Engineering

Assessment

FACILITY DESIGN

Shahab Khoshmashrab, Mark Hesters and Steve Baker

SUMMARY OF CONCLUSIONS

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 project. The purpose of the Facility Design analysis is to:

- verify that the laws, ordinances, regulations and standards (LORS) applicable to the engineering design and construction of the project have been identified;
- verify that the project and ancillary facilities have been described in sufficient detail, including proposed design criteria and analysis methods, to provide reasonable assurance that the project can be designed and constructed in accordance with all applicable engineering LORS, and in a manner that assures public health and safety;
- determine whether special design features should be considered during final design to deal with conditions unique to the site which could influence public health and safety; and
- describe the design review and construction inspection process and establish conditions of certification that will be used to monitor and ensure compliance with the engineering LORS and any special design requirements.

Subjects discussed in this analysis include:

- Identification of the engineering LORS applicable to facility design;
- Evaluation of the applicant’s proposed design criteria, including the identification of those criteria that are essential to ensuring public health and safety;
- Proposed modifications and additions to the Application for Certification (AFC) that are necessary to comply with applicable engineering LORS; and
- Conditions of certification proposed by staff to ensure that the project will be designed and constructed to assure public health and safety and comply with all applicable engineering LORS.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

Lists of LORS applicable to each engineering discipline (civil, structural, mechanical and electrical) are described in the AFC (SFERP 2004a, Appendices 10-A through 10-G) and are duplicated in Amendment A (SFPUC 2005a, Appendices 10-A through 10-G). Some of these LORS are listed in **Facility Design Table 1** below:

Facility Design Table 1
Some 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	2001 California Building Standards Code (CBSC) (also known as Title 24, California Code of Regulations)
Local	1997 Uniform Building Code (UBC), Appendix Chapter 16, Division 4
General	American National Standards Institute (ANSI) American Society of Mechanical Engineers (ASME) American Welding Society (AWS) American Society for Testing and Materials (ASTM)

SETTING

The project will be located on an approximately 4-acre site in the Potrero District of the City of San Francisco, County of San Francisco. The site will lie in seismic zone 4. For more information on the site and related project description, please see the **Project Description** section of this document. Additional engineering design details are contained in the AFC (SFERP 2004a, Appendices 10-A through 10-G) and are duplicated in Amendment A (SFPUC 2005a, Appendices 10-A through 10-G).

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

The purpose of this analysis is to ensure that the project is built to the applicable engineering codes in order to ensure public health and life safety. The analysis verifies that the applicable engineering LORS have been identified and that the project and ancillary facilities have been described in sufficient detail. It also evaluates the applicant's proposed design criteria, describes the design review and construction inspection process, and establishes conditions of certification to monitor and ensure compliance with the engineering LORS and any special design requirements. These conditions allow the Energy Commission Compliance Project Manager (CPM) and the applicant to adopt a compliance monitoring scheme that will verify compliance with these LORS.

COMPLIANCE WITH ENGINEERING LAWS, ORDINANCES, REGULATIONS AND STANDARDS

Staff has evaluated the proposed design criteria and construction methods for the project including its linear support facilities such as a natural gas pipeline and electric transmission line. The applicant proposes to use accepted industry standards (see SFPUC 2005a Appendices 10-A through 10-G and SFERP 2004a Appendices 10-A through 10-G for a representative list of applicable industry standards), design practices and construction methods in building the project. Staff concludes that the project, including its linear facilities, would most likely comply with all applicable engineering LORS, and proposes conditions of certification (see below and the **Geology and Paleontology** section of this document) to ensure compliance.

MAJOR STRUCTURES, SYSTEMS AND EQUIPMENT

Major structures, systems and equipment are defined as those structures and associated components or equipment that are necessary for power production and are costly to repair or replace, that require a long lead time to repair or replace, that are used for the storage, containment, or handling of hazardous or toxic materials, or may become potential health and safety hazards if not constructed according to the applicable engineering LORS. Major structures and equipment will be identified through compliance with proposed Condition of Certification **GEN-2** (below).

The AFC contains lists of the civil, structural, mechanical and electrical design criteria that demonstrate the likelihood of compliance with applicable engineering LORS, and that staff believes are essential to ensuring that the project is designed in a manner that protects public health and safety.

The project shall be designed and constructed to the 2001 edition of the 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 at the time design and construction of the project actually commences. In the event the initial designs are submitted to the Chief Building Official (CBO) for review and approval when the successor to the 2001 CBSC is in effect, the 2001 CBSC provisions, identified herein, shall be replaced with the applicable successor provisions.

Certain structures in a power plant may be required, under the CBC, to undergo dynamic lateral force (structural) analysis; others may be designed using the simpler static analysis procedure. In order to ensure that structures are analyzed using the appropriate lateral force procedure, staff has included Condition of Certification **STRUC-1** (below), which in part, requires review and approval by the CBO of the project owner's proposed lateral force procedures prior to the start of construction.

PROJECT QUALITY PROCEDURES

Amendment A (SFPUC 2005a, § 2.4.5) and the AFC (SFERP 2004a, § 2.4.5) describe a project Quality Program that will be used on the project to maximize confidence that systems and components will be designed, fabricated, stored, transported, installed and tested in accordance with the technical codes and standards appropriate for a power plant. Compliance with design requirements will be verified through an appropriate program of inspections and audits. Employment of this quality assurance/quality control (QA/QC) program would ensure that the project is actually designed, procured, fabricated, and installed as contemplated in this analysis.

COMPLIANCE MONITORING

Under Section 104.2 of the CBC, the building official is authorized and directed to enforce all the provisions of the CBC. For all energy facilities certified by the Energy Commission, the Energy Commission is the building official and has the responsibility to enforce the code. In addition, the Energy Commission has the power to render interpretations of the CBC and to adopt and enforce rules and supplemental regulations to clarify the application of the CBC's provisions.

The Energy Commission's design review and construction inspection process is developed to conform to CBC requirements and to ensure 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 carry out the design review and construction inspections and act as delegate CBO on behalf of the Energy Commission. These delegates typically include the local building official and/or independent consultants hired to cover technical expertise not provided by the local official. The applicant, through permit fees as provided by CBC Sections 107.2 and 107.3, pays the costs of the reviews and inspections. While building permits in addition to the Energy Commission certification are not required for this project, in lieu permit fees are paid by the applicant consistent with CBC Section 107, to cover the costs of reviews and inspections.

Engineering and compliance staff will invite the local building authority, the City and County, or a third party engineering consultant, to act as CBO for the project. When an entity has been identified to perform the duties of CBO, Energy Commission staff will complete a Memorandum of Understanding (MOU) with that entity that outlines 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 applicant's engineers responsible for the design and construction of the project (proposed Conditions of Certification **GEN-1** through **GEN-8**). Engineers responsible for the design of the civil, structural, mechanical and electrical portions of the project are required to be registered in California, and to sign and stamp each submittal of design plans, calculations and specifications submitted to the CBO. These conditions require that no element of construction subject to CBO review and approval shall proceed without prior approval from the CBO. They also require that qualified special inspectors be assigned to perform or oversee special inspections required by the applicable LORS.

While the Energy Commission and delegate CBO have the authority to allow some flexibility in scheduling construction activities, these conditions are written to require that no element of construction of permanent facilities subject to CBO review and approval, which would be difficult to reverse or correct, may proceed without prior approval of plans by the CBO. Those elements of construction that are not difficult to reverse are allowed to proceed without approval of the plans. The applicant shall bear the responsibility to fully modify those elements of construction to comply with all design changes that result from the CBO's subsequent plan review and approval process.

FACILITY CLOSURE

The removal of a facility from service, or decommissioning, as a result of the project reaching the end of its useful life, may range from "mothballing" to removal of all equipment and appurtenant facilities and restoration of the site. Future conditions that may affect the decommissioning decision are largely unknown at this time.

In order to assure that decommissioning of the facility will be completed in a manner that is environmentally sound, safe and will protect public health and safety, the applicant shall submit a decommissioning plan to the Energy Commission for review and approval prior to the commencement of decommissioning. The plan shall include a discussion of:

- proposed decommissioning activities for the project and all appurtenant facilities constructed as part of the project;
- all applicable LORS, local/regional plans and the conformance of the proposed decommissioning activities to the 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.

The above requirements should serve as adequate protection, even in the unlikely event of project abandonment. Staff has proposed general conditions (see **General Conditions**) to ensure that these measures are included in the Facility Closure plan.

CONCLUSIONS

1. The laws, ordinances, regulations and standards (LORS) identified in the AFC and supporting documents are those applicable 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 are likely to comply with applicable engineering LORS.
3. The conditions of certification proposed will ensure that the facilities can be designed and constructed in accordance with applicable engineering LORS. This will occur through the use of design review, plan checking and field inspections, which are to

be performed by the CBO or other Energy Commission delegate. Staff will audit the CBO to ensure satisfactory performance.

4. Whereas future conditions that may 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 the commencement of decommissioning, the decommissioning procedure is likely to occur in compliance with all applicable engineering LORS.

Energy Commission staff recommends that:

1. The conditions of certification proposed herein be adopted to ensure that the project is designed and constructed to assure public health and safety, and to ensure compliance with all applicable engineering LORS;
2. The project be designed and built to the 2001 CBSC (or successor standard, if such is in effect when the initial project engineering designs are submitted for review); and
3. The CBO shall review the final designs, conduct plan checking and perform 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 2001 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 that edition that has been adopted by the California Building Standards Commission and published at least 180 days previously.) The project owner shall insure that all the provisions of the above applicable codes be enforced during any construction, addition, alteration, moving, demolition, repair, or maintenance of the completed facility [2001 CBC, Section 101.3, Scope]. All transmission facilities (lines, switchyards, switching stations and substations) are handled in 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 a successor to the 2001 CBSC is in effect, the 2001 CBSC provisions identified herein 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 insure that all contracts with contractors, subcontractors and suppliers shall clearly specify that all work performed and materials supplied on this project comply with the codes listed above.

Verification: Within 30 days after receipt of the Certificate of Occupancy, the project owner shall submit to the Compliance Project Manager (CPM) 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 [2001 CBC, Section 109 – Certificate of Occupancy].

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 which may require CBO approval for the purpose of complying with the above stated codes. The CPM will then determine the necessity of CBO approval on the work to be performed.

GEN-2 Prior to submittal of the initial engineering designs for CBO review, the project owner shall furnish to the CPM and to the CBO a schedule of facility design submittals, a Master Drawing List and a Master Specifications List. The schedule shall contain a list of proposed submittal packages of designs, calculations and specifications for major structures and equipment. To facilitate audits by Energy Commission staff, the project owner shall provide specific packages to the CPM when requested.

Verification: At least 60 days (or project owner and CBO approved alternative timeframe) prior to the start of rough grading, the project owner shall submit to the CBO and to the CPM the schedule, the Master Drawing List and the 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 and equipment listed in **Facility Design Table 2** below. Major structures and equipment shall be added to or deleted from the table only with CPM approval. The project owner shall provide schedule updates in the Monthly Compliance Report.

Facility Design Table 2
Major Structures and Equipment List

Equipment/System	Quantity (Plant)
Combustion Turbine (CT) Foundation and Connections	3
CT Generator Foundation and Connections	3
SCR Stack Structure, Foundation and Connections	3
CT Main Transformer Foundation and Connections	3
CT Fire Protection Skid Foundation and Connections	3
Sprint System Skid Foundation and Connetctions	3
NOx Water Injection Skid Foundation and Connections	3
SCR/CO Catalyst System Structure, Foundation and Connections	3
CEMS Structure, Foundation and Connections	3

Equipment/System	**Quantity (Plant)**
Chiller/Cooling Tower Package Foundation and Connections	1
Auxiliary Cooling Pumps Foundation and Connections	2
Cooling Tower Chemical System Foundation and Connections	1
Administration/Control Room/Plant Operations Building Structure, Foundation and Connections	1
Plant Air Compressor Package Foundation and Connections	1
Bulk Caustic Storage (if required) Foundation and Connections	1
Bulk Acid Storage (if required) Foundation and Connections	1
Bulk Sodium Hypochlorite Tank Structure, Foundation and Connections	1
EDI Train Foundation and Connections	2
EDI Feed Pump Skid Foundation and Connections	1
RO Clean in Place Skid Foundation and Connections	1
RO Feed Pump Skid Foundation and Connections	1
RO Train Foundation and Connections	1
RO Cartridge Filters Foundation and Connections	1
Ultra Filtration System Waste Skid Foundation and Connections	1
Ultra Filtration System Trains Foundation and Connections	2
Ultra Filtration System Pump Skid Foundation and Connections	1
Air Blowers Foundation and Connections	2
Chemical Metering System Foundation and Connections	1
Equalization Tank Structure, Foundation and Connections	1
Bio Reactor Structure, Foundation and Connections	1
Ultra Filtration Permeate Tank Structure, Foundation and Connections	1
Aqueous Ammonia Forwarding Pumps Foundation and Connections	2
Aqueous Ammonia Storage Tank Structure, Foundation and Connections	1
RO Permeate Tank Structure, Foundation and Connections	1
Treated Water Pumps Foundation and Connections	2
Treated Water Storage Tank Structure, Foundation and Connections	1
Oil/Water Separator Foundation and Connections	1
Waste Water Sump and Lift Station Foundation and Connections	1
DI Water Pumps Foundation and Connections	2
DI Water Storage Tank Structure, Foundation and Connections	1
Turbine Wash Water Drain Tank Structure, Foundation and Connections	1
Natural Gas Inlet Scrubber	1
Hydrocarbon Drain Tank Structure, Foundation and Connections	1
Discharge Filter Scrubbers Foundation and Connections	2
Fuel Gas Compressors Foundation and Connections	4
Fuel Gas Cooling Radiators Foundation and Connections	4
Natural Gas Metering Station Foundation and Connections	1
Hydrocarbon Drain Tank Foundation and Connections	1

Equipment/System	Quantity (Plant)
13.8kV/115kV GSUs Foundation and Connections	3
Auxiliary Transformers Foundation and Connections	2
Fire Blast Walls Structure, Foundation and Connections	3
Switchgears Structure, Foundation and Connections	2
Station Service Transformer Foundation and Connections	4
Retaining Wall Structure, Foundation and Connections	1
Reclaimed Water Treatment Building Structure, Foundation and Connections	1
Supplemental Aeration Blowers Foundation and Connections	2
Membrane Air Scour Blowers Foundation and Connections	2
Drain Pump Foundation and Connections	1
Permeate Pumps Foundation and Connections	2
Mixed Liquor Recirculation Pumps Foundation and Connections	2
CIP/Backpulse Pumps Foundation and Connections	2
CIP/Backpulse Tank Structure, Foundation and Connections	1
DIP Tank Recirculation/Drain Pumps Foundation and Connections	2
DIP Tank Structure, Foundation and Connections	2
Membrane Tanks Structure, Foundation and Connections	2
Feed Channel Structure, Foundation and Connections	1
Combined Inlet System Structure, Foundation and Connections	1
Potable Water Systems	1 Lot
Drainage Systems (including sanitary drain and waste)	1 Lot
High Pressure and Large Diameter Piping and Pipe Racks	1 Lot
HVAC and Refrigeration Systems	1 Lot
Temperature Control and Ventilation Systems (including water and sewer connections)	1 Lot
Building Energy Conservation Systems	1 Lot
Switchyard, Buses and Towers	1 Lot
Electrical Duct Banks	1 Lot

GEN-3 The project owner shall make payments to the CBO for design review, plan check and construction inspection based upon a reasonable fee schedule to be negotiated between the project owner and the CBO. These fees may be consistent with the fees listed in the 2001 CBC [Chapter 1, Section 107 and Table 1-A, Building Permit Fees; Appendix Chapter 33, Section 3310 and Table A-33-A, Grading Plan Review Fees; and Table A-33-B, Grading Permit Fees], adjusted for inflation and other appropriate adjustments; may be based on the value of the facilities reviewed; may be based on hourly rates; or may be as otherwise agreed by the project owner and the CBO.

<u>Verification:</u> 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 the applicable fees have been paid.

GEN-4 Prior to the start of rough grading, the project owner shall assign a California registered architect, structural engineer or civil engineer, as a resident engineer (RE), to be in general responsible charge of the project [Building Standards Administrative Code (Cal. Code Regs., tit. 24, § 4-209, Designation of Responsibilities)]. All transmission facilities (lines, switchyards, switching stations and substations) are handled in Conditions of Certification in the **Transmission System Engineering** section of this document.

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 and electrical portions of the project, respectively. A project may be divided into parts, provided each part is clearly defined as a distinct unit. Separate assignment of general responsible charge may be made for each designated part.

The RE shall:

1. Monitor construction progress of work requiring CBO design review and inspection to ensure compliance with LORS;
2. Ensure that construction of all the facilities subject to CBO design review and inspection conforms in every material respect to the applicable LORS, these conditions of certification, approved plans, and specifications;
3. Prepare documents to initiate changes in the approved drawings and specifications when directed by the project owner or as required by conditions on the project;
4. Be responsible for providing the project inspectors and testing agency(ies) with complete and up-to-date set(s) 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 as not conforming to the approved plans and specifications.

The RE shall have the authority to halt construction and to require changes or remedial work, if the work does not conform to applicable 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.

<u>Verification:</u> At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of rough grading, 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) are 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-5 Prior to the start of rough grading, the project owner shall assign at least one of each of the following California registered engineers to the project: A) a civil engineer; B) a soils engineer, or a geotechnical engineer or a civil engineer experienced and knowledgeable in the practice of soils engineering; and C) 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: D) 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; E) a mechanical engineer; and F) an electrical engineer. [California Business and Professions Code section 6704 et seq., and sections 6730, 6731 and 6736 requires 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 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 (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 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 [2001 CBC, Section 104.2, Powers and Duties of Building Official].

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 Report, Geotechnical Report or Soils Report 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 design, 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 in the construction procedures.

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 Report, Geotechnical Report or Soils Report containing field exploration reports, laboratory tests and engineering analysis detailing the nature and extent of the soils that may be susceptible to liquefaction, rapid settlement or collapse when saturated under load [2001 CBC, Appendix Chapter 33, Section 3309.5, Soils Engineering Report; Section 3309.6, Engineering Geology Report; and Chapter 18, Section 1804, Foundation Investigations];

3. Be present, as required, during site grading and earthwork to provide consultation and monitor compliance with the requirements set forth in the 2001 CBC, Appendix Chapter 33; Section 3317, Grading Inspections (depending on the site conditions, this may be the responsibility of either the soils engineer or 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 with predicted conditions used as a basis for design of earthwork or foundations [2001 CBC, section 104.2.4, Stop orders].

C. The engineering geologist shall:

1. Review all the engineering geology reports and prepare 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 2001 CBC, Appendix Chapter 33; Section 3317, Grading Inspections (depending on the site conditions, this may be the responsibility of either the soils engineer or 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 with 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 timeframe) prior to the start of rough grading, 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 timeframe) 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, 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 2001 CBC, Chapter 17 [Section 1701, Special Inspections; Section 1701.5, Type of Work (requiring special inspection)]; and Section 106.3.5, Inspection and observation program. All transmission facilities (lines, switchyards, switching stations and substations) are handled in Conditions of Certification in the **Transmission System Engineering** section of this document.

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. Observe 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 [2001 CBC, Chapter 17, Section 1701.3, Duties and Responsibilities of the Special Inspector]; 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 and specifications and the applicable provisions of the applicable edition of the CBC.

   A certified weld inspector, certified by the American Welding Society (AWS), and/or ASME as applicable, shall inspect welding performed on-site requiring special inspection (including structural, piping, tanks and pressure vessels).

__**Verification:**__ At least 15 days (or project owner and CBO approved alternative timeframe) 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 the corrective action required [2001 CBC, 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 be submitted to the CBO for review and approval. The discrepancy documentation shall reference this Condition of Certification and, if appropriate, the 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 [2001 CBC, Section 106.4.2, Retention of Plans]. 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 final approved engineering plans, specifications and calculations as described above, the project owner shall submit to the CPM a letter stating that the above documents have been stored and indicate the storage location of such 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 .pdf 6.0 files, with restricted printing privileges (i.e. password protected), 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. Related calculations and specifications, signed and stamped by the responsible civil engineer; and
4. Soils Report, Geotechnical Report or Foundation Investigations Report required by the 2001 CBC [Appendix Chapter 33, Section 3309.5, Soils Engineering Report; Section 3309.6, Engineering Geology Report; and Chapter 18, Section 1804, Foundation Investigations].

Verification: At least 15 days (or project owner and CBO approved alternative timeframe) 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 [2001 CBC, Section 104.2.4, Stop orders].

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 2001 CBC, Chapter 1, Section 108, Inspections; Chapter 17, Section 1701.6, Continuous and Periodic Special Inspection; and Appendix Chapter 33, Section 3317, Grading Inspection. 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 [2001 CBC, Appendix Chapter 33, Section 3317.7, Notification of Noncompliance]. 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 [1998 CBC, Section 3318, Completion of Work].

Verification: Within 30 days (or project owner and CBO approved alternative timeframe) 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, 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 of any major structure or component listed in **Facility Design Table 2** of Condition of Certification **GEN-2**, above, the project owner shall submit to the CBO for design review and approval the proposed lateral force procedures for project structures and the applicable designs, plans and drawings for project structures. Proposed lateral force procedures, designs, plans and drawings shall be those for the following items (from **Table 2**, above):

1. Major project structures;
2. Major foundations, equipment supports and anchorage;
3. Large field fabricated tanks;
4. Turbine/generator pedestal; and

Construction of any structure or component shall not commence 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 (i.e., 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 [2001 CBC, Section 108.4, Approval Required];
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 [2001 CBC, Section 106.4.2, Retention of plans; and Section 106.3.2, Submittal documents];
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 [2001 CBC, Section 106.3.4, Architect or Engineer of Record]; and

5. Submit to the CBO the responsible design engineer's signed statement that the final design plans conform to the applicable LORS [2001 CBC, Section 106.3.4, Architect or Engineer of Record].

Verification: At least 60 days (or project owner and CBO approved alternative timeframe) prior to the start of any increment of construction of any structure or component listed in **Facility Design Table 2** of Condition of Certification **GEN-2** above, 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 are in compliance with the requirements set forth in the 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 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 2001 CBC, Chapter 17, Section 1701, Special Inspections; Section 1701.5, Type of Work (requiring special inspection); Section 1702, Structural Observation and Section 1703, Nondestructive Testing.

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 [2001 CBC, Chapter 17, Section 1701.3, Duties and Responsibilities of the Special Inspector]. 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 2001 CBC, Chapter 1, Section 106.3.2, Submittal documents and Section 106.3.3, Information on plans and specifications, 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: On a schedule suitable to the CBO, 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 Chapter 3, Table 3-E of the 2001 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 timeframe) 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 **Facility Design Table 2**, Condition of Certification **GEN-2**, above. Physical layout drawings and drawings not related to code compliance and life safety need not be submitted. 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 said construction [2001 CBC, Section 106.3.2, Submittal Documents; Section 108.3, Inspection Requests; Section 108.4, Approval Required; 2001 California Plumbing Code, Section 103.5.4, Inspection Request; Section 301.1.1, Approval].

The responsible mechanical engineer shall stamp and sign all plans, drawings and calculations for the major piping and plumbing systems subject to the CBO design review and approval, and submit a signed statement to the CBO when the said proposed piping and plumbing systems have been designed, fabricated and installed in accordance with all of the applicable laws, ordinances, regulations and industry standards [Section 106.3.4, Architect or Engineer of Record], which may include, but not be 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
- Specific City/County code.

The CBO may deputize inspectors to carry out the functions of the code enforcement agency [2001 CBC, Section 104.2.2, Deputies].

Verification: At least 30 days (or project owner and CBO approved alternative timeframe) prior to the start of any increment of major piping or plumbing construction listed in **Facility Design Table 2**, Condition of Certification **GEN-2** above, 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 the 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 the 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 said installation [2001 CBC, Section 108.3, Inspection Requests].

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 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.

<u>Verification:</u> At least 30 days (or project owner and CBO approved alternative timeframe) 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 said 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 [2001 CBC, Section 108.7, Other Inspections; Section 106.3.4, Architect or Engineer of Record].

<u>Verification:</u> At least 30 days (or project owner and CBO approved alternative timeframe) 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 electrical equipment and systems 480 volts and higher, listed 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 [CBC 2001, Section 106.3.2, Submittal documents]. 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 [2001 CBC, Section 108.4, Approval Required, and Section 108.3, Inspection Requests]. 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 to 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 to 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 timeframe) 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

SFERP 2004a — City and County of San Francisco/Blount (tn: 31130). Application for Certification, San Francisco Electric Reliability Project — 145 megawatt natural gas-fired peaking power plant located in San Francisco. Submitted to CEC/Therkelsen/Dockets on 3/18/04.

SFPUC 2005a — San Francisco Public Utilities Commission/Hale (tn: 34403). Amendment A of the Application for Certification. Submitted to CEC/Therkelsen/Dockets on 3/25/05.

GEOLOGY AND PALEONTOLOGY

Patrick Pilling, Ph.D., P.E., G.E.

SUMMARY OF CONCLUSIONS

With the exception of strong ground shaking, potential liquefaction during an earthquake, and potential differential settlement of heavily loaded structures, the San Francisco Electric Reliability Project site lies in an area that generally exhibits low geologic hazards and no known viable geologic or mineralogic resources. Strong ground shaking, potential liquefaction, and potential differential settlement must be mitigated through foundation design as required by the California Building Code (2001) and conditions of certification. Paleontological Resources have been documented in the general area of the project. The potential impacts to paleontological resources due to construction activities will be mitigated as required by conditions of certification.

Based on this information, it is staff's opinion that the potential for significant adverse cumulative impacts to the project from geologic hazards can be mitigated to less than significant, and the potential for significant adverse cumulative impacts to potential geologic, mineralogic, and paleontologic resources from the construction, operation, and closure of the proposed project, is low. It is Energy Commission staff's opinion that the San Francisco Electric Reliability Project can be designed and constructed in accordance with all applicable laws, ordinances, regulations, and standards and in a manner that protects environmental quality and assures public health and safety.

INTRODUCTION

In this section, Energy Commission staff discusses potential impacts of the proposed San Francisco Electric Reliability Project (SFERP) regarding geologic hazards, geologic (including mineralogic), and paleontologic resources. Staff's objective is to ensure that there will be no significant adverse impacts to significant geological and paleontological resources during project construction, operation, and closure. A brief geological and paleontological overview of the project is provided. The section concludes with staff's proposed monitoring and mitigation measures with respect to geologic hazards and geologic, mineralogic, and paleontologic resources, with the inclusion of conditions of certification.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

The applicable laws, ordinances, regulation and standards (LORS) are listed in the Application for Certification (AFC), in Section 8.15.2, Table 8.15-1, Section 8.16.2, and Table 8.16-1 (SFPUC 2005a). The following is a brief description of the LORS for geologic hazards and resources, and mineralogic and paleontologic resources.

Geology and Paleontology Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal	The proposed SFERP is not located on federal land. There are no Federal LORS for geologic hazards and resources for this site.
State	
California Building Standards Code (CBSC), 2001 [particularly Part 2, California Building Code (CBC)]	The CBC includes a series of standards that are used in project investigation, design and construction (including grading and erosion control).
Local	None
Standard of Practice - Society for Vertebrate Paleontology (SVP), 1995	The "Measures for Assessment and Mitigation of Adverse Impacts to Non-renewable Paleontologic Resources: Standard Procedures" is a set of procedures and standards for assessing and mitigating impacts to vertebrate paleontological resources. The measures were adopted in October 1995 by the SVP, a national organization of professional scientists.

SETTING

The proposed SFERP site is a 4-acre parcel owned by the City of San Francisco near Potrero Point in San Francisco. The site is located north of the Islais Creek Channel between Cesar Chavez Street and 25th Street.

REGIONAL SETTING

The project site is located along the eastern side of the San Francisco Peninsula, near the San Francisco Bay and north of the Isais Creek Channel within the limits of the Potrero District. The San Francisco Peninsula lies within the northern Coast Ranges physiographic province. This province is characterized by a northwest-trending series of elongated ranges and narrow valleys and extends from the Oregon border to the Transverse Ranges in Southern California (Norris and Webb, 1990).

Potrero Point lies within the Hunters Point Shear Zone. This shear zone is an older structure that trends northwest across the peninsula and is part of the Coast Range Thrust Fault that juxtaposed the Franciscan Formation and Great Valley Sequence. The California Division of Mines and Geology (CDMG, 1994) considers the shear zone inactive. No known active faults cross the SFERP site.

Potrero Point was originally a spur of Potrero Hill, a serpentine bedrock rock mass of the Franciscan Formation that rose to a height of over 100 feet. During the 19th century the bay and tidelands immediately adjacent to Potrero Point were reclaimed, in part, with rock quarried from Potrero Point (Mace, 2002).

PROJECT SITE DESCRIPTION

The project site is relatively level and consists of reclaimed tidal flats. The site is immediately underlain by artificial fill, older alluvial deposits and Franciscan-age bedrock. Although a detailed geotechnical investigation has not yet been performed for this site, the thickness of the artificial fill materials most likely varies from as little as 3 feet to in excess of 30 feet (SFPUC, 2005). The fill material is expected to consist of generally loose to isolated zones of medium dense materials that contain rubble and debris (e.g. bricks, concrete, wood, and re-worked bedrock). Although the artificial fill could contain fossils since it is typically comprised of sediments from older deposits, any such fossils would lack stratigraphic context such that they would only have very limited scientific and educational value.

The alluvial deposits that overlay the Franciscan bedrock in this area generally consist of clayey sands, sands with gravel, and sandy clays. These materials were derived from topographic highs in the vicinity of the site, and have been dated as early Pleistocene to Holocene in age. Bay mud also overlies the bedrock and is associated with estuarine deposits. These materials, in particular the late Pleistocene and early Holocene sediments, have produced numerous significant plant, invertebrate, and vertebrate fossils at previously recorded fossil sites and, as a result, have a high potential for additional similar fossils to be uncovered by excavations for project construction.

The Franciscan bedrock is primarily composed of serpentine, with occasional tectonic blocks of sandstones and shales. This unit has been dated as Jurassic, Cretaceous, and early Tertiary in age. The serpentine is generally moderately to highly weathered in the upper few feet, and becomes less weathered and very dense at depth. This formation is considered to have a low potential for containing fossils only because there is the possibility that excavations could encounter blocks of fossil-bearing sedimentary rock (SFERP, 2005c).

Ground water is expected to be present at depths that vary between 5 and 7 feet below existing grade.

Based on the information contained in the AFC (SFERP, 2005c) and local geologic maps, artificial fill materials and underlying sediments and bedrock are anticipated along the proposed process water supply pipeline, underground electrical, and natural gas pipeline alignments. Ground water is most likely present at elevations similar to those discussed above.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

There are two types of impacts considered in this section. The first are geologic hazards, which could impact proper functioning of the proposed facility and include faulting and seismicity, liquefaction, dynamic compaction, hydrocompaction, subsidence, expansive soils, landslides, and tsunamis and seiches. The second considers 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 with respect to geologic hazards and geologic and mineralogic resources apply to this project; however, the CBSC and CBC provide geotechnical and geological investigation and design guidelines, which engineers must adhere to when designing a proposed facility. As a result, the criteria used to assess geologic hazard impact significance includes evaluating each potential hazard in relation to being able to adequately design and construct the proposed facility.

The California Environmental Quality Act (CEQA) Guidelines, Appendix G, provides a checklist of questions that a lead agency should normally address if relevant to a project's environmental impacts.

- Section (V) (c) asks if the project will directly or indirectly destroy a unique paleontological resource or site or unique geological feature.
- Sections (VI) (a), (b), (c), (d), and (e) pose questions that are focused on whether or not the project would expose persons or structures to geologic hazards.
- Sections (X) (a) and (b) pose questions about the project's effect on mineral resources.

With respect to impacts the proposed facility may have on existing geologic and mineralogic resources, geologic and mineral resource maps for the surrounding area have been reviewed, in addition to any site-specific information provided by the applicant, to determine if geologic and mineralogic resources are present in the area. When available, operating procedures of the proposed facility, in particular ground water extraction and mass grading, are reviewed to determine if such operations could adversely impact such resources.

Staff reviewed existing paleontologic information for the surrounding area, as well as any site-specific information provided by the applicant, in accordance with accepted assessment protocol (SVP, 1995) to determine if there are any known paleontologic resources in the general area. If present or likely to exist, conditions of certification are applied to the project approval, which outlines procedures required during construction to mitigate impacts to potential resources.

DIRECT/INDIRECT IMPACTS AND MITIGATION

Seismicity and associated liquefaction, as well as potential differential settlement of heavily loaded structures, represent the main geologic hazards at this site. These potential hazards can be effectively mitigated through facility design. Conditions of Certification **GEN-1, GEN-5,** and **CIVIL-1** in the **Facility Design** section and **GEO-1** below should mitigate these impacts to a less than significant level.

No viable geologic or mineralogic resources are known to exist in the area. Paleontological resources have been documented within 1 mile of the project site, and the native materials exhibit a high sensitivity rating with respect to containing significant paleontologic resources. Since the proposed project will include significant amounts of grading, foundation excavation, and utility trenching, staff considers the probability that paleontological resources will be encountered during such activities to be high when native materials are encountered, based on SVP assessment criteria. 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.

GEOLOGICAL HAZARDS

The AFC provides documentation of potential geologic hazards at the SFERP plant site, in addition to subsurface exploration information on the adjacent property to the west of the subject site (SFERP, 2005c). Review of the AFC, coupled with our independent research, indicates that potential geologic hazards at this site can be mitigated to less than significant as long as the proposed conditions of certification are followed.

Our independent research included review of available geologic maps, reports, and related data of the SFERP plant site. Geological information was available from the California Geological Survey (CGS), CDMG, U.S. Geological Survey (USGS), and other governmental organizations.

Faulting and Seismicity

Energy Commission staff reviewed the CGS publication *Fault Activity Map of California and Adjacent Areas with Locations and Ages of Recent Volcanic Eruptions*, dated 1994 (CGS, 1994); the *Simplified Fault Activity Map of California* (Jennings and Saucedo, 2002); the *Maps of Known Active Fault Near-Source Zones in California and Adjacent Parts of Nevada* (International Conference of Building Officials [ICBO], 1998), the *Quaternary Geologic Map of the San Francisco Bay* (Wahrhaftig et al., 1993); the *Geologic Map of the San Francisco-San Jose Quadrangle* (Wagner et al., 1990); *Seismic Shaking Hazard Maps of California* (Petersen et al., 1999); *Probabilistic Seismic Hazard Assessment for the State of California* (CDMG, 1996a); and *Peak Acceleration from Maximum Credible Earthquakes in California (Rock and Stiff Soil Sites)* (CDMG, 1992). No active or potentially active faults are known to cross the power plant footprint or its associated linear facilities. The project is located within seismic Zone 4 as delineated on Figure 16-2 of the 2001 edition of the CBC.

The closest known active fault is the San Andreas Fault, which is located approximately 13 kilometers west of the project site. This fault is designated a class “A” fault under the CBC (a fault with a maximum magnitude earthquake greater than 7 and a slip rate in excess of 5 mm/year). The maximum moment magnitude earthquake, defined as the largest earthquake that a given fault is considered capable of generating, for the segment of San Andreas Fault closest to the project is a moment magnitude 7.9 event. The slip rate for this section of the San Andreas Fault is 24 mm/year (ICBO 1998, Table 1). A mean peak horizontal bedrock acceleration for this fault is estimated to be 60 percent of the acceleration due to gravity (0.60g), while the peak horizontal ground surface acceleration is estimated to be 0.55g at the site (SFPUC, 2005a). These values are generally consistent with the CGS Map Sheet 48, which predicts a peak ground acceleration with a 10 percent chance of exceedance in 50 years of between 0.5g and 0.6g for the project area. Strong ground shaking can be mitigated to less than significant through facility design as required by Condition of Certification **GEN-1**, **GEN-5**, and **CIVIL-1** in the **Facility Design** section.

Since no active faults are known to exist within the limits of the SFERP site, the potential for surface rupture at the site is considered low.

Liquefaction

Liquefaction is a condition in which a cohesionless soil loses its shear strength due to a sudden increase in pore water pressure. The soils most prone to liquefaction during earthquakes are submerged fine-grained, poorly graded, sands and silts. The *2001 Seismic Hazard Map for the City and County of San Francisco* (CDMG, 2000) and the *Preliminary Maps of Quaternary Deposits and Liquefaction Susceptibility, Nine-County San Francisco Bay Region, California* (USGS, 2000) indicates that the plant site and the proposed project linear facilities are located in a liquefaction hazard zone.

