 2009a, p. 5.11-3).

Current Roadway Conditions

The roadways discussion below is based on information contained in the AFC as well as traffic data from Caltrans.

Level of Service

To quantify the existing baseline traffic conditions, the study area roadways and intersections were analyzed in the AFC to determine their operating conditions. Based on the traffic volumes, the turning movement counts, and the existing number of lanes at each intersection, the volume/capacity (V/C) ratios and levels of service (LOS) have been determined for each intersection.

LOS is a qualitative measure describing operational conditions within a traffic stream. It is used to describe and quantify the congestion level on a particular roadway or intersection and generally describes these conditions in terms of such factors as speed or vehicle movement. **Traffic and Transportation Table 2** summarizes roadway LOS for associated V/C ratios.

Traffic and Transportation Table 2
Level of Service Criteria for Roadways and Intersections

Level of Service	Volume/Capacity	Description
A	0.00 – 0.60	Free flow; insignificant delays
B	0.61 – 0.70	Stable operation; minimal delays
C	0.71 – 0.80	Stable operation; acceptable delays
D	0.81 – 0.90	Approaching unstable flow; queues develop rapidly but no excessive delays
E	0.91 – 1.00	Unstable operation; significant delays
F	> 1.00	Forced flow; jammed conditions

Source: Watson 2009a, p. 5.11-5

Current Roadway Segment Conditions — LOS

Traffic and Transportation Table 3 summarizes the existing morning (7:00 a.m. to 9:00 a.m.) and afternoon (4:00 p.m. to 6:00 pm) peak hour LOS for roadway segments located within the proposed project area that could be impacted by proposed project construction and operational related traffic. As shown in **Table 3**, all study area roadway segments under presented existing conditions operate at LOS C or better, with the exception of the I-405 Freeway between Alameda Street and Wilmington Avenue with one direction operating at LOS D during the morning peak hour.

Traffic and Transportation Table 3
Existing (2008) Roadway Segment Level of Service Summary

Roadway	Segment	AM Peak Hour		PM Peak Hour	
		V/C Ratio	LOS	V/C Ratio	LOS
I-405 Freeway (NB/SB)	Between Alameda St. and Wilmington Ave.	30.4/32.2[1]	D/D	31.3/25.4[1]	D/C
East 223rd St. (NB/SB)	Between Alameda St. and Wilmington Ave.	0.41/0.32	A/A	0.80/0.44	C/A
Alameda Ave. (EB/WB)	Between East 223rd St. and East Sepulveda Blvd.	0.34/0.32	A/A	0.58/0.38	A/A
Wilmington Ave. (EB/WB)	Between East 223rd St. and East Sepulveda Blvd.	0.49/0.43	A/A	0.48/0.56	A/A
East Sepulveda Blvd. (NB/SB)	Between Alameda St. and Wilmington Ave.	0.40/0.44	A/A	0.46/0.41	A/A

Source: Watson 2009a, pp. 5.11-6 and 5.11-7
Notes: NB – Northbound; SB – Southbound; EB – Eastbound; WB – Westbound. [1]Shown in Density (vehicle/mile/lane).

Current Intersection Conditions — LOS

Traffic and Transportation Table 4 summarizes the existing morning and afternoon peak hour LOS for intersections located within the proposed project area that could be impacted by proposed project construction and operational related traffic. As shown in **Traffic and Transportation Table 3**, all study area intersections under presented existing conditions operate at LOS C or better, with the exception of the 223rd Street and Wilmington Avenue intersection, which operates at LOS E during the afternoon peak hour.

Traffic and Transportation Table 4
Existing (2008) Intersection Level of Service Summary

Intersection	Control	AM Peak Hour		PM Peak Hour	
		V/C Ratio	LOS	V/C Ratio	LOS
223rd St/I-405 Freeway SB on/off ramps	Signalized	0.47	A	0.49	A
223rd St./Wilmington Ave.	Signalized	0.75	C	0.97	E
Wilmington Ave./Sepulveda Blvd.	Signalized	0.69	B	0.63	B
Sepulveda Blvd./Alameda St. ramp	Signalized	0.60	A	0.56	A
Alameda St./Sepulveda Blvd. ramp	Signalized	0.51	A	0.54	A
Alameda St./223rd St. connector	Signalized	0.46	A	0.59	A
Alameda St./I-405 Freeway NB ramp	Signalized	0.55	A	0.67	B

Source: Watson 2009a, pp. 5.11-4 and 5.11-7
Notes: NB – Northbound; SB – Southbound

RAILWAYS

The nearest rail lines serving the proposed site crosses East 223rd Street at a distance of approximately 500-feet west of the Wilmington Avenue/East 223rd Street intersection, approximately 1,100-feet north of the project site (Watson 2009a, p. 5.11-3). This rail line is considered part of the Alameda Corridor, which is a key railroad facility for goods movement in Southern California (Watson 2009a, p. 5.11-3).

BUS TRANSPORTATION

The nearest transit bus service to the project site are Los Angeles County Metro Bus Route 205 serving Alameda Street to the east of the project site, and city of Carson Circuit Route F serving Wilmington Avenue and 223rd Street to the west and northwest of the project site (Watson 2009a, p. 5.11-3). These bus lines are located approximately 1,500-feet east and 1,800 feet west of the project site (Watson 2009a, p. 5.11-3).

BICYCLES AND PEDESTRIANS

Sidewalks (usually six feet wide) are generally present on one or both sides on all local roadways serving the proposed project site (Alameda Street, 223rd Street, Wilmington Avenue, and Sepulveda Boulevard) (Watson 2009a, p. 5.11-3). Field observations near the project site revealed light pedestrian activities in the vicinity of the site (Watson 2009a, p. 5.11-3). No designated bicycle routes exist within the immediate vicinity of the project site and adjacent project area (Watson 2009a, p. 5.11-3).

AIRPORTS

The nearest airport to the proposed project site is Zamperini Field Airport, located approximately 3.8 miles southwest of the site. Zamperini Field Airport is a public airport containing two parallel runways serving mostly general aviation activities (AirNav 2010a). For the one-year time frame ending May 31, 2005 (most recently published statistic), Zamperini Field Airport handled an average of 474 aircraft per day, of which 55% was transient general aviation and 44% local general aviation (AirNav 2010a).

Additionally, the proposed project is located approximately 3.9 miles west of Long Beach International Airport. Long Beach International Airport is a public airport containing a total of five runways serving mostly general aviation activities as well as limited commercial flights (AirNav 2010b). For the one-year time frame ending December 1, 2009 (most recently published statistic), Long Beach International Airport handled an average of 831 aircraft per day, of which 47% was local general aviation, 41% transient general aviation, and 10% was commercial flights (AirNav 2010b).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

To determine whether there is a potentially significant impact generated by a project, Energy Commission staff reviews the project using the criteria found in the CEQA Guidelines Appendix G Environmental Checklist and applicable LORS utilized by other governmental agencies. Specifically, staff analyzed whether the proposed project would do the following:

- conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrians and mass transit;
- conflict with and applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways;
- result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;
- substantially increase hazards due to a design feature or incompatible uses;
- result in inadequate emergency access; and
- conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Construction Impacts and Mitigation

Project construction is estimated to take 26 months to complete, with approximately 41 workers as the average construction workforce over this period (Watson 2009a, p. 5.11-8). However, during month 12 of construction (the peak month), the construction workforce may reach up to 80 workers (Watson 2009a, p. 5.11-8). Therefore, estimated daily construction trips associated with 80 workers during Month 24 were used to determine potential impacts, as this would represent the worst-case construction traffic scenario.

Typically, construction work starts before the 7:00 a.m. to 9:00 a.m. peak hour traffic and ends before the 4:00 p.m. to 6:00 p.m. peak hour traffic on the streets adjacent to the project site. However, for the purposes of the traffic effect analysis, it was conservatively assumed that project construction workers would commute to work within the 7:00 a.m. to 9:00 a.m. and from work within the 4:00 p.m. to 6:00 p.m. peak hours (Watson 2009a, p. 5.11-8). Also, it was assumed that all construction workers would commute alone to work (Watson 2009a, p. 5.11-8).

In addition to the construction workforce trips, construction equipment deliveries and construction-related truck traffic will contribute additional trips during project construction. Truck and heavy equipment traffic were estimated using a passenger car equivalent (PCE) factor of three cars per truck (Watson 2009a, p. 5.11-8).

Traffic and Transportation Table 5 lists the estimate of total construction vehicle trip for the proposed project, including identifying which of those would be generated during both the a.m. and p.m. peak hour periods.

Traffic and Transportation Table 5
Project Construction Trip Generation – Peak Construction Period

	Total Daily Trips	A.M. Peak Hour		P.M. Peak Hour	
		In	Out	In	Out
Construction Worker Vehicles[1]	160	80	0	0	80
Construction Worker Buses[2]	36	9	9	9	9
Delivery Vehicles (Truck/Van)[3]	42	21	0	0	21
Delivery Vehicles (Heavy Truck)[3]	42	21	0	0	21
Total Trips	*280*	*131*	*9*	*9*	*131*

Source: Watson 2009a, p.5.11-10
Notes:
[1]Peak workforce was conservatively analyzed at 80 worker trips driving alone. During the peak hours of the peak month of construction, 100% of workers are projected to commute during the morning and evening peak hours.
[2] Three buses are assumed to transport workers from off-site parking to the project site, and this value is adjusted into Passenger Car Equivalent (1 bus = 3 PCE) vehicles in the traffic effects analysis.
[3] Delivery vehicles were adjusted into Passenger Car Equivalent (1 heavy vehicle = 3 PCE) vehicles in the traffic effects analysis. Peak construction delivery trips were conservatively analyzed. During the peak month of construction, 100% of delivery trucks are projected to commute during the morning and evening peak hours.

Roadway Segment Levels of Service

Based on the construction vehicle trip calculations presented in **Traffic and Transportation Table 5**, an analysis was conducted in the AFC to determine the impacts of these construction vehicle trips on current LOS for project area roadway segments. **Traffic and Transportation Table 6** identifies the 2011 No-Project Conditions[1] baseline traffic volume projections and compares them with 2011 Peak Project Construction Conditions to show LOS anticipated with and without the proposed project construction vehicle traffic for critical roadway segments in the vicinity of the project.

[1] Consistent with the city of Carson Traffic Impact Analysis Guidelines, the 2011 No-Project Conditions serve as the baseline conditions in the evaluation of project construction traffic effects. The methodology for developing 2011 No-Project Conditions baseline traffic volume projections is presented in the AFC (Watson 2009a, pp. 5.11-10 through 5.11-12).

As shown in **Traffic and Transportation Table 6**, LOS of study area roadway segments will not be significantly impacted with the addition of the project peak construction traffic as compared to the future Year 2011 without project conditions. As shown, construction traffic associated with the project would only temporarily degrade the segment of eastbound Alameda Avenue between East 223rd Street and East Sepulveda Boulevard during the P.M. peak hour from LOS A to LOS B when compared to Year 2011 without project levels. As described in **Traffic and Transportation Table 1**, the city of Carson does not have any LORS specifying acceptable LOS thresholds for roadway segments (General Plan Policy TI-2.1 is specific to intersections). Therefore, as described in **Traffic and Transportation Table 2**, LOS B (stable traffic flow with minimal delay) is considered by staff to be an acceptable LOS resulting in no adverse impacts from construction traffic to roadway segment LOS.

Intersection Levels of Service

Based on the construction vehicle trip calculations presented in **Traffic and Transportation Table 5**, an analysis was conducted in the AFC to determine the impacts of these construction vehicle trips on current levels of service for project area intersections. **Traffic and Transportation Table 7** compares the 2011 No-Project Conditions traffic volume projections and the 2011 Peak Project Construction Conditions to show LOS anticipated with and without the proposed project construction vehicle traffic for critical intersections in the vicinity of the project.

As shown, construction traffic associated with the project would not degrade any analyzed intersection LOS when compared to Year 2011 without project levels. Therefore, the proposed project would not exceed any LOS threshold specified in City of Carson General Plan Transportation and Infrastructure Element Policy TI-2.1 (as described in **Traffic and Transportation Table 1**). The proposed project would be consistent with this LORS and result in no adverse impacts to intersection LOS.

Operational Impacts and Mitigation

Once operational, the proposed project would require no daily vehicle trips to and from the site for either operations and maintenance (O&M) trips outside of those already occurring as part of existing BP Refinery operation (Watson 2009a, p. 5.11-14). As no additional manpower will be needed for project operation, the current workforce of the BP Refinery will operate the project without addition of new staff, resulting in no change to the number of existing vehicle trips (Watson 2009a, p. 5.11-14). Therefore, no impacts to street segment or intersections serving the project site will occur from project operations.

Traffic and Transportation Table 6
Current and Anticipated Year 2011 With and Without Project Roadway Segments Levels of Service - Construction

Roadway	Segment	AM						PM					
		Current		2011 Without Project		2011 With Project		Current		2011 Without Project		2011 With Project	
		V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
I-405 Freeway (NB/SB)[1]	Between Alameda St. and Wilmington Ave.	30.4/32.2	D/D	31.9/33.9	D/D	32.1/34.1	D/D	31.3/25.4	D/C	32.8/26.4	D/D	33.1/26.5	D/D
East 223rd St. (NB/SB)	Between Alameda St. and Wilmington Ave.	0.41/0.32	A/A	0.43/0.33	A/A	0.43/0.34	A/A	0.80/0.44	C/A	0.82/0.45	D/A	0.82/0.46	D/A
Alameda Ave. (EB/WB)	Between East 223rd St. and East Sepulveda Blvd.	0.34/0.32	A/A	0.35/0.33	A/A	0.35/0.37	A/A	0.58/0.38	A/A	0.60/0.39	A/A	0.63/0.39	B/A
Wilmington Ave. (EB/WB)	Between East 223rd St. and East Sepulveda Blvd.	0.49/0.43	A/A	0.51/0.44	A/A	0.51/0.45	A/A	0.48/0.56	A/A	0.49/0.58	A/A	0.50/0.58	A/A
East Sepulveda Blvd. (NB/SB)	Between Alameda St. and Wilmington Ave.	0.40/0.44	A/A	0.42/0.46	A/A	0.42/0.46	A/A	0.46/0.41	A/A	0.47/0.42	A/A	0.48/0.43	A/A

Source: Watson 2009a, pp. 5.11-11 through 5.11-13
Notes:
[1]Shown in Density (vehicle/mile/lane).
NB – Northbound; SB – Southbound; EB – Eastbound; WB – Westbound.

Traffic and Transportation Table 7
Current and Anticipated Year 2011 With and Without Project Intersection Levels of Service - Construction

Intersection[1]	AM						PM					
	Current		2011 Without Project		2011 With Project		Current		2011 Without Project		2011 With Project	
	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS	V/C	LOS
223rd St/I-405 Freeway SB on/off ramps	0.47	A	0.46	A	0.48	A	0.49	A	0.50	A	0.51	A
223rd St./Wilmington Ave.	0.75	C	0.67	B	0.67	B	0.97	E	0.91	E	0.93	E
Wilmington Ave./Sepulveda Blvd.	0.69	B	0.65	B	0.66	B	0.63	B	0.64	B	0.65	B
Sepulveda Blvd./Alameda St. ramp	0.60	A	0.56	A	0.57	A	0.56	A	0.57	A	0.58	A
Alameda St./Sepulveda Blvd. ramp	0.51	A	0.51	A	0.52	A	0.54	A	0.56	A	0.57	A
Alameda St./223rd St. connector	0.46	A	0.42	A	0.45	A	0.59	A	0.61	B	0.62	B
Alameda St./I-405 Freeway NB ramp	0.55	A	0.55	A	0.57	A	0.67	B	0.69	B	0.69	B

Source: Watson 2009a, pp. 5.11-12 and 14
Notes:
[1] For existing intersection control features refer to **Traffic and Transportation Table 4.**
NB – Northbound; SB – Southbound.

Congestion Management Program

California State Proposition 111, passed by voters in 1990, established a requirement that urbanized areas prepare and regularly update a Congestion Management Program (CMP). The purpose of the CMP is to monitor the performance of the countywide transportation system, develop programs to address near-term and long-term congestion, and better integrate transportation and land use planning. The Metropolitan Transportation Authority (MTA), as the designated Congestion Management Agency for Los Angeles County, must develop, adopt, and regularly update the CMP.

The 2004 MTA CMP identifies the I-405 Freeway as a CMP highway (MTA 2010). The CMP identifies that all highways indicated as part of the CMP network shall maintain a LOS E or better (MTA 2010). As shown in **Traffic and Transportation Table 6**, segments of the I-405 Freeway utilized by proposed project construction traffic would operate at LOS D or better. As discussed above, no operational traffic would occur from the proposed project. Therefore, less than significant impacts to CMP designated roadways would occur from construction- or operational-related project traffic.

Airports

FAA Form 7460 completion is required if the proposed project would introduce (1) any construction or alteration of more than 200-feet in height above the ground level at its site, or (2) any construction or alteration of greater height than imaginary surface extending outward and upward at the following applicable slope (100 to 1 for horizontal distance of 20,000 feet from the nearest point of the nearest runway) (FAA 2010). Based on FAA 7460 requirement (2), an outward and upward slope of 100 to 1 from the nearest Zamperini Field Airport runway, any structure over approximately 201 feet would exceed this ratio at approximately 3.8 miles distance (20,064 feet). The proposed project would not include any structures taller than 200 feet (Watson 2009a, p. 5.11-18). Therefore, no impacts to aviation activities would occur from project physical structures, and completion of FAA Form 7460 or an applicant secured FAA Determination of No Hazard to Navigable Airspace is not required.

Project main gas turbine/HRSG operation and wet cooling tower exhaust would result in thermal air plumes during project operation. Thermal plumes are upward clear air exhaust and have the ability to impact low flying aircraft. Currently, numerable other thermal plume sources exist around the existing refinery, with the proposed project merely adding/augmenting several thermal plume sources. Thermal plumes associated with the proposed project are expected to be similar to existing thermal plume sources within the BP Refinery. In general, low elevation overflight of the refinery should already be avoided. Furthermore, given the distance of the nearest airport facilities to the site, Zamperini Field Airport (3.8 miles) and Long Beach International Airport (3.9 miles), no low flying aircraft are expected to have direct overflight of the project site. Therefore, staff concludes that given the existing thermal plumes within the BP Refinery and the distance of the project from the nearest airports, thermal plumes associated with the proposed project would pose no significant hazard to aircraft.

Hazards and Public Safety

Construction vehicle impacts to motorist and public safety would be minimized to the

maximum extent feasible by proposed Condition of Certification **TRANS-1**. **TRANS-1** requires the preparation of a construction traffic control plan that would minimize hazards due to construction related vehicles entering and exiting the project site and construction staging area, and would divert construction-related traffic to the maximum extent feasible away from residential areas.

There is also a potential for unexpected damage to roads by vehicles and equipment within the project area that could result in a roadway hazard to the public. Therefore, staff is proposing Condition of Certification **TRANS-2,** which would require that any road damaged by project construction be repaired to its original condition. This will ensure that any damage to local roadways will not be a safety hazard to motorists.

The use of oversize vehicles during construction can create a hazard to the public by limiting motorist views on roadways and by the obstruction of space. As described above in **Traffic and Transportation Table 1**, CVC Sections 35550-35559 as well as city of Carson Municipal Code, Chapter 2 (Traffic Code), Part 7 establish guidelines for oversize vehicle loads. To ensure consistency with these applicable ordinances, staff is proposing Condition of Certification **TRANS-3,** which would require that all oversize vehicles used on public roadways during construction comply with Caltrans, city of Carson, and other relevant jurisdictions limitations on vehicle sizes and weights, as well as oversize vehicle routes and any other applicable limitations or other relevant jurisdictional policies.

As discussed in the **Visual Resources** section in this Preliminary Staff Assessment (PSA) Appendix VR-2: Visible Plume Modeling Analysis, the ground fogging plume analysis indicates that the cooling tower will not create ground fogging plumes that could reach area roads. Therefore, there would be no impact on ground traffic safety.

The implementation of Conditions of Certification **TRANS-1** through **TRANS-3** would ensure that the proposed project results in less than significant hazard and safety impacts to motorists and ensure project compliance to LORS pertaining to such.

Another anticipated increase in traffic during project construction and operation would be truck trips, including delivery of hazardous materials and removal of wastes. For a discussion of the potential impacts related to the transport of hazardous materials please see the **Hazardous Materials Management** section in this PSA.

Emergency Access

In the event of an emergency at the project site during construction, emergency vehicles would likely use Wilmington Avenue and existing BP Refinery driveways to access the project site. To maintain access for emergency vehicles and allow for adequate access into and within the facility, proposed Condition of Certification **TRANS-1** requires the preparation of a construction traffic control plan which includes the assurance of access and movement of emergency vehicles. Furthermore, as the existing internal BP Refinery road network will serve the proposed project, no new roadways are required (Watson 2009a, pp. 3-44 and 45). For additional discussion of emergency services serving the facility, refer to the **Worker Safety and Fire Protection** section in this PSA.

Parking

During construction, all temporary construction equipment laydown and parking, including construction vehicle parking, construction worker parking, offices, and construction laydown areas would occur within a paved 25-acre parcel located approximately 1 mile southeast of the project site, at the northeast corner of East Sepulveda Boulevard and South Alameda Street (Watson 2009a, p. 5.11-1). The area is owned by Watson Cogeneration Company and is currently used as a truck parking and staging area (Watson 2009a, p. 5.11-1). Access from the construction laydown and parking area to the project site will occur via existing paved public roadways, with all construction related trips traveling south on South Alameda Street to East Sepulveda Boulevard, then north on Wilmington Avenue to the project site, a total travel distance of about 2 miles (Watson 2009a, p. 3-9). Therefore, no construction worker or vehicle parking will occur in or on public parking resources during construction of the proposed project. Once operational, no additional workers would be required for the proposed project and existing BP Refinery worker parking would not be affected. Therefore, both construction and operation of the proposed project will have no impact on public parking resources serving the area.

Alternative Transportation

As discussed above, no local bus stops, pedestrian facilities, or bicycle routes are within the project site footprint. Furthermore, due to the distance to railways, no railways will be directly impacted by construction or operation of the proposed project. To ensure pedestrian and bicycle safety along local roadways utilized during project construction, proposed Condition of Certification **TRANS-1** requires the preparation of a construction traffic control plan which includes the ensurance of pedestrian and bicycle safety from vehicle travel route between construction parking and staging area to the project site and identification of safety procedures for exiting and entering the site access gate. Less than significant impacts would occur to alternative transportation facilities or use during construction and operation of the proposed project.

CUMULATIVE IMPACTS AND MITIGATION

A project may result in a significant adverse cumulative impact where its effects are cumulatively considerable. *Cumulatively considerable* means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (Title 14, California Code Regulation, section 15130).

Continued development of the city of Carson has contributed to congestion on area roadways that would be used by project related traffic. The 2011 No-Project baseline traffic volume projections, as shown in **Traffic and Transportation Tables 6** and **7**, were developed in consultation with city of Carson staff through the application of an ambient 1% growth factor to existing traffic volume to account for background traffic growth and traffic generated by pending development projects that would potentially occur by 2011 (Watson 2009a, p. 5.11-8). Therefore, roadway congestion resulting from proposed project construction related traffic that could combine with cumulative project development and growth within the area was considered in the proposed project analysis.

Traffic and Transportation Tables 6 and **7** identify that construction-related traffic and activities associated with the proposed project would not result in cumulative traffic capacity related impacts as the proposed project would not result in a decrease in LOS when compared to roadway and intersection Year 2011 LOS without project related construction or operational related traffic added. As the proposed project would result in negligible operational traffic, the only contribution to the area traffic network would be from temporary construction related trips.

As discussed above and shown in **Traffic and Transportation Table 6**, construction traffic associated with the project would only temporarily degrade the segment of eastbound Alameda Avenue between East 223rd Street and East Sepulveda Boulevard during the P.M. peak hour from LOS A to LOS B when compared to Year 2011 without project levels. As construction related traffic is temporary and short-term, the temporary degradation of this roadway segment to LOS B is not considered by staff to have the potential to contribute to significant cumulative traffic impacts. Therefore, the proposed project's cumulative contribution to this impact is considered less than significant.

Conditions of Certification **TRANS-1** through **TRANS-3** are proposed to reduce the proposed project's potential to contribute cumulatively to roadway hazards, physical damage to local transportation facilities, parking, and alternative transportation impacts. These conditions ensure that the proposed project's cumulative contribution to these impacts is less than significant. Furthermore, as the proposed project results in no impacts to aviation and airport operations, it would not contribute cumulatively to any aviation impacts.

Furthermore, it is assumed that all cumulative project development occurring with the City of Carson and the surrounding area would include environmental review and mitigation similar to that for the proposed project (i.e. the development of a construction traffic control plan) and would require approval from all affected jurisdictions and agencies. This mitigation and approval would reduce not only project level transportation and traffic impacts of cumulative development, but reduce project-specific transportation and traffic impacts of cumulative projects as well. As agency approval of projects is gained, jurisdictional staggering of project construction and timing may occur to further reduce any potential cumulative transportation and traffic impacts. Therefore, the proposed project would not have a considerable cumulative contribution to transportation and traffic impacts within the area.

With regards to potential environmental justice impacts, staff has determined that all significant direct or cumulative impacts specific to traffic and transportation resulting from the construction or operation of the project would either be less than significant or with the implementation of Conditions of Certification be reduced to a less than significant levels. Therefore, the proposed project would not result in significant and unavoidable disproportionate transportation and traffic related impacts to low-income or minority populations.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Traffic and Transportation Table 8 provides a general description of applicable statutes, regulations, and standards adopted by the federal government, the State of California, and local agencies pertaining to traffic and transportation with which the project is required to comply. Conditions of certification have been proposed to ensure project consistency with a law, ordinance, regulation, or standard where it was not already mandated by federal or state regulations.

NOTEWORTHY PUBLIC BENEFITS

Neither the applicant nor staff has identified any traffic-related benefits associated with the proposed project.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

To date, staff has received no public or agency comments related to traffic and transportation related issues.

Traffic and Transportation Table 8
Project Compliance with Adopted Traffic and Transportation Laws, Ordinances Regulations, and Standards

Applicable Law	LORS Description and Project Compliance Assessment
Federal	
Title 14, CFR, section 77 (14 CFR 77)	Includes standards for determining physical obstructions to navigable airspace. Sets forth requirements for notice to the Federal Aviation Administration of certain proposed construction or alterations. Also provides for aeronautical studies of obstructions to air navigation to determine their effect on the safe and efficient use of airspace (including temporary flight restrictions).
	Based on FAA 7460 requirement (2), an outward and upward slope of 10 to 1 from the nearest Zamperini Field Airport runway, any structure over approximately 201 feet would exceed this ratio at approximately 3.8 miles distance (20,064 feet). The proposed project would not include any structures taller than 200 feet. Therefore, no impacts to aviation activities would occur from project physical structures, and completion of FAA Form 7460 or an applicant secured FAA Determination of No Hazard to Navigable Airspace is not required.
CFR, Title 49, Subtitle B	Includes procedures and regulations pertaining to interstate and intrastate transport (includes hazardous materials program procedures) and specifies safety measures for motor carriers and motor vehicles that operate on public highways.
	Enforcement is conducted by state and local law enforcement agencies and through state agency licensing and ministerial permitting (e.g., California Department of Motor Vehicles licensing, Caltrans permits), and/or local agency permitting (e.g., Los Angeles County of Public Works permits). For a discussion of the potential impacts related to the transport of hazardous materials, please see the **Hazardous Materials Management** section in this PSA.
State	
California Vehicle Code, division 2, chapter 2.5; div. 6, chap. 7; div. 13, chap. 5; div. 14.1, chap. 1 & 2; div. 14.8; div. 15	Includes regulations pertaining to licensing, size, weight, and load of vehicles operated on highways; safe operation of vehicles; and the transportation of hazardous materials.
	Enforcement is provided by state and local law enforcement agencies and through ministerial state agency licensing and permitting and/or local agency permitting. The use of oversize vehicles during construction can create a hazard to the public by limiting motorist views on roadways and by the obstruction of space by the oversize vehicle. Therefore, staff is proposing Condition of Certification **TRANS-3,** which would require that all oversize vehicles used on public roadways during construction comply with Caltrans limitations on vehicle sizes and weights.
California Streets and Highway Code, division 1 & 2, chapter 3 & chapter 5.5	Includes regulations for the care and protection of state and county highways and provisions for the issuance of written permits.
	Enforcement is provided by state and local law enforcement and through ministerial state agency licensing and permitting and/or local agency permitting. There is also a potential for unexpected damage to roads by vehicles and equipment within the project area. Therefore, staff is proposing Condition of Certification **TRANS-2,** which would require that any road damaged by project construction be repaired to its original condition.
Local	
Metropolitan Transportation Authority 2004 Los	Designates that a minimum levels of service (LOS) E performance measurement is designated for highway segments and key roadway intersections in the CMP system.

Angeles County Congestion Management Plan	Segments of the I-405 Freeway utilized by proposed project construction traffic and included in the CMP system would operate at LOS D or better. Furthermore, Condition of Certification **TRANS-1** will further reduce impacts from construction related trips to affected I-405 Freeway segments. No operational traffic would occur from the proposed project. Therefore, less than significant impacts to CMP designated roadways would occur from construction- or operational-related project traffic.
City of Carson General Plan – Transportation and Infrastructure Element	Policy TI-2.1: Require that new projects not cause the Level of Service for intersections to drop more than one level if it is at Level A, B or C, and not drop at all if it is at D or below, except when necessary to achieve substantial City development goals.
	As shown in **Traffic and Transportation Tables 6** and **7**, LOS of study area roadway segments and intersections will not change with the addition of the project peak construction traffic as compared to the future Year 2011 without project conditions. Furthermore, no operational traffic would occur from the proposed project. Therefore, the proposed project is consistent with this City of Carson General Plan Policy.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Public and agency comments were provided in writing and verbally on the contents of the Preliminary Staff Assessment (PSA) during the public comment period and PSA workshop. However, no public or agency comments were received in relation to issues presented in the **Transportation and Traffic** section of the PSA.

CONCLUSIONS

In the Socioeconomics section of this staff assessment, staff presents census information that shows that there are minority populations within six miles of the project. For the proposed BP Watson project, the total population within the six-mile radius of the site is 778,090 persons, and the total minority population is 646,789 persons or 83.12% of the total population (see Socioeconomics Figure 1). Energy Commission staff has identified significant adverse direct or cumulative traffic and transportation impacts resulting from the construction or operation of the proposed project; however, mitigation measures to reduce these impacts have been developed.

Staff concludes that the BP Watson Project would not result in significant traffic and transportation impacts from construction or operation of the power plant on minority population if the proposed Conditions of Certification are implemented. Therefore, there are no environmental justice issues for traffic and transportation.

Based on the list of significance thresholds identified above, staff has analyzed potential construction and operational impacts by the proposed project related to the regional and local traffic and transportation system and conclude the following:

- The construction and operation of the proposed project as proposed with the effective implementation of staff's recommended Conditions of Certification **TRANS-1** through **TRANS-3,** would ensure that the project complies with applicable LORS regarding traffic and transportation
- LOS of study area roadway segments and intersections will not be adversely

impacted with the addition of the project peak construction traffic as compared to the future Year 2011 without project conditions. Construction traffic associated with the project would only temporarily degrade the segment of eastbound Alameda Avenue between East 223rd Street and East Sepulveda Boulevard during the P.M. peak hour from LOS A to LOS B when compared to Year 2001 without project levels. This temporary degradation to LOS B is considered by staff to be an acceptable LOS resulting in no adverse impacts from construction traffic to roadway segment LOS.

- Condition of Certification **TRANS-1** should be implemented to ensure that all construction-related traffic and construction-related activities would not result in the creation of a traffic hazard during any time in the daily construction traffic cycle.
- The proposed project would not include any structures taller than 200 feet. Therefore, no impacts to aviation activities would occur from project physical structures, and completion of FAA Form 7460 or an applicant secured FAA Determination of No Hazard to Navigable Airspace is not required.
- Condition of Certification **TRANS-2** should be implemented to ensure that any road damaged by project construction be repaired to its original condition.
- Condition of Certification **TRANS-3** should be implemented to ensure that all oversize vehicles used on public roadways during construction comply with Caltrans and City of Carson limitations on vehicle sizes and weights, as well as oversize vehicle routes and any other applicable limitations or other relevant jurisdictional policies.
- No construction worker or vehicle parking will occur in or on public parking resources during construction of the proposed project. Once operational, no additional workers would be required for the proposed project and existing BP Refinery worker parking would not be affected.
- No local rail lines or bus stops are in immediate proximity of the proposed project site. Condition of Certification **TRANS-1** should be implemented to ensure pedestrian and bicycle safety along travel routes of construction vehicles between the construction parking and staging area and the project site, as well as the identification of safety procedures for exiting and entering the site access gate.

Should the Energy Commission certify the project, staff recommends that the Energy Commission adopt the following conditions of certification.

PROPOSED CONDITIONS OF CERTIFICATION

TRANS-1 The project owner shall consult with the City of Carson and prepare and submit to the Compliance Project Manager (CPM) for approval a construction traffic control plan and implementation program. The traffic control plan must be prepared in accordance with Caltrans Manual on Uniform Traffic Control Devices and the WATCH Manual and must include but not be limited to the following issues:

- timing of heavy equipment and building materials deliveries
- redirecting construction traffic with a flag person if required
- signing, lighting, and traffic control device placement if required

- ensurance of access for emergency vehicles into and within the project site
- ensurance of pedestrian and bicycle safety from vehicle travel route between construction parking and staging area to the project site
- specification of construction-related haul routes and employee commute routes, construction worker, equipment, and material delivery/haul route from their points of origin to Alameda Avenue and toward the offsite Construction Laydown and Parking Area, avoiding residential neighborhoods to the maximum extent feasible
- identification of safety procedures for exiting and entering the site access gate and construction parking and staging area

Verification: At least 30 days prior to site mobilization, the project owner or contractor shall provide a construction traffic control plan to the CPM for review and approval.

TRANS-2 The project owner shall enter into a secured agreement with the City of Carson to ensure that any roads that are demonstrably damaged by project construction-related activities are promptly repaired and, if necessary, paved, slurry-sealed, or reconstructed per requirements of the City of Carson Public Works Department.

Verification: At least 30 days prior to site mobilization, the project owner or contractor shall provide a copy of said agreement to the CPM. Within 30 days after completion of the project, the project owner shall meet with the CPM and City of Carson to determine and receive approval for the actions necessary and schedule to complete any necessary repair of identified sections of public roadways to original or as near-original condition as possible. Following completion of any regional road improvements, the project owner shall provide to the CPM a letter from City of Carson Public Works Department stating its satisfaction with any required road repairs.

TRANS-3 The project owner shall comply with Caltrans, City of Carson, and other relevant jurisdictions limitations on vehicle sizes, weights, and travel routes and obtain any permits required for this actions. In addition, the project owner shall obtain all necessary transportation permits from Caltrans, city of Carson, and other relevant jurisdictions for roadway use.

Verification: In the Monthly Compliance Reports, the project owner shall indicate that all required permits were obtained and list the jurisdictions they were acquired from, or indicate if no permits were necessary, during that reporting period. In addition, the project owner shall retain copies of all acquired permits and supporting documentation in its compliance file for at least six months after the start of commercial operation.

REFERENCES

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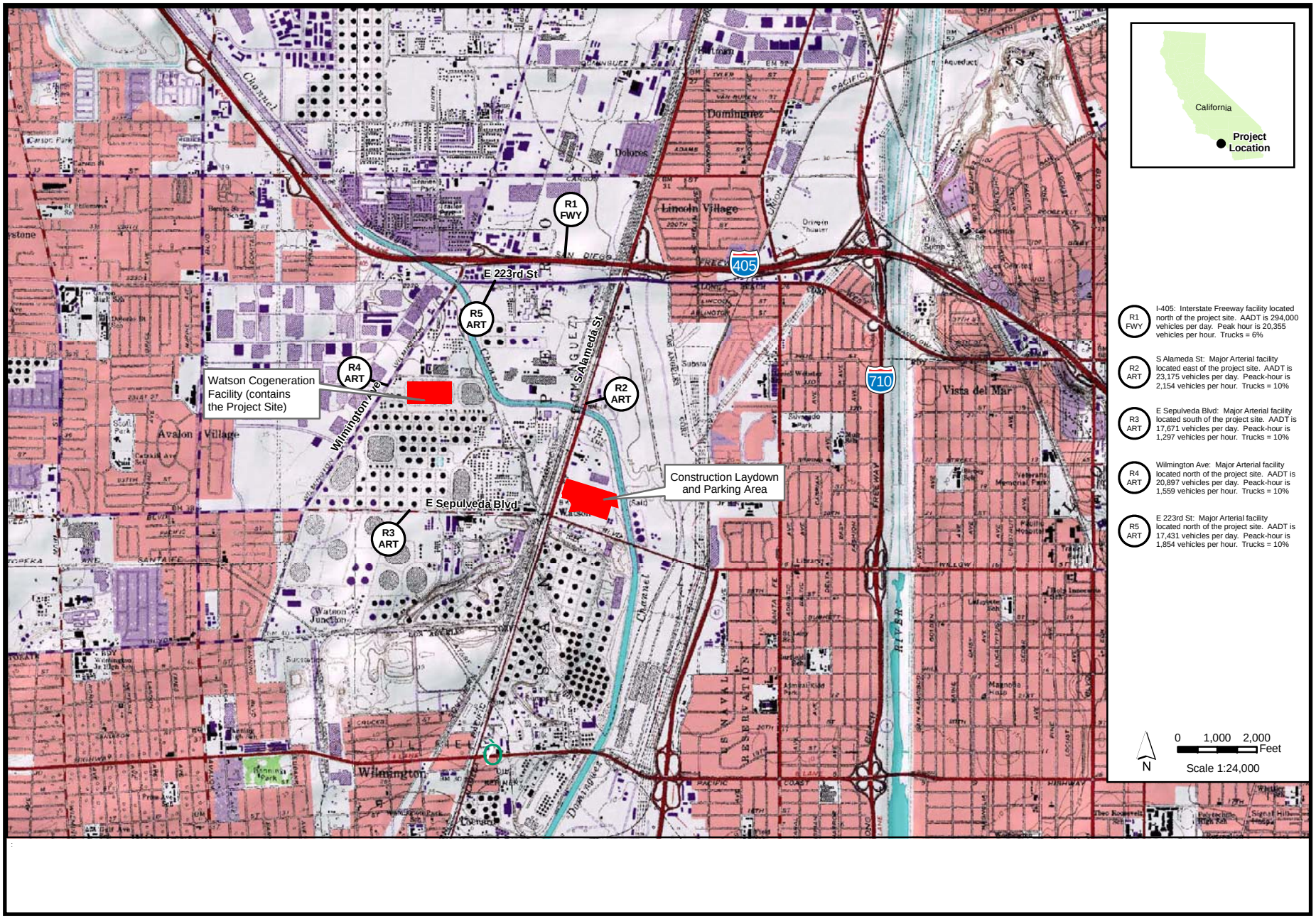
Metropolitan Transportation Authority 2010 – 2004 Congestion Management Plan. [online]: http://www.metro.net/projects/congestion_mgmt_pgm/. Accessed March 23, 2010.

Watson 2009a – Watson Cogeneration Company/Thomas A. Lu (tn 50584). Application for Certification Volume I&II, dated 3/19/09. Submitted to CEC/Docket Unit on 3/19/09.

TRAFFIC AND TRANSPORTATION - FIGURE 1

Watson Cogeneration Steam and Electric Reliability Project - Local Roadway System



TRAFFIC AND TRANSPORTATION

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: AFC Figure 5.11-2

TRANSMISSION LINE SAFETY AND NUISANCE

Testimony of Obed Odoemelam, Ph.D.

SUMMARY OF CONCLUSIONS

The applicant, Watson Cogeneration Company (Watson) proposes to transmit the power from the proposed Watson Cogeneration Steam and Electric Reliability project (BP Watson) to Southern California Edison's (SCE's) 230-Kilovolt (kV) transmission grid through the overhead 230-kV tie-in line used for the existing Watson Cogeneration Facility (Facility). This existing overhead line extends 1.6 miles as it connects the existing Facility Substation 1F to the SCE Hinson Substation from which the generated power currently flows and will continue to flow to the SCE grid. No new offsite overhead transmission lines would be built as the existing line would be adequate for transmitting the additional power from the proposed BP Watson project. The only new transmission-related facilities would be the on-site underground conductors connecting a new project-related on-site 69-kV switchyard to the existing 230-kV Substation 1F from which the line presently extends to the SCE Hinson Substation. The existing line (to be used) and its related switchyard were designed, built, and are operated and maintained according to SCE guidelines for line safety and field management that conform to applicable laws, ordinances, regulations and standards. The proposed BP Watson project would occupy a 2.5-acre site located within the boundaries of the existing facility, meaning that there would be no nearby residents to be exposed to the generated electric and magnetic fields. Since the generated power would be transmitted at the existing 230 kV level, there would be no increase in the related electric fields whose intensities vary directly with voltage. The magnetic field is the only component that directly varies with current flow. Therefore, adding power from the proposed BP Watson project would increase the strengths of the system's magnetic fields to which humans would be exposed during operations. Staff's only recommended condition of certification in this regard (**TLSN-2**), is for measuring this resulting magnetic field to assess similarity with fields from SCE lines of similar design, voltage, and current-carrying capacity. It is this similarity in intensity that constitutes the design-related compliance with existing health and safety laws, ordinances, regulations and standards. The other recommended condition of certification is for ensuring that the new, project-related underground line is constructed and operated according to the requirements of the California Public Utilities commission. Compliance with these recommended conditions would ensure that any health and safety impacts from construction and operation of the proposed line would be less than significant.

INTRODUCTION

The purpose of this analysis is to assess the plan for transmitting the power from the proposed 85-MW BP Watson project to determine whether the related field and nonfield impacts would constitute a significant environmental hazard in the area around the route of the line to be used. The present proposal is essentially a modification of the existing 385-megawatt (MW) facility by adding 85-MW for a total facility capacity of 470 MW. The resulting power would be transmitted through the currently utilized overhead 230-kV line without increasing the applied voltage or upgrading the line. All related health and safety laws, ordinances, regulations and standards (LORS) are currently aimed at

minimizing the health and safety hazards of specific concern in this analysis. The first of BP Watson's project lines is the underground line connecting the new, project-related 69-kV switchyard to the existing on-site Substation 1F for further power transmission to SCE's Hinson Substation which would continue to be used for connection to the SCE power grid. The second line is the existing, 1.6 mile-long, double-circuit, overhead 230-kV line currently used for transmitting the presently generated power to the SCE power grid. Since (a) the existing tie-in line would be used without upgrade or change in applied voltage (Watson 2009a, p. 1-3, and Appendix B), and (b) line electric fields vary directly with applied voltage, the existing environmental impacts of the facility's electric fields would remain the same when the proposed BP Watson is operating. Since the magnetic field is the only component that varies directly with flowing current, the increased power from adding the proposed BP Watson would increase the magnetic field intensity along the line's 1.6-mile route. Staff's analysis focuses on the following issues taking into account both the physical presence of the proposed project lines and the physical interactions of their electric and magnetic fields:

- Aviation safety;
- Interference with radio-frequency communication;
- Audible noise;
- Fire hazards;
- Hazardous shocks;
- Nuisance shocks; and
- Electric and magnetic field (EMF) exposure.

The following federal, state, and local laws and policies apply to the control of the field and non-field impacts of any electric power lines in the project and other areas.

Transmission Line Safety and Nuisance (TLSN) Table 1
Laws, Ordinances, Regulations and Standards (LORS)

Applicable LORS	Description
Aviation Safety	
Federal	
Title 14, Part 77 of the Code of Federal Regulations (CFR),"Objects Affecting the Navigable Air Space"	Describes the criteria used to determine the need for a Federal Aviation Administration (FAA) "Notice of Proposed Construction or Alteration" in cases of potential obstruction hazards.
FAA Advisory Circular No. 70/7460-1G, " Proposed Construction and/or Alteration of Objects that May Affect the Navigation Space"	Addresses the need to file the "Notice of Proposed Construction or Alteration" (Form 7640) with the FAA in cases of potential for an obstruction hazard.
FAA Advisory Circular 70/460-1G, "Obstruction Marking and Lighting"	Describes the FAA standards for marking and lighting objects that may pose a navigation hazard as established using the criteria in Title 14, Part 77 of the CFR.
Interference with Radio Frequency Communication	
Federal	
Title 47, CFR, Section 15.2524, Federal Communications Commission (FCC)	Prohibits operation of devices that can interfere with radio-frequency communication.
State	
California Public Utilities Commission (CPUC) General Order 52 (GO-52)	Governs the construction and operation of power and communications lines to prevent or mitigate interference.
Audible Noise	
Local	
Noise Element of the City of Carson's, Noise Element and City of Carson's Noise Ordinance.	Set noise limits on noise generated around residential and commercial areas.
Hazardous and Nuisance Shocks	
State	
CPUC GO-95, "Rules for Overhead Electric Line Construction"	Governs clearance requirements to prevent hazardous shocks, grounding techniques to minimize nuisance shocks, and maintenance and inspection requirements.
CPUC GO-128, "Rules for Construction of Underground Electric Supply and Communicatons System"	Established requirements for construction and operation of underground electric lines and communications circuits.

Applicable LORS	Description
Title 8, California Code of Regulations (CCR) Section 2700 et seq. “High Voltage Safety Orders”	Specifies requirements and minimum standards for safely installing, operating, working around, and maintaining electrical installations and equipment.
National Electrical Safety Code	Specifies grounding procedures to limit nuisance shocks. Also specifies minimum conductor ground clearances.
Industry Standards	
Institute of Electrical and Electronics Engineers (IEEE) 1119, “IEEE Guide for Fence Safety Clearances in Electric-Supply Stations”	Specifies the guidelines for grounding-related practices within the right-of-way and substations.
Electric and Magnetic Fields	
State	
GO-131-D, CPUC ”Rules for Planning and Construction of Electric Generation Line and Substation Facilities in California”	Specifies application and noticing requirements for new line construction including EMF reduction.
CPUC Decision 93-11-013	Specifies CPUC requirements for reducing power frequency electric and magnetic fields.
Industry Standards	
American National Standards Institute (ANSI/IEEE) 644-1944 Standard Procedures for Measurement of Power Frequency Electric and Magnetic Fields from AC Power Lines	Specifies standard procedures for measuring electric and magnetic fields from an operating electric line.
Fire Hazards	
State	
14 CCR Sections 1250-1258, “Fire Prevention Standards for Electric Utilities”	Provides specific exemptions from electric pole and tower firebreak and conductor clearance standards and specifies when and where standards apply.

SETTING

As noted in the **Project Description** section, the site for the proposed BP Watson project is a 2.5-acre plot within the boundaries of the existing Watson Cogeneration Facility (Facility) which occupies a 21.7-acre parcel. The project area is designated as heavy industrial and zoned for heavy manufacturing and is surrounded by refineries and other industrial facilities and thus has no nearby residences. It is through this uninhabited area that the proposed lines would travel to connect to the SCE power grid. The absence of residences within the lines’ vicinity means that there would continue to be none of the long-term (residential) field exposures of the health concern of recent years.

PROJECT DESCRIPTION

The proposed BP Watson project lines would consist of the following:

- a new, underground line of insulated copper cables connecting the project's power generator to its new on-site 69-kV switchyard;
- the existing 230-kV overhead double-circuit, tie-in line stretching the 1.6 miles between the existing on-site 230-kV Substation 1F and the SCE Hinson Substation; and
- the project's on-site 69-kV switchyard.

The overhead 230-kV line to be used (without upgrades) is supported on lattice steel towers as typical of similar SCE lines. The previously listed LORS are intended against the field and nonfield impacts from new or upgraded lines and not for physical or operational changes to existing ones.

The project's underground line would be designed, placed underground and operated according to SCE guidelines reflecting compliance with the safety and field-reducing measures specified in CPUC's GO-128 (Watson 2009a, pp. 3-48 and 3-9). The potential for significant field and nonfield impacts of concern is assessed using specific evaluative criteria.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHODS AND THRESHOLDS FOR DETERMINING SIGNIFICANCE

The potential magnitude of the line impacts of concern in this staff analysis depends on compliance with the listed design-related LORS and industry standards. These LORS have been established to maintain impacts below levels of potential significance. Thus, if staff determines that a proposed project line would comply with applicable LORS, we would conclude that any transmission line-related safety and nuisance impacts would be less than significant. The nature of these individual impacts is discussed below together with the potential for compliance with the LORS that apply.

DIRECT IMPACTS AND MITIGATION

Aviation Safety

Any potential hazard to area aircraft would relate to the potential for collision in the navigable airspace.

As reflected by the information from the applicant (Watson 2009a, pp. 3-46 through 3-49), the 230-kV tie-in line to be used for the proposed BP Watson project is an existing SCE line sited according to SCE guidelines on aviation safety as required by current LORS. The new, project-related underground line does not protrude into the navigable space and would thus not pose a collision hazard to area aircraft. Therefore, staff does not have any recommendations for any conditions of certification regarding aviation safety.

Interference with Radio-Frequency Communication

Transmission line-related radio-frequency interference is one of the indirect effects of line operation and is produced by the physical interactions of line electric fields. Such interference is due to the radio noise produced by the action of the electric fields on the surface of the energized conductor. The process involved is known as corona discharge, but is referred to as spark gap electric discharge when it occurs within gaps between the conductor and insulators or metal fittings. When generated, such noise manifests itself as perceivable interference with radio or television signal reception or interference with other forms of radio communication. Since the level of interference depends on factors such as line voltage, distance from the line to the receiving device, orientation of the antenna, signal level, line configuration and weather conditions, maximum interference levels are not specified as design criteria for modern transmission lines. The level of any such interference usually depends on the magnitude of the electric fields involved and the distance from the line. The potential for such impacts is therefore minimized by reducing the line electric fields and locating the line away from inhabited areas.

The existing overhead tie-in 230-kV line to be used for the BP Watson project was designed, erected, and is presently operated and maintained according to SCE's guidelines which comply with existing LORS on radio-frequency interference; therefore, staff does not have any recommendations for any conditions of certification regarding radio-frequency interference. Since electric fields are unable to penetrate the soil and other materials, the proposed underground line would be unable to produce these above-ground electric field-related radio-frequency impacts.

Audible Noise

The noise-reducing designs related to electric field intensity are not specifically mandated by federal or state regulations in terms of specific noise limits. As with radio noise, such noise is limited instead through design, construction or maintenance practices established from industry research and experience as effective without significant impacts on line safety, efficiency, maintainability, and reliability. Audible noise usually results from the action of the electric field at the surface of the line conductor and could be perceived as a characteristic crackling, frying, or hissing sound or hum, especially in wet weather. Since the noise level depends on the strength of the line electric field, the potential for perception can be assessed from estimates of the field strengths expected during operation. Such noise is usually generated during rainfall, but mainly from overhead lines of 345-kV or higher. It is, therefore, not generally expected at significant levels from lines of less than 345-kV as proposed to be used for the BP Watson project. Since the proposed transmission line was designed according to the applicable SCE guidelines as required by current LORS, staff does not have any recommendations for any related conditions of certification. The proposed underground line would not produce the above-ground electric fields that produce such noise meaning that there would be no operational risk of audible noise of any significance.

Fire Hazards

The fire hazards addressed through the related LORS in **TLSN Table 1** are those that could be caused by sparks from conductors of overhead lines, or that could result from direct contact between the line and nearby trees and other combustible objects.

Standard fire prevention and suppression measures will continue to be implemented for the proposed tie-in line. Therefore, staff does not have any recommendations for any related conditions for certification for the existing 1.6 mile overhead line. Staff's recommended condition of certification for the proposed underground line is intended to ensure construction according to the fire risk-minimizing requirements of CPUC's GO-128.

Hazardous Shocks

Hazardous shocks are those that could result from direct or indirect contact between an individual and the energized line, whether overhead or underground. Such shocks are capable of serious physiological harm or death and remain a driving force in the design and operation of transmission and other high-voltage lines.

No design-specific federal regulations have been established to prevent hazardous shocks from overhead power lines. Safety is assured within the industry from compliance with the requirements specifying the minimum national safe operating clearances applicable in areas where the line might be accessible to the public.

The proposed tie-in line was designed, erected, and is currently operated according to the required SCE guidelines for preventing shock hazards therefore; staff does not recommend any related conditions of certification. Staff's recommended condition of certification (**TLSN-1**) for the proposed underground line would be adequate to prevent any hazardous shocks.

Nuisance Shocks

Nuisance shocks are caused by current flow at levels generally incapable of causing significant physiological harm. They result mostly from direct contact with metal objects electrically charged by fields from the energized line. Such electric charges are induced in different ways by the line's electric and magnetic fields.

There are no design-specific federal or state regulations to limit nuisance shocks in the transmission line environment. For modern overhead high-voltage lines, such shocks are effectively minimized through grounding procedures specified in the National Electrical Safety Code (NESC) and the joint guidelines of the American National Standards Institute (ANSI) and the Institute of Electrical and Electronics Engineers (IEEE). Since the proposed tie-in line was designed, erected and is operated according to the applicable SCE guidelines as required by current LORS, staff does not recommend any related condition of certification for it. Compliance with staff's the undergrounding-related condition for certification (**TLSN-1**) would be adequate to prevent operational nuisance shocks from the proposed underground cables.

Electric and Magnetic Field Exposure

The possibility of deleterious health effects from EMF exposure has increased public concern in recent years about living near high-voltage lines. Both electric and magnetic fields occur together whenever electricity flows and exposure to them together is generally referred to as EMF exposure. The CPUC, other regulatory agencies, and staff have evaluated the available evidence and concluded that such fields do not pose a significant health hazard to exposed humans. There are no health-based federal

regulations or industry codes specifying environmental limits on the strengths of fields from power lines. Most regulatory agencies believe, as staff does, that health-based limits are inappropriate at this time. They also believe that the present knowledge of the issue does not justify any retrofit of existing lines.

Staff considers it important, as does the CPUC, to note that while such a hazard has not been established from the available evidence, the same evidence does not serve as proof of a definite lack of a hazard. Staff, therefore, considers it appropriate in light of present uncertainty, to recommend feasible reduction of such fields without affecting safety, efficiency, reliability and maintainability.

While there is considerable uncertainty about EMF health effects, the following facts have been established from the available information and have been used to establish existing policies:

- Any exposure-related health risk to the exposed individual will likely be small.
- The most biologically significant types of exposures have not been established.
- Most health concerns are about the magnetic field.
- There are measures that can be employed for field reduction, but they can affect line safety, reliability, efficiency, and maintainability, depending on the type and extent of such measures.

State's Approach to Reducing EMF Exposures

In California, the CPUC (which regulates the installation and operation of many high-voltage lines owned and operated by investor-owned utilities) has determined that only no-cost or low-cost measures are presently justified in any effort to reduce power line fields beyond levels existing before the present health concern arose. The CPUC has further determined that such reduction should be made only in connection with new or modified lines and not existing ones. The CPUC requires each utility within its jurisdiction to establish EMF-reducing measures and incorporate such measures into the designs for all new or upgraded power lines and related facilities within their respective service areas. The CPUC further established specific limits on the resources to be used in each case for field reduction. Such limitations were intended by the CPUC to apply to the cost of any redesign to reduce field strength or relocation to reduce exposure. Publicly owned utilities, which are not within the jurisdiction of the CPUC, voluntarily comply with these CPUC requirements. This CPUC policy resulted from assessments made to implement CPUC Decision 93-11-013.

In keeping with this CPUC policy, staff requires a showing that each proposed overhead line would be designed according to the EMF-reducing design guidelines applicable to the utility service area involved. These field-reducing measures can impact line operation if applied without appropriate regard for environmental and other local factors bearing on safety, reliability, efficiency, and maintainability. Therefore, it is up to each applicant to ensure that such measures are applied in ways that prevent significant impacts on line operation and safety. The extent of such applications would be reflected by ground-level field strengths as measured during operation. When estimated or measured for lines of similar voltage and current-carrying capacity, such field strength values can be used by staff and other regulatory agencies to assess the effectiveness

of the applied reduction measures. These field strengths can be estimated for any given design using established procedures. Estimates are specified for a height of one meter above the ground, in units of kilovolts per meter (kV/m), for the electric field, and milligauss (mG) for the companion magnetic field. Their magnitude depends on line voltage (in the case of electric fields), the geometry of the support structures, degree of cancellation from nearby conductors, distance between conductors and, in the case of magnetic fields, amount of current in the line.

Since most new or upgraded lines in California are currently required by the CPUC to be designed according to the EMF-reducing guidelines of the electric utility in the service area involved, the proposed line's fields are required under this CPUC policy to be similar to fields from similar lines in that service area. Since the proposed tie-in line was designed, erected and is operated according to SCE's field strength-reducing guidelines, it is in compliance with present CPUC requirements for line field management.

The CPUC has recently revisited the EMF management issue to assess the need for policy changes to reflect the available information on possible health impacts. The CPUC found that there is no need for significant changes to existing field management policies. Since there are no residences in the immediate vicinity of the proposed project lines, there would not be the long-term residential EMF exposures mostly responsible for the health concern of recent years. The only project-related EMF exposures of potential significance are the short-term exposures of plant workers, regulatory inspectors, maintenance personnel, visitors, or individuals in the vicinity of the line. These types of exposures are short term and well understood as not significantly related to the health concern. Given the potential for human exposures, staff recommends a specific condition of certification (**TLSN-2**) to measure the maximum intensity of the system's electric and magnetic fields. Such measurements would allow assess of similarity with SCE lines of similar voltage and current-carrying capacity. Such similarity reflects mitigation efficiency and is an important aspect of compliance with present CPUC requirements. Staff does not recommend similar measurements for the proposed underground line since undergrounding produces fields of the least intensity through cancellation from closer-placement of the current-carrying conductors.

Applicant's and Industry's Approach to Reducing EMF Exposures

The present focus is on the magnetic field because unlike electric fields, it (as previously noted) can penetrate the soil, buildings and other materials to produce the types of human exposures at the root of the health concern of recent years. The industry seeks to reduce exposure, not by setting specific exposure limits, but through design guidelines that minimize exposure in each given case. As one focuses on the strong magnetic fields from the more visible high-voltage power lines, staff considers it important, for perspective, to note that an individual in a home could be exposed to much stronger fields while using some common household appliances than from high-voltage lines (National Institute of Environmental Health Services and the U.S. Department of Energy, 1998). The difference between these types of field exposures is that the higher-level, appliance-related exposures are short-term, while the exposure from power lines are lower level, but long-term. Scientists have not established which of these types of exposures would be more biologically meaningful in the individual. Staff

notes such exposure differences only to show that high-level magnetic field exposures regularly occur in areas other than around high-voltage power lines.

As an SCE line, specific field strength-reducing measures were incorporated into the design of the existing overhead line to be used and would also be incorporated into the design for the proposed new underground line. These measures are intended to ensure the safety and field strength minimization currently required by the CPUC in light of the concern over EMF exposure and health.

The applied reduction measures usually include the following:

1. increasing the above-or below-ground distance between the conductors and the ground to an optimal level;

2. reducing the spacing between the conductors to an optimal level;

3. minimizing the current in the line; and

4. arranging current flow to maximize the cancellation effects from interacting of conductor fields.

CUMULATIVE IMPACTS AND MITIGATION

When field intensities are measured or estimated for a specific location, they reflect the interactive, and therefore, cumulative effects of fields from all contributing conductors. This interaction could be additive, or subtractive depending on prevailing conditions. As noted by the applicant (Watson 2009a, pp. 3-46 through 3-49), the conductors for the proposed project lines are, or would be located within the existing Facility property boundaries meaning that the measured intensities would reflect the interactive and thus cumulative impacts of fields from contributing lines. Since both project lines have been, or would be designed according to applicable field-reducing SCE guidelines (as currently required by the CPUC for effective field management), any contribution to total area exposures should be at levels expected for SCE lines of similar voltage and current-carrying capacity. It is this similarity in intensity (which reflects mitigation efficiency) that constitutes compliance with current CPUC requirements on EMF management. The actual field strengths and contributions from addition of the BP Watson-generated power would be reflected by the field strength measurements specified in Condition of Certification **TLSN-2**.

COMPLIANCE WITH LORS

As previously noted, current CPUC policy on line routing and safe EMF management requires that any high-voltage line within a given area be designed to incorporate the routing and field strength-reducing guidelines of the main area utility lines to be interconnected. The utility in this case is SCE. Since the proposed lines and related switchyards were, or would be designed according to the respective requirements of the LORS listed in **TLSN Table 1**, and operated and maintained according to current SCE guidelines on line safety and field strength management, staff considers the presented design and operational plans to be in compliance with the health and safety requirements of concern in this analysis and recommends approval. The actual, design-

driven contribution of the proposed overhead line to the area's field exposure levels would be assessed from results of the field strength measurements required in Condition of Certification **TLSN-2**. Undergrounding produces the fields of least intensity and are not recommended for the mitigation-related field measurements.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff received no public or agency comments on the transmission line nuisance and safety aspects of the proposed BP Watson project.

CONCLUSIONS

In the Socioeconomics section of this staff assessment, staff presents census information that shows that there are minority populations within six miles of the project. For the proposed Watson Cogeneration project, the total population within the six-mile radius of the site is 778,090 persons, and the total minority population is 646,789 persons or 83.12% of the total population (see Socioeconomics Figure 1). Energy Commission staff has identified significant adverse direct or cumulative Transmission Line Safety and Nuisance impacts resulting from the construction or operation of the proposed project; however, mitigation measures to reduce these impacts have been developed.

Staff concludes that the BP Watson Project would not result in significant Transmission Line Safety and Nuisance impacts from construction or operation of the power plant on minority population if the proposed Conditions of Certification are implemented. Therefore, there are no environmental justice issues for Transmission Line Safety and Nuisance.

Since neither the proposed new underground line nor the existing overhead line (to be used without modification) would pose an aviation hazard according to current FAA criteria, staff does not consider it necessary to recommend location changes on the basis of a potential hazard to area aviation.

The potential for nuisance shocks would be minimized through grounding and other field-reducing measures to be implemented or already implemented in keeping with current SCE guidelines (reflecting standard industry practices). These field-reducing measures would maintain or continue to maintain the generated fields within levels not associated with radio-frequency interference or audible noise.

The potential for hazardous shocks would be minimized or continue to be minimized through compliance with the height and clearance requirements of CPUC's General Order 95. Compliance with Title 14, California Code of Regulations, Section 1250, would minimize or continue to minimize fire hazards while the use of low-corona line design, together with appropriate corona-minimizing construction practices, would (in the case of the proposed overhead line) continue to minimize the potential for corona noise and its related interference with radio-frequency communication.

Since electric or magnetic field health effects have neither been established nor ruled

out for fields from the proposed BP Watson project and similar transmission lines, the public health significance of any related field exposures cannot be characterized with certainty. The only conclusion to be reached with certainty is that the proposed line designs and operational plans would be adequate to ensure that the electric and magnetic fields are managed to an extent the CPUC considers appropriate in light of the available health effects information. The long-term, mostly residential magnetic exposure of health concern in recent years would be insignificant for the proposed lines given the general absence of residences along their respective routes. On-site worker or public exposure would be short term and at levels expected for SCE lines of similar design and current-carrying capacity. Such exposure is well understood and has not been established as posing a significant human health hazard.

Since the proposed project lines would be operated or continue to be operated to minimize the health, safety, and nuisance impacts of concern to staff and are or would be located along routes without nearby residences, staff considers the proposed design, maintenance, and construction plans as complying with the applicable LORS. With the conditions of certification proposed below, any such impacts would be maintained at less-than-significant levels. Since these impacts would be below significance levels, the issue of environmental justice would not apply to the previously noted minority population around the project site.

PROPOSED CONDITIONS OF CERTIFICATION

TLSN-1 The project owner shall construct, operate, and maintain the proposed new underground BP Watson line according to the requirements of CPUC's GO-128.

Verification: At least thirty days before starting construction of the proposed new underground line, the project owner shall submit to the Compliance Project Manager (CPM) a letter signed by a California registered electrical engineer affirming that the line and related structures will be constructed according to the requirements stated in the condition.

TLSN-2 The project owner shall use a qualified individual to measure the strengths of the electric and magnetic fields from the existing overhead 230-kV overhead line to be used at the points of maximum intensity along the route. The measurements shall be made before and after energization according to the American National Standard Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE) standard procedures. These measurements shall be completed not later than six months after the start of operations.

Verification: The project owner shall file copies of the pre-and post-energization measurements with the CPM within 60 days after completion of the measurements.

REFERENCES

Electric Power Research Institute (EPRI) 1982. Transmission Line Reference Book: 345 kV and Above.

National Institute of Environmental Health Services 1998. An Assessment of the Health Effects from Exposure to Power-Line Frequency Electric and Magnetic Fields. A Working Group Report, August 1998.

Watson 2009a-Watson Cogeneration Company/Thomas A Lu (tn 50584). Application for Certification for the Watson Cogeneration Steam and Electric Reliability Project Volumes I and 2. Submitted to the California Energy Commission on March 29, 2009.

VISUAL RESOURCES

Testimony of Martha A. Goodavish

SUMMARY OF CONCUSIONS

Staff has analyzed visual resource related information pertaining to the proposed Watson Cogeneration Steam and Electric Reliability Project (BP Watson) and concludes that the proposed project would not result in any significant unavoidable adverse aesthetic or visual impacts under the California Environmental Quality Act (CEQA. With staff's proposed conditions of certification, the proposed project would conform with applicable general plan policies and zoning ordinances of the City of Carson.

INTRODUCTION

Visual resources are the visible natural and man-made features and attributes of the proposed project setting or viewshed. The following analysis evaluates potential impacts to visual and aesthetic resources from the construction and operation of the BP Watson project under criteria of the CEQA Guidelines (California Code of Regulations Title 14) and the consistency of project construction and operation with applicable state and local laws, ordinances, regulations, and standards (LORS).

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following table (**Visual Resources Table 1**) lists the applicable laws, ordinances, regulations, and standards applicable to the BP Watson project. Project conformance with the identified LORS is discussed in the "Compliance with Applicable LORS" section of "Impacts", below.

Visual Resources Table 1
Laws, Ordinances, Regulations, and Standards

Applicable LORS and Policies	Discussion of LORS and Policies
Federal	
Transportation Equity Act for the 21st Century of 1998 and Safe, Accountable, Flexible, and Efficient Transportation Equity Act of 2005	There are no federal lands, recognized National Scenic Byways, or All American Roads within the effective viewshed of the Project.
State	
California Streets and Highways Code, sections 260 through 263 – Scenic Highways	There are no state-eligible or designated scenic highway corridors within the effective viewshed of the Project.

Visual Resources Table 1 (continued)
Laws, Ordinances, Regulations, and Standards

Applicable LORS and Policies	Discussion of LORS and Policies
Local	
General Plan, City of Carson, Chapter 2, Land Use Element (City of Carson 2004)	
Policy LU-9. Develop design standards to address permanent and effective screening of areas in transition and heavy industrial uses, such as outdoor storage yards, pallet yards, salvage yards, auto dismantling yards, and similar uses.	The city's land use goal LU-9 is to eliminate all evidence of property deterioration throughout Carson.
Policy LU-12.3. Review landscape plans for new development to ensure that landscaping relates well to the proposed land use, the scale of structures, and the surrounding area. **Policy – LU 12.5.** Improve city appearance by requiring landscaping to screen, buffer, and unify new and existing development. Mandate continued upkeep of landscaped areas.	The city's land use goal LU-12 is to create a visually attractive appearance throughout Carson.
Policy – LU 13.5. Continue to require landscaping treatment along any part of a building site which is visible from city streets.	The city's land use goal LU-13 is to encourage interesting and attractive streetscapes throughout Carson.
Policy – LU 14.2. Require new commercial or industrial development adjacent to and visible from freeways and freeway ramps to incorporate full architectural and landscape treatment of the building on the freeway side.	The city's land use goal LU-14 is to enhance freeway corridors and major arterials which act as gateways into the City of Carson.
General Plan, City of Carson, Chapter 8, Open Space and Conservation (OSC) (City of Carson 2004)	
Policy – OSC -1.2. Maintain existing landscaping along the City's major streets and expand the landscaping program along other arterial streets throughout the community. **Policy – OSC -1.5.** Utilize electric transmission and other utility corridors for greenbelt and recreational uses where appropriate.	The city's Open Space Goal OSC-1 is for enhanced landscaping and improved maintenance of Carson's public areas.

Visual Resources Table 1 (continued)
Laws, Ordinances, Regulations, and Standards

Applicable LORS and Policies	Discussion of LORS and Policies
City of Carson Municipal Code, Article IX, Planning and Zoning, Chapter 1. Zoning, Part 4. Industrial Zones (Code Publishing Company 2010)	
Division 6. Site Development Standards, Section 9146.3 Fences, Walls and Hedges. No fence, wall, or hedge in an industrial zone shall exceed a height of 50 feet. **Division 6. Site Development Standards, Section 9146.8 Utilities**. All new utility lines, other than major transmission lines, shall be placed underground. This requirement may be waived by the Planning Commission where topography, soil, undue financial hardship, or other conditions that make such underground installation unreasonable or impractical. All aboveground equipment (other than pole lines when permitted), such as transformers and pedestal terminals that are visible from an adjacent public street or walkway, shall be within a solid enclosure or otherwise screened from public view. Such enclosure/screening shall be in accordance with the utility's service requirement. **Division 6. Site Development Standards, Section 9146.9. Site Planning and Design**. In the case of a commercial or industrial use located on a corner lot, no public pedestrian entrance from a side street shall be located less than one hundred (100) feet from any residential zone. Mechanical equipment not enclosed within a building shall be screened from view from any adjoining public street or walkway.	