Information contained in the AFC (SFPUC, 2005a) indicates that ground water is present at relatively shallow depths and that the deeper fill areas present at the site exhibit a high potential for liquefaction. Such conditions may also exist in the proposed project linear facility areas.

Based on the above information, the site can be characterized as having a high potential for liquefaction during a large earthquake; however, this potential impact can be mitigated to less than significant through facility design as required by Conditions of Certification **GEN-1**, **GEN-5**, and **CIVIL-1** in the **Facility Design** section and **GEO-1** below. Due to the heterogeneous character of the fill, potentially liquefiable soils are expected to occur as zones or pockets, rather than as horizontally or vertically continuous layers. The potential for liquefaction-induced lateral spreading within the fill is considered low due to low surface gradients at the project site, the heterogeneous nature of the fill, and the lateral confinement present immediately around the site.

Dynamic Compaction

Dynamic compaction of soils results 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 in soil density). The decrease in volume can result in settlement of overlying structural improvements.

Based on the information contained in the AFC (SFERP, 2005c), the potential for localized areas of dynamic compaction is considered high for the site and associated project linear facilities that pass through artificial fill materials; however, this potential impact can be mitigated to less than significant through facility design as required by Condition of Certification **GEN-1**, **GEN-5**, and **CIVIL-1** in the **Facility Design** section and **GEO-1** below.

Hydrocompaction

Partially saturated soils can possess bonds that are a result of chemical precipitates that accumulate under semi-arid conditions. Such soluble compound bonds provide the soils with cohesion and rigidity; however, these bonds can be destroyed upon prolonged submergence. When destroyed, a substantial decrease in the material's void ratio is experienced even though the vertical pressure does not change. Materials that exhibit this decrease in void ratio and corresponding decrease in volume with the addition of water are defined as collapsible soils. Collapsible soils are typically limited to true loess, clayey loose sands, loose sands cemented by soluble salts, and windblown silts. Since the plant site and proposed linear facilities are generally underlain by granular soils with a relatively shallow ground water table, the potential for hydrocompaction of site soils is considered low.

Subsidence

Ground subsidence is typically caused when ground water is drawn down by irrigation activities such that the effective unit weight of the soil mass is increased, which in turn increases the effective stress on the underlying soils. This results in consolidation/settlement of the underlying soils. The SFERP will obtain process water from the City of San Francisco via a new water pumping station. As such, drawdown of the water table due to SFERP operations is not anticipated. Therefore, the potential for ground subsidence is considered low.

Due to the varying thickness and density of the artificial fill that mantles the entire site, differential settlement of this material due to conventional foundation surcharge loads could be excessive. As a result, design of the heavier structures at this site will most likely require the use of ground improvement techniques or deep foundations bearing on the underlying native serpentine bedrock to minimize any differential settlement to acceptable levels.

Expansive Soils

Soil expansion occurs when clay-rich soils, with an affinity for water, exist in-place at a moisture content below their plastic limit. The addition of moisture from irrigation, capillary tension, water line breaks, etc. causes the clay soils to collect water molecules in their structure, which in turn causes an increase in the overall volume of the soil. This increase in volume can correspond to movement of overlying structural improvements. Surface materials present at the project site are expected to consist of granular fill materials overlying bedrock. Such materials are not prone to excessive expansion. Only thin, localized areas of surface clay soils would be expected. As a result, the potential for expansive soils to impact the project facilities is considered low.

Landslides

Landslides typically involve rotational slump failures within surficial soils/colluvium and/or weakened bedrock that are usually implemented by an increase of the material's moisture content above a layer, which exhibits a low strength. Debris flows are shallow landslides that travel downslope very rapidly as muddy slurry. The SFERP is relatively flat, exhibiting slopes on the order of 1 to 2 percent. As a result, the potential impact of landslides and debris flows to the SFERP is low.

Tsunamis and Seiches

Tsunamis and seiches are earthquake-induced waves, which inundate low-lying areas adjacent to large bodies of water. The proposed SFERP site is located on the east side of the San Francisco peninsula; it is not in the direct path of any potential tsunami waves. As a result, the potential for tsunamis to affect the operation of the facility is considered low.

The anticipated finish grade of the site will be approximately 15 to 20 feet above mean sea level. An earthquake on one of the local faults could generate a seiche wave in the adjacent bay, but such waves are typically less than this height. As a result, the potential for a seiche wave to impact the operation of the facility is considered low.

GEOLOGIC, MINERALOGIC, AND PALEONTOLOGIC RESOURCES

Energy Commission staff have reviewed applicable geologic maps and reports for this area (Wahrhaftig et al., 1993; Wagner et al., 1990; CDMG, 1978; California Department of Conservation, 2001; CDMG, 1990; CDMG, 1999; CGS, 2002; CDMG, 1998; CDMG, 1986; and CDMG, 1996b. Based on this review and the information contained in the AFC (SFPUC, 2005a), there are no known viable geologic or mineralogic resources located at or immediately adjacent to the proposed SFERP site. The power plant footprint and the majority of the proposed linear facility routes are located in mineral resource zone (MRZ) MRZ-1, while portions of the proposed underground electrical and process water line routes are within MRZ-4. The MRZ-1 designation means that there are no known mineralogical resources, while the MRZ-4 designation indicates an area where available information is inadequate for assignment to any other MRZ zone. The only potential mineral resource in the vicinity of the project site is construction aggregate generated from the serpentine bedrock; however, this is not a viable resource since the site and surrounding area have been developed, the amount of potential aggregate would be very limited for such a small site, ground water is present at shallow depths, and the potential resource is covered by artificial fill.

A paleontologic resources field survey has not been performed for this site, but previous studies (SFERP2004a) for sites in the immediate vicinity of the project area have been completed. Based on existing literature, a sensitivity analysis has been performed for the SFERP site. Several documented vertebrate fossil sites are present within 1 mile of the project site. Although the artificial fill that underlies the site and the areas proposed to host the proposed project linear routes could contain fossils since it is typically comprised of sediments from older deposits, any such fossils would lack stratigraphic context such that they would only have very limited scientific and educational value.

However, the underlying late Pleistocene to early Holocene sediments have produced numerous significant plant, invertebrate, and vertebrate fossils at previously recorded fossil sites and, as a result, have a high potential for additional similar fossils to be uncovered by excavations for project construction. The materials associated with the underlying Franciscan formation is considered to have a low potential for containing fossils only because there is the possibility that excavations could encounter blocks of fossil-bearing sedimentary rock (SFERP, 2005c). Based on this information and staff’s review of available information, the proposed SFERP site has a high potential to contain significant paleontological resources when native materials are encountered during grading, foundation, and trenching activities.

<u>Construction Impacts and Mitigation</u>

As noted above, no viable geologic or mineralogic resources are known to exist in the area. Paleontological resources have been documented with 1 mile of the project site, and the native materials exhibit a high sensitivity rating with respect to containing significant paleontologic resources. Since construction of the proposed project will include significant amounts of grading, foundation excavation, and utility trenching, staff considers the probability that paleontological resources will be encountered during such activities to be high when native materials are encountered, based on SVP assessment criteria. 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.

Operation Impacts and Mitigation

Operation of the proposed facility should not have any adverse impact on geologic, mineralogic, or paleontologic resources.

CUMULATIVE IMPACTS AND MITIGATION

With the exception of strong ground shaking and the potential liquefaction during an earthquake, as well as potential differential settlement of heavily loaded structures, the SFERP site lies in an area that generally exhibits low geologic hazards and no known viable geologic or mineralogic resources. Strong ground shaking, potential liquefaction, and potential differential settlement must be mitigated through foundation design as required by the CBC, Conditions of Certification **GEN-1**, **GEN-5**, and **CIVIL-1** in the **Facility Design** section, and **GEO-1**. Paleontological resources have been documented in the general area of the project. The potential impacts to paleontological resources due to construction activities will be mitigated as required by Conditions of Certification **PAL-1** to **PAL-7.**

Based on this information, it is staff's opinion that the potential for significant adverse cumulative impacts to the project from geologic hazards can be mitigated to less than significant, and that the potential for significant adverse cumulative impacts to potential geologic, mineralogic, and paleontologic resources from the proposed project, is low.

Based upon the literature and archives search, field surveys and the preliminary geotechnical investigation for the project, the applicant has proposed monitoring and mitigation measures to be followed during the construction of the power plant and associated linear facilities. Energy Commission staff agree with the applicant that the facility can be designed and constructed to minimize the effect of geologic hazards at the site, and that impacts to vertebrate fossils encountered during construction of the power plant and associated linear facilities would be mitigated to a level of insignificance.

The proposed conditions of certification are to allow the Energy Commission Compliance Project Manager (CPM) and the applicant to adopt a compliance monitoring scheme that will ensure compliance with LORS applicable to geologic hazards, and geologic, mineralogic, and paleontologic resources.

FACILITY CLOSURE

A definition and general approach to closure is presented in the General Conditions section of this assessment. Facility closure activities are not anticipated to impact geologic, mineralogic, or paleontologic resources. This is due to the fact that no such resources are known to exist at the power plant location or along its proposed linear facilities. In addition, decommissioning and closure of the power plant should not negatively affect geologic, mineralogic, or paleontologic resources since the majority of the ground disturbed in plant decommissioning and closure would have been disturbed during construction and operation of the facility.

RESPONSE TO AGENCY AND PUBLIC COMMENTS

No comments on geology and paleontology have been received for the SFERP project.

CONCLUSIONS

The applicant will likely be able to comply with applicable LORS, provided that the proposed conditions of certification are followed. The project should have no adverse impact with respect to design and construction of the project, and geologic, mineralogic, and paleontologic resources. 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 Geology are covered under Conditions of Certification **GEN-1**, **GEN-5**, and **CIVIL-1** in the **Facility Design** section, and include **GEO-1** below. Paleontological conditions of certification also follow.

GEO-1 The Soils Engineering Report required by the 2001 CBC Appendix Chapter 33, Section 3309.5 Soils Engineering Report, should specifically include data regarding the liquefaction potential and dynamic compaction potential of the site soils. The liquefaction analysis shall be implemented by following the recommended procedures contained in *Recommended Procedures for Implementation of California Division of Mines and Geology Special Publication 117, Guidelines for Analyzing and Mitigating Liquefaction Hazards in California* dated March 1999.

The project owner shall include in the application for a grading permit a copy of the Soils Engineering Report which describes the liquefaction and dynamic compaction potential of the site foundation soils and a summary of how the results of the analyses were incorporated into the project foundation design and grading plan for review and comment by the Chief Building Official (CBO). A copy of the Soils Engineering Report, application for grading permit and any comments by the CBO are to be provided to the CPM at least 30 days prior to grading.

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 submit to the CPM to keep on file, resumes of the 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 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 and 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 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 laydown 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 the 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 can be at a scale of 1 inch = 40 feet to 1 inch = 100 feet range. If the footprint of the power plant or linear facility changes, the project owner shall provide maps and drawings reflecting these changes to the PRS and CPM.

If construction of the project will proceed 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. Prior to work commencing 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 during the next week, until ground disturbance is completed.

<u>Verification:</u> (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 a basis for discussion in the event that 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 the 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 the monitoring and sampling;
6. A discussion of the 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 meets the Society of Vertebrate Paleontology standards and requirements for the curation of paleontological resources;
9. Identification of the institution that has agreed to receive any 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, the project owner and the PRS shall prepare and conduct weekly CPM-approved training for all recently employed project managers, construction supervisors and workers who are involved with or 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 an initial in-person PRS training during the project kick-off for those mentioned above. Following initial training, a CPM-approved video or in-person training may be used for new employees. The training program may be combined with other training programs prepared for cultural and biological resources, hazardous materials, or any 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 potential to encounter paleontological resources in the field, the sensitivity and importance of these resources, and the legal obligations to preserve and protect such 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 shall be provided 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 Certification of Completion of WEAP form signed by each worker indicating that they have 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 the workers are 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 on using 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 potentially 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 different from the accepted schedule presented 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 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) keeps a daily log of monitoring 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 immediately 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 when construction has been halted due to a paleontological find.

The project owner shall ensure that the PRS prepares a summary of the monitoring and other paleontological activities that will be placed in the Monthly Compliance Reports (MCR). 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, etc. A section of the report shall include the geologic units or subunits encountered; descriptions of sampling 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 and 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 the project construction.

Verification: The project owner shall maintain in their 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 completion and approval of the CPM-approved Paleontological Resource Report (See **PAL-7**). The project owner shall be responsible to pay 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 submitted 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.

Within 90 days after completion of ground disturbing activities, including landscaping, the project owner shall submit the Paleontological Resources Report under confidential cover to the CPM.

Certification of Completion
Worker Environmental Awareness Program
San Francisco Reliability Project (Docket #XX-AFC-XX)

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, Paleontology and Biological Resources for all personnel (i.e., construction supervisors, crews and plant operators) working on-site or at related facilities. By signing below, the participant indicates that they understand 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
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			
16.			
17.			
18.			
19.			
20.			
21.			
22.			
23.			
24.			
25.			

Cultural Trainer: ______________ Signature:____________________Date: ___/___/____

Paleo Trainer: _______________ Signature:_____________________Date: ___/___/____

Biological Trainer: ________________ Signature:________________Date: ___/___/__

REFERENCES

CBC (California Building Code). 2001.

California Code of Regulations, Title 24 (*California Building Standards Code* [CBSC]), Part 2, *California Building Code* (CBC). 2001.

California Code of Regulations, Title 14 (*California Environmental Quality Act [CEQA),* Guidelines, amended September 7, 2004.

CDC (California Department of Conservation). 2001. *Oil, Gas, and Geothermal Fields in California.*

CDMG (California Department of Conservation, Division of Mines and Geology). 1978. *Limestone, Dolomite, and Shell Resources of the Coast Ranges Province*, California, Bulletin 197.

CDMG. 1986. Mineral Land Classification: Aggregate Materials in the San Francisco – Monterey Bay Area, Special Report 146, Part I.

CDMG. 1990. Industrial Minerals in California: Economic Importance, Present Availability, and Future Development, Special Publication 105, Reprinted from U.S. Geological Survey Bulletin 1958.

CDMG. 1992. *Peak Acceleration from Maximum Credible Earthquakes in California (Rock and Stiff-Soil Sites)* (Prepared for Internal Use by Caltrans), DMG Open-File Report 92-1.

CDMG. 1994. *Fault Activity Map of California and Adjacent Areas with Locations and Ages of Recent Volcanic Eruptions, Scale: 1:750,000.*

CDMG. 1996a. *Probabilistic Seismic Hazard Assessment for the State of California*, DMG Open-File Report 96-08, USGS Open-File Report 96-706.

CDMG. 1996b. *Update of Mineral Land Classification: Aggregate Materials in the South San Francisco Bay Production-Consumption Region*, DMG Open-File Report 96-03.

CDMG. 1998. *Gold Districts of California*, Sesquicentennial Edition, California Gold Discovery to Statehood, Bulletin 193.

CDMG. 1999. *Mines and Mineral Producers Active in California (1997-1998)*, Special Publication 103.

CDMG. 2000. *2001 Seismic Hazard Map for the City and County of San Francisco.*

CGS (California Geological Survey - Formerly the California Division of Mines and Geology). 1994. *Fault Activity Map of California and Adjacent Areas with Locations and Ages of Recent Volcanic Eruptions*, Scale: 1:750,000.

CGS. 2002. *Aggregate Availability in California*, Map Sheet 52.

ICBO (International Conference of Building Officials). 1998. *Map of Known Active Fault Near-Source Zones in California and Adjacent Portions of Nevada.*

Jennings, Charles W., and George J. Saucedo. 2002. *Simplified Fault Activity Map of California, Map Sheet 54*. California Geological Survey.

Mace, Neil. 2002. *Final Staff Assessment for Potrero Power Plant Unit 7 Project (Geology and Paleontology).*

Norris, R. M. and R. W. Webb. 1990. *Geology of California*. Second Edition. John Wiley and Sons. New York.

Petersen, M., Beeby, D., Bryant, W., Cao, C., Cramer, C., Davis, J., Reichle, M., Saucedo, G., Tan, S., Taylor, G., Toppozada, T., Treiman, J., Wills, C. 1999. *Seismic Shaking Hazard Maps of California, Map Sheet 48*. California Division of Mines and Geology.

SFERP 2004a – City and County of San Francisco/Blout. *Application for Certification* San Francisco Electric Reliability Project – 145-megawatt natural gas-fired peaking power plant located in San Francisco. Submitted to CEC/Therkelsen/Dockets on 3/18/04.

SFERP 2005c – San Francisco Electric Reliability Project. Final Geotechnical Study Report. Submitted to CED/Pfanner/Dockets on 3/25/05.

SFPUC 2005a – San Francisco Public Utilities Commission/Hale. Amendment A of the Application for Certification. Submitted to CEC/Therkelsen/Dockets on 3/25/05.

SVP (Society for Vertebrate Paleontology). 1995. *Measures for Assessment and Mitigation of Adverse Impacts to Non-Renewable Paleontologic Resources: Standard Procedures.*

USGS (U.S. Geological Survey). 2000. *Preliminary Maps of Quaternary Deposits and Liquefaction Susceptibility, Nine-County San Francisco Bay Region, California*.

Wagner, D.L., E. J. Bortugno, and R.D. McJunkin. 1990. *Geologic Map of the San Francisco-San Jose Quadrangle*, California Division of Mines and Geology.

Wahrhaftig, Clyde, Scott W. Stine, and N. King Huber. 1993. *Quaternary Geologic Map of the San Francisco Bay 4° x 6° Quadrangle, United States*.

POWER PLANT EFFICIENCY

Kevin Robinson and Steve Baker

SUMMARY OF CONCLUSIONS

The project, if constructed and operated as proposed, would generate a nominal 145 MW of peaking electric power, at an overall project fuel efficiency of 36 percent lower heating value at maximum full load. While it will consume substantial amounts of energy, it will do so in the most efficient manner practicable. It will not create significant adverse effects on energy supplies or resources, will not require additional sources of energy supply, and will 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 Energy Commission makes findings as to whether energy use by the San Francisco Electric Reliability Project (SFERP) will result in significant adverse impacts on the environment, as defined in the California Environmental Quality Act (CEQA). If the Energy Commission finds that the SFERP's consumption of energy would create a significant adverse impact, it must determine whether there are any feasible mitigation measures that could eliminate or minimize the impacts. 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

The City and County of San Francisco (CCSF) proposes to construct and operate the 145 MW (nominal net output) simple cycle SFERP, providing peaking power to the Pacific Gas and Electric (PG&E) power grid system in San Francisco and the peninsula (SFPUC 2005a, AFC §§ 1.2, 1.9.4, 3.4.3, 10.3.2). (Note that this nominal rating is based upon preliminary design information and generating equipment manufacturers' guarantees. The project's actual maximum generating capacity may differ from this figure.) SFERP has executed a Power Purchase Agreement (PPA) with the California

Department of Water Resources (CDWR) that requires SFERP to sell the power from the four GE LM6000 SPRINT combustion turbine generators (CTG), received as part of a settlement with Williams Energy Marketing and Trading Company, to the CDWR (SFPUC 2005a, AFC § 1.1). This Staff Assessment will only evaluate the three-turbine project described in CCSF's Application for Certification (AFC) (the fourth turbine is proposed to be sited at the San Francisco International Airport). The applicant intends for SFERP to operate up to a total of 12,000 engine hours per year for the three combustion turbines. This is equivalent to each of the three turbines operating approximately 46 percent of the year (SFPUC 2005a, AFC § 2.4.1). Each CTG will utilize an electric water chiller at its inlet to maintain output and efficiency during periods of high ambient temperatures (SFPUC 2005a, AFC §§ 2.2.2, 2.2.3, 2.2.4). Natural gas will be transmitted to the plant via a new 900-foot section of 12-inch diameter (or less) pipeline connected to a booster compressor station that will be part of the SFERP facility (SFPUC 2005a, AFC §§ 1.2, 2.1, 6.1, 6.2).

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" (Cal. Code Regs., tit. 14, § 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 (Cal. Code regs., tit. 14, § 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. Under average ambient conditions, the SFERP would burn natural gas at a nominal rate of 31,667 million Btu per day lower heating value (LHV) (SFPUC 2005a, AFC § 2.2.6). This is a substantial rate of energy consumption, and holds the potential to impact energy supplies. Under expected project conditions, electricity will be generated at a full load efficiency of approximately 36 percent LHV with the combustion turbines operating at full load (SFPUC 2005a, AFC § 10.4, Fig. 2-4a, Fig. 2-4b, Fig. 2-4c).

ADVERSE EFFECTS ON ENERGY SUPPLIES AND RESOURCES

The applicant has described its sources of supply of natural gas for the project (SFPUC 2005a, AFC §§ 1.2, 2.1, 2.2.6, 6.0, 10.2.1). Natural gas for the SFERP will be supplied from the existing PG&E natural gas transmission pipeline located adjacent to the project site. The PG&E natural gas system has access to gas from the Rocky Mountains, Canada and the Southwest. This represents a resource of considerable capacity. Furthermore, the PG&E gas supply represents an adequate source for a project of this size. It is therefore highly unlikely that the project could pose a significant adverse impact on natural gas supplies in California.

ADDITIONAL ENERGY SUPPLY REQUIREMENTS

Natural gas fuel will be supplied to the project by PG&E transmission pipeline 101 via a new 12-inch diameter pipeline constructed from the PG&E tap point to the SFERP site(SFPUC 2005a, AFC §§ 1.2, 2.1, 2.2.6, 6.0, 6.1, Appendix 6). A letter from PG&E dated August 13, 2004 confirms the ability and willingness of PG&E to provide the necessary quantities of natural gas to the SFERP (PG&E 2004a). This is a resource with adequate delivery capacity for a project of this size. There is no real likelihood that the SFERP will require the development of additional energy supply capacity.

COMPLIANCE WITH ENERGY STANDARDS

No standards apply to the efficiency of the SFERP or other non-cogeneration projects.

ALTERNATIVES TO REDUCE WASTEFUL, INEFFICIENT AND UNNECESSARY ENERGY CONSUMPTION

The SFERP 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 project objective is to reduce the need for existing unreliable and highly-polluting in-City generation while maintaining the reliability of the electric system (SFPUC 2005a, AFC §§ 1.1, 1.2.1, 3.0). It is the City's expectation that the SFERP will mostly operate to provide local reliability service. A simple-cycle configuration is consistent with and supports this expectation since the units will not be competitive with base load facilities (SFERP 2005n, Data Response 179). The SFERP will be configured as three simple cycle power plants in parallel, in which electricity is generated by three natural gas-fired turbine generators (SFPUC 2005a, AFC §§ 1.1, 1.2, 2.2.2, 2.2.4). This configuration, with its short start-up time and fast ramping[1] capability, is well suited to providing peaking power. Further, when reduced output is required, one or two turbine generators can be shut down, allowing the remaining machine(s) to produce a percentage of the full power at optimum efficiency, rather than operating a single, larger machine at an inefficient part load output.

The applicant intends for this facility to operate in peaking duty up to a total of 12,000 engine hours per year for the three combustion turbines. This is equivalent to each of the three turbines operating approximately 46 percent of the year (SFPUC 2005a, AFC § 2.4.1).

Equipment Selection

Modern gas turbines embody the most fuel-efficient electric generating technology available today. The applicant will employ three General Electric LM6000 SPRINT gas turbine generators (SFPUC 2005a, AFC §§ 1.1, 1.2, 2.2.2, 2.2.4). The LM6000 SPRINT gas turbine to be employed in the SFERP represents one of the most modern and efficient such machines now available. The SPRINT version of this machine is nominally rated at 50 MW and 40.3 percent efficiency LHV at ISO[2] conditions (GTW 2004). This rating differs from SFERP's projected efficiency of 36 percent LHV because of the efficiency losses from parasitic loads (mechanical inlet air chillers) and the reduced system efficiency from the selective catalytic reduction units used on the exhaust of each unit.

Efficiency Of Alternatives To The Project

Alternative Generating Technologies

Alternative generating technologies for the SFERP are considered in the AFC (SFPUC 2005a, AFC § 9.7). Fossil fuels (oil and coal), biomass, geothermal, solar, hydroelectric, wind, and nuclear technologies are all considered. Biomass and fossil fuels other than natural gas cannot meet air quality limitations. Renewables require more physical area and are not always available when peaking power is needed. Given the project objectives, location, and air pollution control requirements, staff agrees with the applicant that only natural gas-burning technologies are feasible.

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-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.

Capital cost is also important in selecting generating machinery. Recent progress in the development of gas turbines, incorporating technological advances made in the

[1] Ramping is increasing and decreasing electrical output to meet fluctuating load requirements.

[2] International Standards Organization (ISO) standard conditions are 15°C (59°F), 60 percent relative humidity, and one atmosphere of pressure (equivalent to sea level).

development of aircraft (jet) engines, combined with the cost advantages of assembly-line manufacturing, has made available machines that not only offer the lowest available fuel costs, but at the same time sell for the lowest per-kilowatt capital cost.

The applicant will employ three General Electric LM6000PC SPRINT gas turbine generators (SFPUC 2005a, AFC §§ 1.1, 1.2, 2.2.2, 2.2.4). The LM6000PC SPRINT gas turbine to be employed in the SFERP represents one of the most modern and efficient such machines now available. The SPRINT version of this machine is nominally rated at 50 MW and 40.5 percent efficiency LHV at ISO[3] conditions (GTW 2004). (Staff compares alternative machines' ISO ratings as a common baseline, since project-specific ratings are not available for the alternative machines.) Alternative machines that can meet the project's objectives are the SGT-800 and FT8 TwinPac which, like the LM6000, are aeroderivative machines, adapted from Siemens Power Generation and Pratt & Whitney aircraft engines, respectively.

The Siemens SGT-800 gas turbine generator in a simple cycle configuration is nominally rated at 45 MW and 37 percent LHV at ISO conditions (GTW 2004).

Another alternative is the Pratt & Whitney FT8 TwinPac gas turbine generator in a simple cycle configuration that is nominally rated at 51 MW and 38.4 percent LHV at ISO conditions (GTW 2004).

Machine	Generating Capacity (MW)	ISO Efficiency (LHV)
GE LM6000PC SPRINT	**50**	**40.5 %**
SIEMENS	45	37.0 %
P & W FT8 TwinPac	51	38.4 %

Source: GTW 2004

The LM6000PC SPRINT is further enhanced by the incorporation of spray intercooling (thus the name, SPRay INTercooling). This takes advantage of the aeroderivative machine's two-stage compressor.[4] By spraying water into the airstream between the two compressor stages, the partially compressed air is cooled, reducing the amount of work that must be performed by the second stage compressor. This reduces the power consumed by the compressor, yielding greater net power output and higher fuel efficiency. The benefits in generating capacity and fuel efficiency increase with rising ambient air temperatures (GTW 2000).

While the LM6000 enjoys a slight advantage in fuel efficiency over the alternative machines, any differences among the three in actual operating efficiency will be relatively insignificant. Other factors such as generating capacity, cost, and ability to meet air pollution limitations are some of the factors considered in selecting the turbine model.

[3] International Standards Organization (ISO) standard conditions are 15°C (59°F), 60 percent relative humidity, and one atmosphere of pressure (equivalent to sea level).

[4] The larger industrial type gas turbines typically are single-shaft machines, with single-stage compressor and turbine. Aeroderivatives are two-shaft (or, in some cases, three-shaft) machines, with two-stage (or three-stage) compressors and turbines.

Inlet Air Cooling

A further choice of alternatives involves the selection of gas turbine inlet air-cooling methods.[5] The two commonly used techniques are the evaporative cooler or fogger, and the chiller (mechanical or absorption); both techniques increase power output by cooling the gas turbine inlet air. In general terms, a mechanical chiller can offer greater power output than the evaporative cooler on hot, humid days, but 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.

The applicant proposes to employ inlet air mechanical chillers (SFPUC 2005a, AFC §§ 2.2.2, 2.2.4, 2.2.8). Given the relative lack of clear superiority of one system over the other, staff agrees that the applicant's approach will yield no significant adverse energy impacts.

In conclusion, the project configuration (simple cycle) and generating equipment chosen appear to represent the most efficient feasible combination to satisfy the project objectives. There are no alternatives that could significantly reduce energy consumption.

CUMULATIVE IMPACTS

Potrero Unit 3 and Hunters Point Unit 4 are nearby operating power plant projects that hold the potential for cumulative energy consumption impacts when aggregated with the project. A letter from PG&E dated August 13, 2004 confirms the ability and willingness of PG&E to provide the necessary quantities of natural gas to the SFERP with the Hunters Point and Potrero Unit 3 Power Plants on-line.

CCSF's proposed peaker plant (fourth turbine) at the San Francisco International airport will have a minimal impact on the natural gas supply of the San Francisco Bay Area. Staff knows of no other projects that could result in cumulative energy impacts.

Staff believes that construction and operation of the project will 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 SFERP (CEC 2004rr). The high efficiency of the proposed SFERP should allow it to compete very favorably, running at a high capacity factor, replacing less efficient power generating plants, and therefore not having an impact or even reducing the cumulative amount of natural gas consumed for power generation.

[5] A gas turbine's power output decreases as ambient air temperatures rise. The LM6000 SPRINT produces peak power at 50°F; this peak output can be maintained in much hotter weather by cooling the inlet air.

NOTEWORTHY PROJECT BENEFITS

The applicant claims that the SFERP complements City efforts to develop energy efficiency improvements, renewable resources, and clean distributed generation. The City meets their efforts to develop improvements in energy efficiency with the proposed use of the GE LM6000 SPRINT gas turbines for the SFERP. The GE LM6000 SPRINT gas turbines represent one of the most modern and efficient such machines now available. The SFERP will represent an efficient replacement for existing in-City generation.

The configuration of the SFERP, as three simple cycle power plants in parallel, allows for one or two turbine generators to be shut down, with the remaining machine(s) still producing a percentage of the full power at optimum efficiency, rather than operating a single, larger machine at an inefficient part load output.

CONCLUSIONS

The project, if constructed and operated as proposed, would generate a nominal 145 MW of peaking electric power, at an overall project fuel efficiency of 36 percent LHV at maximum full load. While it will consume substantial amounts of energy, it will do so in the most efficient manner practicable. It will not create significant adverse effects on energy supplies or resources, will not require additional sources of energy supply, and will 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.

PROPOSED CONDITIONS OF CERTIFICATION

No Conditions of Certification are proposed.

REFERENCES

CEC 2004 rr – California Energy Commission (tn: 32924). Integrated Energy Policy Report 2004 Update, “Reliability Concerns with Aging Power Plants”, page 5. Publication # 100-02-004CM. Submitted to CEC/Dockets on 12/13/2004.

GTW (Gas Turbine World). 2004. *Gas Turbine World, Volume 24 (the 2004-05 GTW Handbook), pp. 71, 76-77.*

GTW (Gas Turbine World). 2000. “LM6000 SPRINT design enhanced to increase power and efficiency”, *Gas Turbine World*, July-August 2000, pp. 16-19.

PG&E 2004a – Pacific Gas & Electric Company/Boschee (tn: 32098). Letter to confirm that PG&E does have capacity to serve the gas load with power plants on line. Submitted to Hetch Hetchy Water & Power/Hollenbacher/CEC/Dockets on 8/13/04.

Power (Power Magazine). 1994. “Operating and maintaining IPP/cogen facilities,” Power, September 1994, p. 14.

SFERP 2005n — CH2MHill/Carrier (tn:34542). Data Response Set 3A. Submitted to CEC/Pfanner/Dockets on 6/3/05.

SFPUC2005a — San Francisco Public Utilities Commission/Hale. Amendment A of the Application for Certification. Submitted to CEC/Therkelsen/Dockets on 3/25/05.

POWER PLANT RELIABILITY

Kevin Robinson and Steve Baker

SUMMARY OF CONCLUSIONS

The City and County of San Francisco predicts an equivalent availability factor of 94 to 98 percent, which staff believes is achievable. Based on a review of the proposal, staff concludes that the plant will 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, 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 City and County of San Francisco (CCSF) has predicted an equivalent availability factor approaching 94 to 98 percent for the San Francisco Electric Reliability Project (SFERP) (see below), staff uses typical industry norms as a benchmark, rather than CCSF'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 (Cal-ISO), that purchase, dispatch, and sell electric power throughout the State. How the Cal-ISO and other control area operators will ensure system reliability is still being determined; protocols are being developed and put in place that will, it is anticipated, 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.

The Cal-ISO also requires those power plants selling ancillary services, as well as those holding reliability must-run contracts, to fulfill certain requirements, including:

- filing periodic reports on plant reliability;
- reporting all outages and their causes; and
- scheduling all planned maintenance outages with the Cal-ISO.

The Cal-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 exhibit individual reliability sufficiently lower than this historical level, the assumptions used by Cal-ISO to ensure system reliability will prove invalid, with potentially disappointing results. Until the restructured competitive electric power system has undergone a 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.

As part of its plan to provide needed reliability, the applicant proposes to operate the 145 MW (nominal output) SFERP, a simple-cycle peaking power plant, providing power to the San Francisco peninsula customers (SFPUC 2005a, AFC §§ 1.2, 1.9.4, 3.4.3, 10.3.2). The project estimates an Equivalent Availability Factor (EAF) in the range of 94 to 98 percent, and is designed to operate between approximately 15 and 100 percent of base load. The combustion turbine generator power block is also projected to operate between 15 and 100 percent of the time, if required, during each year of its operating life (SFPUC 2005a, AFC § 10.3.2).

ASSESSMENT OF IMPACTS

METHOD FOR DETERMINING RELIABILITY

The 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 [Cal. Code Regs., tit. 20, § 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 its 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. Throughout its intended 30-year life (SFPUC 2005a, AFC § 10.3.2), the SFERP will be expected to perform reliably. 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 SFERP will be as reliable as other power plants on the electric system, and will therefore not degrade system reliability.

EQUIPMENT AVAILABILITY

Equipment availability will 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 (SFPUC 2005a, AFC §§ 2.4.5, 2.4.5.2) typical of the power industry. Equipment will be purchased from qualified suppliers, based on technical and commercial evaluations. Suppliers' personnel, production capability, past performance, QA programs and quality history will be evaluated. The project owner will 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 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 (SFPUC 2005a, AFC § 2.4.2). The fact that the project consists of three combustion turbine-generators configured as independent equipment trains provides inherent reliability. A single equipment failure cannot disable more than one train, thus allowing the plant to continue to generate (at reduced output). Further, all plant ancillary systems are also designed with adequate redundancy, and 100% backup of station service and auxiliary transformers. The natural gas fuel supply line interconnects with Pacific Gas and Electric's (PG&E) natural gas transmission system at a natural gas pipeline header. This enables the project to be supplied by any one of three natural gas pipelines. In addition, four 33% capacity natural gas booster compressors are provided to insure an adequate fuel supply (SFERP 2004g).

With this opportunity for continued operation in the face of equipment failure, staff believes that equipment redundancy will be sufficient for a project such as this.

Maintenance Program

The applicant proposes to establish a preventive plant maintenance program typical of the industry (SFPUC 2005a, AFC § 2.4.5.2). Equipment manufacturers provide maintenance recommendations with their products; the applicant will base its maintenance program on these recommendations. The program will encompass preventive and predictive maintenance techniques. Maintenance outages will be planned for periods of low electricity demand. In light of these plans, staff expects that the project will 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 SFERP will burn natural gas from the PG&E distribution system. Natural gas fuel will be supplied to the project by PG&E transmission pipeline 101 via a new 12-inch diameter pipeline constructed from the PG&E tap point to the SFERP site. PG&E transmission pipeline 101 is one of three supply lines to PG&E's San Francisco Load Center located adjacent to PG&E's Potrero Substation. The San Francisco Load Center is supplied by three natural gas lines (101, 109, and 132), which will provide the SFERP facility with a reliable source of natural gas (SFPUC 2005a, AFC §§ 1.2, 2.1, 6.0, 6.1, 10.3.1). This PG&E natural gas system represents a resource of considerable capacity and offers access to adequate supplies of gas. A letter from PG&E dated August 13, 2004 confirms the ability and willingness of PG&E to provide the necessary quantities of natural gas to the SFERP (PG&E 2004a). Staff agrees with the applicant's prediction that there will be adequate natural gas supply and pipeline capacity to meet the project's needs.