Visual Resources Table 1 (continued)
Laws, Ordinances, Regulations, and Standards

Applicable LORS and Policies	Discussion of LORS and Policies
Division 7. Environmental Effects, Section 9147.1 Exterior Lighting. All lighting of buildings, landscaping, parking lots and similar facilities shall be directed away from all adjoining and nearby residential property. Such lighting shall be arranged and controlled so as not to create a nuisance or hazard to traffic or to the living environment. This Section is also applicable to arc lights, search lights and similar lighting devices. **Division 7. Environmental Effects, Section 9147.2 Performance Standards.** No use shall create a disturbance to the surrounding area in the form of vibration, noise, electromagnetic or other radiations, odor, dust, heat or glare. All uses shall comply with Federal, State and local laws and regulations pertaining to such environmental effects.	
***City of Carson Municipal Code, Article IX, Planning and Zoning,* Chapter 1. Zoning, Part 6. General Development Standards (Code Publishing Company 2010)**	
Division 2. Vehicular Parking, Loading and Maneuvering Areas, Off-street Parking, Section 9162.52 Landscaping Requirements, A. Interior Parking Lot Facilities. 1. Except for parking lot facilities serving retail petroleum outlets, all required automobile parking facilities and any parking facilities visible from the public right-of-way shall have interior landscaping of no less than 5% of the area of such facilities. 2. Required setback landscaping abutting a street, sidewalk or structure, and border plantings up to five (5) feet in width abutting a building shall not be considered as interior landscaping for the purposes of this section. 3. No interior landscaping shall be located in a truck maneuvering or truck loading area.	

Visual Resources Table 1 (continued)
Laws, Ordinances, Regulations, and Standards

Applicable LORS and Policies	Discussion of LORS and Policies
4. Interior landscaping shall be arranged so as to provide shade for vehicles and to enhance visual attractiveness from adjoining streets and walkways. 5. Interior landscaping shall be maintained with an irrigation system, permanently installed which delivers water to all landscaped areas. 6. All landscaped areas and parking facilities shall be maintained to present attractive appearance at all times. 7. Unless the Director shall determine that such is not feasible, all interior areas of outdoor parking facilities which, as a result of the parking design, are unused and which are visible from a public street and walkway, shall be landscaped and maintained with an irrigation system, permanently installed, which delivers water directly to all landscaped areas. Such landscaping may be included in computing the 5% interior landscaping requirement.	

SETTING

REGIONAL LANDSCAPE SETTING

The proposed project is located in the southeast corner of the City of Carson (City), in Los Angeles County, California. The project would be located within the regional landscape province of the Los Angeles Basin: an elongated topographic depression consisting of a fairly flat coastal plain that stretches roughly 35 miles north to south, and 15 miles east to west. The basin is bounded by the Santa Monica and San Gabriel Mountains to the north, the Santa Ana Mountains to the east and south, and the Palos Verdes Peninsula to the west. The area experiences Mediterranean-type weather with cool, somewhat rainy winters, and warm, dry summers with ocean breezes and fog from the west predominating. Precipitation flows south across the plain in fixed concrete channels to the Pacific Ocean at Long Beach.

The City of Carson lies at the southern end of the Los Angeles Basin, surrounded by the cities of Torrance, Compton, Lakewood and Long Beach. The City is relatively flat with elevations ranging from sea level to 195 feet above mean sea level (amsl) (City of Carson 2002). Most of the City (83%) is developed, with the vast majority (54%) consisting of industrial land uses, followed by residential (roughly 30%) and commercial (6%) (City of Carson 2004). There are no natural open space areas within the city.

Open space in the city consists of parks, play fields, golf courses, and the open space associated with utility corridors, drainages, flood control projects and street medians. The Los Angeles River and the Dominguez Canal flow through the city in concrete channels. The Dominguez Channel bisects the BP Carson Refinery (Refinery) just to the east of the Watson Cogeneration Facility (Facility) and is not open to the public (City of Carson 2002).

Project Viewshed

The viewshed for the BP Watson project site is the area of potential visual effect, or the area within which the project could potentially be seen. Based on staff's field reconnaissance, the effective viewshed is extremely limited to the Wilmington Avenue travel corridor (sidewalk and roadway) in the vicinity of East Watson Center Road. Since the BP Watson project site is nearly surrounded by the existing Watson Cogeneration Facility (Facility) and the Refinery, views of the site from other directions are not available.

Project Location

The project consists of a 2.5-acre site, and a 25-acre off-site construction parking and laydown area. The project site is a brown field, located within the boundary of the existing 21.7-acre Facility, within the 428-acre parcel for the refinery. The project site is located at 22850 South Wilmington Avenue, Carson, California. Access to the site is via an entrance road on Wilmington Avenue, approximately 0.7 mile south of the 405 Freeway. The Facility is completely surrounded by the refinery and is bounded by Wilmington Avenue to the west, 223rd Street to the north, South Alameda Street to the east, and East Sepulveda Boulevard to the south. No off-site improvements are currently planned for the BP Watson project. Both the Facility and the refinery are zoned for heavy manufacturing.

The refinery dominates the project area landscape. Numerous exhaust stacks, piping, railings, vapor plumes, cooling towers, siren posts, and high voltage transmission lines and towers protrude into the sky above the refinery grounds. The interior is devoid of trees and dominated by industrial structures, equipment, machines, and paved surfaces. There are some clusters of trees and shrubs around the perimeter of the site. Storage tanks rise above chain link and barbed wire fencing and walls that surround the refinery site. The refinery is seen from the 405 Freeway and the streets that surround it. The Facility, within the refinery, cannot be seen from the 405 Freeway, or the streets that surround the refinery, except for Wilmington Avenue. The Facility can be seen from Wilmington Avenue but is not readily noticeable due to the small scale of the cogeneration equipment (trains and cooling towers) compared to the Refinery.

Streets bordering the refinery, Wilmington Avenue, Alameda Street, Sepulveda Boulevard, and 223rd Street, support well-maintained landscaped medians and shoulders with trees and plants. These streets have four lanes of traffic with turn lanes and medians. Most of these streets support relatively large volumes of truck and vehicular traffic. The City of Carson maintains all landscaping in the public right-of-way, including all center medians. The property owners west of Wilmington Avenue, north of 223rd Street, and at the refinery maintain their own properties (City of Carson 2010a).

The heavily landscaped streetscapes reflect the city's General Plan goals and policies presented in **Visual Resources Table 1**, above.

On Wilmington Avenue, west of the refinery and across from the entrance to the Facility, is "Watson Center" a multiple-block, light-industrial, commercial office complex that supports landscape plantings, including green lawn areas, flower beds, and mature palm and other trees. To the north on 223rd Street and the 405 Freeway, there is a coffee shop, light-industrial office complex, car dealerships gas stations, quick marts and fast food restaurants. The nearest residential area is 0.6 miles northwest of the Facility at the intersection of 223rd Street and Lucerne Avenue. To the east and south of the refinery are Alameda Street and Sepulveda Boulevard, respectively, beyond which are other industrial land uses. To the southeast, at the intersection of Sepulveda Boulevard and Wilmington Avenue, is the nearest residential area (0.8 mile).

Project Facilities

The existing facility has four General Electric 7EA combustion turbine generators (CTGs), four heat recovery steam generators (HRSGs) and two steam turbine generators (STG). The project would add a fifth CTG with a single-pressure HRSG to the existing configuration. The new CTG would also be a General Electric 7EA, which would add a nominal 85 MW to the existing facility. The HRSG would be equipped with a supplementary duct burner with up to 447.9 MMBtu/hr heat input. The applicant has not proposed to use any methods to abate visible plumes from the gas turbine/HRSG exhaust.

The most visually prominent feature of the Project would be the 100-foot high HRSG. All other facilities would be 50 feet and shorter. **Visual Resources Table 2** provides the dimensions, colors and textures of the new facilities. The new HRSG, pipe racks and cooling towers would replicate the existing on-site structures in their dimensions, colors and textures. The two cooling tower cells would be added to each end of the existing row of seven cooling tower cells. Both the HRSG and exhaust stack and the cooling towers would be constructed out of non-reflective materials. The existing maintenance shop would be demolished and a new one constructed to the west of the control building. The metal structure would be painted white. The new 69kV gas insulated substation (GIS) would be constructed in an existing parking lot adjacent to the existing office building and surrounded with unpainted masonry walls. Two new 230kV/69kV transformers would be surrounded by tan metal walls located in an existing parking lot northwest of the control building, and across the parking lot from two existing transformers.

Visual Resources Table 2
Major Project Feature Descriptions

Number	Feature	Height (feet)	Width (feet)	Length (feet)	Diameter (feet)	Color	Materials	Finish
1	HRSG Stack	100	-	-	18	Blue	Carbon Steel	Flat/Untextured
1	HRSG-excluding access platforms	50	60	100	-	Blue	Carbon Steel	Flat/Untextured
2	Cooling tower cells	45	50	55	-	Tan	Fiberglass	Flat/Untextured
1	Pipe rack north/south section	44	26	190	-	Bare Galvanized (no paint)	Carbon Steel	Flat/Untextured
1	Pipe rack east/west section	44	28	193	-	Bare Galvanized (no paint)	Carbon Steel	Flat/Untextured
1	69kV GIS – lower half	15	60	80	-	Bare (no paint)	Masonry block	Concrete
1	230/69 kV GIS – upper half	15	50	100	-	Tan	Metal siding	Flat/Untextured
1	Maintenance Shop	15	30	60	-	White	Metal	Flat/Untextured

Source: Application for Certification Table 5.13-4 and Application for Certification Figure 3-8 which was used to scale off the dimensions of the GISs (Watson 2009a).

Project Cooling

For project cooling the applicant has proposed an addition of two new cells to the existing mechanical draft seven-cell cooling tower. The cooling tower is designed with a linear design, oriented in north to south direction, and a new cell will be added to each end of the cooling tower. The applicant has not proposed to use any methods to abate visible plumes from the cooling tower.

Project Construction

Construction would begin with demolition or removal of existing above and underground structures: warehouse, foundations, piping systems, and maintenance access roads. Although the site is relatively flat (32 feet amsl), a balanced cut and fill operation would occur to level the site. Foundation excavations would occur for the HRSG, CTG, transformers and other heavy equipment and would require removal and stockpiling of approximately 7,000 cubic yards of fill material.

Mobile trailers and suitable facilities would be used as construction offices where applicable. Primary equipment such as the CTG, HRSG sections, transformers and other equipment would be delivered to the site most likely by rail due to their weight and/or size. Other construction materials and supplies would most likely be delivered to the site by truck. A variety of construction equipment would be required: however, no cranes or other equipment that could protrude into the sky are proposed (Watson 2009a).

Plant Night Lighting

According to the Application for Certification (Watson 2009a), the existing lighting

system would be expanded to cover the new equipment areas at the HRSG and cooling tower platforms and walkways, the transformer and GIS, and along new roads associated with the new facilities. Lighting would be designed and installed to minimize light emissions by shielding light sources, while meeting Occupational Safety and Health Administration (OSHA) lighting standards.

Landscaping

The Application for Certification does not propose landscaping for the BP Watson project since it is surrounded by the refinery. The entrance into the Facility is off of Wilmington Avenue and through the refinery entrance gate. Along Wilmington Avenue the refinery has a partially slatted chain link fence with barbed wire above and shrubs growing near the base on the street side. Some segments of slats are missing and others are broken. At the entrance road, there is no landscaping.

Off-Site Construction

Existing water, sewer and gas utilities will connect to the project. Therefore, the project does not include any new off-site facilities.

During construction, a paved 25-acre parcel located approximately one mile southeast of the BP Watson project site at 219 East Sepulveda Boulevard, near the northeast corner of East Sepulveda Boulevard and South Alameda Street, will be used for construction parking and laydown of equipment and supplies. The parcel is part of the refinery and is currently used as a truck parking and staging area for the refinery. During the 26 months of project construction, the parking and laydown site would be used for construction-worker parking and storage of equipment and supplies.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

To determine whether there is a potentially significant visual resources impact generated by a project, Energy Commission staff reviews the project using the 2011 CEQA Guidelines Appendix G Environmental Checklist pertaining to “Aesthetics.” The checklist questions include the following:

A. Would the project have a substantial adverse effect on a scenic vista?

B. Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

C. Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

D. Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Publicly Visible Vapor Plume

In support of the four CEQA questions above, Energy Commission air quality staff

conducted a “visible plume modeling analysis” of the Project (**Appendix VR-1**) to address potential visual impacts associated with water vapor plumes emitted from the project cooling towers. Visual impacts of vapor plumes are more difficult to evaluate than structures because they are transient and vary in both size and duration depending upon operating and meteorological conditions. Vapor plumes are generally associated in the public’s mind with heavy industrial land uses and pollution, and thus tend to be regarded negatively by visually sensitive observers. Vapor plumes may attain very large size and thus affect considerably larger areas than a power plant’s structures.

Under the visual plume methodology, a visual impact may occur if the modeling analysis shows vapor plumes to occur for 20% or more of seasonal daytime clear hours, during the period of November through April (when plumes are most prevalent in the project setting). Nighttime hours without fog are also considered in cases where night illumination could result in potential visual impacts from plumes.

The 20% criterion recognizes that plumes occurring less frequently than 20% of the seasonal period would be sufficiently infrequent as to represent a less than significant impact regardless of size. The seasonal criterion reflects the tendency of visible plumes to be concentrated in certain seasonal periods and not in others. The clear criterion reflects the fact that plumes may often form in conditions that are also conducive to fog, rain and overcast weather, but are less likely to be highly visible or perceived as substantially adverse under such conditions, since visibility and contrast of plumes is lower under such conditions.

When modeling results indicate that a project exceeds the 20% impact criteria threshold, plume dimensions are calculated (**Appendix VR-1**). Staff considers the 20th percentile plume dimension to be the reasonable worst case on which to base its visual impact analysis. The 20th percentile plume is the smallest of the plumes that are predicted to occur zero to 20% of the time. 80% of the time the dimensions of the clear hour plumes would be smaller than the 20th percentile plume dimensions. A one percentile clear hour plume would be extremely large (physical size) and very noticeable to a wide area, but would occur very infrequently. The visual impact of the expected plume dimension is assessed in terms of contrast, scale, and view disruption from each of the KOPs.

Staff concludes visible water vapor plumes are predicted to occur less than 20% of seasonal daylight clear hours. See the Publicly Visible Water Vapor Plumes and Visible Plume Modeling Analysis sections of this assessment.

Key Observation Points (KOPs)

Staff evaluates the existing visible physical environmental setting from representative fixed vantage points, called key observation points (KOPs). The use of KOPs or similar view locations is common in visual-resource analyses conducted by the U.S. Bureau of Land Management (USDI BLM 1987) and the U.S. Forest Service (USDA Forest Service 1995). Staff uses a KOP to represent a location(s) from which to conduct detailed analyses of the proposed project and to obtain existing condition photographs and prepare photo simulations. KOPs are selected to be representative of the most critical viewshed locations from which the project would be seen. Because it may not be

feasible to analyze all the views in which a proposed project would be seen, it is necessary to select KOPs that would most clearly represent the major visual effects of the proposed Project as they would be experienced by key sensitive viewing groups. **Visual Resources Figure 1** shows the location of the KOP used in this analysis:

- KOP 1 – Wilmington Avenue at East Watson Center Road

The KOP 1 vicinity represents the primary public viewing location of the project site and the existing facility. The project site and the existing facility cannot be seen from other roads or public use areas, including the 405 Freeway, due to its location within the existing refinery.

Staff's analysis of the project's effect on this KOP is presented under "Operation Impacts". Significant impacts are identified by staff where the level of visual change caused by the project would exceed acceptable levels in the context of a KOP's overall visual sensitivity, a measure that reflects the anticipated sensitivity of the viewing public to the visual effects of the proposed project. Please refer to **Appendix VR-2** for a description of staff's visual resources evaluation process. **Appendix VR-3** provides visual resource terms for the purposes of this analysis.

Laws, Ordinances, Regulations and Standards (LORS)

Staff also reviews federal, state, and local LORS and their policies or guidelines for aesthetics or preservation and protection of sensitive visual resources that may be applicable to the Project site and surrounding area. These LORS include local government land use-planning documents (e.g., General Plan, zoning ordinance) and are listed in **Visual Resources Table 1,** above.

DIRECT/INDIRECT IMPACTS AND MITIGATION

The impact discussion is presented under the following topics as listed in the CEQA Guidelines Appendix G: scenic vistas, scenic resources, visual character or quality, and light or glare.

Scenic Vistas

"Would the project have a substantial adverse effect on a scenic vista?"

A scenic vista, for the purpose of this analysis, is defined as a distant view through, or along, a corridor or opening that exhibits a high level of visual quality, particularly including viewpoints identified as having scenic value in public documents.

There are no specific scenic vista points of notable importance in the KOP 1 viewshed: the only location from which the project can be seen. The project is surrounded by the existing facility, refinery and nearby industrial office parks. The one location where there are views into the project site is at East Watson Center Road and Wilmington Avenue (KOP 1). Beyond this area, views of the project would be screened by intervening refinery structures, office park buildings and trees. The project would not result in substantial view intrusion or obstruction due to its relatively small scale in the context of the refinery complex. This is discussed further under KOP 1 in the section on "Operation Impacts" below.

Scenic Resources

"Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway corridor?"

A scenic resource for the purpose of this analysis includes a unique water feature (waterfall, transitional water, part of a stream or river, estuary); a unique physical geological terrain feature (rock masses, outcroppings, layers or spires); a tree having a unique visual/historical importance to a community (a tree linked to a famous event or person, an ancient old growth tree); historic building; or a designated federal scenic byway or state scenic highway corridor.

There are no scenic resources that would be substantially damaged by the project. A water feature, the Dominguez Canal, runs diagonally through the refinery site, but is closed to the public and the project site cannot be seen from it. The terrain surrounding the project is flat and highly urbanized with industrial and commercial development. There are no unique rock masses, outcroppings, layers or spires that would be affected by the project. Streets surrounding the refinery support numerous street-tree plantings which contribute to a visual attractiveness of the streetscape. However, none of the trees are of unique visual or historical importance, nor would they be affected by the project. The warehouse to be removed for the project is not historically significant, and there are no other historical buildings that would be affected by the project. The nearest scenic highway to the project is a short segment of Highway 1, an eligible scenic highway near Seal Beach, which is more than six miles southeast of the project. The nearest National Scenic Byway is Arroyo Seco Historic Parkway - Route 110 which begins at Highway 101 near Los Angeles and extends northeast towards Pasadena and is more than 18 miles away from the project. The project would not be seen from these scenic highways. Thus no resources would be affected.

Visual Character or Quality

"Would the project substantially degrade the existing visual character or quality of the site and its surroundings?"

The project aspects evaluated under this criterion are broken down into two categories: Construction Impacts and Operation Impacts.

Construction Impacts

The BP Watson project would use existing natural gas, water and sewer pipelines. Therefore, the project does not include these new off-site linear appurtenances. There would be minor changes associated with electrical transmission system. Two new GISs would be constructed to connect to the existing electric transmission system substation at the refinery.

Construction activities for the project would occur over an approximate 26-month period. As the project is built, the fifth train-structure would rise above the 6-foot fence to a height of 100 feet (same as other trains) and would be visible from the facility entrance area on Wilmington Avenue. Public visibility of the construction site and activities would be limited due to the location of the site within the refinery and the presence of a six-foot-high fence around the refinery. The BP Watson project site is set back from

Wilmington Avenue such that most views of the Facility are screened by refinery equipment and fencing. The entrance gate off of Wilmington Avenue is the only location where the Facility is noticeable from street level. In general, motorists and pedestrians could experience short term views while passing by the refinery and Facility entrance road off of Wilmington Avenue. Workers in the Watson Center buildings across the street from the entrance road may have views into the site, but the construction activity would not be highly noticeable due to the dominant industrial character of the area and the construction-like activities that occur on a regular basis at the refinery and the existing Facility. Activities include truck and heavy equipment traffic around the site, employees walking around, noise from heavy equipment operation associated with refinery production, and exhaust emanating from numerous equipment exhaust pipes.

Project construction activity is proposed to occur typically from 6:00 a.m. to 7:00 p.m. Monday through Saturday, although longer periods could occur. During nighttime construction periods, illumination that meets state and federal worker safety regulations would be required. As a result, there would be limited times during the construction period that the project site would be brightly illuminated at night. The existing Facility and refinery are currently brightly illuminated at night, therefore construction night lighting for the project would not be readily noticeable from areas outside because construction lighting would appear against the background of the existing lighting. There are no residential uses within a 0.5 mile radius of the project.

Construction activities are anticipated to generate noise, dust, increased traffic and equipment and vehicle emissions associated with the demolition, removal, excavation and construction associated with the project. Nearby businesses, pedestrians and motorists may experience short-term visual effects associated with these construction activities. However, the effects would not be significant or adverse due to the short-term nature of the construction activities and the existing heavy industrial uses at the refinery that surround the site. Residential areas would not be affected by the visual effects of construction due to their distance (0.5 mi and greater) from the site.

In conclusion, BP Watson project construction activities would result in less-than-significant visual effects due to the location of the project site within the refinery, and the industrial and commercial land uses that surround the refinery, and the over half-mile distance from the nearest residential area.

Operation Impacts

Operational impacts are assessed from a KOP identified by the applicant in the Application for Certification. Staff's field reconnaissance of the project area found the existing Facility and project area could only be seen from immediate vicinity of Wilmington Avenue at East Watson Center Road due to the location of the site within the refinery. Therefore, no additional KOPs were identified for analysis. Staff concurs with the evaluations and rationales underlying the Application for Certification's conclusions on potential visual impacts to KOP 1, as presented in Section 5.13 of the Application for Certification (Watson 2009a). However, staff disagrees with the applicant's determination of project consistency with the City of Carson's ordinances regarding development standards for landscaping which call for the development and implementation of a landscaping plan for new development. Staff also believes that

more specific conditions than those proposed in the Application of Certification (Watson 2009a) are needed regarding construction and operational lighting of the project, and surface treatment of project structures and buildings.

KOP 1 − Wilmington Avenue at East Watson Center Road

Visual Resources Figure 2 presents a photograph of the existing Facility and BP Watson project site as seen from the northwest corner of Wilmington Avenue at Watson Center Road, looking southeast. KOP 1 is approximately 100 feet northwest of the BP Watson project site. KOP 1 provides the most unobstructed view there is of the project, at Wilmington Avenue at Watson Center Road. From this location, the refinery entrance driveway, chain link fencing, and barbed wire can be seen. A parking area associated with the refinery can be seen that adjoins to the north side of the entrance driveway, beyond which the four blue HRSGs associated with the existing Facility rise into the sky. Most other structures at the Facility, such as the existing maintenance shop (where the new HRSG will be located) and control building, are obscured from view from KOP 1 by intervening slatted chain link fencing and vehicle parking in the adjoining parking lot.

VISUAL SENSITIVITY

The overall visual sensitivity of KOP 1 is considered to be *Moderately Low.* Visual sensitivity is a composite evaluation of existing visual quality, anticipated viewer concern for visual resources, and viewer exposure, each of which is discussed below.

Visual Quality

The existing visual quality of KOP 1 is considered to be *Moderately Low.* The view from KOP 1 is predominantly industrial in character. The foreground is dominated by Wilmington Avenue, which is a landscaped travel corridor with four lanes of truck traffic, landscaped medians, and varying amounts of landscaping on both sides of the street. The refinery side supports slatted chain link fencing with shrubs growing on it, and the Watson Center side is lushly landscaped with green lawn areas, flower beds and palm trees. While the industrial character of the refinery dominates, the street tree plantings provide shade and cooling, making the sidewalks and street more pedestrian friendly.

There has been a concerted effort by the city to maintain an attractive streetscape on Wilmington Avenue. The exposed chain link gate at the entrance and nearby partially deteriorated slatted chain link around the refinery contrasts strongly with the highly attractive, well-designed landscaping associated with the Watson Center across the street. The contrast of the highly industrial refinery area with the adjacent Watson Center development results in a low level of visual intactness and unity. While the Watson Center landscaping has an aesthetic vividness, the refinery has an industrial vividness due to its dominant size and heavy manufacturing character. Therefore, the existing visual quality is not significantly affected by the project.

Viewer Concern

Viewer concern from KOP 1 is considered to be *Moderately Low* due to the heavy industrial character of the area and brief viewing duration of the project site. The project site is located in a heavy industrial area of Carson where truck traffic associated with heavy industry predominates. Potential viewers are motorists and pedestrians on

Wilmington Avenue: a four-lane primary road with a 40 mph speed limit, average daily trips (ADTs) of over 20,000, a high percentage of which are made by trucks (Watson 2009a), and sidewalks on both sides of the street. Trucks and cars traveling on Wilmington Avenue have views of brief duration (approximately 10-20 seconds) into the project site when stopping at the stop sign at the intersection of Watson Center and Wilmington Avenue near the BP entrance gate. Pedestrians would experience short duration views (approximately one minute) into the project site when passing by the BP entrance gate. Therefore, the existing visual quality is not significantly affected by the project.

Viewer Exposure

Viewer exposure is considered to be *Low*. The BP Watson project site is within the immediate foreground of KOP 1, but is not easily noticed due to the intervening land use of the refinery and the oblique angle at which the site is located relative to Wilmington Avenue. From Wilmington Avenue, the entrance road to the refinery and the Facility dominate the view along with a parking area and chain link fencing with barbed wire on top. In the background, the existing four light blue HRSG stacks can be seen. However, it is difficult to distinguish the existing Facility features from the refinery features that surround it.

Viewers from KOP 1 include motorists, truck drivers, workers at Watson Center, the refinery, and the Facility, as well as pedestrians and bicyclists, resulting in a moderate number of viewers. The duration of viewing toward the project site would be short term for most viewers (motorists, pedestrians, and workers at the Watson Center), since they would be passing views into the existing Facility while traveling past the entrance road or stopped at the light at Watson Center Road. Watson Center workers directly across from the refinery entrance road could have longer duration views if they were in windowed buildings across from the refinery. However, views of the project would be limited primarily to views of the upper portion of the HRSG exhaust stack. Overall viewer exposure is considered to be *Low* due to the limited number of long-term viewers and the visual screening of the lower portion of the existing Facility provided by the intervening land use of the refinery.

VISUAL CHANGE

As seen from KOP 1 (**Visual Resources Figure 3**), the applicant shows in its photo simulations and architectural rendering that the exteriors of major project structures would be treated with a gray-blue finish intended to optimize visual integration of those structures with the surrounding industrial setting. The BP Watson project would introduce into the KOP 1 viewshed a 100-foot-tall, 60 by 100 feet -wide, light-blue-colored box-like HRSG and cylindrical exhaust stack similar in form, line, color and texture to the four existing HRSGs. A white, 15 foot high, 30 by 60 foot-wide maintenance shop would be located in front of the HRSG, against the existing six foot-high slatted chain link fence that surrounds the Facility. Two new cooling tower cells, 55 feet in diameter by 50 feet high, would be added to the existing cooling tower cells where they would not be seen from outside the Facility. The 69 kV GIS and 230/69 kV GIS would be enclosed; the 69 kV GIS would be within an unpainted masonry block walls, and the 230/69 kV GIS within tan metal walls. Staff has proposed Condition of

Certification **VIS-3** which requires that all project features be colored to blend in with the existing landscape to the greatest extent feasible.

The overall visual change associated with these facilities as seen from KOP 1 would be *Moderately Low* because the project would not be highly visible from Wilmington Avenue. Visual change is a composite evaluation of visual contrast, project dominance, and view blockage and/or disruption, each of which is discussed below.

Visual Contrast

The visual contrast created by the BP Watson project would be *Moderately Low* as seen from KOP 1. The cylindrical form, vertical lines and color created by the new HRSG and exhaust stack would be similar in structure and same in color as the four existing HRSGs and would repeat existing forms, lines, color, textures, thus reducing visual contrasts to a low level. The new maintenance shop may be slightly more visually apparent than the existing maintenance shop due to its white color and closer proximity to the Facility site boundary. However, the six foot-high slatted chain link fence along the site boundary would screen nearly half of the building, which would be 15 feet high, and 30 by 60 feet in size, and therefore not a large structure that would easily attract attention in the context of the existing view. Other facilities such as the GISs would be enclosed and of tan and gray hue, similar to other site structures, therefore not resulting in a noticeable level of contrast. The two new cooling tower cells would be similar in form, line, color and texture to the existing cells, and could not be seen from KOP 1 or other public viewing locations. Therefore, the existing visual quality is not significantly affected by the project.

Project Dominance

The apparent size and scale of the BP Watson project as seen from KOP 1 would be dominated by the surrounding larger stacks, pipes and equipment associated with the refinery. The proposed project would not be readily noticeable since it would be repeating the form, line, color and texture of the existing four HRSGs. In the context of the existing Facility and refinery, the project would appear as one of numerous stacks and pipes that are seen while driving along Wilmington Avenue. Thus project dominance is *Low*.

View Blockage/Disruption

There are no scenic views or vistas within the viewshed of KOP 1. The HRSG exhaust stack does not rise above the height of existing structures of the Facility or the refinery. As such, the project would not block or disrupt a scenic view or vista.

IMPACT SIGNIFICANCE

Staff concludes the introduction of project structures would not substantially degrade the existing viewshed of KOP 1. The *Moderately Low* overall visual sensitivity, combined with the *Moderately Low* overall visual change, would result in a less than significant visual impact. The only portion of the BP Watson project that would be readily visible to the public would be the new HRSG and exhaust stack from the KOP 1 viewshed. While the stack would add another heavy industrial character feature to an area that is already heavily industrialized, the scale, form and color of the HRSG would not dominate the

view nor would it block or disrupt any scenic views or vista. There would be no substantial change in visual quality since the limited visibility of the project would not result in substantial alteration of the composition, vividness, unity, or intactness of the existing landscape setting.

Light and Glare

"Would the Project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area? "

Project operation during times of darkness will require on-site nighttime lighting for safety and security. Lighting would provide personnel with illumination for operation under normal operating conditions, for egress during emergencies, for emergency lighting to perform manual operations during an outage of the normal power source, and convenience outlets for portable lamps and tools. Since the project would be located within the existing Facility and surrounded by the refinery, where nighttime, safety and emergency lighting already exist, the additional construction, nighttime, safety and emergency lighting from the BP Watson project would not be visually noticeable in the existing setting. Staff believes that the applicant's general description of light mitigation would reduce off-site light impacts; however, the description does not specifically describe what the mitigations may consist of during the project's construction and operation. There are many light-mitigation options available that are extremely effective at limiting off-site light. With the effective implementation of some or all of these measures, staff believes that the BP Watson project would not result in a substantial new source of light that could adversely affect existing nighttime views. Thus, staff has proposed Condition of Certification **VIS-2,** which limits lighting during operation and requires all fixed-position lighting shall be shielded/hooded, and directed downward and toward the area to be illuminated to prevent direct illumination of the night sky and direct light trespass.

Publicly Visible Water Vapor Plumes

Visible water vapor plumes from the proposed nine-cell cooling tower, which is comprised of an existing seven-cell cooling tower with two cells added for this project, are predicted to occur less than 20% of seasonal daylight clear hours, the frequency threshold used by staff to determine if an evaluation of vapor plume visual impacts is necessary. Therefore, no further visual impact analysis of the predicted cooling tower exhaust plumes has been completed. However, it is predicted that when plumes do form, the additional two cells would increase the visible plume dimensions.

Visible water vapor plumes from the Watson gas turbine/HRSG are not predicted to occur under normal weather conditions. Therefore, no further visual impact analysis of the predicted gas turbine/HRSG exhaust plumes has been completed.

CUMULATIVE IMPACTS AND MITIGATION

Section 15355 of the CEQA Guidelines (California Code of Regulations, Title 14) defines a cumulatively considerable impact asa combination of projects under consideration together with other existing or reasonably foreseeable projects causing related impacts. Cumulative impacts can result from individually minor but collectively

significant impacts taking place over a period of time. The significance of a cumulative visual impact would depend on the degree to which:

1. the viewshed is altered;
2. views of a scenic resource are impaired; or
3. visual quality is diminished.

As discussed under KOP 1, the viewshed would not be significantly altered by the project. The primary visual feature of the project, the addition of an exhaust stack similar to the existing exhaust stacks, would not significantly alter the KOP 1 viewshed. There are no views of a scenic resource that the project would impair since the project is surrounded by larger industrial structures. Visual quality would not be significantly diminished since the project exhaust stack would be similar in form, line and color as the existing exhaust stacks and therefore would not be readily noticeable to most observers. The incremental impact of the project would not be cumulatively considerable since the heavy industrial character of the refinery would continue to dominate the visual landscape along Wilmington Avenue. There are no known projects that would remove surrounding structures and make the project more visible and no known projects that would be visible within the same view as the project. For these reasons, the project would not cause any cumulative visual impacts.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Visual Resources Table 3 provides an analysis of the applicable LORS pertaining to the aesthetics or preservation and protection of sensitive visual resources relevant to the proposed project. Condition of Certification **VIS-1** is proposed to make the project conform to the LORS where appropriate.

Visual Resources Table 3
Proposed Project Consistency with LORS Applicable to Visual Resources

Source	Policies	Consistency Determination	Basis for Consistency
General Plan, City of Carson, Chapter 2, Land Use Element (City of Carson 2004)	**Policy LU-9.** Develop design standards to address permanent and effective screening of areas in transition and heavy industrial uses, such as outdoor storage yards, pallet yards, salvage yards, auto dismantling yards, and similar uses.	YES	The project site is not readily noticeable due to intervening structures and fencing associated with the refinery.
	Policy LU-12.3. Review landscape plans for new development to ensure that landscaping relates well to the proposed land use, the scale of structures, and the surrounding area.	YES AS CONDITIONED	Condition of Certification **VIS-1** would implement landscaping of the BP Refinery as recommended by the City of Carson Planning Department (City of Carson 2010b). The landscape plan would be reviewed and commented on by the City of Carson ensuring conformance with Policy LU-12.3.
	Policy – LU 12.5. Improve City appearance by requiring landscaping to screen, buffer, and unify new and existing development. Mandate continued upkeep of landscaped areas.	YES AS CONDITIONED	See response to Policy LU 12.3, above.
	Policy – LU 13.5. Continue to require landscaping treatment along any part of a building site which is visible from City streets.	YES AS CONDITIONED	See response to Policy LU 12.3, above.
	Policy – LU 14.2. Require new commercial or industrial development adjacent to and visible from freeways and freeway ramps to incorporate full architectural and landscape treatment of the building on the freeway side.	YES AS CONDITIONED	The Project is not visible from the nearby 405 freeway and ramps. However, the refinery is visible from Wilmington Avenue. Condition of Certification **VIS-1** proposes the applicant develop a landscape plan for areas along Wilmington Avenue. See response to Policy LU 12.3, above.
General Plan, City of Carson, Chapter 8, Open Space and Conservation (OSC) (City of Carson 2004)	**Policy – OSC 1.2.** Maintain existing landscaping along the City's major streets and expand the landscaping program along other arterial streets throughout the community.	YES AS CONDITIONED	See response to Policy LU 12.3, above.
	Policy – OSC -1.5. Utilize electric transmission and other utility corridors for greenbelt and recreational uses where appropriate.	N/A	The Project would utilize existing electric transmission utility corridors associated with SCE's Hinson Substation.
City of Carson Municipal Code, Article IX, Planning and Zoning, Chapter 1. Zoning, Part 4. Industrial Zones (Code Publishing Company 2010)	**Division 6. Site Development Standards, Section 9146.3 Fences, Walls and Hedges**. No fence, wall, or hedge in an industrial zone shall exceed a height of 50 feet.	YES	The existing Facility is fenced with six foot fencing. No new fencing is proposed as part of the Project.
	Division 6. Site Development Standards, Section 9146.8 Utilities. All new utility lines, other than major transmission lines, shall be placed underground. This requirement may be waived by the Planning Commission where topography, soil, undue financial hardship, or other	N/A	Existing underground water and sewer utilities would be extended to accommodate the project and no new water and sewer utilities are proposed. New aboveground transmission lines will connect the project to the existing SCE substation at

Source	Policies	Consistency Determination	Basis for Consistency
	conditions that make such underground installation unreasonable or impractical.	YES	the refinery. The Project transmission line would be underground from the generator to the existing 230kV GIS substation on the refinery site. From the substation, the power would be transferred into the existing SCE 230kV Hinson substation via an existing double circuit.
	All aboveground equipment (other than pole lines when permitted), such as transformers and pedestal terminals that are visible from an adjacent public street or walkway shall be within a solid enclosure or otherwise screened from public view. Such enclosure/screening shall be in accordance with the utility's service requirement.	YES	The Project transmission equipment (69kV GIS and 230/69kV GIS) would not be visible from adjacent streets or walkways. The lower 69kV GIS would be enclosed in an unpainted masonry block. The upper 230/69kV GIS would be enclosed with tan-colored metal siding. Both enclosures would be consistent with this ordinance.
	Division 6. Site Development Standards, Section 9146.9. Site Planning and Design.		
	Mechanical equipment not enclosed within a building shall be screened from view from any adjoining public street or walkway.	YES	The cooling tower cells are mechanical equipment associated with the project that would not be enclosed. However, they cannot be seen from any adjoining public street or walkway and therefore would be in conformance with this ordinance.
		YES	The fifth train (HRSG) structure would be the same height (100-feet) as the existing four trains all of which are visible from Wilmington Avenue in the vicinity of Watson Center Road. It would be impractical to screen any of the trains. In addition, such screening would be inconsistent with Division 6. Site Development Standards, Section 9146.3 Fences, Walls and Hedges (see above).
	Division 7. Environmental Effects, Section 9147.1 Exterior Lighting. All lighting of buildings, landscaping, parking lots and similar facilities shall be directed away from all adjoining and nearby residential property. Such lighting shall be arranged and controlled so as not to create a nuisance or hazard to traffic or to the living environment. This section is also applicable to arc lights, search lights and similar lighting devices.	YES	There are no adjoining and nearby residential properties to the project site. The nearest residential property is approximately 0.5 mile to the northwest of the existing Facility. Operational lighting would not be noticeably different from the existing Facility lighting and is not anticipated to result in a noticeable change to the experience of motorists on

Source	Policies	Consistency Determination	Basis for Consistency
			Wilmington Avenue. Since the fifth train would be set back from Wilmington Avenue by about 200 feet, and other features even further, lighting is not anticipated to create a nuisance or hazard to traffic or the living environment.
	Division 7. Environmental Effects, Section 9147.2 Performance Standards. No use shall create a disturbance to the surrounding area in the form of vibration, noise, electromagnetic or other radiations, odor, dust, heat or glare. All uses shall comply with federal, state and local laws and regulations pertaining to such environmental effects.	YES	Construction activities may result in temporary visual disturbances from dust and glare in the immediate area of industrial uses that surround the site. However, these disturbances would be short-term, occurring during the 26 month construction period and would not affect any residential land uses.
City of Carson Municipal Code, Article IX, Planning and Zoning, Chapter 1. Zoning, Part 6. General Development Standards (Code Publishing Company 2010)	**Division 2. Vehicular Parking, Loading and Maneuvering Areas, Off-street Parking, Section 9162.52 Landscaping Requirements, A. Interior Parking Lot Facilities.** 1. Except for parking lot facilities serving retail petroleum outlets, all required automobile parking facilities and any parking facilities visible from the public right-of-way shall have interior landscaping of no less than 5% of the area of such facilities. 2. Required setback landscaping abutting a street, sidewalk or structure, and border plantings up to five (5) feet in width abutting a building shall not be considered as interior landscaping for the purposes of this Section. 3. No interior landscaping shall be located in a truck maneuvering or truck loading area. 4. Interior landscaping shall be arranged so as to provide shade for vehicles and to enhance visual attractiveness from adjoining streets and walkways. 5. Interior landscaping shall be maintained with an irrigation system, permanently installed which delivers water to all landscaped areas. 6. All landscaped areas and parking facilities shall be maintained to present attractive appearance at all times. 7. Unless the Director shall determine that such is not feasible, all interior areas of outdoor parking facilities which, as a result of the parking design, are unused and which are visible from a public street and walkway shall be landscaped and maintained with an irrigation system, permanently installed, which delivers	YES AS CONDITIONED	Condition of Certification **VIS-1** calls for the Project owner to install and maintain landscaping in 5% of the parking facility and 5% of the driveway leading to the parking facility, located north of the proposed facility at the southeastern corner of Wilmington Avenue and Watson Center Road. Installation of such landscaping would partially screen views of the existing Facility and parking areas that can be seen from public right-of-ways in the immediate vicinity of Wilmington Avenue, consistent with Section 9162.52 of the City of Carson municipal code.

Source	Policies	Consistency Determination	Basis for Consistency
	water directly to all landscaped areas Such landscaping may be included in computing the 5% interior landscaping requirement.		

RESPONSE TO COMMENTS

Staff received no public comment on the visual resources section of the Preliminary Staff Assessment (PSA) (CEC 2010). Three comments were received from the applicant, Watson Cogeneration Company (Watson 2011). Staff agrees with the applicant's comment which proposes a correction to the KOP 1 Impact Significance section discussion. The visual sensitivity conclusion was incorrectly stated in this section as "*Moderate",* when it should have been "*Moderately Low"* since that is the conclusion in the KOP 1 Visual Sensitivity section discussion. Thus the visual sensitivity conclusion in the Impact Significance section for KOP 1 has been changed from "Moderate" to "Moderately Low".

A comment by the applicant requested clarification as to whether the existing landscaping along Wilmington Avenue is adequate, and if it is, to amend Condition of Certification **VIS-1** (Landscape Screening) to require maintenance of the existing landscaping. Staff has clarified Condition of Certification **VIS-1** by stating that the existing landscaping along Wilmington Avenue (shown as a green line on **Visual Resources Figure 4**) will be supplemented and/or replaced such that the refinery will be adequately screened and aesthetically pleasing from the right-of-way of Wilmington Avenue as called for in Carson Municipal Code Section 9162.52(B)(1). Citations from the Carson Municipal Code sections calling for landscaping of the parking lot and along Wilmington Avenue were added to Condition of Certification **VIS-1** for additional clarification.

The last applicant comment on the visual section is in regard to Condition of Certification **VIS-2** (Construction and Night Lighting)**.** The applicant is concerned that it may be difficult to ascertain whether a complaint about lighting pertains to the project or to lights associated with existing structures that are not part of the project due to the project's location next to the refinery. Staff acknowledges this possibility and has revised **VIS-2** to state that where a lighting complaint cannot clearly be identified as being associated with the project or the refinery, the project owner shall work cooperatively with the refinery to resolve the lighting complaint and report the resolution in the Monthly Compliance Report for the project.

CONCLUSIONS

The visual analysis focused on two main issues; (1) would construction and operation of the project cause an aesthetic impact under CEQA; and (2) would the project comply with applicable local LORS pertaining to aesthetics, or preservation and protection of sensitive visual resources.

1. The project would not result in a significant visual impact under CEQA since it would not adversely affect a scenic vista, substantially degrade existing scenic resources or the existing visual character or quality of the site and its surrounding, and would not create a new source of light, glare or water vapor plumes.

2. The project would have no visual effect on any National Scenic Byway, All American Road, or State Scenic Highway.

3. In the Socioeconomics section of this staff assessment, staff presents census information that shows that there are minority populations within six miles of the project. For the proposed Watson Cogeneration project, the total population within the six-mile radius of the site is 778,090 persons, and the total minority population is 646,789 persons or 83.12% of the total population (see Socioeconomics Figure 1). Staff concludes that the BP Watson Project would not result in significant visual resources impacts from construction or operation of the power plant on minority population if the proposed Conditions of Certification are implemented. Therefore, there are no environmental justice issues for visual resources.

4. The Project would be consistent with local LORS with implementation of Condition of Certification **VIS-1** calling for landscaping along Wilmington Avenue and in the parking lot to the north of the project site as shown in **Visual Resources Figure 4**.

5. Conditions of Certification **VIS-2** regarding night lighting, and **VIS-3** regarding surface treatment of project structures and buildings have been included to ensure that specific mitigation measures are implemented in addition to the general measures proposed in the Application for Certification (Watson 2009a).

PROPOSED CONDITIONS OF CERTIFICATION

Although staff did not find that the project would result in significant adverse aesthetic or visual impacts under the California Environmental Quality Act and Guidelines, staff did find that the BP Watson project, as part of the refinery, would not be consistent with the City of Carson's General Plan policies and municipal codes regarding landscaping. Therefore, staff recommends that the Energy Commission adopt the following condition of certification **VIS-1** for landscape screening if it approves the project. Staff also included Conditions of Certification **VIS-2** for construction and operational lighting, and **VIS-3**, which calls for surface treatment of project structures and buildings to ensure that measures stated in the Application for Certification are implemented.

LANDSCAPE SCREENING

VIS-1 The project owner shall prepare and implement a landscape plan for the areas shown in red and green on **Visual Resources Figure 4** of the final staff assessment in accordance with Carson Municipal Code Sections 9162.52(A)(1) and 9162.52(B)(1) regarding landscaping along public streets and in parking lot areas.

The landscape plan will provide interior landscaping of the refinery parking lot (area outlined in red on **Visual Resources Figure 4**) that is adjacent to Wilmington Avenue and north of the project. No less than 5% of the parking lot area shall be landscaped so as to provide shade for vehicles and to enhance visual attractiveness as seen from adjoining streets and walkways as called for in CMC Section 9162.52(A)(1).

The landscape plan will provide landscaping along the public street and walkway on Wilmington Avenue and parallel with the refinery parking lot (green line on **Visual Resources Figure 4**). The existing landscaping will be supplemented and/or replaced such that the refinery will be adequately screened and aesthetically pleasing from the right-of-way of Wilmington Avenue as called for in CMC Section 9162.52(B)(1).

The project owner shall submit to the Compliance Project Manager (CPM) for review and approval and simultaneously to the City of Carson for review and comment, a landscaping plan whose objective is to provide an attractive visual screen from Wilmington Avenue of the refinery, Facility, and the project. The plan shall include:

a) a detailed landscape, grading, and irrigation plan, at a reasonable scale. The plan shall demonstrate how the requirements stated above shall be met. The plan shall provide a detailed installation schedule demonstrating installation of as much of the landscaping as early in the construction process as is feasible in coordination with project construction;

b) a list (prepared by a qualified professional arborist familiar with local growing conditions) of proposed species, specifying installation sizes, growth rates, expected time to maturity, expected size at five years and at maturity, spacing, number, availability, and a discussion of the suitability of the plants for the site conditions and mitigation objectives, with the objective of providing the widest possible range of species from which to choose;

c) maintenance procedures, including any needed irrigation and a plan for routine annual or semi-annual debris removal for the life of the project;

d) a procedure for monitoring for, and replacement of, unsuccessful plantings for the life of the project; and

e) the plan shall not be implemented until the project owner receives final approval from the Compliance Project Manager.

Verification: The landscaping plan shall be submitted to the CPM for review and approval and simultaneously to the City of Carson for review and comment at least 90 days prior to installation of the landscaping.

If the CPM determines that the plan requires revision, the project owner shall provide to the Compliance Project Manager and simultaneously to the City of Carson a revised plan for review and approval by the CPM.

The planting must occur during the first optimal planting season following site mobilization. The project owner shall simultaneously notify the CPM and the City of Carson within seven days after completing installation of the landscaping, that the landscaping is ready for inspection.

The project owner shall report landscape maintenance activities, including replacement of dead or dying vegetation, for the previous year of operation in each Annual Compliance Report.

Construction and Operational Lighting

VIS-2 The project owner shall ensure that lighting for construction of the power plant is used in a manner that minimizes potential night lighting impacts, as follows:

a) all lighting shall be of minimum necessary brightness consistent with worker safety and security;

b) all fixed position lighting shall be shielded/hooded, and directed downward and toward the area to be illuminated to prevent direct illumination of the night sky and direct light trespass (direct light extending outside the boundaries of the power plant site or the site of construction of ancillary facilities, including any security related boundaries); and

c) wherever feasible and safe and not needed for security, lighting shall be kept off when not in use.

Verification: Within seven days after the first use of construction lighting, the project owner shall notify the CPM that the lighting is ready for inspection. If the CPM requires modifications to the lighting, within 15 days of receiving that notification the project owner shall implement the necessary modifications and notify the CPM that the modifications have been completed.

Within 48 hours of receiving a lighting complaint associated with BP Watson the project owner shall provide the CPM with a complaint resolution form as specified in the General Conditions section, including a proposal to resolve the complaint, and a schedule for implementation. The project owner shall notify the CPM within 48 hours after completing implementation of the proposal. A copy of the complaint resolution form shall be included in the subsequent Monthly Compliance Report. Where a lighting complaint cannot clearly be identified as being associated with the project or the refinery, the project owner shall work cooperatively with the refinery to resolve the lighting complaint and report the resolution in the Monthly Compliance Report for the project.

Surface Treatment of Project Structures and Buildings

VIS-3 The project owner shall treat the surfaces of all project structures and buildings on site, including those of the existing power plant, visible to the public such that (a) their colors minimize visual intrusion and contrast by blending with existing structures; (b) their colors and finishes do not create excessive glare; and (c) their colors and finishes are consistent with local policies and ordinances. The transmission line conductors shall be non-specular and non-reflective; and the insulators shall be non-reflective and non-refractive.

The project owner shall submit for CPMreview and approval, a specific

surface treatment plan that will satisfy these requirements. The treatment plan shall include:

a) description of the overall rationale for the proposed surface treatment, including the selection of the proposed colors and finishes;

b) list of each major project structure, building, tank, pipe, and wall; the transmission line towers and/or poles; and fencing, specifying the color(s) and finish proposed for each. Colors must be identified by vendor, name, and number; or according to a universal designation system;

c) one set of color brochures or color chips showing each proposed color and finish;

d) one set of 11” x 17” color photo simulations at life size scale, of the treatment proposed for use on project structures, including structures treated during manufacture as well as those of the existing on-site power plant, from Key Observation Point 1 (location shown on Figure 1 of the Final Staff Assessment);

e) specific schedule for completion of the treatment; and

f) a procedure to ensure proper treatment maintenance for the life of the project.

Verification: At least 90 days prior to specifying to the vendor the colors and finishes of the first structures or buildings that are surface treated during manufacture, the project owner shall submit the proposed treatment plan to the CPM for review and approval and simultaneously to the City of Carson Planning Division for review and comment.

If the CPM determines that the plan requires revision, the project owner shall provide a plan with the specified revisions for review and approval by the CPM before any treatment is applied. Any modifications to the treatment plan must be submitted to the CPM for review and approval.

Prior to the start of commercial operation, the project owner shall notify the CPMthat surface treatment of all listed structures and buildings has been completed and they are ready for inspection and shall submit one set of electronic color photographs from the same key observation point identified in (d) above.

The project owner shall provide a status report regarding surface treatment maintenance in the Annual Compliance Report. The report shall specify: (a) the condition of the surfaces of all structures and buildings at the end of the reporting year; (b) maintenance activities that occurred during the reporting year; and (c) the schedule of maintenance activities for the next year.

REFERENCES

California Energy Commission, 2010. Watson Cogeneration Steam and Electric Reliability Project, Preliminary Staff Assessment. CEC 700-2010-020-PSA, Docket Number09-AFC-1. December, 2010.

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Appendix VR-1: Visible Plume Modeling Analysis

William Walters, P.E.

INTRODUCTION

The following provides the assessment of the cooling tower and gas turbine/HRSG visible plumes for the Watson Cogeneration Steam and Electric Reliability Project (BP Watson). Staff completed a modeling analysis for the applicant's proposed cooling tower and gas turbine/HRSG designs.

PROJECT DESCRIPTION

For project cooling the applicant has proposed an addition of two new cells to the existing mechanical draft 7-cell cooling tower. The cooling tower is designed with a linear design, oriented in north to south direction, and a new cell will be added to each end of the cooling tower. The applicant has not proposed to use any methods to abate visible plumes from the cooling tower.

The existing facility has four GE 7EA CTGs, four heat recovery steam generators (HRSGs) and two steam turbine generators (STG). The project would add a fifth combustion turbine generator (CTG) with a single-pressure HRSG to the existing configuration. The new CTG would also be a General Electric (GE) 7EA CTG, which would add a nominal 85 MW to the existing facility. The HRSG would be equipped with a supplementary duct burner with up to 447.9 MMBtu/hr heat input. The applicant has not proposed to use any methods to abate visible plumes from the gas turbine/HRSG exhaust.

VISIBLE PLUME MODELING METHODS

VISIBLE PLUME FREQUENCY AND DIMENSION MODELING

The Combustion Stack Visible Plume (CSVP) model was used to estimate visible plume frequency and visible plume dimensions for both the cooling tower and gas turbine/HRSG exhaust. This model provides conservative estimates of both visible plume frequency and visible plume dimensions. This model utilizes hourly cooling tower and gas turbine/HRSG exhaust parameters and hourly ambient condition data to determine the visible plume frequency. This model is based on the algorithms of the Industrial Source Complex model (Version 2), that determine conditions at the plume centerline, but this model does not incorporate building downwash.

The modeling method combines the cooling tower cell exhausts into an equivalent single stack. This method may overestimate cooling tower visible plume dimensions (particularly height) during predicted visible plume hours with higher winds due to reduced cell exhaust interaction and the potential for building downwash, but will be more accurate during low wind and calm periods when the exhausts from the cooling tower cells will combine into one coherent body. Wind speeds are set to one meter per second during calm hours.

The Seasonal/Annual Cooling Tower Impacts (SACTI) model was used to determine frequency and direction of potential visible plume ground fogging events that could impact traffic safety for roads surrounding the project site.

CLOUD COVER DATA ANALYSIS METHOD

A visible plume frequency of 20% of seasonal (November through April) daylight, no rain/fog, high visual contrast (i.e. “clear”) hours, is used to determine potential visible plume impact significance. The methodology used to determine high visual contrast hours is provided below:

> The Energy Commission has identified a “clear” sky category during which visible plumes have the greatest potential to cause adverse visual impacts. For this project the meteorological data set[1] used in the analysis categorizes sky cover in 10% increments. Staff has included in the “Clear” category a) all hours with sky cover equal to or less than 10% plus b) half of the hours with total sky cover 20-90%. The rationale for including these two components in this category is as follows: a) visible plumes typically contrast most with sky under clear conditions and, when total sky cover is equal to or less than 10%, clouds either do not exist or they make up such a small proportion of the sky that conditions appear to be virtually clear; and b) for a substantial portion of the time when total sky cover is 20-90% the opacity of sky cover is relatively low (equal to or less than 50%), so this sky cover does not always substantially reduce contrast with visible plumes; staff has estimated that approximately half of the hours meeting the latter sky cover criteria can be considered high visual contrast hours and are included in the “clear” sky definition.

If it is determined that the seasonal daylight clear hour visible plume frequency is greater than 20% then visible plume dimensions are calculated, and a significance analysis of the plumes is included in the Visual Resources section of the Preliminary Staff Assessment.

COOLING TOWER VISIBLE PLUME MODELING ANALYSIS

Staff evaluated the applicant’s Application for Certification, Application for Certification Supplement and data responses (Watson 2009a, Watson 2009e, URS 2009e) and performed an independent psychrometric analysis. The Combustion Stack Visible Plume (CSVP) model was used to estimate the worst-case potential visible plume frequency and dimensions for the cooling tower.

COOLING TOWER PARAMETERS

Based on the cooling tower parameters anticipated by the applicant, the frequency of visual plumes can be estimated. The exhaust data for the cooling tower are provided in **Visible Plume Table 1**.

[1] This analysis uses five years of South Coast Air Quality Management District AERMOD meteorological data (2002-2006), available from their website, which was collected from the Long Beach monitoring station. Hours with missing data were excluded.

Visible Plume Table 1
Cooling Tower Exhaust Parameters

Parameter		Cooling Tower Design Parameters		
Number of Cells		9 Cells		
Cell Height		50.85 feet (15.5 meters)		
Cell Stack Diameter		30.5 feet (9.3 meters)		
Case	**Ambient Condition**	**Heat Rejection Rate (MW)**	**Exhaust Flow Rate (K lbs/hr)**	**Exhaust Temp (°F)**
1	36°F, 36% RH	181.17	37,926	60.9
2	59°F, 60% RH	180.63	37,260	74.6
3	85°F, 60% RH	179.82	36,252	89.7

Source: Watson 2009a, Watson 2009b, Watson 2009e.

The information supplied by the applicant was used to interpolate the operating conditions for the cooling tower exhaust to the different modeled hourly ambient conditions. The applicant provided information on the two new cooling tower cells and indicated that exhaust conditions would be similar for the existing seven cooling tower cells (URS 2009e). For modeling purposes, when the cooling tower physical dimensions did not match the existing cooling tower dimensions (such as exhaust height), they were standardized to the dimensions provided for the existing 7-cell cooling tower.

COOLING TOWER VISIBLE PLUME MODELING RESULTS

Visible Plume Table 2 provides the CSVP model visible plume frequency results for year round full load operation using a five year (2002-2006) Long Beach meteorological data set, obtained from the South Coast Air Quality Management District website.

Visible Plume Table 2
Staff Predicted Hours with Cooling Tower Visible Plumes
Long Beach 2002-2006 Meteorological Data

Case	Available (hr)	Full Load	
		Plume (hr)	Percent
All Hours	40,701	12,991	31.92%
Daylight Hours	19,591	2,425	12.38%
Daylight No Rain No Fog	19,457	2,305	11.85%
Seasonal Daylight No Rain No Fog [a]	8,891	1,546	17.39%
Seasonal Daylight Clear [a]	5,300	573	10.81%

Note:
a. Seasonal conditions occur anytime from November through April.

Visible water vapor plumes from the proposed cooling tower are predicted to occur less than 20% of seasonal daylight clear hours. Therefore, plume dimension modeling and additional impact analysis for the cooling tower visible plumes is not required for this project. The addition of two cooling tower cells is not predicted to impact plume frequency, but would increase plume dimensions when plumes do occur.

COOLING TOWER GROUND FOGGING MODELING RESULTS

The Seasonal/Annual Cooling Tower Impacts (SACTI) model was used to determine frequency and direction of potential ground fogging plume events that could impact traffic safety on roads near the site. The SACTI model was run using the 59°F ambient temperature case data that was provided in **Visible Plume Table 1**. **Visible Plume**

Table 3 provides the SACTI model predicted hours of plume ground fogging with direction and distance for the ground fogging events.

Visible Plume Table 3
Predicted Hours of Ground Fogging Plumes
Year Round Full Load Operation
Long Beach 2002-2006 Meteorological Data

Plume From				
	WSW	W	WNW	All
Plume Headed				
Distance from tower (m)	ENE	E	ESE	Sum
100	0.6	0.8	0.6	1.9
200	0.4	1.0	0.4	1.8
300	0.0	0.9	0.0	0.9
400	0.0	0.1	0.0	0.1

The SACTI model predicts that less than two hours of ground fogging plumes would occur for the five years modeled. Fogging plumes are predicted to head toward the east northeast, east, and east southeast directions. Ground fogging plumes are only predicted further up to 400 meters in east northeast, east and east southeast direction, and these plumes would have no impacts on traffic safety since the nearest road, S. Alameda Street, is located east approximately 1,000 meters away from the cooling tower. Even if plume fogging were to happen during meteorological or operating conditions not captured in this modeling analysis, it is almost certain that such ground fogging plumes would not be able to cross through the additional air turbulence to reach area roads that are located more than 600 meters in all directions from the cooling tower.

GAS TURBINE/HRSG VISIBLE PLUME MODELING ANALYSIS

GAS TURBINE/HRSG DESIGN AND OPERATING PARAMETERS

The following gas turbine/HRSG design characteristics, presented below in **Visible Plume Table 4**, were determined through a review of the applicant's Application for Certification and Application for Certification Supplement (Watson 2009a, Watson 2009, Watson 2009e). The data presented in **Visible Plume Table 4** was used to model the gas turbine/HRSG visible plume frequency and dimensions.

Visible Plume Table 4
Gas Turbine/HRSG Operating and Exhaust Parameters [a]

Parameter	**Gas Turbine/HRSG Exhaust Parameters**		
Stack Height	100 feet (30.48 meters)		
Stack Diameter	15.5 feet (4.72 meters)		
Ambient Conditions	Moisture Content (% by weight)	Exhaust Flow Rate (klbs/hr)	Exhaust Temp (°F)
36°F	5.73%	2,529	386
59°F	6.31%	2,434	385
85°F	7.15%	2,294	383

Source: Watson 2009a, Watson 2009b, Watson 2009e
Note:
a. Values were extrapolated or interpolated between hourly ambient condition data points as necessary.

The information supplied by the applicant was used to interpolate the operating conditions for the gas turbine/HRSG exhaust to the different modeled hourly ambient conditions.

GAS TURBINE/HRSG TURBINE VISIBLE PLUME MODELING RESULTS

Staff evaluated the applicant's Application for Certification and Application for Certification Supplement (Watson 2009a, Watson 2009e) and performed an independent psychrometric analysis. The Combustion Stack Visible Plume (CSVP) model was used to estimate the worst-case potential plume frequency for the new gas turbine/HRSG stack proposed. **Visible Plume Table 5** provides the CSVP model visible plume frequency results for year round full load operation using a five year (2002-2006) Long Beach meteorological data set, obtained from the South Coast Air Quality Management District website.

Visible Plume Table 5
Predicted Hours with Gas Turbine/HRSG Visible Plumes
Year Round Full Load Operation
Long Beach 2002-2006 Meteorological Data

Case	Available (hr)	Plume (hr)	Percent
All Hours	40,701	0	0.00%
Daylight Hours	19,591	0	0.00%
Daylight No Rain No Fog	19,457	0	0.00%
Seasonal Daylight No Rain No Fog[a]	8,891	0	0.00%
Seasonal Daylight Clear[a]	5,300	0	0.00%

Note:
a. Seasonal conditions occur anytime from November through April.

The CSVP model predicted that there would be no visible plumes to occur for the proposed gas turbine/HRSG exhaust. Therefore, plume dimension modeling and additional impact analysis for the gas turbine/HRSG visible plumes is not required for this Project.

CONCLUSIONS

Visible water vapor plumes from the proposed 9-cell cooling tower, which is comprised of an existing 7-cell cooling tower with two cells added for this project, are predicted to occur less than 20 % of seasonal daylight clear hours. Therefore, no further visual impact analysis of the predicted gas turbine/HRSG exhaust plumes has been completed. However, it is predicted that when plumes do form the additional two cells would increase the visible plume dimensions.

The ground fogging plume analysis indicates that the cooling tower will not create ground fogging plumes that could reach area roads. Therefore, there would be no impact on ground traffic safety.

Visible water vapor plumes from the BP Watson project gas turbine/HRSG are not predicted to occur under normal weather conditions. Therefore, no further visual impact analysis of the predicted gas turbine/HRSG exhaust plumes has been completed.

REFERENCES

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Watson 2009a – Watson Cogeneration Company/Thomas A. Lu (tn 50584). Application for Certification Volume I&II, dated 3/19/09. Submitted to CEC/Docket Unit on 3/19/09.

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Watson 2009e – Watson Cogeneration Company/Thomas A. Lu (tn 52187). Supplement in Response to CEC Data Adequacy Review, dated 6/29/09. Submitted to CEC/Docket Unit on 6/29/09.

APPENDIX VR-2

STAFF'S VISUAL RESOURCES EVALUATION METHODOLOGY

Staff evaluates the visual characteristics of the existing physical setting, the proposed project, the circumstances affecting the viewer, and the degree of visual change that a proposed project may introduce using the identified elements and generally accepted criteria for determining substantial environmental impact significance identified below.

ELEMENTS OF THE METHODOLOGY

Key Observation Points

Staff evaluates the existing visible physical environmental setting from a fixed vantage point, called a *key observation point* (KOP), that provides a view of the visual change introduced by the proposed project to the view from that KOP. The view as seen from the KOP is referred to as the *viewshed*. Staff uses a KOP[2] to represent a location(s) from which to conduct detailed analyses of the proposed project and to obtain existing condition photographs and prepare photo simulations. KOPs are selected to be representative of the most critical viewshed locations from which the project would be seen. Because it is not feasible to analyze all the views in which a proposed project would be seen, it is necessary to select a KOP that would most clearly display the visual effects of the proposed project. A KOP may also represent primary viewer groups that would potentially be affected by the project. In addition to KOP photo(s), staff reviews landscape character photos that help provide a visual overview of a project site, its vicinity, and the selected KOP area, as appropriate. Prior to application submittal, staff participates in the selection of appropriate KOP(s) for the analysis.

LORS Consistency

Energy Commission considers federal, state, and local laws, ordinances, regulations, and standards (LORS) relevant to aesthetics or protection and preservation of visual sensitive resources. Conflicts with such LORS can constitute significant visual impacts. For example, visual staff examines land use planning documents, such as a local government's General Plan, Specific Plan, and zoning ordinances applicable to the project site and surrounding area to gain insight as to the type of land uses intended for the area, and the guidelines given for aesthetics, or protection and preservation of visual sensitive resources.

California Environmental Quality Act Guidelines

The CEQA Guidelines define a "significant effect on the environment" to mean a "substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including . . . objects of historic or aesthetic significance" (California Code of Regulations, Title 14, section 15382).

Appendix G Environmental Checklist Form of the CEQA Guidelines, under "Aesthetics,"

[2]The use of KOPs or similar view locations is common in visual resource analysis. The U.S. Bureau of Land Management (USDI BLM 1986a, 1986b, 1984) and the U.S. Forest Service (USDA Forest Service 1995) use such an approach.

lists the following four questions to be addressed regarding whether the potential impacts of a Project are significant:

A. Would the project have a substantial adverse effect on a scenic vista?

B. Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

C. Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

D. Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Staff answers each of the four checklist questions for the proposed project, including any related facility such as a transmission line or gas pipeline, for both construction and operation phases.

APPENDIX VR-3

ENERGY COMMISSION STAFF - VISUAL ANALYSIS TERMS

For the purpose of this visual analysis, Energy Commission staff has defined the following visual related terms:

Duration of View - ranges from *high* (extended), a view of the project site that is reached across an extended distance or amount of time, to *low* (brief), a view of the project site that is reached in a short amount of distance or time. The range of view duration generally differs depending on the type of activity in which the viewer is engaged.

Scenic Resource - a unique water feature (waterfall, transitional water, part of a stream or river, estuary); a unique physical geological terrain feature (rock masses, outcroppings, layers or spires); a tree having a unique visual/historical importance to a community (a tree linked to a famous event or person, an ancient old growth tree); historic building; or a designated federal scenic byway or state scenic highway corridor.

Scenic Vista - a distant view through and along a corridor or opening that exhibits a high degree of pictorial quality.

Viewer Concern - estimated level of a viewer's anticipated interest in preserving and protecting the existing physical environment. Viewer attitudes and expectations are often correlated with viewer activity type (e.g., viewers engaged in certain activities, such as recreation, are considered to have high levels of concern for scenic quality, while those engaged in other activities, such as work, are generally considered to have lower levels of concern). Residences are generally considered to have high viewer concern.

Existing landscape character may temper viewer concern on some state and locally designated scenic highways and corridors. Similarly, travelers on other highways and roads, including those in agricultural areas, may have moderate viewer concern depending on viewer expectations as conditioned by regional and local landscape features. Commercial uses, including business parks, typically have low-to-moderate viewer concern, though some commercial developments have specific requirements related to visual quality with respect to landscaping, building height limitations, building design, and prohibition of above-ground utility lines, thus indicating a higher level of viewer concern. Industrial uses typically have the lowest viewer concern because workers are focused on their work and generally are working in surroundings with relatively low visual value.

Viewer Exposure – the primary factors affecting viewer susceptibility to impacts, including visibility of a landscape feature, the number of viewers, distance, and the duration of the view.

Viewshed – an area visible to an observer from a fixed vantage point, called a *key observation point* (KOP). Staff uses a 35mm camera with a focal length of 50mm which encompasses an approximate image angle of 46^0. Staff uses a field of view that is not to

be confused with a panoramic (180^0) or cycloramic (360^0) view. These are broad horizontal composition with no apparent limits to the view.

Visibility - the level to which the proposed Project site is visually obstructed by natural and/or man-made surface features (development, vegetation, hills) from the key observation point.

Visual Contrast - the conspicuousness or prominence of a Project and its compatibility with its setting. Visual contrast is described in terms of formal attributes of form, line, color, and texture of the project in comparison to those of the setting. Staff considers the proposed project's introduction of form (shape and mass), line (changes in edge types and interruption or introduction of edges, bands, and silhouette lines), color (surface color, reflectivity, and glare), and texture (noticeable differences in the grain or irregularity and directional patterns) to the existing physical environment to determine the degree of contrast**.** Degree of contrast: *none* – the element contrast is not visible or perceived; *weak* – the element contrast can be seen but does not attract attention; *moderate* – the element contrast begins to attract attention and begins to dominate the characteristic landscape; *strong* – the element contrast demands attention, will not be overlooked, and is dominant in the landscape.

Visual Disruption - the extent to which a previously visible scenic resource or scenic vista in the existing physical environment is blocked from view by the proposed project. The view disruption is assigned greater weight according to the quality and importance of the blocked view.

Visual Quality – the estimated visual impression and appeal of the existing physical environmental setting and the associated public value attributed to it. An outstanding visual quality is a rating reserved for landscapes that would be what a viewer might think of as "picture postcard" landscapes. Low visual quality describes landscapes that are often dominated by visually discordant human alterations and do not provide views that people would find inviting or interesting (Buhyoff et al. 1994).

Visual Scale - the proposed Project's apparent size relationship with other components in the existing physical environment relative to the total field-of-view as viewed by the human eye, or the lens of a 35mm camera with a focal length of 50mm.

Visual Sensitivity - the overall level of sensitivity of a viewshed due to visual change that is a function of visual quality, viewer concern, and viewer exposure.

VISUAL RESOURCES - FIGURE 1

Watson Cogeneration Steam and Electric Reliability Project - KOP Locations

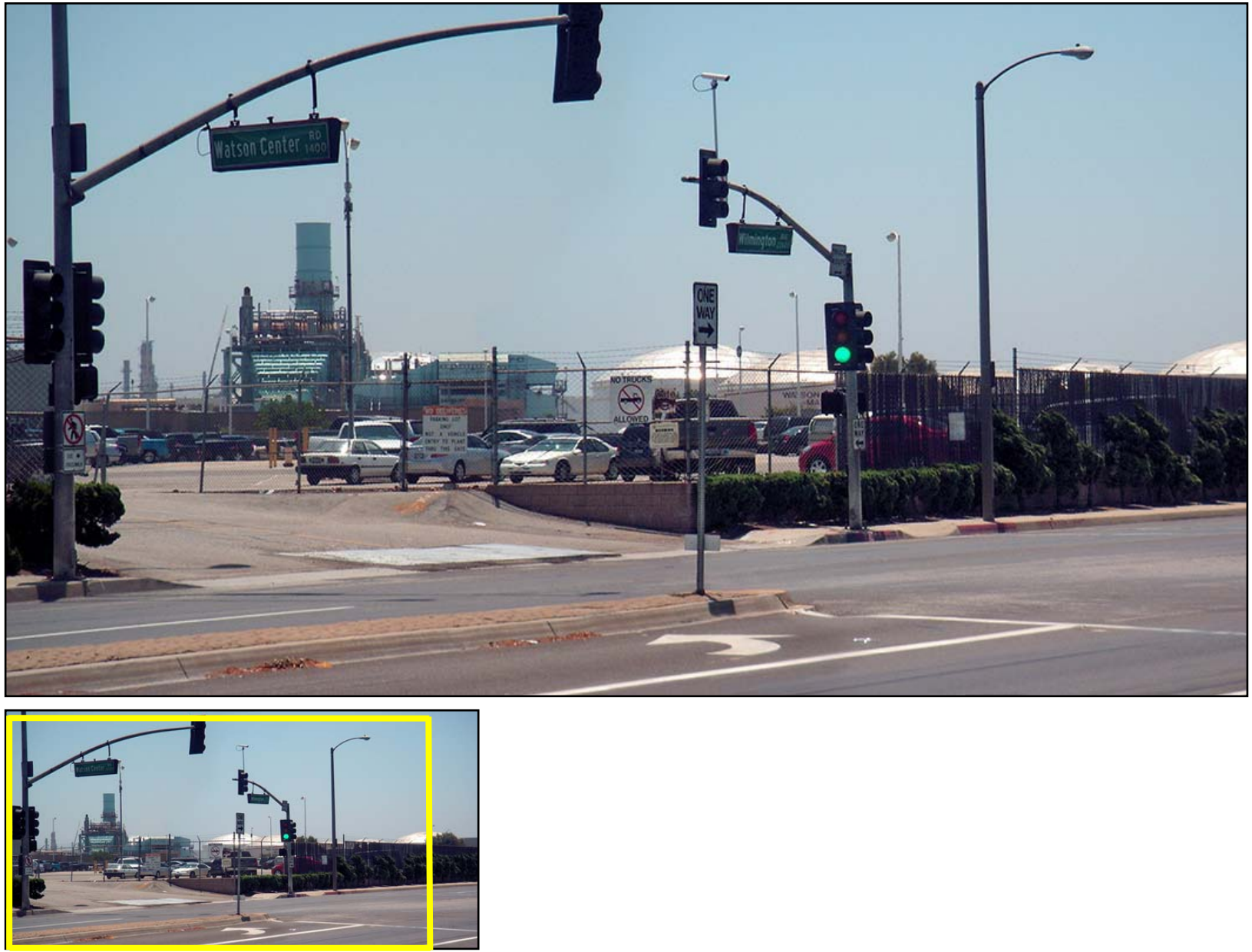
VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: AFC Aerial of Immediate Project Vicinity Fig: 5.13-2

VISUAL RESOURCES - FIGURE 2

Watson Cogeneration Steam and Electric Reliability Project - KOP1: Existing View of BP Watson from KOP 1



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SOURCE: AFC 5.13-7

VISUAL RESOURCES - FIGURE 3

Watson Cogeneration Steam and Electric Reliability Project - KOP 1: Simulated View of BP Watson from KOP 1

VISUAL RESOURCES

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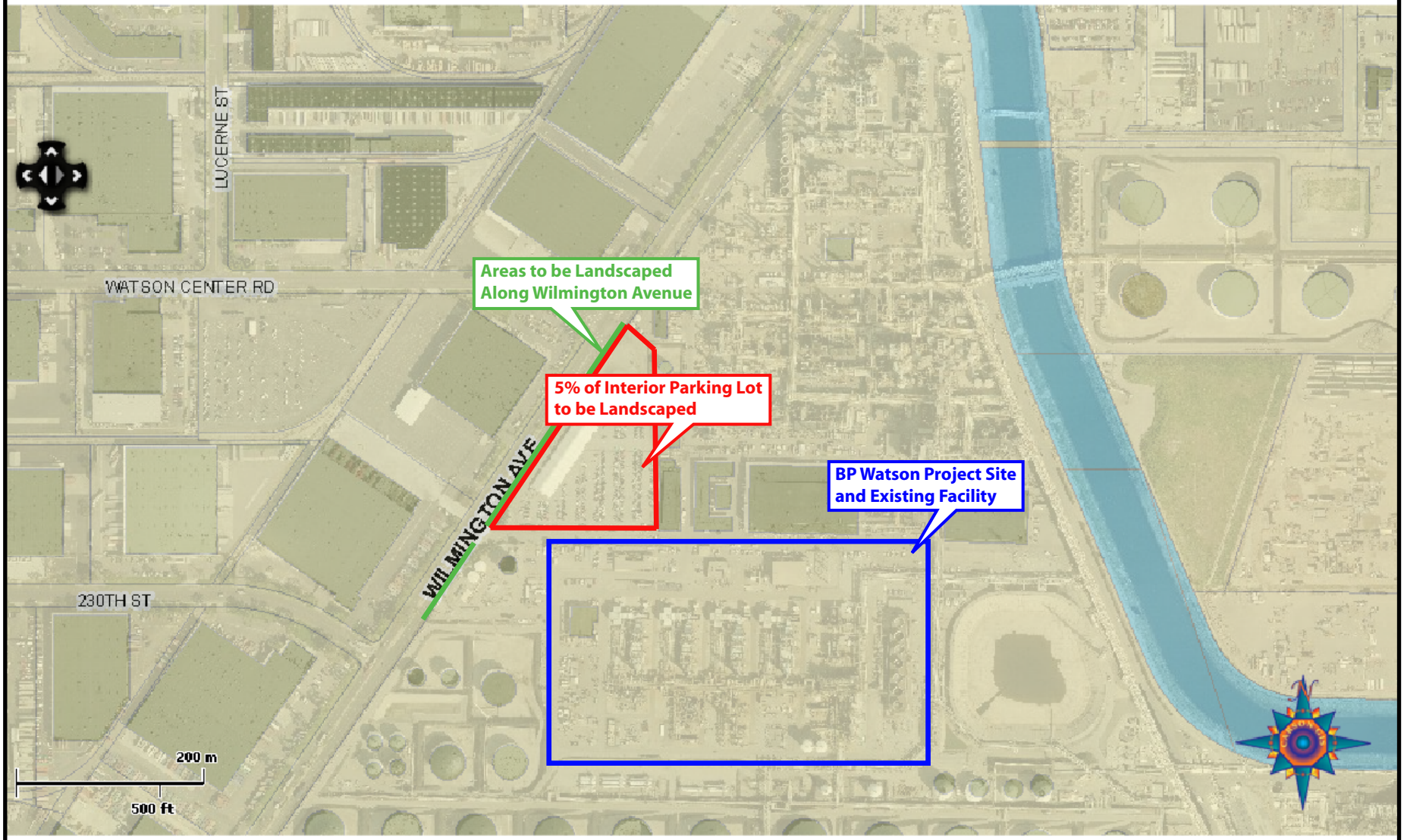
SOURCE: AFC 5.13-8

VISUAL RESOURCES - FIGURE 4

Watson Cogeneration Steam and Electric Reliability Project - Areas to be Landscaped Under Condition of Certification VIS-1, Landscape Screening



VISUAL RESOURCES

CALIFORNIA ENERGY COMMISSION - SITING, TRANSMISSION AND ENVIRONMENTAL PROTECTION DIVISION

SOURCE: Goodavish.pdf file labeled “Fig 7. COC VIS-1, Landscape Screening Locations”

WASTE MANAGEMENT

Testimony of Ellie Townsend-Hough

SUMMARY OF CONCLUSIONS

Management of the waste generated during demolition, construction and operation of the Watson Cogeneration Steam and Electric Reliability (BP Watson) Project would not result in any significant adverse impacts and would comply with applicable waste management laws, ordinances, regulations, and standards if the measures proposed in the Application for Certification and staff's proposed conditions of certification are implemented. The applicant has provided a Phase I Environmental Site Assessment which identifies a number of Recognized Environmental Conditions that indicate the presence or likely presence of hazardous substances or petroleum products on the project site. To further assess and remediate the soil contamination on the site, the applicant must provide, prior to site mobilization for project construction, a Soils Management Plan for the project site, as required by the Los Angeles Regional Water Quality Control Board's existing Cleanup and Abatement Orders that cover the entire BP Carson Refinery industrial complex. The purpose of the Soils Management Plan is to identify, remove, and dispose of contaminated soils. Condition of Certification **WASTE-2** assures that remediation of site soil contamination and related water pollution are addressed as part of the Los Angeles Regional Water Quality Control Board's overall regulatory program, as prescribed in the existing Cleanup and Abatement Orders for the BP Watson Industrial complex.

INTRODUCTION

This Final Staff Assessment (FSA) presents an analysis of issues associated with wastes generated from the proposed construction and operation of the Watson Steam and Electric Reliability Project. The technical scope of this analysis encompasses solid wastes existing on site and those to be generated during demolition of existing facilities and during facility construction and operation. Management and discharge of wastewater is addressed in the **Soil and Water Resources** section of this document. Additional information related to waste management may also be covered in the **Worker Safety** and **Hazardous Materials Management** sections of this document.

The objectives of the Energy Commission staff's waste management analysis are to ensure that:

- The management of project wastes would be in compliance with all applicable laws, ordinances, regulations, and standards (LORS). Compliance with LORS ensures that wastes generated during the construction and operation of the proposed project would be managed in an environmentally safe manner.
- The disposal of project wastes would not result in significant adverse impacts to existing waste disposal facilities.
- Upon project completion, the site is managed in such a way that project wastes and waste constituents would not pose a significant risk to humans or the environment.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The following federal, state, and local environmental laws, ordinances, regulations, and standards have been established to ensure the safe and proper management of both solid and hazardous wastes in order to protect human health and the environment. Project compliance with the various LORS is a major component of staff's determination regarding the significance and acceptability of the BP Watson Project with respect to management of waste.

WASTE MANAGEMENT Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
Title 42, United States Code, §§ 6901, et seq. Solid Waste Disposal Act of 1965 (as amended and revised by the Resource Conservation and Recovery Act of 1976, et al.)	The Solid Waste Disposal Act, as amended and revised by the Resource Conservation and Recovery Act (RCRA) et al., establishes requirements for the management of solid wastes (including hazardous wastes), landfills, underground storage tanks, and certain medical wastes. The statute also addresses program administration, implementation, and delegation to states, enforcement provisions, and responsibilities, as well as research, training, and grant funding provisions. RCRA Subtitle C establishes provisions for the generation, storage, treatment, and disposal of hazardous waste, including requirements addressing: • generator record keeping practices that identify quantities of hazardous wastes generated and their disposition; • waste labeling practices and use of appropriate containers; • use of a manifest when transporting wastes; • submission of periodic reports to the United States Environmental Protection Agency (U.S. EPA) or other authorized agency; and • corrective action to remediate releases of hazardous waste and contamination associated with RCRA-regulated facilities. RCRA Subtitle D establishes provisions for the design and operation of solid waste landfills. RCRA is administered at the federal level by U.S. EPA and its 10 regional offices. The Pacific Southwest regional office (Region 9) implements U.S. EPA programs in California, Nevada, Arizona, and Hawaii.
Title 42, United States Code, §§ 9601, et seq. Comprehensive Environmental Response, Compensation and Liability Act	The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), also known as Superfund, establishes authority and funding mechanisms for cleanup of uncontrolled or abandoned hazardous waste sites, as well as cleanup of accidents, spills, or emergency releases of pollutants and contaminants into the environment. Among other things, the statute addresses: • reporting requirements for releases of hazardous substances; • requirements for remedial action at closed or abandoned hazardous waste sites and brownfields; • liability of persons responsible for releases of hazardous substances or waste; and • requirements for property owners/potential buyers to conduct "all

	appropriate inquiries" into previous ownership and uses of the property to 1) determine if hazardous substances have been or may have been released at the site and 2) establish that the owner/buyer did not cause or contribute to the release. A Phase I Environmental Site Assessment is commonly used to satisfy CERCLA's "all appropriate inquiries" requirements.
Title 40, Code of Federal Regulations (CFR), Subchapter I – Solid Wastes	These regulations were established by U.S. EPA to implement the provisions of the Solid Waste Disposal Act and RCRA (described above). Among other things, the regulations establish the criteria for classification of solid waste disposal facilities (landfills), hazardous waste characteristic criteria and regulatory thresholds, hazardous waste generator requirements, and requirements for management of used oil and universal wastes. • Part 246 addresses source separation for materials recovery guidelines. • Part 257 addresses the criteria for classification of solid waste disposal facilities and practices. • Part 258 addresses the criteria for municipal solid waste landfills. • Parts 260 through 279 address management of hazardous wastes, used oil, and universal wastes (i.e., batteries, mercury-containing equipment, and lamps). U.S. EPA implements the regulations at the federal level. However, California is an authorized state so the regulations are implemented by state agencies and authorized local agencies in lieu of U.S. EPA.
Title 40, CFR, Part 6.3, Subpart GGGGG—National Emission Standards for Hazardous Air Pollutants: Site Remediation	This subpart establishes national emissions limitations and work practice standards for hazardous air pollutants (HAP) emitted from site remediation activities. This subpart also establishes requirements to demonstrate initial and continuous compliance with the emissions limitations and work practice standards.
Title 49, CFR, Parts 172 and 173 Hazardous Materials Regulations	U.S. Department of Transportation established standards for transport of hazardous materials and hazardous wastes. The standards include requirements for labeling, packaging, and shipping of hazardous materials and hazardous wastes, as well as training requirements for personnel completing shipping papers and manifests. Section 172.205 specifically addresses use and preparation of hazardous waste manifests in accordance with Title 40, CFR, and section 262.20.
State	
California Health and Safety Code, Chapter 6.5, §§ 25100, et seq. Hazardous Waste Control Act of 1972, as amended	This California law creates the framework under which hazardous wastes must be managed in California. The law provides for the development of a state hazardous waste program that administers and implements the provisions of the federal RCRA program. It also provides for the designation of California-only hazardous wastes and development of standards (regulations) that are equal to or, in some cases, more stringent than federal requirements. The California Environmental Protection Agency (Cal/EPA), Department of Toxic Substances Control (DTSC) administers and implements the

	provisions of the law at the state level. Certified Unified Program Agencies (CUPAs) implement some elements of the law at the local level.
Title 22, California Code of Regulations (CCR), Division 4.5 Environmental Health Standards for the Management of Hazardous Waste	These regulations establish requirements for the management and disposal of hazardous waste in accordance with the provisions of the California Hazardous Waste Control Act and federal RCRA. As with the federal requirements, waste generators must determine if their wastes are hazardous according to specified characteristics or lists of wastes. Hazardous waste generators must obtain identification numbers, prepare manifests before transporting the waste off site, and use only permitted treatment, storage, and disposal facilities. Generator standards also include requirements for record keeping, reporting, packaging, and labeling. Additionally, while not a federal requirement, California requires that hazardous waste be transported by registered hazardous waste transporters. The standards addressed by Title 22, CCR include: • Identification and Listing of Hazardous Waste (Chapter 11, §§ 66261.1, et seq.) • Standards Applicable to Generators of Hazardous Waste (Chapter 12, §§ 66262.10, et seq.) • Standards Applicable to Transporters of Hazardous Waste (Chapter 13, §§ 66263.10, et seq.) • Standards for Universal Waste Management (Chapter 23, §§ 66273.1, et seq.) • Standards for the Management of Used Oil (Chapter 29, §§ 66279.1, et seq.) • Requirements for Units and Facilities Deemed to Have a Permit by Rule (Chapter 45, §§ 67450.1, et seq.) The Title 22 regulations are established and enforced at the state level by DTSC. Some generator standards are also enforced at the local level by CUPAs.
California Health and Safety Code, Chapter 6.11 §§ 25404–25404.9 Unified Hazardous Waste and Hazardous Materials Management Regulatory Program (Unified Program)	The Unified Program consolidates, coordinates, and makes consistent the administrative requirements, permits, inspections, and enforcement activities of the six environmental and emergency response programs listed below. • Aboveground Storage Tank Program • Business Plan Program • California Accidental Release Prevention (CalARP) Program • Hazardous Material Management Plan / Hazardous Material Inventory Statement Program • Hazardous Waste Generator / Tiered Permitting Program • Underground Storage Tank Program The state agencies responsible for these programs set the standards for their programs while local governments implement the standards. The local agencies implementing the Unified Program are known as CUPAs. Los Angeles County Department of Environmental Health is the area CUPA. Note: The Waste Management analysis only considers application of the Hazardous Waste Generator/Tiered Permitting element of the Unified

	Program. Other elements of the Unified Program may be addressed in the **Hazardous Materials** and/or **Worker Health and Safety** analysis sections.
Title 27, CCR, Division 1, Subdivision 4, Chapter 1, §§ 15100, et seq. Unified Hazardous Waste and Hazardous Materials Management Regulatory Program	While these regulations primarily address certification and implementation of the program by the local CUPAs, the regulations do contain specific reporting requirements for businesses. • Article 9 – Unified Program Standardized Forms and Formats (§§ 15400–15410). • Article 10 – Business Reporting to CUPAs (§§ 15600–15620).
Public Resources Code, Division 30, §§ 40000, et seq. California Integrated Waste Management Act of 1989.	The California Integrated Waste Management Act of 1989 (as amended) establishes mandates and standards for management of solid waste. Among other things, the law includes provisions addressing solid waste source reduction and recycling, standards for design and construction of municipal landfills, and programs for county waste management plans and local implementation of solid waste requirements.
Title 14, CCR, Division 7, § 17200, et seq. California Integrated Waste Management Board	These regulations further implement the provisions of the California Integrated Waste Management Act and set forth minimum standards for solid waste handling and disposal. The regulations include standards for solid waste management, as well as enforcement and program administration provisions. • Chapter 3 – Minimum Standards for Solid Waste Handling and Disposal. • Chapter 3.5 – Standards for Handling and Disposal of Asbestos Containing Waste. • Chapter 7 – Special Waste Standards. • Chapter 8 – Used Oil Recycling Program. • Chapter 8.2 – Electronic Waste Recovery and Recycling.
California Health and Safety Code, Division 20, Chapter 6.5, Article 11.9, §25244.12, et seq. Hazardous Waste Source Reduction and Management Review Act of 1989 (also known as SB 14).	This law was enacted to expand the state's hazardous waste source reduction activities. Among other things, it establishes hazardous waste source reduction review, planning, and reporting requirements for businesses that routinely generate more than 12,000 kilograms (~ 26,400 pounds) of hazardous waste in a designated reporting year. The review and planning elements are required to be done on a four-year cycle, with a summary progress report due to DTSC every fourth year.
Title 22, CCR, § 67100.1 et seq. Hazardous Waste Source Reduction and Management	These regulations further clarify and implement the provisions of the Hazardous Waste Source Reduction and Management Review Act of 1989 (noted above). The regulations establish the specific review elements and reporting requirements to be completed by generators subject to the act.

Review.	
California Health and Safety Code Section 101480 - 101490	These regulations authorize the Los Angeles County Department of Environmental Health to enter into voluntary agreements for the oversight of remedial action at sites contaminated by wastes.
Title 22, CCR, Chapter 32, §67383.1 – 67383.5	This chapter establishes minimum standards for the management of all underground and aboveground tank systems that held hazardous waste or hazardous materials, and are to be disposed, reclaimed or closed in place.
Title 8, CCR §1529 and §5208	These regulations require the proper removal of asbestos containing materials in all construction work and are enforced by California Occupational Safety and Health Administration (Cal-OSHA).
Title 27, CCR , division 2, Subdivision 1, Chapter 3, Subchapter 4,	This regulation establishes that alternative daily cover (ADC) and other waste materials beneficially used at landfills constitutes diversion through recycling, and requires the California Integrated Waste Management Board to adopt regulations governing ADC.
California Porter-Cologne Water Quality Control Act of 1952: California Water Code, Division 7, Title 23, CCR, Division 3, Chapter 9	Requires adequate protection of water quality by appropriate design, sizing and construction of erosion and sediment controls.
Local	
Los Angeles County Fire Department (LACOFD) Health Hazardous Materials Division (CUPA)	Regulates enforcement responsibility for the implementation of Title 23, Division 3, Chapters 16 and 18 of the CCR, as it relates to hazardous material storage and petroleum underground storage cleanup.
LACOFD Health Hazardous Materials Division	Regulates hazardous waste generator permitting and hazardous waste handling and storage.
Los Angeles County Department of Environmental Health, Hazardous Material Division various programs	Hazardous Material Division is the CUPA for Los Angeles County that regulates and conducts inspections of businesses that handle hazardous materials, hazardous wastes, and/or have underground storage tanks. Hazardous Material Division programs include assistance with oversight on property re-development (i.e., brownfields) and voluntary or private oversight cleanup assistance.
Los Angeles County Code Section 68.905	Incorporates by reference the California Health & Safety Code Division 20, Chapter 6.11 which requires the facility to operate as a unified program facility.
Los Angeles Air Pollution Control District Regulation XI, Subpart M – Rule 361.145	This rule requires the owner or operator of a demolition or renovation to submit an Asbestos Demolition or Renovation Operational Plan (Notice of Intention) at least 10 working days before any asbestos stripping or removal work begins (such as site preparation that would break up, dislodge or similarly disturb asbestos containing materials. A Notice of Intent is required for all demolition regardless of whether there is the presence of asbestos containing material.

South Coast Air Quality Management District Rule 1166. Volatile Organic Compound Emissions from decontamination of soil	This rule sets requirements to control the emission of Volatile Organic Compounds (VOC) from VOC-contaminated soil as a result of leakage from storage or transfer facilities, from accidental spillage, or other deposition.
Policies	
Los Angeles County Code – Chapter 20.87 Los Angeles Integrated Waste Management Construction and Demolition (C&D) Ordinance.	The C&D ordinance applies to all construction and renovation projects with a value in excess of $100,000.Applicants must submit a recycling and reuse plan demonstrating how they will divert at least 50 percent of all soil, rock and gravel, and at least 50 percent of all C&D debris, excluding inert material.

SETTING

Proposed Project

The proposed BP Watson Project is an 85-megawatt (MW) natural gas-fired cogeneration facility (Watson 2009a, p. 3-1). The project would add a fifth train to the existing Watson Cogeneration Facility that was originally licensed by the Energy Commission. The cogeneration equipment would consist of one combustion turbine generator, one heat recovery steam generator, two new cooling tower cells, and associated support equipment.

The facility would be located in the City of Carson, Los Angeles County, California. The facility is surrounded by both the Watson Cogeneration Facility and the BP Carson Refinery. The project site, laydown area, and parking area are bounded by Wilmington Avenue and the Dominquez Channel; and occupy the area southeast of Wilmington Avenue and East 223rd Street on the San Pedro-Dominquez Land Grant of the San Bernardino Base and Meridian (Watson 2009a, Volume II ES-1).

The proposed project would be built on a 2.5 acre brown field site within a 21.7acre area that is within a 428-acre parcel described as Assessor's Parcel Number(APN) 7315-006-003 (Watson 2009a, page 1-3). An existing warehouse/maintenance shop would be removed as part of the project (Watson 2009a, page 5.14-1). A temporary 25-acre paved laydown, equipment staging and contractor parking site would be located one mile southeast of the project site. There are no off-site linear facilities associated with the project.

The demolition and construction activities associated with the BP Watson Project would produce a variety of mixed nonhazardous wastes, such as soil, wood, metal, concrete,

etc. Waste would be recycled where practical and non-recyclable waste would be deposited in a Class III landfill. The hazardous waste generated during this phase of the project would consist of used oils, universal wastes, solvents, and empty hazardous waste materials (Watson 2009a, § 5.14.4). Universal wastes are hazardous wastes that contain mercury, lead, cadmium, copper, and other substances hazardous to human and environmental health. Examples of universal wastes are batteries, fluorescent tubes, and some electronic devices.

Operation and maintenance of the project and associated facilities would generate a variety of wastes, including hazardous wastes. To control air pollutant emissions, the project's turbine units would use selective catalytic reduction and oxidation catalyst equipment and chemicals, which generate both solid and hazardous wastes.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

This waste management analysis addresses: a) existing soil contamination on the project site associated with prior activities on or near the project site; and b) the impacts from the generation and management of wastes during demolition of existing structures and during project construction and operation.

a) For any site in California proposed for the construction of a power plant, the applicant must provide documentation about the nature of any potential or existing releases of hazardous substances or contamination at the site. If potential or existing releases or contamination at the site are identified, the significance of the release or contamination would be determined by site-specific factors, including, but not limited to: the amount and concentration of contaminants or contamination; the proposed use of the area where the contaminants/contamination is found; and any potential pathways for workers, the public, or sensitive species or environmental areas to be exposed to the contaminants. Any unmitigated contamination or releases of hazardous substances that pose a risk to human health or environmental receptors would be considered significant by Energy Commission staff.

   As a first step in documenting existing site conditions, the Energy Commission's power plant site certification regulations require that a Phase I Environmental Site Assessment (ESA) be prepared[1] and submitted as part of an application for certification. The Phase I ESA is conducted to identify any conditions indicative of releases or threatened releases of hazardous substances at the site and to identify any areas near the site that are known to be contaminated (or a source of contamination).

   The Phase I ESA is conducted by a qualified environmental professional. It includes inquiries into past uses and ownership of the property, former hazardous substance releases and/or hazardous waste disposal at the site and within a certain distance of

[1] Title 20, California Code of Regulations, section 1704(c) and Appendix B, section (g)(12)(A). Note that the Phase I ESA must be prepared according to American Society for Testing and Materials protocol or an equivalent method agreed upon by the applicant and the Energy Commission staff.

the site, and visual inspection of the property, and making observations about the potential for contamination and possible areas of concern. After conducting all necessary file reviews, interviews, and site observations, the environmental professional provides findings about the environmental conditions at the site. In addition, since the Phase I ESA does not include sampling or testing, the environmental professional may give an opinion about the potential need for any additional investigation. Additional investigation may be needed, for example, if there were significant gaps in the information available about the site, an ongoing release is suspected, or to confirm an existing environmental condition.

If additional investigation is needed to identify the extent of possible contamination, a Phase II ESA may be required. The Phase II ESA usually includes sampling and testing of potentially contaminated media to verify the level of contamination and the potential for remediation at the site.

In conducting its assessment of a proposed project, Energy Commission staff review the project's Phase I ESA and work with the appropriate oversight agencies, as necessary, to determine if additional site characterization work is needed and if any mitigation is necessary at the site to ensure protection of human health and the environment from any hazardous substance releases or contamination identified.

b) Regarding the management of project-related wastes generated during demolition, construction and operation, staff reviews the applicant's proposed solid and hazardous waste management methods and determines if the methods proposed are consistent with the LORS identified for waste disposal and recycling. The federal, state, and local LORS represent a comprehensive regulatory system designed to protect human health and the environment from impacts associated with management of both non-hazardous and hazardous wastes. Absent any unusual circumstances, staff considers project compliance with LORS to be sufficient to ensure that no significant impacts would occur as a result of project waste management.

Staff then reviews the capacity available at off-site treatment and disposal sites and determines whether or not the proposed power plant's waste would have a significant impact on the volume of waste a facility is permitted to accept. Staff uses a waste volume threshold equal to ten percent of a disposal facility's remaining permitted capacity to determine if the impact from disposal of project wastes at a particular facility would be significant.

In addition, the two Class I disposal facilities that could be used for hazardous wastes generated by the construction and operation of the BP Watson Project have a combined remaining capacity in excess of 10 million cubic yards. The total amount of hazardous wastes generated by the BP Watson Project would consume less than 0.02 percent of the remaining permitted capacity. Therefore, impacts from disposal of Watson Cogeneration generated hazardous wastes would also have a less than significant impact on the remaining capacity at Class I landfills.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Existing Site Conditions and Potential for Contamination

The proposed 2.5-acre project site is located adjacent to four operating cogeneration units in the maintenance area of the 428-acre BP Carson petroleum refinery parcel. The maintenance area was developed within the refinery retention basin, which was in operation from 1920 until 1987 (Watson 2009a Appendix A page ES-2). There are known and potential soil and groundwater impacts associated with the current and historic refinery operations and maintenance operations at the BP Carson Refinery, including the proposed project site (Watson 2009a, page 5.14-2).

Remediation of soil and groundwater impacts at the BP Carson Refinery is ongoing in accordance with Cleanup and Abatement Orders (CAO) Numbers 84-17 and 90-121, issued in 1984 and 1990 respectively by the Los Angeles Regional Water Quality Control Board (LARWQCB) with Environmental Protection Agency (EPA) involvement (URS 2009e, Data Response 37 and 39). CAO 84-17 required operators of all 15 Los Angeles County petroleum chemical facilities to conduct subsurface investigations of their facilities to detect and assess any groundwater pollution which may be present. Later, the Regional Board required the Atlantic Richfield Company (the BP Refinery) to conduct further ground water cleanup and investigation at the refinery. CAO 90-121 required Atlantic Richfield Company (BP Carson Refinery) to cleanup and abate the ground water pollution caused by uncontrolled releases of hydrocarbon product from its Los Angeles County Refinery. The RWQCB issued the two orders per California Water Code (CWC) Sections 13260, 13267, 13304 and 13350 for investigation of contaminated soils and groundwater and their cleanup. The CAOs require adequate protection of water quality by appropriate design, sizing, and construction of erosion and sediment controls. The CAOs, which are still in effect, are designed to address all ground water and soil clean-up at the entire refinery (Cho 2010b), including the proposed project site.

There are known and potential subsurface impacts associated with the historic and current operations of the Watson Cogeneration Facility. A limited soil investigation was conducted on February 8, 1985 on the site where the proposed project would be built. It was reported that hydrocarbons were encountered in several borings within the fill soils and underlying natural soils (Watson 2009a, page 5.14-2). A Phase I ESA, dated January 20, 2009, was prepared by the URS Corporation for the applicant. The assessment was completed in accordance with the American Society for Testing and Materials Standard Practice E 1527-05 for ESAs (Watson 2009a, Appendix A). It identified a number of Recognized Environmental Conditions (REC). A REC is the presence or likely presence of any hazardous substances or petroleum products on a property under the conditions that indicate an existing release, past release, or a material threat of a release of any hazardous substance or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property. The existing fill on the site may consist of a blend of non-hazardous and hazardous constituents.

At the Preliminary Staff Assessment Workshop in January 2011, the LARWQCB staff, Mohammad Ziadi, also presented data that indicated that groundwater below the project

site is significantly impacted by hydrocarbons including up to 14 feet of non-aqueous liquid phase petroleum hydrocarbons on the groundwater surface above the shallow water table. Prior to the January 2011 Preliminary Staff Assessment Workshop, BP Watson had not acknowledged the extent of existing groundwater impacts at the project site. Prior to the Preliminary Staff Assessment, Watson recognized the likelihood of encountering impacted soils during excavation and construction activities. Watson indicated that the investigation of soil and groundwater contamination is part of a separate ongoing investigation/remediation by the BP Carson Refinery Project as part of their two COA Numbers 84-17 and 90-121. During the project geotechnical assessment activities, soil samples will be collected in areas where ground disturbance is planned within the project footprint (URS 2009e Data Response 37a). The samples will be analyzed to investigate the potential petroleum hydrocarbon impacts on the subsurface soils. During the project geotechnical assessment and construction activities, any excavated soil will be managed pursuant to applicable BP Carson Refinery soils management plans, pursuant to Condition of Certification **Waste- 2**, and health and safety of site personnel will be managed in accordance with the site specific health and safety plan (Condition of Certification **Worker Safety-2**) and applicable BP Carson Refinery procedures. Watson indicates that contaminated soils, if encountered, will be stockpiled onsite and later removed for disposal or treatment and recycling. Watson plans to conduct a pre-assessment to determine if existing soils are subject to additional Federal and State regulations that control excavation of soils impacted by volatile organic compounds (Watson, 2009a). If necessary, engineered fill will be imported to replace excavated materials that are not suitable for reuse.

The project site is currently covered with asphalt paving, and has a warehouse/maintenance shop with associated underground man-made structures, such as piping and tanks and possibly other unidentified structures. The asphalt and structures in the footprint of the project site would be demolished and removed prior to construction. The site would then be prepared for installation of foundations and underground facilities. The foundation excavations would require that approximately 7,000 cubic yards of existing fill material be removed and stockpiled. Excavated contaminated soils would be stored temporarily in construction zones and later removed off-site for disposal (URS 2009e, Data Response 37). Prior to excavation, the applicant would demonstrate how they would manage the contaminated soil, maintain compliance with regulatory requirements (Waste Management , Air Quality, Water Resources, and Worker Safety),and verify that there would be no human health risks associated with the movement of contaminated soil.

Based on the known previous refinery activity (retention basin and maintenance/operation area) on the proposed project site and the findings discussed above, CEC staff and Paul Cho of the LARWQCB both believe that a more detailed characterization of the soil that will be disturbed during project excavation and grading should be required. The applicant should be required to evaluate whether the soil is classified as non-hazardous or hazardous and determine what disposal methods are appropriate. The characterization should also address whether there are potential impacts from soil excavation and grading that could exacerbate groundwater impacts. Characterization of the 2.5 acre site should be carried out by the applicant consistent with the various remediation programs currently in place at the refinery (URS 2009e, Data Response 37). The project owner shall ensure that the soil will be disposed of in

legal discharge areas and handled in accordance with the existing CAOs and applicable LORS.

Staff recommends the applicant be required to comply with Condition of Certification **WASTE-1** which would require the applicant to sample and analyze soil to be excavated during construction, evaluate whether it is classified as hazardous or nonhazardous, and determine appropriate methods of disposal.[2] Condition of Certification **WASTE-2** would require that prior to initiating any earthwork on the project site; the project owner shall prepare and submit to the LARWQCB, and to the CPM for approval, a Soils Management Plan to assure the proper handling, storage and disposal of contaminated soils. Condition of Certification **WASTE-3** would require that an experienced and qualified professional engineer or professional geologist be available for consultation during site characterization, soil grading or soil excavation to determine appropriate actions to be taken in the event contaminated soil is encountered.

Conditions of Certification **WASTE -1** and **2**, and **WORKER SAFETY-1** and **2** would require the applicant to demonstrate how the project owner would manage the excavation of the contaminated soils in order to protect human health and the environment. These conditions would ensure the potential contamination is adequately characterized and the type and extent of contamination is quantified. They would also ensure that potential contaminated soils are appropriately disposed of and managed so that worker health and safety is protected and potential environmental impacts are not exacerbated.

Demolition and Construction Impacts and Mitigation

Demolition of existing structures and construction of the proposed power plant and associated facilities would last approximately 26 months and generate both nonhazardous and hazardous wastes in solid and liquid forms (Watson 2009a, page 5.4-7). Before demolition and construction can begin, the project owner would be required to develop and implement a Demolition and Construction Waste Management Plan, per proposed Condition of Certification **WASTE-4**.

Non-Hazardous Wastes

All non-hazardous wastes would be recycled to the extent possible and non-recyclable wastes would be collected by a licensed hauler and disposed in a solid waste disposal facility, in accordance with Title 14, California Code of Regulations, section 17200 et seq.

During demolition, approximately 1,120 tons of debris would be recycled and approximately one ton would be disposed of in a Class I or II landfill (Watson 2009a, page 5.14-8). During construction, as little as 20 cubic yards (estimate does not include amount of soil to be disposed of in landfill) of non-hazardous solid wastes would be

[2] Prior to the excavation, a pre-assessment would be conducted to determine if the excavation will need to follow 40 CFR 63 Subpart GGGGG and Air Quality Management District Rule 1166 that regulate air emissions from excavation of soil contaminated with volatile organic compounds (Watson 2009a, page 5.4-7, Data Request 37).

generated. Construction waste would include scrap metal, wood, concrete, steel/metal, paper, glass, empty tanks, waste oil, and plastic waste (Watson 2009a, Table 5.14-2).

The Los Angeles County Integrated Waste Management Authority (IWMA) passed a construction and demolition (C&D) ordinance on January 4, 2005. The C&D ordinance applies to all construction and renovation projects with a value in excess of $100,000, all permits which consist of the demolition of a structure or structures, irrespective of the value of the demolition work, and all projects which consist only of grading, irrespective of the total value of the grading work. All applicants must submit a Recycling and Reuse Plan (RRP). The C&D requires that 50 percent of total debris generated by a project be recycled or reused. Permits would not be issued until the project has an approved RRP. (Los Angeles County Integrated Waste Management authority http://dpw.lacounty.gov/epd/cd). Adoption of Condition of Certification **WASTE-5** would ensure that the BP Watson Project owner complies with the county's Construction and Demolition Debris Recycling and Reuse Program Ordinance, Chapter 20.87. Staff believes that compliance with proposed Condition of Certification **WASTE-5** would further reduce potential impacts to local landfills from project wastes.

Non-hazardous liquid wastes would also be generated during construction, including sanitary wastes, dust suppression drainage, and equipment wash water. Sanitary wastes would be collected in portable, self-contained toilets and pumped periodically for disposal at an appropriate facility. Potentially contaminated equipment wash water will be contained at designated wash areas and transported to a sanitary wastewater treatment facility (see the **Soil and Water Resources** section of this document for more information on the management of project wastewater).

Hazardous Wastes

Hazardous wastes that would likely be generated during construction include solvents, waste paint, oil absorbents, used oil, oily rags, batteries, cleaning wastes, spent welding materials, and empty hazardous material containers (Watson 2009a, Table 5.14-2). The total volume of hazardous wastes generated during construction is estimated by staff to be approximately 195 cubic yards.

The project owner would be required to obtain a unique hazardous waste generator identification number for the site prior to starting construction, pursuant to proposed Condition of Certification **WASTE-6.** Although the hazardous waste generator number is determined based on site location, both the construction contractor and the project owner/operator could be considered the generator of hazardous wastes at the site.

Wastes would be accumulated on site for less than 90 days and then properly manifested, transported, and disposed of at a permitted hazardous waste management facility by licensed hazardous waste collection and disposal companies. Staff reviewed the disposal methods described in AFC section 5.14.2 and concluded that all wastes would be disposed of in accordance with all applicable LORS. Should any construction waste management-related enforcement action be taken or initiated by a regulatory agency, the project owner would be required by proposed Condition of Certification **WASTE-7** to notify the Energy Commission's Compliance Project Manager (CPM) whenever the owner becomes aware of any such action.

In the event that construction excavation, grading, or trenching activities for the proposed project encounter potentially contaminated soils that require specific handling, disposal and other precautions required pursuant to hazardous waste management LORS, staff finds that proposed Conditions of Certification **WASTE-2** and **3** would be adequate to address such concerns. Absent any unusual circumstances, staff considers project compliance with LORS to be sufficient to ensure that no significant impacts would occur as a result of project waste management activities.

Operation Impacts and Mitigation

The proposed Watson Cogeneration facility would generate non-hazardous and hazardous wastes in both solid and liquid forms under normal operating conditions. Table 5.14-3 of the project AFC gives a summary of the operation waste streams, expected waste volumes and generation frequency, and management methods proposed. Before operations can begin, the project owner would be required to develop and implement an Operation Waste Management Plan pursuant to proposed Condition of Certification **WASTE-8**.

Non-Hazardous Solid Wastes

Operation of the project is expected to generate less than ten tons per year of non-hazardous solid wastes (not including filter cake). This would include routine maintenance wastes (such as used air filters, spent deionization resins, sand and filter media) as well as domestic and office wastes (such as office paper, newsprint, aluminum cans, plastic, and glass). All non-hazardous wastes would be recycled, to the extent possible, and non-recyclable wastes would be regularly transported off site to a local solid waste disposal facility (Watson 2009a § 5.14.2.2).

Non-Hazardous Liquid Wastes

Non-hazardous liquid wastes would be generated during facility operation and are discussed in the **Soil and Water Resources** section of this document.

Hazardous Wastes

The project owner/operator would be considered the generator of hazardous wastes at the site during facility operations. Therefore, the project owner's unique hazardous waste generator identification number, obtained prior to construction in accordance with proposed Condition of Certification **WASTE-6**, would be retained and used for the management of hazardous wastes generated during facility operation.

The generation of hazardous wastes expected during routine project operation includes used hydraulic fluids, oils, greases, oily filters and rags, spent selective catalytic reduction catalysts, cleaning solutions and solvents, and batteries. In addition, spills and unauthorized releases of hazardous materials or hazardous wastes may generate contaminated soils or materials that may require corrective action and management as hazardous waste. Proper hazardous materials handling and good housekeeping practices would help keep spilled wastes to a minimum. However, to ensure proper cleanup and management of any contaminated soils or waste materials generated from hazardous materials spills, staff proposes Condition of Certification **WASTE-9**, which would require the project owner/operator to report, clean up, and remediate as

necessary, any hazardous materials spills or releases in accordance with all applicable federal, state, and local requirements. More information on hazardous material management, spill reporting, containment, and spill control and countermeasures plan provisions for the project are provided in the **Hazardous Materials Management** section of the PSA.

Less than two tons per year of hazardous wastes would be generated during the 30-year anticipated operation of the BP Watson facility, with source reduction and recycling of wastes implemented whenever possible. The hazardous wastes would be temporarily stored on site, transported off site by licensed hazardous waste haulers, and recycled or disposed of at authorized disposal facilities in accordance with established standards applicable to generators of hazardous waste (Title 22, CCR, §§ 66262.10 et seq.). Should any operations waste management-related enforcement action be taken or initiated by a regulatory agency, the project owner would be required by proposed Condition of Certification **WASTE-7** to notify the CPM whenever the owner becomes aware of any such action.

Impact on Existing Waste Disposal Facilities

Non-Hazardous Wastes

During demolition and construction of the proposed project, approximately 144 cubic yards of solid waste, and approximately eight tons per year of operation waste would be generated and recycled or disposed of in a Class III landfill (Watson 2009a, Table 5.14-3).

Table 5.14-1 of the project AFC presents details of six non-hazardous (Class III) waste disposal facilities that could potentially take the non-hazardous construction and operation wastes generated by the BP Watson Project facility. These Class III landfills are all located in Southern California in Los Angeles County. The remaining capacity for the six landfills combined is over 49 million cubic yards. The total amount of non-hazardous waste generated from project construction and operation would contribute less than one percent of the available landfill capacity. Staff finds that disposal of the solid wastes generated by the BP Watson Project facility can occur without significantly impacting the capacity or remaining life of any of these facilities.

Hazardous Wastes

Table 5.14-1 of the AFC displays information on the two Class I landfills in California: the Buttonwillow Landfill in Kern County, and the Kettleman Hills Landfill in King's County. The Kettleman Hills facility also accepts Class II and Class III wastes. Kettleman Hills and Buttonwillow landfills have a combined excess of 10 million cubic yards of remaining hazardous waste disposal capacity, with up to 33 years of remaining operating lifetimes (Watson 2009a, page 5.14-.3).

Hazardous wastes generated during construction and operation would be recycled to the extent possible and practical. Those wastes that cannot be recycled would be transported off site to a permitted treatment, storage, or disposal facility. Approximately 144 cubic yards of construction hazardous waste, and 19 cubic yards per year of operation hazardous waste would be generated from the BP Watson Project facility.

The volume of hazardous waste from the Watson Cogeneration facility requiring off-site disposal would be far less than staff's threshold of significance and would therefore not significantly impact the capacity or the remaining life of the Class I waste facilities.

CUMULATIVE IMPACTS AND MITIGATION

The CEQA Guidelines (Section 15355) define cumulative effects as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts." As noted in the **Land Use** Section, existing projects in the vicinity of the BP Watson site include industrial facilities and uses. The city of Carson has identified two future projects in the vicinity of the project site: The Alameda Corridor Improvement Study and the Shell Specific Plan. In addition, the Housing Element Update project would affect the city as a whole. The Alameda Corridor is a 20-mile rail and traffic route linking the to the ports of Los Angeles and Long Beach to the transcontinental rail lines near downtown Los Angeles and borders the project site to the east. The Shell Specific Plan proposes the redevelopment of the 446-acre Shell Carson Terminal facility to permit development of additional product storage tanks and light industrial storage.

The proposed BP Watson would be constructed on a site with four existing combustion turbine generators within a refinery and would be the same type of land use type as the existing on-site and adjacent uses. The proposed project would not require a General Plan amendment, zone change or a conditional use permit. Since the project is an allowable use at the proposed site, and would not result in significant adverse waste management impacts that cannot be mitigated, impacts from the BP Watson Project facility would not likely combine with those from the projects being processed within the city to result in significant cumulative impacts. The proposed project would not make a significant contribution to regional impacts related to new development and growth. The project is planned to serve the existing and anticipated electrical needs of the region by connecting to the existing electric transmission system and other utility infrastructure. The waste management impacts of the proposed project, in combination with past, present and reasonably foreseeable projects in the area would not be cumulatively considerable.

As proposed, the amount of non-hazardous and hazardous wastes generated during construction and operation of the BP Watson Project facility would add to the total quantity of waste generated in the State of California. Project non-hazardous wastes would be generated in modest quantities, approximately 18 cubic yards during construction, and 12 cubic yards per year during operation [3] (Watson Cogeneration 2009a page 5.14-18 and SR 2008e p. 5-40). On the other hand, one hundred and forty-three cubic yards of hazardous waste would be generated during construction, and approximately 12 cubic yards per year would be generated during operation. Waste recycling would be employed wherever practical, and sufficient capacity is available at several treatment and disposal facilities to handle the volumes of wastes that would be generated by the project. Los Angeles County has 49 million cubic yards of volume remaining in their Class III landfills, and 10 million cubic yards available in the Class I

[3] The cubic yards are staff generated numbers based on approximately 2,000 pounds per ton (Watson 2009a Tables 5.14-2 and Table 5.14-3).

landfills. The proposed Watson Cogeneration facility's contribution would be less than one percent of the county's waste generation. Therefore, staff concludes that the waste generated by the Watson Cogeneration facility would not result in significant cumulative waste management impacts.

COMPLIANCE WITH LORS

Energy Commission staff concludes that the proposed BP Watson Project facility would comply with all applicable LORS regulating the management of hazardous and non-hazardous wastes during both facility construction and operation. The applicant is required to recycle and/or dispose hazardous and non-hazardous wastes at facilities licensed or otherwise approved to accept the wastes. Because hazardous wastes would be produced during both project construction and operation, the BP Watson Project facility would be required to obtain a hazardous waste generator identification number from U.S. EPA. The Watson Cogeneration facility would also be required to properly store, package, and label all hazardous waste; use only approved transporters; prepare hazardous waste manifests; keep detailed records; and appropriately train employees, in accordance with state and federal hazardous waste management requirements.

In the **Socioeconomics** section of this staff assessment, staff presents census information that shows that there are minority populations within one mile and six miles of the project. For the proposed Watson Cogeneration project, the total population within the six-mile radius of the site is 763,629 persons, and the total minority population is 604,924 persons or 79.21 percent of the total population (see **Socioeconomics Figure 1**). Staff concludes that the BP Watson Project would not result in significant waste management impacts from construction or operation of the power plant on minority population if the proposed Conditions of Certification are implemented. Therefore, there are no environmental justice issues for Waste Management.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

Staff contacted the Los Angeles Regional Water Quality Control Board (LARWQCB) Site Cleanup Unit IV to inquire if the licensing, construction or operation of the BP Watson project could adversely affect the successful implementation and enforcement of CAO 85-17 and 90-121. Paul Cho of the LARWQCB provided staff with the background on the CAOs and indicated the CAOs were based on the California Water Codes 13260, 13267 and 13302. Mr. Cho stated that contaminated soil removed from the site that is either recycled or reused is regulated under different LORS than contaminated soil removed from the site that is disposed of in a landfill (California Code of Regulation, Title 27).). The key issue for the LARWQCB is that compliance with the CAOs continues to be unaffected and the project complies with all applicable LORS and mitigate where necessary (Cho 2010a).

On January 25, 2011, the LARWQCB staff (Paul Cho) attended a CEC workshop to discuss Waste Management issues related to the BP Watson project. At the workshop LARWQCB staff stated that construction activities at the site could increase the threat of groundwater contamination and potentially affect human health and therefore could

have an adverse impact on the environment. In response to Mr. Cho's comments, CEC staff sent a letter to LARWQCB requesting their continued participation in the BP siting process. Staff's letter requested clarification of what role if any that LARWQCB would play in the siting of the project in light of previous CAOs associated with the entire 428-acre BP refinery property. The letter addressed a series of questions concerning surface and/or subsurface contamination at the BP project site, identified problems that might occur as construction proceeds, and potential mitigation measures to address the anticipated problems (CEC 2011c). LARWQCB replied to staff's letter on June 30, 2011 and August 3, 2011 indicating that the applicant must coordinate with LARWQCB if contamination is found in the area of the fifth train in compliance with the CAOs (LARWQCB 2011a & b). Also, in response to staff's May 30, 2011 letter to LARWQCB applicant provided a detailed analysis of the ongoing assessment and remedial activities at the refinery (URS 2011d). The applicant asserted that ongoing assessment and remedial activities at the refinery are being conducted in accordance with the CAOs under the jurisdiction of the LARWQCB and the Environmental Protection Agency.

Staff developed Condition of Certification **WASTE-2** to incorporate LARWQCB comments and to address LARWQCB's concerns for the mandated compliance with the CAO's as they apply to the project site and ensure there are no project disturbances that result in an a significant impact on human health and the environment.

CONCLUSIONS

Consistent with the three main objectives for staff's waste management analysis (as noted in the Introduction section of this analysis), staff provides the following conclusions:

1) Based on its review of the applicant's proposed waste management procedures, staff concludes that project wastes would be managed in compliance with all applicable waste management LORS. Staff notes that both construction and operation wastes would be characterized and managed as either hazardous or non-hazardous waste. All non-hazardous wastes would be recycled to the extent feasible, and non-recyclable wastes would be collected by a licensed hauler and disposed of at a permitted solid waste disposal facility. Hazardous wastes would be accumulated onsite in accordance with accumulation time limits (90,180, 270, or 365 days depending on waste type and volumes generated), and then properly manifested, transported to, and disposed of at a permitted hazardous waste management facility by licensed hazardous waste collection and disposal companies.

   However, to help ensure and facilitate ongoing project compliance with LORS, staff proposes Conditions of Certification **WASTE-1** through **9**. These conditions would require the project owner to do all of the following:

   - Ensure the project site is investigated and any contamination identified is remediated, as necessary, with appropriate professional and regulatory agency oversight (**WASTE-1**, **2**, **3**, and **6**).
   - Obtain a hazardous waste generator identification number (**WASTE-6**).

- Prepare a Demolition and Construction Waste Management Plan and an Operation Waste Management Plan that detail the types and volumes of wastes to be generated and how wastes would be managed, recycled, and/or disposed of after generation (**WASTE-4** and **8**).
- Report any waste management-related LORS enforcement actions and how violations would be corrected (**WASTE-7**).
- Comply with local waste recycling and diversion requirements (**WASTE-5**).
- Ensure that all spills or releases of hazardous substances are reported and cleaned up in accordance with all applicable federal, state, and local requirements (**WASTE-9)**.

2) Existing conditions at the BP Watson project site do include areas where prior site uses and/or demolition activities may have resulted in releases of hazardous substances or caused soil contamination. To ensure that the project site is investigated and remediated, as necessary, and to reduce any impacts from prior or future hazardous substance or hazardous waste releases at the site to a level of insignificance, staff proposes Conditions of Certification **WASTE-1**, **2**, **3**, **4**, **6**, and **9**. These conditions would require the project owner to ensure that the project site is investigated and remediated as necessary; demonstrate that project wastes are managed properly; and ensure that any future spills or releases of hazardous substances or wastes are properly reported, cleaned up, and remediated as necessary. Therefore, staff concludes that construction and operation of the proposed BP Watson Project would not result in contamination or releases of hazardous substances that would pose a substantial risk to human health or the environment.

3) Regarding impacts of project wastes on existing waste disposal facilities, staff uses a waste volume threshold equal to ten (10) percent of a disposal facility's remaining capacity to determine if the impact from disposal of project wastes at a particular facility would be significant. The existing available capacity for the three Class III landfills that may be used to manage nonhazardous project wastes exceeds 87 million cubic yards. The total amount of nonhazardous wastes generated from construction and operation of the proposed BP Watson Project would consume less than 0.1 percent of the remaining landfill capacity. Therefore, disposal of project generated non-hazardous wastes would have a less than significant impact on Class III landfill capacity.

   In addition, the two Class I disposal facilities that could be used for hazardous wastes generated by the construction and operation of the BP Watson Project have a combined remaining capacity in excess of 10 million cubic yards. The total amount of hazardous wastes generated by the BP Watson Project would consume less than 0.02 percent of the remaining permitted capacity. Therefore, impacts from disposal of Watson Cogeneration generated hazardous wastes would also have a less than significant impact on the remaining capacity at Class I landfills.

PROPOSED CONDITIONS OF CERTIFICATION

WASTE-1 The project owner shall sample and analyze soil to be excavated during construction of the BP Watson Project and evaluate whether it is hazardous or nonhazardous and determine the appropriate disposal method. In no event shall project construction commence in areas requiring characterization until the CPM has determined that all necessary testing, characterization, and method of disposal has been accomplished.

Verification: At least 60 days prior to the start of site mobilization, the project owner shall provide to the CPM for review and approval the results of the soil sampling and analysis, and determination of methods of disposal.

WASTE-2 Prior to initiating any earthwork on the project site, the project owner shall prepare and submit to the Los Angeles Regional Water Quality Control Board, and to the CPM for approval, a Soils Management Plan (SMP). The SMP should include but is not limited to the following:

- Land use history, including description and locations of known contamination;
- An earthwork schedule;
- The project owner shall describe methods which will be used to properly handle and/or dispose of soil which may be classified as hazardous or contain contaminants at levels of potential concern, including the identification of legal discharge areas;
- The SMP shall discuss whether the disturbance or removal of soil and other materials during excavation and grading will exacerbate existing groundwater contamination or compromise the ability to remediate groundwater contamination in accordance with Cleanup and Abatement Orders 84-17 and 90-121;
- The SMP shall discuss, as necessary, the reuse of soil on site in accordance with applicable criteria to protect construction workers or future workers on site;
- This SMP should be submitted to the Los Angeles Regional Water Quality Control Board as part of the cleanup plans required by Cleanup and Abatement Orders 84-17 and 90-121;
- A SMP summary report, which includes all analytical data and other findings, must be submitted once the earthwork has been completed.

Verification: At least 60 days prior to any earthwork, including those earthwork activities associated with the site mobilization, ground disturbance, or grading as defined in the general conditions of certification the project owner shall submit the Soils Management Plan to the Los Angeles Regional Water Quality Control Board for review and comment, and to the CPM for approval.

WASTE-3 The project owner shall provide the resume of an experienced and qualified professional engineer or professional geologist, who shall be

available for consultation during site characterization (if needed), demolition, excavation, and grading activities, to the CPM for review and approval. The resume shall show experience in remedial investigation and feasibility studies.

The professional engineer or professional geologist shall be given full authority by the project owner to oversee any earth moving activities that have the potential to disturb contaminated soil, and to determine appropriate actions to be taken.

Verification: At least 30 days prior to the start of site mobilization, the project owner shall submit the resume to the CPM for review and approval.

WASTE-4 The project owner shall prepare a Demolition and Construction Waste Management Plan for all wastes generated during demolition of existing structures or construction of the facility and shall submit the plan to the CPM for review and approval. The plan shall contain, at a minimum, the following:

- a description of all demolition and construction waste streams, including projections of frequency, amounts generated, and hazard classifications; and
- management methods to be used for each waste stream, including temporary on-site storage, housekeeping and best management practices to be employed, treatment methods and companies providing treatment services, waste testing methods to assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/source reduction plans.

Verification: The project owner shall submit the Demolition and Construction Waste Management Plan to the CPM for approval no less than 30 days prior to the initiation of construction activities at the site.

WASTE-5 The project owner shall provide a Recycling and Reuse Plan demonstrating how they will divert at least 50 percent of all soil, rock and gravel, and at least 50 percent of all construction and demolition (C & D) debris, excluding inert material, to the Los Angeles County Integrated Waste Management Authority (IWMA) Construction and Demolition Debris Recycling and Reuse Program per Los Angeles County Code Chapter 20.87. The project owner shall ensure compliance with all of the county of Los Angeles' diversion program requirements and shall provide proof of compliance documentation to the county of Los Angeles and the CPM, including a Recycling and Reuse Summary Report, receipts, and records of measurement, consistent with the county of Los Angeles' normal reporting requirements.

Verification: Prior to the start of any construction activities, the project owner shall submit to the county of Los Angeles IWMA documentation consistent with the requirements of the County's C & D Debris Recycling and Reuse Program, along with the normally required deposit and administrative fees. At least 60 days prior to the start of any construction activities, the project owner shall submit the proposed C & D Debris Recycling and Reuse Plan, along with any comments received from the county of Los Angeles, to the CPM for review and approval. Project mobilization and construction

shall not proceed until the County of Los Angeles issues an approval document, consistent with the county's normal building permit approval, and the CPM provides written concurrence. Not later than 60 days after completion of project construction, the project owner shall submit documentation of compliance with the diversion program requirements to the CPM and County of Los Angeles IWMA. The required documentation shall include a Recycling and Reuse Summary Report (as set forth by the county program), along with all necessary receipts and records of measurement from entities receiving project wastes.

WASTE-6 The project owner shall obtain a hazardous waste generator identification number from the United States Environmental Protection Agency prior to generating any hazardous waste during construction and operations.

Verification: The project owner shall keep a copy of the identification number on file at the project site and provide documentation of the hazardous waste generation and notification and receipt of the number to the CPM in the next scheduled Monthly Compliance Report after receipt of the number. Submittal of the notification and issued number documentation to the CPM is only needed once unless there is a change in ownership, operation, waste generation, or waste characteristics that requires a new notification to USEPA. Documentation of any new or revised hazardous waste generation notifications or changes in identification number shall be provided to the CPM in the next scheduled compliance report.

WASTE-7 Upon becoming aware of any impending waste management-related enforcement action by any local, state, or federal authority, the project owner shall notify the CPM of any such action taken or proposed to be taken against the project itself, or against any waste hauler or disposal facility or treatment operator with which the owner contracts.

Verification: The project owner shall notify the CPM in writing within 10 days of becoming aware of an impending enforcement action. The CPM shall notify the project owner of any changes that will be required in the way project-related wastes are managed.

WASTE-8 The project owner shall prepare an Operation Waste Management Plan for all wastes generated during operation of the facility and shall submit the plan to the CPM for review and approval. The plan shall contain, at a minimum, the following:

- a detailed description of all operation and maintenance waste streams, including projections of amounts to be generated, frequency of generation, and waste hazard classifications;
- management methods to be used for each waste stream, including temporary on-site storage, housekeeping and best management practices to be employed, treatment methods and companies providing treatment services, waste testing methods to assure correct classification, methods of transportation, disposal requirements and sites, and recycling and waste minimization/source reduction plans;
- Information and summary records of conversations with the local Certified Unified Program Agency and the Department of Toxic Substances Control

regarding any waste management requirements necessary for project activities. Copies of all required waste management permits, notices, and/or authorizations shall be included in the plan and updated as necessary;

- a detailed description of how facility wastes will be managed and any contingency plans to be employed in the event of an unplanned closure or planned temporary facility closure; and
- A detailed description of how facility wastes will be managed and disposed of upon closure of the facility.

Verification: The project owner shall submit the Operation Waste Management Plan to the CPM for approval no less than 30 days prior to the start of project operation. The project owner shall submit any required revisions to the CPM within 20 days of notification from the CPM that revisions are necessary.

The project owner shall also document in each Annual Compliance Report the actual volume of wastes generated and the waste management methods used during the year; provide a comparison of the actual waste generation and management methods used to those proposed in the original Operation Waste Management Plan; and update the Operation Waste Management Plan, as necessary, to address current waste generation and management practices.

WASTE-9 The project owner shall ensure that all spills or releases of hazardous substances, hazardous materials, or hazardous waste are documented and cleaned up and that wastes generated from the release/spill are properly managed and disposed of, in accordance with all applicable federal, state, and local requirements.

Verification: The project owner shall document management of all unauthorized releases and spills of hazardous substances, hazardous materials, or hazardous wastes that are in excess of EPA's reportable quantities (RQ), that occur on the project property or related linear facilities during construction and on the property during operation. The documentation shall include, at a minimum, the following information: location of release; date and time of release; reason for release; volume released; how release was managed and material cleaned up; amount of contaminated soil and/or cleanup wastes generated; if the release was reported; to whom the release was reported; release corrective action and cleanup requirements placed by regulating agencies; level of cleanup achieved and actions taken to prevent a similar release or spill; and disposition of any hazardous wastes and/or contaminated soils and materials that may have been generated by the release. A copy of the unauthorized release/spill documentation shall be provided to the CPM within 30 days of the date the release was discovered.

REFERENCES

CEC 2011c– California Energy Commission/M. Layton (tn 61182). Request for LARWQCB
Participation dated 5/31/11. Submitted to CEC/Docket Unit on 6/20/11.

CEC 2009h – California Energy Commission/Melissa Jones (TN: 51147). Data Adequacy Recommendation, dated 4/17/09. Submitted to CEC/Dockets Unit on 4/17/09.

CEC 2009q – California Energy Commission/Alan Solomon (TN: 53086). Data Request set 1 (1-39), dated 8/28/09. Submitted CEC/Docket Unit on 9/1/09.

CEC 2008ac – California Energy Commission/Alan Solomon (TN: 54390). CEC Data Request Set 2, dated 12/10/09. Submitted to CEC/Docket Unit on 12/10/09.

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WORKER SAFETY AND FIRE PROTECTION

Testimony of Geoff Lesh, P.E. and Rick Tyler

SUMMARY OF CONCLUSIONS

Staff concludes that if the applicant for the proposed Watson Cogeneration Steam and Electric Reliability (BP Watson) project provides a Project Construction Safety and Health Program and a Project Operations and Maintenance Safety and Health Program, as required by Conditions of Certification **WORKER SAFETY-1** and **-2** and fulfils the requirements of **WORKER SAFETY-3** through**-5**, the project would incorporate sufficient measures to ensure adequate levels of industrial safety and comply with applicable laws, ordinances, regulations, and standards. The proposed conditions of certification provide assurance that the Construction Safety and Health Program and the Operations and Maintenance Safety and Health Program proposed by the applicant will be reviewed by the appropriate agencies before implementation. The conditions also require verification that the proposed plans adequately assure worker safety and fire protection and comply with applicable laws, ordinances, regulations, and standards.

The proposed BP Watson project is the fifth “power train” of five that were originally planned to be installed at the existing BP Watson cogeneration facility. The existing BP Watson facility is adjacent to a major refinery within a heavy industrial district. The existing four operating power trains have been in continuous operation for more than twenty years (Watson 2009a, Section 1.1). The overall design, layout, and construction of this new unit will be essentially identical to the four already operating units. As such, there is considerable current on-site expertise to ensure that safe operational procedures will be followed and that effective fire and emergency medical services (EMS) response measures will remain in place. Staff concludes that the addition of this power train will not add significantly to the demands of local fire and EMS response services.

Staff also concludes that incidents at power plants that require fire or EMS response are infrequent and thus would not result in significant impacts on the local fire department. Given the lack of unique fire hazards associated with a modern gas-fired cogen power plant, and that incidents at power plants that require fire or EMS response are infrequent, staff finds that this project will not have a significant adverse cumulative impact on the LACOFD’s ability to respond to a fire or medical emergency.

INTRODUCTION

Worker safety and fire protection is regulated through laws, ordinances, regulations, and standards (LORS), at the federal, state, and local levels. Industrial workers at the facility operate equipment and handle hazardous materials daily and may face hazards that can result in accidents and serious injury. Protection measures are employed to eliminate or reduce these hazards or to minimize the risk through special training, protective equipment, and procedural controls.

The purpose of this Staff Assessment is to assess the worker safety and fire protection

measures proposed by the BP Watson project and to determine whether the applicant has proposed adequate measures to:

- comply with applicable safety LORS;
- protect the workers during construction and operation of the facility;
- protect against fire; and
- provide adequate emergency response procedures.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Worker Safety and Fire Protection Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	
29 U.S. Code § 651 et seq (Occupational Safety and Health Act of 1970)	This act mandates safety requirements in the workplace with the purpose of "[assuring] so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources" (29 USC § 651).
29 CFR sections 1910.1 to 1910.1500 (Occupational Safety and Health Administration Safety and Health Regulations)	These sections define the procedures for promulgating regulations and conducting inspections to implement and enforce safety and health procedures to protect workers, particularly in the industrial sector.
29 CFR sections 1952.170 to 1952.175	These sections provide federal approval of California's plan for enforcement of its own safety and health requirements, in lieu of most of the federal requirements found in 29 CFR §§1910.1 to 1910.1500.
State	
8 CCR all applicable sections (Cal/OSHA regulations)	Requires that all employers follow these regulations as they pertain to the work involved. This includes regulations pertaining to safety matters during construction, commissioning, and operations of power plants, as well as safety around electrical components; fire safety; and hazardous materials use, storage, and handling.
24 CCR section 3, et seq.	Incorporates the current addition of the California Building Code. Enforced by the Los Angeles County Fire Department.
Health and Safety Code section 25500, et seq.	Risk Management Plan requirements for threshold quantity of listed acutely hazardous materials at a facility.
Health and Safety Code sections 25500 to 25541	Requires a Hazardous Material Business Plan detailing emergency response plans for hazardous materials emergency at a facility.
Local (or locally enforced)	

2007 Edition of California Fire Code and all applicable NFPA standards (24 CCR Part 9)	National Fire Protection Association (NFPA) standards are incorporated into the California Fire Code. The fire code contains general provisions for fire safety, including road and building access, water supplies, fire protection and life safety systems, fire-resistive construction, storage of combustible materials, exits and emergency escapes, and fire alarm systems. Enforced by the Los Angeles County Fire Department.
Los Angeles County Fire Department, Health and Hazardous Materials Division	Requires new/modified businesses to complete a Hazardous Materials Business Plan and Chemical Inventory Forms when handling hazardous materials in excess of threshold quantities.

SETTING

The proposed project would be located in the City of Carson within an industrial area that is currently served by the local fire department. Fire support services to the site will be under the jurisdiction of the Los Angeles County Fire Department (LACOFD). The LACOFD would be the first responder for hazardous materials incidents. The LACOFD Hazardous Materials Response Team would respond from LACOFD Station # 105 located at 18915 S. Santa Fe, Compton, California, approximately 5.3 miles from the project site (LACOFD 2010). Staff concludes that the available local hazmat team is capable of responding to a hazardous materials emergency call from the BP Watson project site with an adequate response time.

For fire and emergency medical services, the closest station to the BP Watson project site would be Station #127, located at 2049 E. 223rd Street (approximately 2.3 miles away) with a response time of three minutes. The next nearest stations would be Station #10 located at 1860 East Del Amo Blvd, Carson, (approximately 3.4 miles away) and Station #36, at 17 West 223rd Street, (approximately 3.1 miles away), respectively. Response times from these stations are estimated at less than seven minutes (Watson 2009a, Table 5.10-10).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

Two issues are assessed in Worker Safety-Fire Protection:

A. The potential for impacts on the safety of workers during demolition, construction, and operations activities and

B. Fire prevention/protection, emergency medical response, and hazardous materials spill response during demolition, construction, and operations.

Worker safety issues are thoroughly addressed by California Division of Occupational Safety and Health (Cal-OSHA) regulations. If all LORS are followed, workers will be adequately protected. Thus, the standard for staff's review and determination of significant impacts on workers is whether or not the applicant has demonstrated adequate knowledge about and dedication to implementing all pertinent and relevant Cal-OSHA standards.

Regarding fire prevention matters, staff reviews and evaluates the on-site fire-fighting systems proposed by the applicant and the time needed for off-site local fire departments to respond to a fire, medical, or hazardous material emergency at the proposed power plant site. If on-site systems do not follow established codes and industry standards, staff recommends additional measures. Staff confers with the local fire officials to determine if they feel adequately trained, manned, and equipped to respond to the needs of a power plant, to determine if the presence of the power plant would cause a significant impact on a local fire department. If it would, staff will recommend that the applicant mitigate this impact by providing increased resources to the fire department.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Worker Safety

Industrial environments are potentially dangerous during construction and operation of facilities. Workers at the proposed BP Watson project would be exposed to loud noises, moving equipment, trenches, and confined space entry and egress problems. The workers may experience falls, trips, burns, lacerations, and numerous other injuries. They have the potential to be exposed to falling equipment or structures, chemical spills, hazardous waste, fires, explosions, and electrical sparks and electrocution. It is important for the BP Watson project to have well-defined policies and procedures, training, and hazard recognition and control at its facility to minimize such hazards and protect workers. If the facility complies with all LORS, workers will be adequately protected from health and safety hazards.

A Safety and Health Program will be prepared by the applicant to minimize worker hazards during construction and operation. Staff uses the phrase "Safety and Health Program" to refer to the measures that will be taken to ensure compliance with the applicable LORS during the construction and operational phases of the project.

Construction Safety and Health Program

The BP Watson project encompasses construction and operation of a natural gas-fired cogeneration facility. Workers will be exposed to hazards typical of construction and operation of a gas-fired cogeneration facility.

Construction Safety Orders are published in 8 CCR sections 1502, et seq. These requirements are promulgated by Cal/OSHA and are applicable to the construction phase of the project. The Construction Safety and Health Program will include the following:

- Construction Injury and Illness Prevention Program (8 CCR § 1509);

- Construction Fire Prevention Plan (8 CCR § 1920);
- Personal Protective Equipment Program (8 CCR §§ 1514 to 1522); and
- Emergency Action Program and Plan.

Additional programs under General Industry Safety Orders (8 CCR §§ 3200 to 6184), Electrical Safety Orders (8 CCR §§2299 to 2974) and Unfired Pressure Vessel Safety Orders (8 CCR §§ 450 to 544) will include:

- Electrical Safety Program;
- Motor Vehicle and Heavy Equipment Safety Program;
- Forklift Operation Program;
- Excavation/Trenching Program;
- Fall Protection Program;
- Scaffolding/Ladder Safety Program;
- Articulating Boom Platforms Program;
- Crane and Material Handling Program;
- Housekeeping and Material Handling and Storage Program;
- Respiratory Protection Program;
- Employee Exposure Monitoring Program;
- Hand and Portable Power Tool Safety Program;
- Hearing Conservation Program;
- Back Injury Prevention Program;
- Hazard Communication Program;
- Heat and Cold Stress Monitoring and Control Program;
- Pressure Vessel and Pipeline Safety Program;
- Hazardous Waste Program;
- Hot Work Safety Program; and
- Permit-Required Confined Space Entry Program.