Water Supply Reliability

The SFERP will obtain untreated wastewater from the City of San Francisco's combined sewer system via a new 0.76-mile long pipeline. Recycled water will be produced (for gas turbine injection, inlet air chiller cooling and other plant uses) on site from this wastewater at a new water treatment system included as part of the project (SFPUC 2005a, AFC §§ 1.2, 2.2.7.2, 2.2.7.3, 2.4.4, 7.2.1, 8.14, 10.2.3). Potable water will be supplied by the City's potable water distribution system via an approximately 300 foot pipeline (SFPUC 2005a, AFC §§ 7.3, 8.14, 10.2.3). Note that there is no substantial consumptive use of cooling water, as would be the case with a combined cycle power plant. 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 will 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 Seismic Zone 4 (SFPUC 2005a, AFC § 2.3.1); see that portion of this document entitled **Geology, Mineral Resources, and Paleontology**. The project will be designed and constructed to the latest appropriate LORS (SFPUC 2005a, AFC §§ 2.3.1, 10.2, Appendix 10). Compliance with current LORS applicable to seismic design represents an upgrading of performance during seismic shaking compared to older facilities, due to the fact that these LORS have been periodically and continually upgraded. By virtue of being built to the latest seismic design LORS, this project will 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 that portion of this document entitled **Facility Design**. In light of the historical performance of California power plants and the electrical system in seismic events, staff believes there is no special concern with power plant functional reliability affecting the electric system's reliability due to seismic events.

Tsunamis and Seiches

Although tsunamis and seiches can occur and cause tidal surges in the San Francisco Bay, the Bay greatly attenuates tsunamis that might reach the Golden Gate area and these events are extremely rare. Damaging tsunamis are not common on the California coast and devastating tsunamis have not occurred in historic times in the Bay area (SFPUC 2005a, AFC §§ 8.14.4.5, 8.14.6.5).

Flooding

Site average elevation is approximately 13.5 feet above mean sea level. The highest tide ever recorded in the project area is approximately 9.25 feet above the mean average sea level. A Storm Water Pollution Prevention Plan and Best Management Practices will be implemented during construction and operation to control erosion and sedimentation (SFPUC 2005a, AFC §§ 2.3.1, 8.14.4.5, 8.14.6.5, 8.14.8).

Staff believes there are no concerns with the power plant functional reliability due to tsunamis, seiches, and flooding events. 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 Council (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). NERC reports the following summary generating unit statistics for the years 1999 through 2003 (NERC 2005):

For Gas Turbine units (All MW sizes)

Equivalent Availability Factor = 88.37 percent

The gas turbines that will be employed in the project have been on the market for several years now, and can be expected to exhibit typically high availability. The applicant's prediction of an equivalent availability factor of 94 to 98 percent (SFPUC 2005a, AFC § 10.3.2) appears reasonable compared to the NERC figure for similar plants throughout North America (see above). In fact, these new machines can well be expected to outperform the fleet of various (mostly older) gas turbines that make up the NERC statistics. Further, since the plant will consist of three parallel gas turbine generating trains, maintenance can be scheduled during those times of year when the full plant output is not required to meet 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 that one of the primary justifications for the SFERP is that it will improve reliability in San Francisco and the peninsula. This will be accomplished by replacing old unreliable units with a new highly-reliable technology. The fact that the project consists of three combustion turbine generators configured as independent equipment trains provides inherent reliability. A single equipment failure cannot disable more than one train, thus allowing the plant to continue to generate (at reduced output).

The gas turbines that will be employed in the project have been on the market for several years now, and can be expected to exhibit typically high availability. The applicant's prediction of an equivalent availability factor of 94 to 98 percent appears reasonable compared to the NERC figure for similar plants throughout North America (see above). Staff believes this should provide an adequate level on reliability.

CONCLUSION

The City and County of San Francisco predicts an equivalent availability factor of 94 to 98 percent, 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, an Executive Report, 1994.

NERC (North American Electric Reliability Council). 2005. 1999-2003 Generating Availability Report.

PG&E 2004a – Pacific Gas & Electric Company/Boschee (tn: 32098). Letter to confirm that PG&E does have capacity to serve the gas load with power plants on-line. Submitted to Hetch Hetchy Water & Power/Hollenbacher/CEC/Dockets on 8/13/04.

SFERP 2004g - CH2MHill/Carrier (tn:31268). Data Adequacy Supplement. Submitted to CEC/Pfanner/Dockets on 4/16/04.

SFPUC 2005a – San Francisco Public Utilities Commission/Hale (tn: 34403). Amendment A of the Application for Certification. Submitted to CEC/Therkelsen/Dockets on 3/25/05.

TRANSMISSION SYSTEM ENGINEERING

Mark Hesters

SUMMARY OF CONCLUSIONS

- The addition of the San Francisco Energy Reliability Project would not cause any negative impacts on the Pacific Gas & Electric transmission system and interconnection would require no downstream facilities.
- The San Francisco Energy Reliability Project switchyard and interconnection facilities will be adequate and reliable. The power plant switchyard, outlet lines, and termination are in accordance with good utility practices and will comply with all applicable laws, ordinances, regulations and standards, assuming the proposed conditions of certification are met.
- Adding local generation would reduce transmission system losses and provide reactive power helping to maintain adequate voltage in the San Francisco Peninsula area.

INTRODUCTION

The Transmission System Engineering (TSE) analysis identifies whether or not the transmission facilities associated with the proposed San Francisco Energy Reliability Project conform to all applicable laws, ordinances, regulations and standards (LORS), required for safe and reliable electric power transmission, and assesses whether or not the applicant has accurately identified all interconnection facilities required as a result of the project.

Staff's analysis evaluates the power plant switchyard, outlet lines, termination and downstream facilities identified by the applicant and staff, and provides proposed conditions of certification to ensure the project complies with applicable LORS during the design review, construction, operation and potential closure of the project.

Additionally, under the California Environmental Quality Act (CEQA), the Energy Commission conducts an environmental review of the "whole of the action," which may include facilities not licensed by the Energy Commission (Cal. Code Reg., tit. 14, §15378). The Energy Commission identifies and evaluates the environmental effects of construction and operation of any new or modified transmission facilities required for the project's interconnection to the electric grid, even if such facilities are beyond the project's interconnection with the existing transmission system and not under the permit authority of the Energy Commission.

The California Independent System Operator (CA ISO) is responsible for ensuring electric system reliability for all participating transmission owning utilities and determines both the standards necessary to achieve reliability and whether a proposed project conforms with those standards. The CA ISO will provide testimony on these matters at the Energy Commission's hearings.

LAWS, ORDINANCES, REGULATION, AND STANDARDS

TSE Table 1 provides a brief list of the laws, ordinances, regulations and standards that apply to the proposed project. A detailed description of these LORS is provided in TSE Attachment 1.

TSE Table 1
Laws, Ordinances, Regulations, and Standards

Applicable Law	Description
Federal	
North American Electric Reliability Council (NERC Planning Standards	Principles designed to insure the adequacy and security of the transmission network.
National Electric Safety Code 1999 (NESC)	Provides electrical, mechanical, civil and structural requirements for overhead electric line construction and operation.
Regional	
Western Electricity Coordinating Council (WECC) Reliability Criteria	Insure continuity of load service and protection of the interconnected grid.
State	
California Public Utilities Commission (CPUC) General Orders 95 and 128	Rules for overhead and underground line construction
CA ISO Reliability Criteria	Incorporate NERC and WECC standards and some additional requirements.

SETTING

The City and County of San Francisco's San Francisco Electric Reliability Project (SFERP) would be located in San Francisco and deliver power to Pacific Gas and Electric's (PG&E) transmission network through an interconnection at the PG&E Potrero substation. Power would be produced by three simple-cycle gas turbines at 13.8 kilovolts (kV) (see Definition of Terms in Transmission System Engineering Attachment 2) and stepped up to 115 kV by three dedicated 13.8/115 kV grounded transformers. The SFERP power plant switchyard would consist of five circuit breakers organized in a three-phase ring bus configuration. Two three-phase 115 kV underground transmission circuits would connect the power plant switchyard to the Potrero substation (SFPUC 2005a, Page 5-2).

REGIONAL SETTING

The SFERP would be located in the City and County San Francisco which sits at the end of an essentially radial electric network in PG&E's transmission system. Currently there are two major power plants operating in San Francisco, the Hunters Point Power

Plant owned by PG&E and the Potrero Power plant owned by Mirant. It is anticipated that at least the larger of the two generating units at the Hunters Point Power Plant, Hunters Point 4, would be shut down if the SFERP begins operation. There are six transmission lines feeding San Francisco from the Peninsula (i.e. San Mateo County and parts of Santa Clara County), with one line, the Jefferson-Martin 230 kV Project, under construction.

PROJECT, SITE, AND VICINITY SETTING

The proposed power plant switchyard would consist of five circuit breakers in a 3-phase ring bus formation. Three of the circuit breakers would receive power from the generator transformers and the remaining two circuit breakers would connect to the Potrero substation. The latter interconnection would be through two approximately 3,000-foot three-phase 115 kV solid dielectric underground circuits and underground/overhead transmission structures located at the Potrero substation (SFPUC 2005a, Page 5-1). The applicant is seeking certification for two interconnection options; one would enter the Potrero Substation from Illinois street and the other from 22nd Street. Both interconnections to the Potrero Substation are acceptable. The power plant switchyard, outlet lines, and termination are in accordance with good utility practices and are acceptable.

ASSESSMENT OF IMPACTS AND DISCUSSION OF MITIGATION

METHOD AND THRESHEOLD FOR DETERMINING SIGNIFICANCE

For interconnecting a proposed generating unit to the grid, a System Impact Study (SIS) and a Facilities Study (FS) are generally performed to determine the alternate and preferred interconnection methods. The studies also determine the downstream transmission system impacts of the proposed project, and the mitigation measures needed to insure system conformance with performance levels required by utility reliability criteria, NERC planning standards, WECC reliability criteria, and CA ISO reliability criteria. The studies determine both positive and negative impacts of a proposed project and determine the alternate and preferred additional transmission facilities or other mitigation measures for any reliability criteria violations. The studies are conducted with and without the new generation project and its interconnection facilities. The studies normally include a Load Flow study, Transient Stability study, Post-transient Load Flow study, and Short Circuit study. The studies are focused 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 duties. The studies must be conducted under the normal condition (N-0) of the system and also for all credible contingency/emergency conditions, which includes the loss of a single system element (N-1) such as a transmission line, transformer, or a generator and the simultaneous loss of two system elements (N-2), such as two transmission lines or a transmission line and a generator. Equipment that is loaded beyond 100 percent of its thermal or path rating constitutes a violation of the reliability criteria. Generally voltage deviations must be within 95 percent and 105 percent of the facility rating. In addition to the above analysis, the studies may be performed to verify whether sufficient active or reactive power is available in the area system or area sub-system to which the new generator project would be interconnected.

New or modified downstream facilities that are a reasonably foreseeable consequence of approval of the project are analyzed from an engineering and environmental perspective but are not licensed by the Commission.

SCOPE OF STUDIES

PG&E completed several transmission studies for the SFERP. The first studies assumed the project originally proposed by the applicant and included four simple-cycle gas turbines (195 MW) at the Potrero site. Both PG&E and the CA ISO agreed that an additional study of the current proposal for three turbines at the current site was not necessary because the study of four turbines was already completed and showed that there were no adverse affects on the transmission system (SFERP 2004g, TSE attachment). Staff agrees with PG&E and the CA ISO.[1] Three studies, the System Impact Study, the Facilities Study, and the Updating Facilities Study, have been completed by PG&E and are briefly summarized below. These studies are still applicable to both of the proposed interconnections to the Potrero Substation, and the SFERP received Final Interconnection Approval from the CA ISO on June 27, 2005 (CA ISO 2005a, page 1).

System Impact Study:

Four turbines (195 MW) were studied with a proposed interconnection at the Potrero substation.

- 2005 PG&E Summer Peak base case with 1-in-10 year peak load conditions for the San Francisco/Peninsula area. Hunters Point Unit 4 was available in the without SFERP case and unavailable in the with SFERP case.
- 2005 PG&E Fall base case with loads approximately 96-percent of those used in the Summer Peak case and Potrero Unit 3 unavailable due to overhaul.

The study included Steady State Power Flow analysis, Dynamic Stability studies, and Short Circuit studies. Hunters Point Unit 4 was available in the without SFERP cases and was removed for the with SFERP cases. The Jefferson-Martin 230 kV transmission project was not included in either case (SFERP 2004a, Appendix 5).

Facilities Study:

The Facilities Study analyzed two 2005 Summer Peak cases with four turbines connected to the Potrero substation:

- Case one was exactly like the 2005 Summer Peak base case in the System Impact Study
- Case two studied four turbines with Mirant's Potrero Power Plant Unit 7 Project operating, Hunters Point Unit 4 unavailable, three Potrero-Hunters Point 115 kV cables operating and the Jefferson-Martin 230 kV transmission line operating.

[1] A smaller project will have impacts similar to or less than a larger project. Since the studies of the larger project (four turbines) indicated that there would be no adverse impacts the smaller project (three turbines) would have no adverse impacts as well.

Updating Facilities Study

The Updating Facilities Study analyzed the SFERP under the following conditions (SFERP 2004p, Page 6):

- 2007 Summer Peak Base Case with 1-in10 year summer heat wave load in the San Francisco/Peninsula area with three turbines (net output 145 MW) connected to the Potrero substation with Mirant's Potrero Power Plant Unit 7 operating, three 115 kV cables between the Potrero and Hunters Point substations operating and the Jefferson-Martin 230 kV transmission line operating.

STUDY RESULTS

Power Flow Study Results

The Power Flow Study results from the SIS, Facilities Study and Updating Facilities Study indicate that interconnection and operation of the SFERP will have no adverse electrical system impacts and will require no downstream mitigation measures. An emergency one-percent pre-project overload of the San Mateo-Belmont 115 kV line increased to a seven-percent overload with the addition of the SFERP (SFERP 2004a, Appendix 5, Page 12). However, this pre-existing overload is no longer an issue as PG&E remedied the overload through the addition of a 230/115 kV transformer at the Ravenswood Substation in May of 2004. No other overloads attributed to the SFERP were identified by the studies.

The PG&E power flow studies included an analysis of the transmission system impacts with Mirant's proposed Potrero Power Plant Unit 7 operating as well as the SFERP. Staff believes that it is unlikely that both projects will be completed because Mirant has been unable to obtain critical permits from the City and County of San Francisco for the Potrero Power Plant Unit 7 Project. Hence any theoretical downstream impacts that would result from the interconnection and operation of both the SFERP and Potrero Power Plant Unit 7 are considered highly unlikely and are thus, not analyzed in this assessment.

Compliance with LORS

The project will comply with the NERC/WSCC, Cal-ISO and NERC planning standards and reliability criteria. The proposed SFERP includes overhead and underground transmission lines, as well as substation and switchyard facilities. The applicant will design, build and operate the proposed facilities according the provisions of GO 95 and GO 128 or the NESC, Title 8, NEC, applicable interconnection and related industry standards.

DIRECT/INDIRECT IMPACTS AND MITIGATION

The results of the System Impact Study, the Facilities Study and the Updating Facilities Study did not identify any overloads and associated mitigation measures that would result from the interconnection and operation of the SFERP.

CUMULATIVE IMPACTS AND MITIGATION

There are currently no proposed projects other than the Potrero Power Plant Unit 7 that would cumulatively create transmission system impacts with SFERP. The System Impact Study for the SFERP analyzed the impacts of the four turbines available to the CCSF connected at Potrero and found that there were no impacts, a fourth turbine at another site in San Francisco would probably have similar impacts. The Updating Facilities Study included an analysis of the impacts of the SFERP in conjunction with the 615 MW Potrero Power Plant Unit 7 Project which provides some insight about the transmission facilities that would be needed if both the SFERP and another large generator were sited in San Francisco. The interconnection of both projects, according to the study, would likely require one major system upgrade, two approximately 6-mile 115 kV underground cables from the Martin Substation to the Potrero Substation.

NOTEWORTHY PUBLIC BENEFITS

Locating a power plant like the SFERP in the San Francisco load center would reduce system losses. Staff discusses system losses and other potential benefits of the SFERP in the Local System Effects analysis contained as part of the Preliminary Staff Assessment. Transmission line losses occur as a result of conductor resistance and corona discharge. Resistance line losses are significant, especially on long, heavily loaded lines such as those lines serving the San Francisco Peninsula. System losses must be made up for by producing additional generation. As well as reducing the cost of producing power in California, these loss savings would also contribute to a related decrease in the use of fossil fuels and water and in the reduction of air emissions, by diminishing the need for additional generation resources.

CONCLUSIONS

- Addition of the SFERP project does not cause any negative impacts on the PG&E transmission system and interconnection would require no downstream facilities.
- The SFERP does not cause any normal or contingency condition overloads to the transmission grid.
- The SFERP does not cause voltage criteria or system stability criteria violations.
- The SFERP project switchyard and interconnection facilities will be adequate and reliable. The power plant switchyard, outlet lines, and termination are in accordance with good utility practices and are acceptable. Staff concludes that these facilities will comply with all applicable LORS, assuming the conditions of certification are met.
- Adding local generation such as the SFERP would reduce transmission system losses, a noteworthy public benefit.
- The existing circuit breakers are capable of handling the increase in fault level with the addition of the SFERP.

PROPOSED CONDITIONS OF CERTIFICATION

TSE-1 The project owner shall furnish to the CPM and to the 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: At least 60 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of construction, 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
Take off facilities
Electrical Control Building
Switchyard Control Building
Transmission Pole/Tower
Grounding System

TSE-2 Prior to the start of construction the project owner shall assign an electrical engineer and at least one of each of the following to the project: A) a civil engineer; B) a geotechnical engineer or a civil engineer experienced and knowledgeable in the practice of soils engineering; C) 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 D) 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.

<u>Verification:</u> At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) 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. (1998 CBC, 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.

<u>Verification:</u> The project owner shall submit a copy of the CBO's approval of any corrective action taken to resolve a discrepancy to the CPM within 15 days of receipt. If corrective action is not approved, the project owner shall advise the CPM, within five days, of 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:

a) receipt or delay of major electrical equipment;

b) testing or energization of major electrical equipment; and

c) the number of electrical drawings approved, submitted for approval, and still to be submitted.

<u>Verification:</u> At least 30 days (or a lesser number of days mutually agreed to by the project owner and the CBO) prior to the start of each increment of construction, 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 as determined by the CBO.

a) The power plant switchyard and outlet line shall meet or exceed the electrical, mechanical, civil and structural requirements of CPUC General Order 95, CPUC General Order 128 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", CA ISO standards, National Electric Code (NEC) and related industry standards.

1. The power plant switchyard shall consist of five circuit breakers in a 3-phase ring bus formation.
2. The outlet line shall consist of two approximately 3,000 foot solid dielectric underground circuits and an overhead/underground structure.
3. The outline shall enter the existing Potrero Substation from either Illinois Street or 22nd Street.

b) Breakers and busses in the power plant switchyard and other switchyards, where applicable, shall be sized to comply with a short-circuit analysis.

c) 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.

d) The project conductors shall be sized to accommodate the full output from the project.

e) Termination facilities shall comply with applicable PG&E interconnection standards.

f) The project owner shall provide to the CPM:

1. The final Detailed Facility Study (DFS) including a description of facility upgrades, operational mitigation measures, and/or Special Protection System (SPS) sequencing and timing if applicable,
2. Executed project owner and CA ISO Facility Interconnection Agreement

Verification: At least 60 days prior to the start of construction of transmission facilities (or a lessor number of days mutually agree 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, CPUC General Order 128 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"[2] 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, CPUC General Order 128 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** a) through f) above.

d) The final DFS, including a description of facility upgrades, operational mitigation measures, and/or SPS sequencing and timing if applicable, shall be provided concurrently to the CPM.

TSE-6 The project owner shall inform the CPM and CBO of any impending changes, which may not conform to the requirements **TSE-5** a) through f), 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. The CBO and CPM could approve changes in equipment or interconnection design that comply CPUC General Order 95,

[2] Worst case conditions for the foundations would include for instance, a dead-end or angle pole.

CPUC General Order 128 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 and do not require a new System Impact Study or Facility Study.

<u>Verification:</u> At least 60 days prior to the construction of transmission facilities, the project owner shall inform the CBO and the CPM of any impending changes which 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 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 CA 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 CA ISO Outage Coordination Department.

<u>Verification:</u> The project owner shall provide copies of the CA ISO letter to the CPM when it is sent to the CA ISO one week prior to initial synchronization with the grid. The project owner shall contact the CA 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 CA 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 General Order 95, CPUC General Order 128 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.

<u>Verification:</u> 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 General Order 95, CPUC General Order 128 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”.

c) 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.

REFERENCES

CA ISO2004a – California Independent System Operator. San Francisco Electric Reliability Project Final Interconnection Approval, May 28, 2004.

CA ISO2005a – California Independent System Operator. . San Francisco Electric Reliability Project Final Interconnection Approval, Submitted to CEC/Dockets on 6/27/05

SFERP2004a - City and County of San Francisco/Blout (tn: 31130). Application for Certification San Francisco Electric Reliability Project - 145-megawatt natural gas-fired peaking power plant located in San Francisco. Submitted to CEC/Therkelsen/Dockets on 3/18/04.

SFERP2004b - CH2MHill/Carrier (tn: 31126). Transmittal of Appendix 5, System Impact Study. Submitted to CEC/Pfanner/Dockets on 3/18/04.

SFERP2004g - CH2MHill/Carrier (tn: 31268). Data Adequacy Supplement. Submitted to CEC/Pfanner/Dockets on 4/16/04.

SFERP2004p – CH2MHill/Carrier (tn: 31858). Data Responses Set 1A. Attachment TSE-70A, Updating Facilities Study. Submitted to CEC/Pfanner/Dockets on 7/6/04.

SFPUC 2005a – San Francisco Public Utilities Commission/Hale (tn: 34403). Amendment A of the Application for Certification. Submitted to CEC/Therkelsen/Dockets on 3/25/05.

TSE ATTACHMENT 1 LORS

- North American Electric Reliability Council (NERC) Planning Standards provide policies, standards, principles and guides to assure the adequacy and security of the electric transmission system. With regard to power flow and stability simulations, these Planning Standards are similar to WECC's Criteria for Transmission System Contingency Performance. The NERC planning standards provide for acceptable system performance under normal and contingency conditions. The NERC planning standards apply not only to interconnected system operation but also to individual service areas (NERC 1998).
- Western Electric Coordinating Council (WECC) Reliability Criteria provide the performance standards used in assessing the reliability of the interconnected system. These Reliability Criteria require the continuity of service to loads as the first priority and preservation of interconnected operation as a secondary priority. The WECC Reliability Criteria include the Reliability Criteria for Transmission System Planning, Power Supply Design Criteria, and Minimum Operating Reliability Criteria. Analysis of the WECC system is based to a large degree on WECC Section 4 "Criteria for Transmission System Contingency Performance" which requires that the results of power flow and stability simulations verify established performance levels. Performance levels are defined by specifying the allowable variations in voltage, frequency and loading that may occur on systems other than the one in which a disturbance originated. Levels of performance range from no significant adverse effect outside a system area during a minor disturbance (loss of load or facility loading outside emergency limits) to a performance level that only seeks to prevent system cascading and the subsequent blackout of islanded areas. While controlled loss of generation, load, or system separation is permitted in extreme circumstances, their uncontrolled loss is not permitted (WECC 1998).
- California Public Utilities Commission (CPUC) General Order 95 (GO-95), "Rules for Overhead Electric Line Construction," formulates uniform requirements for construction of overhead lines. Compliance with this order ensures adequate service and safety to persons engaged in the construction, maintenance, operation, or use of overhead electric lines and to the public in general.
- California Public Utilities Commission (CPUC) General Order 128 (GO-128), "Rules for Underground Electric Line Construction," formulates uniform requirements for construction of overhead lines. Compliance with this order ensures adequate service and safety to persons engaged in the construction, maintenance, operation, or use of overhead electric lines and to the public in general.
- National Electric Safety Code 1999 provides electrical, mechanical, civil and structural requirements for overhead electric line construction and operation.
- CA ISO's Reliability Criteria also provide policies, standards, principles, and guides to assure the adequacy and security of the electric transmission system. With regard to power flow and stability simulations, these Planning Standards are similar to WECCs Criteria for Transmission System Contingency Performance and the NERC Planning Standards. The CA ISO Reliability Criteria incorporate the WECC Criteria

and NERC Planning Standards. However, the CA ISO Reliability Criteria also provide some additional requirements that are not found in the WECC Criteria or the NERC Planning Standards. The CA ISO Reliability Criteria apply to all existing and proposed facilities interconnecting to the CA ISO controlled grid. It also applies when there are any impacts to the CA ISO grid due to facilities interconnecting to adjacent controlled grids not operated by the CA ISO.

TSE ATTACHMENT 2 DEFINITION OF TERMS

AAC	All Aluminum conductor.
ADR	Alternative Dispute Resolution
Ancillary Services Market	The market for services other than scheduled energy that are required to maintain system reliability and meet WECC/NERC operating criteria. Such services include spinning, non-spinning, replacement reserves, regulation (AGC), voltage control and black start capability.
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 measure of electric current; specifically, a measure of the rate of flow of electrons past a given point in an electric conductor such as a power line.
Available Transmission Capacity (i.e., ATC)	Available Transmission Capacity in any hour is equal to Operational Transmission Capacity for that hour minus Existing Transmission Contracts for that same hour (ATC = OTC - ETC). (See the other definitions below).
Breaker	Circuit breaker - An automatic switch that stops the flow of electric current in a suddenly overloaded or otherwise abnormally stressed electric circuit.
Bundled Conductor	Two or more wires, connected in parallel through common switches, that act together to carry current in a single phase of an electric circuit.
Bus	Conductors that serve as a common connection for multiple transmission lines.

CA ISO	California Independent System Operator - The CA ISO is the FERC regulated control area operator of the CA ISO transmission grid. Its responsibilities include providing non-discriminatory access to the grid, managing congestion, maintaining the reliability and security of the grid, and providing billing and settlement services. The CA ISO has no affiliation with any market participant.
CA ISO Controlled Grid	The combined transmission assets of the Participating Transmission Owners (PTOs) that are collectively under the control of the CA ISO.
CA ISO Reliability Criteria	Reliability standards established by the NERC, WECC, and the ISO, as amended from time to time, including any requirements of the NRC.
CA ISO Planning Process	Annual studies conducted by the PTO's and CA ISO in an open stakeholder process. These studies determine the future transmission reinforcements necessary to enable the ISO Controlled Grid to meet the ISO Reliability Criteria. The CA ISO Planning Process also includes studies of new resource connections and third party proposals for new additions to the ISO Controlled Grid.
CA ISO Tariff	Document filed with the appropriate regulatory authority (FERC) specifying lawful rates, charges, rules, and conditions under which the utilities provide services to parties. A tariff typically includes rate schedules, list of contracts, rules, and sample forms.
Capacitor	An electric device used to store charge temporarily, generally consisting of two metallic plates separated by a dielectric.
Cogeneration	The consecutive generation of thermal and electric or mechanical energy.
Conductor	The part of the transmission line (the wire) which carries the current.

Congestion	The condition that exists when market participants seek to dispatch in a pattern which would result in power flows that cannot be physically accommodated by the system. Although the system will not normally be operated in an overloaded condition, it may be described as congested based on requested/desired schedules.
Congestion Management	Congestion management is a CA ISO scheduling protocol that is used to resolve Congestion.
Contingency	Disconnection or separation, planned or forced, of one or more components from the electric system.
Day-Ahead Market	The forward market for the supply of electrical power at least 24 hours before delivery to Buyers and End-Use Customers.
Demand	Load plus any exports from an electric system.
Demand Forecast	An estimate of demand (electric load) over a designated period of time.
Dispatch	The operating control of an integrated electric system to: (i) assign specific generators and other sources of supply to effect the supply to meet the relevant area Demand taken as Load rises of falls; (ii) control operations and maintenance of high voltage lines, substations, and equipment, including administration of safety procedures; (iii) operate interconnections (iv) manage energy transactions with other interconnected Control Areas; and (v) curtail Demand.
dV/dQ	The partial derivative of the voltage at a bus with respect to the reactive injection at that bus. (See any elementary college calculus text for further discussion of partial derivatives.) The point at which dV/dQ approaches infinity is defined as the point of voltage collapse.
Emergency Condition	The system condition when one or more system elements are forced (not scheduled) out of service.

Emergency Overload	Loading of a transmission system element above its Emergency Rating during an Emergency Condition.
Emergency Rating	A special rating established for short-term use in the event of a forced line or transformer outage (e.g., an emergency). An emergency rating may be expressed as a percentage of the normal rating (e.g., 115 percent of normal) or as an elevated current rating. For example, the normal rating for a conductor may be 1000 amperes and the emergency rating may be 1100 amperes.
Excessive Voltage Deviation	A sudden change in voltage at any substation as a result of a Contingency that exceeds established allowable levels of change.
Existing Transmission Contract (i.e., ETC)	A contract for transmission services that was in place prior to the start of ISO operations.
Fault Duty	The maximum amount of short-circuit current which must be interrupted by a given circuit breaker.
FERC	Federal Energy Regulatory Commission
General Order 95	California Public Utilities Commission (CPUC) General Order which specifies transmission line clearance requirements.
Generation Outlet Line	Transmission facilities (circuit, transformer, circuit breaker, etc.) linking generation to the main grid.
Generation Tie	Transmission facilities (circuit, transformer, circuit breaker, etc.) linking generation to the main grid.
Generator	A machine capable of converting mechanical energy into electrical energy.
Heat Rate	The amount of energy input to an electric generator required to obtain a given value of energy output. Usually expressed in terms of British Thermal Units per kilowatt hour (Btu/kWh).

Hour-Ahead Market	The electric power futures market that is established 1-hour before delivery to End-Use Customers.
Imbalance Energy	Energy not scheduled in advance that is required to meet energy imbalances in real-time. This energy is supplied by Participating Generators under the CA ISO's control, providing spinning and non-spinning reserves, replacement reserves, and regulation, and other generators able to respond to the CA ISO's request for more or less energy.
Interconnected System Reliability	See Reliability.
Kcmil or kcm	One thousand circular mils. A unit of the conductor's cross sectional area which, when divided by 1,273, gives the area in square inches.
Kv	Kilovolt - A unit of potential difference, or voltage, between two conductors of a circuit, or between a conductor and the ground.
Load	The rate expressed in kilowatts, or megawatts, at which electric energy is delivered to or by a system, or part of a system to end use customers at a given instant or averaged over an designated interval of time. (Also see Demand.)
Load Factor	The average Load over a given period (e.g., one year) divided by the peak Load in the period.
Loop	An electrical connection where a line is opened and a new substation is inserted into the opening. A looped configuration creates two lines, one from each of the original end points to the new substation. A looped configuration is more reliable than a tap configuration because the looped configuration provides two lines into the substation rather than just one in a tap configuration. Also, see Tap below.
Low Voltage	Voltage at any substation that is below the minimum acceptable level.

Marginal Unit	The Generator (or Load) that sets the market clearing price in the ISO's Ancillary Services Market (or the Power Exchange's energy market). The marginal unit is the Generator or Load that had the highest accepted bid for energy or Demand reduction.
MVAr	Megavar - One megavolt ampere reactive (a measure of reactive power). Reactive power demand is generally associated with motor loads and generation units or static reactive sources must supply this demand in the system.
MVA	Megavolt ampere - A unit of apparent power: equal to the product of the line voltage in kilovolts, the current in amperes, and the square root of 3 divided by 1000.
MW	Megawatt - A unit of power equivalent to 1,341 horsepower.
NERC	North American Electric Reliability Council
Nominal Voltage	Also known as Normal Voltage. The voltage at which power can be delivered to loads without damage to customer equipment or violation of CA ISO Reliability Criteria when the system is under Normal Operation.
Normal Operation	When all customers receive the power they are entitled to without interruption and at steady voltage, and no element of the transmission system is loaded beyond its continuous rating.
NRC	Nuclear Regulatory Commission
N-1 Contingency	A forced outage of one system element (e.g., a transmission line or generator).
N-2 Contingency	A forced outage of two system elements usually (but not exclusively) caused by one single event. Examples of an N-2 Contingency include loss of two transmission circuits on a single tower line or loss of two elements connected by a common circuit breaker due to the failure of that common breaker.

Operational Transfer Capability (i.e., OTC)	The maximum amount of power which can be reliably transmitted over an electrical path in conjunction with the simultaneous reliable operation of all other paths. This limit is typically defined by seasonal operating studies, and should not be confused with a path rating. Also referred to as OTC.
Outlet	Transmission facilities (circuit, transformer, circuit breaker, etc.) linking generation to the main grid.
Participating Generator	A generator that has signed an agreement with the CA ISO to abide by the rules and conditions specified in the CA ISO Tariff.
Participating Transmission Owner (i.e., PTO)	A Participating Transmission Owner is an electric transmission owning company that has turned over operational control of some or all of their electric transmission facilities to the CA ISO. Currently, the three Participating Transmission Owners are PG&E, SCE, and SDG&E.
Path Rating	The maximum amount of power which can be reliably transmitted over an electrical path under the best set of conditions. Path ratings are defined and specified in the WECC Path Rating Catalog.
PG&E	Pacific Gas & Electric Company
PG&E Interconnection Handbook	Detailed instructions to new customers (either load or generation) on how to interconnect to the PG&E electric system.
Post-Transient Voltage Deviation	The change in voltage from pre-contingency to post-contingency conditions once the system has had time to readjust.
Power Flow	A generic term used to describe the type, direction, and magnitude of actual or simulated electrical power flows on electrical systems.

Power Flow Analysis	A power flow analysis is a forward looking computer simulation of all major generation and transmission system facilities that identifies overloaded circuits, transformers and other equipment as well as system voltage levels under both Normal and Emergency Conditions.
Pump	A hydroelectric generator that acts as a motor and pumps water stored in a reservoir to a higher elevation.
Q/V Curve	A graphical representation of the voltage a given substation bus as a function of the reactive injection at that bus.
RAS	Remedial Action Scheme - An automatic control provision (e.g., trip a generation unit to mitigate a circuit overload).
Reactive Power	The portion of apparent power that does no work in an alternating current circuit but must be available to operate certain types of electrical equipment. Reactive Power is most commonly supplied by generators or by electrostatic equipment, such as shunt capacitors.
Reactive Margin	Reactive Power must be available at all load buses to prevent voltage collapse. Reactive margin is the amount of additional reactive load, usually measured in MVAR's, which may be added at a particular bus before the system experiences voltage collapse.
Reactor	An electric device used to store electric current temporarily, generally consisting of a coil of wire wound around a magnetic core.
Real Power	Real power is the work-producing component of apparent power and is required to operate any electrical equipment that performs energy conversion. Examples of this electrical equipment would be a heater, a lamp, or a motor. Real power is usually metered in units of kilowatt-hours (kWh).
Real-Time Market	The competitive generation market controlled and coordinated by the CA ISO for arranging real-time imbalance power.

Reconductor	The removal of old conductors on a transmission or distribution line followed by replacement of these conductors with new higher capacity conductors.
Reliability	The degree of performance of the elements of the bulk electric system that results in electricity being delivered to customers within accepted standards and in the amount desired. May be measured by the frequency, duration, and magnitude of adverse effects on the electric supply.
Reliability Criteria	Principals used to design, plan, operate, and assess the actual or projected reliability of an electric system.
Reliability Must-Run (i.e., RMR)	The minimum generation (number of units or MW output) required by the CA ISO to be on line to maintain system reliability in a local area.
SCE	Southern California Edison Company
SDG&E	San Diego Gas and Electric Company
Sensitivity Study	An analysis to determine the impact of varying one or more parameters on the results of the original analysis.
Series Capacitor	A static electrical device that is connected in-line with a transmission circuit that allows for higher power transfer capability by reducing the circuit's overall impedance.
Shunt Capacitor	A static electrical device that is connected between an electrical conductor and ground. A shunt capacitor normally will increase the voltage on a transmission circuit by providing reactive power to the electrical system.
Single Contingency	See N-1 Contingency.
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.