The Application for Certification (AFC) includes an adequate outline of the Construction Health & Safety Program (Watson 2009a, Section 5.17.2.1). Staff proposes that prior to the start of construction of the BP Watson project, detailed programs and plans be provided to the California Energy Commission Compliance Project Manager (CPM) pursuant to the Condition of Certification **WORKER SAFETY-1**.

Operations and Maintenance Safety and Health Program

Prior to the start of operations of the BP Watson project, the Operations and

Maintenance Safety and Health Program will be prepared. This operational safety program will include the following programs and plans:

- Injury and Illness Prevention Program (8 CCR § 3203);
- Fire Protection and Prevention Program (8 CCR § 3221);
- Personal Protective Equipment Program (8 CCR §§ 3401 to 3411); and
- Emergency Action Plan (8 CCR § 3220).

In addition, the requirements under General Industry Safety Orders (8 CCR §§ 3200 to 6184), Electrical Safety Orders (8 CCR §§ 2299 to 2974), and Unfired Pressure Vessel Safety Orders (8 CCR §§ 450 to 544) will be applicable to the project. Written safety programs for the BP Watson project, which the applicant will develop, will ensure compliance with the above-mentioned requirements.

The AFC includes adequate outlines of the Injury and Illness Prevention Program, Personal Protective Equipment Program, Emergency Action Plan, and Fire Protection and Prevention Program (Watson 2009a, Section 5.17.2.2). Staff proposes that prior to operation of the BP Watson project, all detailed programs and plans be provided to and approved by the CPM pursuant to Condition of Certification **WORKER SAFETY-2**.

Safety and Health Program Elements

As mentioned above, the applicant provided the proposed outlines for both a Construction Safety and Health Program and an Operations Safety and Health Program. The measures in these plans are derived from applicable sections of state and federal law. The major items required in both safety and health programs are as follows:

Injury and Illness Prevention Program

The Injury and Illness Prevention Program (IIPP) will include the following components as presented in the AFC (Watson 2009a, Section 5.17.2.2):

- identity of person(s) with authority and responsibility for implementing the program;
- a system for ensuring that employees comply with safe and healthy work practices;
- system for ensuring that employees comply with safe and healthy work practices;
- system for facilitating employer-employee communications;
- procedures for identifying and evaluating workplace hazards and developing necessary program(s);
- methods for correcting unhealthy/unsafe conditions in a timely manner;
- training and instruction; and
- methods of documenting inspections and training and maintaining records for 3 years.

Fire Prevention Plan

California Code of Regulations requires an Operations Fire Prevention Plan (8 CCR §

3221). The AFC outlines a proposed Fire Prevention Plan which is acceptable to staff (Watson 2009a, Section 5.17.2.2). The plan will accomplish the following actions:

- identity of persons responsible for maintaining equipment and accumulation of flammable or combustible material control;
- procedures in the event of a fire;
- fire alarm and protection equipment;
- system and equipment maintenance;
- monthly inspections;
- annual inspections;
- firefighting demonstrations;
- housekeeping practices; and
- training.

Staff proposes that the applicant submit a final Fire Prevention Plan to the CPM for review and approval to satisfy proposed Conditions of Certification **WORKER SAFETY-1** and **WORKER SAFETY-2**.

Personal Protective Equipment Program

California regulations require personal protective equipment and first aid supplies whenever hazards are present that due to process, environment, chemicals, or mechanical irritants, can cause injury or impair bodily function as a result of absorption, inhalation, or physical contact (8 CCR §§ 3380 to 3400). The BP Watson project operational environment will require personal protective equipment.

All safety equipment must meet National Institute of Safety and Health (NIOSH) or American National Standards Institute (ANSI) standards and will carry markings, numbers, or certificates of approval. Respirators must meet NIOSH and Cal/OSHA standards. Each employee will be provided with the following information pertaining to the protective clothing and equipment (Watson 2009a, Section 5.17.2.2 and Table 5.17-2):

- proper use, maintenance, and storage;
- when to use the protective clothing and equipment;
- benefits and limitations;
- when and how to replace the protective clothing and equipment; and
- each employee is checked for proper fit and to see if they are medically capable of wearing the equipment.

The Personal Protective Equipment Program ensures that employers comply with the applicable requirements for the program and provides employees with the information and training necessary to protect them from potential workplace hazards.

Emergency Action Plan

California regulations require an Emergency Action Plan (8 CCR § 3220). The AFC contains a satisfactory outline for an emergency action plan (Watson 2009a, Section 5.17.2.2).

The Emergency Action Plan will address the following:

- emergency escape procedures and emergency escape route for the facility;
- handling accidents involving serious injury or death;
- handling fires;
- hazardous waste or chemical spills;
- earthquakes;
- bomb threat;
- emergency shutdown;
- site security;
- emergency medical treatment and first aid
- decontamination;
- documentation and recordkeeping;
- news media;
- emergency notification list; and
- emergency telephone numbers.

Written Safety Program

In addition to the specific plans listed above, additional LORS called “safe work practices” apply to the project. Both the Construction and the Operations Safety Programs will address safe work practices under a variety of programs. The components of these programs include, but are not limited to, the programs found under the heading Construction Safety and Health Program earlier in this staff assessment.

Safety Training Programs

Employees will be trained in the safe work practices described in the above-referenced safety programs.

Additional Mitigation Measures

Protecting construction workers from injury and disease is among the greatest challenges in occupational safety and health. The following facts are reported by the NIOSH:

- More than seven million persons work in the construction industry, representing 6% of the labor force. Approximately 1.5 million of these workers are self employed.
- Of approximately 600,000 construction companies, 90% employ fewer than 20

- From 1980 to 1993, an average of 1,079 construction workers were killed on the job each year, totaling more fatal injuries than in any other industry.
- Falls caused 3,859 construction worker fatalities (25.6%) between 1980 and 1993.
- Construction injuries account for 15% of workers' compensation costs.
- Assuring safety and health in construction is complex, involving short-term work sites, changing hazards, and multiple operations and crews working in close proximity.
- In 1990, Congress directed NIOSH to undertake research and training to reduce diseases and injuries among construction workers in the United States. Under this mandate, NIOSH funds both intramural and extramural research projects.

The hazards associated with the construction industry are thus well documented. These hazards increase in complexity in the multi-employer work sites typical of large complex industrial-type projects such as the construction of gas-fired cogeneration power plants. In order to reduce and/or eliminate these hazards, it has become standard industry practice to hire a Construction Safety Supervisor to ensure a safe and healthful environment for all personnel. This has been evident in the audits of power plants under construction recently conducted by the staff. The federal Occupational Safety and Health Administration (OSHA) has also entered into strategic alliances with several professional and trade organizations to promote and recognize safety professionals trained as Construction Safety Supervisors, Construction Health and Safety Officers, and other professional designations. The goal of these partnerships is to encourage construction subcontractors to improve their safety and health performance; to assist them in striving for the elimination of the four hazards (falls, electrical, caught in/between and struck-by hazards), which account for the majority of fatalities and injuries in this industry and have been the focus of targeted OSHA inspections; to prevent serious accidents in the construction industry through implementation of enhanced safety and health programs and increased employee training; and to recognize those subcontractors with exemplary safety and health programs.

To date, there are no OSHA or Cal/OSHA requirements that an employer hire or provide for a Construction Safety Officer. OSHA and Cal/OSHA regulations do, however, require that safety be provided by an employer and the term “Competent Person” is used in many OSHA and Ca/-OSHA standards, documents, and directives. A “Competent Person” is usually defined by OSHA as an individual who, by way of training and/or experience, is knowledgeable of standards, is capable of identifying workplace hazards relating to the specific operations, is designated by the employer, and has authority to take appropriate action. Therefore, in order to meet the intent of the OSHA standard to provide for a safe workplace during power plant construction, staff proposes Condition of Certification **WORKER SAFETY-3,** which would require the applicant/project owner to designate and provide for a power plant site Construction Safety Supervisor.

As discussed above, the hazards associated with the construction industry are well documented. These hazards increase in complexity in the multi-employer work sites

typical of large complex industrial-type projects such as the construction of gas-fired power plants.

Accidents, fires, and a worker death have occurred at Energy Commission-certified power plants in the recent past due to the failure to recognize and control safety hazards and the inability to adequately supervise compliance with occupational safety and health regulations. Safety problems have been documented by Energy Commission staff in safety audits conducted in 2005 at several power plants under construction. The findings of the audit staff include, but are not limited to, such safety oversights as:

- lack of posted confined space warning placards/signs;
- confusing and/or inadequate electrical and machinery lockout/tagout permitting and procedures;
- confusing and/or inappropriate procedures for handing over lockout/tagout and confined space permits from the construction team to commissioning team and then to operations;
- dangerous placement of hydraulic elevated platforms under each other;
- inappropriate placement of fire extinguishers near hotwork;
- dangerous placement of numerous power cords in standing water on the site, thus increasing the risk of electrocution;
- construction of an unsafe aqueous ammonia unloading pad;
- inappropriate and unsecure placement of above-ground natural gas pipelines inside the facility but too close to the perimeter fence; and
- lack of adequate employee or contractor written training programs addressing proper procedures to follow in the event of finding suspicious packages or objects either on or off site.

In order to reduce and/or eliminate these hazards, it is necessary for the Energy Commission to have a professional Safety Monitor on site to track compliance with Cal/OSHA regulations and periodically audit safety compliance during construction, commissioning, and the hand over to operational status. These requirements are outlined in proposed Condition of Certification **WORKER SAFETY-4**. A Safety Monitor, hired by the project owner yet reporting to the Chief Building Official and CPM, would serve as an extra set of eyes to ensure that safety procedures and practices are fully implemented at all power plants certified by the Energy Commission. During the audits conducted by staff, most site safety professionals welcomed the audit team and actively engaged the team in questions about its findings and recommendations. These safety professionals recognized that safety requires continuous vigilance and that the presence of an independent audit team provided a fresh perspective of the site.

Fire Hazards

During construction and operation of the proposed BP Watson project, there is the potential for both small fires and major structural fires. Electrical sparks, combustion of fuel oil, natural gas, hydraulic fluid, mineral oil, or insulating fluid at the power plant switchyard; or flammable liquids, explosions, and over-heated equipment may cause

small fires. Major structural fires in areas without automatic fire detection and suppression systems are unlikely to develop at power plants. Fires and explosions of natural gas or other flammable gasses or liquids are rare. Compliance with all LORS will be adequate to assure protection from all fire hazards.

Staff reviewed the information provided in the AFC and corresponded with representatives of the Los Angeles County Fire Department to determine if available fire protection services and equipment would adequately protect workers and to determine the project's impact on fire protection services in the area (LACOFD 2010a, LACOFD 2010b, LACOFD 2010c). The project will rely on both on-site fire protection systems and local fire protection services. The on-site fire protection system provides the first line of defense for small fires. In the event of a major fire, fire support services, including trained firefighters and equipment for a sustained response, would be provided by the LACOFD (Watson 2009a Section 5.17.2, LACOFD 2010a, LACOFD 2010b).

Construction

During construction, portable fire extinguishers, small hose lines, and fixed fire suppression equipment would be placed throughout the site at appropriate intervals and periodically maintained. An on-site water supply sufficient to operate the fire suppression equipment would be provided, and safety procedures and training would be implemented in accordance with CalOSHA regulations, National Fire protection Association (NFPA) standards, and the guidelines of the Construction Fire Protection and Prevention Program (Watson 2009a, Section 5.17.2.1).

Operation

The information in the AFC indicates that the project intends to meet the fire protection and suppression requirements of the California Fire Code, all applicable recommended NFPA standards (including Standard 850 addressing fire protection at electric generating plants), and all Cal/OSHA requirements. Fire suppression elements in the proposed plant will include both fixed and portable fire extinguishing systems. The fire water will be supplied by the tying into the existing fire water supply system through two points that connect into the fire new fire loop. The fire loop would supply the sprinkler system, water deluge system, and the fire hydrants. The fire water system would be designed in accordance with NFPA 850 and would provide sufficient flow to meet NFPA codes for firewater demands. No new firewater pumps will be required (Watson 2009a, Section 5.17.2.2).

A fixed water sprinkler system would be installed in areas of risk and in administrative buildings in accordance with NFPA requirements. A carbon dioxide fire protection system would be provided for each of the combustion turbine generators. The CTG auxiliary equipment and transformers would be contained each in a separate concrete berm and protected with a water deluge system. Chemical and gas extinguishers would be installed in areas of risk where water would be ineffective as a fire suppressant. Other plant equipment such as electrical enclosures and the switchyard would be protected with a dry-type fire suppression system (Watson 2009a, Sections 5.17.2.2, and 3.5.5).

The fire protection system would have fire detection sensors that will trigger alarms and

alert the control room as well as the LACOFD. In addition to the fixed fire protection system, the appropriate class of service portable extinguishers and fire hydrants would be located throughout the facility at code-approved intervals (Watson 2009a, Sections 5.17.2.2). These systems are standard requirement by the NFPA and the California Fire Code, and staff has determined that they will ensure adequate fire protection.

The applicant would be required by proposed Conditions of Certification **WORKER SAFETY-1** and **-2** to provide the final Fire Protection and Prevention Program to staff prior to construction and operation of the project, to confirm the adequacy of the proposed fire protection measures.

Emergency Medical Services Response

Staff conducted a statewide survey to determine the frequency of EMS response and off-site fire-fighter response for natural gas-fired power plants in California. The purpose of the analysis was to determine what impact, if any, power plants may have on local emergency services. Staff has concluded that incidents at power plants that require fire or EMS response are infrequent and represent an insignificant impact on the local fire departments, except for rare instances where a rural fire department has mostly volunteer firefighting staff. However, staff has determined that the potential for both work-related and nonwork-related heart attacks exists at power plants. In fact, staff's research on the frequency of EMS response to gas-fired power plants similar to the BP Watson project shows that many of the responses for cardiac emergencies involved nonwork-related incidences, including those involving visitors. The need for prompt response within a few minutes is well documented in the medical literature. Staff believes that the quickest medical intervention can only be achieved with the use of an on-site automatic external defibrillator (AED); the response from an off-site provider would take longer regardless of the provider location. This fact is also well documented and serves as the basis for the maintenance of on-site cardiac defibrillation devices at many private and public locations (e.g., airports, factories, government buildings). Therefore, staff concludes that, with the advent of modern cost-effective cardiac defibrillation devices, it is proper in a power plant environment to maintain such a device on site to address cardiac arrythmias resulting from industrial accidents or other nonwork-related causes.

Therefore, staff proposes a Condition of Certification **WORKER SAFETY-5** which would require that this portable AED be located on site, that all power plant employees on site during operations be trained in its use, and that a representative number of workers on site during construction and commissioning also be trained in its use.

CUMULATIVE IMPACTS AND MITIGATION

Staff reviewed the potential for the construction and operation of the proposed BP Watson project, combined with existing heavy industrial and commercial facilities in the immediate vicinity, to result in impacts on the fire and emergency service capabilities of the LACOFD. The LACOFD was contacted and responded that they would be adequately staffed and equipped, and would be able to adequately respond to an incident at the proposed facility (LACOFD 2010b, LACOFD 2010c).

The proposed BP Watson project is the fifth "power train" of five that were originally

planned to be installed at the existing BP Watson facility. The existing BP Watson facility is adjacent to a major refinery within a heavy industrial district. The existing four operating power trains have been in continuous operation for more than twenty years (Watson 2009a, Section 1.1). The overall design, layout, and construction of this new unit will be essentially identical to the four already operating units. As such, there is considerable current on-site expertise to ensure that safe operational procedures will be followed and that effective fire and EMS response measures will remain in place. Staff concludes that the addition of this power train will not add significantly to the demands of local fire and EMS response services.

Given the lack of unique fire hazards associated with a modern gas-fired cogen power plant, and that incidents at power plants that require fire or EMS response are infrequent, staff finds that this project will not have a significant adverse cumulative impact on the LACOFD's ability to respond to a fire or medical emergency where its effects would be cumulatively considerable.

COMPLIANCE WITH LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

Staff concludes that with the adoption of the proposed Conditions of Certification **WORKER SAFETY-1** through**-5**, construction and operation of the BP Watson project would be in compliance with all applicable laws, ordinances, regulations, and standards (LORS) regarding long-term and short-term project impacts in the area of worker safety and fire protection.

CONCLUSIONS

Staff concludes that if the applicant for the proposed BP Watson project provides a Project Construction Safety and Health Program and a Project Operations and Maintenance Safety and Health Program as required by Conditions of Certification **WORKER SAFETY -1**, and **-2** and fulfils the requirements of Conditions of Certification **WORKER SAFETY-3** through **-5**, the project would incorporate sufficient measures to ensure adequate levels of industrial safety and comply with applicable LORS. Staff also concludes that incidents at power plants that require fire or EMS response are infrequent and thus will represent an insignificant impact on the local fire department.

PROPOSED CONDITIONS OF CERTIFICATION

WORKER SAFETY-1 The project owner shall submit to the Compliance Project Manager (CPM) a copy of the Project Construction Safety and Health Program containing the following:

1. a Construction Personal Protective Equipment Program;
2. a Construction Exposure Monitoring Program;
3. a Construction Injury and Illness Prevention Program;

4. a Construction Emergency Action Plan; and

5. a Construction Fire Prevention Plan.

The Personal Protective Equipment Program, the Exposure Monitoring Program, and the Injury and Illness Prevention Program shall be submitted to the CPM for review and approval concerning compliance of the programs with all applicable Safety Orders. The Construction Emergency Action Plan and the Fire Prevention Plan shall be submitted to the Los Angeles County Fire Department for review and comment prior to submittal to the CPM for approval.

Verification: At least 30 days prior to the start of construction, the project owner shall submit to the CPM for review and approval a copy of the Project Construction Safety and Health Program.

The project owner shall provide a copy of a letter to the CPM from the Los Angeles County Fire Department stating the Fire Department's comments on the Construction Fire Prevention Plan and Emergency Action Plan.

WORKER SAFETY-2 The project owner shall submit to the CPM a copy of the Project Operations and Maintenance Safety and Health Program containing the following:

1. an Operation Injury and Illness Prevention Plan;

2. an Emergency Action Plan;

3. a Hazardous Materials Management Program;

4. an Operation Fire Prevention Program (8 CCR § 3221); and

5. a Personal Protective Equipment Program (8 CCR §§ 3401-3411).

The Operation Injury and Illness Prevention Plan, Emergency Action Plan, and Personal Protective Equipment Program shall be submitted to the CPM for review and comment concerning compliance of the programs with all applicable Safety Orders. The Operation Fire Prevention Plan, the Hazardous Materials Management Program, and the Emergency Action Plan shall also be submitted to the Los Angeles County Fire Department for review and comment.

Verification: At least 30 days prior to the start of first-fire or commissioning, the project owner shall submit to the CPM for approval a copy of the Project Operations and Maintenance Safety and Health Program.

The project owner shall provide a copy of a letter to the CPM from the Los Angeles County Fire Department stating the Fire Department's comments on the Operations Fire Prevention Plan and Emergency Action Plan.

WORKER SAFETY-3 The project owner shall provide a site Construction Safety Supervisor (CSS) who, by way of training and/or experience, is

knowledgeable of power plant construction activities and relevant laws, ordinances, regulations, and standards; is capable of identifying workplace hazards relating to the construction activities; and has authority to take appropriate action to assure compliance and mitigate hazards. The CSS shall:

1. have overall authority for coordination and implementation of all occupational safety and health practices, policies, and programs;

2. assure that the safety program for the project complies with Cal/OSHA and federal regulations related to power plant projects;

3. assure that all construction and commissioning workers and supervisors receive adequate safety training;

4. complete accident and safety-related incident investigations and emergency response reports for injuries and inform the CPM of safety-related incidents; and

5. assure that all the plans identified in Conditions of Certification **WORKER SAFETY-1** and **-2** are implemented.

6. submit in the Monthly Compliance Report a monthly safety inspection report to include:

   - record of all employees trained for that month (all records shall be kept on site for the duration of the project);
   - summary report of safety management actions and safety-related incidents that occurred during the month;
   - report of any continuing or unresolved situations and incidents that may pose danger to life or health; and
   - report of accidents and injuries that occurred during the month.

Verification: At least 30 days prior to the start of site mobilization, the project owner shall submit to the CPM the name and contact information for the Construction Safety Supervisor (CSS).

The contact information of any replacement (CSS) shall be submitted to the CPM within one business day.

WORKER SAFETY-4 The project owner shall make payments to the Chief Building Official (CBO) for the services of a Safety Monitor based upon a reasonable fee schedule to be negotiated between the project owner and the CBO. Those services shall be in addition to other work performed by the CBO. The Safety Monitor shall be selected by and report directly to the CBO and will be responsible for verifying that the Construction Safety Supervisor, as required in Condition of Certification **WORKER SAFETY-3**, implements all appropriate Cal/OSHA and Energy Commission safety requirements. The Safety Monitor shall conduct on-site (including linear facilities) safety inspections at intervals necessary to fulfill those responsibilities.

Verification: At least 30 days prior to the start of construction, the project owner shall provide proof of its agreement to fund the Safety Monitor services to the CPM for review and approval.

WORKER SAFETY-5 The project owner shall ensure that a portable automatic external defibrillator (AED) is located on site during construction and operations and shall implement a program to ensure that workers are properly trained in its use and that the equipment is properly maintained and functioning at all times. During construction and commissioning, the following persons shall be trained in use of the AED and shall be on site whenever the workers that they supervise are on site: the Construction Project Manager or delegate, the Construction Safety Supervisor or delegate, and all shift foremen. During operations, all power plant employees shall be trained in use of the AED. The training program shall be submitted to the CPM for review and approval.

Verification: At least 30 days prior to the start of site mobilization, the project owner shall submit to the CPM proof that a portable automatic external defibrillator (AED) exists on site and a copy of the training and maintenance program for review and approval.

REFERENCES

LACOFD 2010a (Los Angeles County Fire Department) 2010 – Phone communication with Tony Payne, CUPA Health Hazardous Materials Division, April 6, 2010

LACOFD 2010b (Los Angeles County Fire Department) 2010 – Phone communication with Mike Leckliter, Chief, Battalion Number 7, May 3, 2010

LACOFD 2010c (Los Angeles County Fire Department) 2010 – Phone communication with Troy Flath, Acting Fire Marshall, May 4, 2010

U.S. OSHA (United States Occupational Safety and Health Administration). 1993 – Process Safety Management / Process Safety Management Guidelines for Compliance. U.S. Department of Labor, Washington, D.C.

Watson 2009a – Watson Cogeneration Company/Thomas A. Lu (tn 50584). Application for Certification, Volume I&II, dated 3/19/09, Submitted to CEC/Docket Unit on 3/19/09.

ENGINEERING ASSESSMENT

FACILITY DESIGN

Testimony of Shahab Khoshmashrab

SUMMARY OF CONCLUSIONS

The California Energy Commission staff (staff) concludes that the design, construction, and eventual closure of the project and its linear facilities would likely comply with applicable engineering laws, ordinances, regulations and standards. The proposed conditions of certification, below, would ensure compliance with these laws, ordinances, regulations and standards.

INTRODUCTION

Facility design encompasses the civil, structural, mechanical, and electrical engineering design of the Watson Cogeneration Steam and Electric Reliability project. The purpose of this analysis is to:

- Verify that the laws, ordinances, regulations and standards (LORS) that apply to the engineering design and construction of the project have been identified;
- Verify that both the project and its ancillary facilities are sufficiently described, including proposed design criteria and analysis methods, in order to provide reasonable assurance that the project will be designed and constructed in accordance with all applicable engineering LORS, in a manner that also ensures the public health and safety;
- Determine whether special design features should be considered during final design to address conditions unique to the site which could influence public health and safety; and
- Describe the design review and construction inspection process and establish the conditions of certification used to monitor and ensure compliance with the engineering LORS, in addition to any special design requirements.

Subjects discussed in this analysis include:

- Identification of the engineering LORS that apply to facility design;
- Evaluation of the applicant's proposed design criteria, including identification of criteria essential to public health and safety;
- Proposed modifications and additions to the application for certification (AFC) necessary for compliance with applicable engineering LORS; and
- Conditions of certification proposed by staff to ensure that the project will be designed and constructed to ensure public health and safety and comply with all applicable engineering LORS.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Lists of LORS applicable to each engineering discipline (civil, structural, mechanical,

and electrical) are described in the AFC (Watson 2009a, Appendices C through G). Key LORS are listed in **Facility Design Table 1,** below:

Facility Design Table 1
Key Engineering Laws, Ordinances, Regulations and Standards (LORS)

Applicable LORS	Description
Federal	Title 29 Code of Federal Regulations (CFR), Part 1910, Occupational Safety and Health standards
State	2007 (or the latest edition in effect) California Building Standards Code (CBSC) (also known as Title 24, California Code of Regulations)
Local	City of Carson regulations and ordinances
General	American National Standards Institute (ANSI) American Society of Mechanical Engineers (ASME) American Welding Society (AWS) American Society for Testing and Materials (ASTM)

SETTING

Watson Cogeneration Steam and Electric Reliability project (BP Watson) would be built on a site that is located in the City of Carson, California, and lies in a seismically active region. For more information about the site's seismic setting, please see the **Geology and Paleontology** section of this document. Also, for more information on the site and its related project description, please see the **Project Description** section of this document. Additional engineering design details are contained in the AFC, Appendices C through G (Watson 2009a).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The purpose of this analysis is to ensure that the project would be built to applicable engineering codes and ensure public health and life safety. This analysis further verifies that applicable engineering LORS have been identified and that the project and its ancillary facilities have been described in adequate detail. It also evaluates the applicant's proposed design criteria, describes the design review and construction inspection process, and establishes conditions of certification that would monitor and ensure compliance with engineering LORS and any other special design requirements. These conditions allow both the California Energy Commission (Energy Commission) compliance project manager (CPM) and the applicant to adopt a compliance monitoring scheme that will verify compliance with these LORS.

SITE PREPARATION AND DEVELOPMENT

Staff has evaluated the proposed design criteria for grading, flood protection, erosion control, site drainage, and site access, in addition to the criteria for designing and constructing linear support facilities such as natural gas and electric transmission interconnections. The applicant proposes the use of accepted industry standards (see

Watson 2009a, Appendices C through G, for a representative list of applicable industry standards), design practices, and construction methods in preparing and developing the site. Staff concludes that this project, including its linear facilities, would most likely comply with all applicable site preparation LORS, and proposes conditions of certification (see below and the **Geology and Paleontology** section of this document) to ensure that compliance.

MAJOR STRUCTURES, SYSTEMS, AND EQUIPMENT

Major structures, systems, and equipment are structures and their associated components or equipment that are necessary for power production, costly or time consuming to repair or replace, are used for the storage, containment, or handling of hazardous or toxic materials, or could become potential health and safety hazards if not constructed according to applicable engineering LORS. See Condition of Certification **GEN-2**, below.

The BP Watson project shall be designed and constructed to the 2007 California Building Standards Code (CBSC), also known as Title 24, California Code of Regulations, which encompasses the California Building Code (CBC), California Building Standards Administrative Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Fire Code, California Code for Building Conservation, California Reference Standards Code, and other applicable codes and standards in effect when the design and construction of the project actually begin. If the initial designs are submitted to the chief building official (CBO) for review and approval after the update to the 2007 CBSC takes effect, the 2007 CBSC provisions shall be replaced with the updated provisions.

In order to ensure that structures are analyzed according to their appropriate lateral force procedure, staff has included Condition of Certification **STRUC-1**, below, which, in part, requires the project CBO's review and approval of the owner's proposed lateral force procedures before construction begins.

Major structures as defined above, also include enclosures, tanks, pipes, gas lines, waterlines, septic systems, grading, and are required to comply with the engineering codes adopted by the State of California. Exempt work is listed under Section 105.2 in Appendix Chapter 1 of the CBC.

PROJECT QUALITY PROCEDURES

The project's AFC (Watson 2009a, Appendices C through G) describes a quality program intended to inspire confidence that its systems and components will be designed, fabricated, stored, transported, installed, and tested in accordance with all appropriate power plant technical codes and standards. Compliance with design requirements will be verified through specific inspections and audits. Implementation of this quality assurance/quality control (QA/QC) program will ensure that the BP Watson project is actually designed, procured, fabricated, and installed as described in this analysis.

COMPLIANCE MONITORING

Under Section 104.2 of the CBC, the CBO is authorized and directed to enforce all

provisions of the CBC. The Energy Commission itself serves as the building official, and has the responsibility to enforce the code, for all of the energy facilities it certifies. In addition, the Energy Commission has the power to interpret the CBC and adopt and enforce both rules and supplemental regulations that clarify application of the CBC's provisions.

The Energy Commission's design review and construction inspection process conforms to CBC requirements and ensures that all facility design conditions of certification are met. As provided by Section 104.2.2 of the CBC, the Energy Commission appoints experts to perform design review and construction inspections and act as delegate CBOs on behalf of the Energy Commission. These delegates typically include the local building official and/or independent consultants hired to provide technical expertise that is not provided by the local official alone. The applicant, through permit fees provided by the CBC, pays the cost of these reviews and inspections. While building permits in addition to Energy Commission certification are not required for this project, the applicant pays in lieu of CBC permit fees to cover the costs of these reviews and inspections.

Engineering and compliance staff will invite the City of Carson or a third-party engineering consultant to act as CBO for this project. When an entity has been assigned CBO duties, Energy Commission staff will complete a memorandum of understanding (MOU) with that entity to outline both its roles and responsibilities and those of its subcontractors and delegates.

Staff has developed proposed conditions of certification to ensure public health and safety and compliance with engineering design LORS. Some of these conditions address the roles, responsibilities, and qualifications of the engineers who will design and build the proposed project (Conditions of Certification **GEN-1** through **GEN-8**). These engineers must be registered in California and sign and stamp every submittal of design plans, calculations, and specifications submitted to the CBO. These conditions require that every element of the project's construction (subject to CBO review and approval) be approved by the CBO before it is performed. Items exempt from this requirement are listed in Section 105.2 of Appendix Chapter 1 of the CBC. The conditions also require that qualified special inspectors perform or oversee special inspections required by all applicable LORS.

The Energy Commission and delegate CBO have the authority to allow some flexibility in scheduling construction activities on a case by case basis. The Energy Commission and the CBO also have the authority to interpret and accept alternate methods of construction and alternate materials.

FACILITY CLOSURE

The removal of a facility from service (decommissioning) when it reaches the end of its useful life ranges from "mothballing," to the removal of all equipment and appurtenant facilities and subsequent restoration of the site. Future conditions that could affect decommissioning are largely unknown at this time.

In order to ensure that decommissioning will be completed in a manner that is

environmentally sound, safe, and protects the public health and safety, the applicant shall submit a decommissioning plan to the Energy Commission for review and approval before the project's decommissioning begins. The plan shall include a discussion of:

- Proposed decommissioning activities for the project and all appurtenant facilities that were constructed as part of the project;
- All applicable LORS, local/regional plans, and proof of adherence to those applicable LORS and local/regional plans;
- The activities necessary to restore the site if the plan requires removal of all equipment and appurtenant facilities; and
- Decommissioning alternatives other than complete site restoration.

Satisfying the above requirements should serve as adequate protection, even in the unlikely event that the project is abandoned. Staff has proposed general conditions (see **General Conditions**) to ensure that these measures are included in the Facility Closure Plan.

CONCLUSIONS AND RECOMMENDATIONS

1. The laws, ordinances, regulations and standards (LORS) identified in the AFC and supporting documents directly apply to the project.

2. Staff has evaluated the proposed engineering LORS, design criteria, and design methods in the record, and concludes that the design, construction, and eventual closure of the project will likely comply with applicable engineering LORS.

3. The proposed conditions of certification will ensure that BP Watson is designed and constructed in accordance with applicable engineering LORS. This will be accomplished through design review, plan checking, and field inspections that will be performed by the CBO or other Energy Commission delegate. Staff will audit the CBO to ensure satisfactory performance.

4. Though future conditions that could affect decommissioning are largely unknown at this time, it can reasonably be concluded that if the project owner submits a decommissioning plan as required in the **General Conditions** portion of this document prior to decommissioning, decommissioning procedures will comply with all applicable engineering LORS.

Energy Commission staff recommends that:

1. The proposed conditions of certification be adopted to ensure that the project is designed and constructed in a manner that protects the public health and safety and complies with all applicable engineering LORS;

2. The project be designed and built to the 2007 CBSC (or successor standards, if in effect when initial project engineering designs are submitted for review) and other applicable codes adopted by the State of California; and

3. The CBO reviews the final designs, checks plans, and performs field inspections during construction. Energy Commission staff shall audit and monitor the CBO to ensure satisfactory performance.

CONDITIONS OF CERTIFICATION

GEN-1 The project owner shall design, construct, and inspect the project in accordance with the 2007 (or the latest edition in effect when initial project engineering designs are submitted for review) California Building Standards Code (CBSC), also known as Title 24, California Code of Regulations, which encompasses the California Building Code (CBC), California Building Standards Administrative Code, California Electrical Code, California Mechanical Code, California Plumbing Code, California Energy Code, California Fire Code, California Code for Building Conservation, California Reference Standards Code, and all other applicable engineering LORS in effect at the time initial design plans are submitted to the CBO for review and approval (the CBSC in effect is the edition that has been adopted by the California Building Standards Commission and published at least 180 days previously). The project owner shall ensure that all the provisions of the above applicable codes are enforced during the construction, addition, alteration, moving, demolition, repair, or maintenance of the completed facility. All transmission facilities (lines, switchyards, switching stations and substations) are covered in the conditions of certification in the **Transmission System Engineering** section of this document.

In the event that the initial engineering designs are submitted to the CBO when the successor to the 2007 CBSC is in effect, the 2007 CBSC provisions shall be replaced with the applicable successor provisions. Where, in any specific case, different sections of the code specify different materials, methods of construction or other requirements, the most restrictive shall govern. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall govern.

The project owner shall ensure that all contracts with contractors, subcontractors, and suppliers clearly specify that all work performed and materials supplied comply with the codes listed above.

The project owner shall submit plans, calculations and other related documents that have been specifically developed for the BP Watson project

Verification: Five (5) days prior to requesting the issuance of the certificate of occupancy, the project owner shall submit to the CPM and the CBO a statement of verification, signed by the responsible design engineer, attesting that all designs, construction, installation, and inspection requirements of the applicable LORS and the Energy Commission's decision have been met in the area of facility design. The project owner shall provide the CPM a copy of the certificate of occupancy within 30 days of receipt from the CBO.

Once the certificate of occupancy has been issued, the project owner shall inform the CPM at least 30 days prior to any construction, addition, alteration, moving, demolition, repair, or maintenance to be performed on any portion(s) of the completed facility that requires CBO approval for compliance with the above codes. The CPM will then determine if the CBO needs to approve the work.

GEN-2 Before submitting the initial engineering designs for CBO review, the project owner shall furnish the CPM and the CBO with a schedule of facility design submittals, and master drawings and master specifications list. The master drawings and master specifications list shall contain a list of proposed submittal packages of designs, calculations, and specifications for major structures, systems, and equipment. Major structures, systems, and equipment are structures and their associated components or equipment that are necessary for power production, costly or time consuming to repair or replace, are used for the storage, containment, or handling of hazardous or toxic materials, or could become potential health and safety hazards if not constructed according to applicable engineering LORS. The schedule shall contain the planned date of each submittal to the CBO. To facilitate audits by Energy Commission staff, the project owner shall provide specific packages to the CPM upon request. In addition to the design submittals referenced above, plans and calculations for all construction work shall be submitted to the CBO for approval.

Verification: At least 60 days (or a project owner- and CBO-approved alternative time frame) prior to the start of the demolition of the existing structures, the project owner shall submit to the CBO and to the CPM the schedule, and the master drawings and master specifications list of documents to be submitted to the CBO for review and approval. These documents shall be the pertinent design documents for the major structures, systems, and equipment defined above in Condition of Certification **GEN-2**. Major structures and equipment shall be added to or deleted from the list only with CPM approval. The project owner shall provide schedule updates in the monthly compliance report.

GEN-3 The project owner shall make payments to the CBO for design review, plan checks, and construction inspections, based upon a reasonable fee schedule to be negotiated between the project owner and the CBO. These fees may be based on hourly rates or the valuation of the facilities reviewed, or may be otherwise agreed upon by the project owner and the CBO. A copy of the

contract between the owner and the CBO shall be submitted to the CPM for review and approval by staff.

Verification: The project owner shall make the required payments to the CBO in accordance with the agreement between the project owner and the CBO. The project owner shall send a copy of the CBO's receipt of payment to the CPM in the next monthly compliance report indicating that applicable fees have been paid. The CBO shall inform the CPM if the project owner has not met its obligations as specified in the agreement between the project owner and the CBO for payments related to CBO services.

GEN-4 Prior to the start of demolition, the project owner shall assign a California-registered architect, or a structural or civil engineer, as the resident engineer (RE) in charge of the project. All transmission facilities (lines, switchyards, switching stations, and substations) are addressed in the conditions of certification in the **Transmission System Engineering** section of this document.

The RE shall be aware of construction activities at the project site at all times. However, he/she is not required to be physically present at the job site as long as the construction work is being performed as delegated below. The RE may delegate responsibility for portions of the project to other registered engineers. Registered mechanical and electrical engineers may be delegated responsibility for mechanical, plumbing, and electrical portions of the project, respectively. A registered civil engineer may be delegated responsibility for civil engineering aspects of the project such as grading, storm water pollution prevention practices (SWPPP), storm water management practices (SWMP), drainage, erosion, sedimentation control programs (DESCP) and similar aspects of civil engineering. A project may be divided into parts, provided that each part is clearly defined as a distinct unit. Separate assignments of general responsibility may be made for each designated part.

The RE or his/her delegate shall:

1. Monitor progress of construction work requiring CBO design review and inspection to ensure compliance with LORS;

2. Ensure that construction of all facilities subject to CBO design review and inspection conforms in every material respect to applicable LORS, these conditions of certification, approved plans, and specifications;

3. Prepare documents to initiate changes in approved drawings and specifications when either directed by the project owner or as required by the conditions of the project;

4. Be responsible for providing project inspectors and testing agencies with complete and up-to-date sets of stamped drawings, plans, specifications, and any other required documents;

5. Be responsible for the timely submittal of construction progress reports to the CBO from the project inspectors, the contractor, and other engineers

who have been delegated responsibility for portions of the project; and

6. Be responsible for notifying the CBO of corrective action or the disposition of items noted on laboratory reports or other tests when they do not conform to CBO-approved plans and specifications.

The resident engineer (or his delegate) must be located at the project site, or be available at the project site within a reasonable period of time, during any hours in which construction takes place.

The RE shall have the authority to halt construction and to require changes or remedial work if the work does not meet requirements.

If the RE or the delegated engineers are reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer.

Verification: At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of demolition, the project owner shall submit to the CBO for review and approval the resume and registration number of the RE and any other delegated engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the RE and other delegated engineer(s) within five days of the approval.

If the RE or the delegated engineer(s) is subsequently reassigned or replaced, the project owner has five days to submit the resume and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

GEN-5 Prior to the start of demolition, the project owner shall assign at least one of each of the following California registered engineers to the project: a civil engineer; a soils, geotechnical, or civil engineer experienced and knowledgeable in the practice of soils engineering; and an engineering geologist. Prior to the start of construction, the project owner shall assign at least one of each of the following California registered engineers to the project: a design engineer who is either a structural engineer or a civil engineer fully competent and proficient in the design of power plant structures and equipment supports; a mechanical engineer; and an electrical engineer. (California Business and Professions Code section 6704 et seq., and sections 6730, 6731 and 6736 require state registration to practice as a civil engineer or structural engineer in California). All transmission facilities (lines, switchyards, switching stations, and substations) are handled in the conditions of certification in the **Transmission System Engineering** section of this document.

The tasks performed by the civil, mechanical, electrical, or design engineers may be divided between two or more engineers, as long as each engineer is responsible for a particular segment of the project (for example, proposed earthwork, civil structures, power plant structures, equipment support). No

segment of the project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California registered electrical engineer.

The project owner shall submit, to the CBO for review and approval, the names, qualifications, and registration numbers of all responsible engineers assigned to the project.

If any one of the designated responsible engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned responsible engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer.

A. The civil engineer shall:

1. Review the foundation investigations, geotechnical, or soils reports prepared by the soils engineer, the geotechnical engineer, or by a civil engineer experienced and knowledgeable in the practice of soils engineering;

2. Design (or be responsible for the design of), stamp, and sign all plans, calculations, and specifications for proposed site work, civil works, and related facilities requiring design review and inspection by the CBO. At a minimum, these include: grading, site preparation, excavation, compaction, construction of secondary containment, foundations, erosion and sedimentation control structures, drainage facilities, underground utilities, culverts, site access roads and sanitary sewer systems; and

3. Provide consultation to the RE during the construction phase of the project and recommend changes in the design of the civil works facilities and changes to the construction procedures.

4. Review, implement and monitor storm water pollution prevention practices (SWPPP).

5. Review, implement and monitor storm water management practices (SWMP).

6. Review, implement and monitor drainage, erosion, sedimentation control programs (DESCP).

7. Review, implement and monitor all other civil engineering (earthwork) aspects of the project.

B. The soils engineer, geotechnical engineer, or civil engineer experienced and knowledgeable in the practice of soils engineering, shall:

1. Review all the engineering geology reports;

2. Prepare the foundation investigations, geotechnical, or soils reports containing field exploration reports, laboratory tests, and engineering analysis detailing the nature and extent of the soils that could be susceptible to liquefaction, rapid settlement or collapse when saturated under load;

3. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with requirements set forth in the CBC (depending on the site conditions, this may be the responsibility of either the soils engineer, the engineering geologist, or both); and

4. Recommend field changes to the civil engineer and RE.

This engineer shall be authorized to halt earthwork and to require changes if site conditions are unsafe or do not conform to the predicted conditions used as the basis for design of earthwork or foundations.

C. The engineering geologist shall:

1. Review all the engineering geology reports and prepare a final soils grading report; and

2. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with the requirements set forth in the CBC (depending on the site conditions, this may be the responsibility of either the soils engineer, the engineering geologist, or both).

D. The design engineer shall:

1. Be directly responsible for the design of the proposed structures and equipment supports;

2. Provide consultation to the RE during design and construction of the project;

3. Monitor construction progress to ensure compliance with engineering LORS;

4. Evaluate and recommend necessary changes in design; and

5. Prepare and sign all major building plans, specifications, and calculations.

E. The mechanical engineer shall be responsible for, and sign and stamp a statement with, each mechanical submittal to the CBO, stating that the proposed final design plans, specifications, and calculations conform to all of the mechanical engineering design requirements set forth in the Energy Commission's decision.

F. The electrical engineer shall:

1. Be responsible for the electrical design of the project; and

2. Sign and stamp electrical design drawings, plans, specifications, and calculations.

Verification: At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of demolition, the project owner shall submit to the CBO for review and approval resumes and registration numbers of the responsible civil engineer, soils (geotechnical) engineer and engineering geologist assigned to the project.

At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of construction, the project owner shall submit to the CBO for review and approval resumes and registration numbers of the responsible design engineer, mechanical engineer, and electrical engineer assigned to the project.

The project owner shall notify the CPM of the CBO's approvals of the responsible engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five days in which to submit the resume and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO’s approval of the new engineer within five days of the approval.

GEN-6 Prior to the start of an activity requiring special inspection, including prefabricated assemblies, the project owner shall assign to the project qualified and certified special inspector(s) who shall be responsible for the special inspections required by the applicable edition of the CBC. All transmission facilities (lines, switchyards, switching stations, and substations) are handled in conditions of certification in the **Transmission System Engineering** section of this document.

A certified welding inspector, certified by the American Welding Society (AWS), and/or American Society of Mechanical Engineers (ASME) as applicable, shall inspect welding performed on-site requiring special inspection (including structural, piping, tanks and pressure vessels).

The special inspector shall:

1. Be a qualified person who shall demonstrate competence, to the satisfaction of the CBO, for inspection of the particular type of construction requiring special or continuous inspection;

2. Inspect the work assigned for conformance with the approved design drawings and specifications;

3. Furnish inspection reports to the CBO and RE. All discrepancies shall be brought to the immediate attention of the RE for correction, then, if uncorrected, to the CBO and the CPM for corrective action; and

4. Submit a final signed report to the RE, CBO, and CPM, stating whether the work requiring special inspection was, to the best of the inspector's knowledge, in conformance with the approved plans, specifications, and other provisions of the applicable edition of the CBC.

Verification: At least 15 days (or project owner- and CBO-approved alternative time frame) prior to the start of an activity requiring special inspection, the project owner shall submit to the CBO for review and approval, with a copy to the CPM, the name(s) and qualifications of the certified weld inspector(s), or other certified special inspector(s) assigned to the project to perform one or more of the duties set forth above. The project owner shall also submit to the CPM a copy of the CBO's approval of the qualifications of all special inspectors in the next monthly compliance report.

If the special inspector is subsequently reassigned or replaced, the project owner has five days in which to submit the name and qualifications of the newly assigned special inspector to the CBO for approval. The project owner shall notify the CPM of the CBO's approval of the newly assigned inspector within five days of the approval.

GEN-7 If any discrepancy in design and/or construction is discovered in any engineering work that has undergone CBO design review and approval, the project owner shall document the discrepancy and recommend required corrective actions. The discrepancy documentation shall be submitted to the CBO for review and approval. The discrepancy documentation shall reference this condition of certification and, if appropriate, applicable sections of the CBC and/or other LORS.

Verification: The project owner shall transmit a copy of the CBO's approval of any corrective action taken to resolve a discrepancy to the CPM in the next monthly compliance report. If any corrective action is disapproved, the project owner shall advise the CPM, within five days, of the reason for disapproval and the revised corrective action to obtain CBO's approval.

GEN-8 The project owner shall obtain the CBO's final approval of all completed work that has undergone CBO design review and approval. The project owner shall request the CBO to inspect the completed structure and review the submitted documents. The project owner shall notify the CPM after obtaining the CBO's final approval. The project owner shall retain one set of approved engineering plans, specifications, and calculations (including all approved changes) at the project site or at another accessible location during the operating life of the project. Electronic copies of the approved plans, specifications, calculations, and marked-up as-builts shall be provided to the CBO for retention by the CPM.

Verification: Within 15 days of the completion of any work, the project owner shall submit to the CBO, with a copy to the CPM, in the next monthly compliance report, (a) a written notice that the completed work is ready for final inspection, and (b) a signed statement that the work conforms to the final approved plans. After storing the final approved engineering plans, specifications, and calculations described above, the project owner shall submit to the CPM a letter stating both that the above documents have been stored and the storage location of those documents.

Within 90 days of the completion of construction, the project owner shall provide to the CBO three sets of electronic copies of the above documents at the project owner's expense. These are to be provided in the form of "read only" (Adobe) files, with restricted (password-protected) printing privileges, on archive quality compact discs.

CIVIL-1 The project owner shall submit to the CBO for review and approval the following:

1. Design of the proposed drainage structures and the grading plan;
2. An erosion and sedimentation control plan;
3. A storm water pollution prevention plan (SWPPP);
4. Related calculations and specifications, signed and stamped by the responsible civil engineer; and
5. Soils, geotechnical, or foundation investigations reports required by the CBC.

Verification: At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of site grading the project owner shall submit the documents described above to the CBO for design review and approval. In the next monthly compliance report following the CBO's approval, the project owner shall submit a written statement certifying that the documents have been approved by the CBO.

CIVIL-2 The resident engineer shall, if appropriate, stop all earthwork and construction in the affected areas when the responsible soils engineer, geotechnical engineer, or the civil engineer experienced and knowledgeable in the practice of soils engineering identifies unforeseen adverse soil or geologic conditions. The project owner shall submit modified plans, specifications, and calculations to the CBO based on these new conditions. The project owner shall obtain approval from the CBO before resuming earthwork and construction in the affected area.

Verification: The project owner shall notify the CPM within 24 hours, when earthwork and construction is stopped as a result of unforeseen adverse geologic/soil conditions. Within 24 hours of the CBO's approval to resume earthwork and construction in the affected areas, the project owner shall provide to the CPM a copy of the CBO's approval.

CIVIL-3 The project owner shall perform inspections in accordance with the CBC. All plant site-grading operations, for which a grading permit is required, shall be subject to inspection by the CBO.

If, in the course of inspection, it is discovered that the work is not being performed in accordance with the approved plans, the discrepancies shall be reported immediately to the resident engineer, the CBO, and the CPM. The project owner shall prepare a written report, with copies to the CBO and the CPM, detailing all discrepancies, non-compliance items, and the proposed corrective action.

Verification: Within five days of the discovery of any discrepancies, the resident engineer shall transmit to the CBO and the CPM a non-conformance report (NCR), and the proposed corrective action for review and approval. Within five days of resolution of the NCR, the project owner shall submit the details of the corrective action to the CBO and the CPM. A list of NCRs, for the reporting month, shall also be included in the following monthly compliance report.

CIVIL-4 After completion of finished grading and erosion and sedimentation control and drainage work, the project owner shall obtain the CBO's approval of the final grading plans (including final changes) for the erosion and sedimentation control work. The civil engineer shall state that the work within his/her area of responsibility was done in accordance with the final approved plans.

Verification: Within 30 days (or project owner- and CBO-approved alternative time frame) of the completion of the erosion and sediment control mitigation and drainage work, the project owner shall submit to the CBO, for review and approval, the final grading plans (including final changes) and the responsible civil engineer's signed statement that the installation of the facilities and all erosion control measures were completed in accordance with the final approved combined grading plans, and that the facilities are adequate for their intended purposes, along with a copy of the transmittal letter to the CPM. The project owner shall submit a copy of the CBO's approval to the CPM in the next monthly compliance report.

STRUC-1 Prior to the start of any increment of construction, the project owner shall submit plans, calculations and other supporting documentation to the CBO for design review and acceptance for all project structures and equipment identified in the CBO-approved master drawing and master specifications list. The design plans and calculations shall include the lateral force procedures and details as well as vertical calculations.

Construction of any structure or component shall not begin until the CBO has approved the lateral force procedures to be employed in designing that structure or component.

The project owner shall:

1. Obtain approval from the CBO of lateral force procedures proposed for project structures;

2. Obtain approval from the CBO for the final design plans, specifications, calculations, soils reports, and applicable quality control procedures. If there are conflicting requirements, the more stringent shall govern (for example, highest loads, or lowest allowable stresses shall govern). All plans, calculations, and specifications for foundations that support structures shall be filed concurrently with the structure plans, calculations, and specifications;

3. Submit to the CBO the required number of copies of the structural plans, specifications, calculations, and other required documents of the designated major structures prior to the start of on-site fabrication and

installation of each structure, equipment support, or foundation;

4. Ensure that the final plans, calculations, and specifications clearly reflect the inclusion of approved criteria, assumptions, and methods used to develop the design. The final designs, plans, calculations, and specifications shall be signed and stamped by the responsible design engineer; and

5. Submit to the CBO the responsible design engineer's signed statement that the final design plans conform to applicable LORS.

Verification: At least 60 days (or project owner- and CBO-approved alternative time frame) prior to the start of any increment of construction of any structure or component listed in the CBO-approved master drawing and master specifications list, the project owner shall submit to the CBO the above final design plans, specifications and calculations, with a copy of the transmittal letter to the CPM.

The project owner shall submit to the CPM, in the next monthly compliance report, a copy of a statement from the CBO that the proposed structural plans, specifications, and calculations have been approved and comply with the requirements set forth in applicable engineering LORS.

STRUC-2 The project owner shall submit to the CBO the required number of sets of the following documents related to work that has undergone CBO design review and approval:

1. Concrete cylinder strength test reports (including date of testing, date sample taken, design concrete strength, tested cylinder strength, age of test, type and size of sample, location and quantity of concrete placement from which sample was taken, and mix design designation and parameters);

2. Concrete pour sign-off sheets;

3. Bolt torque inspection reports (including location of test, date, bolt size, and recorded torques);

4. Field weld inspection reports (including type of weld, location of weld, inspection of non-destructive testing (NDT) procedure and results, welder qualifications, certifications, qualified procedure description or number (ref: AWS); and

5. Reports covering other structural activities requiring special inspections shall be in accordance with the CBC.

Verification: If a discrepancy is discovered in any of the above data, the project owner shall, within five days, prepare and submit an NCR describing the nature of the discrepancies and the proposed corrective action to the CBO, with a copy of the transmittal letter to the CPM. The NCR shall reference the condition(s) of certification and the applicable CBC chapter and section. Within five days of resolution of the NCR, the project owner shall submit a copy of the corrective action to the CBO and the CPM.

The project owner shall transmit a copy of the CBO's approval or disapproval of the corrective action to the CPM within 15 days. If disapproved, the project owner shall advise the CPM, within five days, the reason for disapproval, and the revised corrective action to obtain CBO's approval.

STRUC-3 The project owner shall submit to the CBO design changes to the final plans required by the CBC, including the revised drawings, specifications, calculations, and a complete description of, and supporting rationale for, the proposed changes, and shall give to the CBO prior notice of the intended filing.

Verification: The project owner shall notify the CBO of the intended filing of design changes and shall submit the required number of sets of revised drawings and the required number of copies of the other above-mentioned documents to the CBO, with a copy of the transmittal letter to the CPM. The project owner shall notify the CPM, via the monthly compliance report, when the CBO has approved the revised plans.

STRUC-4 Tanks and vessels containing quantities of toxic or hazardous materials exceeding amounts specified in the CBC shall, at a minimum, be designed to comply with the requirements of that chapter.

Verification: At least 30 days (or project owner- and CBO-approved alternate time frame) prior to the start of installation of the tanks or vessels containing the above specified quantities of toxic or hazardous materials, the project owner shall submit to the CBO for design review and approval final design plans, specifications, and calculations, including a copy of the signed and stamped engineer's certification.

The project owner shall send copies of the CBO approvals of plan checks to the CPM in the following monthly compliance report. The project owner shall also transmit a copy of the CBO's inspection approvals to the CPM in the monthly compliance report following completion of any inspection.

MECH-1 The project owner shall submit, for CBO design review and approval, the proposed final design, specifications and calculations for each plant major piping and plumbing system listed in the CBO-approved master drawing and master specifications list. The submittal shall also include the applicable QA/QC procedures. Upon completion of construction of any such major piping or plumbing system, the project owner shall request the CBO's inspection approval of that construction.

The responsible mechanical engineer shall stamp and sign all plans, drawings, and calculations for the major piping and plumbing systems, subject to CBO design review and approval, and submit a signed statement to the CBO when the proposed piping and plumbing systems have been designed, fabricated, and installed in accordance with all of the applicable laws, ordinances, regulations and industry standards, which may include, but are not limited to:

- American National Standards Institute (ANSI) B31.1 (Power Piping Code);
- ANSI B31.2 (Fuel Gas Piping Code);

- ANSI B31.3 (Chemical Plant and Petroleum Refinery Piping Code);
- ANSI B31.8 (Gas Transmission and Distribution Piping Code);
- Title 24, California Code of Regulations, Part 5 (California Plumbing Code);
- Title 24, California Code of Regulations, Part 6 (California Energy Code, for building energy conservation systems and temperature control and ventilation systems);
- Title 24, California Code of Regulations, Part 2 (California Building Code); and
- City of Carson codes.

The CBO may deputize inspectors to carry out the functions of the code enforcement agency.

Verification: At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of any increment of major piping or plumbing construction listed in the CBO-approved master drawing and master specifications list, the project owner shall submit to the CBO for design review and approval the final plans, specifications, and calculations, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with applicable LORS, and shall send the CPM a copy of the transmittal letter in the next monthly compliance report.

The project owner shall transmit to the CPM, in the monthly compliance report following completion of any inspection, a copy of the transmittal letter conveying the CBO's inspection approvals.

MECH-2 For all pressure vessels installed in the plant, the project owner shall submit to the CBO and California Occupational Safety and Health Administration (Cal-OSHA), prior to operation, the code certification papers and other documents required by applicable LORS. Upon completion of the installation of any pressure vessel, the project owner shall request the appropriate CBO and/or Cal-OSHA inspection of that installation.

The project owner shall:

1. Ensure that all boilers and fired and unfired pressure vessels are designed, fabricated, and installed in accordance with the appropriate section of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, or other applicable code. Vendor certification, with identification of applicable code, shall be submitted for prefabricated vessels and tanks; and

2. Have the responsible design engineer submit a statement to the CBO that the proposed final design plans, specifications, and calculations conform to all of the requirements set forth in the appropriate ASME Boiler and Pressure Vessel Code or other applicable codes.

Verification: At least 30 days (or project owner- and CBO-approved alternative time

frame) prior to the start of on-site fabrication or installation of any pressure vessel, the project owner shall submit to the CBO, for design review and approval, the above listed documents, including a copy of the signed and stamped engineer's certification, with a copy of the transmittal letter to the CPM.

The project owner shall transmit to the CPM, in the monthly compliance report following completion of any inspection, a copy of the transmittal letter conveying the CBO's and/or Cal-OSHA inspection approvals.

MECH-3 The project owner shall submit to the CBO for design review and approval the design plans, specifications, calculations, and quality control procedures for any heating, ventilating, air conditioning (HVAC) or refrigeration system. Packaged HVAC systems, where used, shall be identified with the appropriate manufacturer's data sheets.

The project owner shall design and install all HVAC and refrigeration systems within buildings and related structures in accordance with the CBC and other applicable codes. Upon completion of any increment of construction, the project owner shall request the CBO's inspection and approval of that construction. The final plans, specifications and calculations shall include approved criteria, assumptions, and methods used to develop the design. In addition, the responsible mechanical engineer shall sign and stamp all plans, drawings and calculations and submit a signed statement to the CBO that the proposed final design plans, specifications and calculations conform with the applicable LORS.

Verification: At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of construction of any HVAC or refrigeration system, the project owner shall submit to the CBO the required HVAC and refrigeration calculations, plans, and specifications, including a copy of the signed and stamped statement from the responsible mechanical engineer certifying compliance with the CBC and other applicable codes, with a copy of the transmittal letter to the CPM.

ELEC-1 Prior to the start of any increment of electrical construction for all electrical equipment and systems 480 Volts or higher (see a representative list, below), with the exception of underground duct work and any physical layout drawings and drawings not related to code compliance and life safety, the project owner shall submit, for CBO design review and approval, the proposed final design, specifications, and calculations. Upon approval, the above listed plans, together with design changes and design change notices, shall remain on the site or at another accessible location for the operating life of the project. The project owner shall request that the CBO inspect the installation to ensure compliance with the requirements of applicable LORS. All transmission facilities (lines, switchyards, switching stations, and substations) are handled in conditions of certification in the **Transmission System Engineering** section of this document.

A. Final plant design plans shall include:

1. one-line diagrams for the 13.8 kV, 4.16 kV and 480 V systems; and

2. system grounding drawings.

B. Final plant calculations must establish:

1. short-circuit ratings of plant equipment;
2. ampacity of feeder cables;
3. voltage drop in feeder cables;
4. system grounding requirements;
5. coordination study calculations for fuses, circuit breakers and protective relay settings for the 13.8 kV, 4.16 kV and 480 V systems;
6. system grounding requirements; and
7. lighting energy calculations.

C. The following activities shall be reported to the CPM in the monthly compliance report:

1. Receipt or delay of major electrical equipment;
2. Testing or energization of major electrical equipment; and
3. A signed statement by the registered electrical engineer certifying that the proposed final design plans and specifications conform to requirements set forth in the Energy Commission decision.

Verification: At least 30 days (or project owner- and CBO-approved alternative time frame) prior to the start of each increment of electrical construction, the project owner shall submit to the CBO for design review and approval the above listed documents. The project owner shall include in this submittal a copy of the signed and stamped statement from the responsible electrical engineer attesting compliance with the applicable LORS, and shall send the CPM a copy of the transmittal letter in the next monthly compliance report.

REFERENCES

Watson 2009a – Watson Cogeneration Company/Thomas A. Lu (tn 50584). Application for Certification, Volume I&II, dated 3/19/09. Submitted to CEC/Docket Unit on 3/19/09.

GEOLOGY AND PALEONTOLOGY

Testimony of Dal Hunter, Ph.D., C.E.G.

SUMMARY OF CONCLUSIONS

The proposed Watson Cogeneration Steam and Electric Reliability project (BP Watson) would be located in a geologically active area of Los Angeles County, Southern California. The project would be constructed in an area zoned for industrial development by the City of Carson. Because of its geologic setting, the site could be subject to intense levels of earthquake-related ground shaking. While the potential for earthquake ground rupture is low, at least 36 known, major, on-shore and off-shore faults are located within 62 miles (100 kilometers) of the site. The effects of strong ground shaking would need to be mitigated through structural designs required by the California Building Code (CBC, 2010). The California Building Code (2010) requires that structures be designed to resist seismic stresses from ground acceleration and, to a lesser extent, liquefaction. While earthquake damage to a building may be extensive, the intent is to prevent structural collapse and loss of life. The design-level geotechnical investigation required for the project by the California Building Code, and proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1**, should present standard engineering design recommendations for mitigation of potential expansive clay soils, as well as excessive settlement due to compressible soils or dynamic compaction.

There are no known viable geologic or mineralogical resources at the proposed Watson Cogeneration Steam and Electric Reliability project site. Paleontological resources have been documented in older Quaternary sediments within 1 mile of the site, but no significant fossils were found during field evaluations at the plant site or near ancillary facilities. Potential impacts to paleontological resources due to construction activities would be mitigated through worker training and monitoring by qualified paleontologists, as required by Conditions of Certification, **PAL-1** through **PAL-7**.

Based on its independent research and review, the California Energy Commission staff believes that the potential is low for significant adverse cumulative impacts to the project from geologic hazards during its design life and to potential geologic, mineralogic, and paleontologic resources from the construction, operation, and closure of the proposed project. It is California Energy Commission staff's opinion that the proposed Watson Cogeneration Steam and Electric Reliability project can be designed and constructed in accordance with all applicable laws, ordinances, regulations, and standards (LORS), and in a manner that both protects environmental quality and assures public safety.

INTRODUCTION

In this section, California Energy Commission (Energy Commission) staff discusses the potential impacts of geologic hazards on the proposed project as well as the BP Watson project impact on geologic, mineralogic, and paleontologic resources. The Energy Commission staff's objective is to ensure that there will be no significant adverse impacts to significant geological and paleontological resources during the project construction, operation, and closure and that operation of the plant would not expose occupants to high-probability geologic hazards. A brief geological and paleontological

overview and assessment of potential impacts are provided. The section concludes with Energy Commission staff's proposed monitoring and mitigation measures for geologic hazards and geologic, mineralogic, and palentologic resources, with the proposed conditions of certification.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Applicable LORS are listed in the application for certification (AFC) (Watson 2009a). The following briefly describes the current LORS for both geologic hazards and resources and mineralogic and paleontologic resources.

GEOLOGY AND PALEONTOLOGY Table 1
Laws, Ordinances, Regulations, and Standards (LORS)

Applicable Law	Description
Federal	The proposed BP Watson is not located on federal land. There are no federal LORS for geologic hazards and resources for this site.
State	
California Building Code (2010) in CCR Title 24	The CBC (2010) includes a series of standards that are used in project investigation, design, and construction (including grading and erosion control). The CBC has adopted provisions in the International Building Code (ICC, 2009). The International Code Council authors the International Building Code.
Alquist-Priolo Earthquake Fault Zoning Act, Public Resources Code (PRC), section 2621–2630	Mitigates against surface fault rupture of known active faults beneath occupied structures. Requires disclosure to potential buyers of existing real estate and a 50-foot setback for new occupied buildings. The project site is not located within a designated Alquist-Priolo Fault Zone.
The Seismic Hazards Mapping Act, PRC section 2690–2699	Areas are identified that are subject to the effects of strong ground shaking, such as liquefaction, landslides, tsunamis, and seiches.
PRC, Chapter 1.7, sections 5097.5 and 30244	Regulates removal of paleontological resources from state lands, defines unauthorized removal of fossil resources as a misdemeanor, and requires mitigation of disturbed sites.
Warren-Alquist Act, PRC, sections 25527 and 25550.5(i)	The Warren-Alquist Act requires the Energy Commission to "give the greatest consideration to the need for protecting areas of critical environmental concern, including, but not limited to, unique and irreplaceable scientific, scenic, and educational wildlife habitats; unique historical, archaeological, and cultural sites…" With respect to paleontologic resources, the Energy Commission relies on guidelines from the Society for Vertebrate Paleontology (SVP), indicated below.

Applicable Law	Description
California Environmental Quality Act (CEQA), PRC Chapter 21000 et seq., Guidelines 15000 et seq., Appendix G – Environmental Checklist form.	Mandates that public and private entities identify the potential impacts on the environment during proposed activities. Appendix G outlines the requirements for compliance with CEQA and provides a checklist that includes significant impacts to a paleontological resource.
Local	
City of Carson General Plan	Requires steps to minimize the risk of injury, loss of life, and property damage caused by earthquake hazards.
Applicable Standard (General)	
Society for Vertebrate Paleontology (SVP), 1995	The "Measures for Assessment and Mitigation of Adverse Impacts to Non-Renewable Paleontological Resources: Standard Procedures" is a set of procedures and standards for assessing and mitigating impacts to vertebrate or significant invertebrate fossils or significant suites of plant fossils .The measures were adopted in October 1995 by the SVP, a national organization of professional scientists.

SETTING

The proposed BP Watson project would be constructed on approximately 2.5 acres of previously developed land located within the existing BP Carson Refinery at 22850 South Wilmington Avenue in the City of Carson, Los Angeles County, California. The proposed project site is predominantly vacant although an existing warehouse/maintenance shop would be demolished prior to initiation of construction activities.

The proposed project is an expansion of the existing steam and electrical energy generating facility already on-site and is located in an area originally allocated for the additional steam turbine, generator, and cooling equipment. No upgrade to the existing transmission line or project water supply is required. Natural gas is also already piped to the site but two new (redundant) gas compressors will be necessary.

REGIONAL SETTING

The BP Watson site would be located in Los Angeles County, California, within the Los Angeles Basin at the northern end of the Peninsular Ranges geomorphic province (Norris and Webb, 1990). The Peninsular Ranges geomorphic province extends from the Los Angeles Basin in the north some 900 miles south to the tip of Baja California in Mexico (Norris and Webb 1990). The Peninsular Ranges Geomorphic Province varies from approximately 30 to 100 miles in width. The highland and mountain masses of the Peninsular Range on the north and east sides of Los Angeles County are characterized

by Cenozoic to Tertiary volcanic, intrusive, metamorphic, and sedimentary rocks which slope steeply downward to alluvial, colluvial and uplifted marine deposits along the Pacific coast to the south and west. Mountains of the Peninsular Range are being actively offset by northwest-trending right-lateral strike-slip faulting. In addition, active regional reverse and thrust faulting, associated with compressional tectonics, continues to cause uplift in the east-west-trending Transverse Ranges which form the northern boundary of the Peninsular Range Geomorphic Province and along blind thrusts which underlie the Los Angeles basin (CGS 2002). Extensively folded and faulted Miocene age volcanic and marine sedimentary rocks of the Monterrey Formation form the Palos Verde Peninsula southwest of the proposed site (Dibblee 1999).

PROJECT SITE DESCRIPTION

The proposed BP Watson site lies in the relatively flat flood plain of the Los Angeles River. Local surface deposits are mapped as young alluvial fan and valley deposits which overlie old alluvial flood plain deposits. Young alluvial fan and valley deposits are described as poorly consolidated and poorly sorted clay, sand, gravel, and cobbles. Old alluvial flood plain deposits are described as fluvial sediment deposits on valley floors consisting of moderately well consolidated, poorly sorted, permeable, slightly dissected gravel, sand, silt, and clay bearing alluvium.

EQFAULT™ Version 3.00 was used to model seismic sources within 62 miles (100 kilometers) of the BP Watson site (Blake 2006). The various faults are listed below in **GEOLOGY AND PALEONTOLOGY Table 2**, along with the distance from the project site and maximum estimated earthquake magnitude. The peak acceleration, fault type, and fault class for each fault is also given. The fault locations can be found on the Fault Activity Map of California (CDMG 1994) and on the Southern California Earthquake Data Center website (SCEC 2008).

GEOLOGY AND PALEONTOLOGY Table 2
Active Faults Relative to the Proposed BP Watson Sie

Fault Name	Distance From Site (miles)	Maximum Earthquake Magnitude (Mw)	Estimated Peak Site Acceleration (g)	Fault Type and Strike	Fault Class
Newport-Inglewood (LA Basin)	2.6	7.1	0.416	Right-Lateral Strike Slip (Northwest)	B
Palos Verdes	4.4	7.3	0.378	Right-Lateral Strike Slip (Northwest)	B
Puente Hills Blind Thrust	11.1	7.1	0.234	Blind Thrust/Reverse (West)	B
Upper Elysian Park Blind Thrust	17.3	6.4	0.117	Blind Thrust/Reverse (Northwest)	B
Whittier	17.5	6.8	0.118	Right-Lateral Reverse/Oblique Slip (Northwest)	A
Santa Monica	19.6	6.6	0.119	Left-Lateral Reverse/Oblique Slip (West)	B
San Joaquin Hills Blind Thrust	19.8	6.6	0.118	Blind Thrust/Reverse (Northwest)	B
Hollywood	20.6	6.4	0.103	Left-Lateral Reverse/Oblique Slip (West)	B
Raymond	21.1	6.5	0.106	Left-Lateral Reverse/Oblique Slip (West)	B
Malibu Coast	22.2	6.7	0.114	Left-Lateral Reverse/Oblique Slip (West)	B
Verdugo	22.4	6.9	0.126	Reverse (Northwest)	B
Newport-Inglewood (Offshore)	24.5	7.1	0.107	Right-Lateral Strike Slip (Northwest)	B
San Jose	26.0	6.4	0.086	Left-Lateral Reverse/Oblique Slip (Northeast)	B
Sierra Madre	26.8	7.2	0.128	Reverse (West)	B
Northridge (East Oak Ridge)	26.8	7.0	0.116	Blind Thrust/Reverse (West)	B
Elsinore (Chino-Central Ave.)	28.0	6.7	0.095	Right-Lateral Reverse/Oblique Slip (Northwest)	B
Anacapa-Dume	28.3	7.5	0.144	Reverse/Left-Lateral/Oblique Slip (West)	B
Clamshell-Sawpit	28.6	6.5	0.084	Reverse (Northeast)	B
Sierra Madre (San Fernando)	31.9	6.7	0.086	Reverse (West)	B
San Gabriel	34.7	7.2	0.087	Right-Lateral Strike Slip (West)	B
Elsinore (Glen Ivy)	35.0	6.8	0.070	Right-Lateral Strike Slip (Northwest)	A
Cucamonga	36.5	6.9	0.086	Reverse (West)	B
Santa Susana	37.5	6.7	0.076	Reverse (West)	B
Coronado Bank	42.0	7.6	0.092	Right-Lateral Strike Slip (Northwest)	B
Simi – Santa Rosa	42.3	7.0	0.081	Left-Lateral Reverse Oblique Slip (West)	B
Holser	42.4	6.5	0.062	Reverse (West)	B
Oak Ridge (Onshore)	45.8	7.0	0.076	Reverse (West)	B
San Andreas – Entire M-1a	49.0	8.0	0.101	Right-Lateral Strike Slip (Northwest)I	A
San Jacinto-San Bernardino	51.6	6.7	0.049	Right-Lateral Strike Slip (Northwest)	A
San Cayetano	52.1	7.0	0.069	Reverse (West)	B
Elsinore (Temecula)	52.9	6.8	0.051	Right-Lateral Strike Slip (North)	A
San Andreas – San Bernardino-Coachella	53.9	7.7	0.080	Right-Lateral Strike Slip (Northwest)	A
San Andreas - San Bernardino	53.9	7.5	0.072	Right-Lateral Strike Slip (Northwest)	A

Cleghorn	56.4	6.5	0.041	Left-Lateral Strike Slip (West)	B
Oak Ridge Offshore Blind Thrust	57.9	7.1	0.067	Reverse Blind Thrust (West)	B
Channel Islands Thrust (Eastern)	59.7	7.5	0.081	Reverse (West)	B
San Jacinto Valley	59.7	6.9	0.049	Right-Lateral Strike Slip (Northwest)	A

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

This section considers two types of impacts. The first is geologic hazards, which could impact the proper functioning of the proposed facility and create life/safety concerns. The second is the potential impacts the proposed facility could have on existing geologic, mineralogic, and paleontologic resources in the area.

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE

No federal LORS concerning geologic hazards and geologic and mineralogic resources apply to this project. The California Building Standards Code (CBSC) and CBC (2010) require geotechnical and geological investigation and design guidelines, which engineers must follow when designing a facility. As a result, the criteria used to assess the significance of a geologic hazard includes evaluating each hazard's potential impact on the design and construction of the proposed facility. Geologic hazards include faulting and seismicity, liquefaction, dynamic compaction, hydrocompaction, subsidence, expansive soils, landslides, tsunamis, seiches, and others as may be dictated by site-specific conditions. Of these, dynamic compaction, hydrocompaction, subsidence, and expansive soils do present serious life/safety concerns.

The California Environmental Quality Act (CEQA) guidelines, Appendix G, provide a checklist of questions that lead agencies typically address when assessing the impacts of the project on geologic, mineralogic, and paleontologic resources, and the potential impacts of geologic hazards to people or structures.

- Section (V) (c) includes guidelines that determine if a project will either directly or indirectly destroy a unique paleontological resource or site, or a unique geological feature.
- Sections (VI) (a), (b), (c), (d), and (e) focus on whether or not the project would expose persons or structures to geologic hazards.
- Sections (X) (a) and (b) concern the project's effects on mineral resources.

The Energy Commission staff has reviewed geologic and mineral resource maps for the surrounding area, as well as site-specific information provided by the Watson Cogeneration Company (Watson), to determine if geologic and mineralogic resources exist in the area and to determine if plant operations could adversely affect any such resources.

Energy Commission staff reviewed existing paleontologic information and requested records searches from the Natural History Museum of Los Angeles County (NHLMC) and the vertebrate paleontology section of the San Bernardino County Museum (SBCM) for the surrounding area. The University of California (at Berkeley) Museum of Paleontology's (UCMP) website, which gives generalized information for locality

records of their collection, was consulted as well (UCMP 2008). Site-specific information generated by Watson for the project was also reviewed. All research was conducted in accordance with accepted assessment protocol (SVP, 1995) to determine whether any known paleontologic resources exist in the general area. If present or likely to be present, conditions of certification which outline required procedures to mitigate impacts to potential paleontological resources, and proposed as part of the projects approval.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Ground shaking and expansive clays represent the main geologic hazards at this site. These potential hazards can be effectively mitigated through facility design by incorporating recommendations contained in a project-specific geotechnical report. The requirements of the proposed **Facility Design** Conditions of Certification **GEN-1, GEN-5,** and **CIVIL-1** in the **Facility Design** section should also aid in mitigating these impacts to a less than significant level.

No viable geologic or mineralogic resources are known to exist within 3 miles of the proposed BP Watson plant site or project linears.

Numerous oil wells are present in Los Angeles County or immediately offshore. These are primarily found along structural traps formed by anticlinal folding along the Newport-Inglewood Fault north of the site and along the Palos Verdes Fault south of the site. The proposed BP Watson site lies in the synclinal low between the faults and no petroleum or natural gas deposits are known to exist beneath the project site (CDC 1982; CDC 1992; CDC 2001).

No important paleontological resources were observed on the BP Watson site during the paleontological field survey conducted for the project AFC (Watson 2009a). The NHMLC considers the most recent unconsolidated alluvial deposits, which form the natural site surface, to hold little potential for preservation of significant fossil remains. However, the older Quaternary alluvium, which directly underlies the recent alluvium, has yielded fossils including fossil horse, mammoth, mastodon, sloth, wolf, bear, saber-toothed cats, camels, and bison from depths as shallow as 8 feet below surface in other areas. For this reason the paleontological sensitivity of older Quaternary (older Pleistocene) alluvium is considered to be high. If the proposed site construction includes significant amounts of grading, excavation, and utility trenching, CEC staff considers the probability that paleontological resources would be encountered during such activities to be high anytime excavation activities fully penetrate the recent alluvial deposits and encounter older Quaternary alluvium. Proposed Conditions of Certification **PAL-1** to **PAL-7** are designed to mitigate paleontological resource impacts, as discussed above, to less than significant levels. These conditions essentially require a worker education program in conjunction with the monitoring of earthwork activities by a qualified professional paleontologist (paleontologic resource specialist; PRS).

The proposed conditions of certification allow the CEC's compliance project manager (CPM) and Watson to adopt a compliance monitoring scheme ensuring compliance with LORS applicable to geologic hazards and the protection of geologic, mineralogic, and paleontologic resources.

Based on the information below, it is the opinion of the CEC staff that the potential for significant adverse direct or indirect impacts to the project from geologic hazards, and to potential geologic, mineralogic, and paleontologic resources from the proposed project, is low assuming the proposed conditions of certification are adopted and enforced.

GEOLOGICAL HAZARDS

The AFC (Watson 2009a) provides documentation of potential geologic hazards at the proposed plant site. Review of the AFC, coupled with CEC staff's independent research, indicates that the possibility of geologic hazards at the plant site, during its practical design life, is low. Geologic hazards, such as potential for expansive clay soils and settlement due to compressible soils and dynamic compaction, hydrocompaction, or dynamic compaction, must be addressed in the project specific geotechnical report per California Building Code (CBC 2010) requirements.

The CEC staff's independent research included the review of available geologic maps, reports, and related data of the BP Watson plant site. Geological information was available from the California Geological Survey (CGS), California Division of Mines and Geology (CDMG), the U.S. Geological Survey (USGS), and other government organizations. Since 2002, the CDMG has been known as the California Geologic Survey.

Faulting and Seismicity

Type A faults have slip-rates of ≥5 mm per year and are capable of producing an earthquake of magnitude 7.0 or greater. Type B faults have slip-rates of 2 to 5 mm per year and are capable of producing an earthquake of magnitude 6.5 to 7.0. Eight Type A Faults and 28 Type B faults have been identified within 62 miles (100 kilometers) of the proposed BP Watson site. The fault type, potential magnitude, and distance from the site were summarized previously in **GEOLOGY AND PALEONTOLOGY Table 2**.

The Alquist-Priolo Act of 1973 and subsequent California state law (California Code of Regulations 2001) require that all occupied structures be set back 50 feet or more from the surface trace of an active fault. Since no active faults have been documented within the BP Watson power plant site, setbacks of occupied structures would not be required.

The CEC staff reviewed the CDMG publication *Fault Activity Map of California and Adjacent Areas with Locations and Ages of Recent Volcanic Eruptions* (1994) and Alquist-Priolo Special Studies Zone mapping and reports (CDMG 2003; CGS 2002; and Hart and Bryant 1999). No active faults are shown on published maps as crossing the boundary of new construction at the proposed BP Watson power plant site. The nearest major active faults are the Newport-Inglewood Fault located approximately 2.6 miles north, and the Palos Verdes Fault located approximately 4.4 miles to the south. Both are Class B right-lateral strike-slip faults. At least 12 other active or potentially active faults which are estimated to be capable of causing site acceleration greater than 0.1g are present within 28 miles of the site (**GEOLOGY AND PALEONTOLOGY Table 2**).

Most of the faults listed on **GEOLOGY AND PALEONTOLOGY Table 2** within 62 miles of the proposed BP Watson plant site are northwest-striking right-lateral strike-slip faults related to regional transform faulting, of which San Andreas Fault Zone is the central

structure. The structural history of the Los Angeles basin is complex due to historic and ongoing compression, extension, and shearing along major regional fault zones. For example, relative motion on the Whittier Fault has changed over time from normal in the Miocene epoch, to reverse in the Pliocene to early Pleistocene, to late Quaternary right-lateral strike-slip (Yeats 2004). Most of the Elsinore Fault is strike-slip in character; however, the fault splays to the north near the Transverse Ranges into the Whittier and Chino-Central Avenue Faults. The history and sense of movement on these, and other faults, becomes more complicated with proximity to the transition zone between the Peninsular Ranges and Transverse Ranges Geomorphic Provinces. Structures that predominantly show reverse and thrust movement characteristic of the compressional tectonics of the Transverse Ranges include, the North Frontal Fault Zone, and the Cleghorn, Cucamonga, San Jose, and Sierra Madre Faults. The Elysian Park, Puente Hills and San Joaquin Hills (Compton) Blind Thrusts are also included in **GEOLOGY AND PALEONTOLOGY Table 2,** and developed in response to compressional tectonics. The reverse structures are generally north-dipping and trend east-west, although some are relatively shallow-dipping with variable orientations. The closest known fault is over 4 miles away so the potential for ground rupture, at the site, is minimal.

The project-specific geotechnical report will indicate the appropriate seismic soil classification for the proposed site and will make recommendations for mitigation of potential hazards due to seismic shaking. The estimated peak horizontal ground acceleration for the proposed power plant site is 0.78 times the acceleration of gravity (0.78g) for bedrock acceleration based on 2 percent probability of exceedence in 50 years under 2010 CBC criteria (USGS 2007).

Liquefaction

Liquefaction is a condition where in a cohesionless soil may lose shear strength because of sudden increase in pore water pressure caused by an earthquake. The seismic hazards zones map for the Long Beach Quadrangle indicates the proposed project site is in an area outside of any designated liquefaction hazard zone (CDMG 1998a). The historic depth to ground water near the southwest corner of the proposed BP Watson site has been reported to be as shallow as 10 feet below surface (DWR 2000). The project specific geotechnical report must assess the liquefaction potential of the proposed site to facilitate mitigation of any liquefaction hazard. This will include determination of the depth to ground water, the presence of liquefiable layers such as clean sands, and the relative soil compaction with depth.

Lateral Spreading

Lateral spreading of the ground surface can occur within liquefiable beds during seismic events. Lateral spreading generally requires an abrupt change in slope, such as a nearby steep hillside or deeply eroded stream bank, but can also occur on gentle slopes. Other factors such as distance from the epicenter, magnitude of the seismic event, and thickness and depth of liquefiable layers also affect the amount of lateral spreading. Because the BP Watson site is nearly flat, the potential for lateral spreading of the site surface during seismic events is very low. If the project geotechnical investigation determines that liquefaction is unlikely, the potential for lateral spreading would be considered negligible.

Dynamic Compaction

Dynamic compaction of soils can occur when relatively unconsolidated granular materials experience vibration associated with seismic events. The vibration causes a decrease in soil volume, as the soil grains tend to rearrange into a more dense state (an increase is soil density). The decrease in volume can result in settlement of overlying structural improvements but not to the extent that it develops a life/safety issue. Mitigation of the possible effects of dynamic compaction of site native and fill soils during an earthquake should be addressed in the final project geotechnical report, per CBC (2010) requirements and proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1**.

Hydrocompaction

Hydrocompaction (also known as hydro-collapse) is generally limited to young soils that were deposited rapidly in a saturated state, most commonly by a flash flood. The soils dry quickly, leaving an unconsolidated, low density deposit with a high percentage of voids. Foundations built on these types of compressible materials can settle excessively, particularly when landscaping irrigation dissolves the weak cementation that is preventing the immediate collapse of the soil structure. Hydrocompaction does not represent a threat to life or safety. Any necessary mitigation measures for the effects of hydrocompaction of site soils should be addressed as required in the project-specific geotechnical report, per CBC (2010) requirements and proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1**.

Subsidence

Local subsidence or settlement may occur when areas containing compressible soils are subjected to foundation loads. Regional studies conducted to evaluate the effects of subsidence due to pumping of ground water, oil, and gas reserves indicate no significant regional subsidence is occurring. Subsidence does not represent a threat to life or safety. Recommendations for mitigation of the effects of normal subsidence due to foundation loads should be addressed in the project-specific geotechnical report, per CBC (2010) requirements and proposed **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1**. When needed, mitigation is normally accomplished by over-excavation and replacement of the compressible soils. For deep-seated conditions, deep foundations are commonly used.

Expansive Soils

Soil expansion occurs when clay-rich soils with an affinity for water exist at a moisture content below their plastic limit. The addition of moisture from irrigation, precipitation, capillary tension, water line breaks, etc. causes the clay soils to absorb water molecules into their structure, which in turn causes an increase in the overall volume of the soil. This increase in volume can correspond to excessive movement (heave) of overlying structural improvements. Expansive soils do not represent a threat to life or safety. The potential for and methods for mitigation of the effects of expansive soils should be addressed in the project-specific geotechnical report, per CBC (2010) requirements and **Facility Design** Conditions of Certification **GEN-1**, **GEN-5** and **CIVIL-1**. Expansive soil mitigation, when necessary, is normally accomplished by over-excavation and replacement of the soils. For deep-seated conditions, deep foundations are commonly

used. Lime-treated (chemical modification) is often used to mitigate expansive clays in pavement areas.

Landslides

The proposed BP Watson site is relatively flat and the gradual slope of the site coupled with the absence of topographically high ground within or immediately upgradient from the site suggest it is not susceptible to landslide activity. The project-specific engineering geology report should verify that landslide potential is minimal, in accordance with the requirements of the CBC (2010) and proposed **Facility Design** Condition of Certification **GEN-4**.

Flooding

The Federal Emergency Management Agency (FEMA) has identified the proposed BP Watson site and project linears as lying in Unshaded Zone X, which are “areas determined to be outside the 0.2 percent annual chance flood plain” (FEMA 2008). Therefore, the potential for flooding to impact the proposed site is considered to be low.

Tsunamis and Seiches

Tsunamis are large-scale seismic-sea waves caused by offshore earthquakes, landslides and/or volcanic activity. The proposed BP Watson power plant site lies inland approximately 4 miles from the Long Beach Harbor. The potential tsunami height that might impact Southern California has been estimated at up to 11.5 feet (McCullogh 1985). Recently, run-up heights up to 3 feet above mean sea level (msl) have been predicted on the Southern California coastline, although heights up to 16 feet could occur at San Diego due to the configuration of the bay (CSSC 2005). The proposed BP Watson project lies outside of the area designated by the California Emergency Management Agency (CalEMA) as a potential tsunami inundation area (CalEMA 2009). Given the power plant footing elevation of approximately 30 feet msl, a tsunami of the maximum indicated height of 11.5 feet cannot impact the site. No large inland surface water bodies which could produce seiches are located near the proposed plant site.

GEOLOGIC, MINERALOGIC, AND PALEONTOLOGIC RESOURCES

The CEC staff has reviewed applicable geologic maps and reports for this area (CDC 1992; CDC 2001; CDMG 1966; CDMG 1990; CDMG 1994; CDMG 1997; CDMG 1998b; CDMG 1999; CDMG 2003; CGS 2003; McCleod 2009; UCMP 2008). Historically, minor quantities of gold, silver, and other metals as well as industrial minerals such as barite and kaolinite were produced in Los Angeles County, primarily from the Cenozoic to Tertiary volcanic, intrusive, metamorphic, and sedimentary rocks which form the highlands of the north and east portions of the county (CDMG 1999). Alluvium and colluvium of the Los Angeles River have yielded primarily aggregate in the form of sand and gravel.

The CEC staff did not identify any geological resources at the facility location or along project linears and given the absence of rock outcrops on or near the site surface there is very low potential for this site to have economically valuable mineral deposits.

The Energy Commission staff has reviewed the Paleontological Resources assessment in Section 5.8 and Paleontological Records Search and Literature Review (Confidential) in Appendix E3 of the AFC (Watson 2009c). The CEC staff has also reviewed the paleontological literature and records searches conducted by the NHMLC (McCleod 2009), as well as the online records database maintained by the UCMP (2008). No paleontological finds have been documented on the proposed BP Watson plant site.

Construction Impacts and Mitigation

The design-level geotechnical investigation required for the project by the CBC (2010) and proposed **Facility Design** Condition of Certification **GEN-1** will provide standard engineering design recommendations for mitigation of potential expansive clay soils, as well as excessive settlement due to compressible soils or dynamic compaction, as appropriate (See proposed **Conditions of Certification Facility Design**).

As noted above, no viable geologic or mineralogic resources are known to exist within 3 miles of the proposed BP Watson construction site or linear routes. The potential to impact significant paleontological resources in older Quaternary (older Pleistocene) sediments, especially in deeper excavations, is considered to be high. Fill materials, if present, and younger alluvium have a negligible paleontological sensitivity. Construction of the proposed project would include grading, excavation, and utility trenching. The CEC staff considers the probability of encountering paleontological resources to be generally high in excavations which penetrate through the recent alluvium and encounter older Quaternary alluvium. The potential for encountering fossils would increase with the depth of excavation.

Proposed Conditions of Certification **PAL-1 to PAL-7** are designed to mitigate any paleontological resource impacts, as discussed above, to a less than significant level. Essentially, these conditions require a worker education program in conjunction with monitoring of earthwork activities by qualified professional paleontologists (paleontologic resource specialist; PRS). Earthwork in the immediate vicinity is halted any time potential fossils are recognized by either the paleontologist or the worker. When properly implemented, the conditions of certification yield a net gain to the science of paleontology since fossils that would not other wise have been discovered can be collected, identified, studied, and properly curated. A paleontological resource specialist is retained, for the project by Watson, to produce a monitoring and mitigation plan, conduct the worker training, and provide the on site monitoring. During the monitoring, the PRS can and often does petition the CEC for a change in the monitoring protocol. Most commonly, this is a request for lesser monitoring after sufficient monitoring has been performed to ascertain that there is little chance of finding significant fossils. In other cases, the PRS can propose increased monitoring due to unexpected fossil discoveries or in response to repeated out-of-compliance incidents by the earthwork contractor.

Based upon the literature and archives search, field surveys, and compliance documentation for the proposed BP Watson project, Watson has proposed monitoring and mitigation measures to be followed during the construction of the project. The CEC staff believes that the facility can be designed and constructed to minimize the effect of geologic hazards at the site during project design life and that impacts to any vertebrate

fossils encountered during construction of the power plant and associated linears would be mitigated to a level of insignificance.

Operation Impacts and Mitigation

Operation of the proposed plant facilities should not have any adverse impact on geologic, mineralogic, or paleontologic resources. Potential geologic hazards, including strong ground shaking, foundation settlement due to compressible soils, dynamic compaction, and the possible presence of expansive clay soils can be effectively mitigated through facility design (See proposed **Conditions of Certification GEN-1, GEN-5** and **CIVIL-1** in the **Facility Design** section) such that these potential hazards should not affect operation of the facility.

CUMULATIVE IMPACTS AND MITIGATION

The proposed BP Watson project site is situated in an active geologic environment. Strong ground shaking potential must be mitigated through foundation and structural design as required by the CBC (2010). Expansive materials, as well as compressible soils and soils that may possibly be subject to subsidence due to dynamic compaction, must be mitigated in accordance with a design-level geotechnical investigation as required by the CBC (2010), and proposed Conditions of Certification **GEN-1, GEN-5, and CIVIL-1** under **Facility Design**. Paleontological resources have been documented in the general area of the project and in sediments similar to those that are present at depth on the site. However, to date, none have been found on the plant site. The potential impacts to paleontological resources due to construction activities would be mitigated as required by proposed Conditions of Certification **PAL-1 to PAL-7**.

The CEC staff believes that the potential for significant adverse cumulative impacts to the proposed project from geologic hazards, during the project's design life, is low, and that the potential for impacts to geologic, mineralogic, and paleontologic resources is very low.

Based upon the literature and archives search, field surveys and compliance documentation for the proposed BP Watson project, the applicant proposes monitoring and mitigation measures for construction of the project. The CEC staff agrees with Watson that the project can be designed and constructed to minimize the effects of geologic hazards at the site, and that impacts to scientifically significant vertebrate and invertebrate fossils encountered during construction would be mitigated to levels of less than significant.

The proposed conditions of certification allow the CEC (CPM) and Watson to adopt a compliance monitoring scheme ensuring compliance with applicable LORS for geologic hazards and geologic, mineralogic, and paleontologic resources.

FACILITY CLOSURE

Facility closure activities are not expected to impact geologic or mineralogic resources since no such resources are known to exist at either the project location or along its proposed linears. In addition, the decommissioning and closure of the project should not negatively affect geologic, mineralogic, or paleontologic resources since the majority of

the ground disturbed during plant decommissioning and closure would have been already disturbed, and mitigated as required, during construction and operation of the project.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

The CEC staff has not received any agency or public comments regarding geologic hazards, mineral resources, or paleontology at this time.

CONCLUSIONS

Watson will be able to comply with applicable LORS, provided that the proposed conditions of certification are adopted and enforced. The design and construction of the project should have no adverse impact with respect to geologic, mineralogic, and paleontologic resources. The CEC staff proposes to ensure compliance with applicable LORS through the adoption of the proposed conditions of certification listed below.

PROPOSED CONDITIONS OF CERTIFICATION

General conditions of certification with respect to engineering geology are proposed under Conditions of Certification **GEN-1, GEN-5, and CIVIL-1** in the **FACILITY DESIGN** section. Proposed paleontological conditions of certification follow in **PAL-1** through **PAL-7**. It is CEC staff's opinion that the likelihood of encountering paleontologic resources is high if any excavations penetrate through the recent alluvium of the site surface. The CEC staff will consider reducing monitoring intensity, at the recommendation of the project PRS, following examination of sufficient, representative, deep excavations to fully understand site stratigraphy.

PAL-1 The project owner shall provide the Compliance Project Manager (CPM) with the resume and qualifications of its Paleontological Resource Specialist (PRS) for review and approval. If the approved PRS is replaced prior to completion of project mitigation and submittal of the Paleontological Resources Report, the project owner shall obtain CPM approval of the replacement PRS. The project owner shall keep resumes on file for qualified Paleontological Resource Monitors (PRMs). If a PRM is replaced, the resume of the replacement PRM shall also be provided to the CPM.

The PRS resume shall include the names and phone numbers of references. The resume shall also demonstrate to the satisfaction of the CPM the appropriate education and experience to accomplish the required paleontological resource tasks.

As determined by the CPM, the PRS shall meet the minimum qualifications for a vertebrate paleontologist as described in the Society of Vertebrate Paleontology (SVP) guidelines of 1995. The experience of the PRS shall include the following:

1. Institutional affiliations, appropriate credentials, and college degree;

2. Ability to recognize and collect fossils in the field;

3. Local geological and biostratigraphic expertise;

4. Proficiency in identifying vertebrate and invertebrate fossils; and

5. At least three years of paleontological resource mitigation and field experience in California and at least one year of experience leading paleontological resource mitigation and field activities.

The project owner shall ensure that the PRS obtains qualified paleontological resource monitors to monitor as he or she deems necessary on the project. Paleontologic Resource Monitors (PRMs) shall have the equivalent of the following qualifications:

- BS or BA degree in geology or paleontology and one year of experience monitoring in California; or
- AS or AA in geology, paleontology, or biology and four years' experience monitoring in California; or
- Enrollment in upper division classes pursuing a degree in the fields of geology or paleontology and two years of monitoring experience in California.

Verification:

1. At least 60 days prior to the start of ground disturbance, the project owner shall submit a resume and statement of availability of its designated PRS for on-site work.

2. At least 20 days prior to ground disturbance, the PRS or project owner shall provide a letter with resumes naming anticipated monitors for the project, stating that the identified monitors meet the minimum qualifications for paleontological resource monitoring required by the condition. If additional monitors are obtained during the project, the PRS shall provide additional letters and resumes to the CPM. The letter shall be provided to the CPM no later than one week prior to the monitor's beginning on-site duties.

3. Prior to the termination or release of a PRS, the project owner shall submit the resume of the proposed new PRS to the CPM for review and approval.

PAL-2 The project owner shall provide to the PRS and the CPM, for approval, maps and drawings showing the footprint of the power plant, construction lay down areas, and all related facilities. Maps shall identify all areas of the project where ground disturbance is anticipated. If the PRS requests enlargements or strip maps for linear facility routes, the project owner shall provide copies to the PRS and CPM. The site grading plan and plan and profile drawings for the utility lines would be acceptable for this purpose. The plan drawings should show the location, depth, and extent of all ground disturbances and be at a scale between 1 inch = 40 feet and 1 inch = 100 feet range. If the footprint of the project or its linear facilities change, the project owner shall provide maps and drawings reflecting those changes to the PRS and CPM.

If construction of the project proceeds in phases, maps and drawings may be submitted prior to the start of each phase. A letter identifying the proposed schedule of each project phase shall be provided to the PRS and CPM. Before work commences on affected phases, the project owner shall notify the PRS and CPM of any construction phase scheduling changes.

At a minimum, the project owner shall ensure that the PRS or PRM consults weekly with the project superintendent or construction field manager to confirm area(s) to be worked the following week, and until ground disturbance is completed.

Verification:

1. At least 30 days prior to the start of ground disturbance, the project owner shall provide the maps and drawings to the PRS and CPM.

2. If there are changes to the footprint of the project, revised maps and drawings shall be provided to the PRS and CPM at least 15 days prior to the start of ground disturbance.

3. If there are changes to the scheduling of the construction phases, the project owner shall submit a letter to the CPM within 5 days of identifying the changes.

PAL-3 The project owner shall ensure that the PRS prepares, and the project owner submits to the CPM for review and approval, a paleontological resources monitoring and mitigation plan (PRMMP) to identify general and specific measures to minimize potential impacts to significant paleontological resources. Approval of the PRMMP by the CPM shall occur prior to any ground disturbance. The PRMMP shall function as the formal guide for monitoring, collecting, and sampling activities, and may be modified with CPM approval. This document shall be used as the basis of discussion when on-site decisions or changes are proposed. Copies of the PRMMP shall reside with the PRS, each monitor, the project owner's on-site manager, and the CPM.

The PRMMP shall be developed in accordance with the guidelines of the Society of Vertebrate Paleontology (SVP, 1995) and shall include, but not be limited, to the following:

1. Assurance that the performance and sequence of project-related tasks, such as any literature searches, pre-construction surveys, worker environmental training, fieldwork, flagging or staking, construction monitoring, mapping and data recovery, fossil preparation and collection, identification and inventory, preparation of final reports, and transmittal of materials for curation will be performed according to PRMMP procedures;

2. Identification of the person(s) expected to assist with each of the tasks identified within the PRMMP and the conditions of certification;

3. A thorough discussion of the anticipated geologic units expected to be encountered, the location and depth of the units relative to the project when known, and the known sensitivity of those units based on the occurrence of fossils either in that unit or in correlative units;

4. An explanation of why, how, and how much sampling is expected to take place and in what units. Include descriptions of different sampling procedures that shall be used for fine-grained and coarse-grained units;

5. A discussion of the locations of where the monitoring of project construction activities is deemed necessary, and a proposed plan for monitoring and sampling;

6. A discussion of procedures to be followed in the event of a significant fossil discovery, halting construction, resuming construction, and how notifications will be performed;

7. A discussion of equipment and supplies necessary for collection of fossil materials and any specialized equipment needed to prepare, remove, load, transport, and analyze large-sized fossils or extensive fossil deposits;

8. Procedures for inventory, preparation, and delivery for curation into a retrievable storage collection in a public repository or museum, which meet the Society of Vertebrate Paleontology's standards and requirements for the curation of paleontological resources;

9. Identification of the institution that has agreed to receive data and fossil materials collected, requirements or specifications for materials delivered for curation, and how they will be met, and the name and phone number of the contact person at the institution; and

10. A copy of the paleontological conditions of certification.

Verification: At least 30 days prior to ground disturbance, the project owner shall provide a copy of the PRMMP to the CPM. The PRMMP shall include an affidavit of authorship by the PRS, and acceptance of the PRMMP by the project owner evidenced by a signature.

PAL-4 Prior to ground disturbance and for the duration of construction activities involving ground disturbance, the project owner and the PRS shall prepare and conduct weekly CPM-approved training for the following workers: project managers, construction supervisors, foremen and general workers involved with or who operate ground-disturbing equipment or tools. Workers shall not excavate in sensitive units prior to receiving CPM-approved worker training. Worker training shall consist of a CPM-approved video or in-person presentation. The training program may be combined with other training programs prepared for cultural and biological resources, hazardous materials, or other areas of interest or concern. No ground disturbance shall occur prior

to CPM approval of the Worker Environmental Awareness Program (WEAP), unless specifically approved by the CPM.

The WEAP shall address the possibility of encountering paleontological resources in the field, the sensitivity and importance of these resources, and legal obligations to preserve and protect those resources.

The training shall include:

1. A discussion of applicable laws and penalties under the law;

2. Good quality photographs or physical examples of vertebrate fossils for project sites containing units of high paleontologic sensitivity;

3. Information that the PRS or PRM has the authority to halt or redirect construction in the event of a discovery or unanticipated impact to a paleontological resource;

4. Instruction that employees are to halt or redirect work in the vicinity of a find and to contact their supervisor and the PRS or PRM;

5. An informational brochure that identifies reporting procedures in the event of a discovery;

6. A WEAP certification of completion form signed by each worker indicating that he/she has received the training; and

7. A sticker that shall be placed on hard hats indicating that environmental training has been completed.

Verification:

1. At least 30 days prior to ground disturbance, the project owner shall submit the proposed WEAP, including the brochure, with the set of reporting procedures for workers to follow.

2. At least 30 days prior to ground disturbance, the project owner shall submit the script and final video to the CPM for approval if the project owner is planning to use a video for interim training.

3. If the owner requests an alternate paleontological trainer, the resume and qualifications of the trainer shall be submitted to the CPM for review and approval prior to installation of an alternate trainer. Alternate trainers shall not conduct training prior to CPM authorization.

4. In the monthly compliance report (MCR), the project owner shall provide copies of the WEAP certification of completion forms with the names of those trained and the trainer or type of training (in-person or video) offered that month. The MCR shall also include a running total of all persons who have completed the training to date.

PAL-5 The project owner shall ensure that the PRS and PRM(s) monitor consistent with the PRMMP all construction-related grading, excavation, trenching, and augering in areas where potential fossil-bearing materials have been identified, both at the site and along any constructed linear facilities associated with the project. In the event that the PRS determines full-time monitoring is not necessary in locations that were identified as potentially fossil-bearing in the PRMMP, the project owner shall notify and seek the concurrence of the CPM.

The project owner shall ensure that the PRS and PRM(s) have the authority to halt or redirect construction if paleontological resources are encountered. The project owner shall ensure that there is no interference with monitoring activities unless directed by the PRS. Monitoring activities shall be conducted as follows:

1. Any change of monitoring from the accepted schedule in the PRMMP shall be proposed in a letter or email from the PRS and the project owner to the CPM prior to the change in monitoring and will be included in the monthly compliance report. The letter or email shall include the justification for the change in monitoring and be submitted to the CPM for review and approval.

2. The project owner shall ensure that the PRM(s) keep a daily monitoring log of paleontological resource activities. The PRS may informally discuss paleontological resource monitoring and mitigation activities with the CPM at any time.

3. The project owner shall ensure that the PRS notifies the CPM within 24 hours of the occurrence of any incidents of non-compliance with any paleontological resources conditions of certification. The PRS shall recommend corrective action to resolve the issues or achieve compliance with the conditions of certification.

4. For any significant paleontological resources encountered, either the project owner or the PRS shall notify the CPM within 24 hours, or Monday morning in the case of a weekend event where construction has been halted because of a paleontological find.

The project owner shall ensure that the PRS prepares a summary of monitoring and other paleontological activities placed in the monthly compliance reports. The summary will include the name(s) of PRS or PRM(s) active during the month, general descriptions of training and monitored construction activities, and general locations of excavations, grading, and other activities. A section of the report shall include the geologic units or subunits encountered, descriptions of samplings within each unit, and a list of identified fossils. A final section of the report will address any issues or concerns about the project relating to paleontologic monitoring, including any incidents of non-compliance or any changes to the monitoring plan that have been approved by the CPM. If no monitoring took place during the month, the

report shall include an explanation in the summary as to why monitoring was not conducted.

Verification: The project owner shall ensure that the PRS submits the summary of monitoring and paleontological activities in the MCR. When feasible, the CPM shall be notified 10 days in advance of any proposed changes in monitoring different from the plan identified in the PRMMP. If there is any unforeseen change in monitoring, the notice shall be given as soon as possible prior to implementation of the change.

PAL-6 The project owner, through the designated PRS, shall ensure that all components of the PRMMP are adequately performed including collection of fossil materials, preparation of fossil materials for analysis, analysis of fossils, identification and inventory of fossils, the preparation of fossils for curation, and the delivery for curation of all significant paleontological resource materials encountered and collected during project construction.

Verification: The project owner shall maintain in his/her compliance file copies of signed contracts or agreements with the designated PRS and other qualified research specialists. The project owner shall maintain these files for a period of three years after project completion and approval of the CPM-approved paleontological resource report (see **PAL-7**). The project owner shall be responsible for paying any curation fees charged by the museum for fossils collected and curated as a result of paleontological mitigation. A copy of the letter of transmittal submitting the fossils to the curating institution shall be provided to the CPM.

PAL-7 The project owner shall ensure preparation of a Paleontological Resources Report (PRR) by the designated PRS. The PRR shall be prepared following completion of the ground-disturbing activities. The PRR shall include an analysis of the collected fossil materials and related information, and submit it to the CPM for review and approval.

The report shall include, but is not limited to, a description and inventory of recovered fossil materials; a map showing the location of paleontological resources encountered; determinations of sensitivity and significance; and a statement by the PRS that project impacts to paleontological resources have been mitigated below the level of significance.

Verification: Within 90 days after completion of ground-disturbing activities, including landscaping, the project owner shall submit the PRR under confidential cover to the CPM.

Certification of Completion
Worker Environmental Awareness Program
BP Watson Power Plant (09-AFC-01)

This is to certify these individuals have completed a mandatory California Energy Commission-approved Worker Environmental Awareness Program (WEAP). The WEAP includes pertinent information on cultural, paleontological, and biological resources for all personnel (that is, construction supervisors, crews, and plant operators) working on site or at related facilities. By signing below, the participant indicates that he/she understands and shall abide by the guidelines set forth in the program materials. Include this completed form in the Monthly Compliance Report.

No.	Employee Name	Title/Company	Signature
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Cultural Trainer: _____ Signature:_____ Date: ___/___/____

PaleoTrainer: _____ Signature:_____ Date: ___/___/____

Biological Trainer: _____Signature:_____ Date:___/___/__

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POWER PLANT EFFICIENCY

Testimony of Shahab Khoshmashrab

SUMMARY OF CONCLUSIONS

The Watson Cogeneration Steam and Electric Reliability Project (BP Watson), if constructed and operated as proposed, would generate up to 85 megawatts (MW) (nominal net output) of additional electrical power for the existing Watson power plant facility, plus an additional 659,000 pounds per hour of process steam for the nearby BP Carson refinery. The project would burn a blend of natural gas and refinery gas, producing electrical power at fuel efficiency of approximately 52% lower heating value (LHV).

While it would consume substantial amounts of energy, it would do so in the most efficient manner practicable. It would not create significant adverse effects on energy supplies or resources, would not require additional sources of energy supply, and would not consume energy in a wasteful or inefficient manner. No energy standards apply to the project. Staff therefore concludes that the project would present no significant adverse impacts upon energy resources.

INTRODUCTION

The California Energy Commission (Energy Commission) makes findings as to whether energy use by BP Watson would result in significant adverse impacts on the environment, as defined in the California Environmental Quality Act (CEQA). If the Energy Commission finds that BP Watson project's consumption of energy creates a significant adverse impact, it must determine whether there are any feasible mitigation measures that could eliminate or minimize the impact. In this analysis, staff addresses the issue of inefficient and unnecessary consumption of energy.

In order to support the Energy Commission's findings, this analysis will:

- examine whether the facility will likely present any adverse impacts upon energy resources;
- examine whether these adverse impacts are significant; and if so,
- examine whether feasible mitigation measures exist that would eliminate the adverse impacts or reduce them to a level of insignificance.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

No federal, state, or local/county laws, ordinances, regulations, and standards (LORS) apply to the efficiency of this project.

SETTING

Watson Cogeneration Company and BP West Coast Products, LLC propose to expand

the existing Watson Cogeneration Facility, located in the city of Carson, by 85 MW (nominal net output) plus an additional 659,000 pounds per hour of process steam generation. The BP Watson project would consist of one GE 7EA combustor turbine generator (CTG) and one duct fired heat recovery steam generator (HRSG) operating in parallel with four existing CTGs/HRSGs, and an expansion of an existing mechanical draft cooling tower (two additional cells). For air emissions control, the CTG would be equipped with dry low-NOx combustors and the HRSG with a selective catalytic reduction (SCR) system (Watson 2009a, AFC §§ 3.1, 3.4.1).

The project would be fueled by a blend of natural gas and refinery gas with the CTG running primarily on natural gas and the refinery gas being used for duct burning, and thus steam production, in the HRSG. Refinery gas would be provided by the adjacent BP Carson refinery. Natural gas would be delivered to the project site through an existing Southern California Gas Company (SoCal Gas) pipeline that currently serves the Watson Cogeneration Facility (Watson 2009a, AFC §§ 3.4.2, 3.11.6.1).

ASSESSMENT OF IMPACTS

METHOD AND THRESHOLD FOR DETERMINING SIGNIFICANCE OF ENERGY RESOURCES

CEQA Guidelines state that the environmental analysis "…shall describe feasible measures which could minimize significant adverse impacts, including where relevant, inefficient and unnecessary consumption of energy" (Title 14 CCR §15126.4[a][1]). Appendix F of the Guidelines further suggests consideration of such factors as the project's energy requirements and energy use efficiency; its effects on local and regional energy supplies and energy resources; its requirements for additional energy supply capacity; its compliance with existing energy standards; and any alternatives that could reduce wasteful, inefficient, and unnecessary consumption of energy (Title 14, CCR §15000 et seq., Appendix F).

The inefficient and unnecessary consumption of energy, in the form of non-renewable fuels such as natural gas and oil, constitutes an adverse environmental impact. An adverse impact can be considered significant if it results in:

- adverse effects on local and regional energy supplies and energy resources;
- a requirement for additional energy supply capacity;
- noncompliance with existing energy standards; or
- the wasteful, inefficient, and unnecessary consumption of fuel or energy.

PROJECT ENERGY REQUIREMENTS AND ENERGY USE EFFICIENCY

Any power plant large enough to fall under Energy Commission siting jurisdiction will consume large amounts of energy. During base load operation at average ambient conditions and with no duct firing, the BP Watson project is expected to burn natural gas at a rate of 926 million British thermal units (MMBtu) per hour, LHV. The estimated fuel consumption (a blend of natural gas and refinery gas) with duct firing at the same conditions would be 1,310 MMBtu per hour (Watson 2009a, AFC Table 3-3). This is a

substantial rate of energy consumption and holds the potential to impact energy supplies.

The electric generation heat rate of a cogeneration plant can be expressed as "heat rate chargeable to power." This is calculated by subtracting the fuel used to serve the cogeneration load from total fuel consumption; the remainder is fuel chargeable to power generation. Electrical power would be generated by BP Watson (calculated as “heat rate charged to power”) at an efficiency of about 52% LHV.

ADVERSE EFFECTS ON ENERGY SUPPLIES AND RESOURCES

The applicant has described its sources of supply of fuel for the project (Watson 2009a, AFC §§ 3.4.2, 3.11.6.1). Refinery gas for the BP Watson project would be supplied from the existing refinery gas system from the adjacent BP Carson Refinery that currently supplies the Watson Cogeneration Facility. Natural gas for BP Watson would be supplied from the existing SoCal Gas system via the existing pipeline which also serves the Watson Cogeneration Facility. The SoCal Gas system is capable of delivering the required quantity of gas to the project; the SoCal Gas natural gas supply represents a reliable source of natural gas for this project. Therefore, it appears unlikely that the project could pose a substantial increase in demand for natural gas in California.

ADDITIONAL ENERGY SUPPLY REQUIREMENTS

Natural gas fuel would be supplied to the project by SoCal Gas via an existing pipeline connection. Refinery gas would also be supplied via an existing pipeline connection (Watson 2009a, AFC §§ 3.4.2, 3.11.6.1). There appears to be no real likelihood that BP Watson would require the development of additional energy supply capacity, since SoCal Gas’ regional supplies are considered plentiful.

COMPLIANCE WITH ENERGY STANDARDS

There are no specific LORS which mandate a particular efficiency level for power plants.

ALTERNATIVES TO REDUCE WASTEFUL, INEFFICIENT, AND UNNECESSARY ENERGY CONSUMPTION

The BP Watson project could be deemed to create significant adverse impacts on energy resources if alternatives existed that would reduce the project’s use of fuel. Evaluation of alternatives to the project that could reduce wasteful, inefficient, or unnecessary energy consumption first requires examination of the project’s energy consumption. Project fuel efficiency, and therefore its rate of energy consumption, is determined by the configuration of the power producing system and by the selection of equipment used to generate power.

Project Configuration

The BP Watson project would be configured as a simple cycle cogeneration power plant. Cogeneration (also called combined heat and power, or CHP) involves the concurrent generation of electricity and useful thermal energy (heat). A "topping cycle" cogeneration plant, such as the Watson Cogeneration Facility, uses the heat of combusted fuel first to produce electricity. The residual or waste heat remaining is then put to some industrial

use, in this case as process steam at the BP Carson Refinery. By using waste heat which would otherwise be lost, a cogeneration power plant is inherently more efficient than the separate power plant and industrial heat source that it replaces.

The applicant proposes to use evaporative inlet air cooling, a HRSG duct burner (re-heaters), and a single pressure natural circulation HRSG (Watson 2009a, AFC 3.1, 3.4.5, 3.4.5.2). Staff believes these features contribute to meaningful efficiency enhancement of the BP Watson project. The BP Watson project would also be operating as an extension of the existing four trains of the Watson Cogeneration Facility, which allows for high efficiency for the combined projects during unit turndown; one CTG can operate at a more efficient full load while others are shut down.

Equipment Selection

The E-class advanced heavy duty gas turbines to be employed in the BP Watson project represent some of the most modern and efficient such machines now available. The applicant would employ one GE Frame 7EA combustion turbine generator operating in simple cycle configuration with waste heat being captured to produce steam for cogeneration. This cogeneration configuration would thus have a capacity similar to the turbine running in simple cycle, but would have a thermal efficiency similar to a combined cycle configuration. In a one-on-one combined cycle configuration, the GE 7EA is nominally rated at 130 MW and 50.2% maximum full load efficiency LHV at ISO conditions[1] (GTW 2009). By comparison, BP Watson would be expected to reach at least 51.7% maximum full load efficiency LHV. The cogeneration configuration allows the project to meet a lower capacity demand at a slightly higher efficiency.

Efficiency of Alternatives to the Project

The project objectives include improving the reliability of steam supply at the BP Carson Refinery and providing added generation capacity and voltage support to the California transmission grid (Watson 2009a, AFC § 2.0)

Alternative Generating Technologies

Alternative generating technologies for the BP Watson project are considered in the AFC (Watson 2009a, AFC § 4.4). Fossil fuels, nuclear, solar, biomass, hydroelectric, wind, and geothermal technologies are all considered. Given the project objectives, location, air pollution control requirements, and commercial availability of the above technologies, staff agrees with the applicant that only gas-burning technologies are feasible.

[1] International Standards Organization (ISO) standard conditions are 15°C (59°F), 60% relative humidity, and one atmosphere of pressure (equivalent to sea level).

Natural Gas-Burning Technologies

Fuel consumption is one of the most important economic factors in selecting an electric generator; fuel typically accounts for over two-thirds of the total operating costs of a fossil-fuel-fired power plant (Power, 1994). Under a competitive power market system, where operating costs are critical in determining the competitiveness and profitability of a power plant, the plant owner is thus strongly motivated to purchase fuel-efficient machinery.

Modern gas turbines embody the most fuel-efficient electric generating technology available today. Currently available, large combustion turbine models can be grouped into three categories including conventional, advanced, and next generation. Advanced combustion turbines offer advantages for the BP Watson project. Their higher firing temperatures offer higher efficiencies than conventional turbines. They offer proven technology with numerous installations and extensive run time in commercial operation. Emission levels are also proven, and guaranteed emission levels have been reduced based on operational experience and design optimization by the manufacturers.

Gas turbines are available in two basic configurations, heavy-duty "industrial" machines and aeroderivative machines. While the aeroderivative machines appear to be more efficient in simple cycle mode, this advantage generally disappears in either combined cycle or cogeneration applications. Because a typical aeroderivative gas turbine is more efficient in converting the heat from combusted fuel into shaft power (and thus electricity), less heat remains in the turbine exhaust to produce steam to operate a combined cycle steam turbine or a cogeneration industrial process. The heavy-duty machine, on the other hand, converts less of the heat from fuel combustion into shaft power, and more remains in the exhaust gases to power a steam turbine or cogeneration process. In fact, the heavy-duty turbines with their lower pressure ratios have an efficiency advantage in combined cycle and cogeneration configurations.

One possible alternative to the chosen project configuration would be to use the same 7EA turbine in a one-on-one combined cycle configuration, which would incorporate an additional steam turbine generator (STG). In combined cycle, the GE 7EA would produce upwards of 130 MW at approximately 50% efficiency (GWT 2009). However, the steam turbine would only be usable when steam is not needed by the BP Carson Refinery. The purpose of the project, as stated in the project objectives, is first to provide added steam supply reliability to the refinery; the applicant estimates that the BP Watson project would be operated 95% of the year to meet steam supply requirements (Watson 2009a, AFC § 3.4.5.3). Thus, an STG would likely be underused, making this configuration unattractive.

Aeroderivative gas turbines could also have been considered for this project. A pair of GE LM6000 simple cycle gas turbines with HRSGs would produce nearly as much electric power and steam as a simple cycle Frame 7EA, approximately 87 MW at 40.1% efficiency (GTW 2009). This is not a viable option, however, given the space constraints of the project site. Additionally, the LM6000 model turbine is more suitable for uses in non-cogeneration projects because the steam production would not be as high as with the heavy duty machines, as stated above.

The proposed project configuration of one GE Frame 7EA simple cycle gas turbine in cogeneration mode appears to be the most efficient option for the BP Watson project.

Inlet Air Cooling

A further choice of alternatives involves the selection of gas turbine inlet air cooling methods. The two commonly used techniques are the evaporative cooler, or fogger, and the chiller. Both devices increase power output by cooling the gas turbine inlet air. A mechanical chiller can offer greater power output than the evaporative cooler on hot, humid days, but it consumes electric power to operate its refrigeration process, thus slightly reducing overall net power output and, thus, overall efficiency. An absorption chiller uses less electric power but necessitates the use of a substantial inventory of ammonia. An evaporative cooler or a fogger boosts power output best on dry days; it uses less electric power than a mechanical chiller, possibly yielding slightly higher operating efficiency. The difference in efficiency among these techniques is relatively insignificant.

Given the climate at the project site and the relative lack of clear superiority of one system over the other, staff agrees that the applicant’s choice of an evaporative cooler for gas turbine inlet air cooling would yield no significant adverse energy impacts.

Staff, therefore, believes the BP Watson project would not constitute a significant adverse impact on energy resources.

CUMULATIVE IMPACTS

There are no nearby power plant projects that hold the potential for cumulative energy consumption impacts when aggregated with the project. Staff knows of no other projects that could result in cumulative energy impacts.

Staff believes that construction and operation of the project would not bring about indirect impacts, in the form of additional fuel consumption, that would not have occurred but for the project. The older, less efficient power plants consume more natural gas to operate than the new, more efficient plants such as the BP Watson project. Since natural gas would be burned by the power plants that are most competitive on the spot market, the most efficient plants would likely run the most. The high efficiency of the proposed BP Watson project should allow it to compete very favorably, running at a high capacity factor, replacing less efficient power generating plants in the market, and therefore not impacting or even reducing the cumulative amount of natural gas consumed for power generation.

NOTEWORTHY PUBLIC BENEFITS

The applicant expects the project to help meet local electricity generation needs for Los Angeles County. By doing so in this most fuel-efficient manner, that is, employing the most modern E-class gas turbine generator available, the BP Watson project would provide a benefit to the electric consumers of California.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

None Received.

CONCLUSIONS AND RECOMMENDATIONS

The project, if constructed and operated as proposed, would generate up to 85 MW (nominal gross output) of electric power at an efficiency of 52% LHV. Additional process steam would be produced for the BP Carson Refinery, resulting in an overall cogeneration efficiency of 56.7%. While the project would consume substantial amounts of energy, it would do so in the most efficient manner practicable. It would not create significant adverse effects on energy supplies or resources, would not require additional sources of energy supply, and would not consume energy in a wasteful or inefficient manner. No energy standards apply to the project. Staff therefore concludes that the project would present no significant adverse impacts upon energy resources.

No cumulative impacts on energy resources are likely. Facility closure would not likely present significant impacts on electric system efficiency.

PROPOSED CONDITIONS OF CERTIFICATION

No conditions of certification are proposed.

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POWER PLANT RELIABILITY

Testimony of Shahab Khoshmashrab

SUMMARY OF CONCLUSIONS

Watson Cogeneration Company (Watson), the applicant, predicts an equivalent availability factor of 90 to 100%. Staff believes the middle of this range is achievable. Based on a review of the Application for Certification, staff concludes that the Watson Cogeneration Steam and Electric Reliability Project (BP Watson) would be built and operated in a manner consistent with industry norms for reliable operation. This should provide an adequate level of reliability. No conditions of certification are proposed.

INTRODUCTION

In this analysis, California Energy Commission (Energy Commission) staff addresses the reliability issues of the project to determine if the power plant is likely to be built in accordance with typical industry norms for reliability of power generation. Staff uses this level of reliability as a benchmark because it ensures that the resulting project would likely not degrade the overall reliability of the electric system it serves (see “Setting” below).

The scope of this power plant reliability analysis covers:

- equipment availability;
- plant maintainability;
- fuel and water availability; and
- power plant reliability in relation to natural hazards.

Staff examined the project design criteria to determine if the project is likely to be built in accordance with typical industry norms for reliability of power generation. While the applicant has predicted an equivalent availability factor of 90 to 100% for the BP Watson project (see below), staff uses typical industry norms as a benchmark, rather than Watson’s projection, to evaluate the project’s reliability.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

No federal, state, or local/county laws, ordinances, regulations, and standards (LORS) apply to the reliability of this project.

SETTING

In the restructured competitive electric power industry, the responsibility for maintaining system reliability falls largely to the state’s control area operators, such as the California Independent System Operator (California ISO), that purchase, dispatch, and sell electric power throughout the state. How the California ISO and other control area operators will ensure system reliability is an ongoing process; protocols are still being developed and

put in place that will allow sufficient reliability to be maintained under the competitive market system. “Must-run” power purchase agreements and “participating generator” agreements are two mechanisms being employed to ensure an adequate supply of reliable power.

In September 2005, California AB 380 (Núñez, Chapter 367, Statutes of 2005) became law. This modification to the Public Utilities Code requires the California Public Utilities Commission to consult with the California ISO to establish resource adequacy requirements for all load-serving entities (basically, public and privately owned utility companies). These requirements include maintaining a minimum reserve margin (extra generating capacity to serve in times of equipment failure or unexpected demand) and maintaining sufficient local generating resources to satisfy the load-serving entity’s peak demand and operating reserve requirements.

In order to fulfill this mandate, the California ISO has begun to establish specific criteria for each load-serving entity under its jurisdiction. These criteria guide each load-serving entity in deciding how much generating capacity and ancillary services to build or purchase, after which the load-serving entity issues power purchase agreements to satisfy these needs.

The California ISO’s mechanisms to ensure adequate power plant reliability apparently have been devised under the assumption that the individual power plants that compete to sell power into the system will each exhibit a level of reliability similar to that of power plants of past decades. However, there is cause to believe that, under free market competition, financial pressures on power plant owners to minimize capital outlays and maintenance expenditures may act to reduce the reliability of many power plants, both existing and newly constructed (McGraw-Hill, 1994). It is possible that, if significant numbers of power plants were to exhibit individual reliability sufficiently lower than this historical level, the assumptions used by California ISO to ensure system reliability would prove invalid, with potentially disappointing results. Until the restructured competitive electric power system has undergone an adequate shakeout period, and the effects of varying power plant reliability are thoroughly understood and compensated for, staff will recommend that power plant owners continue to build and operate their projects to the level of reliability to which all in the industry are accustomed.

The applicant proposes to operate the 85-megawatt (MW) (nominal net output) BP Watson project, a cogeneration power plant, to meet a need for process steam for the adjacent BP Carson Refinery and capacity and voltage support in the region of the City of Carson (AFC § 2.0). The project is expected to achieve a service factor, similar to an equivalent availability factor (EAF), in the range of 90 to 100% (AFC §§ 3.11.3, 3.11.4). The applicant expects to operate the plant at a capacity factor of 95% during each year of its operating life (AFC § 3.4.5.3).

ASSESSMENT OF IMPACTS

METHOD FOR DETERMINING RELIABILITY

The Energy Commission must make findings as to the manner in which the project is to be designed, sited, and operated to ensure safe and reliable operation (Title 20, CCR §1752[c]). Staff takes the approach that a project is acceptable if it does not degrade the reliability of the utility system to which it is connected. This is likely the case if the project exhibits reliability at least equal to that of other power plants on that system.

The availability factor for a power plant is the percentage of the time that it is available to generate power; both planned and unplanned outages subtract from its availability. Measures of power plant reliability are based on the plant's actual ability to generate power when it is considered available and are based on starting failures and unplanned, or forced, outages. For practical purposes, reliability can be considered a combination of these two industry measures, making a reliable power plant one that is available when called upon to operate. Power plant systems must be able to operate for extended periods without shutting down for maintenance or repairs. Achieving this reliability is accomplished by ensuring adequate levels of equipment availability, plant maintainability with scheduled maintenance outages, fuel and water availability, and resistance to natural hazards. Staff examines these factors for the project and compares them to industry norms. If they compare favorably, staff can conclude that the BP Watson project would be as reliable as other power plants on the electric system and will therefore not degrade system reliability.

EQUIPMENT AVAILABILITY

Equipment availability would be ensured by use of appropriate quality assurance/quality control (QA/QC) programs during design, procurement, construction and operation of the plant and by providing for adequate maintenance and repair of the equipment and systems (discussed below).

Quality Control Program

The applicant describes a QA/QC program (AFC § 3.11.7) typical of the power industry. Equipment would be purchased from qualified suppliers based on technical and commercial evaluations. The project owner would perform receipt inspections, test components, and administer independent testing contracts. Staff expects implementation of this program to yield typical reliability of design and construction. To ensure such implementation, staff has proposed appropriate conditions of certification under the portion of this document entitled **Facility Design**.

PLANT MAINTAINABILITY

Equipment Redundancy

A generating facility called on to operate in base-load service for long periods of time must be capable of being maintained while operating. A typical approach for achieving this is to provide redundant examples of those pieces of equipment most likely to require service or repair.

The applicant plans to provide appropriate redundancy of function for the project (AFC § 3.11.4). The BP Watson project is essentially an expansion of the Watson Cogeneration Facility (Facility) and would be operating in parallel with the Facility's four existing trains. Thus BP Watson acts to enhance the operational reliability of the Watson Cogeneration Facility. If the BP Watson project were to experience an equipment failure, the four trains at the original plant would still be able to operate, so the combined facilities would still generate power (at reduced output). Further, all plant ancillary systems are also designed with adequate redundancy to ensure continued operation in the face of equipment failure. Staff believes that equipment redundancy would be sufficient for a project such as this.

Maintenance Program

The applicant proposes to establish a preventive plant maintenance program typical of the industry (AFC § 3.9). Equipment manufacturers provide maintenance recommendations with their products; the applicant would base its maintenance program on these recommendations. The program will encompass preventive and predictive maintenance techniques. Maintenance outages would be planned for periods of low electricity demand. In light of these plans, staff expects that the project would be adequately maintained to ensure acceptable reliability.

FUEL AND WATER AVAILABILITY

For any power plant, the long-term availability of fuel and of water for cooling or process use is necessary to ensure reliability. The need for reliable sources of fuel and water is obvious; lacking long-term availability of either source, the service life of the plant may be curtailed, threatening the supply of power as well as the economic viability of the plant.

Fuel Availability

The BP Watson project would burn natural gas supplied by Southern California Gas Company (SoCal Gas) and refinery gas supplied by the adjacent BP Carson Refinery. Natural gas fuel would be supplied to the project via the existing pipeline connection that currently serves the Watson Cogeneration Facility (AFC §§ 3.4.7, 3.7.1, 3.11.6.1). This natural gas system represents a resource of considerable capacity and offers access to adequate supplies of gas from the Rocky Mountains, Canada, and the Southwest. Staff agrees with the applicant's prediction that there would be adequate natural gas supply and pipeline capacity to meet the project's needs.

Water Supply Reliability

It is the goal of BP Watson to use reclaimed water. However, until the negotiations between BP Carson Refinery and the West Basin Municipal Water District are finalized, the applicant wants to use the municipal and groundwater which is available to the existing Watson Cogeneration Facility. Water would be used for utility, fire system, and inlet air fogger consumption, boiler feedwater makeup, and heat recovery steam generator (HRSG) blowdown quenching (AFC §§ 3.4.8, 3.11.6.2). Staff believes these sources yield sufficient likelihood of a reliable supply of water. (For further discussion of water supply, see the **Soil and Water Resources** section of this document.)

POWER PLANT RELIABILITY IN RELATION TO NATURAL HAZARDS

Natural forces can threaten the reliable operation of a power plant. High winds, tsunamis (tidal waves), seiches (waves in inland bodies of water), and flooding would not likely represent a hazard for this project, but seismic shaking (earthquake) may present a credible threat to reliable operation.

Seismic Shaking

The site lies within the seismically active Southern California. However, no active or potentially active faults have been identified near the project site (AFC §§ 3.11.1.1, 5.3.1.2); see the "Faulting and Seismicity" portion of the **Geology and Paleontology** section of this document. The project will be designed and constructed to the latest applicable LORS (AFC Appendix J). Compliance with current seismic design LORS represents an upgrading of performance during seismic shaking compared to older facilities since these LORS have been continually upgraded. Because it would be built to the latest seismic design LORS, this project would likely perform at least as well as, and perhaps better than, existing plants in the electric power system. Staff has proposed conditions of certification to ensure this; see the section of this document entitled **Facility Design**. In light of the general historical performance of California power plants and the electrical system in seismic events, staff has no special concerns with the power plant's functional reliability during earthquakes.

Flooding

The site is not within a 100-year flood zone (AFC § 3.11.1.2). Staff believes there are no concerns with power plant functional reliability due to flooding. For further discussion, see **Soil and Water Resources** and **Geology and Paleontology**.

COMPARISON WITH EXISTING FACILITIES

Industry statistics for availability factors (as well as many other related reliability data) are kept by the North American Electric Reliability Corporation (NERC). NERC continually polls utility companies throughout the North American continent on project reliability data through its Generating Availability Data System (GADS) and periodically summarizes and publishes the statistics on the Internet [http://www.nerc.com]. Because no statistics are available for cogeneration power plants, staff compares the project's availability factor to the average availability factor of natural gas combined cycle units. The NERC reported an availability factor of 89.5% as the generating unit average for the years 2002 through 2006 for combined cycle units of any capacity (NERC 2007).

The model of gas turbine that would be employed in the BP Watson project has been on the market for many years now and can be expected to exhibit typically high availability. The middle range of the applicant's prediction of an annual availability factor of 90 to 100% (AFC §§ 3.11.3, 3.11.4) appears reasonable compared to the NERC figure for similar plants throughout North America (see above). In fact, these machines can well be expected to outperform the fleet of various (mostly older and smaller) gas turbines that make up the NERC statistics. Further, since the plant would be operating in parallel with the four units at the Watson Cogeneration Facility, maintenance can be scheduled during those times of year when plant output is not required to meet BP Carson Refinery's steam requirements or market demand, typical of industry standard

maintenance procedures. The applicant's estimate of plant availability, therefore, appears realistic. The stated procedures for assuring design, procurement, and construction of a reliable power plant appear to be in keeping with industry norms, and staff believes they are likely to yield an adequately reliable plant.

NOTEWORTHY PROJECT BENEFITS

The applicant proposes to enhance steam supply reliability at the BP Carson Refinery as well as power supply reliability in the Southern California electricity market by meeting regional energy demands (AFC § 2.0). The fact that the project would operate as an independent equipment train in parallel with the four trains from the existing Watson Cogeneration Facility provides inherent reliability. While a single equipment failure at the BP Watson project could disable operation, the BP Watson project is an expansion to a larger facility with multiple trains; so a single equipment failure, while possibly disabling the project's single train, would not affect the other trains of the Facility. Overall generation would continue (at reduced output).

The gas turbine that would be employed in the project has been on the market for many years and can be expected to exhibit typically high availability. The applicant's prediction of an equivalent availability factor of 90 to 100% appears achievable. Staff believes this should provide an adequate level of reliability.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

None Received.

CONCLUSION

Watson predicts an equivalent availability factor of 90 to 100%, the middle range of which staff believes is achievable. Based on a review of the proposal, staff concludes that the plant would be built and operated in a manner consistent with industry norms for reliable operation. This should provide an adequate level of reliability. No conditions of certification are proposed.

PROPOSED CONDITIONS OF CERTIFICATION

No conditions of certification are proposed.

REFERENCES

McGraw-Hill (McGraw-Hill Energy Information Services Group). 1994. Operational Experience in Competitive Electric Generation. Executive report.

NERC (North American Electric Reliability Council). 2007. 2002–2006 Generating Availability Report.

Watson 2009a – Watson Cogeneration Company/Thomas A. Lu (tn 50584). Application for Certification Volume I&II, dated 3/19/09. Submitted to CEC/Docket Unit on 3/19/09.

TRANSMISSION SYSTEM ENGINEERING

Testimony of Sudath Edirisuriya and Mark Hesters

SUMMARY OF CONCLUSIONS

The proposed Watson Cogeneration Steam and Electric Reliability project (BP Watson) outlet lines and termination are acceptable and would comply with all applicable laws, ordinances, regulations, and standards. The analysis of project transmission lines and equipment, both from the power plant up to the point of interconnection with the existing transmission network as well as upgrades beyond the interconnection that are attributable to the project have been evaluated by staff and are included in the environmental sections of this Preliminary Staff Assessment.

Thermal overloads caused by the BP Watson project under the N-1 and N-2 conditions would be fully mitigated by the following facilities:

- Upgrading the existing Mesa and Hinson substation wave traps to 3000 Amps. Wave trap upgrade would occur within the fence line of the existing Southern California Edison (SCE) substations.
- Adding the BP Watson project to an existing planned Special Protection System (SPS) or implementing congestion management.

INTRODUCTION

STAFF ANALYSIS

This transmission system engineering (TSE) analysis examines whether this project's proposed interconnection conforms to all laws, ordinances, regulations, and standards (LORS) required for safe and reliable electric power transmission. Additionally, under the California Environmental Quality Act (CEQA), the Energy Commission must conduct an environmental review of the "whole of the action," which may include facilities not licensed by the Energy Commission (Title 14, California Code of Regulations Section 15378). The Energy Commission must, therefore, identify the system impacts and necessary new or modified transmission facilities downstream of the proposed interconnection that are required for interconnection and that, when included with the other project features, represent the whole of the action.

Commission staff relies on the responsible interconnecting authority for analysis of impacts on the transmission grid, as well as for the identification and approval of new or modified facilities required downstream from a proposed interconnection for mitigation purposes. The proposed BP Watson project would connect to SCE's existing 230-kV Hinson Substation and would require both analysis by SCE and the approval of the California Independent System Operator (California ISO).

SCE'S ROLE

SCE is responsible for ensuring electric system reliability in its service territory for proposed transmission modifications. For the proposed BP Watson project, SCE performed a Transition Cluster Phase I (Phase 1) study to determine whether or not the

proposed transmission modifications needed for the proposed BP Watson project conform to reliability standards. Because the project would be connected to the California ISO controlled transmission grid, the California ISO's role is to review and approve the Phase 1 study and its conclusions.

CALIFORNIA ISO'S ROLE

The California ISO is responsible for ensuring electric system reliability for all participating transmission owners and for developing the standards to achieve system reliability. The excess power generated by the proposed BP Watson project will be dispatched to the California ISO grid via SCE's existing Hinson 230-kV Substation. Therefore, the California ISO will review the studies of the SCE system to ensure adequacy of the proposed transmission interconnection. The California ISO determines the reliability impacts of proposed transmission modifications on the SCE transmission system in accordance with all applicable reliability criteria. According to the California ISO tariffs, the California ISO will determine the need for transmission additions or upgrades downstream from the interconnection point to insure reliability of the transmission grid.

The California ISO reviewed the Phase 1 study prepared by SCE for the proposed BP Watson project and issued a preliminary approval to SCE. On completion of the SCE Transition Cluster Phase 2 (Phase 2) study, the California ISO will review the study results and provide its conclusions and recommendations. The California ISO may provide written and verbal testimony on its findings at the Energy Commission hearings.

LAWS, ORDINANCES, REGULATIONS, AND STANDARDS

The LORS that apply to the transmission facilities associated with the proposed BP Watson project are:

California Public Utilities Commission (CPUC) General Order 95 (GO-95), *Rules for Overhead Electric Line Construction*, sets forth uniform requirements for the construction of overhead lines. Compliance with this Order ensures adequate service and the safety of the public and the people who build, maintain, and operate overhead electric lines.

CPUC General Order 128 (GO-128), *Rules for Construction of Underground Electric Supply and Communications Systems*, sets forth uniform requirements and minimum standards for underground supply systems to ensure adequate service and the safety of the public and the people who build, maintain, and operate underground electric lines.

The National Electric Safety Code, 1999, provides electrical, mechanical, civil, and structural requirements for overhead electric line construction and operation.

The combined North American Electric Reliability Corporation/Western Electricity Coordinating Council (NERC/WECC) planning standards provide system performance standards for assessing the reliability of the interconnected transmission system. These standards require continuity of service and the preservation of interconnected operation as the first and second priorities, respectively. Some aspects of NERC/WECC standards are either more stringent or more specific than the either agency's standards alone. These standards are

designed to ensure that transmission systems can withstand both forced and maintenance outage system contingencies while operating reliably within equipment and electric system thermal, voltage, and stability limits. These standards include reliability criteria for system adequacy and security, system modeling data requirements, system protection and control, and system restoration. Analysis of the WECC system is based to a large degree on Section I.A of WECC standards, *NERC and WECC Planning Standards with Table I and WECC Disturbance-Performance Table,* and on Section I.D, *NERC and WECC Standards for Voltage Support and Reactive Power.* These standards require that power flows and stability simulations verify defined performance levels. Performance levels are defined by specifying allowable variations in thermal loading, voltage and frequency, and loss of load that may occur during various disturbances. Performance levels range from no substantial adverse effects inside and outside a system area during a minor disturbance (such as the loss of load from a single transmission element) to a catastrophic loss level designed to prevent system cascading and the subsequent blackout of islanded areas and millions of consumers during a major transmission disturbance (such as the loss of multiple 500-kV lines along a common right-of- way, and/or of multiple large generators). While the controlled loss of generation or system separation is permitted under certain specific circumstances, a major uncontrolled loss is not permitted (WECC, 2002).

NERC's reliability standards for North America's electric transmission system spell out the national policies, standards, principles, and guidelines that ensure the adequacy and security of the nation's transmission system. These reliability standards provide for system performance levels under both normal and contingency conditions. While these standards are similar to the combined NERC/WECC standards, certain aspects of the combined standards are either more stringent or more specific than the NERC performance standards alone. NERC's reliability standards apply to both interconnected system operations and to individual service areas (NERC, 2006).

California ISO planning standards provide the standards and guidelines that ensure the adequacy, security, and reliability of the state's member grid facilities. These standards incorporate the combined NERC/WECC and NERC standards. These standards are also similar to the NERC/WECC or NERC standards for transmission system contingency performance. However, the California ISO standards provide additional requirements not included in the WECC/NERC or NERC standards. The California ISO standards apply to all participating transmission owners interconnecting to the California ISO-controlled grid. They also apply to non-member facilities that impact the California ISO grid through their interconnections with adjacent control grids (California ISO, 2002a).

California ISO/Federal Energy Regulatory Commission (FERC) electricity tariffs contain guidelines for building all transmission additions/upgrades within the California ISO-controlled grid. (California ISO, 2003a).