Source or Sink of Reactive Power	A source of Reactive Power is a device that injects reactive power into the power system (e.g., a Generator or a Capacitor). A sink of Reactive Power absorbs reactive power from the power system. Examples of reactive power sinks are shunt Reactors and motor loads.
Static Compensator	StatCom - a shunt connected power system device that includes Capacitors and Reactors controlled by solid state electronic devices as opposed to mechanically operated switches.
Substation	An assemblage of equipment that switches, changes, or regulates voltage in the electric transmission and distribution system.
Switchyard	A substation that is used as an outlet for one or more electric generators.
Switched Reactive Devices	A shunt Capacitor or shunt Reactor controlled by mechanically operated switches.
Switching Station	Similar to a substation, but there is only one voltage level.
Synchronous Condenser	A rotating mechanical device very similar to a Generator. The Synchronous Condenser has no mechanical power input and cannot produce Real Power. It can only produce or absorb Reactive Power.
System Reliability	See “Reliability”.
Tap	An electrical connection where a new line is connected to an intermediate point on an existing transmission line and a new substation is connected to the end of the new line. A tapped configuration creates a single transmission circuit with more than two end points (for example, a “T”). A tapped configuration is less reliable than a looped configuration because a fault on any portion of the tapped circuit causes a complete loss of power to the new substation. Also, see Loop above.

Tap Changing Transformer	A Transformer that has the ability change the number of windings in service. By changing the number of windings in service (by moving to a different tap), the Tap Changing Transformer has the ability to maintain a nearly constant voltage at its output terminals even though the input voltage to the Transformer may vary.
Thermal Loading Capability	The current-carrying capacity (in Amperes) of a conductor at specified ambient conditions, at which damage to the conductor is non-existent or deemed acceptable based on economic, safety, and reliability considerations.
Thermal overload	A thermal overload occurs when electrical equipment is operated in excess of its current carrying capability. Overloads are generally given in percent. For example, a transmission line may be said to be loaded to 105 percent of its rating.
Thermal rating	See Ampacity.
Transformer	A device that changes the voltage of alternating current electricity.
Transformer Loading Capability	The current-carrying capacity (in Amperes) of a transformer at specified ambient conditions, at which damage to the transformer is non-existent or deemed acceptable based on economic, safety, and reliability considerations.
TSE	Transmission System Engineering.
Underbuild	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.
Undercrossing	A transmission configuration where a transmission line crosses below the conductors of another transmission line, generally at 90 degrees.

VAr	One Volt ampere reactive. Also see the definition for MVAr.
Voltage Collapse	The point at which the reactive demand at a substation bus exceeds the reactive supply at that bus. When the reactive demand is greater than the supply, the voltage at that point in the system will drop. Eventually, the voltage will drop to a point at which it is no longer possible to serve load at that bus.
Wheeling	A service provided by an entity, such as a utility, that owns transmission facilities whereby it receives electric energy into its system from one party and then uses its system to deliver that energy to a third party. The wheeling entity is usually paid a fee for this service.
WECC	Western Electricity Coordinating Council

LOCAL SYSTEM EFFECTS

Mark Hesters and Ajoy Guha

INTRODUCTION

This evaluation was prepared by California Energy Commission staff and provides an analysis of the local electric system effects of the San Francisco Electric Reliability Project and our conclusions regarding these effects. Local system effects are the localized electrical benefits and impacts that can be attributed to the addition of a new generator to the grid. The effects assessed in this evaluation include: the potential to defer capital investments, the effect on system losses and reactive power margin, and the ability of the San Francisco Electric Reliability Project to be integrated into the existing and planned system.

The evaluation of local system effects has been included to provide a greater understanding of the effect of the addition of the San Francisco Electric Reliability Project to the grid. Conformance with system reliability criteria is addressed in the Transmission System Engineering section of the Preliminary Staff Assessment.

Generally, there are two ways to supply power to the San Francisco peninsula. Power may be produced and distributed locally, or power may be produced remotely and shipped into the area through interconnected transmission facilities. The amount of power that can be delivered from remote locations is limited by the capacity of the transmission facilities serving the area. San Francisco Electric Reliability Project, if approved and built, would insert as much as 145 megawatts (MW) of real power and 70 megavars (MVar) of reactive power into the grid, which in turn would help maintain the ability of the Bay Area grid to transport power[5]. As a result, San Francisco Electric Reliability Project plays a key role (along with future transmission upgrades) in the long-term plan to retire older, less efficient Bay Area power plants. San Francisco Electric Reliability Project will also reduce system losses and provide reactive power, thus helping to maintain adequate voltage in the San Francisco peninsula area.

SUMMARY OF CONCLUSIONS

1. The SFERP will reduce transmission system losses. Over 20 years, the savings to ratepayers have a present value at between $18 million and $27 million. In addition to reducing the cost of producing power in California, these loss savings would also contribute to a related decrease in the use of fossil fuels, water, and the production of air emissions by reducing the need for additional generation resources.

[5] In general, electrical energy defined by “real power” measured in megawatts is used to supply lighting, motors, computers and numerous other appliances. “Reactive power”, measured in megavars, supplies voltage support to transport the energy through the electrical transmission system. Real power flow on transmission facilities must not exceed the capability of the transmission facilities. When real power flow is projected to exceed the capability of transmission facilities, either steps must be taken to limit the power flow, or additional or higher capacity equipment must be installed. If reactive power is insufficient, system voltages will decrease, which could lead to the controlled dropping of customer loads (rolling blackouts) and even the uncontrolled loss of load associated with voltage collapse.

2. A primary benefit of the addition of the San Francisco Electric Reliability Project (SFERP) is that the old and unreliable Potrero turbines (units 4, 5 and 6) could be released from their Reliability Must Run (RMR) contracts and retired.
3. The SFERP can be reliably connected to the CA ISO controlled grid with the projects identified in the current transmission plan and no "downstream" new or modified facilities are required to accommodate interconnection of the project.
4. The SFERP would increase reactive margin in San Francisco and thus improve system reliability and help to maintain sufficient voltage in the area.
5. There are no proposed conditions of certification for the LSE area.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS (LORS)

Where appropriate, the authors have utilized North American Electric Reliability Council (NERC), Western Electric Coordinating Council (WECC), and CA ISO Grid Planning Standards regarding outages and system reactive margin criteria to assess the benefits or detriments of the SFERP project.

To assure that energy implications are considered in project decisions, California Environmental Quality Act (CEQA) guidelines require that environmental analyses include a discussion of the potential energy impacts of proposed projects with particular emphasis on avoiding or reducing inefficient, wasteful and unnecessary consumption of energy. The CEQA guidelines also require that the decision-maker consider "[t]he effects of the project on local and regional energy supplies and on requirements for additional capacity,…" (CEQA, Appendix F).

SETTING AND AREA RESOURCES

The San Francisco Peninsula area is composed of the City and County of San Francisco (CCSF), and the area between Pacific Gas & Electric's San Mateo substation and San Francisco. Major transmission lines feed the area through the San Mateo and Martin substations, which connect to the 230kV system (see Figure 1). The 2007 one-in-ten year peak load forecast for San Francisco is 957 MW. Power is supplied to the San Francisco Peninsula area by generation located in the area and across major transmission lines that bring in power from other areas.

GENERATION

The forecasted total local generation in the year 2007 is 383 MW (363 MW from the Potrero Power Plant and 20 MW from the United Cogeneration Plant)[6].

[6] The CA ISO, in its Memorandum regarding Action Plan for San Francisco, Options and Risks, describes the transmission projects that are required to release the Hunters Point Power Plant from its Reliability Must Run Contract. All of the transmission facilities required for the release from RMR contracts and the subsequent shutdown of the Hunters Point Power Plant Units 1 and 4 are expected to be complete before the SFERP would be operating.

LOCAL SYSTEM EFFECTS Table 1
San Francisco Peninsula Generation

Plant	Unit	Size (MW)	Fuel Type	In-service Date	Operating Restrictions
Potrero	3	207	Natural Gas	1965	Bay Area NOx restrictions
	4	52	Distillate	1976	877 hours/year
	5	52	Distillate	1976	877 hours/year
	6	52	Distillate	1976	877 hours/year
Hunters Point	1*	0 (52)	Distillate	1976	877 hours/year
	2*	0	None	1948	(107 MVAR)
	3*	0	None	1949	(107 MVAR)
	4*	0(163)	Natural Gas	1958	Bay Area NOx restrictions
United Cogen	1	20	Natural Gas	1986	none

*Hunters Point units 1-4 are expected to be shutdown.
Units 2 & 3 are used now as synchronous condensers.

The existing generation in San Francisco is highly vulnerable to disruption. The Potrero power plant is old and tends to have frequent outages. The largest and most critical generating unit on the peninsula is Potrero Unit 3 (a steam thermal generating unit), which began operating in 1965, and is significantly beyond the expected 30-year life of a power plant of its type.

Potrero Power Plant Units 4, 5, and 6 (52 MW each for a total of 156 MW) are combustion turbines that operate on distillate fuel with high air pollution emissions. These turbines are restricted in operation to 877 hours per year (or about ten-percent of a given calendar year) each according to their Bay Area Quality Management District permits.

TRANSMISSION

The San Francisco Peninsula receives its power from three sources. Part of the demand is served by power generated locally by San Francisco generation. Part of the San Francisco Peninsula load is served by power delivered to the San Mateo Substation via 230 kV transmission lines connected to the Tesla, Newark and Ravenswood substations. Part of the San Francisco Peninsula load demand is also met through power delivered to the San Mateo substation via two 230 kV transmission lines crossing San Francisco Bay. And finally power will be delivered from the Metcalf substation up the Peninsula from a new Jefferson-Martin 230 kV line starting in 2006. Power will flow northward along the Peninsula from the San Mateo and Jefferson Substations to the Martin Substation through the combination of two 230kV transmission lines, and six 115kV transmission lines (see Figure 1).

Figure 1
PROJECT DESCRIPTION
San Francisco Electric Reliability Project - Regional Setting

CALIFORNIA ENERGY COMMISSION, ENERGY FACILITIES SITING & ENVIRONMENTAL PROTECTION DIVISION, AUGUST 2004
SOURCE: California Energy Commission Statewide Transmission Line & Power Plant maps/2004 & USGS 7.5 Minute Quadrangles

AUGUST 2004 PROJECT DESCRIPTION

Synchronous condensers located at the Hunters Point Power Plant are used to maintain voltages in the area[7] although according to the CA ISO Action Plan for San Francisco Memorandum these can be shut down in 2005. Numerous small shunt capacitors are also used within the local electric distribution system to maintain voltages by supplying reactive power support. Reactive power support cannot be transmitted over long distances and needs to be provided locally. While it is possible to operate a system devoid of local generation, in San Francisco's case this would require substantial new transmission lines to import the required quantity of power, and additional local voltage support devices (i.e., synchronous condensers, shunt capacitors, static Var. compensators etc.)

The operation of the existing power plants in San Francisco has long been contentious. The CCSF and PG&E have had an agreement that PG&E would shut down the Hunters Point Power Plant as soon as it could do so without compromising the reliability of the transmission network. The Maxwell Ordinance (see Attachment 1 for a brief summary) set strict requirements about the retrofit and shut down of existing generation in order for the CCSF to support Mirant's Potrero Power Plant Unit 7 Project. The CA ISO September 10, 2004, Memorandum from Marcie Edwards (CA ISO interim CEO) to the CA ISO Board of Governors clearly states the transmission and generation projects that need to be in place before the existing Hunters Point and Potrero Power Plants could be shutdown. All seven of the projects required for the shutdown of Hunters Point Power Plant are expected to be operating before the proposed on-line date of the SFERP.

LOCAL SYSTEM EFFECTS

The following types of local system effects have been reviewed to assess the potential benefits of local generation:

1. **The Effect on Plans for Transmission Facility Upgrades:** Deferral of capital facilities is determined by identifying proposed facilities for which need is delayed or eliminated because a target generator offsets the need for such facilities. In the case of San Francisco where there has been a public desire to see the existing Hunters Point and Potrero power plants shut down, a new plant or plants could allow for the shutdown of existing plants.
2. **The Effect on System Losses:** Comparing the system with and without SFERP interconnected and operating identifies the increase or decrease in losses.
3. **Impact on RMR Costs:** Would the proposed project increase or decrease RMR costs?
4. **Ability to be integrated into existing and planned system:** Would major system additions or system modifications be needed to accommodate the new facility?
5. **Affect on System Reliability:** Would the project increase or decrease system reliability?

[7] These are assumed to be shut down by the time the SFERP could be operational in 2007.

THE EFFECT ON PLANS FOR TRANSMISSION FACILITY UPGRADES

As stated earlier, power will be supplied to customers on the San Francisco Peninsula either through local generation or through transmission facilities that run in a northward loop along the Peninsula from the Jefferson and San Mateo Substation. Additional generation on the Peninsula can reduce the need for additional transmission facilities into the Peninsula but, given the potential retirement of existing generation in the Bay Area, staff is unable to attribute the deferral of any planned transmission facilities directly to the SFERP. The SFERP could be a component of a reliable network when the existing generators are allowed to retire.

Over the next five to ten years the addition of the SFERP will probably not defer any identified major transmission facilities. The CA ISO is currently developing a plan for the San Francisco Peninsula so the network will meet reliability criteria under a variety of load and resource scenarios from 2011 to 2016. Given the large number of scenarios that include the analysis of generation retirement and a potential Direct Current (DC) line from the East Bay to San Francisco it will be very hard to determine the impact of a single project like the SFERP on the need for transmission facilities. Transmission facilities that could be deferred by the SFERP could be offset by the retirement of other plants making the deferrals uncertain. The SFERP could allow for the retirement of existing generators.

Based on the CA ISO Action Plan for San Francisco Memorandum the SFERP and one additional new gas turbine are needed in order to allow the CA ISO to release Potrero units 4, 5 and 6 from their Reliability Must Run contracts which is required before the units could be shut down. There could be other options like the Babcock and Brown proposed DC (See staff's **Alternatives** analysis) line from the Pittsburgh Substation in Contra Costa County to the Potrero Substation, which if implemented, could allow the CA ISO to release the Potrero units 4, 5 and 6 from their RMR contracts. While release from the RMR contracts would allow the Potrero units to shut down, they are privately owned and would be free to operate in the energy market.

Thus, while the SFERP may not defer transmission facilities it is a key component in the release and eventual shutdown of Potrero Units 4, 5 and 6.

THE EFFECT ON SYSTEM LOSSES

Transmission system losses are a function of generation schedules, imports, exports, wheeling and system loop flow in addition to load. Transmission line losses occur as a result of conductor resistance and corona discharge. Resistance line losses are significant, especially on long, heavily loaded lines with a high load factor (75% - 100%). Typical values for utility systems in California range from 12 kW/mile to 500 kW/mile for line loadings between 25% and 100% of the conductor ratings. These losses are similar to the operation of electric strip heaters for home and building use where heat is produced by connecting a resistor heating element across 120V or 240V, and allowing the current to flow through the resistor element.

Based on the predicted 2007 Northern California system peak demand of 26,000 MW, the primary system losses (transmission lines and transformers) are approximately 916 MW without SFERP operating. Transmission losses thus constitute 3.5% of the load.

Transmission line losses were assessed for six dispatch scenarios. These dispatch scenarios were selected to bracket the range of dispatch conditions that occur in an actual year. Because the power supplied to the system must equal the system load plus the losses, when SFERP operates, 146 MW of generation as shown by the dispatch scenarios must be reduced to balance the additional 146 MW from SFERP. The baseline for comparison was the system losses without SFERP. Losses with SFERP on line and other units redispatched according to the established dispatch scenarios were then compared to the baseline.

The following dispatch scenarios were studied for the year 2007 to allow for the addition of the 146 MW SFERP:

1. Moss Landing Power Plant output reduced 146 MW.
2. Delta Energy Center output reduced 146 MW.
3. Metcalf Energy Center output reduced 146 MW.
4. Contra Costa Power Plant output reduced 146 MW.
5. Sutter Power Plant Project output reduced 146 MW.
6. Northwest Imports reduced 146 MW.

By adding SFERP and reducing generation as depicted in the dispatch scenarios, system peak loss reductions range between 6 MW and 21 MW for the different scenarios (See Appendix A, Table I). The additional 6 to 21 MW is “produced” without the use of any additional fuel or water and without producing any additional plant emissions.

To estimate the annual energy savings staff assigned probabilities to the various dispatch scenarios tested. Multiplying the unique dispatch related loss reduction value by the assigned dispatch probability provided an expected overall MW loss reduction value for the study year: 10.4 MW in 2007. The estimated annual energy savings that correspond to the expected overall system loss reduction values noted above are 27.5 GWh in year 2007. These amounts of energy savings are equivalent to the annual energy requirement for approximately 4,100 homes[8]. A reduction in system losses of this magnitude would save ratepayers $1.8 to $2.7 million per year. Over a twenty-year period, the present value of these savings to ratepayers is $18 to $27 million. In calculating these values for the loss savings, the following assumptions were made:

- Natural gas prices are $5 - $7/MMBtu,
- The displaced unit’s heat rate is 13,000 – 14,000 Btu/kWh,
- Any emissions offsets created were valued at $0 (a very conservative assumption), and

[8] For this estimate staff assumed that an average household in California uses 6,600 KWh of energy annually.

- The rate of return is 8%.

The calculations for this analysis are contained in Appendix A, Table II, for the study year 2007.

To assure that energy implications are considered in project decisions, environmental documents must include a discussion of the potential energy impacts of proposed projects. This discussion places particular emphasis on avoiding or reducing inefficient, wasteful and unnecessary consumption of energy and the project's effect on local and regional energy supplies. Most decision-makers generally are faced with only the negative energy use considerations when approving a project that may result in significant increased use of energy. This Commission faces a different situation in that SFERP will reduce energy losses while providing numerous other benefits. If one anticipates that SFERP, if built, would operate for at least 20 years, there are long-term environmental benefits related to reduced fuel and water use and to reduced emissions due to the reduction in electricity system losses.

RELIABILITY MUST RUN COSTS

According to the CA ISO's Action Plan for San Francisco, the SFERP plus one additional turbine at the San Francisco airport must be operating before Potrero units 4, 5 and 6 can be released from their RMR contracts Thus ratepayers would be saved the costs of the RMR contracts for Potrero units 4, 5 and 6. Currently, the RMR owners per their RMR contract are paid the difference between their variable operating costs and market prices, and some proportion of their fixed costs depending on the type of RMR contract selected by the unit owner. The savings due to ending the three Potrero RMR contracts is uncertain because the form of RMR contract that will be selected by a unit owner from time to time is uncertain.

ABILITY TO BE INTEGRATED INTO EXISTING AND PLANNED SYSTEM

Based on the various studies from PG&E (SFERP2004b and SFERP2004p), the SFERP can be connected to the CA ISO controlled grid with the projects identified in the current transmission plan and if several system protection schemes are implemented. There is no evidence that any existing facilities or the additional facilities planned to be added to the CA ISO controlled grid through 2007 will need to be modified because of the addition of SFERP.

AFFECT ON SYSTEM RELIABILITY

The SFERP would provide both real and reactive power to the grid in San Francisco. The reactive power, 70 MVAR, will increase the local reactive margin (see Appendix B, Tables I and II) and improve system reliability and voltage in the area.

CONCLUSIONS

1. The SFERP will reduce transmission system losses. Over 20 years, the savings to ratepayers have a present value at between $18 million and $27 million. As well as reducing the cost of producing power in California, these loss savings would also

contribute to a related decrease in the use of fossil fuels, water, and the production of air emissions by reducing the need for additional generation resources.

2. A primary benefit of the addition of the SFERP is that the old and unreliable Potrero turbines (units 4, 5 and 6) could be released from their RMR contracts and retired.
3. The effects of SFERP on RMR costs are uncertain.
4. The SFERP can be connected to the CA ISO controlled grid with the projects identified in the current transmission plan. No new or modified grid facilities are required to accommodate interconnection of the SFERP.

CONDITIONS OF CERTIFICATION

Staff has concluded that no conditions of certification are required for this area.

REFERENCES

The SFERP would increase reactive margin in San Francisco thus improving system reliability and voltage in the area.

CA ISO2004a - California Independent System Operator, Action Plan for San Francisco, Options and Risks, Memorandum from Marcie Edwards to the CA ISO Board of Governors, September 10, 2004.

CA ISO2003a - California Independent System Operator, San Francisco Peninsula Load Serving Capability, July 3, 2003.

CCSF 2001a - (City and County of San Francisco). CCSF Ord. Final CCSF Ordinance of May 29, 2001. Submitted to California Energy Commission, June 12, 2001.

SFERP2004a - City and County of San Francisco/Blout (tn:31130). Application for Certification San Francisco Electric Reliability Project - 145-megawatt natural gas-fired peaking power plant located in San Francisco. Submitted to CEC/Therkelsen/Dockets on 3/18/04.

SFERP2004b - CH2MHill/Carrier (tn:31126). Transmittal of Appendix 5, System Impact Study. Submitted to CEC/Pfanner/Dockets on 3/18/04.

SFERP2004g - CH2MHill/Carrier (tn:31268). Data Adequacy Supplement. Submitted to CEC/Pfanner/Dockets on 4/16/04.

SFERP2004p – CH2MHill/Carrier (tn:31858). Data Responses Set 1A. Attachment TSE-70A, Updating Facilities Study. Submitted to CEC/Pfanner/Dockets on 7/6/04.

DEFINITION OF TERMS

AAC	All Aluminum conductor.
ADR	Alternative Dispute Resolution
Ancillary Services Market	The market for services other than scheduled energy that are required to maintain system reliability and meet WSCC/NERC operating criteria. Such services include spinning, non-spinning, replacement reserves, regulation (AGC), voltage control and black start capability.
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 measure of electric current; specifically, a measure of the rate of flow of electrons past a given point in an electric conductor such as a power line.
Available Transmission Capacity (i.e., ATC)	Available Transmission Capacity in any hour is equal to Operational Transmission Capacity for that hour minus Existing Transmission Contracts for that same hour (ATC = OTC - ETC). (See the other definitions below).
Breaker	Circuit breaker - An automatic switch that stops the flow of electric current in a suddenly overloaded or otherwise abnormally stressed electric circuit.
Bundled Conductor	Two or more wires, connected in parallel through common switches, that act together to carry current in a single phase of an electric circuit.
Bus	Conductors that serve as a common connection for multiple transmission lines.
CA ISO	California Independent System Operator - The CA ISO is the FERC regulated control area operator of the CA ISO transmission grid. Its responsibilities include providing non-discriminatory access to the grid, managing congestion, maintaining the reliability and

	security of the grid, and providing billing and settlement services. The CA ISO has no affiliation with any market participant.
CA ISO Controlled Grid	The combined transmission assets of the Participating Transmission Owners (PTOs) that are collectively under the control of the CA ISO.
CA ISO Reliability Criteria	Reliability standards established by the NERC, WSCC, and the ISO, as amended from time to time, including any requirements of the NRC.
CA ISO Planning Process	Annual studies conducted by the PTO's and CA ISO in an open stakeholder process. These studies determine the future transmission reinforcements necessary to enable the ISO Controlled Grid to meet the ISO Reliability Criteria. The CA ISO Planning Process also includes studies of new resource connections and third party proposals for new additions to the CA ISO Controlled Grid.
CA ISO Tariff	Document filed with the appropriate regulatory authority (FERC) specifying lawful rates, charges, rules, and conditions under which the utilities provide services to parties. A tariff typically includes rate schedules, list of contracts, rules, and sample forms.
Capacitor	An electric device used to store charge temporarily, generally consisting of two metallic plates separated by a dielectric.
Cogeneration	The consecutive generation of thermal and electric or mechanical energy.
Conductor	The part of the transmission line (the wire) which carries the current.
Congestion	The condition that exists when market participants seek to dispatch in a pattern which would result in power flows that cannot be physically accommodated by the system. Although the system will not normally be operated in an overloaded condition, it may be described as congested based on requested/desired schedules.

Congestion Management	Congestion management is a CA ISO scheduling protocol that is used to resolve Congestion.
Contingency	Disconnection or separation, planned or forced, of one or more components from the electric system.
Day-Ahead Market	The forward market for the supply of electrical power at least 24 hours before delivery to Buyers and End-Use Customers.
Demand	Load plus any exports from an electric system.
Demand Forecast	An estimate of demand (electric load) over a designated period of time.
Dispatch	The operating control of an integrated electric system to: (i) assign specific generators and other sources of supply to effect the supply to meet the relevant area Demand taken as Load rises of falls; (ii) control operations and maintenance of high voltage lines, substations, and equipment, including administration of safety procedures; (iii) operate interconnections (iv) manage energy transactions with other interconnected Control Areas; and (v) curtail Demand.
dV/dQ	The partial derivative of the voltage at a bus with respect to the reactive injection at that bus. (See any elementary college calculus text for further discussion of partial derivatives.) The point at which dV/dQ approaches infinity is defined as the point of voltage collapse.
Emergency Condition	The system condition when one or more system elements are forced (not scheduled) out of service.
Emergency Overload	Loading of a transmission system element above its Emergency Rating during an Emergency Condition.

Emergency Rating	A special rating established for short term use in the event of a forced line or transformer outage (e.g., an emergency). An emergency rating may be expressed as a percentage of the normal rating (e.g., 115 percent of normal) or as an elevated current rating. For example, the normal rating for a conductor may be 1000 amperes and the emergency rating may be 1100 amperes.
Excessive Voltage Deviation	A sudden change in voltage at any substation as a result of a Contingency that exceeds established allowable levels of change.
Existing Transmission Contract (i.e., ETC)	A contract for transmission services that was in place prior to the start of ISO operations.
Fault Duty	The maximum amount of short-circuit current which must be interrupted by a given circuit breaker.
FERC	Federal Energy Regulatory Commission
General Order 95	California Public Utilities Commission (CPUC) General Order which specifies transmission line clearance and other requirements.
Generation Outlet Line	Transmission facilities (circuit, transformer, circuit breaker, etc.) linking generation to the main grid.
Generation Tie (gen tie)	Transmission facilities (circuit, transformer, circuit breaker, etc.) linking generation to the main grid.
Generator	A machine capable of converting mechanical energy into electrical energy.
Heat Rate	The amount of energy input to an electric generator required to obtain a given value of energy output. Usually expressed in terms of British Thermal Units per kilowatt hour (Btu/kWh).
Hour-Ahead Market	The electric power futures market that is established 1-hour before delivery to End-Use Customers.

Imbalance Energy	Energy not scheduled in advance that is required to meet energy imbalances in real-time. This energy is supplied by Participating Generators under the CA ISO's control, providing spinning and non-spinning reserves, replacement reserves, and regulation, and other generators able to respond to the CA ISO's request for more or less energy.
Interconnected System Reliability	See Reliability.
Kcmil or kcm	One thousand circular mils. A unit of the conductor's cross sectional area which, when divided by 1,273, gives the area in square inches.
Kv	Kilovolt - A unit of potential difference, or voltage, between two conductors of a circuit, or between a conductor and the ground.
Load	The rate expressed in kilowatts, or megawatts, at which electric energy is delivered to or by a system, or part of a system to end use customers at a given instant or averaged over a designated interval of time. (Also see Demand.)
Load Factor	The average Load over a given period (e.g., one year) divided by the peak Load in the period.
Loop	An electrical connection where a line is opened and a new substation is inserted into the opening. A looped configuration creates two lines, one from each of the original end points to the new substation. A looped configuration is more reliable than a tap configuration because the looped configuration provides two lines into the substation rather than just one in a tap configuration. Also, see Tap below.
Low Voltage	Voltage at any substation that is below the minimum acceptable level.
Marginal Unit	The Generator (or Load) that sets the market clearing price in the ISO's Ancillary Services Market. The marginal unit is the Generator or Load that had the highest accepted bid for energy or Demand reduction.

MVar	Megavar - One megavolt ampere reactive (a measure of reactive power). Reactive power demand is generally associated with motor loads and this demand must be supplied by generation units or static reactive sources in the system.
MVA	Megavolt ampere - A unit of apparent power: equal to the product of the line voltage in kilovolts, the current in amperes, and the square root of 3 divided by 1000.
MW	Megawatt - A unit of power equivalent to 1,341 horsepower.
NERC	North American Electric Reliability Council
Nominal Voltage	Also known as Normal Voltage. The voltage at which power can be delivered to loads without damage to customer equipment or violation of CA ISO Reliability Criteria when the system is under Normal Operation.
Normal Operation	When all customers receive the power they are entitled to without interruption and at steady voltage, and no element of the transmission system is loaded beyond its continuous rating.
NRC	Nuclear Regulatory Commission
N-1 Contingency	A forced outage of one system element (e.g., a transmission line or generator).
N-2 Contingency	A forced outage of two system elements usually (but not exclusively) caused by one single event. Examples of an N-2 Contingency include loss of two transmission circuits on a single tower line or loss of two elements connected by a common circuit breaker due to the failure of that common breaker.
Operational Transfer Capability (i.e., OTC)	The maximum amount of power which can be reliably transmitted over an electrical path in conjunction with the simultaneous reliable operation of all other paths. This limit is typically defined by seasonal operating studies, and should not be confused with a path rating. Also referred to as OTC.

Outlet	Transmission facilities (circuit, transformer, circuit breaker, etc.) linking generation to the main grid.
Participating Generator	A generator that has signed an agreement with the CA ISO to abide by the rules and conditions specified in the CA ISO Tariff.
Participating Transmission Owner (i.e., PTO)	A Participating Transmission Owner is an electric transmission owning company that has turned over operational control of some or all of their electric transmission facilities to the CA ISO. Currently, the three Participating Transmission Owners are PG&E, SCE, and SDG&E.
Path Rating	The maximum amount of power which can be reliably transmitted over an electrical path under the best set of conditions. Path ratings are defined and specified in the WSCC Path Rating Catalog.
PG&E	Pacific Gas & Electric Company
PG&E Interconnection Handbook	Detailed instructions to new customers (either load or generation) on how to interconnect to the PG&E electric system.
Post-Transient Voltage Deviation	The change in voltage from pre-contingency to post-contingency conditions once the system has had time to readjust.
Power Flow	A generic term used to describe the type, direction, and magnitude of actual or simulated electrical power flows on electrical systems.
Power Flow Analysis	A power flow analysis is a forward looking computer simulation of all major generation and transmission system facilities that identifies overloaded circuits, transformers and other equipment as well as system voltage levels under both Normal and Emergency Conditions.
Pump	A hydroelectric generator that acts as a motor and pumps water stored in a reservoir to a higher elevation.

Q/V Curve	A graphical representation of the voltage a given substation bus has as a function of the reactive injection at that bus.
RAS	Remedial Action Scheme - An automatic control provision (e.g., trip a generation unit to mitigate a circuit overload).SPS???
Reactive Power	The portion of apparent power that does no work in an alternating current circuit but must be available to operate certain types of electrical equipment. Reactive Power is most commonly supplied by generators or by electrostatic equipment, such as shunt capacitors.
Reactive Margin	Reactive Power must be available at all load buses to prevent voltage collapse. Reactive margin is the amount of additional reactive load, usually measured in MVAR's, which may be added at a particular bus before the system experiences voltage collapse.
Reactor	An electric device used to store electric current temporarily, generally consisting of a coil of wire wound around a magnetic core.
Real Power	Real power is the work-producing component of apparent power and is required to operate any electrical equipment that performs energy conversion. Examples of this electrical equipment would be a heater, a lamp, or a motor. Real power is usually metered in units of kilowatt-hours (kWh).
Real-Time Market	The competitive generation market controlled and coordinated by the CA ISO for arranging real-time imbalance power.
Reconductor	The removal of old conductors on a transmission or distribution line followed by replacement of these conductors with new higher capacity conductors.

Reliability	The degree of performance of the elements of the bulk electric system that results in electricity being delivered to customers within accepted standards and in the amount desired. May be measured by the frequency, duration, and magnitude of adverse effects on the electric supply.
Reliability Criteria	Principals used to design, plan, operate, and assess the actual or projected reliability of an electric system.
Reliability Must-Run (i.e., RMR)	The minimum generation (number of units or MW output) required by the CA ISO to be on line to maintain system reliability in a local area.
SCE	Southern California Edison Company
SDG&E	San Diego Gas and Electric Company
Sensitivity Study	An analysis to determine the impact of varying one or more parameters on the results of the original analysis.
Series Capacitor	A static electrical device that is connected in-line with a transmission circuit that allows for higher power transfer capability by reducing the circuit's overall impedance.
Shunt Capacitor	A static electrical device that is connected between an electrical conductor and ground. A shunt capacitor normally will increase the voltage on a transmission circuit by providing reactive power to the electrical system.
Single Contingency	See N-1 Contingency.
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.
Source or Sink of Reactive Power	A source of Reactive Power is a device that injects reactive power into the power system (e.g., a Generator or a Capacitor). A sink of Reactive Power absorbs reactive power from the power system. Examples of reactive power sinks are shunt Reactors and motor loads.

Static Compensator	StatCom - a shunt connected power system device that includes Capacitors and Reactors controlled by solid state electronic devices as opposed to mechanically operated switches.
Substation	An assemblage of equipment that switches, changes, or regulates voltage in the electric transmission and distribution system.
Switchyard	A substation that is used as an outlet for one or more electric generators.
Switched Reactive Devices	A shunt Capacitor or shunt Reactor controlled by mechanically operated switches.
Switching Station	Similar to a substation, but there is only one voltage level.
Synchronous Condenser	A rotating mechanical device very similar to a Generator. The Synchronous Condenser has no mechanical power input and cannot produce Real Power. It can only produce or absorb Reactive Power.
System Reliability	See “Reliability”.
Tap	An electrical connection where a new line is connected to an intermediate point on an existing transmission line and a new substation is connected to the end of the new line. A tapped configuration creates a single transmission circuit with more than two end points (for example, a “T”). A tapped configuration is less reliable than a looped configuration because a fault on any portion of the tapped circuit causes a complete loss of power to the new substation. Also, see Loop above.
Tap Changing Transformer	A Transformer that has the ability to change the number of windings in service. By changing the number of windings in service (by moving to a different tap), the Tap Changing Transformer has the ability to maintain a nearly constant voltage at its output terminals even though the input voltage to the Transformer may vary.

Thermal Loading Capability	The current-carrying capacity (in Amperes) of a conductor at specified ambient conditions, at which damage to the conductor is non-existent or deemed acceptable based on economic, safety, and reliability considerations.
Thermal overload	A thermal overload occurs when electrical equipment is operated in excess of its current carrying capability. Overloads are generally given in percent. For example, a transmission line may be said to be loaded to 105 percent of its rating.
Thermal rating	See Ampacity.
Transformer	A device that changes the voltage of alternating current electricity.
Transformer Loading Capability	The current-carrying capacity (in Amperes) of a transformer at specified ambient conditions, at which damage to the transformer is non-existent or deemed acceptable based on economic, safety, and reliability considerations.
TSE	Transmission System Engineering.
Underbuild	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.
Undercrossing	A transmission configuration where a transmission line crosses below the conductors of another transmission line, generally at 90 degrees.
Var	One Volt ampere reactive. Also see the definition for MVar.
Voltage	Electromotive force or potential difference.
Voltage Collapse	The point at which the reactive demand at a substation bus exceeds the reactive supply at that bus. When the reactive demand is greater than the supply, the voltage at that point in the system will drop. Eventually, the voltage will drop to a point at which it is no longer possible to serve load at that bus.

Wheeling	A service provided by an entity, such as a utility, that owns transmission facilities whereby it receives electric energy into its system from one party and then uses its system to deliver that energy to a third party. The wheeling entity is usually paid a fee for this service.
WSCC	Western Systems Coordinating Council

ATTACHMENT 1

MAXWELL ORDINANCE

An important consideration in determining the benefits of the Unit 7 project is the Maxwell ordinance which was approved by the San Francisco Board of Supervisors on May 29, 2001. This ordinance sets several requirements for City staff to consider supporting the permitting of Unit 7. Briefly these requirements are:

- Hunters Point Power Plant will cease operation as a fossil generation plant within 90 days of the operation of Unit 7.
- Potrero Power Plant Units 4 through 6 will be retrofitted or rebuilt with the best available pollution control technology (BACT) and will operate only during specified times.
- Potrero Power Plant Unit 3 will shut down as soon as it is no longer needed to sustain electric reliability in San Francisco. (CCSF Ord, Pages 2-4).

.