PROPOSED PROJECT

The proposed Watson Cogeneration Steam and Electric Reliability project is an expansion of a cogeneration facility that is located in the City of Carson in the County of Los Angeles. The existing cogeneration facility is owned by Watson Cogeneration

Company and operated by BP West Coast Products, LLC-BP Carson Refinery. The project consists of adding a fifth combustion turbine generator/ heat recovery steam generator (CTG/HRSG) to the existing configuration, hence it is also referred to as the "fifth train".

The existing facility has a net output of 385 MW and consists of four GE 7EA CTG's, four HRSGs and two Steam turbine generators (STG). The proposed plant will add a nominal 85 megawatt (MW) CTG with a single-pressure HRSG to provide additional process steam to the BP Carson refinery. The proposed generating unit (CTG) would be connected to the low side of its dedicated 13.8/69kV generator step-up (GSU) transformer through 13.8kV, 2000 Amps SF6 Circuit Breaker (CB). The GSU transformer would be rated at 13.8/69kV and 67/89/112 Megavolt Ampere (MVA) at 55 centigrade. The high side of the transformer would be connected to the proposed on site 69kV Gas Insulated Substation (GIS) via underground short segment of dielectric cables.

SWITCHYARD AND INTERCONNECTION FACILITIES

The 69kV GIS substation would design and build with Ring Bus configuration and consist of 2000 Amps - 10CBs, Motorized disconnect switches and protection relays. The 69kV substation would have six line positions to interconnect the refinery plant future loads and two line positions to interconnect with the onsite existing 230kV GIS switchyard via two 69/230kV transformers. The 230kV two transformers are rated at 120/160/200 MVA and high sides of the transformers are connected to the extended bus work of the Bay #6 and existing bus work of the Bay #5 of the "Arcogen" switchyard. All the 230kV, SF6 gas insulated high voltage circuit breakers are rated 3000 Ampere continuous current and 63000 Ampere interrupting capacity.

Electric power generated at the Watson Cogeneration Facility, which is not consumed for internal refinery use is transmitted from the existing switchyard to the SCE Hinson substation. The existing transmission line is a double circuit, single conductor per phase at 230kV. All conductors are 1033 Kcmil ACSR and each circuit is rated to carry the full output of the project. The existing 1.6 mile long double circuit generator tie lines are supported by lattice steel towers. (CAISO 2009a, Section 1, 3.6 pages 3.46 to 3.49, and Figures D-1, D-3, and D-4)

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

For the interconnection of this proposed project to the grid, the interconnecting utility (SCE) and the control area operator (California ISO) are responsible for ensuring grid reliability. These two entities will assess the potential impacts of the proposed BP Watson on the transmission system and any mitigation measures needed to ensure system conformance with the applicable utility reliability criteria, NERC planning standards, WECC reliability criteria, and California ISO reliability criteria. Phase 1 and Phase 2 studies are used to determine the impacts of the proposed BP Watson project on the transmission grid. Staff relies on these studies and any review conducted by the California ISO to determine the potential effects of the proposed BP Watson project on the transmission grid and to identify any necessary downstream facilities or indirect project impacts required to bring the transmission network into compliance with

applicable reliability standards. Phase 1 and Phase 2 studies analyze the grid with and without the proposed BP Watson project, under conditions specified in the planning standards and reliability criteria. The standards and criteria define the assumptions used in the study and establish the thresholds through which grid reliability is determined. The studies analyze the potential impact of the proposed BP Watson project for the anticipated first year of operation, and are based on a forecast of loads, generation, and transmission. Load forecasts are developed by the interconnected utility. Generation and transmission forecasts are established by an interconnection queue. The studies focus on thermal overloads, voltage deviations, system stability (excessive oscillations in generators and transmission system, voltage collapse, loss of loads, or cascading outages), and short circuit current. If the studies show that the interconnection of the project causes the grid to be out of compliance with the reliability standards, then the study will identify mitigation measures or ways in which the grid could be brought into compliance with the reliability standards.

When a project connects to the California ISO-controlled grid, both the studies and mitigation measures must be reviewed and approved by the California ISO. If either the California ISO or interconnecting utility determines that the only feasible mitigation includes transmission modifications or additions requiring CEQA review, the Energy Commission must analyze those modifications or additions according to CEQA requirements.

SCOPE OF SYSTEM IMPACT STUDIES

The Phase 1 study was performed by SCE at the request of the applicant to identify the potential impacts of the proposed BP Watson project on SCE's 69/115/230kV transmission system. The existing plant is currently connected to the SCE Hinson substation and its point of interconnection (POI) is located in the Metro Area system. The BP Watson project does not cause power flow or stability impacts on other Transmission Cluster projects; therefore, it has been studied on an individual basis. The Phase 1 study included power flow, sensitivity, short circuit studies, transient and post-transient analyses (Watson 2009a, Phase 1 study). The Phase 1 study modeled the proposed project for a net output of 85MW. The base cases included all California ISO approved major SCE transmission projects, and major path flow limits of Southern California Import Transmission, Midway-Vincent, and South of Lugo. The Phase 1 study considered light load conditions with generation patterns and SCIT imports maximized to identify the extent of potential congestion and to fully stress the SCE system in the area where the project of the proposed BP Watson project would be interconnected. The study assumptions are described in further detail in the Phase 1 study. The power flow studies were conducted with and without the BP Watson project connected to SCE's grid at the existing Hinson Substation, using 2013 heavy summer and 2013 light spring base cases. The power flow study assessed the potential impacts of the proposed BP Watson project on thermal loading of the transmission lines and equipment. Transient and post-transient studies were conducted for the BP Watson project using the 2013 heavy summer base case to determine whether the project would create instability in the system following certain selected outages. Short circuit studies were conducted to determine if the BP Watson project would overstress existing substation facilities.

Transient Cluster Phase 1 (Power Flow Study Results)

Base case condition (N-0):
The Phase 1 Cluster Study identified that there are no Post-project overload criteria violations in the SCE system area under the 2013 Heavy Summer and Spring conditions.

Single Outage contingency (N-1):
The Phase 1 Cluster Study identified that there is one single contingency (N-1) overload that was aggravated by the addition of the BP Watson in the SCE system.

Overload:
The Lighthipe-Mesa 220kV transmission line was overloaded due to the N-1 outage of Alamitos-Barre No.2 220kV transmission line under the Heavy Spring contingency analysis.

> Mitigation: The above aggravated N-1 thermal overload could be mitigated by upgrading the existing Mesa wave trap to 3000 Ampere ratings.

Double Outage Contingency (N-2):
The phase 1 cluster study identified five pre-existing overloads which were aggravated by the addition of the Watson project under N-2, Heavy Spring conditions.

Oveload facilities:
Del Amo-Hinson 220kV line, Lighthipe-Mesa 220kV line and Mesa-Rodando 220kV line.

> Mitigation: The above aggravated N-2 thermal overloads could be mitigated by upgrading the existing two Mesa wave traps to 3000 Ampers and Hinson wave trap to 3000 Amperes.

Oveload facilities:
Lighthipe-Long Beach 220kV line and Hinson-Lighthipe 220kV line.

> Mitigation: The above aggravated N-2 thermal overloads could be mitigated by adding the BP Watson project to an existing planned SPS or implementing congestion management.

Transient Study Results

The Transient Study was conducted for the critical single and double contingencies affecting the area listed in the table 3.6 and 3.7 of the SCE Phase 1 Cluster study. The three-phase faults with normal clearing are studied for single contingencies; single-line-to-ground faults with delayed clearing are studied for double contingencies. All outage cases were evaluated with the assumption that existing SPS or Remedial Action Schemes (RAS) would operate as designed where required. Transient stability study indicates there would be no system performance issues caused by the BP Watson. (CAISO 2009a, Page 28)

Post-Transient Study Results

The NERC/WECC planning standards require that the system maintain post-transient voltage stability when either critical path transfers or area loads increase by 5% for Category B contingencies, and 2.5% for Category C contingencies. Post-transient studies conducted for similar or larger generators in the area concluded that voltage remains stable under both N-1 and N-2 contingencies. All outage cases were evaluated with the assumption that existing SPS or RAS would operate as designed where required. The studies determined that the system remained stable with the proposed upgrades in place under both single and double contingency outage conditions and the addition of BP Watson would not trigger any new post-transient criteria violations. (CAISO 2009a, Page 28)

Short-Circuit Duty Study Results

Short circuit studies were performed to determine the degree to which the addition of the power generated by the BP Watson project increases fault duties at SCE substations, and other 69kV, 115 kV, 230 kV, and 500 kV busses in the study area. The busses at which faults were simulated, the maximum three-phase and single-line-to-ground fault currents at these busses both with and without the project, and information on the breaker duties at each location are summarized in the Short Circuit Study results tables in the Phase 1 study (CAISO 2009a, Table 3.8 and 3.9, Page 29-Phase 1 Cluster Study Report)

The Phase1 study depicts several areas of the SCE system with extremely high Short Circuit Duty, and various methods of mitigation are being evaluated. However, SCE does not have a proposed recommendation to alleviate this issue at two separate substations. SCE's Mira Loma substation shows a post project three-phase Short Circuit Duty of 75.5 kA at the 230kV bus. Given the high X/R ratio and close proximity of the calculated Short Circuit duties to the next higher CB ratings (80kA), SCE would likely need to upgrade the 220kV bus to 100kA.

Additionally, SCE's Serrano substation is shown with a post project three-phase Short Circuit Duty of 69.9kA at the 220kV bus, however existing SCE equipment is rated at 63kA. The Serrano substation is critical to the operation of the SCE system, and it is physically located in a congested metropolitan area. SCE will further evaluate the impacts of the Short Circuit Duty at these stations, and investigate mitigation during the Phase 2 study. The Phase 2 study report will be available to the staff at the end of July (Cluster Phase 1 Interconnection Study, Table 3.8, 3.9 Page 29, July 28, 2009)

COMPLIANCE WITH LORS

The findings of the studies conducted for the proposed BP Watson project would comply with the NERC/WECC planning standards and California ISO reliability criteria. The project will be designed and constructed to include the 69 kV substations on the project site and an addition of a new Bay to the existing 230kV switchyard. Staff concludes that, assuming the proposed conditions of certification are met, the project would meet the requirements and standards of all applicable LORS for TSE.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No agency or public comments related to the TSE discipline have been received.

CONCLUSION

The proposed BP Watson project outlet lines and termination are acceptable and would comply with all applicable laws, ordinances, regulations, and standards. The analysis of project transmission lines and equipment, both from the power plant up to the point of interconnection with the existing transmission network as well as upgrades beyond the interconnection that are attributable to the project have been evaluated by staff and are included in the environmental sections of this Preliminary Staff Assessment.

Thermal overloads caused by the BP Watson project under the N-1 and N-2 conditions would be fully mitigated by the following facilities:

- Upgrading the existing Mesa and Hinson substation wave traps to 3000 Ampers. Wave trap upgrade would occur within the fence line of the existing SCE substations.
- Adding the BP Watson project to an existing planned SPS or implementing congestion management.

RECOMMENDATIONS

If the Energy Commission approves the proposed BP Watson project, staff recommends that the applicant be required to satisfy the conditions of certification/ mitigation measures set forth in this section to ensure both system reliability and conformance with LORS.

PROPOSED CONDITIONS OF CERTIFICATION

The following conditions of certification/mitigation measures are incorporated in the proposed Watson Cogeneration Steam and Electric Reliability Project to address potential project impacts related to the transmission system.

TSE-1 The project owner shall furnish to the Compliance Project Manager (CPM) and to the Chief Building Official (CBO) a schedule of transmission facility design submittals, a Master Drawing List, a Master Specifications List, and a Major Equipment and Structure List. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment. To facilitate audits by Energy Commission staff, the project owner shall provide designated packages to the CPM when requested.

Verification: Prior to the start of construction of the transmission facilities, the project owner shall submit the schedule, a Master Drawing List, and a Master Specifications List to the CBO and to the CPM. The schedule shall contain a description and list of proposed submittal packages for design, calculations, and specifications for major structures and equipment (see a list of major equipment in Table 1: Major Equipment List below). Additions and deletions shall be made to the table only with

CPM and CBO approval. The project owner shall provide schedule updates in the Monthly Compliance Report.

Table 1: Major Equipment List
Breakers
Step-up Transformer
Switchyard
Busses
Surge Arrestors
Disconnects and Wave-traps
Take off facilities
Electrical Control Building
Switchyard Control Building
Transmission Pole/Tower
Insulators and Conductors
Grounding System

TSE-2 Prior to the start of construction the project owner shall assign an electrical engineer <u>and at least one of each</u> of the following to the project:

1. a civil engineer;
2. a geotechnical engineer or a civil engineer experienced and knowledgeable in the practice of soils engineering;
3. a design engineer, who is either a structural engineer or a civil engineer fully competent and proficient in the design of power plant structures and equipment supports; or
4. a mechanical engineer.

(Business and Professions Code Sections 6704 et seq., require state registration to practice as a civil engineer or structural engineer in California.)

The tasks performed by the civil, mechanical, electrical or design engineers may be divided between two or more engineers, as long as each engineer is responsible for a particular segment of the project (e.g., proposed earthwork, civil structures, power plant structures, equipment support). No segment of the project shall have more than one responsible engineer. The transmission line may be the responsibility of a separate California registered electrical engineer. The civil, geotechnical or civil and design engineer assigned in conformance with Facility Design condition **GEN-5**, may be responsible for design and review of the TSE facilities.

The project owner shall submit to the CBO for review and approval the names, qualifications and registration numbers of all engineers assigned to the project. If any one of the designated engineers is subsequently reassigned or replaced, the project owner shall submit the name, qualifications and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer. This engineer shall be authorized

to halt earthwork and to require changes if site conditions are unsafe or do not conform with predicted conditions used as a basis for design of earthwork or foundations.

The electrical engineer shall:

1. Be responsible for the electrical design of the power plant switchyard, outlet and termination facilities; and

2. Sign and stamp electrical design drawings, plans, specifications, and calculations.

Verification: Prior to the start of rough grading, the project owner shall submit to the CBO for review and approval the names, qualifications and registration numbers of all the responsible engineers assigned to the project. The project owner shall notify the CPM of the CBO's approvals of the engineers within five days of the approval.

If the designated responsible engineer is subsequently reassigned or replaced, the project owner has five days in which to submit the name, qualifications, and registration number of the newly assigned engineer to the CBO for review and approval. The project owner shall notify the CPM of the CBO's approval of the new engineer within five days of the approval.

TSE-3 If any discrepancy in design and/or construction is discovered in any engineering work that has undergone CBO design review and approval, the project owner shall document the discrepancy and recommend corrective action (2001 California Building Codes, Chapter 1, Section 108.4, approval required; Chapter 17, Section 1701.3, Duties and Responsibilities of the Special Inspector; Appendix Chapter 33, Section 3317.7, Notification of Noncompliance). The discrepancy documentation shall become a controlled document and shall be submitted to the CBO for review and approval and shall reference this condition of certification.

Verification: The project owner shall submit a copy of the CBO's approval or disapproval of any corrective action taken to resolve a discrepancy to the CPM within 15 days of receipt. If disapproved, the project owner shall advise the CPM, within five days, the reason for disapproval, and the revised corrective action required to obtain the CBO's approval.

TSE-4 For the power plant switchyard, outlet line and termination, the project owner shall not begin any increment of construction until plans for that increment have been approved by the CBO. These plans, together with design changes and design change notices, shall remain on the site for one year after completion of construction. The project owner shall request that the CBO inspect the installation to ensure compliance with the requirements of applicable LORS. The following activities shall be reported in the Monthly Compliance Report:

1. receipt or delay of major electrical equipment;

2. testing or energization of major electrical equipment; and

3. the number of electrical drawings approved, submitted for approval, and still to be submitted.

Verification: Prior to the start of each increment of construction of the transmission facilities, the project owner shall submit to the CBO for review and approval the final design plans, specifications and calculations for equipment and systems of the power plant switchyard, outlet line and termination, including a copy of the signed and stamped statement from the responsible electrical engineer attesting to compliance with the applicable LORS, and send the CPM a copy of the transmittal letter in the next Monthly Compliance Report.

TSE-5 The project owner shall ensure that the design, construction and operation of the proposed transmission facilities will conform to all applicable LORS, including the requirements listed below. The project owner shall submit the required number of copies of the design drawings and calculations to the CBO as determined by the CBO.

1. The power plant switchyard and outlet line shall meet or exceed the electrical, mechanical, civil and structural requirements of CPUC General Order 95 or National Electric Safety Code (NESC), Title 8 of the California Code and Regulations (Title 8), Articles 35, 36 and 37 of the "High Voltage Electric Safety Orders", California ISO standards, National Electric Code (NEC) and related industry standards.

2. Breakers and busses in the power plant switchyard and other switchyards, where applicable, shall be sized to accommodate full output from the project and to comply with a short-circuit analysis.

3. Outlet line crossings and line parallels with transmission and distribution facilities shall be coordinated with the transmission line owner and comply with the owner's standards.

4. The project conductors shall be sized to accommodate the full output from the project.

5. Termination facilities shall comply with applicable SCE interconnection standards.

6. The project owner shall provide to the CPM:

   a. The Special Protection System (SPS) sequencing and timing if applicable,

   b. A letter stating that the mitigation measures or projects selected by the transmission owners for each reliability criteria violation, for which the project is responsible, are acceptable,

   c. The Transition Cluster Phase II Interconnection Study report including an Operational study based on mid 2013 or current Commercial Operation Date (COD) system conditions from the California ISO and/or SCE, and

   d. A copy of the executed Large Generator Interconnection Agreement signed by the California ISO and the project owner.

Verification: Prior to the start of construction of transmission facilities (or a lesser number of days mutually agreed to by the project owner and CBO), the project owner shall submit to the CBO for approval:

A. Design drawings, specifications and calculations conforming with CPUC General Order 95 or NESC, Title 8, Articles 35, 36 and 37 of the "High Voltage Electric Safety Orders", NEC, applicable interconnection standards and related industry standards, for the poles/towers, foundations, anchor bolts, conductors, grounding systems and major switchyard equipment.

B. For each element of the transmission facilities identified above, the submittal package to the CBO shall contain the design criteria, a discussion of the calculation method(s), a sample calculation based on "worst case conditions"[1] and a statement signed and sealed by the registered engineer in responsible charge, or other acceptable alternative verification, that the transmission element(s) will conform with CPUC General Order 95 or NESC, Title 8, California Code of Regulations, Articles 35, 36 and 37 of the, "High Voltage Electric Safety Orders", NEC, applicable interconnection standards, and related industry standards.

C. Electrical one-line diagrams signed and sealed by the registered professional electrical engineer in responsible charge, a route map, and an engineering description of equipment and the configurations covered by requirements **TSE-5** 1 through 6 above.

D. The Special Protection System (SPS) sequencing and timing if applicable shall be provided concurrently to the CPM.

E. A letter stating that the mitigation measures or projects selected by the transmission owners for each reliability criteria violation, for which the project is responsible, are acceptable,

F. The Transition Cluster Phase II Interconnection Study report from the California ISO and/or SCE, and

G. A copy of the executed Large Generator Interconnection Agreement signed by the California ISO and the project owner.

TSE-6 The project owner shall inform the CPM and CBO of any impending changes that may not conform to requirements **TSE-5** 1 through 6, and have not received CPM and CBO approval, and request approval to implement such changes. A detailed description of the proposed change and complete engineering, environmental, and economic rationale for the change shall accompany the request. Construction involving changed equipment or substation configurations shall not begin without prior written approval of the changes by the CBO and the CPM.

[1] Worst case conditions for the foundations would include for instance, a dead-end or angle pole.

Verification: Prior to the construction of transmission facilities, the project owner shall inform the CBO and the CPM of any impending changes that` may not conform to requirements of TSE-5 and request approval to implement such changes.

TSE-7 The project owner shall provide the following Notice to the California Independent System Operator (California ISO) prior to synchronizing the facility with the California Transmission system:

1. At least one week prior to synchronizing the facility with the grid for testing, provide the California ISO a letter stating the proposed date of synchronization; and

2. At least one business day prior to synchronizing the facility with the grid for testing, provide telephone notification to the California ISO Outage Coordination Department.

Verification: The project owner shall provide copies of the California ISO letter to the CPM when it is sent to the California ISO one week prior to initial synchronization with the grid. The project owner shall contact the California ISO Outage Coordination Department, Monday through Friday, between the hours of 0700 and 1530 at (916) 351-2300 at least one business day prior to synchronizing the facility with the grid for testing. A report of conversation with the California ISO shall be provided electronically to the CPM one day before synchronizing the facility with the California transmission system for the first time.

TSE-8 The project owner shall be responsible for the inspection of the transmission facilities during and after project construction, and any subsequent CPM and CBO approved changes thereto, to ensure conformance with CPUC GO-95 or NESC, Title 8, CCR, Articles 35, 36 and 37 of the, "High Voltage Electric Safety Orders", applicable interconnection standards, NEC and related industry standards. In case of non-conformance, the project owner shall inform the CPM and CBO in writing, within 10 days of discovering such non-conformance and describe the corrective actions to be taken.

Verification: Within 60 days after first synchronization of the project, the project owner shall transmit to the CPM and CBO:

A. "As built" engineering description(s) and one-line drawings of the electrical portion of the facilities signed and sealed by the registered electrical engineer in responsible charge. A statement attesting to conformance with CPUC GO-95 or NESC, Title 8, California Code of Regulations, Articles 35, 36 and 37 of the, "High Voltage Electric Safety Orders", and applicable interconnection standards, NEC, related industry standards, and these conditions shall be provided concurrently.

B. An "as built" engineering description of the mechanical, structural, and civil portion of the transmission facilities signed and sealed by the registered engineer in responsible charge or acceptable alternative verification. "As built" drawings of the electrical, mechanical, structural, and civil portion of the transmission facilities shall be maintained at the power plant and made available, if requested, for CPM audit as set forth in the "Compliance Monitoring Plan".

A summary of inspections of the completed transmission facilities, and identification of any nonconforming work and corrective actions taken, signed and sealed by the registered engineer in charge.

DEFINITION OF TERMS

AAC - All aluminum conductor

ACSR - Aluminum conductor steel-reinforced

ACSS - Aluminum conductor steel-supported

Ampacity - Current-carrying capacity, expressed in amperes, of a conductor at specified ambient conditions, at which damage to the conductor is nonexistent or deemed acceptable based on economic, safety, and reliability considerations.

Ampere - The unit of current flowing in a conductor.

Bundled - Two wires, 18 inches apart.

Bus - Conductors that serve as a common connection for two or more circuits.

Conductor - The part of the transmission line (the wire) that carries the current.

Congestion management – A scheduling protocol, which provides that dispatched generation and transmission loading (imports) will not violate criteria.

Emergency overload – See “Single Contingency.” This is also called an N-1.

Kcmil– Thousand circular mil. A unit of the conductor’s cross sectional area When divided by 1,273, the area in square inches is obtained

Kilovolt (kV) - A unit of potential difference, or voltage, between two conductors of a circuit, or between a conductor and the ground.

Megavars - Mega-volt-Ampere-Reactive. One million Volt-Ampere-Reactive. Reactive power is generally associated with the reactive nature of motor loads that must be fed by generation units in the system.

Megavolt ampere (MVA) – A unit of apparent power. It equals the product of the line voltage in kilovolts, current in amperes, and the square root of 3, divided by 1,000.

Megawatt (MW) – A unit of power equivalent to 1,341 horsepower.

Normal operation/normal overload – The condition arrived at when all customers receive the power they are entitled to, without interruption and at steady voltage,

and with no element of the transmission system loaded beyond its continuous rating.

Outlet - Transmission facilities (circuit, transformer, circuit breaker, etc.) linking generation facilities to the main grid.

Power flow analysis – A forward-looking computer simulation of essentially all generation and transmission system facilities that identifies overloaded circuits, transformers, and other equipment and system voltage levels.

Reactive power – Generally associated with the reactive nature of motor loads that must be fed by generation units in the system. An adequate supply of reactive power is required to maintain voltage levels in the system.

Remedial action scheme (RAS) – An automatic control provision, which, for instance, will trip a selected generating unit upon a circuit overload.

Single contingency – Also known as “emergency” or “N-1 condition,” the occurrence when one major transmission element (circuit, transformer, circuit breaker, etc.) or one generator is out of service.

Solid dielectric cable – Copper or aluminum conductors that are insulated by solid polyethylene type insulation and covered by a metallic shield and outer polyethylene jacket.

Switchyard - An integral part of a power plant and used as an outlet for one or more electric generators.

TSE - Transmission system engineering.

Undercrossing – A transmission configuration where a transmission line crosses below the conductors of another transmission line, generally at 90 degrees. Under build - A transmission or distribution configuration where a transmission or distribution circuit is attached to a transmission tower or pole below (under) the principle transmission line conductors.

REFERENCES

California ISO (California Independent System Operator). 1998a. Cal-ISO Tariff Scheduling Protocol. Posted April 1998, Amendments 1,4,5,6, and 7 incorporated.

California ISO (California Independent System Operator). 1998b. Cal-ISO Dispatch Protocol. Posted April 1998.

California ISO (California Independent System Operator). 2002a. Cal-ISO Grid Planning Standards. February 2002.

CAISO 2009a. Watson Cogeneration Project Transition Cluster Phase 1 Interconnection

Study submitted to the California Energy Commission, July 28, 2009.

Watson 2009a. Watson Cogeneration Project, Application for Certification. Submitted to the California Energy Commission.

NERC/WECC (North American Reliability Council/Western Electricity Coordinating Council). 2002. NERC/WECC Planning Standards. August 2002.

ALTERNATIVES

Testimony of Alan Solomon

SUMMARY OF CONCLUSIONS

The proposed project would increase the capacity of the 385-megawatt (MW) existing Watson Cogeneration Facility (Facility) by approximately 85 MW. The addition would improve reliability of steam and electric energy supply to the adjacent BP Carson Refinery (Refinery) by adding a fifth train that completes the original design of the Facility. Staff recommends that the Energy Commission find that the proposed project has a strong relationship to the existing industrial site and therefore does not require the analysis of alternative sites.

Alternative generation technologies (i.e., solar, wind, and biomass) were considered as possible alternatives to the project. In addition, staff analyzed a steam-only alternative and determined that it did not meet most of the basic objectives of the project and that it would not reduce identified environmental impacts while meeting project objectives.

INTRODUCTION

This section considers potential alternatives to the construction and operation of the proposed Watson Cogeneration Steam and Electric Reliability (BP Watson) project. The purpose of this section is to provide an analysis of a reasonable range of feasible alternatives, including the no project alternative, which could substantially reduce or avoid any potentially significant adverse impacts of the proposed project (Cal. Code Regs., tit. 14, §15126.6; Cal. Code Regs., tit. 20, §1765). This section identifies potentially significant impacts of the proposed project and analyzes different technologies that may reduce or avoid significant impacts. Staff has also analyzed the impacts that may be created by alternative technologies.

DETERMINING THE SCOPE OF THE ALTERNATIVES ANALYSIS

The California Environmental Quality Act's (CEQA's) Guidelines for Implementation, Title 14, California Code of Regulations, section 15126.6(a), calls for an evaluation of project alternatives based upon the comparative merits of "a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project." In addition, the analysis must address the "no project" alternative (Cal. Code Regs., tit. 14, §15126.6 (e)).

The range of alternatives is governed by the "rule of reason," which requires consideration only of those alternatives necessary to permit a reasoned choice. Further, the potentially feasible alternatives shall be selected and discussed to foster informed decision making and public participation. The CEQA Guidelines state that an environmental document does not have to consider an alternative where the effect cannot be reasonably ascertained and whose implementation is remote and speculative (Cal. Code Regs., tit. 14, §15126.6(f)(3)). To prepare the alternatives analysis, staff

used the methodology summarized below:

- Identify the basic project objectives.
- Identify the proposed project's significant adverse environmental impacts.
- Identify the project's relationship to the existing site.
- Evaluate and determine if an alternative site is feasible.
- Evaluate and determine whether any alternative energy generation technologies are feasible.
- Consider the "No Project" alternative.
- Conclude whether or not an alternative site and/or a different technology is feasible and will yield less of an environmental impact than the proposed project. Include a recommendation based on the evidence.

OBJECTIVES OF THE PROJECT

After studying the BP Watson project's AFC, Energy Commission staff has determined that BP Watson project's objectives are to:

- deliver an additional, secure, and long-term supply of steam and electric power to the BP Carson Refinery;
- add a fifth train to complete the original design of the Facility; and
- conserve natural gas and reduce environmental impacts from emissions and contributions to global climate change.

POTENTIAL SIGNIFICANT ENVIRONMENTAL IMPACTS OF THE PROJECT

Energy Commission staff has determined that potentially significant impacts to the environment can be mitigated to a level that is less than significant by the project owner's implementation of the conditions of certification identified in the Final Staff Assessment (FSA). In the case of Air Quality, the applicant has proposed emission reduction credits (ERCs) to fully offset all non-attainment pollutants and their precursors at a minimum ratio of one-to-one to reduce impacts to less than significant. For a more detailed review of potential impacts, see staff's technical analyses in this FSA.

PROJECT'S RELATIONSHIP TO THE EXISTING SITE

Watson proposes to expand the existing Facility, a nominal 385-megawatt (MW) cogeneration power plant, by adding an 85 MW fifth train, culminating in a combined nominal generating capacity of 470 MW. The proposed project was a part of the original design of the Facility but was not constructed; Watson proposes to complete the original design now. The existing Facility has been in continuous operation for over 20 years.

The proposed project would produce steam for delivery to the immediately adjacent BP Carson Refinery. Steam is a necessary and integral component of refinery operations,

and the production of steam for refinery operation derives maximum efficiencies and benefits by its proximity to those operations in order to provide heat, control over the steam state of water, and minimize the construction and length of lateral facilities.

The proposed project would include one General Electric (GE) 7EA Combustion Turbine Generator (CTG) with an inlet fogging system, one duct-fired heat recovery steam generator (HRSG), two redundant natural gas compressors, one boiler feedwater (BFW) pump, one circulating water pump, two new cells added to an existing cooling tower, an electrical distribution system, a new on-site 69 kilovolt gas insulated substation, and a paved 25-acre construction laydown and parking area located one mile southeast of the project site.

SITE ALTERNATIVES

CEQA Guidelines, section 15126.6 (f)(2)(A) states: “The key question and first step in [the Alternatives] analysis is whether any of the significant effects of the project would be avoided or substantially lessened by putting the project in another location. Only locations that would avoid or substantially lessen any of the significant effects of the project need be considered for inclusion in the [Environmental Impact Report].”

If an alternative site were used for the proposed BP Watson project, the 85 MW cogeneration facility would have to be built at a location likely not adjacent to the steam host (BP Carson Refinery) and would likely require the construction of a new natural gas pipeline, water supply pipeline, and electric transmission infrastructure. This site alternative would have potential impacts to air quality, biological resources, public health, land use, and water resources; all of which would require mitigation likely greater than at the proposed site.

Key points when considering alternative sites:

- The existing Facility was built on a 21.7-acre brownfield parcel within the boundaries of the BP Carson Refinery, of which the proposed project site would occupy 2.5 acres. If an alternative site were used, then at least 2.5 acres in an area outside the existing Facility would need to be developed for the placement of the project on that alternative site.
- If an alternative site were used, additional fuel gas supply, water supply, and electric transmission facilities would likely need to be provided to the new facility and to connect the new facility to the steam host (existing BP Carson Refinery) .
- All of the work for the proposed project at the proposed site would be done at the current brownfield Facility site, thereby minimizing impact to biological resources and land use.
- No new linear facilities would need to be constructed. The proposed project would use the existing water supply pipeline, natural gas pipeline, wastewater pipeline, and electric transmission lines.

SITE ALTERNATIVES CONCLUSION

Based on the facts and analysis above, staff has determined that: 1) the proposed

project makes substantial use of the existing infrastructure, which would greatly reduce significant impacts that would occur if the project is constructed at an alternative site, and 2) the proposed project would maximize efficiencies gained from constructing a more reliable steam supply and electric generation facility immediately adjacent to the steam host and electricity load.

Given these facts, staff does not believe a detailed reexamination of alternative sites is required for BP Watson. This is supported by the Warren-Alquist Act and CEQA.

The Warren-Alquist Act provides that discussion of "any alternative sites that the applicant considered for the project, and the reasons why the applicant chose the proposed site…shall not be required for cogeneration projects at existing industrial sites." (Public Resource Code, § 25540.6(b).) It also provides that the Commission may accept an AFC for a noncogeneration project at an existing industrial site "without requiring a discussion of site alternatives if the commission finds that the project has a strong relationship to the existing industrial site and that it is therefore reasonable not to analyze alternative sites for the project." (*Id.*) Section 25540.6(b) of the Public Resources Code generally concerns the filing requirements and time period for processing AFCs for cogeneration facilities, modifications of existing facilities, and other facilities. Nevertheless, it recognizes the inherent value of siting cogeneration facilities at existing industrial sites and even noncogeneration facilities with a strong relationship to the existing industrial site, and its release of such facilities' AFCs from the requirement of discussing the applicant's site selection criteria, any alternative sites that the applicant considered for the project, and the reasons why the applicant chose the proposed site should guide the development of range of reasonable site alternatives for this project. Staff has the facts that the BP Watson project is an addition to a cogeneration facility that is already on an existing industrial site for the past 20 years and that a detailed alternative site analysis should not be required for this project.

Furthermore, CEQA Guidelines, section 15126.6(f)(2)(A) states, in part, that only locations that would avoid or substantially lessen any of the significant effects of the project need be considered. Staff concludes that, per CEQA Guidelines, section 15126.6(f)(2)(B), no feasible alternative sites exist that would avoid or substantially lessen any of the significant effect of the proposed project.

Therefore, staff has applied the "rule of reason" and determined that that a more detailed alternative site analysis is not needed.

GENERATION TECHNOLOGY ALTERNATIVES

CONSERVATION AND DEMAND SIDE MANAGEMENT

One alternative to meeting California's electricity demand with new generation is to reduce that demand for electricity. Such "demand side" measures include programs that increase energy efficiency, reduce electricity use, or shift electricity use away from "peak" hours of demand.

In California, there is a considerable array of demand side programs in effect. At the

federal level, the Department of Energy adopts national standards for appliance efficiency and building standards to reduce the use of energy in federal buildings and at military bases. At the state level, the Energy Commission adopts comprehensive energy efficiency standards for most buildings, appliance standards for specific items not subject to federal appliance standards, and load management standards. The Energy Commission also provides grants for energy efficiency development through the Public Interest Energy Research (PIER) program.

The California Public Utilities Commission, along with the Energy Commission, oversees investor-owned utilities' demand side management programs financed by the utilities and its ratepayers. At the local level, many municipal utilities administer demand side management and energy conservation programs. These include subsidies for the replacement of older appliances through rebates, building weatherization programs, and peak load management programs. In addition, several local governments have adopted building standards that exceed the state standards for building efficiency or have by ordinance set retrofit energy efficiency requirements for older buildings. New buildings may combine the need for heat and power through a single fuel source, or a common source may supply heating and/or heating and cooling to a number of adjacent buildings, increasing overall efficiency.

Even with this great variety of federal, state, and local demand side management programs, the state's electricity use is still increasing as a result of population growth, the proliferation of electronic devices, and business expansion (US Census Bureau).

Therefore, although it is likely that federal, state, and local demand side programs will receive even greater emphasis in the future, both new generation and new transmission facilities will be needed in the immediate future and beyond in order to maintain adequate supplies.

Moreover, demand side technologies do not address the two leading project objectives: to increase steam and electric reliability for the adjacent BP Carson Refinery.

ALTERNATIVE TECHNOLOGIES

Under the Warren-Alquist Act, Public Resources Code § 25540.6(b), and the Energy Commission siting regulation, 20 Cal. Admin. Code § 1763(a), the Energy Commission must determine that there are no feasible alternative sites for a cogeneration project larger than 300 MW. Staff believes that alternative sites where the environmental setting and the potential environmental impacts would be different from those encountered at the BP Watson project and the contiguous areas are not available within a reasonable distance from the Refinery, which the proposed project is designed to serve.

The BP Watson project was designed to complete the existing Facility of four existing General Electric (GE) 7EA combustion turbine generators (CTG), by adding an additional fifth CTG that has the same configuration as the other units. Any other type of a combustion turbine would require a different configuration of the steam systems and would have a significant effect on the existing operation of the Facility and its operational interaction with the adjacent refinery .

Alternative generation technologies such as solar, wind, and geothermal generation would not be able to meet the refinery's needs for a quality, pressure, reliable steam supply within the constraints of the existing Facility. Therefore, per the Warren Alquist Act, Public Resources Code § 25540.6(b), staff considered but did not analyze in depth geothermal, hydroelectric, solar, wind, or biomass technologies. However, as stated in the applicant's project objectives, one of the main objectives is to improve the reliability of steam supply at the Refinery; therefore, staff did analyze a steam-only alternative.

Steam Only Alternative

Although a steam only alternative is feasible, it would require nearly the same amount of water resources and produce nearly the same amount of pollutants without the benefit of adding an additional 85 MW of electrical energy output. Furthermore, the steam only alternative would require additional space and additional linears, thereby causing possible significant environmental impacts. This proposed project completes the original design of the Facility and, because it would use the existing linears, it would not cause any additional environmental impacts.

THE "NO PROJECT" ALTERNATIVE

The "no project" alternative under CEQA assumes that the project is not constructed. In the CEQA analysis, the "no project" alternative is compared to the proposed project and determined to be superior, equivalent, or inferior to it. The CEQA Guidelines state that "the purpose of describing and analyzing a "no project" alternative is to allow decision makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project" (Cal. Code Regs., tit. 14, §15126.6(i)). Toward that end, the "no project" analysis considers "existing conditions" and "what would be reasonably expected to occur in the foreseeable future if the project were not approved…" (*Id.,* §15126.6(e)(2)). CEQA Guidelines and Energy Commission regulations require consideration of the "no project" alternative. The no-action alternative provides a baseline against which the effects of the proposed action may be compared. In short, the site-specific and direct impacts associated with the power plant would not occur at this site if the project does not go forward.

If the "no project" alternative were selected, the construction and operational impacts of proposed upgrades to the existing Facility would not occur. Without the proposed project, the existing Facility would continue to run as a 385 MW cogeneration facility and the additional 85 MW of power and additional steam supply source in the project area would have to be met by another project.

Staff views the "no project" alternative as feasible. However, if the project is not built, the region will not benefit from the relatively efficient source of 85 MW of power that this facility would provide. This new baseload generation would increase the amount of electrical energy available to the local grid per therm of natural gas consumed. Additionally, the "no project" alternative would eliminate the expected steam reliability benefits, as well as the economic benefits that the proposed project would bring to the area, including increased property taxes, employment during project construction, sales taxes, and sales of services, manufactured goods, and equipment. Therefore, staff believes that, overall, the "no project" alternative is not the preferred alternative.

CONCLUSIONS AND RECOMMENDATION

Staff has analyzed in detail all reasonable and feasible alternatives to the project design and related facilities, alternative technologies, and the “no project” alternative in relation to meeting the project objectives. Staff did not analyze in detail alternative sites for the project. Staff determined that developing the project at an alternative site would not achieve most of the basic objectives of this project and would not avoid or substantially lessen any of the significant effects of the project.

Alternative generation technologies were considered but only the steam-only alternative was analyzed in detail. Staff determined that the steam-only alternatives was neither feasible nor met most of the basic objectives of the project as it would not reduce identified impacts while meeting project objectives.

As determined by Energy Commission staff in the FSA, the BP Watson project as mitigated is not likely to cause potentially significant environmental impacts. Staff determined that the proposed project 1) is a cogeneration project at an existing industrial site, 2) makes substantial use of the existing infrastructure which would greatly reduce significant impacts and 2) accomplishes the project objectives of delivering an additional, secure, and long-term supply of steam and electric power to the BP Carson Refinery and completing the original design of the Facility. With no significant issues at this time, staff does not recommend an alternative over the project.

REFERENCES

Watson 2009a – Watson Cogeneration Company/Thomas A. Lu (tn 50584). Application for Certification Volume I&II, dated 3/19/09. Submitted to CEC/Docket Unit on 3/19/09.

GENERAL CONDITIONS
INCLUDING
COMPLIANCE MONITORING AND CLOSURE PLAN

Testimony of Dale Rundquist

INTRODUCTION

The project's General Compliance Conditions of Certification, including Compliance Monitoring and Closure Plan (Compliance Plan) have been established as required by Public Resources Code section 25532. The plan provides a means for assuring that the facility is constructed, operated, and closed in compliance with public health and safety, environmental, and other applicable regulations, guidelines, and conditions adopted or established by the California Energy Commission and specified in the written decision on the Application for Certification or otherwise required by law.

The Compliance Plan is composed of elements that:

- set forth the duties and responsibilities of the Compliance Project Manager (CPM), the project owner, delegate agencies, and others;
- set forth the requirements for handling confidential records and maintaining the compliance record;
- state procedures for settling disputes and making post-certification changes;
- state the requirements for periodic compliance reports and other administrative procedures that are necessary to verify the compliance status for all Energy Commission approved conditions of certification;
- establish requirements for facility closure plans; and
- specify conditions of certification for each technical area containing the measures required to mitigate any and all potential adverse project impacts associated with construction, operation and closure below a level of significance. Each specific condition of certification also includes a verification provision that describes the method of assuring that the condition has been satisfied.

DEFINITIONS

The following terms and definitions are used to establish when Conditions of Certification are implemented.

PRE-CONSTRUCTION SITE MOBILIZATION

Site mobilization is limited preconstruction activities at the site to allow for the installation of fencing, construction trailers, construction trailer utilities, and construction trailer parking at the site. Limited ground disturbance, grading, and trenching associated with the above mentioned pre-construction activities is considered part of site mobilization. Walking, driving or parking a passenger vehicle, pickup truck and/or light vehicles is allowable during site mobilization.

CONSTRUCTION

Onsite work to install permanent equipment or structures for any facility.

Ground Disturbance

Construction-related ground disturbance refers to activities that result in the removal of top soil or vegetation at the site beyond site mobilization needs, and for access roads and linear facilities.

Grading, Boring, and Trenching

Construction-related grading, boring, and trenching refers to activities that result in subsurface soil work at the site and for access roads and linear facilities, e.g., alteration of the topographical features such as leveling, removal of hills or high spots, moving of soil from one area to another, and removal of soil.

Notwithstanding the definitions of ground disturbance, grading, boring, and trenching above, construction does **not** include the following:

1. the installation of environmental monitoring equipment;
2. a soil or geological investigation;
3. a topographical survey;
4. any other study or investigation to determine the environmental acceptability or feasibility of the use of the site for any particular facility; and
5. any work to provide access to the site for any of the purposes specified in "Construction" 1, 2, 3, or 4 above.

START OF COMMERCIAL OPERATION

For compliance monitoring purposes, "commercial operation" begins after the completion of start-up and commissioning, when the power plant has reached reliable steady-state production of electricity at the rated capacity. At the start of commercial operation, plant control is usually transferred from the construction manager to the plant operations manager.

COMPLIANCE PROJECT MANAGER RESPONSIBILITIES

The Compliance Project Manager (CPM) shall oversee the compliance monitoring and is responsible for:

1. ensuring that the design, construction, operation, and closure of the project facilities are in compliance with the terms and conditions of the Energy Commission Decision;
2. resolving complaints;
3. processing post-certification changes to the conditions of certification, project description (petition to amend), and ownership or operational control (petition for change of ownership) (See instructions for filing petitions);

4. documenting and tracking compliance filings; and

5. ensuring that compliance files are maintained and accessible.

The CPM is the contact person for the Energy Commission and will consult with appropriate responsible agencies, Energy Commission, and staff when handling disputes, complaints, and amendments.

All project compliance submittals are submitted to the CPM for processing. Where a submittal required by a condition of certification requires CPM approval, the approval will involve all appropriate Energy Commission staff and management. All submittals must include searchable electronic versions (pdf or MS Word files).

PRE-CONSTRUCTION AND PRE-OPERATION COMPLIANCE MEETING

The CPM usually schedules pre-construction and pre-operation compliance meetings prior to the projected start-dates of construction, plant operation, or both. The purpose of these meetings is to assemble both the Energy Commission's and project owner's technical staff to review the status of all pre-construction or pre-operation requirements contained in the Energy Commission's conditions of certification. This is to confirm that all applicable conditions of certification have been met, or if they have not been met, to ensure that the proper action is taken. In addition, these meetings ensure, to the extent possible, that Energy Commission conditions will not delay the construction and operation of the plant due to oversight and to preclude any last minute, unforeseen issues from arising. Pre-construction meetings held during the certification process must be publicly noticed unless they are confined to administrative issues and processes.

ENERGY COMMISSION RECORD

The Energy Commission shall maintain the following documents and information as a public record, in either the Compliance file or Dockets file, for the life of the project (or other period as required):

1. all documents demonstrating compliance with any legal requirements relating to the construction and operation of the facility;

2. all monthly and annual compliance reports filed by the project owner;

3. all complaints of noncompliance filed with the Energy Commission; and

4. all petitions for project or condition of certification changes and the resulting staff or Energy Commission action.

PROJECT OWNER RESPONSIBILITIES

The project owner is responsible for ensuring that the compliance conditions of certification and all other conditions of certification that appear in the Commission Decision are satisfied. The compliance conditions regarding post-certification changes specify measures that the project owner must take when requesting changes in the project design, conditions of certification, or ownership. Failure to comply with any of the conditions of certification or the compliance conditions may result in reopening of the

case and revocation of Energy Commission certification; an administrative fine; or other action as appropriate. A summary of the Compliance Conditions of Certification is included as **Compliance Table 1** at the conclusion of this section.

COMPLIANCE CONDITIONS OF CERTIFICATION

Unrestricted Access (COMPLIANCE-1)

The CPM, responsible Energy Commission staff, and delegated agencies or consultants shall be guaranteed and granted unrestricted access to the power plant site, related facilities, project-related staff, and the records maintained on-site for the purpose of conducting audits, surveys, inspections, or general site visits. Although the CPM will normally schedule site visits on dates and times agreeable to the project owner, the CPM reserves the right to make unannounced visits at any time.

Compliance Record (COMPLIANCE-2)

The project owner shall maintain project files on-site or at an alternative site approved by the CPM for the life of the project, unless a lesser period of time is specified by the conditions of certification. The files shall contain copies of all “as-built” drawings, documents submitted as verification for conditions, and other project-related documents.

Energy Commission staff and delegate agencies shall, upon request to the project owner, be given unrestricted access to the files maintained pursuant to this condition.

Compliance Verification Submittals (COMPLIANCE-3)

Each condition of certification is followed by a means of verification. The verification describes the Energy Commission’s procedure(s) to ensure post-certification compliance with adopted conditions. The verification procedures, unlike the conditions, may be modified as necessary by the CPM.

Verification of compliance with the conditions of certification can be accomplished by the following:

1. monthly and/or annual compliance reports, filed by the project owner or authorized agent, reporting on work done and providing pertinent documentation, as required by the specific conditions of certification;

2. appropriate letters from delegate agencies verifying compliance;

3. energy Commission staff audits of project records; and/or

4. energy Commission staff inspections of work, or other evidence that the requirements are satisfied.

Verification lead times associated with start of construction may require the project owner to file submittals during the certification process, particularly if construction is planned to commence shortly after certification.

A cover letter from the project owner or authorized agent is required for all compliance submittals and correspondence pertaining to compliance matters.

The cover letter subject line shall identify the project by AFC number, the appropriate condition(s) of certification by condition number(s), and a brief description of the subject of the submittal. The project owner shall also identify those submittals **not** required by a condition of certification with a statement such as: "This submittal is for information only and is not required by a specific condition of certification." When submitting supplementary or corrected information, the project owner shall reference the date of the previous submittal and CEC submittal number.

The project owner is responsible for the delivery and content of all verification submittals to the CPM, whether such condition was satisfied by work performed by the project owner or an agent of the project owner.

All hardcopy submittals shall be addressed as follows:

Compliance Project Manager
(09-AFC-1C)
California Energy Commission
1516 Ninth Street (MS-2000)
Sacramento, CA 95814

Those submittals shall be accompanied by a searchable electronic copy, on a CD or by e-mail, as agreed upon by the CPM.

If the project owner desires Energy Commission staff action by a specific date, that request shall be made in the submittal cover letter and shall include a detailed explanation of the effects on the project if that date is not met.

Pre-Construction Matrix and Tasks Prior to Start of Construction (COMPLIANCE-4)

Prior to commencing construction, a compliance matrix addressing only those conditions that must be fulfilled before the start of construction shall be submitted by the project owner to the CPM. This matrix will be included with the project owner's first compliance submittal or prior to the first pre-construction meeting, whichever comes first. It will be submitted in the same format as the compliance matrix described below.

Construction shall not commence until the pre-construction matrix is submitted, all pre-construction conditions have been complied with, and the CPM has issued a letter to the project owner authorizing construction. Various lead times for submittal of compliance verification documents to the CPM for conditions of certification are established to allow sufficient staff time to review and comment and, if necessary, allow the project owner to revise the submittal in a timely manner. This will ensure that project construction may proceed according to schedule.

Failure to submit compliance documents within the specified lead-time may result in delays in authorization to commence various stages of project development.

If the project owner anticipates commencing project construction as soon as the project is certified, it may be necessary for the project owner to file compliance submittals prior to project certification. Compliance submittals should be completed in advance where the necessary lead time for a required compliance event extends beyond the date anticipated for start of construction. The project owner must understand that the submittal of compliance documents prior to project certification is at the owner's own risk. Any approval by Energy Commission staff is subject to change, based upon the Commission Decision.

Compliance Reporting

There are two different compliance reports that the project owner must submit to assist the CPM in tracking activities and monitoring compliance with the terms and conditions of the Energy Commission Decision. During construction, the project owner or authorized agent will submit Monthly Compliance Reports. During operation, an Annual Compliance Report, and other peoridic reports, must be submitted. These reports, and the requirement for an accompanying compliance matrix, are described below. The majority of the conditions of certification require that compliance submittals be submitted to the CPM in the monthly or annual compliance reports.

Compliance Matrix (COMPLIANCE-5)

A compliance matrix shall be submitted by the project owner to the CPM along with each monthly and annual compliance report. The compliance matrix is intended to provide the CPM with the current status of all conditions of certification in a spreadsheet format. The compliance matrix must identify:

1. the technical area;
2. the condition number;
3. a brief description of the verification action or submittal required by the condition;
4. the date the submittal is required (e.g., 60 days prior to construction, after final inspection, etc.);
5. the expected or actual submittal date;
6. the date a submittal or action was approved by the Chief Building Official (CBO), CPM, or delegate agency, if applicable;
7. the compliance status of each condition, e.g., "not started," "in progress" or "completed" (include the date); and
8. if the condition was amended, the date of the amendment.

Satisfied conditions shall be placed at the end of the matrix.

Monthly Compliance Report (COMPLIANCE-6)

The first Monthly Compliance Report is due one month following the Energy Commission business meeting date upon which the project was approved, unless

otherwise agreed to by the CPM. The first Monthly Compliance Report shall include the AFC number and an initial list of dates for each of the events identified on the **Key Events List. The Key Events List form is found at the end of these General Conditions.**

During pre-construction and construction of the project, the project owner or authorized agent shall submit an original and an electronic searchable version of the Monthly Compliance Report within 10 working days after the end of each reporting month. Monthly Compliance Reports shall be clearly identified for the month being reported. The reports shall contain, at a minimum:

1. a summary of the current project construction status, a revised/updated schedule if there are significant delays, and an explanation of any significant changes to the schedule;

2. documents required by specific conditions to be submitted along with the Monthly Compliance Report. Each of these items must be identified in the transmittal letter, as well as the conditions they satisfy and submitted as attachments to the Monthly Compliance Report;

3. an initial, and thereafter updated, compliance matrix showing the status of all conditions of certification;

4. a list of conditions that have been satisfied during the reporting period, and a description or reference to the actions that satisfied the condition;

5. a list of any submittal deadlines that were missed, accompanied by an explanation and an estimate of when the information will be provided;

6. a cumulative listing of any approved changes to conditions of certification;

7. a listing of any filings submitted to, or permits issued by, other governmental agencies during the month;

8. a projection of project compliance activities scheduled during the next two months. The project owner shall notify the CPM as soon as any changes are made to the project construction schedule that would affect compliance with conditions of certification;

9. a listing of the month's additions to the on-site compliance file; and

10. a listing of complaints, notices of violation, official warnings, and citations received during the month, a description of the resolution of the resolved actions, and the status of any unresolved actions.

All sections, exhibits, or addendums shall be separated by tabbed dividers or as acceptable by the CPM.

Annual Compliance Report (COMPLIANCE-7)

After construction is complete, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports. The reports are for each year of commercial operation and are due to the CPM each year at a date agreed to by the CPM. Annual Compliance Reports shall be submitted over the life of the project, unless otherwise specified by the CPM. Each Annual Compliance Report shall include the AFC number, identify the reporting period, and shall contain the following:

1. an updated compliance matrix showing the status of all conditions of certification (fully satisfied conditions do not need to be included in the matrix after they have been reported as completed);

2. a summary of the current project operating status and an explanation of any significant changes to facility operations during the year;

3. documents required by specific conditions to be submitted along with the Annual Compliance Report. Each of these items must be identified in the transmittal letter with the condition it satisfies, and submitted as attachments to the Annual Compliance Report;

4. a cumulative listing of all post-certification changes approved by the Energy Commission or cleared by the CPM;

5. an explanation for any submittal deadlines that were missed, accompanied by an estimate of when the information will be provided;

6. a listing of filings submitted to, or permits issued by, other governmental agencies during the year;

7. a projection of project compliance activities scheduled during the next year;

8. a listing of the year's additions to the on-site compliance file;

9. an evaluation of the on-site contingency plan for unplanned facility closure, including any suggestions necessary for bringing the plan up to date (see Compliance Conditions for Facility Closure addressed later in this section); and

10. a listing of complaints, notices of violation, official warnings, and citations received during the year, a description of the resolution of any resolved matters, and the status of any unresolved matters.

Confidential Information (COMPLIANCE-8)

Any information that the project owner deems confidential shall be submitted to the Energy Commission's Executive Director with an application for confidentiality pursuant to Title 20, California Code of Regulations, section 2505(a). Any information that is determined to be confidential shall be kept confidential as provided for in Title 20, California Code of Regulations, section 2501, et. seq.

Annual Energy Facility Compliance Fee (COMPLIANCE-9)

Pursuant to the provisions of Section 25806(b) of the Public Resources Code, the project owner is required to pay an annual compliance fee, which is adjusted annually. Current Compliance fee information is available on the Energy Commission's website http://www.energy.ca.gov/siting/filing_fees.html. You may also contact the CPM for the current fee information. The initial payment is due on the date of the Business Meeting at which the Energy Commission adopts the final decision. All subsequent payments are due by July 1 of each year in which the facility retains its certification. The payment instrument shall be made payable to the California Energy Commission and mailed to: Accounting Office MS-02, California Energy Commission, 1516 9th St., Sacramento, CA 95814.

Reporting of Complaints, Notices, and Citations (COMPLIANCE-10)

Prior to the start of construction, the project owner must send a letter to property owners living within one mile of the project notifying them of a telephone number to contact project representatives with questions, complaints, or concerns. If the telephone is not staffed 24 hours per day, it shall include automatic answering with a date and time stamp recording. All recorded complaints shall be responded to within 24 hours. The telephone number shall be posted at the project site and made easily visible to passersby during construction and operation. The telephone number shall be provided to the CPM who will post it on the Energy Commission's web page at http://www.energy.ca.gov/sitingcases/power_plants_contacts.html.

Any changes to the telephone number shall be submitted immediately to the CPM, who will update the web page.

In addition to the monthly and annual compliance reporting requirements described above, the project owner shall report and provide copies to the CPM of all complaint forms, including noise and lighting complaints, notices of violation, notices of fines, official warnings, and citations within 10 days of receipt. Complaints shall be logged and numbered. Noise complaints shall be recorded on the form provided in the **NOISE** conditions of certification. All other complaints shall be recorded on the complaint form (Attachment A).

FACILITY CLOSURE

At some point in the future, the project will cease operation and close down. At that time, it will be necessary to ensure that the closure occurs in such a way that public health and safety and the environment are protected from adverse impacts. Although the project setting for this project does not appear, at this time, to present any special or unusual closure problems, it is impossible to foresee what the situation will be in 30 years or more when the project ceases operation. Therefore, provisions must be made that provide the flexibility to deal with the specific situation and project setting that exist at the time of closure. Laws, Ordinances, Regulations, and Standards (LORS) pertaining to facility closure are identified in the sections dealing with each technical area. Facility closure will be consistent with LORS in effect at the time of closure.

There are at least three circumstances in which a facility closure can take place: planned closure, unplanned temporary closure, and unplanned permanent closure**.**

CLOSURE DEFINITIONS

Planned Closure

A planned closure occurs when the facility is closed in an anticipated, orderly manner, at the end of its useful economic or mechanical life, or due to gradual obsolescence.

Unplanned Temporary Closure

An unplanned temporary closure occurs when the facility is closed suddenly and/or unexpectedly, on a short-term basis, due to unforeseen circumstances such as a natural disaster or an emergency.

Unplanned Permanent Closure

An unplanned permanent closure occurs if the project owner closes the facility suddenly and/or unexpectedly, on a permanent basis. This includes unplanned closure where the owner implements the on-site contingency plan. It can also include unplanned closure where the project owner fails to implement the contingency plan, and the project is essentially abandoned.

COMPLIANCE CONDITIONS FOR FACILITY CLOSURE

Planned Closure (COMPLIANCE-11)

In order to ensure that a planned facility closure does not create adverse impacts, a closure process that provides for careful consideration of available options and applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of closure will be undertaken. To ensure adequate review of a planned project closure, the project owner shall submit a proposed facility closure plan to the Energy Commission for review and approval at least 12 months (or other period of time agreed to by the CPM) prior to the commencement of closure activities. The project owner shall file 120 copies (or other number of copies agreed upon by the CPM) of a proposed facility closure plan with the Energy Commission.

The plan shall:

1. identify and discuss any impacts and mitigation to address significant adverse impacts associated with proposed closure activities and to address facilities, equipment, or other project related remnants that will remain at the site;

2. identify a schedule of activities for closure of the power plant site, transmission line corridor, and all other appurtenant facilities constructed as part of the project;

3. identify any facilities or equipment intended to remain on site after closure, the reason, and any future use; and

4. address conformance of the plan with all applicable laws, ordinances, regulations, standards, and local/regional plans in existence at the time of facility closure, and applicable conditions of certification.

Prior to submittal of the proposed facility closure plan, a meeting shall be held between the project owner and the Energy Commission CPM for the purpose of discussing the specific contents of the plan.

In the event that there are significant issues associated with the proposed facility closure plan's approval, or if the desires of local officials or interested parties are inconsistent with the plan, the CPM shall hold one or more workshops and/or the Energy Commission may hold public hearings as part of its approval procedure.

As necessary, prior to or during the closure plan process, the project owner shall take appropriate steps to eliminate any immediate threats to public health and safety and the environment, but shall not commence any other closure activities until the Energy Commission approves the facility closure plan.

Unplanned Temporary Closure/On-Site Contingency Plan (COMPLIANCE-12)

In order to ensure that public health and safety and the environment are protected in the event of an unplanned temporary facility closure, it is essential to have an on-site contingency plan in place. The on-site contingency plan will help to ensure that all necessary steps to mitigate public health and safety impacts and environmental impacts are taken in a timely manner.

The project owner shall submit an on-site contingency plan for CPM review and approval. The plan shall be submitted no less than 60 days (or other time agreed to by the CPM) prior to commencement of commercial operation. The approved plan must be in place prior to commercial operation of the facility and shall be kept at the site at all times.

The project owner, in consultation with the CPM, will update the on-site contingency plan as necessary. The CPM may require revisions to the on-site contingency plan over the life of the project. In the annual compliance reports submitted to the Energy Commission, the project owner will review the on-site contingency plan, and recommend changes to bring the plan up to date. Any changes to the plan must be approved by the CPM.

The on-site contingency plan shall provide for taking immediate steps to secure the facility from trespassing or encroachment. In addition, for closures of more than 90 days, unless other arrangements are agreed to by the CPM, the plan shall provide for removal of hazardous materials and hazardous wastes, draining of all chemicals from storage tanks and other equipment, and the safe shutdown of all equipment. (Also see specific conditions of certification for the technical areas of **Hazardous Materials Management** and **Waste Management**)

In addition, consistent with requirements under unplanned permanent closure addressed below, the nature and extent of insurance coverage, and major equipment warranties must also be included in the on-site contingency plan. In addition, the status of the insurance coverage and major equipment warranties must be updated in the annual compliance reports.

In the event of an unplanned temporary closure, the project owner shall notify the CPM, as well as other responsible agencies, by telephone, fax, or e-mail, within 24 hours and shall take all necessary steps to implement the on-site contingency plan. The project owner shall keep the CPM informed of the circumstances and expected duration of the closure.

If the CPM determines that an unplanned temporary closure is likely to be permanent, or for a duration of more than 12 months, a closure plan consistent with the requirements for a planned closure shall be developed and submitted to the CPM within 90 days of the CPM's determination (or other period of time agreed to by the CPM).

Unplanned Permanent Closure/On-Site Contingency Plan (COMPLIANCE-13)

The on-site contingency plan required for unplanned temporary closure shall also cover unplanned permanent facility closure. All of the requirements specified for unplanned temporary closure shall also apply to unplanned permanent closure.

In addition, the on-site contingency plan shall address how the project owner will ensure that all required closure steps will be successfully undertaken in the event of abandonment.

In the event of an unplanned permanent closure, the project owner shall notify the CPM, as well as other responsible agencies, by telephone, fax, or e-mail within 24 hours and shall take all necessary steps to implement the on-site contingency plan. The project owner shall keep the CPM informed of the status of all closure activities.

A closure plan, consistent with the requirements for a planned closure, shall be developed and submitted to the CPM within 90 days of the permanent closure or another period of time agreed to by the CPM.

Post Certification Changes to the Energy Commission Decision: Amendments, Ownership Changes, Staff Approved Project Modifications and Verification Changes (COMPLIANCE-14)

The project owner must petition the Energy Commission pursuant to Title 20, California Code of Regulations, section 1769, in order to modify the project (including linear facilities) design, operation or performance requirements, and to transfer ownership or operational control of the facility. **It is the responsibility of the project owner to contact the CPM to determine if a proposed project change should be considered a project modification pursuant to section 1769.** Implementation of a project modification without first securing Energy Commission, or Energy Commission staff approval, may result in enforcement action that could result in civil penalties in accordance with section 25534 of the Public Resources Code.

A petition is required for **amendments** and for **staff approved project modifications** as specified below. Both shall be filed as a "Petition to Amend." Staff will determine if the change is significant or insignificant. For verification changes, a letter from the project owner is sufficient. In all cases, the petition or letter requesting a change should

be submitted to the CPM, who will file it with the Energy Commission's Dockets Unit in accordance with Title 20, California Code of Regulations, section 1209.

The criteria that determine which type of approval and the process that applies are explained below. They reflect the provisions of Section 1769 at the time this condition was drafted. If the Commission's rules regarding amendments are amended, the rules in effect at the time an amendment is requested shall apply.

Amendment

The project owner shall petition the Energy Commission, pursuant to Title 20, California Code of Regulations, Section 1769(a), when proposing modifications to the project (including linear facilities) design, operation, or performance requirements. If a proposed modification results in deletion or change of a condition of certification, or makes changes that would cause the project not to comply with any applicable laws, ordinances, regulations, or standards the petition will be processed as a formal amendment to the final decision, which requires public notice and review of the Energy Commission staff analysis and approval by the full Commission. The petition shall be in the form of a legal brief and fulfill the requirements of Section 1769(a). Upon request, the CPM will provide a sample petition to use as a template.

Change of Ownership

Change of ownership or operational control also requires that the project owner file a petition pursuant to section 1769 (b). This process requires public notice and approval by the full Commission. The petition shall be in the form of a legal brief and fulfill the requirements of Section 1769(b). Upon request, the CPM will provide a sample petition to use as a template.

Staff Approved Project Modification

Modifications that do not result in deletions or changes to conditions of certification, that are compliant with laws, ordinances, regulations and standards and will not have significant environmental impacts may be authorized by the CPM as a staff approved project modification pursuant to section 1769(a) (2). Once staff files an intention to approve the proposed project modifications, any person may file an objection to staff's determination within 14 days of service on the grounds that the modification does not meet the criteria of section 1769 (a)(2). If a person objects to staff's determination, the petition must be processed as a formal amendment to the decision and must be approved by the full commission at a noticed business meeting or hearing.

Verification Change

A verification may be modified by the CPM without requesting an amendment to the decision if the change does not conflict with the conditions of certification and provides an effective alternate means of verification.

Notification to CPM of a Situation Requiring an Unplanned Response from an Emergency Services Agency (COMPLIANCE 15)

The project owner shall notify the XXX within one hour by XXX of the circumstances, current status, and expected duration of all accidents, emergencies, and other abnormal

incidents at the facility or appurtenant facilities, that have resulted or could result in any of the following situations:

1. Reduction in the facility's ability to respond to dispatch (excluding forced outages caused by protective equipment or other typically encountered shut down events),
2. Health and safety impacts on the surrounding population,
3. Property damage off-site,
4. Response by off-site emergency response agencies,
5. Serious on-site injury,
6. Serious environmental damage,
7. Filing of bankruptcy, and/or,
8. Emergency reporting to any federal, state, or local agency.

The owner shall also provide a detailed incident report describing the incident and any impacts as described above within 30 days that shall include, as appropriate to the incident, the following information;

1. A brief description of the incident including its date, time and location,
2. A description of cause of the incident, or likely causes if it is still under investigation,
3. The location of any offsite impacts,
4. A description of emergency response actions associated with the incident,
5. Identification of responding agencies,
6. Identification of emergency notifications made to other federal, state, and/or local agencies,
7. Identification of any hazardous materials released and an estimate of the quantity released,
8. A description of any injuries, fatalities, or property damage that occurred as a result of the incident,
9. Fines or violations assessed or being processed,
10. Name, phone number, and email address of the appropriate facility contact person having knowledge of the event, and/or,

11. Corrective actions or repairs necessary, a proposed schedule, and potential cost to restore the facility to acceptable performance and availability.

Verification: The owner shall document in the annual compliance report any incidents described in the condition above and provide the time of the incident, the time of CEC CPM notification, and the date of the follow up report.

CBO DELEGATION AND AGENCY COOPERATION

In performing construction and operation monitoring of the project, Energy Commission staff acts as, and has the authority of, the Chief Building Official (CBO). Energy Commission staff may delegate CBO responsibility to either an independent third party contractor or the local building official. Energy Commission staff retains CBO authority when selecting a delegate CBO, including enforcing and interpreting state and local codes, and use of discretion, as necessary, in implementing the various codes and standards.

Energy Commission staff may also seek the cooperation of state, regional, and local agencies that have an interest in environmental protection when conducting project monitoring.

ENFORCEMENT

The Energy Commission's legal authority to enforce the terms and conditions of its Decision is specified in Public Resources Code sections 25534 and 25900. The Energy Commission may amend or revoke the certification for any facility, and may impose a civil penalty for any significant failure to comply with the terms or conditions of the Energy Commission Decision. The specific action and amount of any fines the Energy Commission may impose would take into account the specific circumstances of the incident(s). This would include such factors as the previous compliance history, whether the cause of the incident involves willful disregard of LORS, oversight, unforeseeable events, and other factors the Energy Commission may consider.

NONCOMPLIANCE COMPLAINT PROCEDURES

Any person or agency may file a complaint alleging noncompliance with the conditions of certification. Such a complaint will be subject to review by the Energy Commission pursuant to Title 20, California Code of Regulations, section 1237, but in many instances the noncompliance can be resolved by using the informal dispute resolution process. Both the informal and formal complaint procedure, as described in current State law and regulations, are described below. They shall be followed unless superseded by future law or regulations.

Informal Dispute Resolution Process

The following procedure is designed to informally resolve disputes concerning the interpretation of compliance with the requirements of this compliance plan. The project owner, the Energy Commission, or any other party, including members of the public, may initiate an informal dispute resolution process. Disputes may pertain to actions or decisions made by any party, including the Energy Commission's delegate agents.

This process may precede the more formal complaint and investigation procedure specified in Title 20, California Code of Regulations, section 1237, but is not intended to be a substitute for, or prerequisite to it. This informal procedure may not be used to change the terms and conditions of certification as approved by the Energy Commission, although the agreed upon resolution may result in a project owner, or in some cases the Energy Commission staff, proposing an amendment.

The process encourages all parties involved in a dispute to discuss the matter and to reach an agreement resolving the dispute. If a dispute cannot be resolved, then the matter must be brought before the full Energy Commission for consideration via the complaint and investigation procedure.

Request for Informal Investigation

Any individual, group, or agency may request the Energy Commission to conduct an informal investigation of alleged noncompliance with the Energy Commission's terms and conditions of certification. All requests for informal investigations shall be made to the designated CPM.

Upon receipt of a request for an informal investigation, the CPM shall promptly notify the project owner of the allegation by telephone and letter. All known and relevant information of the alleged noncompliance shall be provided to the project owner and to the Energy Commission staff. The CPM will evaluate the request and the information to determine if further investigation is necessary. If the CPM finds that further investigation is necessary, the project owner will be asked to promptly investigate the matter. Within seven working days of the CPM's request, the project owner shall provide a written report to the CPM of the results of the investigation, including corrective measures proposed or undertaken. Depending on the urgency of the noncompliance matter, the CPM may conduct a site visit and/or request the project owner to also provide an initial verbal report, within 48 hours.

Request for Informal Meeting

In the event that either the party requesting an investigation or the Energy Commission staff is not satisfied with the project owner's report, investigation of the event, or corrective measures proposed or undertaken, either party may submit a written request to the CPM for a meeting with the project owner. Such request shall be made within 14 days of the project owner's filing of its written report. Upon receipt of such a request, the CPM shall:

1. immediately schedule a meeting with the requesting party and the project owner, to be held at a mutually convenient time and place;

2. secure the attendance of appropriate Energy Commission staff and staff of any other agencies with expertise in the subject area of concern, as necessary;

3. conduct such meeting in an informal and objective manner so as to encourage the voluntary settlement of the dispute in a fair and equitable manner;

4. After the conclusion of such a meeting, promptly prepare and distribute copies to all in attendance and to the project file, a summary memorandum that fairly and

accurately identifies the positions of all parties and any understandings reached. If an agreement has not been reached, the CPM shall inform the complainant of the formal complaint process and requirements provided under Title 20, California Code of Regulations, section 1230, et. seq.

Formal Dispute Resolution Procedure-Complaints and Investigations

Any person may file a complaint with the Energy Commission's Dockets Unit alleging noncompliance with a Commission decision adopted pursuant to Public Resources Code section 25500. Requirements for complaint filings and a description of how complaints are processed are in Title 20, California Code of Regulations, section 1237.

KEY EVENTS LIST

PROJECT: WATSON COGENERATION (BP WATSON)

DOCKET #: 09-AFC-1C

COMPLIANCE PROJECT MANAGER: _____

EVENT DESCRIPTION	DATE
Certification Date	
Obtain Site Control	
Online Date	
POWER PLANT SITE ACTIVITIES	
Start Site Mobilization	
Start Ground Disturbance	
Start Grading	
Start Construction	
Begin Pouring Major Foundation Concrete	
Begin Installation of Major Equipment	
Completion of Installation of Major Equipment	
First Combustion of Gas Turbine	
Obtain Building Occupation Permit	
Start Commercial Operation	
Complete All Construction	
TRANSMISSION LINE ACTIVITIES	
Start T/L Construction	
Synchronization with Grid and Interconnection	
Complete T/L Construction	
FUEL SUPPLY LINE ACTIVITIES	
Start Gas Pipeline Construction and Interconnection	
Complete Gas Pipeline Construction	
WATER SUPPLY LINE ACTIVITIES	
Start Water Supply Line Construction	
Complete Water Supply Line Construction	

COMPLIANCE TABLE 1
SUMMARY of COMPLIANCE CONDITIONS OF CERTIFICATION

CONDITION NUMBER	SUBJECT	DESCRIPTION
COMPLIANCE-1	Unrestricted Access	The project owner shall grant Energy Commission staff and delegate agencies or consultants unrestricted access to the power plant site.
COMPLIANCE-2	Compliance Record	The project owner shall maintain project files on-site. Energy Commission staff and delegate agencies shall be given unrestricted access to the files.
COMPLIANCE-3	Compliance Verification Submittals	The project owner is responsible for the delivery and content of all verification submittals to the CPM, whether such condition was satisfied by work performed or the project owner or his agent.
COMPLIANCE-4	Pre-construction Matrix and Tasks Prior to Start of Construction	Construction shall not commence until the all of the following activities/submittals have been completed: • property owners living within one mile of the project have been notified of a telephone number to contact for questions, complaints or concerns, • a pre-construction matrix has been submitted identifying only those conditions that must be fulfilled before the start of construction, • all pre-construction conditions have been complied with, • the CPM has issued a letter to the project owner authorizing construction.
COMPLIANCE-5	Compliance Matrix	The project owner shall submit a compliance matrix (in a spreadsheet format) with each monthly and annual compliance report which includes the status of all compliance conditions of certification.
COMPLIANCE-6	Monthly Compliance Report including a Key Events List	During construction, the project owner shall submit Monthly Compliance Reports (MCRs) which include specific information. The first MCR is due the month following the Energy Commission business meeting date on which the project was approved and shall include an initial list of dates for each of the events identified on the Key Events List.

CONDITION NUMBER	SUBJECT	DESCRIPTION
COMPLIANCE-7	Annual Compliance Reports	After construction ends and throughout the life of the project, the project owner shall submit Annual Compliance Reports instead of Monthly Compliance Reports.
COMPLIANCE-8	Confidential Information	Any information the project owner deems confidential shall be submitted to the Energy Commission's Executive Director with a request for confidentiality.
COMPLIANCE-9	Annual fees	Payment of Annual Energy Facility Compliance Fee
COMPLIANCE-10	Reporting of Complaints, Notices and Citations	Within 10 days of receipt, the project owner shall report to the CPM, all notices, complaints, and citations.
COMPLIANCE-11	Planned Facility Closure	The project owner shall submit a closure plan to the CPM at least 12 months prior to commencement of a planned closure.
COMPLIANCE-12	Unplanned Temporary Facility Closure	To ensure that public health and safety and the environment are protected in the event of an unplanned temporary closure, the project owner shall submit an on-site contingency plan no less than 60 days prior to commencement of commercial operation.
COMPLIANCE-13	Unplanned Permanent Facility Closure	To ensure that public health and safety and the environment are protected in the event of an unplanned permanent closure, the project owner shall submit an on-site contingency plan no less than 60 days prior to commencement of commercial operation.
COMPLIANCE-14	Post-certification changes to the Decision	The project owner must petition the Energy Commission to delete or change a condition of certification, modify the project design or operational requirements and/or transfer ownership of operational control of the facility.
COMPLIANCE-15	Notification to CPM of response from Emergency Services	The project owner shall notify the CPM of a response from Emergency Services.

ATTACHMENT A
COMPLAINT REPORT/RESOLUTION FORM

COMPLAINT LOG NUMBER:_____ DOCKET NUMBER:_____

PROJECT NAME:_____

COMPLAINANT INFORMATION

NAME:_____ PHONE NUMBER:_____

ADDRESS:_____

COMPLAINT

DATE COMPLAINT RECEIVED:_____ TIME COMPLAINT RECEIVED:_____

COMPLAINT RECEIVED BY: ☐ TELEPHONE ☐ IN WRITING (COPY ATTACHED)

DATE OF FIRST OCCURRENCE:_____

DESCRIPTION OF COMPLAINT (INCLUDING DATES, FREQUENCY, AND DURATION):_____

_____

_____

FINDINGS OF INVESTIGATION BY PLANT PERSONNEL:_____

_____

_____

DOES COMPLAINT RELATE TO VIOLATION OF A CEC REQUIREMENT? ☐ YES ☐ NO

DATE COMPLAINANT CONTACTED TO DISCUSS FINDINGS:_____

DESCRIPTION OF CORRECTIVE MEASURES TAKEN OR OTHER COMPLAINT RESOLUTION:_____

_____

_____

DOES COMPLAINANT AGREE WITH PROPOSED RESOLUTION? ☐ YES ☐ NO

IF NOT, EXPLAIN:_____

_____

CORRECTIVE ACTION

IF CORRECTIVE ACTION NECESSARY, DATE COMPLETED:_____

DATE FIRST LETTER SENT TO COMPLAINANT (COPY ATTACHED):_____

DATE FINAL LETTER SENT TO COMPLAINANT (COPY ATTACHED):_____

OTHER RELEVANT INFORMATION:_____

_____

_____

"This information is certified to be correct."

PLANT MANAGER SIGNATURE:_____ DATE:_____

(ATTACH ADDITIONAL PAGES AND ALL SUPPORTING DOCUMENTATION, AS REQUIRED)

PREPARATION TEAM

BP WATSON COGENERATION STEAM AND ELECTRIC RELIABILITY PROJECT (09-AFC-1) FINAL STAFF ASSESSMENT

Executive Summary	Alan Solomon
Introduction	Alan Solomon
Project Description	Alan Solomon
Air Quality	Matthew Layton, Gerry Bemis, Dave Vidaver, Steve Radis
Biological Resources	Andrea Martine
Cultural Resources	Beverly Bastian
Hazardous Materials Management	Geoff Lesh, P.E., Rick Tyler
Land Use	Candace M. Hill
Noise and Vibration	Shahab Khoshmashrab
Public Health	Alvin J. Greenberg, Ph.D
Socioeconomic Resources	Kristin Ford
Soils and Water Resources	Mark Lindley, P.E.
Traffic and Transportation	Scott Debauche
Transmission Line Safety and Nuisance	Obed Odoemelam, Ph.D.
Visual Resources	William Walters, P.E., Martha A. Goodavish
Waste Management	Ellie Townsend-Hough
Worker Safety and Fire Protection	Geoff Lesh, P.E., Rick Tyler
Facility Design	Shahab Khoshmashrab
Geology and Paleontology	Dal Hunter, Ph. D, C.E.G.
Power Plant Efficiency	Shahab Khoshmashrab
Power Plant Reliability	Shahab Khoshmashrab
Transmission System Engineering	Sudath Edirisuriya and Mark Hesters
Alternatives	Alan Solomon
General Conditions	Dale Rundquist
Project Assistant	Maria Santourdjian
Staff Counsel	Christine Hammond

DECLARATION OF
Alan H. Solomon

I, **Alan H. Solomon**, declare as follows:

1. I am presently employed by The California Energy Commission in the **Siting, Transmission, and Environmental Protection Division** as a **Planner III**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on the **Executive Summary, Introduction, Project Description, and Alternatives sections** for the Watson Cogeneration Steam and Electric Reliability Project, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: August 23, 2011 Signed: _____

At: Sacramento, California

Résumé for

Alan H. Solomon

State of California, California Energy Commission
Project Manager, Siting, Transmission, and Environmental Protection Division Oct 2008-Present

The mission of the Siting, Transmission, and Environmental Protection Division is to ensure that needed energy facilities are authorized in an expeditious, safe and environmentally acceptable manner. In addition, the division prepares environmental documents for the Commission as required by the California Environmental Quality Act.

As a Project Manager with the Siting, Transmission, and Environmental Protection Division, I am responsible for the following:

- Ensuring that applicable local, state and federal laws, ordinances, regulations and standards are followed.
- Ensuring that the principles and practices of engineering analysis, environmental impact analysis, and socioeconomic impact analysis are followed.
- Ensuring that the principles and techniques of supervision are followed.
- Knowledge of federal, state, and local laws and regulations relating to energy or similar industrial facility siting, construction and operation.

I also am responsible for:

- Analyzing and evaluating data and information in order to reach sound conclusions;
- Developing and evaluating alternatives.
- Establishing and maintaining cooperative relationships and effective communication with local, state and federal government agencies.
- Preparing complete and technically accurate reports.
- Presenting information both orally and in writing.
- Coordinating and working effectively with others as an interdisciplinary team member.
- Working independently on complex energy or similar industrial facility siting projects.
- Evaluating general energy or similar industrial facility siting proposals.
- Gaining and maintaining the confidence and cooperation of all parties involved in the siting process.
- Planning, organizing and directing the work of staff engaged in energy or related industrial facility siting activities.
- Evaluating and monitoring the work of consultants.
- Developing solutions to difficult energy related issues.

In addition, to these regular duties, I also have presented Energy Commission rules, regulations, and technical procedures to international delegations and to investors completing their due diligence review.

State of California, Department of Mental Health
Ombudsman, Office of the Ombudsman Nov 2005-Oct 2008

The Ombudsman Office handles the sensitive and critical issues that are brought to the Department's attention by consumers, their family members and other users of the state mental health system. Additionally, this office provides information and makes referrals for all services offered by other

governmental agencies, including; CPS, Healthy Families, Social Security, welfare, senior services, and disability services.

As the Ombudsman for the Office of the Ombudsman, my specific duties included the following:

- Conducting interviews to determine the nature and extent of a person's issue or problem.
- Assisting people with their mental health questions and concerns.
- Assisting family members with their mental health questions or concerns.
- Providing advice and making appropriate referrals to all people who call or visit our office.
- Providing personal financial management information to people so that they can make informed financial management decisions.
- Maintaining good working knowledge of current social service delivery systems (e.g., CPS, Healthy Families, Social Security, welfare, senior services, and disability services.)
- Maintaining good working knowledge of current behavioral science practices.
- Being able to establish good working relationships with individuals, their families, and program administrators both at the state and county level.
- Being able to discuss, provide information, provide referrals, and provide assistance to individuals and their families so that they can make well informed decisions.
- Work with other State Health and Human Services agency's; such as, the Department of Aging, the Department of Health Care Services, and the Department of Social Services.
- Working with State staff to address and resolve complaints, misunderstandings, and problems.
- Working with county staff to address and resolve complaints, misunderstandings, and problems.
- Providing training to executive staff, supervisors, and frontline staff.
- Consensus building, mediating problems and complaint resolution.
- Providing recommendations to policy decision-makers.
- Extensive liaison and public relations experience.
- Investigating problems and developing solutions.
- Understanding the importance of resolving sensitive and critical issues timely.
- Overseeing a staff of three.

Other Experience

In addition, to my experience listed above, I also have international experience and have been certified in Russian Language and Culture.

DECLARATION OF
Matthew S Layton, P.E.

I**,** Matthew S Layton, declare as follows:

1. I am presently employed by the California Energy Commission in the Siting, Transmission and Environmental Protection Division as Supervising Mechanical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepared the staff testimony on **Air Quality, Appendix AIR-1, Greenhouse Gas Emissions** for the Watson Cogeneration Steam and Electric Reliability Project based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

   I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated:_____ Signed:_____

At: Sacramento, California

MATTHEW S. LAYTON

Experience Summary

Twenty eight years of experience in the electric power generation field, including regulatory compliance and modification; research and development; licensing of nuclear, coal-fired, peaking and combined cycle power plants; and engineering and policy analysis of regulatory issues.

Education

B.S., Applied Mechanics, University of California, San Diego.

Registered Professional Engineer - Mechanical, California.

Experience

2009-present – Supervising Mechanical Engineer, Systems Assessment and Facilities Siting Division, California Energy Commission.

1987-2009 – Senior Mechanical Engineer, Systems Assessment and Facilities Siting Division, California Energy Commission. Review and evaluate power plant proposals, identify issues and resolutions; coordinate with other agencies; and prepare testimony, in the areas of:

- Air quality resources and potential impacts, and mitigation measures;
- Public Heath; and
- Transmission Line Safety and Nuisance.

Prepared Commission demonstration project process; contributed to the Energy Technology Status, Energy Development, and Electricity Reports; Project Manager for demonstration projects; evaluated demonstration test plans, procedures, data and reports; disseminated test results; and managed research and development contracts.

1983-1986 – Control Systems Engineer, Bechtel Power Corporation. Managed a multi-disciplined effort to environmentally qualify client's safety related nuclear plant equipment. Performed analyses, calculations and reviews against vendor test reports, NRC guidelines and plant normal and postulated accident conditions.

1981-1983 – Engineer, GA Technologies, Inc. Supervised design and procurement of full-scale test assembly used to evaluate design changes to operating reactor graphite core assembly. Conducted experiment to determine the relationship of graphite oxidation rate to water concentration, temperature, and helium pressure. Environmentally qualified essential and safety related nuclear power plant equipment to comply with NRC guidelines.

DECLARATION OF
Gerry Bemis

I, **Gerry Bemis**, declare as follows:

1. I am presently employed by The California Energy Commission in the **Siting, Transmission, and Environmental Protection Division** as an **Air Resources Supervisor I**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared a portion of the staff testimony on the **Air Quality Appendix Air-1, Greenhouse Gas Emissions** for the Watson Cogeneration Steam and Electric Reliability Project, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: August 30, 2011 Signed: _____

At: Sacramento, California

GERALD R. (Gerry) BEMIS

Experience Summary

Over thirty years of experience in the energy field, including electric power plant facility siting, advanced electricity production technologies, regulatory compliance and modification; energy research and development; energy transportation technology and policy and analysis of regulatory issues.

Education

B.S.; Civil Engineering (CSU Sacramento, 1969)
M. Engr; Civil/Environmental Engineering (UC Davis, 1978).

Registered Professional Civil Engineer (California).

Experience (at California Energy Commission)

2009-present – Air Resources Supervisor, Systems Assessment and Facilities Siting Division. Supervise and lead the review and evaluation of power plant proposals, identify issues and resolutions; coordinate with other agencies; and prepare testimony, in the areas of:

- Air quality resources and potential impacts, and mitigation measures;
- Transmission Line Safety and Nuisance.

Coordinate with local air quality districts, the Air Resources Board (ARB) and U.S. Environmental Protection Agency (U.S. EPA).

2001-2009 – Developed and updated the statewide California Greenhouse Gas (GHG) emissions inventory, including training ARB to take over responsibility for the GHG inventory as part of Assembly Bill 32 (in 2007). Also developed a strategy to enable California's light-duty vehicle sector to do its "fair share" of emissions reductions to meet a 2050 goal of reducing statewide GHGs to a level 80 percent below 1990 levels.

1994-2001 – Managed Fuel Resources Office. This consisted of a staff of 23 professionals who performed various activities related to fuel supply adequacy, including natural gas for power plants and petroleum for transportation.

1991-1994 – Supervised Heavy-Duty Alternative Fuels Program. This group was responsible for the $100 million Safe School Bus Program and provided funding for several clean fuel transportation technology research and grant activities.

1982-1991 – Supervised or performed technical analyses and support for several activities, including the Energy Technologies Status Report used to document the commercial availability of advanced technologies which were alternatives to conventional power plants during Energy Commission siting cases.

1977-1982 – Reviewed and evaluated large thermal power plant siting proposals, coordinating with the U.S. EPA, ARB and local air quality districts.

DECLARATION OF
Dave Vidaver

I, **Dave Vidaver**, declare as follows:

1. I am presently employed by **the California Energy Commission** in the **Electricity Analysis Office/Electricity Supply Analysis Division** as a **Electric Generation System Program Specialist**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Air Quality Appendix AIR-1**, for the **Watson Cogeneration Steam and Electric Reliability project**, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: August 8, 2011 Signed: _____

At: Sacramento, California

Dave Vidaver
Electricity Analysis Office
Electricity Supply Assessment Division
California Energy Commission
(916) 654-4656
dvidaver@energy.state.ca.us

Education

BA, Political Science University of California, Berkeley
MS, Agricultural Economics, University of California, Davis

Relevant Coursework: Microeconomic Theory, Econometrics, Time Series Analysis, Operations Research, Game Theory

Employment (all with the California Energy Commission)

Electric Generation System Specialist I, Electricity Analysis Office, 1998 – 2002

> Simulation modeling of WECC for studies of resource adequacy, market price forecasts, emissions and fuel use studies; assessments of market conditions; contributing and principal author of numerous papers, reports and presentations.

Electric Generation System Specialist II, Electricity Analysis Office 2002 – 2005

> Supervisor of Electricity System Modeling Unit; supervised four staff responsible for studies of resource adequacy, market price forecasts, emissions and fuel use studies, assessments of market conditions, role of aging power plants; contributing and principal author of numerous reports, papers, and presentations,

Energy Commission Specialist II, Demand Analysis Office, 2005

> Monitoring near-term load growth at utility and regional level across the WECC; assessing load-temperature relationships for California and major western utilities and long-term changes in temperatures and load-temperature relationships.

Electric Generation System Specialist III, Electricity Analysis Office, 2005 - 2011

Supervisor of Procurement and Resource Adequacy Unit, supervise nine staff responsible for evaluating utility procurement and resource adequacy, combined heat

and power and distributed generation issues, role of aging and once-through cooled power plants, compiling and maintaining office databases.

Electric Generation System Program Specialist II

Responsible for design and development of staff analysis of electricity sector performance and planning. Areas include but are not limited to resource adequacy, impacts of once-through-cooling policy, GHG implications of electricity system development

Additional Information

Member of the Northwest Power and Conservation Council's Generation Resource Committee, which characterizes the cost and performance of generation technologies for studies undertaken in support of the Council's 5-year power plans; numerous reports at conferences and symposia on topics ranging from natural gas demand in California's electricity sector to implementation of resource adequacy measures in California during 2001- 2004; participant in collaborative proceedings with CPUC (resource adequacy, long-term procurement)

DECLARATION OF
Steven R. Radis

I, **Steven R. Radis**, declare as follows:

1. I am presently employed as a consultant to the California Energy Commission in the **Environmental Protection Office** of the **Energy Facilities Siting Division**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Air Quality**, for the **Watson Cogeneration Steam and Electric Reliability project**, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 8 Aug 2011 Signed: _____

At: Ventura, California

Steven R. Radis

Mr. Radis is a Principal with MRS. Before joining MRS, he was a Principal in Arthur D. Little, Inc.'s Environmental Health & Safety Practice located in the Santa Barbara and Ventura, California offices. His expertise includes meteorological modeling and analysis, physical oceanographic modeling and analysis, consequence and risk analysis, fire and explosion dynamics, hazard evaluation, external events analysis, fault tree analysis, and model development. Mr. Radis has worked on a wide variety of studies for utilities, commercial, and government clients involving meteorological modeling, quantitative risk assessments, health risk assessments, consequence analysis, risk management, air quality modeling (inert/photochemical pollutants, toxic air contaminants), and Environmental Impact Reports (EIR)/Statements (EIS) prepared in compliance with the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA). His experience includes the following:

- Mr. Radis has participated on power plant siting projects before the California Energy Commission in a variety of roles. He is currently assisting the CEC on the GWF Tracy Combined Cycle Power Plant, City of Palmdale Hybrid Power Plant, Watson Cogeneration Steam and Electric Reliability, and the Kings River Conservation District Community Power Plant projects. Mr. Radis also participated as an intervener on the Metcalf Energy Center and Potrero Unit 7 siting cases. Mr. Radis has also represented applicants on the Occidental Elk Hills project, and several siting cases in the 1980's for Southern California Edison.
- Mr. Radis completed a safety and vulnerability analysis of the Diablo Canyon Power Plant (DCPP) and the San Onofre Nuclear Generating Station (SONGS) Steam Generator Replacement Projects for the California Public Utilities Commission. The EIR analyses evaluated a range of equipment and operational failure modes and quantitatively evaluated the associated radiological consequences of core damage accidents and releases. Failure modes, release mechanisms and consequences associated with terrorist attacks were also evaluated.
- For the County of San Luis Obispo, Mr. Radis completed a safety and vulnerability analysis of the Diablo Canyon Power Plant (DCPP) Independent Spent Fuel Storage Installation (ISFSI). The EIR analysis evaluated a range of equipment and operational failure modes and quantitatively evaluated the associated radiological consequences of spent fuel pool and dry cask storage accidental releases. Failure modes, release mechanisms and consequences associated with terrorist attacks were also evaluated.
- Mr. Radis was the project Manager and Public Safety coordinator for the Venoco Ellwood Marine Terminal Lease Renewal Project EIR that was recently prepared for the California State Lands Commission. This is the last marine oil terminal in Santa Barbara County and the continuing operation of the terminal is raising a lot of public opposition. Critical environmental issues include the increased risk of an accidental release of oil and its impact on marine and terrestrial water quality and biological resources, recreation, land use, and visual resources.
- Mr. Radis prepared two sections of the Plains All American Crude Oil Marine Terminal SEIS/EIR, the project that includes construction of a marine terminal on

Steven R. Radis (continued)

Pier 400 in the Port of Los Angeles. Marine Vessel Transportation and System Safety/Risk of Upset. The Marine Vessel Transportation analysis considers the specific type and number of vessels that currently visit the Port and pass by Pier 400, and evaluates the number and characteristics of tankers that would be calling at the new Pier 400 marine terminal after project implementation.

- For the California Coastal Commission, Mr. Radis provided technical assistance in the reviews of the BHP Billiton Liquefied Natural Gas (LNG) Cabrillo Port Project and the Port of Long Beach Sound Energy Solutions (SES) Long Beach LNG Project. The review of the proposed projects is focused on the adequacy and completeness of risk analysis, especially in terms of the safety review requirements of 49 CFR 193 Subpart B and NFPA Design Standard 59A. Mr. Radis is also acting as a technical advisor to CCC staff on risk analysis, vapor dispersion modeling, etc., as well as identifying deficiencies, if any, in the analysis or recommended mitigation measures. Mr. Radis is also currently providing technical assistance to the California Coastal Commission on the OceanWay and Clearwater LNG projects.
- Mr. Radis managed the preparation of an Environmental Impact Report for the Nacimiento Water Project. The EIR that evaluated environmental impacts associated with construction and operation of a 65-mile water pipeline and associated facilities in San Luis Obispo County. The pipeline would draw water from Nacimiento Reservoir and deliver it to various purveyors in the County. The pipeline would cross numerous jurisdictions and would affect a number of landowners and agencies. The proposed project included two equal options: (1) Raw Water Option that entailed construction of the pipeline and facilities that would deliver raw water to the purveyors; and (2) Treated Water Option that also entailed construction of a water treatment plant; in this case, potable water would be delivered to the purveyors. This EIR contained more than 800 pages, not including the Executive Summary and technical appendices. Over 140 mitigation measures were developed to lessen impacts from the proposed project.
- Mr. Radis was a Project Manager on the Point Pedernales Project Supplemental EIR that was prepared for Santa Barbara County. Mr. Radis was also the Principal Investigator for the Air Quality and Risk-of-Upset Project portions of the Supplemental EIR.
- Mr. Radis conducted system safety and reliability studies for several oil and gas projects for Santa Barbara County. These studies included hazard identification, external event and offsite consequence analyses. Facilities included oil and gas processing plants, offshore platforms, onshore production facilities, as well as sour gas and crude oil pipelines. Quantitative Risk Analyses (QRA) were prepared for several of the projects.
- As part of an EIR/EIS for the Unocal Avila Beach Cleanup Project, Mr. Radis served as the Project Manager for San Luis Obispo County, California Regional Water Quality Control Board, and the U.S. Army Corps of Engineers. The EIR/EIS included the evaluation of site contamination and a variety of cleanup strategies, including air

Steven R. Radis (continued)

sparging/bioventing, solidification/ stabilization, solvent flooding, steam stripping, excavation, and thermal desorption. Leaking Unocal Marine Terminal pipelines had resulted in approximately 400,000 gallons of petroleum hydrocarbon contamination beneath the town of Avila Beach and the adjacent beach and intertidal zone. San Luis Obispo County certified the EIR/EIS, and Mr. Radis assisted the Regional Water Quality Control Board in establishing cleanup levels for the site.

- For the Center for Chemical Process Safety (CCPS) of the American Institute of Chemical Engineers (AIChE), Mr. Radis co-authored a book entitled *Guidelines for Postrelease Mitigation Technology in the Chemical Process Industry*. As part of this effort, Mr. Radis quantitatively evaluated the effectiveness of a variety of hazardous chemical mitigation technologies.
- For a Texas-based law firm, Mr. Radis prepared an analysis of external events and provided expert testimony to the Texas Water Commission related to the safety of a hazardous waste disposal facility proposed for the Houston Ship Channel. This study included a review of past external events in the region and centered on hurricane, tornado, and storm surge hazards. The study required the development of a wind field model to simulate hurricanes passing over the site and to estimate potential maximum wind speeds and wind load on the proposed equipment, as well as projected changes in ship channel water levels.
- For a large Southern California utility, Mr. Radis evaluated the feasibility and system safety of converting a fuel oil pipeline distribution network into a regional crude oil and petroleum product storage and distribution system. An analysis of safety and environmental issues was prepared for the CPUC and the South Coast Air Quality Management District. Both agencies approved the conversion project, which is now operating at full capacity. An expansion of the pipeline system was evaluated to increase overall system pipeline throughput capacity, as well as to accommodate unit train and VLCC tanker deliveries.
- Mr. Radis has been involved in the preparation of EIR/EISs for a wide variety of facilities including power generating facilities (coal, fuel oil, natural gas, geothermal, hazardous waste), hazardous waste disposal facilities (chemical and nuclear), crude oil and natural gas transmission pipelines and distribution networks, oil and gas development projects, and military development or conversion projects. Mr. Radis has managed a majority of these projects and was also responsible for the system safety, public health, and air quality issue areas.
- For four Local Emergency Planning Committees (LEPCs) in Alaska, Mr. Radis developed emergency response planning procedures through the preparation of a comprehensive regional hazard and risk analysis.
- For a large engineering company, Mr. Radis prepared a quantitative risk assessment for a LNG marine terminal and power plant project in Puerto Rico. The project included conducting a hazard assessment, fault tree analysis, consequence analysis,

Steven R. Radis (continued)

and quantitative risk analysis. An analysis of external events that could potentially affect the proposed facility was also conducted.

- Mr. Radis has worked on the development of several models, including the development or revisions to several accidental release models, an oil spill model, a multi-component pool model, atmospheric diffusion models, an integrated human exposure and health risk assessment model, and several meteorological models.

Mr. Radis earned his M.A. and B.A degrees in Climatology from California State University, Northridge. He is a member of the American Meteorological Society, and the Air and Waste Management Association.

DECLARATION OF
Andrea Martine

I, **Andrea Martine**, declare as follows:

1. I am presently employed by **California Energy Commission** in the **Environmental Protection Office** of the **Energy Facilities Siting Division** as a **Planner II**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Biological Resources**, for the **Watson Cogeneration Steam and Electric Reliability project**, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated:_____ Signed:_____

At: Sacramento, California

Andrea Martine

Employment History

California Energy Commission

Planner II, Staff Biologist *12/2009 to present*

As a staff biologist with the Energy Commission, Ms. Martine analyzes the biological resource components of energy facilities siting applications to assess resource impacts, develop mitigation, and to evaluate compliance with applicable federal, state, and local, laws, ordinances, regulations, and standards. This requires working closely with biological resource protection and management agencies, subject matter experts, and Energy Commission consultants as well as with other Energy Commission staff to provide the best available information is included in staff analyses.

California Department of Transportation, District 3

Associate Environmental Planner/Environmental *11/1998 to 7/2000*

Ms. Martine's primary duties with Caltrans as Project Biologist were to analyze environmental impacts to special status plants, wildlife and wetlands and stream associated with transportation projects in Northern California. She wrote environmental documents to satisfy CEQA, NEPA, obtained 404 permits, 401 certification and 1601 agreements for various transportation-related projects. She acted as liaison for Federal Highways Administration while reviewing documents prepared for local projects.

Jones & Stokes Associates, Inc.

Environmental Specialist/Botanist *04/1994 to 11/1998*

While with the environmental consulting firm Jones & Stokes Assoc. Inc., Ms. Martine specialized in listed Brachiopod surveys, special status plant and floristic surveys. She worked throughout California including Sacramento, Placer, Fresno and San Diego counties and several military sites (BEALE AFB, Camp Roberts, & Fort Hunter Ligget). Projects while at JSA included protocol-level surveys for special-status plants and brachiopods, wetland delineations, and monitoring vernal pools, seasonal wetlands and riparian vegetation at mitigation sites. Managed brachiopod projects and budgets and writing biological resources sections of documents to satisfy NEPA and CEQA requirements.

El Dorado National Forest

Botanist (Volunteer) *07/1993 to 08/1993*

Ms. Martine helped prepare environmental analyses of proposed timber and recreational projects in which, she produced inventories and assessments of the existing natural environmental conditions of project sites and watersheds.

EDUCATION

Biological Sciences *B.S.*

California State University , Sacramento *June 1993*

DECLARATION OF
Beverly E. Bastian

I, Beverly E. Bastian, declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Office as a Planner II.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I assisted in the preparation of the staff testimony on Cultural Resources for the **Watson Cogeneration Steam and Electric Reliability project**, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated:_____ Signed:_____

At: Sacramento, California

Beverly E. Bastian
1516 Ninth Street MS 40, Sacramento, CA 95814-5504
(916) 654-4840 email: bbastian@energy.state.ca.us

Education	Field	Degree	Year
University of California, Davis	Anthropology	B.A	1967
University of California, Davis	Anthropology	M.A	1969
Tulane University	Anthropology	P.H.C.	1975
University of Mississippi	American History	(courses only)	1989
University of California, Santa Barbara	Public (American) History and Historic Preservation	P.H.C.	1996

Experience

State of California, California Energy Commission *2005 to present*
Planner II, Siting, Transmission, and Environmental Protection Division
Environmental Office, Cultural Resources Unit
All tasks related to the production of the cultural resources sections of CEQA-equivalent (California Environmental Quality Act) documents for the environmental review of proposed 50-MW+ power plants in California, including: Evaluating data in applications; writing data requests to applicants and doing independent research to compile an inventory of and evaluate the historical/cultural significance of cultural resources subject to significant impacts from proposed projects; providing and receiving information in public hearings on applications; analyzing all pertinent data; writing Staff Assessments of impacts; identifying California Register of Historical Resources-eligible cultural resources; developing mitigation measures to reduce to insignificant any impacts to Register-eligible cultural resources; providing expert testimony on my analyses and recommendations in public hearings; and reviewing compliance with mitigation measures during the construction, operation, and decommissioning of certified power plants. Additional tasks include: providing prefiling assistance to applicants; coordinating the joint environmental review of power plant projects with cultural resources specialists in sister state agencies and in federal agencies; supervising and reviewing the work of Commission cultural resources consultants; reviewing the CEQA documents of sister state agencies; and developing internal procedures and guidelines to improve cultural resources review of applications.

State of California, Department of Parks and Recreation *2001 to 2005*
Historian II, Cultural Resources Division, Cultural Resources Support Unit
Major and complex historical and historic architectural investigations and studies dealing with the significance, integrity, and management of historic buildings, structures, and landscapes in California's state parks; participation in interdisciplinary teams and project assignments; preparation of technical reports and correspondence; inventorying and evaluating historic properties; coordinating the statewide registration of historical properties; assessing the eligibility of historic properties to the National Register of Historic Places and the California Register of Historical Resources; reviewing environmental documents and providing technical analyses of major Departmental projects to determine impacts to cultural resources under State and federal laws; identifying resource issues and constraints; establishing allowable use and development guidelines; developing approaches to protect, enhance, and perpetuate cultural resources under relevant State and federal laws, regulations, and standards; proposing and developing programs, policies, and budgets to meet Department's historic preservation missions.

Department of Social Sciences, American River College *2000 to 2002*
Instructor (part-time), American History
Creation and presentation of classroom lectures, selection of assigned texts and readings, creation and administration of quizzes and examinations, assignment and supervision of student research papers, student consultation in office hours, grading of all quizzes, tests, and papers, and assigning final student grades. These research, organizing, and teaching skills demonstrate the ability to organize information, to speak effectively to the public, and to train and direct other personnel.

Department of Sociology and Anthropology, University of Mississippi *1987 to 1989*
Archaeologist, Center for Archaeological Research
All tasks for the completion of the historical archaeological part of an archaeological survey and testing program final report related to a U. S. Army Corps of Engineers erosion control project in twelve north-central Mississippi counties, including: Coordinating the activities of a field crew and the research of historians working in archives; setting up an artifact database using survey data to generate statistical summaries for discovered historical archaeological sites; gathering historical settlement and land-use data for twelve counties; conducting a special statistical analysis and synthesis of historical data only, focusing on pre-and post-Civil War land tenure and agricultural production for plantations in two counties where soil fertility contrasted; synthesizing data from all sources, collaborating on the final cultural resources management report with archaeologists specializing in prehistory and survey and sampling methodology; presenting findings at the annual meeting of the Society for Historical Archaeology in 1989.

Gilbert Commonwealth, Inc. *1984 to 1987*
Historical Archaeologist and Project Manager, Environmental Unit
All tasks as Principal Investigator for six major historical archaeological and/or historical architectural cultural resources management projects done under contract to federal, state, and local governments, including: Writing winning proposals for these projects; negotiating and managing project budgets; gathering/supervising the gathering of historical, oral historical, and archaeological data; analyzing/supervising the analysis of gathered data; and writing/supervising the writing of reports of findings, along with the creation of maps, illustrations, and data tables for these reports; serving as the historian and historical preservationist on several multidisciplinary teams tasked with siting the routes for several major power lines in east Texas.

Tennessee Valley Authority (personal services contract) *1979 to 1981, 1983-1984*
Historical Archaeologist (self-employed)
All tasks as Principal Investigator for various cultural resources management projects in areas affected by TVA construction, the most significant of which were: the complete excavation of and report on seven nineteenth-century log cabin sites in Cedar Creek Reservoir in northwestern Alabama; and all historical research, the field work, and the report for the underwater remote-sensing reconnaissance and underwater videotaping of sunken Civil War cargo boats and gunboats at Johnsonville, Tennessee, in the western part of the Tennessee River.

Other Archaeological Projects *1966 to 1981*

Professional Societies
Register of Professional Archaeologists, #10683
Society for Historical Archaeology
California Council for the Promotion of History
Vernacular Architecture Forum
Society for California Archeology

DECLARATION OF
Geoffrey Lesh

I**, Geoffrey Lesh** declare as follows:

1. I am presently employed by the California Energy Commission in the **Engineering Office** of the Siting, Transmission and Environmental Protection Division as a **Mechanical Engineer.**

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on the **Hazardous Materials Management Section** and the **Worker Safety and Fire Protection Section** for the **Watson Cogeneration Steam and Electric Reliability Project** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated:_____ Signed:_____

At: Sacramento, California

Geoffrey Lesh, P.E.
Mechanical Engineer

WORK HISTORY

California Energy Commission Mechanical Engineer 2002 - Current
• Review and analyze applicants' plans for safe management of hazardous materials, fire prevention, and worker safety.

Self-Employed Independent Investor 2000 - 2002
• Wrote market analysis computer software.

Read-Rite Corp Wafer Engineering Manager 1994 - 2000
• Designed and developed wafer manufacturing processes for computer data storage systems. Managed team of engineers and technicians responsible for developing wet and dry chemical processes for manufacturing, including process and safety documentation.
• Managed process and equipment selection for manufacturing processes.
• Processes included vacuum processed metals and ceramics, grinding-polishing, plating, etching, encapsulation, process troubleshooting, and SPC reporting.

Dastek Corp (Komag Joint Venture Start-up) Wafer Engineering Manager 1992 - 1994
• Developed wafer processes for new technology recording head for hard disk drives.
• Managed team of engineers and technicians.
• This position included start-up of wafer fab, including line layout, purchase, installation, and startup of new process equipment, etc.

Komag, Inc Alloy Development Manager 1989 - 1992
• Developed new vacuum-deposited recording alloys
• Responsible for planning and carrying-out tests, designing experiments, analyzing results, managing test lab conducting materials characterizations.
• Extensive process modeling and data analysis.

Verbatim Corp (Kodak) Process Development Manager 1983 - 1989
• Mechanical engineering for computer disk manufacturing, including product, process, and equipment including metal-ceramic-plastic processes for optical disk development.
• Production processes included plating, metal evaporation, reactive sputtering, laser-based photolithography, injection molding.
• Steering Committee Member, *Center for Magnetic Recording Research, UC San Diego*
• Steering Committee Member, *Institute for Information Storage Technology, University of Santa Clara*

IBM Corp Mechanical/Process Engineer 1977 - 1983
• Product development for photocopiers and computer tape-storage systems.

EDUCATION

Stanford University, Master of Science Degree	Materials Science and Engineering
UC-Berkeley, Bachelor of Science Degree (Double Major)	Mechanical Engineering, Materials Science and Engineering
University of Santa Clara, Graduate Certificate	Magnetic Recording Engineering
Registered Professional Engineer, California	Mechanical #M32576 Metallurgical #MT1940

PUBLICATIONS

All-Solid Lithium Electrodes with Mixed-Conductor Matrix, J. Electrocchem. Soc. **128**, 725 (1981).

Proc. Symp. on Lithium Batteries, H.V. Venkatasetty, Ed., Electrochem Soc (1981), p. 467.

PATENTS

Method of Preparing Thermo-Magneto-Optic Recording Elements, US Pat# 4,892,634 (assigned to Eastman Kodak Co.)

DECLARATION OF
Rick Tyler

I, **Rick Tyler**, declare as follows:

1. I am presently employed by The California Energy Commission in the **Siting, Transmission, and Environmental Protection Division** as a SR. Mechanical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on the **Hazardous Materials and Worker Safety / Fire Protection** for the Watson Cogeneration Steam and Electric Reliability Project, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: August 28, 2011 Signed: _____

At: Sacramento, California

RICK TYLER

Associate Mechanical Engineer

CALIFORNIA ENERGY COMMISSION

EDUCATION B.S., Mechanical Engineering, California State University, Sacramento. Extra course work in Statistics, Instrumentation, Technical Writing, Management; Toxicology, Risk Assessment, Environmental Chemistry, Hazardous Materials Management, Noise Measurement, and regulations regarding control of toxic substances.

Near completion of course work necessary to obtain a certificate in hazardous materials management from University of California, Davis.

EXPERIENCE

Jan. 1998-Present — California Energy Commission - Senior Mechanical Engineer
Energy Facility Siting and Environmental Protection Division

Responsible for review of Applications for Certification (applications for permitting) for large power plants including the review of handling practices associated with the use of hazardous and acutely hazardous materials, loss prevention, safety management practices, design of engineered equipment and safety systems associated with equipment involving hazardous materials use, evaluation of the potential for impacts associated with accidental releases and preparation and presentation of expert witness testimony and conditions of certification. Review of compliance submittals regarding conditions of certifications for hazardous materials handling, including Risk Management Plans Process Safety Management.

April 1985-Jan. 1998 — California Energy Commission - Health and Safety
Program Specialist; Energy Facility Siting and Environmental Protection Division.

Responsible for review of Public Health Risk Assessments, air quality, noise, industrial safety, and hazardous materials handling of Environmental Impact Reports on large power generating and waste to energy facilities, evaluation of health effects data related to toxic substances, development of recommendations regarding safe levels of exposure, effectiveness of measures to control criteria and non-criteria pollutants, emission factors, multimedia exposure models. Preparation of testimony providing Staff's position regarding public health, noise, industrial safety, hazardous materials handling, and air quality issues associated with proposed power plants. Advise Commissioners, Management, other Staff and the public regarding issues related to health risk assessment of hazardous materials handling.

Nov. 1977-
April 1985

California Air Resources Board - Engineer (last 4 years Associate level)

Responsible for testing to determine pollution emission levels at major industrial facilities; including planning, supervision of field personnel, report preparation and case development for litigation; evaluate, select and acceptance-test instruments prior to purchase; design of instrumentation systems and oversight of their repair and maintenance; conduct inspections of industrial facilities to determine compliance with applicable pollution control regulations; improved quality assurance measures; selected and programmed a computer system to automate data collection and reduction; developed regulatory procedures and the instrument system necessary to certify and audit independent testing companies; prepared regulatory proposals and other presentations to classes at professional symposia and directly to the Air Resources Board at public hearings. As state representative, coordinated efforts with federal, local, and industrial representatives.

PROFESSIONAL AFFILIATIONS/ LICENSES

Past President, Professional Engineers in California Government Fort Sutter Section;
Past Chairman, Legislative Committee for Professional Association of Air Quality Specialists. Have passed the Engineer in Training exam.

PUBLICATIONS, PROFESSIONAL PRESINTATIONS AND ACCOMPLISHMENTS

Authored staff reports published by the California Air Resources Board and presented papers regarding continuous emission monitoring at symposiums.

Authored a paper entitled "A Comprehensive Approach to Health Risk Assessment", presented at the New York Conference on Solid Waste Management and Materials Policy.

Authored a paper entitled "Risk Assessment A Tool For Decision Makers" at the Association of Environmental Professionals AEP Conference on Public Policy and Environmental Challenges.

Conducted a seminar at University of California, Los Angeles for the Doctoral programs in Environmental Science and Public Health on the subject of "Health Risk Assessment".

Authored a paper entitled "Uncertainty Analysis -An Essential Component of Health Risk Assessment and Risk Management" presented at the EPA/ORNL expert workshop on Risk Assessment for Municipal Waste Combustion: Deposition, Uncertainty, and Research Needs.

Presented a talk on off-site consequence analysis for extremely hazardous materials releases. Presented at the workshop for administering agencies conducted by the City of Los Angeles Fire Department.

Evaluated, provided analysis and testimony regarding public health and hazardous materials management issues associated with the permitting of more than 20 major power plants throughout California.

Developed Departmental policy, prepared policy documents, regulations, staff instruction, and other guidance documents and reference materials for use in evaluation of public health and hazardous materials management aspects of proposed power plants.

Project Manager on contracts totaling more than $500,000.

RES.RT

DECLARATION OF
Candace M. Hill

I, **Candace M. Hill**, declare as follows:

1. I am presently employed by **California Energy Commission** in the **Siting, Transmission and Environmental Protection Division** as a **Planner II**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Land Use**, for the **Watson Cogeneration Steam and Electric Reliability project**, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated:_____ Signed:_____

At: _____

CANDACE M. HILL

PROFESSIONAL EXPERIENCE

The mission of the California Energy Commission, Siting, Transmission, and Environmental Protection Division is to ensure that needed energy facilities are authorized in an expeditious, safe and environmentally acceptable manner. In addition, the division prepares environmental documents for the Commission as required by the California Environmental Quality Act.

CALIFORNIA ENERGY COMMISSION - December 2009 – Present
Siting, Transmission, and Environmental Protection Division, Sacramento, California
Environmental Planner II

- Write preliminary and final staff assessments for traffic and transportation and land use technical sections.
- Compliance review of approved projects for traffic and transportation, land use and visual technical sections.
- Attend workshops on authored technical sections.

DEPARTMENT OF TRANSPORTATION – December 2008 – December 2009
Division of Mass Transportation, Sacramento, California
Associate Transportation Planner

- Administered two Federal Transit Administration (FTA) Grant Programs – Job Access and Reverse Commute (JARC) and New Freedom (NF).
- Reviewed and assessed grant proposals, monitored and prepared weekly and bi-weekly status reports for both Programs, managed the day-to-day operations of the grants and budgets for transportation, capital, operating and mobility management grants administered through the Department of Transportation for District 4 and District 5 which covered 14 counties.
- Responded to inquiries from grant recipients and the general public regarding the grants.

DEPARTMENT OF CONSERVATION - May, 2000 – December, 2008
California Geological Survey, Sacramento, California
Associate Planner

- Met with staff of the planning, building, public works and engineering departments of affected cities and counties throughout the State to explain the requirements and implementation of the California Seismic Hazards Mapping Act in the land use development process such as the General Plan, Zoning Code, building process and the California Environmental Quality Act.
- Analyzed and commented on General Plan Draft Safety Elements to incorporate the Seismic Hazard Zone Maps into the Element; reviewed Tribal Land Applications for seismic impacts.

- Presented the Seismic Hazard Zone Maps before the State Mining and Geology Board and coordinated with the public affairs office, legislative office and other state departments regarding the issuance of the Seismic Hazard Zone Maps.
- Maintained a database of affected cities and counties.
- Point person for outreach events.
- Responded to public inquires regarding Zone Maps and general seismic hazards.

SACRAMENTO COUNTY PLANNING DEPARTMENT July, 1999– May, 2000
Current Planning, Sacramento, California
Associate Planner

- Researched, analyzed and wrote staff reports for land use development proposals.
- Presented staff reports and recommendations for the land use development proposals to the Sacramento County Planning Commission and Sacramento Board of Supervisors.
- Staff Planner for the Cosumnes Community Planning Advisory Council.
- Supervised one Assistant Planner.
- Assisted the public with zoning, planning and general questions via the public counter, telephone and e-mail.

STANISLAUS COUNTY PLANNING DEPARTMENT – December, 1996 – July1999
Current Planning, Modesto, California
Associate Planner

- Researched, analyzed and wrote staff reports for land use development proposals.
- Prepared Initial Studies and associated documents per the California Environmental Quality Act.
- Presented staff reports and recommendations for the land use development proposals to the Stanislaus County Planning Commission.
- Assisted the public with zoning, planning and general questions via the public counter and telephone.

IMPERIAL COUNTY PLANNING AND BUILDING DEPARTMENT - October, 1990 – December, 1996
Current Planning, El Centro, California
Planner III

- Researched, analyzed and wrote staff reports for land use development proposals.
- Prepared Initial Studies and associated documents per the California Environmental Quality Act.
- Assisted the public with zoning, planning and general questions via the public counter and telephone.

EDUCATION

University of California, Riverside
Bachelor of Arts in Administrative Studies – 1989

DECLARATION OF
SHAHAB KHOSHMASHRAB

I**, SHAHAB KHOSHMASHRAB**, declare as follows:

1. I am presently employed by the California Energy Commission in the **ENGINEERING OFFICE** of the Siting, Transmission, and Environmental Protection Division as a **SENIOR MECHANICAL ENGINEER**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I participated in the preparation of the staff testimony on **Power Plant Efficiency** for the **Watson Cogeneration Steam and Electric Reliability Project** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: _____ Signed: _____

At: Sacramento, California

DECLARATION OF
SHAHAB KHOSHMASHRAB

I**, SHAHAB KHOSHMASHRAB**, declare as follows:

1. I am presently employed by the California Energy Commission in the **ENGINEERING OFFICE** of the Siting, Transmission, and Environmental Protection Division as a **SENIOR MECHANICAL ENGINEER**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I participated in the preparation of the staff testimony on **Facility Design** for the **Watson Cogeneration Steam and Electric Reliability Project** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: _____ Signed: _____

At: Sacramento, California

DECLARATION OF
SHAHAB KHOSHMASHRAB

I**, SHAHAB KHOSHMASHRAB**, declare as follows:

1. I am presently employed by the California Energy Commission in the **ENGINEERING OFFICE** of the Siting, Transmission, and Environmental Protection Division as a **SENIOR MECHANICAL ENGINEER**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I participated in the preparation of the staff testimony on **Noise and Vibration** for the **Watson Cogeneration Steam and Electric Reliability Project** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: _____ Signed: _____

At: Sacramento, California

DECLARATION OF
SHAHAB KHOSHMASHRAB

I**, SHAHAB KHOSHMASHRAB**, declare as follows:

1. I am presently employed by the California Energy Commission in the **ENGINEERING OFFICE** of the Siting, Transmission, and Environmental Protection Division as a **SENIOR MECHANICAL ENGINEER**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I participated in the preparation of the staff testimony on **Power Plant Reliability** for the **Watson Cogeneration Steam and Electric Reliability Project** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: _____ Signed: _____

At: Sacramento, California

Shahab Khoshmashrab, P.E.
Mechanical Engineer

Experience Summary

16 years experience in the Mechanical, Civil, Structural, and Manufacturing Engineering fields involving engineering and manufacturing of various mechanical components and building structures. This experience includes QA/QC, construction/licensing of electric generating power plants, analysis of noise pollution, and engineering and policy analysis of thermal power plant regulatory issues.

Education

- California State University, Sacramento-- Bachelor of Science, Mechanical Engineering
- Registered Professional Engineer (Mechanical), California

Professional Experience

2001-2011—Mechanical Engineer – Engineering Office – Siting, Transmission and Environmental Protection Division – California Energy Commission

Performed analysis of generating capacity, reliability, efficiency, noise and vibration, and the mechanical, civil, structural and geotechnical engineering aspects of power plant siting cases.

1998-2001—Structural Engineer – Rankin & Rankin

Engineered concrete foundations, structural steel and sheet metal of various building structures including energy related structures such as fuel islands. Performed energy analysis/calculations of such structures and produced structural engineering detail drawings.

1995-1998—Manufacturing Engineer – Carpenter Advanced Technologies

Managed manufacturing projects of various mechanical components used in high tech medical and engineering equipment. Directed fabrication and inspection of first articles. Wrote and implemented QA/QC procedures and occupational safety procedures. Conducted developmental research of the most advanced manufacturing machines and processes including writing of formal reports. Developed project cost analysis. Developed/improved manufacturing processes.

DECLARATION OF
Alvin J. Greenberg, Ph.D.

I, **Alvin J. Greenberg, Ph.D.** declare as follows:

1. I am presently a consultant to the California Energy Commission, Energy Facilities Siting and Environmental Protection Division.

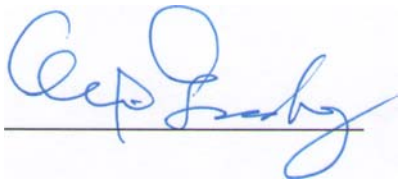
2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. 1 prepared the **Public Health** assessment for the **Watson Cogeneration Steam and Electric Reliability project,** based on my independent analysis of the application for certification, supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. 1 am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 4 S- D V(I Signed: 

At: Sacramento, California

Risk Science Associates

121 Paul Dr., Suite A, San Rafael, Ca. 94903-2047
office 415-479-7560 cell 415-302-0438
e-mail agreenberg@risksci.com

Dr. Alvin Greenberg has considerable experience and ability to manage, prepare, and critically review CEQA, NEPA, and local permitting documentation for many projects, including: gas-fired, solar thermal, photovoltaic, and geothermal power plants; petroleum refineries; and the construction/operation of Indian Gaming facilities. His subject areas of expertise include air quality, public health and safety, hazards and hazardous materials, water quality, hazardous/solid waste management, public services (fire and EMS), and occupational safety and health. Under contract to the California Energy Commission, he prepared EIRs and EISs for eight solar power plants or solar/gas hybrids in the Southern California desert and is currently under contract with the CEC to conduct compliance review for these projects and environmental assessment for a PV-solar thermal hybrid project. He has authored and defended at Evidentiary Hearing over150 CEQA-equivalent Staff Assessments for power plant siting cases in California over a 17-year period as a contractor to the CEC.

Dr. Greenberg has a B.S. from the University of Illinois, Urbana, and a Ph.D. from the University of California San Francisco. He conducted postdoctoral research in neurotoxicology and served as an Assistant Professor at UCSF. He also attended the prestigious Lovelace Institute of Inhalation Toxicology in 1980, is Board Certified as a Qualified Environmental Professional (QEP), and is a California Registered Environmental Assessor - I (REA). Dr. Greenberg was formerly Chair of the Bay Area Air Quality Management District Hearing Board, a former Member of the State of California Occupational Health and Safety Standards Board (appointed by the Governor), and former Assistant Deputy Chief for Health, California OSHA.

Since January 2005, he has trained and led an audit team conducting hazmat, safety, and security audits at power plants throughout California that are under the jurisdiction of the California Energy Commission. His unique experience in Cal-OSHA and with the CEC allows him to effectively identify safety and health hazards and recommend cost-effective solutions. Additionally, Dr. Greenberg has been trained in and has considerable experience in critical infrastructure security. After the events of 9/11, Dr. Greenberg was trained by Israel's oldest security company SB Security LTD, the most experienced and tested security planning and service company in the world. He then became the lead for the California Energy Commission developing a power plant vulnerability assessment methodology and model power plant security plan, reviewing and evaluating power plant security plans, testifying at Hearings on power plant security, preparing a "background" report on the risks and hazards of siting LNG terminals in California, consulting for the City of Vallejo on a proposed LNG terminal and storage facility at the former Mare Island Naval Shipyard, and preparing safety and security recommendations for the proposed LNG terminal in Long Beach, CA. He has also been the lead person for the CEC in gas pipeline safety review and evaluation. He is knowledgeable about and has experience implementing infrastructure security needs and methods and has U.S. Coast Guard Sensitive Security Information (SSI) and U.S. Department of Energy Critical Energy Infrastructure (CI) security clearances.

121 Paul Dr., Suite A, San Rafael, Ca. 94903-2047
office 415-479-7560 cell 415-302-0438
e-mail agreenberg@risksci.com

He also has had over two decades of complete technical and administrative responsibility as a team leader in the preparation of human and ecological risk assessments, air quality assessments, hazardous materials handling and risk management/prevention, infrastructure vulnerability assessments, occupational safety and health, hazardous waste site characterization, interaction with regulatory agencies in obtaining permits, and conducting lead surveys and studies. He has particular expertise in the assessment of dioxins, lead, diesel exhaust, petroleum hydrocarbons, mercury, hexavalent chromium, and in the intrusion of subsurface contaminants into indoor air.

Dr. Greenberg's expertise in risk assessment has led to his appointment as a member of several state and federal advisory committees, including the California EPA Advisory Committee on Stochastic Risk Assessment Methods, the U.S. EPA Workgroup on Cumulative Risk Assessment, the Cal/EPA Peer Review Committee of the Health Risks of Using Ethanol in Reformulated Gasoline, the California Air Resources Board Advisory Committee on Diesel Emissions, the Cal/EPA Department of Toxic Substances Control Program Review Committee, and the DTSC Integrated Site Mitigation Committee.

DECLARATION OF
Kristin Ford, Planner I

I, **Kristin Ford**, declare as follows:

1. I am presently employed by **California Energy Commission** in the Environmental Office of the Siting, Transmission & Environmental Protection Division as a **Planner I**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Socioeconomics**, for the **Watson Cogeneration Steam and Electric Reliability project**, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: August 5, 2011 Signed: _____

At: Sacramento, CA

Kristin S. Ford

Experience

Environmental Planner November 2009 to Present
California Energy Commission, Sacramento, California

- Conduct CEQA-equivalent environmental review for proposed and existing power plants.
- Write analysis for Socioeconomics, Traffic, Visual Resources and Land Use sections for staff assessments.
- Provide expert witness testimony on Socioeconomics, Traffic, Visual Resources and Land Use issues at Energy Commission hearings.

Assistant Planner June 2006 to July 2009
City of Sacramento, Environmental Planning Services, Sacramento, California

- Evaluated, prepared and supervised the preparation of a variety of environmental documents under the California Environmental Quality Act (CEQA); analyzed data and made recommendations on complex planning matters involving issues related to land use, traffic, utilities, aesthetics, noise, energy, historic preservation, air quality and biological resources.
- Prepared, researched and reviewed Mitigation Monitoring Plans per CEQA, the California State & Federal Endangered Species Acts (CESA & FESA), the Clean Water Act (CWA), the Migratory Bird Treaty Act (MBTA) and the Natomas Basin Habitat Conservation Plan.
- Conducted biological resources site assessments for proposed development projects. Determined the need for preparation and/or review of specific studies, such as Wetland Delineations, Nesting Raptor Surveys, and Arborist Reports, to identify resources and provide mitigation measures.
- Coordinated the release of the City of Sacramento's 2030 General Plan Draft/Final Environmental Impact Report between various City departments, the Planning Commission, City Council and the consultant team.

Environmental Coordinator August 2005 to June 2006
Nella Oil Company, Auburn, California

- Coordinated company-wide environmental regulatory compliance activities, including:
  - site investigations;
  - underground fuel-storage tank environmental compliance recommendations and subsequent tank upgrades; and
  - hazardous waste removal.
- Maintained and managed Air Quality Management District and Environmental Health Department permits for 60+ gas stations.

Student Assistant March 2005 to August 2005
California Energy Commission, Sacramento, California

- Conducted research and provided technical writing support to Biology and Water Departments for the annual Energy Policy Report impact analyses.
- Maintained and managed compliance files on power plant facilities.

Student Assistant June 2004 to March 2005
Central Valley Regional Water Quality Control Board, Sacramento, California

- Supported National Pollutant Discharge Elimination System (NPDES) staff by:
  - maintaining waste water treatment plant discharge self-monitoring reports and case files; and
  - analyzed (Amador, Sutter, Placer and Yolo county) wastewater treatment plant monthly monitoring reports for possible permit violations.

Education

2005 Bachelor of Arts, Environmental Studies, *California State University, Sacramento*
2001 Associate of Arts, Liberal Studies, *Allan Hancock College, Santa Maria, California*

DECLARATION OF
Mark Lindley

I, **Mark Lindley**, declare as follows:

1. I am presently employed as a consultant to the California Energy Commission om the Siting, Transmission, and Environmental Protection Division.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Soil and Water Resources Section**, for the **Watson Cogeneration Steam and Electric Reliability project**, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 8/16/11 Signed: _____

At: SAN FRANCISCO, CA

Mark Lindley, P.E.

Senior Engineer

Mr. Lindley is a water resources engineer with experience in stormwater management, hydraulic design, creek and wetland restoration design, construction management, environmental impact/CEQA review, surface and groundwater hydrology, field data collection, water quality, and remediation. His graduate studies focused on the application of analytical and numerical modeling techniques to hydraulic routing and sedimentation in wetlands, impoundments, detention basins and small sediment control structures.

Mr. Lindley combines his expertise in technical analyses and engineering design with his project management responsibilities to effectively address client needs. His technical work has included analysis and engineering design guidance in creek and wetland restoration projects, as well as hydraulic design guidance for stormwater management and flood control projects and environmental impact analysis for CEQA projects.

Education

M.S., 1994 — Biosystems & Agricultural Engineering, Oklahoma State University, Stillwater, OK

B.S., 1989 — Mechanical Engineering, University of Kentucky, Lexington, KY

Professional Registration

2004 Civil Engineer, California (License No. C 66701)

Awards

Phoenix Award for Outstanding Master's Student—First Runner-Up

Professional Societies

American Society of Agricultural Engineers

Selected Project Experience

Oakley Generating Station, Environmental Impact Review. Oakley, California. Provided environmental review of a proposed combined cycle power plant in Oakley for the California Energy Commission. The environmental review was focused on the treatment and discharge of stormwater runoff into an adjacent mitigation wetland. Additionally, the analysis considered the use of recycled water to replace proposed freshwater supply following completion of a nearby wastewater treatment plant that would make tertiary treated recycled water available in the vicinity of the proposed project. Other analyses included assessing potential flooding, erosion, and water quality impacts related to the plant's construction and operation.

GWF Hanford Combined Cycle Power Plant, Environmental Impact Review. Hanford, California. Provided environmental review of a proposed power plant upgrade in Kings County for the California Energy Commission. The environmental review was focused on the conversion of the existing simple cycle plant to a combined cycle plant utilizing air cooled condensers to provide plant cooling. The analysis also examined the stormwater drainage, treatment, and flood control facilities shared with the adjacent Hanford LP Plant and required improved stormwater treatment practices to address existing contamination associated with the existing plants.

GWF Henrietta Combined Cycle Power Plant, Environmental Impact Review. Lemoore, California. Provided environmental review of a proposed power plant upgrade in Kings County for the California Energy Commission. The environmental review was focused on the conversion of the existing simple cycle plant to a combined cycle plant utilizing air cooled condensers to provide plant cooling. The analysis also examined the potential to utilize recycled water from the neighboring Lemoore Naval Air Station as an alternate water supply. Other analyses included assessing potential flooding, erosion, and water quality impacts related to the plant's construction and operation.

Selected Project Experience
(continued)

Carrizo Energy Solar Farm, Environmental Impact Review. Carrizo Plain, California. Provided environmental review of a proposed solar thermal power plant in Carrizo for the California Energy Commission. The environmental review was focused on the use of groundwater for collector mirror washing and other process needs and the potential for impacts to neighboring groundwater users. Other analyses included assessing potential flooding, erosion, and water quality impacts related to the plant's construction and operation.

San Francisco Electric Reliability Project, Environmental Impact Review. San Francisco, California. Provided environmental review of a proposed power plant in San Francisco for the California Energy Commission. The environmental review was focused on the utilization of recycled wastewater from the City of San Francisco's combined sewer system and treated onsite for power plant evaporative cooling. In addition, the project site is located in a historic industrial area with existing subsurface impacts from previous land uses that required specific assessment and management to limit risks to onsite workers and neighboring businesses and residences. Other analyses included assessing potential flooding, erosion, and water quality impacts related to the plant's construction and operation.

Soil and Water Resource Compliance Reviews, Storm Water Pollution Prevention Plan review and implementation. Throughout California. Provided technical review of construction and operation Storm Water Pollution Prevention Plans (SWPPPs) for several power plants located throughout California on behalf of the California Energy Commission. Review of SWPPPs to determine if the SWPPPs met the requirements of Conditions of Certification specified in the Energy Commission's licensing decision and included sufficient detail and specified appropriate Best Management Practices (BMPs) to address potential erosion and water quality impacts. Site visits involved inspection of installed BMPs to verify that the measures included in the SWPPP were properly installed in preparation for the rainy season.

Blythe Energy Project - Phase II, Environmental Impact Review. Blythe, California. Provided environmental review of a proposed power plant in Blythe for the California Energy Commission. The environmental review was focused on the impacts of the proposed use of groundwater on the neighboring Colorado River. Other analyses included assessing potential flooding, erosion, and water quality impacts related to the plant's evaporation pond, retention basin, and storm water drainage channels.

University of California – Santa Cruz, Stormwater Improvement Projects. Santa Cruz County, California. Developed the design of stormwater management projects intended to increase infiltration and percolation of runoff from paved surfaces to address impacts of increased runoff on downstream creeks. Conducted analysis and design of detention facilities, bio-retention facilities, vegetated bio-swales, and infiltration channels. Managed the development of the designs from the conceptual level through final design and construction.

Pond A8 Phase I Restoration. Santa Clara County, California. Developed a conceptual level runoff management plan for a proposed widening of the existing Interstate 5 highway in Orange County. The runoff management plan was intended to address flood control, water quality treatment, and hydrograph modification concerns associated with the highway. In addition, provided review of runoff management plans for an alternative toll road in Orange County.

Selected Project Experience
(continued)

Interstate 5 - Runoff Management Plan. Orange County, California. Developed a conceptual level runoff management plan for a proposed widening of the existing Interstate 5 highway in Orange County. The runoff management plan was intended to address flood control, water quality treatment, and hydrograph modification concerns associated with the highway. In addition, provided review of runoff management plans for an alternative toll road in Orange County.

Windemere Development, Surface Runoff Management. Contra Costa County, California. Conducted analysis and design of water quality treatment and flood control detention facilities for the Windemere Development. Developed a sediment management and monitoring plan for a wetland detention basin, collecting runoff from the Windemere Development.

Wendt Ranch Development, Surface Runoff Management. Contra Costa County, California. Conducted hydrologic and hydraulic analysis and design of water quality treatment and flood control detention facilities for the Wendt Ranch Development.

Knightsen, Runoff Management Plan. Contra Costa County, California. Developed a conceptual runoff management plan utilizing treatment wetlands and bio-swales to treat runoff and agricultural wastewater while addressing local flooding issues.

Petaluma Marsh Restoration Project, Construction Management. Marin County, California. Provided construction management and observation services for the Petaluma Marsh Restoration Project, which entailed re-creation of a 102-acre tidal marsh on diked and subsided farmland. The restoration plan included excavation of tidal slough channels, breaching and lowering the existing perimeter levee, creation of wind-wave berms, construction of a significant new levee to protect an adjacent railroad easement, and revegetation.

Martinez Salt Marsh Restoration Project, Post-Construction Marsh Restoration Monitoring. Contra Costa County. Managed mitigation monitoring for a restored salt marsh for the California Department of Transportation. The mitigation project included removing fill, excavating a slough channel network, revegetation, and public access trails and bridges. Post-construction mitigation monitoring involves geomorphic monitoring of marshplain and slough channel development and biological monitoring of vegetation establishment and endangered species habitat development.

Bahia Marsh Restoration Project, Wetland Design. Marin County. Developed wetland restoration design plans to restore both diked and filled baylands to tidal marsh. Restoration designs include grading plans, an excavated slough channel network, breaching and lowering levees, phased water level management with culvert structures, seasonal wetland enhancement, and revegetation. Performed construction support and post-construction monitoring.

Los Capitancillos Wetland Mitigation Project, Wetland Design. San Jose, California. Conducted hydrologic and hydraulic analysis and design of freshwater mitigation wetland facility for Santa Clara Valley Water District. Provided preliminary design of grading, clean soil liner, as well as, inlet and outlet channels and structures. Analyses included water usage, percolation and seepage, rainfall-runoff, and flood routing.

Selected Project Experience *(continued)*

Hamilton Seasonal Wetland Design Guidelines, Wetland Design. Novato, California. Developed design guidelines for seasonal wetland at the Hamilton Airfield. Provided water balance and percolation analyses related of placement of dredged materials at pilot seasonal wetland sites.

Lincoln Creek Restoration, Creek Restoration Design. Auburn, California. Developed Creek Restoration design plans for day-lighting a 500 feet reach of Lincoln Creek within the Auburn School Park Preserve for the City of Auburn. Conducted hydraulic analyses and engineering design for the restored creek to determine design sections and rock sizes that met the client's aesthetic requirements for the park and engineering design/stability requirements. Developed design drawings from conceptual level through 100% construction plans.

Sonoma Baylands Wetlands Demonstration Project, Post-Construction Marsh Restoration Monitoring. Sonoma County, California. Managed a team of surveyors and vegetation, avian, and fish scientists in the monitoring of a marsh restoration project for the U.S. Army Corps of Engineers. The Sonoma Baylands Wetlands Demonstration Project utilized dredge materials to raise the elevation of subsided farmland by several feet to approximately mean tide level to accelerate the establishment of wetland vegetation. Post-Construction Restoration Monitoring is focused on slough channel development, tidal elevation monitoring, sedimentation, bird and fish use, and vegetation establishment.

Alamo Creek Restoration Project, Construction Management. Contra Costa County, California. Provided construction management and observation services for the Alamo Creek Restoration Project which entailed re-creation of a multi-stage channel for 6,000 feet of the deeply incised main branch and channel relocation of 3,000 feet of the east branch. The restoration plan included grading, grade control, bank restoration and vegetative treatments.

Laguna de Santa Rosa, Suspended Sediment/Turbidity Monitoring. Santa Rosa, California. Monitored turbidity, water level and flow at three locations discharging into the Laguna de Santa Rosa for the U.S. Army Corps of Engineers. Turbidity was measured with optical backscatter instruments calibrated to estimate suspended sediment concentrations at each location. Suspended sediment data was utilized with flow data to estimate sediment yield into the Laguna de Santa Rosa to help determine sedimentation rates within the Laguna and to guide decisions on projects to limit sedimentation.

DECLARATION OF
Scott Debauche

I, Scott Debauche, declare as follows:

1. I am presently employed by Aspen Environmental Group, a contractor to the California Energy Commission, Siting, Transmission and Environmental Protection Division, as a **Traffic and Transportation Technical Specialist**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Transportation and Traffic** for the **BP Watson Cogeneration Project (09-AFC-01)** based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue(s) addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: 8/5/2011

Signed: _____

At: [Agoura Hills, California]

SCOTT DEBAUCHE

Environmental Planner

ACADEMIC BACKGROUND

B.S., Urban & Regional Planning, University of Minnesota, 1994

PROFESSIONAL EXPERIENCE

Mr. Debauche is an environmental planner with over 14 years of experience preparing a variety of federal and State of California environmental, planning, and analytical documents for large-scale infrastructure and development projects. Mr. Debauche brings the experience of specializing in the integration and completion of NEPA and CEQA documentation joint documentation evaluating Transportation/Traffic, Noise, Socioeconomics and Environmental Justice, Air Quality, and Alternatives analyses.