APPENDIX A

TABLE I

SFERPP LOSS ANALYSIS-YEAR 2007

TOTAL PG&E System Losses / System Loss Reduction

	PG&E SYSTEM LOSS PRE-PROJECT (MW)	PG&E SYSTEM LOSS WITH SFERPP 3 UNITS (MW)	SYSTEM PEAK LOSS REDUCTION (MW)	EXPECTED PEAK LOSS REDUCTION (MW)	ANNUAL ENERGY SAVED (GWh)	EXPECTED ANNUAL ENERGY SAVED (GWh)
Base Dispatch, PG&E Assesment 2007 Summer peak, Swing= Morro Bay unit 4. Potrero 7 and SFERPP units are off line.	916.49					
Dispatch 1, Local Adjustment : SFERPP = +146 MW, Duke Moss= -146 MW, Potrero 7 units off line.		907.13	9.36	1.68	27.62	4.97
Dispatch 2, Local Adjustment : SFERPP = +146 MW, Delta Energy= -146 MW, Potrero 7 units off line.		905.29	11.20	2.02	33.05	5.95
Dispatch 3, Local Adjustment: SFERPP = +146 MW, Metcalf = -146 MW, Potrero 7 units off line.		908.59	7.90	1.42	23.31	4.20
Dispatch 4, Local Adjustment: SFERPP = +146 MW, Contra Costa= -146 MW, Potrero 7 units off line.		905.34	11.15	2.01	32.90	5.92
Dispatch 5, Local Adjustment: SFERPP = +146 MW, Sutter= -525 MW, Potrero 7 units off line.		910.32	6.17	1.11	18.20	3.28
Dispatch 6, Remote Adjustment: SFERPP = +146 MW, COI= -146 MW, Potrero 7 units off line.		894.88	21.61	2.16	63.76	3.19
Totals:				**10.40**		**27.50**
Average:			**11.23**		**33.14**	--

NOTE: Calculations for expected MW Peak loss & Energy savings and related present value in dollars are illustrated in Appendix A, Table II

APPENDIX A
TABLE II

SFERPP LOSS ANALYSIS-YEAR 2007
TOTAL PG&E System Losses / System Loss Reduction

	PG&E SYSTEM LOSS PRE-PROJECT (MW)	PG&E SYSTEM LOSS WITH SFERPP 3 UNITS (MW)	SYSTEM PEAK LOSS REDUCTION (MW)	PROBABILITY OF THE REDISPATCH SCENAIRIO	EQUIVALENT PEAK LOSS REDUCTION (MW)	SYSTEM ANNUAL LOAD FACTOR	EQUIVALENT HOURS LOSS FACTOR	ANNUAL ENERGY SAVED (GWh)	PROBABLE ANNUAL ENERGY SAVED (GWh)	ADJUSTMENT FACTOR FOR REMOTE DISPATCH	ADJUSTED PROBABLE ANNUAL ENERGY SAVED (GWh)
Base Dispatch, PG&E Assesment 2007 Summer peak, Swing= Morro Bay unit 4. Potrero 7 units and SFERPP 3 units are off line.	916.49										
Dispatch 1, Local Adjustment : SFERPP= +146 MW, Duke Moss= -146 MW, Potrero 7 units off line.		907.13	9.36	0.18	1.68	0.57	0.34	27.62	4.97	1.00	4.97
Dispatch 2, Local Adjustment : SFERPP= +146 MW, Delta Energy = -146 MW, Potrero 7 units off line		905.29	11.20	0.18	2.02	0.57	0.34	33.05	5.95	1.00	5.95
Dispatch 3, Local Adjustment: SFERPP= +146 MW, Metcalf = -146 MW, Potrero 7 units off line.		908.59	7.90	0.18	1.42	0.57	0.34	23.31	4.20	1.00	4.20
Dispatch 4, Local Adjustment: SFERPP = +146 MW, Contra Costa= -146 MW, Potrero 7 units off line.		905.34	11.15	0.18	2.01	0.57	0.34	32.90	5.92	1.00	5.92
Dispatch 5, Local Adjustment: SFERPP = +146 MW, Sutter= -146 MW, Potrero 7 units off line.		910.32	6.17	0.18	1.11	0.57	0.34	18.20	3.28	1.00	3.28
Dispatch 6, Remote Adjustment: SFERPP = +146 MW, COI= -146 MW, Potrero 7 units off line.		894.88	21.61	0.10	2.16	0.57	0.34	63.76	6.38	0.50	3.19
Totals:				**1.00**	**10.40**				**30.69**		**27.50**
Average:			**11.23**					**33.14**			--

		Gas Cost ($/MMBtu)	Heat Rate (Btu/kWh)
Energy Savings (GWh)	**27.50**		
Cost of Energy ($/MWh)	$44.64	**$3.72**	**12000**
Total Savings per year in 1000 ($)	**$1,227.64**		
Total Savings per year in million ($)	$1.23		
Number of Years	**20**		
Interest Rate (%)	**8%**		
Present Value of Savings in 1000 ($)	$12,053.15		
Present Value of Savings in million ($)	**$12.05**		

		Gas Cost ($/MMBtu)	Heat Rate (Btu/kWh)
Energy Savings (GWh)	**27.50**		
Cost of Energy ($/MWh)	$76.70	**$5.90**	**13000**
Tot. Savings per year in 1000 ($)	**$2,109.32**		
Total Savings per year in million ($)	$2.11		
Number of Years	**20**		
Interest Rate (%)	**8%**		
Pr. Value of Savings in 1000 ($)	$20,709.61		
Pr. Value of Savings in million ($)	**$20.71**		

APPENDIX B
TABLE I
SFERP
TABLES FOR REACTIVE POWER MARGIN
(Without SVC At Potrero Plant)

N-1 Contingency Case: Jefferson - Martin C 230 kV Line

Load Flow Scenario	Monitored Bus	'Nose-Point' without SFERP Units (MVAr)	'Nose-Point' with SFERP Units (MVAr)	+/- Change in Bus Reactive Power Margin (MVAr)
Year 2007 Summer Peak	Potrero 115 kV	-901	-982	+81
	Mission 115 kV	-866	-943	+77
	Bayshore2 115 kV	-884	-963	+79
	Martin C 115 kV	-959	-1047	+88

N-2 Contingency Case: Martin C – San Mateo 230 kV Line + Potrero Gen. Unit 3

Load Flow Scenario	MONITORED BUS	'Nose-Point' without SFERP Units (MVAr)	'Nose-Point' with SFERP units (MVAr)	+/- Change In Bus Reactive Power Margin (MVAr)
Year 2007 Summer Peak	Potrero 115 kV	-687	-779	+92
	Mission 115 kV	-657	-745	+88
	Bayshore2 115 kV	-675	-764	+89
	Martin C 115 kV	-742	-843	+101

N-2 Contingency Case: Martin C – San Mateo 230 kV Line and Jefferson – Martin C 230 kV Line

Load Flow Scenario	Monitored Bus	'Nose-Point' without SFERP Units (MVAr)	'Nose-Point' with SFERP Units (MVAr)	+/- Change in Bus Reactive Power Margin (MVAr)
Year 2007 Summer Peak	Potrero 115 kV	-678	-772	+94
	Mission 115 kV	-657	-745	+88
	Bayshore2 115 kV	-668	-760	+92
	Martin C 115 kV	-710	-811	+101

APPENDIX B
TABLE II
SFERP
TABLES FOR REACTIVE POWER MARGIN
(With SVC At Potrero Plant)

N-1 Contingency Case: Jefferson - Martin C 230 kV Line

Load Flow Scenario	Monitored Bus	'Nose-Point' without SFERP Units (MVAr)	'Nose-Point' with SFERP Units (MVAr)	+/- Change in Bus Reactive Power Margin (MVAr)
Year 2007 Summer Peak	Potrero 115 kV	-916	-975	+59
	Mission 115 kV	-880	-937	+57
	Bayshore2 115 kV	-898	-956	+58
	Martin C 115 kV	-974	-1040	+66

N-2 Contingency Case: Martin C – San Mateo 230 kV Line + Potrero Gen. Unit 3

Load Flow Scenario	MONITORED BUS	'Nose-Point' without SFERP Units (MVAr)	'Nose-Point' with SFERP units (MVAr)	+/- Change In Bus Reactive Power Margin (MVAr)
Year 2007 Summer Peak	Potrero 115 kV	-701	-772	+71
	Mission 115 kV	-672	-738	+66
	Bayshore2 115 kV	-689	-757	+68
	Martin C 115 kV	-757	-836	+79

N-2 Contingency Case: Martin C – San Mateo 230 kV Line and Jefferson – Martin C 230 kV Line

Load Flow Scenario	Monitored Bus	'Nose-Point' without SFERP Units (MVAr)	'Nose-Point' with SFERP Units (MVAr)	+/- Change in Bus Reactive Power Margin (MVAr)
Year 2007 Summer Peak	Potrero 115 kV	-692	-766	+74
	Mission 115 kV	-671	-739	+68
	Bayshore2 115 kV	-683	-754	+71
	Martin C 115 kV	-725	-805	+80

ALTERNATIVES

Susan V. Lee

SUMMARY OF FINDINGS

In the analysis of individual resource areas, the Preliminary Staff Assessment finds potential adverse impacts of the proposed San Francisco Electric Reliability Project air quality, cultural resources, hazardous materials management, land use, noise, and public health. Based on these and other concerns, this section evaluates six alternatives in detail. An additional 24 alternatives were considered but eliminated from detailed analysis. The alternatives analyzed in detail include three site alternatives (involving construction of the three turbines in a different location) at Brisbane, San Francisco International Airport, and East Bay alternative sites, two project alternatives (the Trans Bay Cable Project and the Potrero Power Plant Unit 7 Project), and the No Project Alternative.

Among the project alternatives analyzed, the alternative considering construction of Potrero Power Plant Unit 7 has the potential for greatest impacts. Of the alternative sites evaluated, the Brisbane Alternative has the potential for greatest impacts and would have greater impacts in comparison with the proposed San Francisco Electric Reliability Project in the issue areas of noise, land use, traffic, visual resources, and water and soils, as well as concerns relating to transmission system engineering and transmission safety and nuisance.

The Trans Bay Cable Project and the Brisbane, San Francisco International Airport, and East Bay Alternatives would fail to meet a major project objective: closing aging in-City generation, i.e., releasing Potrero Units 3 through 6 from applicable RMR contracts. Because these alternatives would not result in generation within the City and County of San Francisco, they would not meet California Independent System Operator requirements for generation to be “north of Martin Substation.” The Trans Bay Cable Project would likely have the least environmental impacts overall (primarily because, as a transmission project, its operational impacts would be minor), but construction of this project would result in greater impacts than the proposed project to aquatic biological resources, water and soil, traffic, geological resources, and transmission line safety and nuisance impacts. However, without the ability to cause closure of in-City generation facilities, the overall impacts of the Trans Bay Cable Project would be greater than those of the San Francisco Electric Reliability Project.

Staff also believes that, overall, the No Project Alternative is not superior to the proposed project. This scenario would likely delay the closure of the Potrero Power Plant Units 3 through 6, which are objectives of the proposed San Francisco Electric Reliability Project and are older plants with have relatively higher air emissions. The No Project Alternative would also result in reduced reliability for San Francisco’s electrical supply.

INTRODUCTION

The purpose of staff's alternatives analysis is to consider whether there are alternatives that could feasibly attain most of the basic objectives of the project and avoid or substantially lessen one or more of the significant effects of the project. If the Energy Commission determines that the proposed project will result in significant adverse impacts and identifies an alternative that meets these criteria, it cannot license the project unless it finds that the benefits of the project outweigh the impacts and that the alternative is infeasible. However, the Energy Commission does not have the authority to approve alternative configurations, require alternative technology designs, or to require the applicant to move the proposed project to another location without first conducting a more in-depth review of the environmental consequences of the alternative. If the applicant moves its proposed project to one of the alternative sites, Energy Commission staff will analyze any new proposed site to the same level of detail as the original proposed site. In addition, Energy Commission staff is required by agency regulations to examine the "feasibility of available site and facility alternatives to the applicant's proposal which substantially lessen the significant adverse impacts of the proposal on the environment" (Cal. Code Regs., tit. 20, §1765).

The Energy Commission is the permitting agency and "lead agency" for thermal power plants in California over 50 MW. It provides an environmental assessment of proposed projects pursuant to a regulatory program certified by the Secretary of Resources pursuant to the California Environmental Quality Act (CEQA). The Commission's certified regulatory program is exempt from the requirement that it prepare an Environmental Impact Report (EIR). However, its environmental analysis must meet many basic CEQA requirements. When it prepares its analysis of project alternatives, staff follows the basic tenets of the CEQA Guidelines in the development of its analysis.

The CEQA Guidelines provide further direction by requiring an evaluation of 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 project objectives" (Cal. Code Regs., tit. 14 §15126.6). The analysis should identify and compare the impacts of the various alternatives, but analysis of alternatives need not be in as much detail as the analysis of the proposed project.

In order to provide a comprehensive evaluation, staff's analysis considers a full range of alternatives. This section presents a summary of alternatives that were considered in two previous Energy Commission proceedings for San Francisco power plants: the 1994 proposal by the San Francisco Energy Corporation (SFEC; 94-AFC-1) and the 2000 Potrero Power Plant Unit 7 Project (00-AFC-4). The analysis also considers alternatives studied in the California Public Utilities Commission's (CPUC) Jefferson-Martin 230 kV Transmission Project Final Environmental Impact Report (CPUC 2003). In addition to information from these proceedings, this section evaluates other alternatives recommended by the public and those developed by staff.

Organization of This Section. The body of the analysis explains the analysis methodology used for alternatives and summarizes the conclusions of this section. Three appendices follow this Preliminary Staff Assessment (PSA) section:

- Appendix A presents environmental evaluation of the six selected alternatives (by environmental issue area).
- Appendix B presents the explanation of alternatives eliminated from detailed analysis.
- Appendix C presents supporting documentation (letters between the CCSF and the CA ISO and the San Francisco Action Plan).

APPROACH

This alternatives analysis uses the following approach, based on guidance in the CEQA Deskbook (1999):

1. Describe the project objectives.
2. Assess the proposed project's significant environmental effects.
3. Develop screening criteria for feasibility of alternatives.
4. Consider a broad range of alternatives, including the No Project Alternative, and select a reasonable range of alternatives that:
   - Meet some or all of the project objectives.
   - May be located on alternatives sites.
   - Substantially avoid or lessen one or more of the potential significant effects of the project; and
   - Are feasible based on specific economic, social, legal, or technical considerations.
5. Explain why other alternatives have been rejected from evaluation (Appendix B).
6. Provide meaningful evaluation and analysis of environmental impacts of the reasonable range of alternatives and the No Project Alternative in comparison with environmental effects of the proposed project (Appendix A).
7. Identify the environmentally superior alternative.

SUMMARY DESCRIPTION OF PROPOSED PROJECT

The proposed SFERP would consist of a nominal 145-megawatt (MW) simple-cycle plant, using three natural gas-fired General Electric LM 6000 gas turbines and associated infrastructure. Each CTG would generate a nominal 48 MW with the use of chillers. The project site is located near the San Francisco Bay in the Potrero District of San Francisco, on a four-acre site of City-owned land (see **ALTERNATIVES Figure 1** in

Appendix A). The project would include the construction of a new air-insulated 115-kilovolt (kV) switchyard on the north side of the site adjacent to 25th Street. A detailed description of the proposed SFERP is included in the Project Description section of this Staff Assessment.

BASIC OBJECTIVES OF THE PROJECT

The applicant has identified several basic objectives in the AFC, consistent with the findings and recommendations contained in its Electricity Resource Plan (ERP), for the development of the proposed power project. These objectives are:

1. Improve CCSF's electricity reliability;
2. Facilitate the shutdown of older, more polluting in-City generation; and
3. Minimize local impacts of electrical generation.

The CCSF, PG&E, and the California Independent System Operator (CA ISO) have extensively studied the electrical infrastructure in the CCSF. The applicant and CA ISO state in the San Francisco Action Plan[1] and related documents that SFERP is needed, as part of a portfolio of resources, to maintain system reliability and provide for closure of existing power plants (Edwards 2004a and 2004b). The applicant states that it is committed to maximizing energy efficiency improvements, developing renewable power, encouraging clean distributed generation and supporting needed transmission additions. Nonetheless, the siting of new, clean and operationally flexible generation is also considered necessary to provide for the near-term closure of the Hunters Point Power Plant and to address operational needs. The SFERP will also, in the longer term, facilitate the closure of units at the Potrero Power Plant.

POTENTIAL SIGNIFICANT ENVIRONMENTAL IMPACTS AND AREAS OF IDENTIFIED PUBLIC CONCERN

In this PSA, staff has identified that the SFERP has the potential to cause significant impacts to air quality, cultural resources, hazardous materials management, land use, noise, and public health. However, following the implementation of recommended mitigation, all impacts are expected to be reduced to less than significant levels. Staff's detailed assessments of the expected environmental consequences of the proposed project are discussed in the individual technical sections of the PSA. The following paragraphs summarize the areas of concern.

- **Air Quality**. The community has expressed concerns regarding the dispatch hours and the appropriate location for taking monitoring samples, about the cumulative air impacts of the project and air quality modeling predicts that the impacts for PM10 and PM2.5 would be greatest along the fence line of the facility. Since the public has access up to the property fence, additional mitigation beyond those proposed in the

[1] The San Francisco Action Plan was developed by the CA ISO working with the City of San Francisco and other stakeholders to establish the conditions upon which the existing generation at Hunters Point and Potrero would be released from RMR contracts. The San Francisco Action Plan involves the successful completion of a total of 12 transmission projects by PG&E, four peaking power plants by CCSF, and the Mirant retrofit of Potrero Unit 3 with emissions control technology for its temporary operation. The CA ISO does not control the dates of completion of these projects, nor does it control the permanent shutdown of the Hunters Point and Potrero generation.

AFC may be required to mitigate these impacts. However, Staff finds that, with the inclusion of the Conditions of Certification, the proposed project would be in compliance with all applicable laws, ordinances, regulations, and standards and would not result in any significant air quality-related impacts.

- **Cultural Resources.** Members of the Native American community have expressed concerns regarding development along the Bay. In addition, Staff initially identified the potential impact of vibrations from the construction of trenches on historic buildings within one block on either side of proposed trenches required for the underground transmission line, especially along 3rd Street between 20th and 23rd Streets. There is also a high potential for the presence of prehistoric archaeological resources on the western end of the process water pipeline route. However, overall Staff determined that there would be no impact on significant historic standing structures, historic districts, or ethnographic resources. Impacts to archaeological resources will be discussed at a later time, when the applicant provides two reports on the archaeological survey of portions of the impact area, projected for September 14, 2005 (Carrier 2005). When the reports are received and the cultural resources inventory is complete, the analysis of SFERP's potential impacts to archaeological resources will be completed and mitigation measures proposed for all impacts that are potentially significant.
- **Hazardous Materials Management**. The community is concerned about the impact of increased hazardous materials in their neighborhood; specifically, the impacts from the transportation of aqueous ammonia. Using treated wastewater for cooling the SFERP has been raised as a local public health concern to the immediate area and secondary impacts to the community near the Southeast Water Pollution Control Plant (SEWPCP). However, Staff's evaluation of the proposed project (with Staff's proposed mitigation measures) had determined that hazardous materials use would not present a significant impact to the public.
- **Land Use**. Conflicts may result between new housing proposed in community plans (i.e., Draft Central Waterfront Neighborhood Plan, South Bayshore Area Plan, and the Draft Bayview Hunters Point Redevelopment and Rezoning Project) and the expansion of long established industrial uses, such as power plants. Current and draft land use plans encourage new residential development as well as other industrial uses such as the cruise ship dry dock facility. However, Staff has found that the project will comply with all applicable land use laws, ordinances, regulations and standards and the proposed power plant will be compatible with existing and planned land uses.
- **Noise**. The project would increase noise levels in the project area. However, Staff finds that, with the inclusion of the Conditions of Certification, the proposed project would be in compliance with all applicable laws, ordinances, regulations, and standards and would not result in any significant noise-related impacts.
- **Public Health**. Public health impacts from air pollution generated by power plants are a major concern to the surrounding community. Concerns have been expressed by members of the community that the potential air quality impacts from the SFERP could exacerbate known health problems, including asthma rates in children. Specific mitigation measures have been requested by the community to address impacts to air quality with a program that is implemented locally. However, Staff does not

expect there would be any significant adverse cancer, or short - or long-term noncancer health effects from project toxic emissions if the proposed Conditions of Certification in this section and the Air Quality section are implemented.

IDENTIFICATION AND SCREENING OF ALTERNATIVES

Staff used a two-stage process to select alternatives for analysis. First a reasonable range of alternatives was identified, and then these alternatives were screened to select those that qualified for detailed evaluation. Staff considered alternatives to the project that were identified by several sources, including the applicant, members of the public, previous environmental documents, and other Energy Commission staff.

The following sections first describe alternatives suggested by the applicant, followed by alternative sites identified by the public and sites identified by staff. Appendix A presents analysis of six alternatives:

- Three site alternatives (involving construction of the three turbines in a different location): the Brisbane, San Francisco International Airport, and East Bay alternative sites.
- Two project alternatives: the Trans Bay Cable Project and the Potrero Power Plant Unit 7 Project.
- The No Project Alternative.

Appendix B describes alternatives that were eliminated from detailed consideration and presents an explanation of why these alternatives are not analyzed. Alternatives that were eliminated from detailed consideration are:

- Thirteen site alternatives (three sites are retained for full analysis).
- Two transmission alternatives (one transmission alternative is retained for full analysis).
- Renewable resources (solar, wind, biomass, tidal, geothermal).
- Demand side management.
- Distributed generation.
- Integrated resources alternative.

ALTERNATIVES Table 1 lists all alternatives identified in this analysis, and states whether each is considered for detailed evaluation.

ALTERNATIVES Table 1
Alternatives Considered

Alternative	Qualify?	If Not, Why Not?
TECHNOLOGY ALTERNATIVES		
Demand Side Management	No	Already factored into electrical system planning
Distributed Generation	No	Technological, market, and regulatory barriers, as well as feasibility and timeliness concerns. Some types could cause significant environmental impacts and would not be consistent with project objectives
Renewable Resources	No	Feasibility and availability concerns. Some types could cause significant environmental impacts and would not be consistent with project objectives
Integrated Resource Alternative	No	Feasibility and reliability concerns
ALTERNATIVE SITES		
Applicant's Alternative Sites		
Cesar Chavez Site	No	No environmental benefit compared to proposed
Mirant Site	**Yes**	Considered as Potrero Power Plant Unit 7 in Appendix A
Illinois Street Site	No	No environmental benefit compared to proposed
Pier 70 Site	No	Greater impacts to historic resources; closer to residences
Western Pacific Site	No	Site would be laydown area for proposed SFERP; located on Port property with planned land use and public trust doctrine incompatibility issues
Larkin Substation vicinity	No	No space available
Mission Substation vicinity	No	No space available; proximity of residences
Hunters Point Substation vicinity	No	Proximity of residences
Alternative Sites Identified by the Public		
Smaller Sites	No	Insufficient space or generation capacity for 3 turbines; potentially greater impacts
SF Airport Area	**Yes**	Considered as SFIA Alternative in Appendix A
NRG Steam Plant (Fifth & Jessie Streets)	No	Nearby residences; insufficient space for 3 turbines; cost prohibitive
Treasure Island	No	Incompatible land use and inadequate infrastructure (transmission lines, natural gas)
The Presidio	No	Visual and recreation impacts, incompatible land use, lack of infrastructure; and policy inconsistency with NPS
Alternative Sites Considered in the SFEC FSA		
Innes Avenue	No	No environmental benefit compared to proposed
City Asphalt Plant	No	Too small for 3 turbines
SF Thermal Plant	No	Too small for 3 turbines
Hunters Point Power Plant	No	No environmental benefit; incompatible land use due to residences nearby
China Basin Stadium Site	No	Unavailable due to Mission Bay development underway
Mission Bay Development	No	Unavailable due to Mission Bay development underway
Rail Yard South of China Basin	No	Unavailable due to Mission Bay development underway
Cow Palace, Daly City	No	No environmental benefit (residential developments

Alternative	Qualify?	If Not, Why Not?
		now surround available land)
Treasure Island	No	Inadequate infrastructure (transmission lines, natural gas) and geotechnical concerns related to building on fill
Hunters Point Naval Shipyard	No	Development plans underway for residential and other uses
West of PG&E's Martin Substation, Daly City	No	Inadequate land now available due to residential development
Tuntex Site, Brisbane	**Yes**	Considered as Brisbane Alternative in Appendix A
Alternative Sites Considered in the Potrero Power Plant Unit 7 FSA		
Cargo Way Site	No	No environmental benefit compared to proposed
Gilman Avenue	No	Proximity of residences
Jamie Court, South San Francisco	No	Similar to SFIA Alternative
United Site at SFIA	**Yes**	Considered as SFIA Alternative in Appendix A
3Com Park Area: Carroll Avenue	No	No environmental benefit compared to proposed
South San Francisco: Belle Air Road	No	Inadequate land available
3Com Park, San Francisco	No	Timing of availability uncertain
Alternative Sites/Projects Identified by Staff		
East Bay Alternative, Hayward	**Yes**	Considered in Appendix A
Potrero Unit 7 Power Plant (as proposed by Mirant)	**Yes**	Considered in Appendix A
Trans Bay Cable	**Yes**	Considered in Appendix A

CONSIDERATION OF ALTERNATIVE SITES

BACKGROUND

During the CCSF's siting process, CCSF and the CA ISO engaged in discussions regarding reliable electricity service to CCSF and the requirements for closure of existing in-City generation. As a result of the correspondence, it is CCSF's position that the SFERP should clearly provide for closure of Hunters Point Power Plant (Units 1 and 4) in the event that the Jefferson-Martin transmission line[2] and related transmission projects are not placed in service. It is also CCSF's position that if the Jefferson-Martin line and associated transmission projects (set forth in a May 4, 2004, letter from PG&E to the CA ISO) provide for closure of the Hunters Point Power Plant (Units 1 and 4), then the SFERP should provide for closure of generating units at the existing Potrero Power Plant complex (SFERP 2004aa).

Prior to the May 4, 2004, letter, in making decisions about alternatives to site the SFERP, CCSF relied on the following four communications from the CA ISO, the first three of which are included in Appendix C to this Alternatives section:

1. An April 18, 2003, letter from CA ISO President and CEO Terry M. Winter to Theresa Mueller, Deputy City Attorney, City and County of San Francisco, and Kevin Dasso of PG&E;

2. An October 22, 2003, letter from CA ISO President and CEO Terry M. Winter to San Francisco Supervisor Sophie Maxwell;

[2] The Jefferson-Martin 230 kV Transmission Project was approved by the California Public Utilities Commission on August 19, 2004. Construction is underway and is expected to be completed in April 2006.

3. A matrix entitled "ISO Grid Planning Draft" forwarded by CA ISO staff to the San Francisco Public Utilities Commission (SFPUC) on February 9, 2004; and

4. A statement by CA ISO planning staff at a March 4, 2004, hearing before the City Services Committee of the San Francisco Board of Supervisors (SFERP 2004q).

The attachments to the April 18, 2003, and October 22, 2003, letters indicated that to allow for the shut down of units at Hunters Point Power Plant, the combustion turbines must be "electrically connected to the internal San Francisco 115kV transmission network."

The April 18, 2003, letter set forth the requirements to shut down Hunters Point Power Plant Unit 4, absent the Jefferson-Martin 230 kV Transmission Project, and indicates that four combustion turbines and six transmission projects would be required. The October 22, 2003, letter sets forth the requirements to shut down Hunters Point Power Plant Units 1 and 4, absent the Jefferson-Martin project, and indicates that four combustion turbines and eight transmission projects would be required. Furthermore, with both the SFERP and the Jefferson-Martin line in place, along with related transmission upgrades, the SFERP should, based on numbers set forth in the October 22, 2003, letter, at least provide for the additional closure of Potrero Units 4, 5 and 6.

The February 9, 2004, matrix indicates that Hunters Point Power Plant Units 1 and 4 could be shut down (absent the Jefferson-Martin transmission line), with <u>three</u> combustion turbines and the same eight other transmission projects. This information was confirmed by CA ISO planning staff at the March 4, 2004, hearing before the City Services Committee of the San Francisco Board of Supervisors. On May 28, 2004, San Francisco Mayor Gavin Newsom and Supervisor Sophie Maxwell wrote to CA ISO to request additional information about the ability to shut down in-City generation (including Potrero Power Plant Unit 3) in various scenarios. CCSF received a response to this letter on July 1, 2004 (from Jim Detmers, CA ISO Acting Chief Operations Officer to San Francisco Mayor Newsom, Supervisor Maxwell, and others; also included in Appendix C). CCSF has continued to forcefully press the CA ISO to define the conditions that would allow closure of Potrero Power Plant Unit 3.

In CCSF's data response to SF Power, they state that in a meeting between CCSF, community members and the CA ISO, the CA ISO agreed to engage in an expedited six-week process to define such preconditions. Further, on July 29, 2004, Greg Asay on behalf of Supervisor Maxwell reiterated to the CA ISO governing board CCSF's need for concrete and clear information from the CA ISO about the preconditions for closure of in-City generation. Although CCSF cannot guarantee that closure of all older in-City generation will in fact occur, it is the CCSF's objective in pursuing the SFERP to achieve this goal (SFERP 2004aa).

The efforts of CCSF and other stakeholders working with the CA ISO for three years culminated on September 10, 2004, in a presentation to the CA ISO Board of Governors of an Action Plan for San Francisco (SF Action Plan), which provides specific direction on how the old generation at Hunters Point and Potrero could be released from their RMR Agreements, ultimately leading to their retirement (SFPUC 2005a). At that time, the SF Action Plan showed that the Potrero peakers (Units 4, 5, and 6) would be retired before Potrero Unit 3. The CCSF requested the CA ISO to consider the possibility of retiring Potrero 3 first, followed by the Potrero peakers. The CA ISO evaluated CCSF's request and concluded in October 2004 that this "switch" would be appropriate (DeShazo 2005).

Accordingly, the CA ISO revised the SF Action Plan and on November 10, 2004, the revised Plan was adopted by the Board. The Plan listed a combination of 14 transmission projects and 4 peaking power plants (including the proposed SFERP) that allow the following sequential shutdown of the existing generation (see additional discussion under No Project Alternative and **ALTERNATIVES Table 5** for a list of the required projects) (Edwards 2004a and 2004b):

- **Hunters Point Units 2 & 3**: Completion of one transmission project, which was completed by PG&E in December 2004. These units were released from their RMR Agreements on January 1, 2005.
- **Hunters Point Units 1 & 4**: Completion of seven transmission projects and the retrofit of Potrero Unit 3 (see below); the final project (Jefferson–Martin 230 kV Transmission Project) is scheduled for completion in March 2006. The RMR contracts would be terminated as soon as the remaining transmission projects are deemed completed and in operation (both by PG&E and the CA ISO).
- **Potrero Unit 3**: Completion of Peaking Power Plants (i.e., SFERP and one combustion turbine at the San Francisco International Airport) by CCSF; the scheduled completion is December 2006. Therefore, this unit is planned to be recommended for release from its RMR Agreement in September 2006 for the 2007 RMR Year.
- **Potrero Units 4, 5, & 6**: Completion of four transmission projects and assuming previous completion of the Peaking Power Plants referenced above; PG&E is currently evaluating the project completion dates, but believes they are likely to be scheduled for 2007. Were this to occur, the CA ISO would plan to recommend this units for release from their RMR Agreements in September 2007 for the 2008 RMR year.

PG&E and the CA ISO are implementing the SF Action Plan at this time and expect to be completed by the end of 2007.

ALTERNATIVES ANALYSIS COMPLETED BY THE APPLICANT

CCSF identified and assessed the suitability of several properties for the proposed project that could house different numbers of turbines. A 1998 survey indicates that only 14 percent of the land in the City is zoned as Industrial (SFERP 2004aa). As part of this assessment, it reviewed four siting options. These included siting all four combustion turbines at one site, siting three combustion turbines at one site and one combustion turbine elsewhere, siting two combustion turbines at one site and two elsewhere, and lastly, returning the combustion turbines to the State of California and not siting any combustion turbines (the No Project Alternative). After analyzing these options, CCSF determined that siting multiple combustion turbines at one site offered several advantages, most notably, lower capital and operating costs, and reduced permitting and construction schedules. However, in order to distribute the impacts of power generation more equitably, the applicant decided to proceed with siting three units at the Potrero site and the fourth 48-MW unit at SFIA. The fourth turbine, known as the S.F. International Airport Power Plant (City of San Francisco Planning Department No. 2004.0384), would be located on approximately 2 acres at the corner of North Access Road and Clearwater Drive (SFIA Plot 20) on a projection of filled land known as North Field, approximately 3,100 feet from the existing United Cogeneration Plant, south of the SFIA Wastewater Treatment Plant and adjacent to and west of City College of San Francisco Aviation College (CCSF 2004).

Sites Near 115 kV Substations

To electrically connect at least three combustion turbines to the internal San Francisco 115 kV transmission network, CCSF staff concluded that considering possible line outages as well as interconnection costs, the best interconnection points would be at one of the existing PG&E 115 kV substations. There are four 115 kV substations in CCSF: Larkin, Mission, Potrero and Hunters Point. The **Larkin Substation** (located near the corner of Larkin and McAllister in the Civic Center area) was eliminated from consideration because there is no industrially zoned land in the vicinity.

While there is some industrial land adjacent to **Mission Substation** (located at Mission Street and 8th/9th Streets), the substation was eliminated from consideration to site three combustion turbines because there was insufficient land to locate multiple combustion turbines in the vicinity or for a construction lay down area, modifications, including seismic retrofits of the masonry buildings, would be necessary, and because of the expense of natural gas interconnection in the area. In addition, the Mission Substation is surrounded by commercial and residential land uses, with a low-income apartment building directly to the west of the site on Minna Street. Use of PG&E's Station I Site on the corner of 8th and Mission, diagonally across from the Mission Substation, was also eliminated for these reasons.

The **Hunters Point Substation** was eliminated from consideration due to environmental justice concerns and land use incompatibility with residences nearby. Specifically, CCSF notes that "communities in the vicinity of Hunters Point Substation (which is immediately adjacent to the Hunters Point Power Plant) have borne and continue to bear the impacts from substantial industrial activity, most notably the Hunters Point Power Plant and the SEWPCP" (SFERP 2004a and SFPUC 2005a). To ameliorate environmental justice concerns, it has been CCSF's objective since 1998 to close Hunters Point Power Plant. Given the longstanding impacts of the Hunters Point Power Plant on the local communities, and continued community concerns about the impacts from SEWPCP, CCSF did not consider siting new generation in the Hunters Point area.

In Section 9 of the AFC, the applicant identified and evaluated five alternative sites for the proposed power plant in the vicinity of the **Potrero Substation** (immediately west of the Potrero Power Plant which is approximately 0.5 miles north of the proposed SFERP site): the Cesar Chavez, Mirant, Illinois, Pier 70, and the Western Pacific Alternatives. Staff evaluates the Mirant Site (see Potrero Power Plant Unit 7 Alternative) in Appendix A. The other four sites were eliminated from detailed evaluation, primarily because they are not substantially different from the proposed site and offer no substantial environmental benefits. The specific reasons for elimination of each of these four sites are presented in Appendix B, Alternatives Eliminated.

Sites Not Near 115 kV Substations

In addition to the sites near the Potrero Substation, four other sites were considered and discarded during the planning and screening phase of the AFC. One of these sites was a multiple unit site: at the San Francisco International Airport (SFIA), east of the United Cogeneration facility. The City eliminated this site from further consideration because of indications from the CA ISO that it would not meet the CCSF's goal of shutting down existing in-City generation, in particular, the Hunters Point Power Plant. However staff retains this alternative for full analysis (see Appendix A).

Two other sites considered by CCSF were potential single-turbine sites located at the NRG Thermal plant near Fifth and Jessie Streets or at the SEWPCP. Neither of these sites is evaluated fully in this Staff Assessment; the rationale for their elimination is discussed in Appendix B, Alternatives Eliminated.

The third potential single-turbine site was located on Caltrans property near the Bay Bridge. Caltrans currently intends to use the site as a lay-down area for freeway off-ramp seismic improvements. The closest substation is the Embarcadero 230 kV Substation at 1st and Folsom Streets. To meet the siting criteria, a plant located at this site would have to interconnect to the Mission Substation. CCSF states that both electric and gas interconnection costs would be very expensive, construction costs would be expensive due to lack of a construction staging area, and that noise abatement and visual treatments would likely require either a high sound wall or enclosure. Therefore, this site was eliminated early in the screening process.

The AFC also discussed the feasibility of using Mirant's other Bay Area power plants (the existing Pittsburg and Contra Costa Power Plants). The AFC considered the No Project Alternative, transmission system alternatives, transmission interconnection alternatives, alternative generation technologies and configurations, alternative fuels, and alternative cooling system/water supplies. The AFC also presented a summary of the alternative sites evaluated in the SFEC proceeding.