Aspen Environmental Group — 2001 to present

- **TANC Transmission Project (TTP) EIR/EIS, several Northern California Counties.** Mr. Debauche is currently serving as the Technical Specialist in charge of preparation of the EIR/EIS Transportation/Traffic and Socioeconomics CEQA/NEPA analyses. The Transmission Agency of Northern California (TANC) and Western Area Power Administration (Western), an agency of the U.S. Department of Energy (DOE), are the CEQA lead agency and NEPA lead agency, respectively. The TTP generally would consist of new and upgraded 500 kilovolt (kV) and 230 kV transmission lines, substations, and related facilities generally extending from northeastern California near Ravendale in Lassen County to the California Central Valley through Sacramento and Contra Costa Counties and westward into the San Francisco Bay Area.
- **Littlerock Reservoir Sediment Removal Project EIS/EIR, Palmdale, CA.** Mr. Debauche is the Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, and Socioeconomics analyses for this joint EIS/EIR evaluating the impacts of sediment removal alternatives for the Littlerock Reservoir and Dam on USFS Angeles National Forest (NEPA Lead Agency) lands in Los Angeles County. The project involves impacts to the arroyo toad, extensive coordination with USFWS for a Section 7 consultation, incorporation of new Forest Service Plan updates and requirements into the analysis, preparation of the Forest Service required BE/BA, and analysis of compliance with federal conformity requirements. Aspen is currently working on the Administrative Draft EIR/EIS and assisting the PWD with portions of their Proposition 50 grant application to the DWR.
- **Alta Wind Project EIR, Kern County, CA.** Mr. Debauche is the Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, and Air Quality analyses for this EIR. The applicant, Alta Windpower Development, LLC, proposes to develop the Alta-Oak Creek Mojave Project (proposed project or project) for the commercial production of up to 800 Megawatts (MW) of electricity from wind turbines. The proposed project would result in construction of up to 350 wind turbine generators, their ancillary facilities and supporting infrastructure located on three distinct land areas comprising a total of approximately 10,750 acres located approximately 3 miles west of State Route (SR) 14 (Antelope Valley Freeway) and 3 miles south of SR-58 in the Willow Springs area of eastern Kern County.

- **Baldwin Hills Oil Field Community Standards District EIR Review and Ordinance Preparation, Culver City, CA.** Mr. Debauche served as the Technical Specialist for the City of Culver City reviewing the Los Angeles County Baldwin Hills Oils Field Community Standards District EIR Noise analysis evaluating the impacts of expanding the existing Baldwin Hills oil field. Once completed, Mr. Debauche then prepared the Noise section of the newly enacted City of Culver City Community Standards District overlay zone restricting noise generation by the Baldwin Hills Oil Field on the residents of Culver City.
- **Topaz Solar Project EIR, San Luis Obispo County, CA.** Mr. Debauche is the Technical Specialist in charge of preparation of the Transportation/Traffic and Air Quality sections of this EIR for this 500 MW solar photovoltaic project in the Carrizo Plain area. This project requires the conversion of approximately 6,000 acres of open space (60 percent of which are under land preservation contracts) to an industrial use.
- **California Valley Solar Ranch EIR, San Luis Obispo County, CA.** Mr. Debauche is the technical specialist in charge of preparation of the Air Quality analysis of this EIR for this 250 MW solar photovoltaic project in the Carrizo Plain area. This project requires the conversion of approximately 4,000 acres of open space to an industrial use.
- **Long Beach LNG Import Project EIR/EIS, Long Beach, CA.** Under contract to the City of Long Beach, Aspen was tasked to review the Draft EIS/EIR for the proposed construction and operation of this onshore LNG facility to be located at the Port of Long Beach. Mr. Debauche reviewed the document for technical adequacy and assisted the City in preparing written comments for the following sections of the EIS/EIR: Transportation/Traffic and Noise.
- **Sunset Substation and Transmission and Distribution Project EIR, Banning, CA.** Mr. Debauche served as the Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, Socioeconomics, and Alternatives analyses for this EIR. The City of Banning proposes to construct the Sunset Substation and supporting 33-kilovolt (kV) transmission line that would interconnect with the City's existing distribution system. The purpose of this new substation and transmission is to relieve the existing overloads that are occurring within the City's electric system and to accommodate projected growth in the City.
- **MARS EIR/EIS, Monterey, CA.** Mr. Debauche served as the Technical Specialist in charge of preparation of the Environmental Justice analysis for this EIR/EIS, which would evaluate the effects associated with the installation and operation of the proposed Monterey Accelerated Research System (MARS) Cabled Observatory Project (Project) proposed by Monterey Bay Aquarium Research Institute (MBARI)[NEPA Lead Agency]. The goal of the Project was to install and operate, in State and Federal waters, an advanced cabled observatory in Monterey Bay that would provide a continuous monitoring presence in the Monterey Bay National Marine Sanctuary (MBNMS) as well as serve as the test bed for a state-of-the-art regional ocean observatory, currently one component of the National Science Foundation (NSF) Ocean Observatories Initiative (OOI). The Environmental Justice analysis evaluated the potential for any disproportionate project impacts to both land-based populations and fisheries workers.
- **Diablo Canyon Power Plant (DCPP) Steam Generator Replacement Project EIR, San Luis Obispo County, CA.** Mr. Debauche served as the Technical Specialist in charge of preparation of the Socioeconomics and Alternatives analyses sections of this EIR. The EIR addressed impacts associated with the replacement of the eight original steam generators (OSGs) at DCPP Units 1 and 2 due to degradation from stress and corrosion cracking, and other maintenance difficulties. The Proposed Project would be located at the DCPP facility, which occupies 760 acres within PG&E's 12,000-acre owner-controlled land on the California coast in central San Luis Obispo County. Land use issues of concern include impacts to agricultural lands, recreational resources, and potential Coastal Act inconsistencies.

- **Lake Canyon Dam and Detention Basin Project EIR, Ventura County, CA.** Mr. Debauche served as the Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, Air Quality, and Hazardous Materials analyses for this CEQA document. The proposed project would include an earthfill dam and detention basin located in an unincorporated area of Ventura County, California. It would operate in conjunction with the existing Arundell Dam and Detention Basin, which is located an estimated 600 feet south-southwest and downstream of the proposed project site, to detain peak storm flows and capture the associated debris expected from a 100-year storm event.
- **Colton Substation Project IS/MND, Colton, CA.** Mr. Debauche served as the Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, Air Quality, and Hazardous Materials analyses for this CEQA document. The City of Colton proposes to construct the 1.9 acrea North Substation and supporting 1.7 miles of 69 kV subtransmission and distribution facilities necessary to interconnect with the existing city-owned subtransmission and distribution systems.
- **San Antonio Creek Giant Reed Removal Project IS/MND, Ventura County, CA.** Mr. Debauche served as the Technical Specialist in charge of preparation of a number of technical issues area analyses for this CEQA document including: Transportation/Traffic, Noise, Air Quality, and Hazardous Materials. The purpose of the project is to remove giant reed within the upper reaches of the San Antonio Creek watershed and several tributaries to support other existing efforts to remove this invasive plant species along the main stem of the Ventura River and its watershed.

California Public Utilities Commission (CPUC). Under Aspen's environmental services contract with the CPUC, Mr. Debauche has prepared environmental analysis sections of environmental reports analyzing large-scale infrastructure projects. His project experience with the CPUC includes the following:

- **Tehachapi Renewable Transmission Project (TRTP) EIR/EIS, Kern, Los Angeles, and San Bernardino Counties, CA.** For this EIR/EIS prepared by USFS, Angeles National Forest and CPUC, Mr. Debauche is currently serving as the Technical Specialist for Noise and Alternatives evaluation for SCE's proposal to construct, use, and maintain a series of new and upgraded high-voltage electric transmission lines and substations to deliver electricity generated from new wind energy projects in eastern Kern County. Approximately 46 miles of the project would be located in a 200- to 400-foot right-of-way on National Forest System land (managed by the Angeles National Forest) and approximately three miles would require expanded right-of-way within the Angeles National Forest. The proposed transmission system upgrades of TRTP are separated into eight distinct segments: Segments 4 through 11. Segments 1 (Antelope-Pardee) and Segments 2 and 3 (Antelope Transmission Project) were evaluated in separate CEQA and NEPA documents as described below.
- **Devers–Palo Verde 500 kV Transmission Line Project EIS/EIR, southern California/western Arizona.** For this EIR/EIS prepared by U.S. Bureau of Land Management and CPUC, Mr. Debauche served as the Technical Specialist for Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for SCE's proposed 250-mile transmission line project from the Palo Verde Nuclear power plant in Arizona to the northern Palm Springs area in California. Major issues of concern include EMF and visual impacts on property values, impacts on the area's vast recreational resources and tribal lands, and the development and evaluation of several route alternatives, including the Devers-Valley No. 2 Route Alternative, which eventually was approved by the CPUC.
- **Antelope-Pardee 500 kV Transmission Line Project EIS/EIR, Los Angeles County, CA.** For this EIR/EIS prepared by USFS, Angeles National Forest and CPUC, Mr. Debauche served as the Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for SCE's proposed 25-mile transmission line project from the Antelope Substation in the City of Lancaster, through the ANF, and terminating at SCE's Pardee Substation in Santa Clarita. Major issues of concern included impacts to biological, recreational, and cultural resources within Forest lands, EMF and visual impacts on property values, impacts on residences in the urbanized southern regions of the route, and the development and evaluation of several route alternatives.

- **El Casco System Project EIR, Riverside, CA.** Mr. Debauche served as the Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, Socioeconomics, and Alternatives analyses for this EIR prepared for the CPUC to evaluate SCE's application for a Permit to Construct (PTC) the El Casco System Project. The Proposed Project would be located in a rapidly growing area of northern Riverside County, which includes the Cities of Beaumont, Banning, and Calimesa. A 115 kV subtransmission line begins at Banning Substation and extends westward toward the proposed El Casco Substation site within the existing Banning to Maraschino 115 kV subtransmission line and Maraschino–El Casco 115 kV subtransmission line ROWs. Major issues of concern include impacts to existing and residential land uses, which have led to the development of a partial underground alternative and a route alternative different than the project route proposed by SCE (the Applicant). The 1,200-page Draft EIR was released for a 45-day public review and comment on December 12, 2007, and evaluates project alternatives at the same level of detail as the Proposed Project analysis.
- **Antelope Transmission Project, Segments 2 & 3 EIR, Los Angeles and Kern Counties, CA.** For this EIR prepared by the CPUC, Mr. Debauche served as the Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation. The proposed Project includes both Segment 2 and Segment 3 of the Antelope Transmission Project, and involves construction of new transmission line infrastructure from the Tehachapi Wind Resource Area in southern Kern County, California, to SCE's existing Vincent Substation in Los Angeles County, California. The Tehachapi Wind Resource Area is one of the State's greatest potential sources for the generation of wind energy. A variety of wind energy projects are currently in development for this region. Major issues of concern include EMF and visual impacts on property values, impacts on residences and agricultural resources, and the development and evaluation of several substation and route alternatives.
- **SDG&E Miguel Mission Substation Draft EIR.** The major part of the Proposed Project would include the installation of a new, bundled 230 kV circuit between Miguel and Mission Substations, which would be located entirely within SDG&E's existing 35-mile ROW. Mr. Debauche prepared social science analysis for the Initial Study, as well as the Draft EIR Project Description and several key environmental sections.
- **PG&E's Proposed Divestiture of Hydroelectric Assets Project EIR.** Mr. Debauche prepared several key sections of the Draft EIR, including Socioeconomics and Hazardous Materials analysis. PG&E owns and operates the largest private hydroelectric power system in the nation. Situated in the Sierra Nevada, Southern Cascade, and Coastal mountain ranges of California, this system is strung along 16 different river basins and annually generates approximately five percent of the power consumed each year in California. The proposed sale of assets also includes approximately 140,000 acres of land proposed for sale with the hydroelectric system. The EIR analyzes the range of operational changes that could occur under new ownership, including complex integrated models that analyze power generation and water management.
- **Viejo System Project IS/MND, Orange County, CA.** Mr. Debauche served as the Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for the project's CEQA documentation, including and Initial Study, prepared on behalf of the CPUC to evaluate Southern California Edison's (SCE) Application for a Permit to Construct the Viejo System Project, which was in SCE's forecasted demand of electricity and goal of providing reliable electric service in southern Orange County. The Viejo System Project would serve Lake Forest, Mission Viejo, and the surrounding areas. Components of the project included, construction of the new 220/66/12 kilovolt (kV) Viejo Substation, installation of a new 66 kV subtransmission line within an existing SCE right-of-way, replacement of 19 double-circuit tubular steel poles with 13 H-frames structures, and minor modification to other transmission lines. Major issues of concern include visual impacts of transmission towers, EMF effects, and project impacts on property values.
- **Looking Glass Networks Fiber Optic Cable Project IS/MND, northern and southern California.** As part of Aspen's ongoing contract with the CPUC for review of Telecommunications projects, this document encompasses and evaluation of project impacts and network upgrades in the San Francisco Bay Area and the Los Angeles Basin Area. Prepared the socioeconomic analysis for this comprehensive CEQA document reviewing the potential impacts of hundreds of miles of newly proposed fiber optic lines throughout northern and southern California, including Los Angeles and Orange Counties. Mr. Debauche served as the Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, Socioeconomics, and Alternatives evaluation for the project's CEQA documentation.

California Energy Commission (CEC), Technical Assistance in Application for Certification Review. In response to California's power shortage, Aspen is assisting the California Energy Commission in evaluating the environmental and engineering aspects of new power plant applications throughout the State. As part of this effort, Mr. Debauche works as a technical specialist for Transportation/Traffic, Socioeconomics and Environmental Justice, and Alternatives analyses for the following power plant projects:

- **Carlsbad Energy Center Project, Carlsbad, CA.** Technical Specialist in charge of preparation of the Transportation/Traffic and Alternatives Staff Assessments for Carlsbad Energy Center, LLC's Application for Certification (AFC) to build the Carlsbad Energy Center Project (CECP), which will consist of a 558 MW gross combined-cycle generating facility configured using two units with one natural-gas-fired combustion turbine and one steam turbine per or unit. Issues of concern include major incompatibilities with local LORS, and cumulative impacts from widening of I-5.
- **Hydrogen Energy California Power Plant Project, Kern County CA.** Technical Specialist in charge of preparation of the Transportation/Traffic and Socioconomics/Environmental Justice Staff Assessments for Hydrogen Energy International, LLC integrated gasification combined cycle (IGCC) power generating facility called Hydrogen Energy California (HECA) in Kern County, California. The proposed project will gasify petroleum coke (or blends of petroleum coke and coal, as needed) to produce hydrogen to fuel a combustion turbine operating in combined cycle mode. The gasification component would produce 180 million standard cubic feet per day (MMSCFD) of hydrogen to feed a 390 megawatt (MW) gross combined cycle plant providing California with low-carbon baseload power to the grid.
- **CPV Vaca Station Power Plant Project, Vacaville, CA.** Technical Specialist in charge of preparation of the Transportation/Traffic Staff Assessment prepared for the CPV Vaca Station (CPVV) project, a natural gas-fired, combined-cycle electrical generating facility rated at a nominal generating capacity of 660 megawatts (MW). The CPVV is proposed for a 24-acre site located at the intersection of Lewis and Fry roads in a rural area within the city limits of Vacaville, Solano County.
- **Ivanpah Solar Electric Generating System Project, San Bernardino County, CA.** Technical Specialist in charge of preparation of the Socioeconomics/Environmental Justice Staff Assessment/BLM EIS for a 400-megawatt solar thermal electric power generating system. The project's technology would include heliostat mirror fields focusing solar energy on power tower receivers producing steam for running turbine generators. Related facilities would include administrative buildings, transmission lines, a substation, gas lines, water lines, steam lines, and well water pumps. The proposed project would be developed entirely in the Mojave Desert region of San Bernardino County, California.
- **Abengoa Mojave Solar Power Project, San Bernardino County, CA.** Technical Specialist in charge of preparation of the Socioeconomics/Environmental Justice Staff Assessment for a nominal 250 megawatt (MW) solar electric generating facility to be located near Harper Dry Lake in an unincorporated area of San Bernardino County. The project will implement well-established parabolic trough technology to solar heat a heat transfer fluid (HTF) technology.
- **Rice Solar Energy Generating System Project, Riverside County, CA.** Technical Specialist in charge of preparation of the Transportation/Traffic Staff Assessment/BLM EIS for a 50,000 megawatt hours (MWh) of renewable energy annually, with a nominal net generating capacity of 150 megawatts (MW) located in an unincorporated area of eastern Riverside County, California. The proposed facility will use concentrating solar power (CSP) technology, with a central receiver tower and an integrated thermal storage system.
- **Blythe Solar Power Project, Riverside County, CA.** Technical Specialist in charge of preparation of the Socioeconomics/Environmental Justice Staff Assessment/BLM EIS for a 1,000 MW solar thermal electric generating facility in Riverside County. The project will utilize solar parabolic trough technology to generate electricity. With this technology, arrays of parabolic mirrors collect heat energy from the sun and refocus the radiation on a receiver tube located at the focal point of the parabola.
- **GWF Henrietta Peaker Project, Kings County, CA.** Technical Specialist in charge of preparation of the Transportation/Traffic Staff Assessment for GWF's proposal to modify the existing Henrietta Power Plant. New once-through steam generators (OTSGs) will be installed to allow the plant to be operated in its current simple-cycle configuration with no steam generation but with the selective catalytic reduction

(SCR) and oxidation catalyst in operation, or to operate as a combined-cycle power plant generating an additional 25 MW of power with new proposed emission limits.

- **Palen Solar Power Project, Riverside County, CA.** Technical Specialist in charge of preparation of the Socioeconomics/Environmental Justice Staff Assessment/BLM EIS for a 500 MW solar thermal electric generating facility in Riverside County. The Project will utilize solar parabolic trough technology to generate electricity. With this technology, arrays of parabolic mirrors collect heat energy from the sun and refocus the radiation on a receiver tube located at the focal point of the parabola.
- **Watson Cogeneration Steam and Electric Reliability Project, Carson, CA**. Technical Specialist for the Transportation/Traffic Staff Assessment for a nominal 85 MW combustion turbine generator (CTG), with a single-pressure heat recovery steam generator (HRSG) to provide additional process steam to the BP Carson refinery, to the existing cogeneration facility owned by Watson. The project site is a 2.5-acre brown field site located within the boundary of the existing Watson Cogeneration Facility, which is a 21.7-acre area within BP's existing Carson Refinery (BP Refinery), in the City of Carson, Los Angeles County.
- **Oakley Generating Station Project, Oakley, CA.** Technical Specialist in charge of preparation of the Transportation/Traffic Staff Assessment for a natural gas-fired, combined-cycle electrical generating facility rated at a nominal generating capacity of 624 megawatts (MW). The proposed project would be located in the City of Oakley, in Contra Costa County.
- **Canyon Power Plant Project, Anaheim, CA.** Technical Specialist in charge of preparation of the Socioeconomics/Environmental Justice Staff Assessments for a nominal 200 megawatt (MW) simple-cycle plant, using four natural gas-fired combustion turbines and associated infrastructure proposed by Southern California Public Power Authority (SCPPA). This project is a peaking power plant project located within the City of Anaheim, California.
- **GWF Tracy Combined Cycle Power Plant Project, San Joaquin County, CA.** Technical Specialist in charge of preparation of the Transportation/Traffic Staff Assessment for GWF's proposal to modify the existing TPP, a nominal 169-megawatt (MW) simple-cycle power plant, by converting the facility into a combined-cycle power plant with a nominal 145 MW, net, of additional generating capacity.
- **Lodi Energy Center Project, Lodi, CA.** Technical Specialist in charge of preparation of the Socioeconomics/Environmental Justice Staff Assessment for a natural gas-fired, combined-cycle electrical generating facility rated at a nominal 225-megawatt (MW). The Lodi Energy Center is proposed for a site parcel of approximately 4.4 acres adjacent to the City of Lodi's White Slough Water Pollution Control Facility (WPCF)
- **Kings River Conservation District Community Peaker Power Plant Project, Fresno County, CA.** Technical Specialist in charge of preparation of the Transportation/Traffic Staff Assessment for the Kings Rivers Conservation District, who filed a Small Power Plant Exemption for the King River Conservation District Peaking Power Plant. The proposed 97-megawatt natural gas-fired plant will be located south of the City of Fresno and near the community of Malaga in Fresno County.
- **Valero Cogeneration Project, Benicia, CA.** Technical Specialist in charge of preparation of the Socioeconomics/Environmental Justice Staff Assessments for a proposed cogeneration facility at the Valero Refinery in Benicia. Issues addressed included impacts on public services and other project-related population impacts such as school impact fees.
- **Rio Linda/Elverta Power Project, Sacramento, CA.** Technical Specialist in charge of preparation of the Socioeconomics/Environmental Justice Staff Assessments for a 560-megawatt natural gas power plant in the northern Sacramento County. Issues of importance included environmental justice and impacts on property values.
- **Magnolia Power Project, Burbank, CA.** Technical Specialist in charge of preparation of the Socioeconomics/Environmental Justice Staff Assessments for this nominal 250-megawatt natural gas combined-cycle fired electrical generating facility to be located at the site of the existing City of Burbank power plant. Environmental justice issues and potential impacts on local economy and employment were evaluated.
- **Avenal Energy Project, Kings County, CA.** Technical Specialist in charge of preparation of the Socioeconomics/Environmental Justice Staff Assessments for a 600-megawatt combined cycle electrical generating facility, and associated linear facilities.

- **Inland Empire Energy Center Project, Riverside County, CA.** Technical Specialist in charge of preparation of the Socioeconomics/Environmental Justice Staff Assessments for a 670-megawatt natural gas-fired, combined-cycle electric generating facility and associated linear facilities including, a new 18-inch, 4.7-mile pipeline for the disposal of non-reclaimable wastewater, and a new 20-inch natural gas pipeline. The project would be located on approximately 46-acres near Romoland, within Riverside County.
- **Coastal Plant Study.** Technical Specialist in charge of preparation of the Socioeconomics/Environmental Justice Staff Assessments for a possible modernization, re-tooling, or expansion of California's 25 coastal power plants including the Encina Power Plant and the San Onofre Nuclear Power Plant.

Los Angeles Department of Water and Power (LADWP). Responsible for conducting the analyses of the technical and social science issue areas for a variety of EISs and EAs as part of two environmental services contracts. Delivery orders have included:

- **River Supply Conduit (RSC) Upper Reach Project EIR, Los Angeles and Burbank, CA.** Mr. Debauche served as the Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, Socioeconomics, and Alternatives analyses for the CEQA document for this project. The RSC is a major transmission pipeline in the LADWP water distribution system. The existing RSC pipeline's purpose is to transport large amounts of water from the Los Angeles Reservoir Complex and local ground water wells to reservoirs and distribution facilities located in the central areas within of the City of Los Angeles. The LADWP proposed a new larger RSC pipeline to replace and realign the Upper and Lower Reaches of the existing RSC pipeline, which would involve the construction of approximately 69,600 linear feet (about 13.2 miles) of 42-, 48-, 60-, 66-, 72-, 84-, and 96-inch diameter welded steel underground pipeline.
- **Mulholland Pumping Station and Lower Hollywood Reservoir Outlet Chlorination Station Project IS/MND, Los Angeles, CA.** Under Aspen's on-going environmental services contract with the City of Los Angeles Department of Water and Power (LADWP), Mr. Debauche served as the Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, Socioeconomics, and Alternatives analyses for this project. LADWP proposed to replace the existing historic pumping/chlorination station building as well as the existing lavatory and unoccupied Water Quality Laboratory buildings with a new single structure pumping/chlorination station within the LADWP's Hollywood Reservoir Complex located in the Hollywood Hills section of the City Los Angeles. These improvements were required due to the age and deterioration of the facility and the potential risk of seismic damage to existing structures. An Initial Study was prepared in support of a City of Los Angeles General Exemption.
- **Taylor Yard Water Recycling Project (TYWRP) IS/MND, Los Angeles and Glendale, CA.** Mr. Debauche served as the Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, Socioeconomics, and Alternatives analyses for this project. LADWP proposed to construct the TYWRP in order to provide recycled water produced by the Los Angeles–Glendale Water Reclamation Plant (LAGWRP) to the Taylor Yard. An important part of the City of Los Angeles' expanding emphasis on water conservation is the concept that water is a resource that can be used more than once. Because all uses of water do not require the same quality of supply, the City has been developing programs to use recycled water for suitable landscaping and industrial uses. The project is located in the southernmost part of the City of Glendale and northeastern part of the City of Los Angeles. The IS/MND was adopted in the Summer of 2007.
- **DC Electrode Project IS/MND, Los Angeles, CA.** Mr. Debauche served as the Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, Socioeconomics, and Alternatives analyses for this project. LADWP proposed to construct a new electrode distribution line from West Los Angeles to the Pacific Ocean stopping point in Malibu, CA up the Pacific Coast Highway.
- **District Cooling Plant Project, Los Angeles IS/MND, CA.** Mr. Debauche served as the Technical Specialist in charge of preparation of the Transportation/Traffic, Noise, Socioeconomics, and Alternatives analyses for this project. LADWP proposed to construct a District Cooling Plant and Distribution System (proposed project) in order to provide a centralized system for producing chilled water for use by area users, which are generally large commercial, governmental, industrial and institutional buildings who generate their own chilled water utilizing individual chiller plants for space cooling and air-conditioning.

U.S. Army Corps of Engineers, Los Angeles District. Responsible for conducting the analyses of the social science issue areas for a variety of EISs and EAs as part of two environmental services contracts. Delivery orders have included:

- **Prado Basin/Norco Bluffs/Reach 9 of the Santa Ana River Dikes Supplemental EAs, Riverside County, CA.** Debauche served as the Technical Specialist in charge of preparation of the Transportation/Traffic analysis of two structural alternatives for the Norco Bluffs Toe Stabilization project as well as the No Action/No Project Alternative. Aspen developed the alternatives analyzed in this Supplemental NEPA Environmental Assessment document, a description of the alternatives' physical, construction, and operational characteristics, and a discussion of the potential environmental impacts.
- **Northeast Phoenix Drainage Area Alternatives Analysis Report, Phoenix and Scottsdale, AZ.** Mr. Debauche served as a Technical Specialist in charge of preparation of the Alternatives analysis report that evaluated the potential environmental impacts associated with channel and detention basin alternatives to control flooding problems resulting from fast rate of development in the northeast Phoenix area.
- **Murrieta Creek Flood Control and Environmental Restoration Project**. Mr. Debauche served as a Technical Specialist in charge of preparation of the Environmental Assessment and Mitigation Monitoring plan for Phase 1 of a flood control and restoration project in Riverside County.

California Department of Water Resources. Responsible for conducting the environmental analyses for CEQA compliance as part of two environmental services contracts. Delivery orders have included:

- **Piru Creek Stabilization and Restoration Project IS/MND, northern Los Angeles County.** The California Department of Water Resources (CDWR) proposes to repair erosion damage at a series of three locations downstream of Pyramid Dam and seismically retrofit the Pyramid Dam access bridge that crosses Piru Creek. Mr Debauche served as Technical Specialist in charge of preparation of the Initial Study Transportation/Traffic, Noise, Socioeconomics, and Alternatives analyses for the proposed project.
- **Pyramid Lake Repairs and Improvements Project IS/MND and EA, northern Los Angeles County.** Mr Debauche served as Technical Specialist in charge of preparation of the Initial Study Transportation/Traffic, Noise, Socioeconomics, and Alternatives analyses for the proposed project, which DWR and the Department of Boating and Waterways (DBW) conducted repairs and improvements at various recreational sites at Pyramid Lake, which is located on the border between Los Padres National Forest and Angeles National Forest; recreation is managed by Angeles National Forest. In addition to the CEQA documentation and preparation of permit applications, Aspen coordinated DWR and DBW's efforts with the USFS, and the permitting agencies (i.e., CDFG, RWQCB, and USACE). Through coordination with the USAC, Aspen prepared the NEPA EA for Corps 404 permit process, and reviewed and coordinated revisions to the 1602 with CDFG.

Los Angeles Unified School District (LAUSD), Los Angeles County, CA. Deputy Program manager and Technical writer for several CEQA documents (EIRs and IS/MNDs) being prepared as part of Aspen's ongoing services contract with the LAUSD to help approve school projects that would meet existing overcrowded conditions in the greater Los Angeles area. Projects have included:

- **New School Construction Program EIR.** Served as a Technical Specialist in charge of preparation of the social science issues, including Socioeconomics, Noise, Transportation/Traffic, and Alternatives analyses for this Program EIR being prepared for the LAUSD. The LAUSD 2020 Program would provide student seats throughout the LAUSD via a combination of the addition of portable classrooms to existing campuses, modernization and reconfiguration of existing campuses, and the construction of new schools.
- **East Valley Middle School No. 2 EIR.** Served as a Technical Specialist for this middle school project proposed to be located at the previous Van Nuys Drive-In site, preparing the Transportation/Traffic and Noise analyses. The EIR focused on impacts associated with air quality, hazards and hazardous materials, noise, land use and planning, and traffic and transportation. Major issues of concern included traffic and noise generated by school operation activities. The EIR included LAUSD design standards and measures employed to minimize environmental impacts.
- **Mt. Washington Elementary School Multi-Purpose Room Addition Project IS/MND.** Served as the Technical Specialist in charge of preparation of the IS/MND for the development of a multi-purpose room facility, including a library, auditorium, and theater, to the existing Mt. Washington Elementary School

campus located in Los Angeles. The surrounding residential community had concerns regarding the proposed project's impacts on aesthetics, traffic, air quality, and noise. Of particular concern, was impacts generated due to the after-hours use of the multi-purpose room facility by civic and community groups.

- **Canoga Park New Elementary School IS/MND.** Served as Served as the Technical Specialist in charge of preparation of the IS/MND for this elementary school project proposed to be developed on a parcel of land owned by the non-profit organization, New Economics For Women (NEW). This "turn-key" project consisted of a Charter Elementary School to be developed by NEW and sold to the LAUSD for operation. It was later decided that NEW would lease the school back and run it as a charter school. Issues of concern included, pedestrian safety, traffic, air quality, noise, and land use.
- **Hughes Magnet Span School IS/MND.** Served as the Technical Specialist in charge of preparation of the Socioeconomics, Hydrology, Public Services and Utilities, and Recreational analyses for the proposed re-opening of the existing Hughes Middle School as a Magnet Span School serving up to 1,620 District 6th though 12th grade students. The re-opening of the Hughes Middle School would require the relocation of the existing uses of the campus. The existing Enadia Way Elementary School and Platt Ranch Elementary School would be re-opened for the relocation of these uses.
- **Wonderland Elementary School Portable Classroom Additions IS/MND.** Served as the Technical Specialist in charge of preparation of the IS/MND for a proposed addition to the Wonderland Avenue Elementary School, located in the City of Los Angeles.
- **Pio Pico Elementary School Playground Expansion IS/MND**. Technical Specialist in charge of preparation of the Notice of Preparation, Initial Study, and Administrative Draft EIR for the expansion of a playground at the existing Pio Pico School in the LAUSD. The playground was proposed on five residential properties. One of the residences is a potentially significant historical resource because of its association with an African-American woman journalist, Fay M. Jackson. This project was cancelled by the LAUSD after completion of the administrative draft report.
- **Fairfax Senior High School Portable Classroom Addition IS/MND**. Served as Technical Specialist in charge of preparation of the IS/MND for the addition of portable classrooms at the school. Major issue areas covered were noise, hydrology, and geotechnical analysis.
- **Polytechnic Senior High School Portable Classroom Addition IS/MND**. Served Technical Specialist in charge of preparation of the IS/MND for the addition of portable classrooms at the school. Major issue areas covered were noise, hydrology, and geotechnical analysis.
- **Washington Senior High School Portable Classroom Addition IS/MND**. Technical Specialist in charge of preparation of the IS/MND for the addition of portable classrooms at the school. Major issue areas covered were noise, hydrology, and geotechnical analysis.

EIP Associates 1998 to 2001

MTA Mid Cities/Westside Transit Corridor Study EIS/EIR. Was a key Technical Specialist in charge of preparation of the EIS/EIR for this 3-phase (including prepared the Major Investment Study (MIS), the Environmental Impact Statement (EIS), and an evaluation of the urban design implications of transit interventions on selected routes) study intended to address current and long range traffic congestion in the central and westside areas of the Los Angeles Basin. Three east/west corridors and a range of transit alternatives ranging including Rapid Bus, light rail, and heavy rail are being evaluated. In addition to preparing several issue area chapters of this comprehensive joint EIS/EIR, Mr. Debauche assisted with the Environmental Justice analysis, the Section 4(f) Parklands discussion, Transportation/Traffic, and the Land Use sections of the EIS/EIR.

Wes Thompson Ranch Development Project EIR. Served as Technical Specialist for this hillside residential development in the City of Santa Clarita. Issues of concern included seismic and air quality impacts associated with the excavation of 2 million cubic yards of soil, the project's non-compliance with the City's hillside ordinance for innovative design, and traffic generated by project-related population growth in the area. Four different site configuration alternatives were developed as part of the EIR analysis. Other issues of concern included sensitive biological resources, the potential for hydrological impacts due to disturbance of the hillside, and cultural resources. As the technical writer for socioeconomics,

noise, hazardous materials, air quality, and public services, Mr. Debauche conducted the Transportation/Traffic and Alternatives analyses.

City of Santa Monica Environmental Assessments. Was key Technical Specialist in charge of preparation of several environmental assessment documents for housing, commercial, institutional, and mixed-use developments in compliance with CEQA. As the technical writer for socioeconomics, noise, hazardous materials, air quality, and public services, Mr. Debauche conducted the Transportation/Traffic, Noise, and Alternatives analyses for:

- **Seaview Court Condominiums IS/MND.** This comprehensive Initial Study/Mitigated Negative Declaration included six technical reports including traffic, cultural resources, parking survey, shade and shadow analysis, and a geotechnical assessment to evaluate the level of severity of this development in the waterfront area of Santa Monica. Major issues of concern were; parking and project-generated traffic on adjacent narrow residential streets; visual obstruction and shading impacts of the proposed structure; liquefaction and seismic impacts to adjacent properties as result of the project's excavation for a subterranean parking garage; and the potential impacts of the project to impact the integrity of a historic district and the historic Seaview Walkway to the beachfront.
- **Four-Story Hotel IS/MND.** A comprehensive Initial Study/Mitigated Negative Declaration was prepared for this four-story hotel adjacent to St. John's Hospital in Santa Monica. Major issues of concern included project-generated traffic on surrounding multi-family residential uses and emergency access to the hospital.
- **Santa Monica College Parking Structure B Replacement EIR.** This focused EIR addressed issues related to traffic and neighborhood land use impacts associated with the addition of a 3-story parking structure in the center of the SMC campus. Major issues of concern included the potential for project-generated traffic to cause congestion at the school's main entrance on Pico Boulevard, and the potential for overflow traffic to impact the Sunset Community of single-family homes adjacent to the school.
- **North Main St. Mixed-Use Development Project EIR**. This EIR included evaluation of impacts resulting from the development of a mixed-use development in Santa Monica's "Commercial Corridor" on Main Street, with ground-floor residences and boutique commercial uses. Major issues of concern included traffic and parking impacts to Main Street and surrounding residential land uses, shade and shadow impacts, and neighborhood impacts.

Specific Plans and Redevelopment Projects. As Technical Specialist for Transportation/Traffic, Socioeconomics, Noise, Hazardous Materials, Air Quality, and Public Services/Utilities, Mr. Debauche conducted analyses and prepared these environmental sections for:

- **Cabrillo Plaza Specific Plan EIR in Santa Barbara.** This project consisted a mixed-use commercial development on Santa Barbara's waterfront on Cabrillo Boulevard. On-site uses included an aquarium, specialty retail, restaurants, and office space.
- **Culver City Redevelopment Plan and Merger EIR.** This programmatic EIR evaluated the impacts of the City's redevelopment of its redevelopment zones. A major land use survey and calculation of acreage of redevelopment lands was conducted as part of the EIR.
- **Dana Point Headlands Specific Plan EIR.** This EIR evaluated the development of coastal bluff in the City with hotel, single- and multi-family residential, and commercial uses. Major issues of concern included ground disturbance as a result of excavation, impacts to terrestrial and wildlife biology, recreation impacts to beachgoers, and project-generate population inducement.
- **Triangle Gateway Redevelopment Project EIR in Beverly Hills, CA.** This EIR evaluated the development of a supermarket, retail shops, and office space in the triangle gateway portion of downtown Beverly Hills. Issues of concern evaluated by Mr. Debauche included traffic, land use, and impacts to on-site historic structures.
- **UCLA Campus Housing Expansion.** This EIR evaluated the development and expansion of campus housing within the UCLA campus. Issues of concern evaluated by Mr. Debauche included hazardous materials and population/housing.

CH2M Hill - Minneapolis, MN 1995 to 1998

- **Minneapolis/St. Paul International Airport Expansion EIS:** Mr. Debauche was a key writer of the EIS for this $4 million technical and environmental study, including the preparation of an Environmental Impact Statement (EIS), and an evaluation of the urban design implications of a proposed $800 million expansion of the existing MSP International airport, including transit and terminal modifications and the inclusion of a new perpendicular runaway. The studies included alternatives to the project and the long-term effects on the cities of Minneapolis and St. Paul. In addition to preparing several issue area chapters of this comprehensive EIS, Mr. Debauche assisted with the Environmental Justice Analysis (per Executive Order 12898), the Section 4(f) Parklands discussion, and the socioeconomics sections of the EIS. In addition, Mr. Debauche assisted with preparation of a technical report on airport noise effects on nearby housing and mitigation programs for the impacts of the proposed runway.
- **Minneapolis/St. Paul Wastewater Treatment Facility Expansion EIS:** Was a key writer of the EIS for expansion of the existing wastewater treatment facility serving the twin cities area. The studies included alternatives to the project and the long-term effects on the cities of Minneapolis and St. Paul. Mr. Debauche prepared several issue area chapters of this comprehensive EIS, including the Environmental Justice Analysis (per Executive Order 12898), and the socioeconomics sections of the EIS.

PROFESSIONAL ASSOCIATIONS

- American Planning Association (APA), Chapter Member

DECLARATION OF
Dr. Obed Odoemelam

I, **Obed Odoemelam**, declare as follows:

1. I am presently employed by California Energy Commission in the **Energy Facilities Siting Division** as a Staff Toxicologist.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on Public Health for the **Watson Cogeneration Steam and Electric Reliability project**, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated:_____ Signed:_____

At: _____

RESUME

DR. OBED ODOEMELAM

EDUCATION:

1979-1981 University of California, Davis, California. Ph.D., Ecotoxicology

1976-1978 University of Wisconsin, Eau Claire, Wisconsin. M.S., Biology.

1972-1976 University of Wisconsin, Eau Claire, Wisconsin. B.S., Biology

EXPERIENCE:

1989
The Present: California Energy Commission. Staff Toxicologist.

Responsible for the technical oversight of staffs from all Divisions in the Commission as well as outside consultants or University researchers who manage or conduct multi-disciplinary research in support of Commission programs. Research is in the following program areas: Energy conservation-related indoor pollution, power plant-related outdoor pollution, power plant-related waste management, alternative fuels-related health effects, waste water treatment, and the health effects of electromagnetic fields. Serve as scientific adviser to Commissioners and Commission staff on issues related to energy conservation. Serve on statewide advisory panels on issues related to multiple chemical sensitivity, ventilation standards, electromagnetic field regulation, health risk assessment, and outdoor pollution control technology. Testify as an expert witness at Commission hearings and before the California legislature on health issues related to energy development and conservation. Review research proposals and findings for policy implications, interact with federal and state agencies and industry on the establishment of exposure limits for environmental pollutants, and prepare reports for publication.

1985-1989 California Energy Commission.

Responsible for assessing the potential impacts of criteria and noncriteria pollutants and hazardous wastes associated with the construction, operation and decommissioning of specific power plant projects. Testified before the Commission in the power plant certification process, and interacted with federal and state agencies on the establishment of environmental limits for air and water pollutants.

1983-1985 California Department of Food and Agriculture.

Environmental Health Specialist.

Evaluated pesticide registration data regarding the health and environmental effects of agricultural chemicals. Prepared reports for public information in connection with the eradication of specific agricultural pests in California.

DECLARATION OF
Martha A. Goodavish

I, **Martha A. Goodavish**, declare as follows:

1. I am presently employed by the Aspen Environmental Group, a contractor to the California Energy Commission, Energy Facilities Siting Program and Energy Planning Program, as a Visual Analysis Specialist.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on the **Visual Resources Technical Section**, for the **BP Watson Project**, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: June 29, 2011 Signed:_____

At: _Walnut Creek, California

Martha Ann Goodavish

Senior Visual Analyst

Ms. Goodavish is a landscape architect and planner with over 25 years of experience in visual analysis, environmental planning and resource management. Her areas of expertise are visual resource management, land use planning and outdoor recreation associated with licensing and compliance, natural and water resource management, and National Environmental Protection Act (NEPA) and California Environmental Quality Act (CEQA) compliance. Recent projects have been for a state agency, public and private sector utilities, irrigation districts, and federal land management and water resource agencies. She has been a project manager and task leader for visual, aesthetic, recreation and land use studies on more than 60 projects involving the preparation of technical reports, licensing and compliance documents under NEPA and CEQA.

Professional Experience

- Senior Visual Analyst, William Kanemoto & Associates, 2006 – present
- Principal/Owner, Martha Goodavish Planning & Design, May 1998 – present
- Senior Environmental Planner, EA Engineering, Lafayette, CA, 1988-1998
- Environmental Analyst, LSA Associates, Point Richmond, CA., 1986-1988
- Assistant Landscape Architect, Dames & Moore Engineers, San Francisco, CA., 1984-1986
- Architectural Model Builder, San Francisco, CA., 1983-1984
- Planning Technician, Willamette National Forest, Eugene, OR. 1981-1983

Education

M.C.R.P.; University of California, Berkeley; City and Regional Planning, Environmental Planning; 1995
B.L.A.; University of Oregon, Eugene; Landscape Architecture; 1982

Recent Visual Resource Management Experience

Kirkwood Meadows Power line Reliability Project – Kirkwood Public Utility District, Kirkwood California. 2009-2011. Visual resource specialist for the analysis and preparation of an EIS-EIR for a proposed under and above ground power cable along State Scenic Highway 88 within the Eldorado National Forest.

San Joaquin Solar 1&2 Hybrid Project – California Energy Commission, Sacramento, California. 2009-2010. Senior visual analyst for the preparation of a Preliminary Staff Assessment of a proposed hybrid design solar thermal electric generating plant located in a rural area of Fresno County near Interstate 5, a state hospital and prison.

CPV Sentinel Energy Project – California Energy Commission, Sacramento, California. 2008-2009. Senior visual analyst for the preparation of the Preliminary and Final Staff Assessments of a quick-start peaking electrical generating facility located within the wind turbine area of Riverside County, near Palm Desert and State Scenic Highway 82.

Chula Vista Energy Upgrade Project – California Energy Commission, Sacramento, California. 2007-2009. Senior visual analyst for the preparation of the Preliminary and Final Staff Assessments of a peaking electrical generating facility located in the City of Chula Vista, in San

Diego County and surrounded by a combination of light industrial, residential and open space land uses.

Middle Fork American River Hydroelectric Project Relicensing, Placerville County Water Agency, Placerville, California, 2008-2009. Visual resource analyst responsible for the preparation of a technical report addressing impacts, mitigations and enhancements of over 100 facilities associated with a large hydroelectric project on the Middle Fork American River and spanning both the Eldorado and Tahoe National Forests.

Carmen-Smith Hydroelectric Project, Eugene Water & Electric Board, Eugene, Oregon. 2003-2008. Aesthetics, recreation and land use task leader responsible for the development and implementation of aesthetic, recreation and land use studies associated with the relicensing of an existing Carmen-Smith Hydroelectric Project located on the upper Wild and Scenic McKenzie River in central Oregon.

Haas-Kings River Project, Pacific Gas & Electric, San Francisco, California. 2002-2004. Aesthetics and recreation technical task leader responsible for the preparation of visual and recreation resource management plans for a newly licensed FERC project on the Kings River in the Sierra National Forest, in southeast California. The plans included a visual analysis of and enhance to project features, including landscape planting plans, painting a penstock, surge tank, and siphon, a restorative planting plans for disturbed spoil piles, and relocation of a fishing access trail.

Rock Creek-Cresta FERC/NEPA Compliance Project, Pacific Gas and Electric Company,San Francisco, California, 2001-2004. Visual and recreation technical lead for implementing FERC license articles associated with design, development and installation of Native American and historical interpretative materials, including interpretative panels, travel text, and bronze plaque on floral, fauna, pre-historical, historical, and hydroelectric development in the Feather River Canyon within the Plumas National Forest in northern California.

Upper North Fork American River Hydroelectric Relicensing Project, Sacramento Municipal Utility District, Sacramento, California. 1998-2004. Aesthetics technical lead for the hydroelectric relicensing of SMUD's UARP Project located within the Eldorado National Forest in central California, including participation in technical working groups, design and implementation of aesthetics study plans, recreation user surveys, and preparation of technical reports and Exhibit E documentation.

Iowa Hill Pumped-Storage Project, Sacramento Municipal Utility District, Sacramento, California. 2000-2004. Aesthetics technical lead for the evaluation of a proposed pumped-storage project associated with the hydroelectric relicensing of SMUD's UARP Project located in the Sierra Nevada Mountains east of Sacramento, CA. Tasks included GIS analysis to determine potential seen areas, field reconnaissance to identify photo-simulation points, development of visual simulations, and presentation of findings at public meetings in the area.

DECLARATION OF
Testimony of William Walters, P.E.

I**, William Walters,** declare as follows:

1. I am presently employed by Aspen Environmental Group, a contractor to the California Energy Commission's Siting,Transmission and Environmental Protection Division, as a senior associate in engineering and physical sciences.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **Visual Resources (Appendix VR-1: Visible Plume Modeling Analysis)** for the **Watson Cogeneration Steam and Electric Reliability project**, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: August 8, 2011 Signed: _____

At: Agoura Hills, California

WILLIAM WALTERS, P.E.
Air Quality Specialist

ACADEMIC BACKGROUND
B.S., CHEMICAL ENGINEERING, 1985, CORNELL UNIVERSITY

PROFESSIONAL EXPERIENCE

Mr. Walters has over 20 years of technical and project management experience in environmental compliance work, including environmental impact reports, emissions inventories, source permitting, energy and pollution control research RCRA/CERCLA site assessment and closure, site inspection, and source monitoring.

Aspen Environmental Group 2000 to present

Responsible as lead technical and/or project manager of environmental projects, including the following specific relevant recent (2000 and forward) responsibilities and projects:

- **Engineering and Environmental Technical Assistance to Conduct Application for Certification Review for the California Energy Commission:**
  - Preparation and project management of the air quality section of the Staff Assessment and/or Initial Study and the visual plume assessment for the following licensing projects: Hanford Energy Park; United Golden Gate, Phase I; Huntington Beach Modernization Project*; Woodland Generating Station 2; Ocotillo Energy Project, Phase I; Magnolia Power Project*; Colusa Power Project; Rio Linda/Elverta Power Plant Project; Roseville Energy Center; Henrietta Peaker Project; Tracy Peaking Power Plant Project*; Avenal Energy Project; San Joaquin Valley Energy Center*; Salton Sea Unit 6 Project*; Modesto Irrigation District Electric Generation Station*; Walnut Energy Center*; Riverside Energy Resource Center*; Pastoria Energy Facility Expansion; Bullard Energy Center; Panoche Energy Center; Starwood Power Plant; Riverside Energy Resource Center Units 3 and 4 Project; Colusa Generating Station*; Chula Vista Energy Upgrade Project*; Orange Grove Power Plant Project*; Carlsbad Energy Center Power Project*; Hydrogen Energy California (in process); Canyon Power Plant Project*; Imperial Valley Solar Project*; Beacon Solar Energy Project; Calico Solar Power (in process); Abengoa Mojave Solar Project; Genesis Solar Energy Project; Blythe Solar Power Project; Palen Solar Power Project (in process); Ridgecrest Solar Power Project; Rice Solar Energy Project (in process); Ivanpah Solar Electric Generating Station project.
  - Preparation and project management of the visible plume assessment for the following licensing projects: Metcalf Energy Center Power Project*; Contra Costa Power Plant Project*; Mountainview Power Project; Potrero Power Plant Project; El Segundo Modernization Project; Morro Bay Power Plant Project; Valero Cogeneration Project; East Altamont Energy Center*; SMUD Cosumnes Power Plant Project*; Pico Power Project; Blythe Energy Project Phase II; City of Vernon Malburg Generating Station; San Francisco Electric Reliability Project; Los Esteros Critical Energy Facility Phase II; Roseville Energy Park; City of Vernon Power Plant; South Bay Replacement Project; Walnut Creek Energy Park; Sun Valley Energy Project; Highgrove Power Plant; Colusa Generating Station; Russell City Energy Center; Avenal Energy Project; Community Power Project; San Gabriel Generating Station; Sentinel Energy Project; Victorville 2 Hybrid Power Project; City of Palmdale Hybrid Energy Project (in process); Chevron Richmond Power plant Replacement Project; Tracy Combined Cycle Power Plant; Lodi Energy Center; and San Joaquin Solar 1&2 Power Plant.
  - Assistance in the aircraft safety review of thermal plume turbulence for the Riverside Energy Resources Center; Russell City Energy Center Amendment*; Eastshore Energy Power Plant*; Carlsbad Energy Center (in progress), City of Palmdale Hybrid Energy Project; Riverside Energy Resource Center Units 3 and 4 Project; Victorville 2 Hybrid Power Project; Blythe Energy Project Phase II*, Tracy Power Plant; Avenal Energy Project; and Blythe Solar Energy Project siting cases. Assistance in the aircraft safety review of

* - Includes providing expert witness testimony.

thermal and visual plumes of the operating Blythe Energy Power Plant. Preparation of a white paper on methods for the determination of vertical plume velocity determination for aircraft safety analyses.

- **Other California Energy Commission and relevant project experience:**
  - Preparation and instruction of a visual water vapor plume modeling methodology class for the CEC.
  - Preparation and project management of the public health section of the Initial Study for the Woodland Generating Station 2 Energy Commission licensing project.
  - Preparation of project amendment or project compliance assessments, for air quality or visual plume impacts, for several licensed power plants, including: Metcalf Energy Center; Pastoria Power Plant; Elk Hills Power Plant; Henrietta Peaker Project; Tracy Peaker Project; Magnolia Power Project; Delta Energy Center; SMUD Cosumnes Power Plant; Walnut Energy Center; San Joaquin Valley Energy Center; City of Vernon Malburg Generating Station; Otay Mesa Power Plant; Los Esteros Critical Energy Facility; Pico Power Project; Riverside Energy Resource Center; Blythe Energy Project Phase II; Inland Empire Energy Center; Salton Sea Unit 6 Project; Black Rock 1, 2, and 3 Geothermal Power Project, and Starwood Power-Midway Peaking Power Plant.
  - Preparation of the air quality section of the staff paper "A Preliminary Environmental Profile of California's Imported Electricity" for the Energy Commission and presentation of the findings before the Commission.
  - Preparation of the draft staff paper "Natural Gas Quality: Power Turbine Performance During Heat Content Surge", and presentation of the preliminary findings at the California Air Resources Board Compressed Natural Gas Workshop and a SoCalGas Technical Advisory Committee meeting.
  - Preparation of the staff paper "Emission Offsets Availability Issues" and preparation and presentation of the Emission Offsets Constraints Workshop Summary paper for the Energy Commission.
  - Preparation of information request and data analysis to update the Energy Commission's Cost of Generation Model capital and operating cost factors for combined and simple cycle gas turbine projects. Additionally, performed a review of the presentation for the revised model as part of the CEC's 2007 Integrated Energy Policy Report workshops, and attended the workshop and answering Commissioner questions on the data collection and data analysis. Prepared an update to the Energy Commission's capital and operating cost factors for combined and simple cycle gas turbine projects within the Cost of Generation model as part of the 2009 Integrated Energy Policy Report process.
  - Preparation of the Air Quality Section, air quality emission calculations, or other technical studies, is support of the environmental documentation for renewable energy projects including; the Liberty Energy XXIII Renewable Energy Project; the Topaz Solar Farm, the Pacific Wind Energy Project, and the Pine Tree Wind Development Project.
  - Preparation of comments on the Air Quality, Alternatives, Marine Traffic, Public Safety, and Noise section of the Cabrillo Port Liquefied Natural Gas Deepwater Port Draft EIS/EIR for the City of Oxnard.

CERTIFICATION

- Chemical Engineer, California License 5973

AWARDS

- California Energy Commission Outstanding Performance Award 2001

DECLARATION OF
Ellen Townsend-Hough, REA

I, **Ellen Townsend-Hough** declare as follows:

1. I am presently employed by the California Energy Commission in the Environmental Siting Office of the Siting Transmission& Environmental Protection Division as an Associate Mechanical Engineer.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on Waste Management for the Watson Cogeneration Steam and Electric Reliability Project based on my independent analysis of the Application for Certification and supplements thereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated:_____ Signed:_____

At: Sacramento, California

Ellen Townsend-Hough, REA

(Registered Environmental Assessor, REA 1 – 05465)

SUMMARY

I am a chemical engineer with 30 years of experience. My professional career has afforded me many unique growth and development opportunities. I have a working knowledge of the California Environmental Quality Act. My strengths are in analyzing and performing complex environmental engineering analyses, in areas such as Waste Management, Hazardous Materials Management, Worker Safety, and Water Resources. I worked as a policy advisor to a California Energy Commissioner for three years. I am also an US Environmental Protection Agency Environmental Justice trainer.

PROFESSIONAL EXPERIENCE

Writing

- Write environmental impact reports , negative declarations that require technical evaluation of mechanical engineering and environmental aspects of pollution control systems, environmental impacts, public health issues and worker safety.

Technical Analysis and Presentation

- Performs mechanical engineering analysis of designs for complex mechanical engineering analysis of designs for systems such as combustion chambers and steam boilers, turbine generators, heat transfer systems, air quality abatement systems, cooling water tower systems, pumps and control systems

- Review and process compliance submittals in accordance with the California Environmental Quality Act, the Warren Alquist Act, the Federal Clean Air Act and the California and Federal Occupational Health and Safety Acts to assure compliance of projects

- Provides licensing recommendations and function as an expert witness in regulatory hearings.

- Provide public health impact analysis to assess the potential for impacts associated with project related air toxic/non-criteria pollutant emissions.

- Evaluate the potential of public exposure to pollutant emissions during routine operation and during incidents due to accidents or control equipment failure

- Provide an engineering analysis examining the likelihood of compliance with the design criteria for power plants and also examine site specific potential significant adverse environmental impacts

Technical Skills

- Establish mitigation that reduces the potential for human exposure to levels which would result in significant health impact or health risk in any segment of the exposed population.

- Assist with on-site audits and inspection to assure compliance with Commission decisions.

- Review and evaluate the pollution control technology applied to thermal power plants and other industrial energy conversion technologies.

- Work with the following software applications: WORD, Excel, and PowerPoint.

Policy Advisor

- Provided policy, administrative and technical advice to the Commissioner Robert Pernell. My work with the Commissioner focused on the policy and environmental issues related to the Commission's power plant licensing, research and development and export programs.

- Track and provide research on varied California Energy Commission (CEC) programs. Prepare analysis of economic, environmental and public health impacts of programs, proposals and other Commission business items.

- Represent Commissioner's position in policy arenas and power plant siting discussions.

- Write and review comments articulating commission positions before other regulatory bodies including Air Resources Board, California Public Utilities Commission, and the Coastal Commission.

- Wrote speeches for the Commissioner's presentations.

EDUCATION

Bachelor of Science, Chemical Engineering
Drexel University, Philadelphia Pennsylvania

Continuing Education
Hazardous Material Management Certificate, University California Davis
Urban Redevelopment and Environmental Law, University of California Berkley
Analytical Skills, California Department of Personnel Administration (DPA) Training Center
Legislative Process/Bill Analysis, DPA Training Center
Federally Certified Environmental Justice Trainer

DECLARATION OF

Testimony of Dal Hunter, Ph.D., C.E.G.

I, **Dal Hunter, Ph.D., C.E.G.,** declare as follows:

1. I am presently employed as a subcontractor to Aspen Environmental Group, a contractor to the California Energy Commission, Systems Assessment and Facilities Siting Division, as an Engineering Geologist.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I helped prepare the staff testimony on **GEOLOGY AND PALEONTOLOGY** for the **Watson Cogeneration Steam and Electric Reliability project** based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issue addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated: August 16, 2011 Signed: _____

At: Black Eagle Consulting, Inc.
Reno, Nevada

REGISTERED GEOLOGIST
ROBERT DALTON HUNTER
No. 1411
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

RVP 3.31.13

ROBERT D. HUNTER, PhD, CEG

Engineering Geologist
Vice President

Education

- Ph.D. – Geology – 1989 – University of Nevada, Reno
- M.S. – Geology – 1976 – University of California - Riverside
- B.S. – Geology – 1972 – California State University, Fullerton

Registrations

- Professional Geological Engineer – Nevada
- Registered Geologist – California
- Certified Engineering Geologist – California

Experience

1997 to Present: Black Eagle Consulting, Inc.; Vice President. Dr. Hunter is in charge of all phases of geochemical, geological, and geotechnical projects and is responsible for conducting, coordinating, and supervising geotechnical investigations for public and private sector clients. He is very familiar with design specifications and state and federal requirements.

Dr. Hunter has also provided geological, geotechnical, and paleontological review and written and oral testimony for California Energy Commission (CEC) power plant projects including:

- El Segundo Power Redevelopment Project (Coastal, including testimony and compliance monitoring)
- Magnolia Power Project (including compliance monitoring
- Ocotillo Energy Project (Wind Turbines)
- Vernon-Malburg Generating Station
- Inland Empire Energy Center (including testimony and compliance monitoring)
- Palomar Energy Project
- Henrietta Peaker Project
- East Altamont Energy Center
- Avenal Energy Center
- Teayawa Energy Center monitoring
- Walnut Energy Center (including compliance monitoring
- Riverside Energy Resource Center
- Salton Sea Unit 6 (Geothermal Turbines)
- National Modoc Power Plant
- Pastoria Energy Center
- Sun Valley Energy Project
- El Centro Unit 3 Repower Project
- AES Highgrove Project
- South Bay Replacement Project
- Vernon Power Plant
- Humboldt Bay Repowering Project
- Victorville Power Project
- Carlsbad Energy Center
- San Gabriel Generating Station
- Orange Grove
- Chula Vista Energy Upgrade
- Carrizo (Solar)
- Kings River
- Canyon Power Plant

- Otay Mesa Generating Project (compliance monitoring)
- Montainview Power Plant Project (compliance monitoring)
- Consumes Power Plant (compliance monitoring)
- Sunrise Power Project (compliance monitoring)
- Niland Power Project (compliance monitoring)
- Panoche Power Plant (compliance monitoring)

Attended Expert Witness Training Sponsored by CEC.

1978 to 1997: SEA, Incorporated; Geotechnical Manager, Engineering Geologist. Dr. Hunter was in charge of all phases of geotechnical projects for SEA, including project coordination and supervision, field exploration, geotechnical analysis, slope stability analysis, soil mechanics, engineering geochemistry, mineral and aggregate evaluations, and report preparation. Numerous investigations were undertaken on military, commercial, industrial, airport, residential, and roadway projects. He worked on many geothermal power plants, providing expertise in foundations design, slope stability, seismic assessment, geothermal hazard evaluation, expansive clay, and settlement problems. Project types included high-rise structures, airports, warehouses, shopping centers, apartments, subdivisions, storage tanks, roadways, mineral and aggregate evaluations, slope stability analyses, and fault studies.

1977 to 1978: Fugro (Ertec) Incorporated Consulting Engineers and Geologists; Staff Engineering Geologist; Long Beach, California.

Affiliations

- Association of Engineering Geologists

Publications

Hunter, 1988, *Lime Induced Heave in Sulfate Bearing Clay Soils*, Journal of Geotechnical Engineering, ASCE, Vol. 14, No. 2, pp. 150-167.

Hunter, 1989, *Applications of Stable Isotope Geochemistry in Engineering Geology*: Proceedings of the 25th Annual Symposium on Engineering Geology and Geotechnical Engineering.

Hunter, 1993, *Evaluation of Potential Settlement Problems Related to Salt Dissolution in Foundation Soils*: Proceedings of the 29th Annual Symposium on Engineering Geology and Geotechnical Engineering.

DECLARATION OF
Sudath Edirisuriya

I, **Sudath Edirisuriya**, declare as follows:

1. I am presently employed by **California Energy Commission** in the **Siting, Transmission and Environmental Protection Division** as an **Associate Electrical Engineer**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Transmission System Engineering**, for the **Watson Cogeneration Steam and Electric Reliability project**, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated:_____ Signed:_____

At: _____

Sudath A. Edirisuriya
1916 Ackleton Way
Roseville CA 95661 **Phone 916-654-4851**

EDUCATION:

Bachelor of Science in Electrical Engineering at California State University Fullerton

ATTAINMENTS:

Member of the Professional Engineers in California Government
Vice President Electrical Engineering Society-California State University Fullerton.

EXPERIENCE:

November-2001 to Present: - Associate Electrical Engineer, System Assessment and Facilities Siting Division, California Energy Commission.
Working in the Transmission System Engineering unit on licensing generation projects. Work involves evaluating generation interconnection studies (SIS and FS), their reliability and environmental impacts on transmission system, preparing staff assessment reports, presenting testimony. Perform reliability studies and coordinating data and technical activities with utilities, California ISO and other agencies. Conduct and perform planning studies and contingency analysis including power flow, short-circuit, transient, and post-transient analysis to maintain reliable operation of the power system. Understanding of regulatory and reliability guidelines, WECC and NERC planning and operation criteria, CPUC and FERC requirements. Review technical analyses for WECC/CA ISO/PTO transmission systems and proposed system additions; and provide support for regulatory filings.

June-1998 to November-2001: - Project Electrical Engineer, Design Electrical Engineering Section, Department of Transportation, California.
Electrical Engineering knowledge and skills in the design, construction and maintenance of California state work projects involving all the public work areas; contract administration, construction management, plan checking, field engineering and provide liaison with consultants, developers, and contractors. Plan review in facility constructions, highway lighting, sign lighting, rest area lighting, preparation of project reports, cooperative agreements, review plans for compliance of construction and design guide lines for national electrical code, standards and ordinance. Review process included breaker relay coordination, detail wiring diagrams, layout details, service coordination, load, conductor sizes, derated ampacity, voltage drop calculations, harmonic and flicker determination.

June-1993 to May-1998:- Substation Electrical Engineer, City of Anaheim, California.
Performed protective relay system application, design and setting determination in Transmission & Distribution Substation. Understanding of principles of selective coordination system protection and controls for Electric Utility Equipment. Understanding of Power theory and Analysis of symmetrical components. Ability to review engineering plans, specifications, estimates and computation for Electrical

Utility Projects. Practices of Electrical Engineering design, to include application of Electro-mechanical and solid state relays in Electrical Power Systems. Software skills in RNPDC (Fuse Coordination Program), Capacitor Bank allocation program, and GE Power Flow Program. Design projects using CAD, Excel spread sheets including cost estimates, wiring diagrams, material specifications and field coordination.

Performed underground service design 12kV and 4kV duct banks; pole riser; getaway upgrade; voltage drop calculation, ampacity calculation and wiring diagrams. Design and maintenance of substations in City Electrical Utility System. Upgrade Station Light and power transformers; upgrade capacitor banks; replacement of 12kV-4kV power circuits; Breakers at Metal Clad Switchgear. Design one-line diagrams; three line diagrams; grounding circuits; schematics; coordination of relay settings; conduit and material list preparation. Calculation of derated ampacity; inrush current, short circuit current.

DECLARATION OF
Mark Hesters

I, **Mark Hesters**, declare as follows:

1. I am presently employed by **California Energy Commission** in the **Siting, Transmission and Environmental Protection Division** as a **Senior Electrical Engineer**.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on **Transmission System Engineering**, for the **Watson Cogeneration Steam and Electric Reliability project**, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated:_____ Signed:_____

At: _____

Mark Hesters

916-654-5049
mark.hesters@energy.state.ca.us

Qualifications

- Analyzed the reliability impacts of electric power plants for nine years.
- As an expert witness, produced written and oral testimony in numerous California Energy Commission proceedings on power plant licensing.
- Expertise in power flow models (GE PSLF and PowerWorld), production cost models (GE MAPS), Microsoft word-processing, spreadsheet and database programs.
- Contributing author to many California Energy Commission reports.
- Represented the Energy Commission in the development of electric reliability and planning standards for California.

Experience

Senior Electrical Engineer

2005-Present California Energy Commission, Sacramento, CA

- Program manager of the transmission system engineering analysis for new generator Applications of Certification.
- Lead the development of transmission data collection regulations.
- Overhauled the transmission data adequacy regulations for the Energy Commission's power plant certification process.
- Participated in the analysis of regional transmission projects.
- Technical lead for Commission in regional planning groups.
- Energy Commission representative to the Western Electric Coordinating Council Operations Committee.

Associate Electrical Engineer

1998–2005 California Energy Commission, Sacramento, CA

- Lead transmission systems analyst for power plant licensing under 12-month, 6-month and 21-day licensing processes.
- Provided expert witness testimony on the potential transmission impacts of new power plants in California Energy Commission licensing hearings.
- Authored chapters for California Energy Commission staff reports on regional transmission issues.
- Studied the economics of transmission projects using electricity production simulation tools.
- Analyzed transmission systems using the GE PSLF and PowerWorld load flow models.
- Collected and evaluated transmission data for California and the Western United States

Electric Generation Systems Specialist

1990–1998 California Energy Commission, Sacramento, CA

- Lead generation planner for southern California utilities.
- Analyzed electric generation systems using complex simulation tools.
- Provided analysis on the impact of resource plans on air quality and electricity costs for California Energy Commission reports.
- Developed modeling characteristics for emerging technologies.
- Evaluated resource plans.

Education

1985–1989 University of California at Davis Davis, CA

- B.S., Environmental Policy Analysis and Planning

DECLARATION OF
Dale Rundquist

I, Dale Rundquist, declare as follows:

1. I am presently employed by the California Energy Commission in the Compliance Unit of the Siting Transmission and Environmental Protection Division as a Compliance Project Manager.

2. A copy of my professional qualifications and experience is attached hereto and incorporated by reference herein.

3. I prepared the staff testimony on General Conditions, for the Watson Cogeneration Steam and Electric Reliability project, based on my independent analysis of the Application for Certification and supplements hereto, data from reliable documents and sources, and my professional experience and knowledge.

4. It is my professional opinion that the prepared testimony is valid and accurate with respect to the issues addressed therein.

5. I am personally familiar with the facts and conclusions related in the testimony and if called as a witness could testify competently thereto.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief.

Dated:_____ Signed:_____

At: Sacramento, California

DALE RUNDQUIST

Compliance Project Manager

EXPERIENCE SUMMARY

Over 30 years in project and staff management experience with the California Energy Commission (CEC), Bel Air Markets, and the US Army. Extensive experience in managing people and projects, and resolving difficult situations.

PROFESSIONAL EXPERIENCE AND EDUCATION

ENERGY COMMISSION COMPLIANCE PROJECT MANAGER 09/07 to Present
Worked as a Compliance Project Manager (CPM) for the California Energy Commission, in the Compliance Unit of the Siting, Transmission and Environmental Protection Division. Monitored the construction of two power plant projects (Inland Empire (01-AFC-17C) and Panoche Energy Center (06-AFC-5C)), and the operation of several other power plants(ACE (86-AFC-1C), Bottle Rock Geothermal(79-AFC-4C), Crockett Cogeneration(92-AFC-1C), Midway Sunset Cogeneration (85-AFC-3C), and Palomar Energy Project (01-AFC-24C)).

MANAGER/SUPERVISOR FOR BEL AIR MARKETS 11/74 to 09/07
Worked for Bel Air Markets for over thirty-two years starting on Night Stock Crew. Worked in a management capacity for twenty-eight years. Worked at several stores throughout the greater Sacramento area, managing 4 stores. Involved in scheduling employees, projecting sales on a weekly, monthly and yearly basis, resolving employee/customer disputes, controlling labor, developing business plans, ordering merchandise, and overall operation of the entire store.

US ARMY 02/69 to 02/71
Infantry Sergeant; Fort Lewis, Washington, Viet Nam.

EDUCATION 09/63 to 06/74
Bachelor of Arts Degree in Biological Sciences and a Minor Degree in Business Administration from California State University, Sacramento (1974).

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

APPLICATION FOR CERTIFICATION
FOR THE *WATSON COGENERATION STEAM AND ELECTRICITY RELIABILITY PROJECT*

DOCKET NO. 09-AFC-1
PROOF OF SERVICE LIST
(Revised 8/15/11)

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INTERESTED AGENCIES

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INTERVENORS

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*indicates change

DECLARATION OF SERVICE

I, Maria Santourdjian, declare that on, August 31, 2011, I served and filed copies of the attached Final Staff Assessment for BP Watson Project (09-AFC-1), dated August 31, 2011. The original document, filed with the Docket Unit or the Chief Counsel, as required by the applicable regulation, is accompanied by a copy of the most recent Proof of Service list, located on the web page for this project at: [www.energy.ca.gov/sitingcases/watson/index.html].

The document has been sent to the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit or Chief Counsel, as appropriate, in the following manner:

(*Check all that Apply*)

For service to all other parties:

__x__ Served electronically to all e-mail addresses on the Proof of Service list;

____ Served by delivering on this date, either personally, or for mailing with the U.S. Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses NOT marked "e-mail preferred."

AND

For filing with the Docket Unit at the Energy Commission:

__x__ by sending an original paper copy and one electronic copy, mailed with the U.S. Postal Service with first class postage thereon fully prepaid and e-mailed respectively, to the address below (preferred method); *OR*

____ by depositing an original and 12 paper copies in the mail with the U.S. Postal Service with first class postage thereon fully prepaid, as follows:

CALIFORNIA ENERGY COMMISSION – DOCKET UNIT
Attn: Docket No. 09-AFC-1
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.state.ca.us

OR, if filing a Petition for Reconsideration of Decision or Order pursuant to Title 20, § 1720:

____ Served by delivering on this date one electronic copy by e-mail, and an original paper copy to the Chief Counsel at the following address, either personally, or for mailing with the U.S. Postal Service with first class postage thereon fully prepaid:

California Energy Commission
Michael J. Levy, Chief Counsel
1516 Ninth Street MS-14
Sacramento, CA 95814
mlevy@energy.state.ca.us

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.

Originally Signed by
Maria Santourdjian