Alternative Technologies

In addition to site alternatives, several potential NOx control technologies for combustion gas turbines were evaluated in the AFC (Section 9.6.1). The SCONOx combustion modification technology is not evaluated in this section but is considered in the Hazardous Materials Management section of this PSA.

The applicant also considered alternatives to Ammonia-based Emission Control Systems. These technologies are also evaluated in the Staff Assessment section on Hazardous Materials Management.

ALTERNATIVE SITES IDENTIFIED BY THE PUBLIC

On June 15, 2004, the Energy Commission held the Informational Hearing and Site Visit that begins its project review process. Several members of the public spoke during the public comment period in support of consideration of alternative sites, but no specific sites were suggested in that forum. In addition, Energy Commission staff met with various community members and groups to hear their concerns and solicit recommendations for alternative sites. Sites at the SFIA, Treasure Island, and the

Presidio were suggested as potential alternatives. The SFIA site is fully considered herein (see Appendix A), but the Treasure Island and Presidio sites are not evaluated in detail, as explained more fully in Appendix B, Alternatives Eliminated.

ALTERNATIVE SITES/PROJECTS IDENTIFIED BY STAFF

Based on CEQA requirements, staff's alternatives analysis was based on consideration of the following criteria:

1. An alternative should avoid or substantially lessen one or more of the potential significant effects of the project.
2. An ideal alternative location would be on the San Francisco Peninsula north of PG&E's Martin Substation.
3. A site should be at least 4 acres for the siting of three turbines (the shape of the site also affects its suitability).
4. The site should be within a reasonable distance of the electric transmission system, natural gas supply, and water supply.
5. The site should be available.
6. The site should not be located adjacent to moderate or high density residential areas, sensitive receptors (such as schools and hospitals), or recreation areas.

The second criterion above, that alternatives be located north of Martin Substation, resulted from a recent CA ISO analysis indicating that the entire Hunters Point Power Plant could be retired (a project objective) if at least three of the four combustion turbines available to San Francisco were located north of the Martin Substation. However, in order to provide the public and decisionmakers with analysis of a wide range of alternatives, staff has considered a broader geographic area for alternative sites, including one site south of Martin Substation (at SFIA) on the peninsula and one site in the East Bay.

From a long list of alternatives from current and previous projects (see **ALTERNATIVES Table 1**) and from field reconnaissance, staff identified five alternatives to be carried forward for detailed analysis:

- The Brisbane Alternative is on a vacant parcel in the City of Brisbane across the street from Martin Substation.
- The SFIA Alternative is at the north end of the SFIA on airport land adjacent to the United Airlines maintenance facility and cogeneration plant.
- The East Bay Alternative in Alameda County near the City of Hayward (near the site of the approved Russell City Energy Center, 01-AFC-7).
- The 530 MW Potrero Unit 7 Power Plant Project, a combined cycle project, as proposed by Mirant and as analyzed in the Final Staff Assessment published by the Energy Commission on February 13, 2002.
- The Trans Bay Cable Project, a transmission line between Pittsburg, in Contra Costa County, and the Potrero Substation.

Also, as required under CEQA, the No Project Alternative is also considered. Appendix A presents each of the six selected alternatives described in detail, including environmental and engineering analysis in all disciplines. Appendix B presents a discussion of the alternatives that were eliminated from detailed analysis.

SUMMARY OF IMPACTS OF ALTERNATIVES

ALTERNATIVES Table 2 presents a summary of the comparative impacts of the five alternative sites and projects with the proposed project. This table states whether the impacts of each site in each issue area result in that site being preferred to the proposed site or not. The Potrero Power Plant Unit 7 alternative has the potential for greatest impacts of all the alternatives. Of the four alternative sites evaluated, the Brisbane Alternative has the potential for greatest impacts and would have greater impacts in comparison with the proposed SFERP in the issue areas of noise, land use, traffic, visual resources, and water and soils, as well as issues relating to transmission system engineering and transmission safety and nuisance.

In addition, the Trans Bay Cable Project and the Brisbane, SFIA, and East Bay Alternatives would fail to meet a major project objective of closing down aging in-City generation (e.g., releasing Potrero Units 3 through 6 from applicable RMR contracts) because they would not be located within the CCSF, and would not meet CA ISO requirements for generation to be "north of Martin Substation." The Trans Bay Cable Project would likely have the least environmental impacts overall (primarily because, as a transmission project, its operational impacts would be minor) but construction of this project would result in greater impacts to aquatic biological resources, water and soil, traffic, geological resources, and transmission line safety and nuisance impacts.

Staff also believes that, overall, the No Project Alternative is not superior to the proposed project. The No Project scenario (described in Appendix A) would likely delay the closure of the Hunters Point Power Plant and Potrero Power Plant Units 3 through 6, which are objectives of the proposed SFERP and are older plants, which have relatively higher air emissions. The No Project Alternative would also result in reduced reliability for San Francisco's electrical supply.

ALTERNATIVES Table 2
Comparison of Impacts of Alternative Sites to the Proposed SFERP

Issue Area		Brisbane Alternative	SFIA Alternative	East Bay Alternative	Potrero Unit 7	Trans Bay Cable
Environmental Assessment						
Air Quality		Similar	Similar [for 3 turbines]	Similar	Less preferred	**Preferred**
Biological Resources	**Terrestrial**	Similar	Less preferred	Less preferred	Similar	Less preferred
	Aquatic	Similar	Less preferred	Less preferred	Less preferred (w/ once-through cooling) Similar (w/hybrid)	Less preferred
Cultural Resources		Similar	Slightly Preferred	Slightly Preferred	Similar	Less Preferred
Hazardous Materials Management		Similar	Similar	Similar	Less preferred	**Preferred**
Land Use		Less preferred	Similar	Similar	Less preferred	**Preferred**
Noise		Less preferred	Less preferred	Similar	Less preferred	**Preferred**
Public Health		Similar	Similar [for 3 turbines]	Similar	Less preferred	Similar
Socioeconomics		Similar	Similar	Similar	Similar	**Preferred**
Traffic and Transportation		Less preferred	**Preferred**	Similar	Less preferred	Less preferred
Transmission Line Safety and Nuisance		Less preferred	Depends on transmission line routing	Less preferred	Less preferred	Less preferred
Visual Resources		Less preferred	Similar	Similar	Less preferred	Similar
Waste Management		Similar	Similar	Similar	Less preferred	Slightly preferred
Water and Soils		Less preferred	**Preferred**	Similar	Less preferred	Less preferred

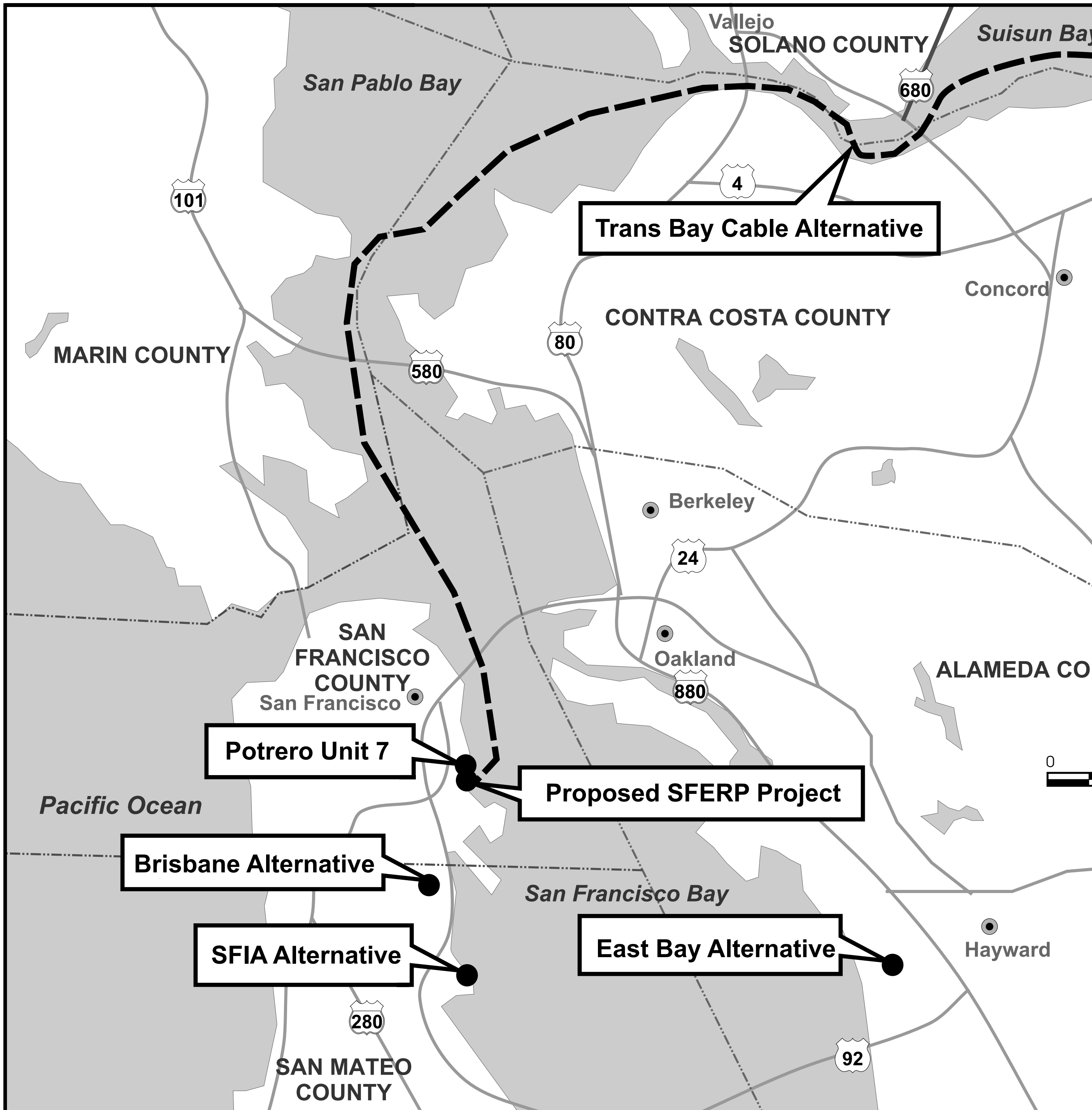
Issue Area	Brisbane Alternative	SFIA Alternative	East Bay Alternative	Potrero Unit 7	Trans Bay Cable
Worker Safety and Fire Protection	Similar	Similar	Similar	Similar	**Preferred**
Engineering Assessment					
Facility Design	Similar	Similar	Similar	Similar	Similar
Geology and Paleontology	Similar	Similar	Similar	Similar	Less preferred
Power Plant Efficiency	Similar	Similar	Similar	**Preferred**	No impact
Power Plant Reliability	Similar	Similar	Similar	Slightly less preferred	No impact
Transmission System Engineering	Less preferred	Less preferred	Less preferred	**Preferred**	Less Preferred

APPENDIX A: ALTERNATIVES EVALUATED IN DETAIL

Six alternatives are evaluated in this section, including three alternative sites for the three turbines proposed by CCSF, two alternatives to the SFERP project as a whole, and the No Project Alternative as required by CEQA. The alternatives are:

- Site Alternatives:
    - Brisbane Alternative
    - SFIA Alternative
    - East Bay Alternative
- Project Alternatives:
    - Potrero Unit 7 Power Plant
    - Trans Bay Cable
- No Project Alternative

Each alternative is described below, followed by analysis of the environmental impacts and engineering constraints of that alternative. **ALTERNATIVES Figure 1** shows the location of all of the alternatives that were evaluated. **ALTERNATIVES Table 2** on the previous page is a comparison table that summarizes the impacts of each alternative in each issue area.



SFERP Alternatives

Figure 1

Overview of Alternatives Evaluated

BRISBANE ALTERNATIVE

Site Description

This site is owned by Sunquest Properties and is located within a large (approximately 180 acres) area of level, vacant land that was used by Southern Pacific Transportation Company for major railcar rehabilitation and locomotive maintenance operations from about 1914 to 1960. The site was purchased by the Taiwan-based firm Sunquest (formerly called Tuntex) Properties in 1990.

The site is located in Visitacion Valley, a basin tributary to the San Francisco Bay and an area of the City of Brisbane known as the Baylands Planning Area. The Bay is located about 2,000 feet east of the site, immediately east of Highway 101. The alternative site would be located northeast of the intersection of Bayshore Boulevard and Geneva Avenue. PG&E's Martin Substation is located on the southwest corner of the intersection. A Union Pacific railroad siding runs just east of and parallel to Bayshore Boulevard in the area of Geneva Avenue, and the proposed site location would be immediately east of the retired siding.

The entire area between Bayshore Boulevard and Highway 101 is vacant and undeveloped so adequate space is available. In this regard, the site would be adequate for either three or four gas turbines (though only the proposed three-turbine option is considered here). The switchyard would be oriented in the westerly direction facing Martin Substation.

The portion of the site located north and east of Geneva Avenue has undergone remediation for heavy metals contamination. A groundwater pump-and-treat system for this area was installed in October 1994. The site portion south of Geneva Avenue is still contaminated with hydrocarbons and is under control of the RWQCB (DTSC 2004).

The Brisbane General Plan calls for this site to be used for "Trade Commercial Planned Development" (TC/PD: for hotels, research, and development, etc.). This site is zoned C-1, which allows mixed-use and commercial development and the owner is working with the City of Brisbane to develop the property into large corporate-style, light-industrial uses. However, no development plans have been formally submitted for the property (Taylor 2004). The site's current zoning reflects a zone change to convert the site's historic M-1 industrial designation. Currently, general development guidelines do not support the location of heavy industrial uses on this site. Therefore, a General Plan amendment and a zoning change would be required to accommodate the siting of power generating facilities at this site (CEC 2002a).

To the west of the site are commercial and service commercial uses along Bayshore Boulevard and Geneva Avenue. Also, the Cow Palace, a regional exhibition facility, is located 0.6 miles west of Bayshore Boulevard on the south side of Geneva Avenue. The land use character of the immediate alternative site area is predominantly industrial, due to the existing electric transmission infrastructure (i.e., Martin Substation) west of the site and the adjacent and nearby light-industrial and heavy industrial uses. However, numerous single-family residences and two elementary schools are located in Daly City to the west in the vicinity of this site. The closest residences are at Talbert Street and

MacDonald Avenue, one block west of Bayshore Boulevard (approximately 2,000 feet), and the closest school is approximately 0.4 miles to the west.

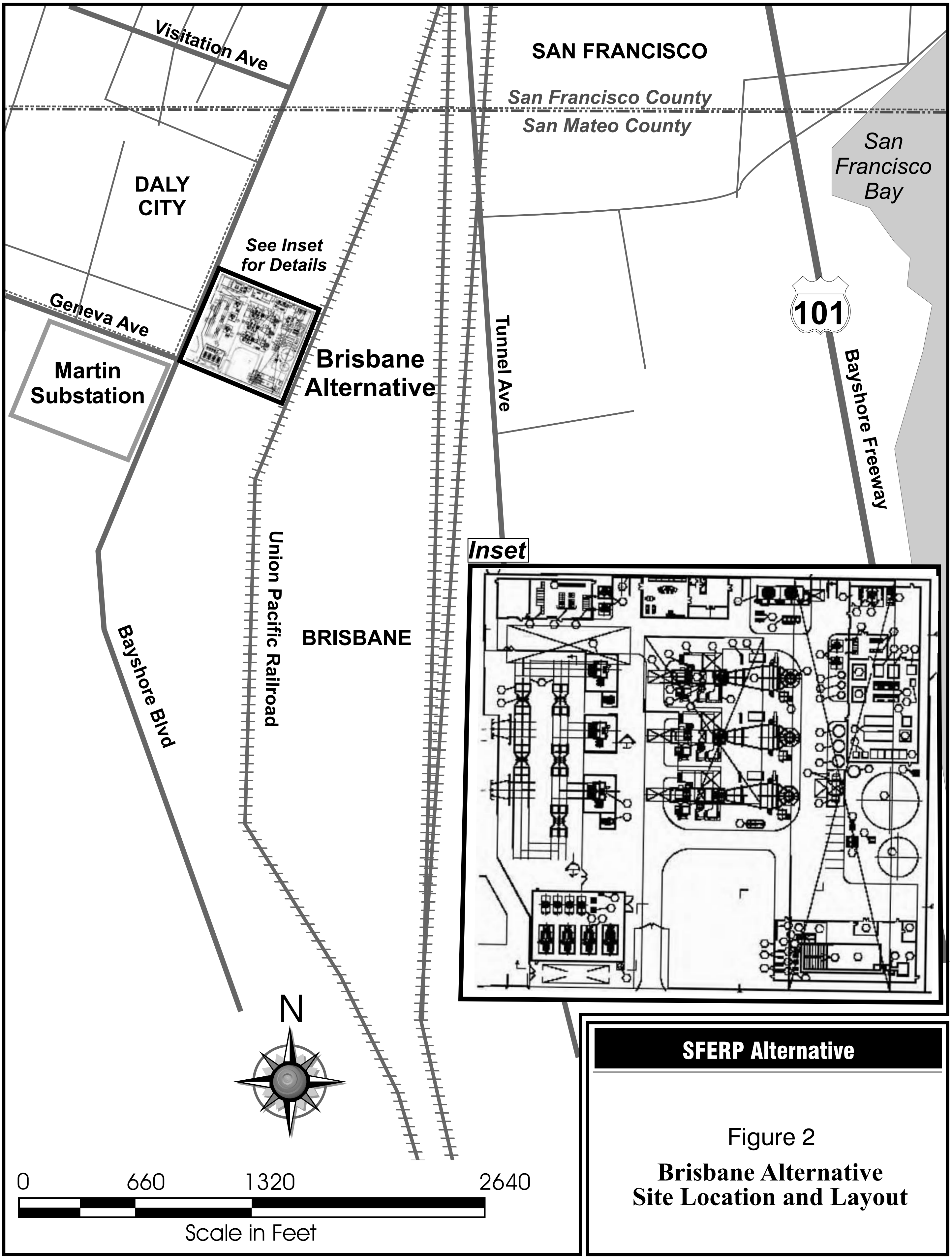
Infrastructure Availability

The City of Brisbane purchases its water from CCSF's Southeast Water Pollution Control Plant (SEWPCP) (located approximately 3 miles north of this site). The sewer main to this facility, which is operated by the Bayshore Sanitary District, runs north from the Carlyle Pump Station at Industrial Avenue along Bayshore Boulevard adjacent to the Brisbane Alternative Site. Therefore, water for this alternative site could be obtained by tapping into the 14-inch force main in Bayshore Boulevard and there is adequate space available to include a treatment facility onsite, as would be installed for the proposed project. Discharge of wastewater would require permits from both the Bayshore Sanitary District and the SFPUC.

A 13.8 to 115 kilovolt (kV) step-up transformer for each unit and 115 kV on-site switchyard would be required. A new 115 kV overhead or underground transmission line would run from the plant switchyard across Bayshore Boulevard to PG&E's Martin Substation, a distance of approximately 600 feet. This line would interconnect to Martin Substation at 115 kV at a location within the substation to be designated by PG&E.

Fuel gas would be supplied from a PG&E gas pipeline in Bayshore Boulevard. Less than 600 feet of new gas pipeline would be required to connect the plant site to the PG&E line (CEC 2002a). Gas compression will be required at the site to provide correct operating pressure for the gas turbines.

ALTERNATIVES Figure 2 shows the likely location and layout of the generating facility within the Brisbane Alternative site.



SFERP Alternative

Figure 2

Brisbane Alternative Site Location and Layout

Environmental Assessment for Brisbane Alternative

Air Quality

Emissions from the Brisbane Alternative would need to be controlled to satisfy the air permitting requirements of the Bay Area Air Quality Management District (BAAQMD). As such, construction and operation of SFERP at the Brisbane site would be subject to permit requirements and it would require Energy Commission mitigation, similar to that of the proposed project, to avoid significant air quality impacts. Appropriate mitigation at the Brisbane site would likely involve similar, locally-oriented recommendations to reduce PM10 impacts. As a result, mitigated power plant emissions would be the same as those of the proposed SFERP.

Biological Resources

The Brisbane site is a vacant, sparsely vegetated and disturbed lot with historic industrial use, in a developed area. The soil surface has been disturbed and compacted, and there is no surface water present. Field reconnaissance for biological resources previously conducted by staff identified no occurrences of threatened or endangered species on or adjacent to the site (CEC 2002a). Vegetation is sparse and cover is limited to herbaceous plants. No native trees, riparian or other sensitive habitats or vegetation are on or near the site. This site is approximately 0.5 miles west of the Bay shoreline, which in this area includes intertidal mudflats. Because of the developed surroundings, there appears to be little or no opportunity for wildlife movement among patches of better habitat. As with the proposed project, storm water runoff management would be appropriate to avoid impacts to surface waters. If the project were located at this alternative site, it would have similar NOx emission concerns for effects on biological resources as the proposed project site.

Cultural Resources

Records searches and detailed site surveys for cultural resources have not been completed for the Brisbane site, but during a pedestrian field survey, no historic structures were apparent on the area proposed for use for this alternative. Adjacent buildings and structures were not evaluated to determine if they met the eligibility requirements for the California Register of Historical Resources (CRHR). Previous assessment of the Brisbane site by staff indicates that there is a potential for encountering prehistoric sites, because the site is located on or near the original shoreline (CEC 2002a). Two prehistoric sites were previously identified along the original shoreline within one-half mile of the Brisbane site. One of these (P-41-000496) is located within 1,000 feet and contains human remains. Additionally, the foundations of a historic period dairy barn (CA-SMA-326H) are located within 0.5 mile of the property (CEC 2002a). These known sites could be avoided with proper mitigation and oversight. Buried cultural resources may also be present in the vicinity of linear facilities. Compared to the SFERP site, developing the SFERP at the Brisbane site would have a similar impact on historical resources.

To avoid impacts potentially caused by disturbing buried cultural and historic resources at the Brisbane site, oversight of a cultural resources specialist would likely be necessary during construction; however these potential impacts would be similar to those associated with the proposed project site.

Hazardous Materials Management

Hazardous materials use at the Brisbane site, including the quantities handled during transportation and disposal, would be identical to the proposed project. Transportation of hazardous materials to the Brisbane site would occur approximately two to three blocks from residences, which are located to the west across Bayshore Boulevard. The transportation route from Highway 101 would be through industrial, commercial, or open space areas. Compared to the proposed project, selecting the Brisbane site would result in similar impacts from transportation of hazardous materials, due to the similar proximity to homes to the site and to the transportation route. No special measures related to hazardous materials management would be required for this alternative site, and impacts during operation would be similar.

Land Use

The Brisbane site is located within an area of the City of Brisbane known as the Baylands Planning Area. The site is on a level, vacant parcel that previously served as a rail freight yard. A portion of the site north of Geneva Boulevard has undergone remediation for heavy metals, and hydrocarbon contamination may be present on lands located immediately to the south (DTSC 2004). Northwest of the site are non-operating commercial and industrial facilities, and east of site are industrial facilities including resource recovery (recycling) operations. West of the site are commercial and service uses along Bayshore Boulevard and Geneva Avenue. The land use character of the area can be described as predominantly industrial due to the existing electric transmission infrastructure (i.e., Martin Substation). However, numerous single-family residences and two elementary schools are located in Daly City to the west in the vicinity of this site. The closest residences are at Talbert Street and MacDonald Avenue, one block west of Bayshore Boulevard (approximately 2,000 feet), and the closest school is approximately 0.4 miles to the west.

Staff previously assessed the designation of the Brisbane site and found that it is zoned C-1, which allows mixed-use and commercial development. This designation is more restrictive than an industrial designation. The Brisbane General Plan designates the area as Trade Commercial Planned Development (PD/TC), and the general development guidelines do not support the location of heavy industrial uses in this area (CEC 2002a). Therefore, a General Plan amendment and a zone change would be required to accommodate the SFERP at this site. This represents an inconsistency with applicable plans and policies. As such, when compared to the proposed project, this alternative site would be more likely to create a significant land use impact because of the potential conflict with the policies of the City of Brisbane.

Noise

The residences nearest to the Brisbane site are approximately 2,000 feet to the west, across Bayshore Boulevard. This alternative site lies within the City of Brisbane and would be subject to the Noise Element of the City of Brisbane General Plan and Chapter 8.28 of the City of Brisbane Municipal Code. Compliance with the Brisbane Noise Element would likely be achieved with economical mitigation features. However, introduction of SFERP at this site would introduce noise levels that could be incompatible with future use of the area under its zoning designation for mixed-use and commercial development. The feasibility of future development of adjacent properties for mixed uses would be adversely affected. Because of this potential land use incompatibility, this alternative would cause greater operational noise impacts than the proposed project. Construction noise would cause impacts similar to those expected at the SFERP site.

Public Health

The air pollutants emitted by the SFERP at the Brisbane site would be identical to those that would occur at the proposed project site. As such, the project's emissions of toxic air contaminants would not be likely to expose the surrounding population to any significant risk of cancer or non-cancer health effects.

Socioeconomics

Staff estimated the benefits from the SFERP project should it be built at the Brisbane site. Benefits include increases in sales taxes, employment, and income for San Mateo County and neighboring counties (see **SOCIOECONOMICS Table 2** for data and information). Staff finds that the SFERP project will not cause a significant adverse socioeconomic impact on the study area's housing, schools, police, emergency services, hospitals, and utilities. Based on staff's demographic screening analysis, the minority population within six miles of the Brisbane Alternative is about 35 percent, and within one mile it is about 22 percent; however, there are individual census blocks with greater than 50 or 75 percent minority population. The low-income population within six miles is slightly more than 6 percent and within one mile is slightly less than 5 percent. In comparison, based on staff's demographic screening analysis for the proposed SFERP project, the minority population within six miles of the proposed power plant site at Potrero is less than 57 percent and the low-income population within six miles is slightly above 11 percent.

Staff finds that there would be no adverse socioeconomic impacts since most of the construction and operation workforce is within the regional or local labor market area and construction activities are short-term. Staff has determined that there would be no significant adverse direct or cumulative socioeconomic impacts and, therefore, there are no socioeconomic environmental justice issues. The Brisbane Alternative would be consistent with the applicable socioeconomic LORS.

Traffic and Transportation

The Brisbane site can be accessed from Bayshore Boulevard west of the site or Tunnel Avenue east of the site. Although the site is located in an industrial area, Bayshore Boulevard and Tunnel Avenue are primarily used for through traffic to residential and local commercial uses. There is no port facility or rail service to this site (CEC 2002a). Similar to the proposed project, before construction could occur at the Brisbane site, a construction traffic control and transportation demand implementation program would need to be developed in coordination with the City of Brisbane, San Mateo County, and Caltrans. These programs would limit construction-period truck and commute traffic to off-peak periods and avoid potential traffic and transportation impacts. Because of the high level of through-traffic on the access roadways, this site would cause greater impacts to traffic and transportation than the proposed project.

Transmission Line Safety and Nuisance

Power generated at the Brisbane site would travel from the on-site switchyard to the adjacent Martin Substation via a short overhead or underground transmission line across Bayshore Boulevard. Similar to the proposed project, this alternative would not be likely to cause transmission line safety hazards or nuisances. However, the length of the proposed project line would be approximately 300 feet compared to the 600 feet to be used for the Brisbane alternative, showing the proposed project line as preferable in terms of the total length of the source of line fields to which individuals might be exposed.

Visual Resources

Observation points for the Brisbane site include the ridges of Visitacion Valley, south, west, and north of the site. Residential areas north and west of the site (within about 0.5 miles) and on San Bruno Mountain to the southwest, and McLaren Park (about 0.7 miles to the northwest) provide numerous opportunities for foreground and middle-ground viewing of the site. There are few structures of notable height surrounding the site. Based on previous staff assessment for this site (CEC 2002a), staff found that the power plant would introduce a high level of contrast because of the general absence of surrounding tall structures and that the power plant would introduce a co-dominant to dominant feature, especially when viewed from the higher residential areas and surrounding hills, including McLaren Park. Staff also found that view blockage of wetland and Bay landscapes would be moderate. These effects would cause significant visual impacts that would be more severe at this site than they would be at the proposed project site.

Waste Management

Construction at the Brisbane site would require excavation of fill material that underlies the site. There is a history of contamination from heavy metals and hydrocarbons at this site and at adjacent properties (DTSC, 2004).

The project will produce minimal maintenance and plant wastes typical of power generation operations. An outside contractor will remove all generated wastes to the contractor's establishment for ultimate disposal. Generation plant wastes include: oily rags, broken and rusted metal and machine parts, defective or broken electrical materials, empty containers, and other miscellaneous solid wastes, including the typical refuse generated by workers. As with the proposed project, all construction and operation activities would need to be conducted in compliance with regulations pertaining to the appropriate management of wastes. Similar to the proposed project, the project would need to implement a comprehensive program to manage hazardous wastes and obtain a hazardous waste generator identification number (required by law for any generator of hazardous wastes). The environmental impact of waste disposal would be similar to the proposed project.

Water and Soils

The Brisbane Alternative and surrounding properties have a history of groundwater and soil contamination from heavy metals and hydrocarbons. Site remediation is ongoing in the vicinity, and contamination is known to remain on adjacent properties. The extent of the remaining contamination is unknown. Mitigation measures would need to be developed to ensure proper testing, treatment, and disposal during construction and site preparation. This would likely involve participation of the San Francisco Bay Regional Water Quality Control Board and the County of San Mateo Health Department.

Plans for grading and erosion control, dewatering, and storm water pollution prevention would also need to be reviewed by local agencies, including the San Francisco Bay Regional Water Quality Control Board, the City of Brisbane Public Works Department. Additionally, this site is in the vicinity of a nearby landfill, which means the County of San Mateo might have provisions related to earthmoving. The plans, procedures, and measures needed to address potentially adverse site conditions would generally be similar to those necessary for the proposed project.

Water for process and domestic uses would likely be obtained from the City of Brisbane or via direct connection to SFPUC facilities. Wastewater would be handled in a similar manner as the proposed project by being treated and discharged to the local sewer or to the SEWPCP.

Worker Safety and Fire Protection

The Brisbane site would be located within an area that is designated for mixed uses. The area is currently served by the San Mateo County, North County Fire Authority. The fire risks of this alternative would be similar to those of the surrounding existing uses, including the Martin Substation, and thus would pose no new or different demands on local services.

Similar to the proposed project, it would be appropriate for a power plant at this site to provide a Project Demolition and Construction Injury and Illness Prevention Program and a Project Operations Safety and Health Program in order to ensure adequate levels of industrial safety. Also similar to the proposed project, the local fire department would be contacted to assure that the level of staffing, equipment, and response time for fire services and EMS are adequate.

Engineering Assessment for Brisbane Alternative

Facility Design

The project's facility design at the Brisbane site would be similar to that of the SFERP at the proposed project site. As with the proposed project, staff-recommended measures may be appropriate to ensure compliance with engineering laws, ordinances, regulations and standards applicable to the design and construction of the project.

Geology and Paleontology

The Brisbane site overlies land created when the tidal flats and marshes along the margin of San Francisco Bay were reclaimed by the placement of fill. The fill probably consists of debris and construction rubble and is believed to be underlain by variable thickness of young Bay mud and Bay-Side Sand. Strong seismic ground shaking (peak ground acceleration of 0.6 to 0.7g) may occur at the site in the next 50 years, although no active faults are known to cross the site. Pile foundations would likely be required throughout this site. Adequate design parameters for the facility would need to be determined through a site specific evaluation by a Certified Engineering Geologist or Geotechnical Engineer.

Impacts due to seismic hazards and soil conditions would need to be mitigated by complying with the requirements and design standards of the California Building Code. Based on previous staff assessment for this site (CEC 2002a), impacts to geologic and paleontological resources would not be expected. Mitigation of potential impacts to paleontological resources could be accomplished with construction monitoring by a resource specialist and salvaging of any identified fossils. These impacts and the measures for mitigation would be similar to those of the proposed project.

Power Plant Efficiency

The plant configuration and combustion turbine generator technology that would be employed at the Brisbane site would be similar to the proposed project, which means it would result in similar consumption of fuel, and it would result in a similar level of efficiency.

Power Plant Reliability

The plant configuration at the Brisbane site would be similar to the proposed project, which means it would result in similar levels of equipment availability. Plant maintainability, fuel and water availability, and reliability of the plant in relation to natural hazards would each be similar to the proposed project.

Transmission System Engineering

The Brisbane site would not be located within the CCSF, and would not meet CA ISO requirements for generation to be “north of Martin Substation”. Locating SFERP in San Mateo County would require reevaluating the capacity of the Martin Substation and its transmission links to PG&E substations north of Martin within the CCSF. Compared to the proposed project, this alternative would likely cause adverse effects to the transmission system because constraints on the links to PG&E substations north of Martin would be exacerbated. Moreover, it would not accomplish the project goal of providing sufficient new in-City generation that would allow for closure of older Hunter’s Point and Potrero facilities.

SAN FRANCISCO INTERNATIONAL AIRPORT (SFIA) ALTERNATIVE

Background

This site was the subject of two Energy Commission proceedings in 2001:

- A 51 MW peaker power plant proposed by El Paso Energy Company (United Golden Gate Power Plant, Phase I) was approved for this site by the Energy Commission in March 2001. This project was never constructed due to unresolved land lease contract issues and its approval has expired (CEC 2004 - Energy Commission Energy Facilities Status).

- El Paso Energy Company submitted an AFC (01-AFC-3) to the Energy Commission in March 2001 to construct United Golden Gate Power Plant, Phase II, a proposed 570 MW power plant, adjacent to the existing United Cogeneration Inc. facility. This combined cycle plant would have replaced the simple-cycle Phase I power plant. However, the application is currently on hold because the applicant has not obtained site control (CEC 2004 - Energy Commission Energy Facilities Status).

While these two projects have encountered difficulties with site control, the site is on the San Francisco International Airport (SFIA) property, and therefore, is within the jurisdiction of the CCSF. CCSF is currently planning to use SFIA property to site one of the four combustion turbines that it would receive from the Williams Settlement (CCSF 2004). This project, known as the San Francisco International Airport Combustion Turbine Project (SFIACTP), is proposing to use a 2-acre lot that currently houses bulk materials and temporary construction trailers and is located near the San Francisco Bay on a projection of filled land known as North Field, approximately 0.6 miles east of the SFIA Alternative site.

There would not be enough space for all four turbines at the proposed SFIACTP site, which is situated on the corner of North Access Road and Clearwater Drive, south of the SFIA Wastewater Treatment Plant. However, given the proximity of the two sites, both of which are located on SFIA property, if the SFIA Alternative site were used then all four turbines would most likely be sited at the SFIA Alternative site together. Therefore, the analysis of this alternative considers that all four turbines would be installed at this alternative site.

Site Description

The SFIA Alternative is located near the San Francisco Bay, approximately 9.3 miles south-southeast of the CCSF. The alternative site is located south of the intersection of North Access Road and Coast Guard Road on SFIA property. The site is immediately east of the United Airlines Maintenance and Operations Center (UMOC) and the United Cogeneration Inc. (UCI) cogeneration power plant. The site is level and paved and is currently used as a parking lot by UMOC employees. There would be adequate space on the 11-acre site for a four turbine installation, retaining a portion of the existing parking lot for its current use.

Airport facilities are located on the east, south, and west sides of the site. North of the site across North Access Road are additional airport facilities, shoreline wetlands, the Safe Harbor Homeless Shelter (located approximately 500 feet from the site), and the County of San Mateo Transit Bus Yard. Immediately west of the homeless shelter and adjacent to the shoreline wetlands is a picnic area and a walking trail. On the west side of the shoreline wetlands are several large jet fuel storage tanks, and silos containing the City of South San Francisco's sewage discharges (CEC 2002a). Generally, the land use character of this area is predominantly industrial due to the adjacent maintenance, fueling, and cogeneration facilities. Aside from the shelter, the next nearest residences are approximately 10 blocks to the north and west, west of Highway 101 (approximately 1 mile from the site).

The site is zoned Planned Industrial (P-I) by the City of South San Francisco. This zoning allows for the development of a steam power plant. The SFIA itself has no zoning designations (UGGPC 2001)

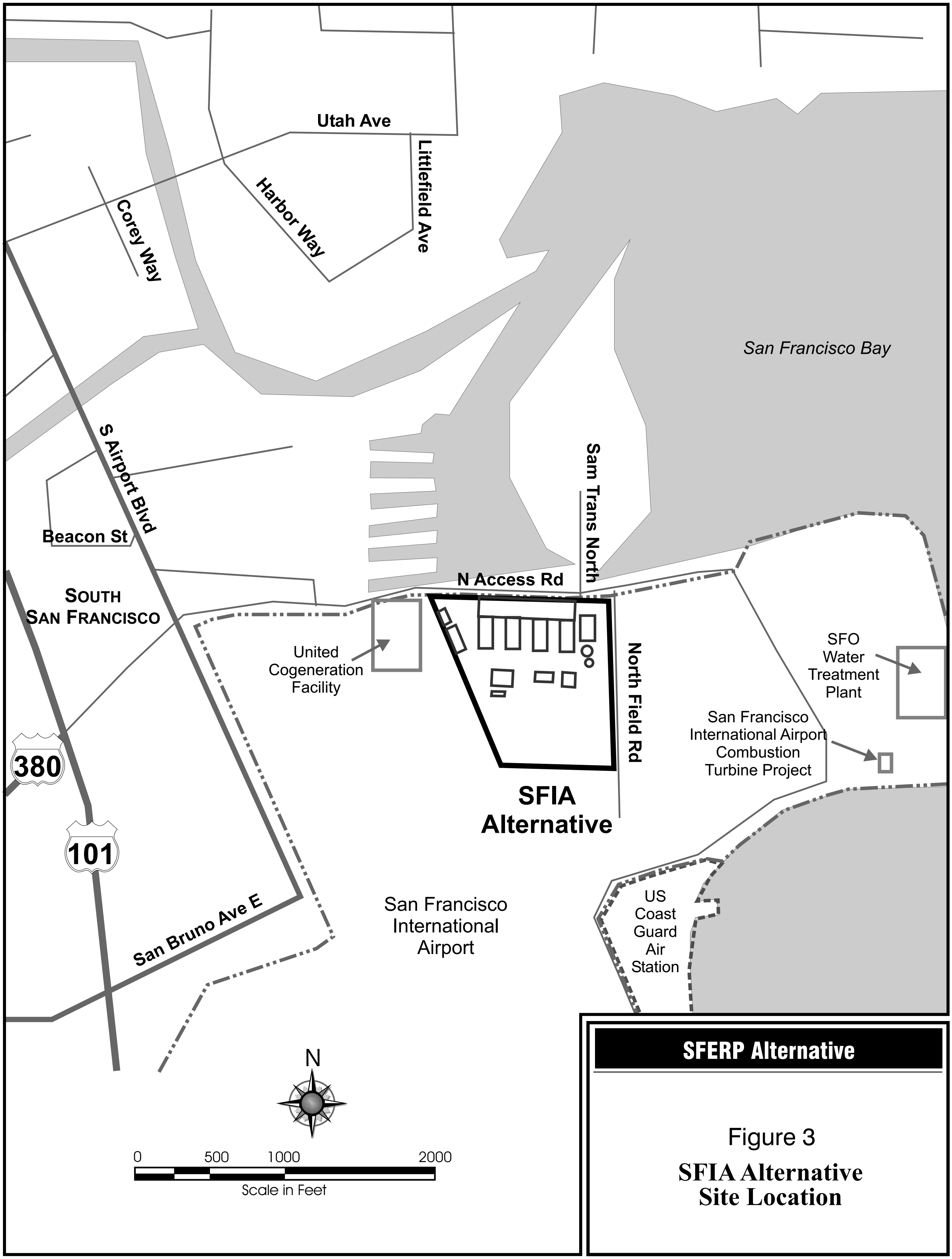
Infrastructure Availability

This alternative site is approximately 1 mile from the newly expanded SFIA Wastewater Treatment Plant on Clearwater Drive (off of North Access Road), which has a total wastewater treatment capacity of 3.22 million gallons per day. Secondary treated effluent may be obtained for plant process uses. This would substantially reduce the space and capital cost required for onsite water treatment facilities. Minimal filtering would be required for basic process water such as cooling tower makeup. Water for injection into the turbine (NOx and Sprint systems) must be de-ionized, so this treatment step would still be required.

Natural gas fuel could be supplied by a connection to PG&E's gas Line 101 near the intersection of South Airport Boulevard and North Access Road. Approximately 2,100 feet of new pipeline would be required to connect Line 101 to the project site. The new pipeline would parallel North Access Road in an existing ROW to the site. Gas compression will be required to provide adequate operating pressure for the combustion turbine. The natural gas interconnection could also be approximately 1 mile from the site at South Airport Boulevard and San Bruno Avenue (SFERP 2004q).

For this site, the electrical interconnection could either be at the East Grand substation, approximately 1.5 miles from the plant on Grand and Gateway in the City of South San Francisco (SFERP 2004q) or via the existing UCI cogeneration facility has a single-circuit 115 kV overhead transmission line that serves the UCI facility and connects with the San Mateo-Martin Circuit No. 5. Each turbine-generator for the alternative would have a dedicated unit transformer feeding a new 115 kV switchyard at the alternative site. To tie into the existing single-circuit 115 kV line for the UCI facility, the switchyard would likely connect to the San Francisco Airport Substation (BA) at 115 kV via two circuits in duct banks and conduits about 6,700 feet long.

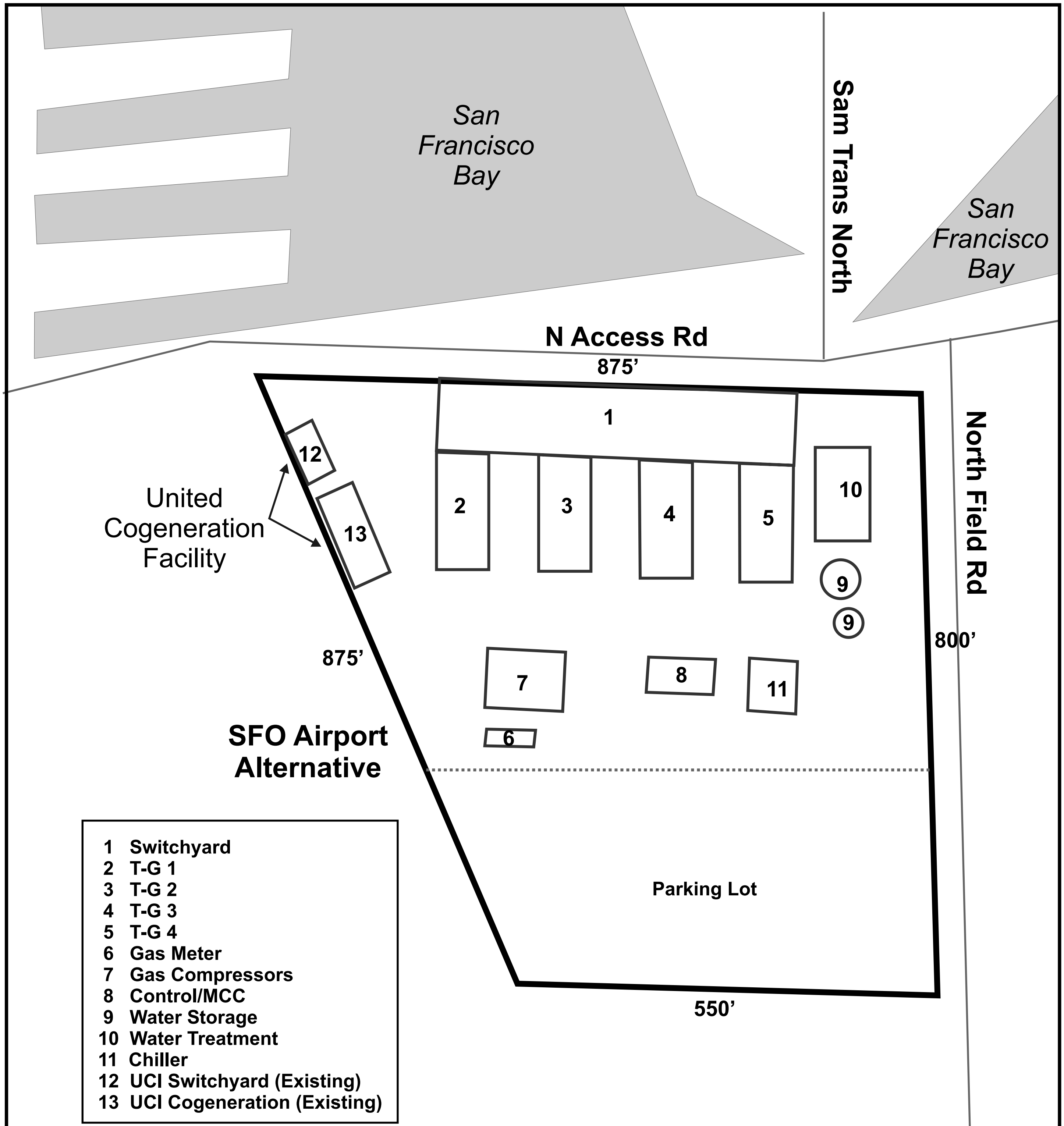
ALTERNATIVES Figure 3 shows the location of the SFIA Alternative, and **ALTERNATIVES Figure 4** shows the layout of the generating facility within the site.



SFERP Alternative

Figure 3

SFIA Alternative Site Location



SFERP Alternative

Figure 4

SFO Airport Alternative Site Layout

Environmental Assessment for SFIA Site Alternative

Air Quality

Emissions from this alternative would need to be controlled to satisfy the air permitting requirements of the BAAQMD. Power plant emissions, therefore, would be approximately 25 percent greater with the addition of the fourth turbine but the use of three turbines would have the same emissions as the proposed project. Regardless, impacts would be similar to the proposed project, because construction and operation of the SFERP at the SFIA site would be subject to similar permit requirements and similar mitigation requirements from the Energy Commission in order to avoid significant air quality impacts. Appropriate mitigation at the SFIA Alternative would likely involve similar, locally-oriented recommendations for reducing PM10impacts as those recommended for the SFERP.

Biological Resources

The SFIA site is a developed parking lot. The impervious surface of this site offers negligible to no habitat resources on the site. The nearest available habitat is the San Bruno Slough marsh located on the opposite side of North Access Road, approximately 75 to 100 feet north of the SFIA Alternative. Field reconnaissance for biological resources previously conducted by staff observed waterfowl, cord grass, pickleweed, and saltgrass at the marsh, and no occurrences of threatened or endangered species on or adjacent to the site (CEC 2002a). However, the California clapper rail (federal and state listed Endangered) is likely to occur in the coastal salt marsh habitat of San Bruno Slough north of the SFIA Alternative site.

Locating SFERP at this site could result in indirect off-site impacts to terrestrial biological resources at the nearby marsh from noise and air emissions. However, this site is located near the airport, adjacent to an existing cogeneration plant and a road that causes considerable continuous and intermittent noise during the day. Therefore, the additional noise from SFERP at this location would be unlikely to cause a significant increase in noise disturbance to biological resources. If the project were located at this alternative site, it would have similar NOx emission concerns as the proposed project site. Air pollutant emissions, such as dust during construction that may not be dispersed beyond the immediate vicinity of the marsh would need to be controlled. As with the proposed project, storm water runoff management would also be essential to avoid impacts to the surface water and the nearby marsh habitat. Because of the proximity of the SFIA Alternative to the San Bruno Slough, the overall impacts to biological resources would likely be greater than those that would occur at the proposed SFERP project site.

Cultural Resources

Records searches and detailed site surveys for cultural resources have not been completed for the SFIA Alternative, but during a recent pedestrian field survey, no historic structures were apparent on this parcel. Adjacent buildings and structures were not evaluated to determine if they met the eligibility requirements for the CRHR. Previous assessment of the SFIA Alternative by staff indicates that it has a low potential for prehistoric sites, and that no cultural resources have been previously recorded on the site (CEC 2002a). The U.S. Coast Guard Air Station San Francisco, approximately 0.5 miles from the airport site, includes several buildings that have been found eligible for listing on the National Register of Historic Places (UGGPC 2001). Buried archaeological and prehistoric cultural resources may be present at the site and in the vicinity of linear facilities. Compared to the SFERP site where there would be the potential for vibration impacts on historic buildings within one block on either side of the proposed trenching required for the underground transmission line, developing SFERP at the SFIA site would fewer impacts on historical resources.

To avoid impacts potentially caused by disturbing buried and historic resources at the SFIA Alternative, mitigation requiring oversight of a cultural resources specialist would likely be necessary; however, potential impacts would be similar to those associated with the proposed project site.

Hazardous Materials Management

Hazardous materials use, including the quantities handled during transportation and disposal, would be identical to the proposed project. The nearest residence is 10 blocks away, but the Safe Harbor homeless shelter is located 500 feet to the north across the North Access Road. The transportation route would be approximately 0.5 miles from Highway 101 and Interstate 380 along the North Access Road, where no residential areas occur. Compared to operation of the proposed project at the Potrero site, impacts from transportation of hazardous materials would be reduced by this alternative because of the lack of proximity to residences. No special measures related to hazardous materials management would be required for this alternative site, and other impacts during operation would be similar.

Land Use

The SFIA Alternative is surrounded by airport facilities with shoreline wetlands, the Safe Harbor Homeless Shelter (located approximately 500 feet from the site), and the County of San Mateo Transit Bus Yard generally to the north. The Safe Harbor Shelter is a 90-bed emergency homeless shelter for individuals 18 years and older on a first-come, first-served basis. Therefore, in general the residents of the shelter are transient and would not be subjected to long-term exposure of project construction and operation. Immediately west of the homeless shelter and adjacent to the shoreline wetlands is a small picnic area and a walking trail. Generally, the land use character of this area is predominantly industrial due to the airport-related adjacent maintenance, fueling, and cogeneration facilities.

SFIA has no zoning ordinances and the City of South San Francisco has jurisdictional oversight within the northern portion of SFIA (UGGPC 2001). Therefore, SFIA would be within South San Francisco's zoning subarea. Staff previously assessed the designation of the SFIA Alternative and found that it is designated mixed industrial by the South San Francisco General Plan with a 161-foot height limit for structures according to the General Plan's Airport Related Height Limitations (CEC 2002a). Although the designation provides for industrial use, industries producing substantial amounts of hazardous waste or odor and other pollutants are not permitted under the mixed industrial designation. The proposed height of the SFERP stacks would conform to this height limit, and, given the adjacent cogeneration facility, use of the SFIA Alternative for SFERP would likely be consistent with other applicable land use policies.

Although the site would be less than one mile from the runways of San Francisco International Airport, it would be located north of the east-west runway and thus would not be located on the extended runway centerline. Therefore, thermal and visible plumes from the facility would not likely cause land use incompatibility with aircraft operations or cause aviation safety impacts. However, the Airport Land Use Commission for the San Francisco International Airport would need to make a determination on consistency with the Airport's Comprehensive Land Use Plan. In addition, a Notice to Airmen may also be required advising pilots to avoid overflight of the power plant.

The proximity of this site to the Safe Harbor Homeless Shelter is a concern despite the transient nature of most of the residents. Although this shelter is located in a heavy industrial area and is likely affected by the existing surrounding airport-industrial uses, development of new power generating facilities at this site may exacerbate impacts on this sensitive land use. Use of this alternative site for SFERP would create more disturbances to short-term occupants of the shelter and people using the adjacent recreation area, both of which is closer to the alternative site than any permanent residences are with respect to the proposed project site (CEC 2002a). However, unlike the proposed SFERP site, there are no permanent residences within a mile of the alternative site.

Noise

The SFIA Alternative is adjacent to the UCI cogeneration plant, and the general area is impacted by noise from aircraft operations at the SFIA. The only nearby sensitive noise receptors are about 500 feet away, at the Safe Harbor Homeless Shelter. For this alternative site, there is a possibility of causing significant noise impacts to the residents of the nearby shelter. Compared to the proposed project, this alternative would cause greater operational noise impacts, and mitigating noise emissions to a level of insignificance would probably be more costly than at the proposed project site due to the proximity of the shelter. Construction noise would cause short-term impacts similar to those expected at the SFERP site.

Public Health

The air pollutants emitted by the SFERP at the SFIA Alternative would be approximately 33 percent greater with four turbines than the three that that would occur at the proposed project site. Use of three turbines would have identical emissions to the proposed project. Because the high-temperature exhaust of the combustion turbines would tend to carry the air pollutants far from the site, the Safe Harbor Homeless Shelter would not be adversely affected. As such, the project's emissions of toxic air contaminants would not be likely to expose the surrounding population to any significant risk of cancer or non-cancer health effects and impacts would be less than significant.

Socioeconomics

Staff has estimated the benefits from the SFERP project should it be built at the SFIA Alternative site. Benefits include increases in sales taxes, employment, and income for

San Francisco and neighboring counties (see **SOCIOECONOMICS Table 2** for data and information). Staff finds that the project will not cause a significant adverse socioeconomic impact on the study area's housing, schools, police, emergency services, hospitals, and utilities. Based on staff's demographic screening analysis, the minority population within six miles of the SFIA Alternative is about 64 percent and within one mile the minority population is about 76 percent. The low-income population within six miles is slightly less than 6 percent and slightly more than 2 percent within one mile. In comparison, based on staff's demographic screening analysis for the proposed SFERP project, the minority population within six miles of the proposed power plant site at Potrero is less than 57 percent (52 percent within one mile) and the low-income population within six miles is slightly above 11 percent.

Staff finds that there would be no adverse socioeconomic impacts since most of the construction and operation workforce is within the regional or local labor market area and construction activities are short-term. Staff has determined that there would be no significant adverse direct or cumulative socioeconomic impacts and, therefore, there are no socioeconomic environmental justice issues. The SFIA Alternative would be consistent with the applicable socioeconomic LORS.

Traffic and Transportation

The SFIA Alternative is located at the north end of San Francisco International Airport, on the North Access Road. There is a large long-term parking structure just east of the site and the area has heavy truck activity. The high level of industrial and commercial activity of the surrounding uses generates a substantial level of traffic. Similar to the proposed project, before construction could occur for the SFIA Alternative, a construction traffic control and transportation demand implementation program would need to be developed in coordination with the CCSF, City of South San Francisco, San Mateo County, and Caltrans. These programs would limit construction-period truck and commute traffic to off-peak periods and avoid potential traffic and transportation impacts.

Although the SFIA site would be less than one mile from the runways, it would be located to the north side of the east-west runway and thus would not be located on the extended runway centerline. Therefore, thermal and visible plumes from the facility would not likely cause conflicts with aircraft traffic and operations or impact aviation safety. However, a Notice to Airmen may be required advising pilots to avoid overflight of the power plant.

Because of the lack of residential traffic in the area, this site would cause fewer impacts to traffic and transportation than the proposed project.

Transmission Line Safety and Nuisance

Power generated at the SFIA Alternative would travel from the on-site switchyard to the adjacent UCI cogeneration facility, where an established corridor would be used to connect to the San Mateo-Martin corridor if the existing 115 kV option is used. Otherwise the line would travel to the East Grand Substation, 1.5 miles away. Similar to the proposed project, this alternative would not be likely to cause transmission line safety hazards or nuisances. The only difference for the impacts of concern would depend on the actual length of the lines as potential sources of human exposure to line fields.

Visual Resources

Observation points for the SFIA Alternative include the relatively distant residential neighborhoods near the base of San Bruno Mountain, in South San Francisco. These neighborhoods are slightly over one mile distant, but they are oriented toward the general direction of the SFIA Alternative. The surroundings of this site are of an industrial nature and they include maintenance and cogeneration facilities that exhibit substantial mass. Based on previous staff assessment for this site (CEC 2002a), staff found that the power plant would introduce a low-to-moderate level of contrast because of the industrial surroundings and that the power plant would introduce a co-dominant feature to the industrial landscape. These effects would cause adverse, but not significant visual impacts that would be similar to those of the proposed project.

Waste Management

Construction at the SFIA Alternative would require excavation of fill material that underlies the site. Previous staff assessment of the adjacent properties did not identify any areas of environmental concern (CEC 2002a).

As with the proposed project, all construction and operation activities would need to be conducted in compliance with regulations pertaining to the appropriate management of wastes. Similar to the proposed project, the project would need to implement a comprehensive program to manage hazardous wastes and obtain a hazardous waste generator identification number (required by law for any generator of hazardous wastes). The environmental impact of waste disposal would be similar to the proposed project.

Water and Soils

The SFIA Alternative would be located on San Francisco International Airport property and therefore subject to the San Francisco International Airport Tenant Improvement Guide. The guide provides provisions, regulations and procedures related to erosion control and discharge. Provisions for grading operations contain Articles that state a permit must be obtained prior to the commencement of work, which may be part of the General Tenant Permit request. During construction and site preparation, if contamination is encountered, mitigation measures consisting of proper testing, treatment, and disposal would be necessary. This would likely involve participation of the San Francisco Bay Regional Water Quality Control Board and the County of San Mateo Health Department. These plans, procedures, and measures would be similar to those necessary for the proposed project.

Water for process and domestic uses would likely be obtained from the SFIA Wastewater Treatment Plant California Water Company that serves the City of South San Francisco. Wastewater would be returned to the SFIA Wastewater Treatment Plant as well.

Worker Safety and Fire Protection

The SFIA Alternative would be located within an existing industrial area on San Francisco International Airport property, served by the City of South San Francisco Fire Department. The fire risks of this alternative would be similar to those of the surrounding existing uses, including the UCI cogeneration facility, and thus would pose no new or different demands on local services.

Similar to the proposed project, it would be appropriate for the project to provide a Project Demolition and Construction Injury and Illness Prevention Program and a Project Operations Safety and Health Program in order to ensure adequate levels of industrial safety.

Engineering Assessment for SFIA Site Alternative

Facility Design

The project's facility design at the SFIA Alternative site would be similar to that of the SFERP at the proposed project site. As with the proposed project, staff-recommended measures may be appropriate to ensure compliance with engineering laws, ordinances, regulations and standards applicable to the design and construction of the project.

Geology and Paleontology

The SFIA Alternative overlies land created when the tidal flats and marshes along the margin of San Francisco Bay were reclaimed by the placement of fill. A bedrock knob is also present in the subsurface, immediately west of the SFIA site. The fill probably consists of debris and construction rubble and is believed to be underlain by variable thickness of Younger Bay Mud and Bay-Side Sand, with bedrock at relatively shallow depths along the western margin of the site. Strong seismic ground shaking (peak ground acceleration of 0.6 to 0.7g) may occur at the site in the next 50 years, although no active faults are known to cross the site. Liquefaction potential also presents an adverse site condition. Pile foundations would likely be required for the major structures of this site. Adequate design parameters for the facility would need to be determined through a site-specific evaluation by a Certified Engineering Geologist or Geotechnical Engineer.

Impacts due to seismic hazards and soil conditions would be addressed through compliance with the requirements and design standards of the California Building Code. Based on previous staff assessment for this site (CEC 2002a), impacts to geologic and paleontological resources would not be expected. Mitigation of potential impacts to paleontological resources could be accomplished with construction monitoring by a resource specialist and salvaging of any identified fossils. These impacts and the measures for mitigation would be similar to those of the proposed project.

Power Plant Efficiency

The plant configuration and combustion turbine generator technology to be employed at the SFIA Alternative would be similar to the proposed project, which means it would result in similar consumption of fuel, and it would result in a similar level of efficiency.

Power Plant Reliability

The plant configuration at the SFIA Alternative would be similar to the proposed project, which means it would result in similar levels of equipment availability. Plant maintainability, fuel and water availability, and reliability of the plant in relation to natural hazards would each be similar to the proposed project.

Transmission System Engineering

The SFIA Alternative would not satisfy the requirements of the CA ISO for allowing closure of the Hunters Point Power Plant or other in-City generation; the CA ISO requires generation to be north of Martin Substation in order to close in-City generation. Therefore, this site would not meet the stated project objectives. Locating SFERP at SFIA would also require reevaluating the capacity of the transmission system serving San Francisco. Compared to the proposed project, this alternative would be more likely to cause adverse effects to the transmission system because constraints in the San Mateo-Martin corridor and at the Martin Substation would be exacerbated.

EAST BAY ALTERNATIVE, HAYWARD

Background

This site was selected because of its proximity to an approved power plant, the Russell City Energy Center (RCEC; 01-AFC-7). Analysis of the proposed Russell City site and several alternatives was completed in the Final Staff Assessment for that project, which was published on June 10, 2002. While the exact site evaluated herein was not considered in that FSA, many characteristics of this alternative site are similar to those of the proposed RCEC site. The RCEC site is immediately south of the Hayward Water Pollution Control Facility (WPCF), and this site is immediately north of the WPCF.

The proposed RCEC site itself was not considered as an alternative site because that project was approved by the Energy Commission, and Calpine still has control of the site. Calpine has the authority to construct at that site at any time; therefore, evaluation of that same site as an alternative in this analysis was not considered an option that would necessarily add generation capacity to the region beyond that already approved.

Site Description

The East Bay Alternative is located at 3862 Depot Road (west of Cabot Boulevard) in unincorporated Alameda County immediately west of the City of Hayward. The site is near the southeastern shoreline of the Bay, west of the junction of Interstate 880 and Highway 92. The lot is level, comprises approximately 10.52 acres, and would involve the consolidation of two parcels with the same ownership. Based on the site layout presented for the proposed SFERP in the AFC, this site should be sufficient to accommodate three LM6000 gas turbines.

The site is centered between Depot Road (to the north) and Enterprise Avenue (to the south), and has approximately 150 feet of frontage along Depot Road. It is connected with Depot Road by an approximately 500-foot long driveway. The parcel is zoned Industrial and is currently being used by several companies, including an auto salvage yard along Depot Road and on the southern portion there are a lumber yard, a pallets company, and Metal Masters (owner of the site). The site is currently for sale through a local broker. The Hayward WPCF abuts the property to the south. Directly west of the parcel are salt ponds that are adjacent to the San Francisco Bay. Depot Road is a busy two-lane roadway with parking shoulders on both sides.

The site would be adjacent to an Industrial Corridor designated by the City of Hayward's General Plan that extends along the western and southwestern perimeter of the City. This area contains a diverse mix of both small and large light industrial, heavy industrial, and office uses. Although some retail commercial uses and a few residences are interspersed through the area, the vicinity of the project site is predominantly industrial in nature, characterized by manufacturing, processing, and fabricating facilities; trucking, distribution, and warehouse facilities; contractor yards and construction supply; auto wrecking and vehicle storage; and miscellaneous industrial and business park developments (CEC 2002b).

The nearest residential uses to the site consist of an apartment complex, located northeast and approximately 0.7 miles from the site, and a single-family residence on Depot Road east of Clawiter Road, also approximately 0.7 miles from the site. There are several residences remaining within the Hayward and Alameda County Industrial zones on McCone and Dunn Road (approximately 0.7 miles or more from the site) and the nearest community is confined to the Mt. Eden residential area east of Industrial Boulevard and northeast of the site (Calpine 2001).

The East Bay Alternative site is also located in the vicinity of the Hayward Regional Shoreline, which encompasses 1,682 acres along the eastern shore of San Francisco Bay consisting of salt, fresh, and brackish water marshes and seasonal wetlands. The Hayward Regional Shoreline is managed by the East Bay Regional Park District and contains a large marsh restoration project (including Cogswell Marsh and Oro Loma Marsh) and hiking and bicycling trails, including a portion of the Bay Trail. The Shoreline Interpretive Center, located on Breakwater Avenue near Highway 92 (approximately 0.9 miles southwest of the RCEC site), is managed by the Hayward Area Recreation District (HARD) and features natural history, ecology, and marine life exhibits (CEC 2002b).

Infrastructure Availability

A water pipeline would travel 0.1 miles to connect to the City of Hayward's Water Pollution Control Facility (WPCF), which is adjacent to the site to the south. Secondary treated effluent may be purchased for plant process uses. This will substantially reduce the space and capital cost required for water treatment facilities (which are included in the proposed SFERP). Minimal filtering would be required for basic process water such as cooling tower makeup. Water for injection into the turbine (NOx and Sprint systems) must be de-ionized, so this treatment step would continue to be required.

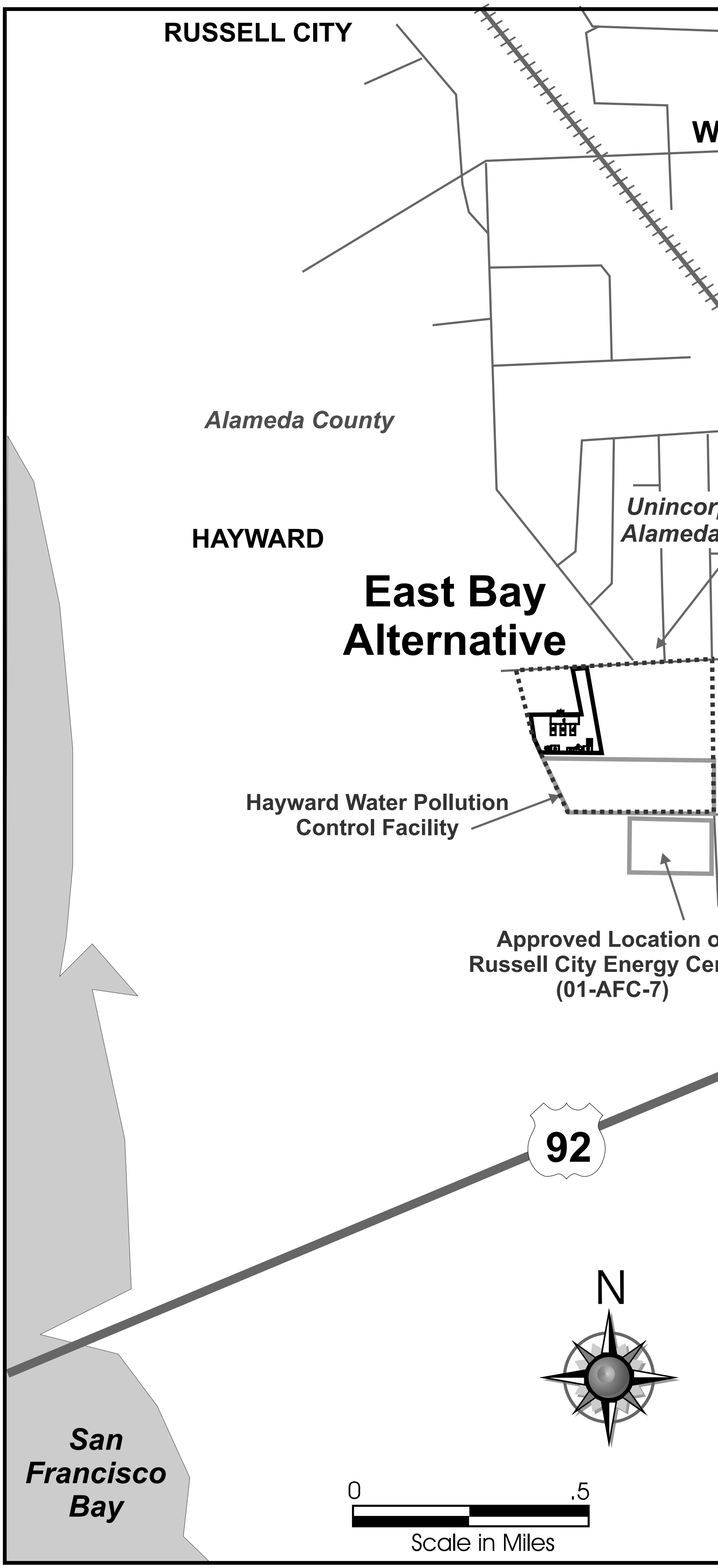
Natural gas would be supplied from a major gas local distribution line (Line 153) that parallels the Union Pacific Railroad tracks approximately 1.0 mile from the site (CEC 2002b). Gas compression would be required at the site to provide correct operating pressure for the gas turbines.

A 13.8 to 115 kilovolt (kV) step-up transformer for each unit and 115-kV on-site switchyard would be required. Approximately 1.1 miles of new 115-kV, overhead transmission line would connect the switchyard to the existing PG&E East Shore Substation via PG&E's existing East Shore to Grant 115 kV double-circuit transmission corridor, which crosses Depot Road and the Hayward WPCF approximately 600 feet east of the site. The connection would be to the East Shore Substation in a manner to be determined by PG&E.

Transmission of Electricity to San Francisco. Because the SFERP is designed to provide electricity to the CCSF, this alternative site would need additional transmission to transmit the generated electricity across the Bay and north of the Martin Substation. This would occur in a similar manner as was considered in the Russell City Energy Center FSA (CEC 2002b). The power would cross the Bay from its connection point at the East Shore Substation overhead on the existing 230 kV lines that are parallel to CA-92 (the San Mateo Bridge) approximately 12.5 miles into San Mateo Substation on the western side of the Bay in San Mateo County south of CCSF.

The addition of the SFERP generation though the East Shore Substation does not, in itself, result in a need to reconductor the East Shore to San Mateo line, because the SFERP would not trigger an overload of the line under normal conditions. Extensive transmission modeling performed for the Russell City Energy Center (RCEC) has shown, however, that this line could currently overload (pre-SFERP) under certain circumstances. Because of these potential overloads, PG&E may need to reconductor the line, changing to a higher capacity wire to prevent line failure and power outages (RCEC 2002). Should RCEC or others cause the need for reconductoring the East Shore to San Mateo line prior to this alternative coming online, there may be sufficient capacity, but only if such new generation projects and requisite upgrades preceded SFERP.

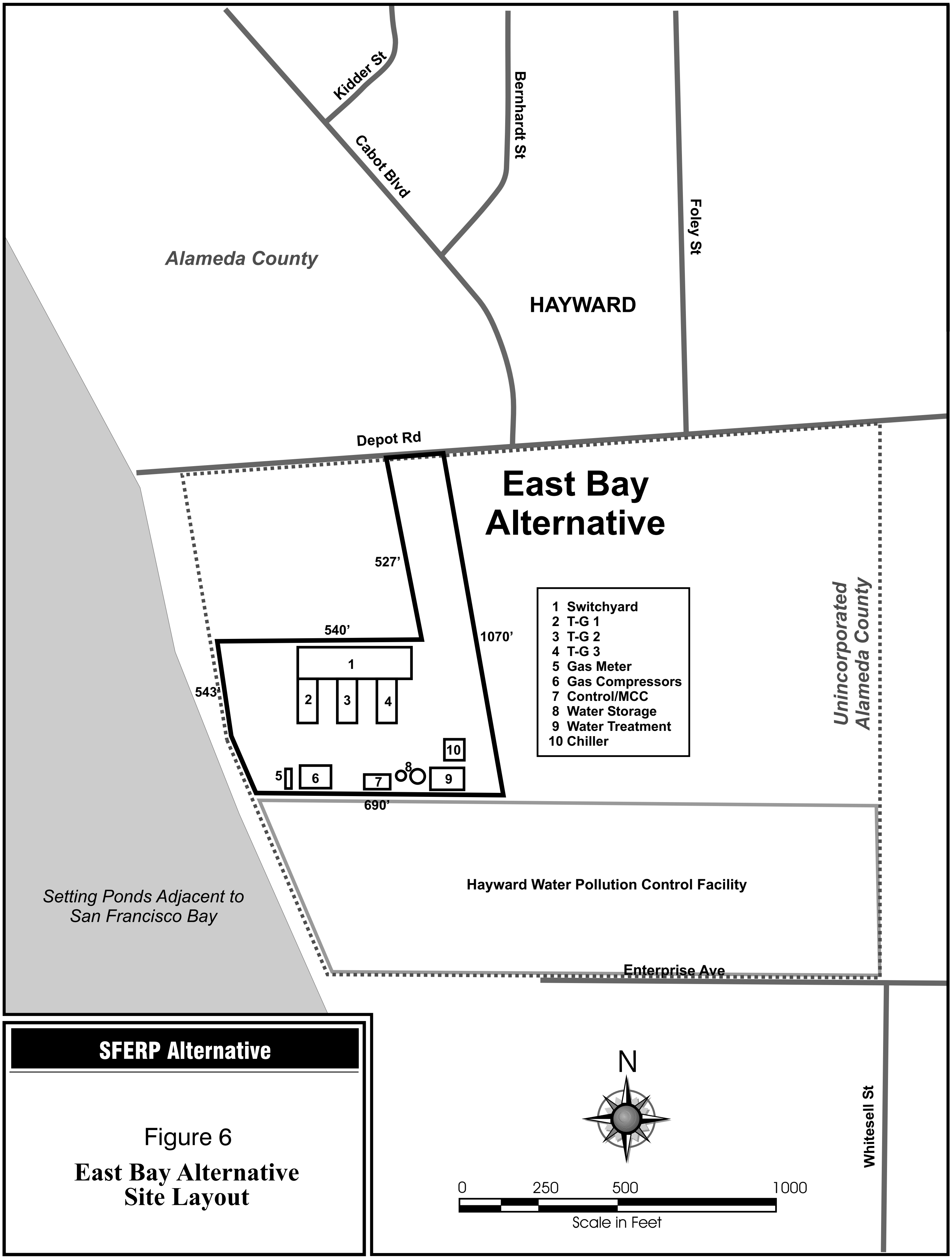
ALTERNATIVES Figure 5 shows the location of the East Bay Alternative, and **ALTERNATIVES Figure 6** shows the potential equipment layout on the site.



SFERP Alternative

Figure 5

East Bay Alternative Site Location



SFERP Alternative

Figure 6

East Bay Alternative Site Layout

Environmental Assessment for East Bay Site Alternative

Air Quality

Emissions from this alternative would need to be controlled to satisfy the air permitting requirements of the BAAQMD. Power plant emissions, therefore, would be identical under this alternative, but in the East Bay location. As such, construction and operation of SFERP at the East Bay Alternative would be subject to permit requirements and it would require Energy Commission mitigation, similar to that of the proposed project, to avoid significant air quality impacts. Appropriate mitigation at the East Bay Alternative would likely involve similar, locally-oriented recommendations for PM10impacts.

Biological Resources

The East Bay Alternative site is a combination of storage lots, surrounded by industrial uses near the Hayward Shoreline. This site is east and north of the Hayward Area Parks and Recreation District's (HARD) salt marsh restoration project and the East Bay Regional Parks District's (EBRPD) Cogswell Marsh and Salt Marsh Harvest Mouse Preserve. The East Bay Alternative is approximately 2,000 feet from the nearest boundary of the industrial area with these protected areas.

Biological surveys of the East Bay Alternative were not conducted, but similar to the proposed project, the site is developed, and there is little likelihood of causing potentially significant impacts to terrestrial biological resources. The East Bay Alternative contains no surface water bodies. Storm water runoff management would be appropriate to avoid impacts to the nearby shoreline habitat, and because of the nearby marsh, specialized mitigation measures could be needed to minimize potential perch areas for predators (raptors, ravens and crows) of the salt marsh harvest mouse (federal and state Endangered) and ground-nesting birds such as the California clapper rail (federal and state listed Endangered). In addition, connecting this alternative to the local transmission grid will likely require the installation of bird flight diverters on the above-ground ground wire to lessen the likelihood of bird collisions with these small diameter wires located above the conductors. If the East Bay Alternative requires transmission line reconductoring to lessen the likelihood of transmission line overloads, then additional biological resource impacts may occur along the shoreline, and possibly in the Bay, if existing towers and conductors need replacing. If the project were located at this alternative site, the plant's air emissions would create concerns about the potential for NOx emissions to affect biological resources near the site, i.e., at the Cogswell Marsh and Salt Marsh Harvest Mouse Preserve.

Because of the proximity of the East Bay Alternative to the protected salt marsh habitat preserves and associated protected species, the overall impacts to biological resources at this alternative site would likely be greater than those that would occur with the SFERP proposed project.

Cultural Resources

Records searches and detailed site surveys for cultural resources were not completed for the East Bay Alternative, but during a pedestrian field survey, no historic structures were apparent on the parcel. Adjacent buildings, structures and linear facilities were not evaluated to determine if they meet the eligibility requirements for the CRHR. Buried archaeological and prehistoric cultural resources may be present at the site and in the vicinity of linear facilities. Compared to the SFERP site, developing SFERP at the East Bay Alternative would be slightly less likely to have an impact on cultural resources because the site is located farther inland from the bayshore.

To avoid impacts potentially caused by disturbing buried cultural and historic resources at the East Bay Alternative, mitigation requiring oversight of a cultural resources specialist would likely be necessary; however these potential impacts would be similar to those associated with the proposed project site.

Hazardous Materials Management

Hazardous materials use, including the quantities handled during transportation and disposal, would be identical to the proposed project. The transportation route to the East Bay Alternative would occur from State Route 92, over Clawiter Road, and Depot Road, and it would generally avoid residential areas. Compared to operation of the proposed project at the SFERP site, impacts from transportation of hazardous materials would be similar because of the lack of proximity to homes. No special measures related to hazardous materials management would be required for this alternative site, and impacts during operation would be similar.

Land Use

The City of Hayward General Plan designates the East Bay Alternative with industrial zoning. The site is near but not within areas covered by the Hayward Area Shoreline Planning Agency (HASPA) and the San Francisco Bay Conservation and Development Commission (BCDC) San Francisco Bay Plan. Similar to the SFERP site, the uses surrounding the East Bay Alternative are primarily industrial, and use of the East Bay Alternative would not be likely to conflict with any applicable land use plan, policy, or regulation.

Noise

The residences nearest to the East Bay Alternative are 0.7 miles to the east on the western edge of the Mt. Eden residential area (near Depot Road and Industrial Boulevard). There are single family and multi-family homes in this area, presently exposed to a significant level of traffic noise on Depot Road and Industrial Boulevard. Compliance with the Hayward Noise Element would be likely at the nearest residential areas because of their sufficient distance from this alternative site. Compared to the proposed project, this alternative would cause similar operational noise impacts, and economical means of mitigating noise emissions to a level of insignificance would likely be available. Construction noise would cause impacts similar to those expected at the SFERP site.

Public Health

The air pollutants emitted by the SFERP at the East Bay Alternative would be identical to those that would occur at the proposed project site. As such, the project's emissions of toxic air contaminants would not be likely to expose the surrounding population to any significant risk of cancer or non-cancer health effects.

Socioeconomics

Staff has estimated the benefits from the SFERP project should it be built at the East Bay alternate site. Benefits include increases in sales taxes, employment, and income for Alameda and neighboring counties (see **SOCIOECONOMICS Table 2** for data and information). Staff finds that the SFERP project will not cause a significant adverse socioeconomic impact on the study area's housing, schools, police, emergency services, hospitals, and utilities. Based on staff's demographic screening analysis, the minority population within six miles of the East Bay Alternative site is about 65 percent and it is approximately 75 percent within a one mile radius of the Russell City Energy Center site, which is less than one mile to the south. The low-income population within six miles is about 8.5 percent. In comparison, based on staff's demographic screening analysis for the proposed SFERP project, the minority population within six miles of the proposed power plant site at Potrero is less than 57 percent and the low-income population within six miles is slightly above 11 percent.

Staff finds that there would be no adverse socioeconomic impacts since most of the construction and operation workforce is within the regional or local labor market area and construction activities are short-term. Staff has determined that there would be no significant adverse direct or cumulative socioeconomic impacts and, therefore, there are no socioeconomic environmental justice issues. The East Bay Alternative would be consistent with the applicable socioeconomic LORS.

Traffic and Transportation

Traffic in the vicinity of the East Bay Alternative tends to be congested due to the high level of industrial activity of the surrounding uses. Similar to the proposed project, before construction could occur at the East Bay Alternative, a construction traffic control and transportation demand implementation program would need to be developed in coordination with the City of Hayward and Caltrans to limit construction-period truck and commute traffic to off-peak periods and avoid potential traffic and transportation impacts.

The East Bay Alternative would be sufficiently distant from the Hayward Municipal Airport (1.3 miles northeast of the site) so that it would not adversely affect air traffic.

Transmission Line Safety and Nuisance

The electricity from the SFERP at the East Bay Alternative would travel through a new 115 kV overhead transmission line, parallel to an existing 115 kV line for approximately 1.5 miles to the East Shore Substation. The substation would need to be modified within its fence line to accommodate its entry. Approximately 600 feet of the new transmission line would occur in a new right-of-way until it intersects with the existing East Shore-Grant corridor.

Because substantial system reinforcements may be necessary, especially to the cross-bay corridor, the transmission line safety and nuisance impacts would likely be greater than those that would occur under the proposed project. This, and the much longer line needed for this alternative site would make it less preferable than the proposed Potrero site in terms of the total length of the source of line fields to which individuals might be exposed.

Visual Resources

Relevant key observation points from residences and a recreational area (Hayward Shoreline Interpretive Center within the Hayward Shoreline Recreational Park) would be located more than 0.7 miles from the East Bay Alternative.

The most prominent project feature at this distance would be the three 85-foot tall stacks. The stacks would be substantially taller than the surrounding industrial structures, which tend to be less than 40 feet tall. With the exception of the stacks, the horizontal form and straight lines of other project features would appear similar to the form of existing structures. The medium gray color of the project would contrast moderately with the white color of existing structures which themselves contrast highly with landforms. The project would appear co-dominant with existing structures.

The project would occupy a small portion of the wide field of view available at the Hayward Shore Interpretive Center. The spatial prominence of the project would be reduced since it would be seen entirely against the backdrop of the East Bay Hills (i.e., project structures would not extend above the ridgeline of the hills).

The project would block from view a relatively small amount of an undeveloped portion of the East Bay Hills for Interpretive Center trail users. In addition, this view blockage would be of short duration as a trail user's position relative to the project site changes.

The project would have moderately low contrast with the rolling, horizontal form of the East Bay Hills. The gray colors of the project would cause moderately low contrast with the seasonal brown and green color of the landforms. Scale contrast would be low since the project would appear much smaller than the landforms.

Similar to the proposed project, mitigation would be appropriate for minimizing the visual effects and light and glare.

The SFERP does not propose landscaping. However, the layout of the project on the East Bay Alternative site and the design of project landscaping in areas along the perimeter of the site that front on streets would require standard street trees be planted to comply with the requirements of the City of Hayward's zoning ordinance, and to provide for a continuation of the Industrial Corridor's tree canopy. The canopy created by the street trees would block views toward stacks and other tall features from nearby areas and would integrate the project into the overall visual composition of the area. Setback areas would need to be established and be landscaped with a mixture of trees, shrubs, and groundcovers to create a visually engaging composition in views from existing roads.

With the project's architectural treatment and careful landscaping around the perimeter of the site to provide maximum screening of views toward the site, the project would visually relate to its immediate setting. The project at the East Bay Alternative site would cause adverse but not significant visual impacts that would be similar to those of the proposed project.

Waste Management

Construction at the East Bay site would require removal of automobiles from the salvage yards, and oversight of this activity may be necessary to ensure proper removal and disposal. This activity and other construction and operation activities would need to be conducted in compliance with regulations pertaining to the appropriate management of wastes. Similar to the proposed project, the project would need to implement a comprehensive program to manage hazardous wastes and obtain a hazardous waste generator identification number (required by law for any generator of hazardous wastes). The environmental impact of waste disposal would be similar to the proposed project.

Water and Soils

Contaminated soils or groundwater could be encountered at the East Bay Alternative because of previous activities that may have resulted in hydrocarbon spills. Site assessment and remediation may be necessary prior to construction, which would involve participation of the San Francisco Bay Regional Water Quality Control Board, and possibly the City of Hayward Fire Department. During construction and site preparation, if contamination is encountered, mitigation measures consisting of proper testing, treatment, and disposal would be necessary.

Plans for grading and erosion control, dewatering, and storm water pollution prevention would also need to be reviewed by local agencies, including the San Francisco Bay Regional Water Quality Control Board, the City of Hayward Public Works Department, Alameda County Public Works Agency, and the State Water Resources Control Board. These plans, procedures, and measures would be similar to those necessary for development of SFERP at the proposed project site.

Worker Safety and Fire Protection

The East Bay Alternative would be located within an existing industrial area that is currently served by the local fire department. The fire risks of this alternative would be similar to those of the surrounding existing uses, including the Hayward WPCF, and thus would pose no new or different demands on local services.

Similar to the proposed project, it would be appropriate for the project to provide a Project Demolition and Construction Injury and Illness Prevention Program and a Project Operations Safety and Health Program in order to ensure adequate levels of industrial safety.

A previous staff assessment for another power plant evaluated the availability of fire and EMS equipment, staff, and response time and found them to be adequate (CEC 2002b).

Engineering Assessment for East Bay Site Alternative

Facility Design

The project's facility design at the East Bay Alternative site would be similar to that of the SFERP at the proposed project site. As with the proposed project, staff-recommended measures may be appropriate to ensure compliance with engineering laws, ordinances, regulations and standards applicable to the design and construction of the project.

Geology and Paleontology

Strong seismic ground shaking is probable at the site, and this may be amplified by young Bay mud and unconsolidated sediments underlying the site. The site may also be subject to expansive soil conditions (i.e., soils that swell when saturated). Adequate design parameters for the facility would need to be determined through a site specific evaluation by a Certified Engineering Geologist or Geotechnical Engineer.

Impacts due to seismic hazards and soil conditions would need to be mitigated by complying with the requirements and design standards of the California Building Code and standards adopted by the City of Hayward Public Works Department. Based on the assessment for the nearby (proposed) Russell City Energy Center, impacts to geologic resources would not be expected. Mitigation of potential impacts to paleontological resources could be accomplished with construction monitoring by a paleontological resources specialist and salvaging of any identified fossils. These impacts and the measures for mitigation would be similar to those of the proposed project.

Power Plant Efficiency

The plant configuration and combustion turbine generator technology to be employed at the East Bay Alternative would be similar to the proposed project, which means it would result in similar consumption of fuel, and it would result in a similar level of efficiency.

Power Plant Reliability

The plant configuration at the East Bay Alternative would be similar to the proposed project, which means it would result in similar levels of equipment availability. Plant maintainability, fuel and water availability, and reliability of the plant in relation to natural hazards would each be similar to the proposed project.

Transmission System Engineering

The East Bay Alternative would not satisfy one of the CA ISO's requirements for a generator that would allow closure of in-City generation, including the Hunters Point Power Plant and Potrero Unit 3: locating a generator on the San Francisco Peninsula, north of the Martin Substation, which is also a stated project objective. Locating SFERP in the East Bay would also require reevaluation of the capability of the transmission system, especially the existing cross-bay connections that would bring the power generated to CCSF. In addition, based on the staff assessment for the proposed RCEC, there is a possibility that use of the East Bay Alternative for SFERP would overload portions of the transmission system (CEC 2002b). Higher capacity conductors between the East Shore and San Mateo Substations may be required to ensure full output of the SFERP at this site, and modifications to the East Shore Substation would also be required. Similar modifications to the transmission system may be necessary to ensure full output of SFERP if RCEC were constructed first. Additional transmission constraints may also be encountered between the San Mateo Substation and San Francisco.

POTRERO POWER PLANT UNIT 7

Alternative Description

Mirant Potrero, LLC (Mirant) filed its original Application for Certification (AFC) on May 31, 2000, for the Potrero Power Plant Unit 7 Project, which would be a nominal 540 MW natural gas-fired, combined cycle power generating facility. Mirant proposed to construct and operate the plant as an expansion of its existing Potrero Power Plant (Units 3 through 6) that is located on the eastern edge of the CCSF. This site was originally considered for the proposed SFERP; however, the City was unable to conclude an option agreement with Mirant for the purchase of the site. Therefore, the location of the proposed SFERP was changed and the Potrero Power Plant site was instead considered as an alternative (the Mirant Site) in the Supplemental Application for Certification (SFPUC 2005a).

The existing Potrero Power Plant, located on 26 acres approximately 0.5 miles north of the proposed SFERP and adjacent to Potrero Substation, is one of two power plants in California that are required to maintain dual-fueled capabilities (natural gas and fuel oil) by the CA ISO. Major existing site features include:

- Unit 3, a 206-MW, steam turbine generator that has dual-fuel capabilities, natural gas and Bunker C fuel oil. Its normal, and current, mode of operation is natural gas firing. Conversion of Unit 3 to use Bunker C should it be required due to partial or full loss of other generation and/or transmission sources, would take approximately 10 days. Unit 3 features a once-through power plant cooling system comprised of intake/outfall structures (CEC 2002a). These structures would be replaced by new intake/discharge systems as a part of the Unit 7 project.
- Three distillate-fired 52-MW peaking units, Units 4, 5 and 6 (totaling 156-MW).
- Three fuel tanks. Tanks Numbers 3 and 4 are filled with Bunker C fuel oil for emergency operation of Unit 3 should natural gas service be interrupted. Tank Number 5 holds the distillate fuel for the peaking Units 4, 5 and 6.
- Station A Complex: turbine room, pump house and gatehouse.
- Gas plant structures: Meter House and Compressor House.

The Unit 7 plant would be located in west-center portion of the site where the existing turbine building stands. Unit 7 would feature two Combustion Turbine Generators (CTGs) and one Steam Turbine Generator (STG). Heat generated from each CTG (a combustion cycle) would flow through a separate Heat Recovery Steam Generator (HRSG) where steam would be produced, which would be used to drive the STG (a steam cycle). This two CTG/HRSG and one STG set up is referred to as a “two-on-one” combined-cycle configuration. Pollution controls on each CTG/HRSG “train” would include a Selective Catalytic Reduction (SCR) system to control the emissions of oxides of nitrogen (NOx), and a CO catalyst to control carbon monoxide emissions. Aqueous ammonia would be used as the reagent in Unit 7’s SCR system. Deliveries will be made by tanker trucks and stored in two new and identical, 20,000-gallon aboveground storage tanks. One tank would be used for Unit 7; with the second tank provided for the Unit 3 SCR retrofit, which is required for compliance with Bay Area Air Quality Management District regulations.

In the January 19 and 31, 2001, amendments to the AFC, Mirant added the demolition of six existing structures to the project. The Station A Complex (turbine room, office, pump house and gate house) and the Meter House and Compressor House were originally slated to be removed under permits issued by the CCSF, but due to urgings by the CCSF and delays, demolition was included in the Energy Commission's Staff Assessment process.

In its original application, Mirant proposed to use water from San Francisco Bay for circulating cooling purposes at the rate of 158,000 gallons per minute (228 million gallons per day). Energy Commission staff in its Final Staff Assessment (FSA) for the project (February 11, 2002) recommended that the project be licensed with mitigation, including replacement of the proposed once-through cooling system with an alternative cooling system. Two cooling options were recommended by Energy Commission staff: a hybrid cooling system that would use reclaimed water and cooling towers, or a dry cooling system that could cool power plant exhaust without use of substantial quantities of water. The FSA identified significant impacts that would result if Mirant implemented its proposed once-through cooling system. In response, in mid-2003, Mirant filed an AFC amendment that analyzed the use of recycled-water cooling systems and proposed use of hybrid cooling, eliminating the previously proposed once-through cooling system.

Mirant requested certification of the project with both cooling system alternatives. Because the original proposal to use a once-through power plant cooling system was not supported by staff in the February 11, 2002, FSA, this staff assessment considers only the hybrid (wet/dry) option to be feasible. The hybrid cooling option would use recycled water from the SEWPCP within a wet/dry plume abated cooling tower at the Unit 7 site. It would require construction of new pump stations and pipelines between the Potrero site and the SEWPCP to convey secondary effluent water from the SEWPCP and return blowdown and sludge water from the Unit 7 power plant. This would avoid potentially significant impacts to aquatic biological resources that were identified for the once-through cooling option.

Mirant Corporation filed for bankruptcy protection on July 14, 2003, and in early November 2003, it requested that review of the AFC be suspended. A year suspension to November 15, 2004 was granted by the Committee and a second request was granted extending the current suspension for another year to November 15, 2005. The suspension order requires that Mirant provide a 45-day notice of their intent to reactivate the proceedings.

It is not certain that the Potrero Unit 7 project could be permitted with either the once-through or hybrid cooling systems. Even if the effects on aquatic resources were eliminated, there was substantial public concern about the effect of Potrero Unit 7 on public health and safety, as well as environmental justice issues due to effects of the proposed plant on areas with disproportionately high minority and low-income populations. The CCSF would have to approve the Potrero Unit 7 project because either cooling option would require a permit from the City (or its Port Authority).

Despite the CCSF's stated opposition to the Potrero Unit 7 project, it is being considered as an alternative to the SFERP, because Mirant could continue with its application process and construction of the Potrero Unit 7 Project. The Energy Commission believes that it is important that a comparison of the potential impacts of Potrero Unit 7 Project with the impacts of the SFERP be presented for review by the public and affected agencies.

Infrastructure Availability

The natural gas pipeline currently serving Potrero Units 3 through 6 would fuel the proposed Unit 7. A pipe tie-in would be made to the gas distribution line and this service will be connected to a compressor station that would be part of Unit 7.

Interconnection with the State's high voltage transmission system would be through the new Potrero Power Plant Switchyard, located onsite, and to two existing PG&E substations. These would be a direct interconnection to PG&E's Potrero Substation adjacent to the Potrero Power Plant, and a separate underground interconnection to the Hunters Point Substation located approximately 1.8 miles to the south of the Potrero Power Plant site. This interconnection was originally part of the Potrero Power Plant Unit 7 AFC, but it is currently being evaluated by the CPUC in response to an application from PG&E to construct the underground 115 kV transmission line, and would not be part of the Potrero Unit 7 project if it were reconsidered.

ALTERNATIVES Figure 1 shows the location of the Potrero Power Plant.

Environmental Assessment for Potrero Unit 7 Alternative

Air Quality

The range of air pollutants emitted by the Potrero Power Plant Unit 7 alternative would be similar to those that would occur with proposed project because both would fire large quantities of natural gas. All emissions from the Potrero Power Plant Unit 7 alternative would need to be controlled to satisfy the air permitting requirements of the BAAQMD. As such, construction and operation of Unit 7 would be subject to BAAQMD requirements set forth in the Energy Commission permit. The Unit 7 alternative would provide a more efficient level of electrical output per pound of pollution generated. Compared to the SFERP, which would create 0.09 pounds of NOx per megawatt-hour (lb/MW-hr) (SFERP 2004a), the Unit 7 alternative would emit NOx at a rate of approximately 0.07 lb/MW-hr. The following table (**ALTERNATIVES**: **Table 3**) shows the criteria pollutant emissions during routine operation of the 540 MW Unit 7 alternative compared with operation of the proposed 145 MW SFERP.

ALTERNATIVES Table 3
Comparison of Maximum Hourly and Annual Emissions

	NOx		PM10		CO		SOx		VOC	
Equipment/Sources	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
Unit 7 Alternative Total	40	138	26	96	60	206	6	20	11	38
SFERP Total	13	40	9	18	13	28	1	3	4	8

Sources: Potrero Unit 7 AFC Cooling Tower System Amendment Table 8.1-6 (steady state with duct burners, including cooling tower emissions; annual basis: 7,446 hours per year); SFERP AFC Table 8.1-17 (steady state; annual basis: approximately 4,000 hours per year).

Air quality impacts from the Potrero Power Plant Unit 7 alternative would be greater than those under the proposed project, and they would require additional mitigation for localized PM10impacts. Mitigation required for the Potrero Power Plant Unit 7 alternative would likely be similar in nature to that necessary for SFERP, but it would need to be in substantially greater quantities.

Biological Resources - Aquatic

The Potrero Power Plant Unit 7 alternative with once-through cooling would cause significant impacts to aquatic biological resources. To address this, staff previously recommended alternative technologies for cooling as a means of avoiding significant impacts related to the loss of planktonic organisms from once-through cooling. Impacts to aquatic biology would much more severe with the Unit 7 alternative with once-through cooling when compared to the proposed project.

The hybrid (wet/dry) cooling system option, proposed by Mirant in July 2003 (Potrero Power Plant Unit 7 AFC Cooling Tower Amendment), would avoid nearly all impacts to aquatic biological resources impacts. With the hybrid cooling option, the Potrero Power Plant Unit 7 alternative would not be expected to cause significant impacts to aquatic biological resources because all blowdown and sludge water from the cooling system would be returned to the SEWPCP for treatment. With this cooling system, the impacts of the Potrero Power Plant Unit 7 alternative would be similar to those of the proposed project.

Biological Resources - Terrestrial

The Potrero Power Plant Unit 7 alternative would require temporary use of temporary laydown facilities either at Pier 80 or Pier 96. This would involve a large area of construction activity, but it would occur on urban and disturbed lands, where no potentially significant impacts to terrestrial biological resources would be expected. Although more land would be disturbed with this alternative, potential impacts to terrestrial biology during construction would be similar to those of the proposed project. If the project were located at this alternative site, it would have similar NOx emission concerns for biological resources as the proposed project site. Storm water runoff management would be essential to avoid impacts to the surface waters.

During operation of the Potrero Power Plant Unit 7 alternative, bird collisions with the exhaust stacks may occur, but as with the proposed project, these impacts would not be considered significant.

Cultural Resources

The Potrero Power Plant Unit 7 alternative would require mitigation to avoid potentially significant impacts related to disturbing buried archaeological resources. At the time of the Energy Commission's analysis, potentially significant impacts were identified due to the possible demolition of the historic Meter House and Compressor House at the site. Staff previously recommended relocating them elsewhere in San Francisco for preservation (CEC 2002a). During hearings on the Potrero Unit 7 case, staff determined that no feasible locations were available for the Meter House and the Compressor House. Since the structures could not be moved, the demolition of the

Compressor House and the Meter House were found to result in an unmitigable significant impact. The demolition of both the Meter House and the Compressor House would be much more severe impacts than historic resource impacts under the SFERP project. However, on May 4, 2005 the San Francisco Planning Department issued a Notification of Project Receiving Environmental Review stating that the City will be performing an environmental review on the demolition of the Station A buildings at Potrero Power Plant due to seismic risks. This proposed demolition would include the Station A Turbine, Compressor House, Meter House, and Gate House Buildings. If this demolition were to occur, this impact would not be attributed to the Potrero Unit 7 project and cultural resources impacts between the two sites would be similar.

Hazardous Materials Management

Construction of the Potrero Power Plant Unit 7 alternative would require use of small quantities of hazardous materials, such as lubricating oils and fuels. Operation of the combined-cycle power plant would similarly involve some use of oils and fuels, and it would also require transportation, handling and use of hazardous materials in large quantities. For air pollution control systems, substantial quantities of aqueous ammonia would need to be delivered to the site and stored. There would be a risk of impacts if a catastrophic accidental release of ammonia occurred, but staff previously assessed such a scenario and found that significant concentrations would not result off-site (CEC 2002a). Large quantities of other materials would also be used, such as sulfuric acid, sodium hypochlorite, and petroleum fuels.

These materials would be present at the site in quantities greater than those under the proposed project. Because of the large quantities, a Risk Management Plan and Safety Management Plan would be required for ensuring safe management of these materials, as it would be for the proposed SFERP project. The U.S. EPA and CCSF would be required to review and oversee implementation of the management plans, in conjunction with Energy Commission staff. Compared to the proposed project, impacts from transportation of the larger quantities of hazardous materials would be increased under the Unit 7 alternative but would remain an insignificant risk.

Land Use

The City and County of San Francisco's Central Waterfront Area Plan designates the Potrero Unit 7 site with zoning for heavy industry. The site is adjacent but not within properties covered by the plans of the Port of San Francisco. The BCDC's San Francisco Bay Plan would only apply to portions of the Potrero Power Plant Unit 7 alternative associated with the proposed once-through cooling system. With the hybrid cooling option, no portion of the Potrero Power Plant Unit 7 alternative would be within the jurisdiction of the BCDC. Measures that would be appropriate under the proposed project, to facilitate access to the shoreline and the San Francisco Bay Trail, consistent with BCDC and local recommendations, would also be applicable to this alternative. As with the proposed project, the Potrero Power Plant Unit 7 alternative would not be likely to conflict with any applicable land use plan, policy, or regulation.

Infrastructure necessary for the Potrero Power Plant Unit 7 alternative may include underground pipelines connecting to the SEWPCP for reclaimed water. Such off-site improvements would need to be coordinated with other ongoing projects in the vicinity, such as the Municipal Railway Metro East Light Rail Maintenance and Operations Facility and the Third Street Light Rail Transit Line. Compared to the proposed SFERP, construction of this off-site infrastructure would require more rigorous coordination with local agencies.

Noise

The nearest residentially-zoned residence with a direct line of site to the Potrero Power Plant Unit 7 alternative would be approximately 1,200 feet from the facility. This location is presently exposed to a significant level of traffic noise from surrounding surface streets. Compliance with the CCSF Zoning Code would be likely at the nearest existing residences, including newer live/work projects near the site, primarily because of their industrial zoning. The Potrero Power Plant Unit 7 alternative may, however, cause a significant noise increase at an adjacent live/work property if the hybrid cooling option is selected, because the wet/dry cooling tower would include numerous large diameter fans, which may warrant a special noise-reducing design.

Potentially significant noise from power plant components can typically be reduced with economical design modifications. Mitigation measures to minimize the noise increases with the Potrero Power Plant Unit 7 alternative would be similar to those recommended for the proposed SFERP. Although staff has not completed a detailed assessment of the Potrero Power Plant Unit 7 alternative with the hybrid cooling option, low-speed fans could be employed in the wet/dry cooling tower if they would be necessary to avoid a significant noise increase. Construction noise would cause impacts slightly greater than those anticipated for SFERP because they would occur over a longer duration. Although noise impacts would be slightly greater than with the proposed project, measures would be available to mitigate all potentially significant impacts.

Public Health

The range of air pollutants emitted by the Potrero Power Plant Unit 7 alternative would be similar to those that would occur with proposed project because both would fire large quantities of natural gas. The toxic contaminant that would be emitted in the greatest quantities by the 540 MW Potrero Power Plant Unit 7 alternative would be ammonia, which could be emitted by the facility at a maximum rate of approximately 60 pounds per hour (SECAL 2000). This can be compared to the 145 MW SFERP, which could emit ammonia at a maximum rate of 19.6 lb/hr (SECAL 2000). The Unit 7 alternative would emit greater quantities of toxic air contaminants. However, similar to the proposed project, this alternative would not be likely to expose the surrounding population to any significant risk of cancer or non-cancer health effects.

Socioeconomics

Staff has estimated the benefits from the SFERP project should it be built at the Potrero Power Plant Unit 7 site. Benefits include increases in sales taxes, employment, and income for San Francisco and neighboring counties (see **SOCIOECONOMICS Table 2** for data and information). Staff finds that the SFERP project will not cause a significant adverse socioeconomic impact on the study area’s housing, schools, police, emergency services, hospitals, and utilities. Based on staff’s demographic screening analysis, the minority population within six miles of the Potrero Power Plant Unit 7 site (where both the SFERP and the Potrero Unit 7 alternative would be located) is about 57 percent (within one mile the minority population is 51 percent), though there are individual census blocks with greater than 75 percent minority population. The low-income population within six miles is approximately 11 percent.

Staff finds that there would be no adverse socioeconomic impacts since most of the construction and operation workforce is within the regional or local labor market area and construction activities are short-term. Staff has determined that there would be no significant adverse direct or cumulative socioeconomic impacts and, therefore, there are no socioeconomic environmental justice issues. As was determined in the Staff Assessment for the Potrero Power Plant Unit 7, the Potrero Power Plant Unit 7 alternative would be consistent with the applicable socioeconomic LORS (CEC 2002a).

Traffic and Transportation

The high level of industrial activity of the surrounding uses generates a substantial level of truck traffic. Similar to the proposed project, before construction could occur for the Potrero Power Plant Unit 7 alternative, a construction traffic control and transportation demand implementation program would need to be developed in coordination with the CCSF and Caltrans. These programs would limit construction-period truck and commute traffic to off-peak periods and avoid potential traffic and transportation impacts.

The Potrero Power Plant Unit 7 alternative would have the potential to cause a greater disruption of local streets due to its longer construction schedule and off-site infrastructure that would be necessary. While the proposed project would require approximately 0.75 miles of construction in city streets to install the process water supply pipeline, the Potrero Power Plant Unit 7 alternative may require additional pipelines to the SEWPCP if the hybrid cooling option is included. Although these impacts would be more severe than those of the proposed project, they would be less than significant through proper coordination with local agencies.

Transmission Line Safety and Nuisance

The electricity from the Potrero Power Plant Unit 7 alternative would travel through two paths: an interconnection to the existing Potrero Substation, and an underground 115 kV transmission line for approximately 1.8 miles in city streets to the Hunters Point Substation. Compared to the proposed project, which would only connect to the adjacent Potrero Substation, this alternative would be more likely to cause transmission line safety hazards or nuisances.

Visual Resources

The Potrero Power Plant Unit 7 alternative would occur less than 0.5 miles from the site of the proposed project, within the highly urbanized western shore of the San Francisco Bay. The same visual setting and key observation points (KOP) that apply to the SFERP would also apply to this alternative.

The most visible features of the Potrero Power Plant Unit 7 alternative would include two 60-foot tall air inlets to the combustion turbine generators, the 60-foot tall steam turbine generator, the 94-foot tall heat recovery steam generator trains, and two 180-foot tall stacks. If the hybrid cooling option is selected, the wet/dry cooling tower would also be a prominent structure at 70 feet high, with a footprint of 670 feet by 60 feet. The cooling tower would also generate steam plumes, especially during cool and wet weather, although the hybrid design would substantially abate the frequency of visible plumes. Other features of the Potrero Power Plant Unit 7 alternative would include an expansion to the Potrero Substation switchyard and possibly the once-through cooling water intake structure, adjacent to the shoreline. The existing 300-foot stack that dominates most views of the area would remain in place under this alternative.

Numerous residences at elevated locations on Potrero Hill would have a view of the site. While residents generally anticipate open, frontal views of a highly urbanized, industrial waterfront landscape, any new industrial features in the views of the Bay would be perceived as detracting from the more scenic elements of the view.

Relevant observation points, including existing residences and recreational areas, would be located approximately 0.5 miles away from the site, which puts the site between the foreground and middle-ground viewing distances for viewers. The Potrero Power Plant Unit 7 alternative would introduce prominent structures of industrial character into the foreground to middle-ground of views from nearby residences and recreation areas. The existing landscape is industrial in appearance with forms, lines, and characteristics similar to those of this alternative. Given this setting and the distances to observation points, the Potrero Power Plant Unit 7 alternative would be co-dominant with existing structures, and would have a low to moderate degree of visual contrast depending on viewpoint. In the context of the site's overall moderate visual impact susceptibility, the resulting visual impact would be considered adverse but not significant. Similar to the proposed project, mitigation would be appropriate for minimizing the visual effects and light and glare.

Similar to the proposed project, it would be difficult for the Potrero Unit 7 alternative to incorporate power plant structure design that would enhance the pleasure of the user or viewer of the Bay or preserve views of the Bay and shoreline, and to ensure that public access is consistent with the BCDC Public Access Design Guidelines. Presently, the only view of the Bay from Illinois Street in the project vicinity is looking down 23rd Street. This alternative may require architectural screening of the project's HRSG and the exhaust stacks; similar to the red brick building façade proposed for the original Potrero Unit 7 project. The SFERP does not propose landscape screening because it involves smaller and less bulky structures than the Unit 7 project and is outside of the jurisdictional boundary of the BCDC. The SFERP is also located farther from residences.

The Unit 7 alternative would increase the structural density and limit visual access across the site and views of the Bay. Under the present circumstances, views from Illinois Street across the undeveloped site of the future light rail maintenance and operation facility to this alternative site are unobstructed.

Waste Management

Hazardous and non-hazardous wastes would be generated during construction and operation. Construction wastes would be generated, similar to that of the proposed project, but in larger quantities due to the longer and more intense construction schedule. There would also be an increased likelihood of encountering unknown contamination during off-site construction excavations that would be required under this alternative (including the transmission cable and possibly pipelines); however, managing such wastes would require oversight by the San Francisco Department of Public Health, the San Francisco Bay Regional Water Quality Control Board, and the Department of Toxic Substances Control. If the once-through cooling option is selected for the Potrero Power Plant Unit 7 alternative, contaminated off-shore sediment could be disturbed during construction of the cooling water intake structure. Dredged material would need to be transferred to land and disposed at an appropriate facility. The environmental impact of dredged material disposal would be greater than the impacts associated with the proposed project.

All construction and operation activities would need to be conducted in compliance with regulations pertaining to the management of hazardous wastes. As with the proposed project, it would be appropriate for the project to implement a comprehensive program to manage hazardous wastes and obtain a hazardous waste generator identification number (required by law for any generator of hazardous wastes).

Water and Soils

Contaminated soils or groundwater could be encountered under this alternative because of the excavations that would be necessary to install off-site underground infrastructure (including possible pipelines for the hybrid cooling option). Although there would be an increased likelihood of encountering unknown contamination, site assessment and remediation would involve participation of oversight agencies so that potential impacts to water and soil resources from contamination would be similar to those of the proposed project.

Plans for grading and erosion control, dewatering, and storm water pollution prevention would also need to be reviewed by local agencies, including the San Francisco Bay Regional Water Quality Control Board, the San Francisco Public Utilities Commission Bureau of Environmental Regulation and Management, and the State Water Resources Control Board. These plans, procedures, and measures would be similar to those necessary for development of SFERP.

The Potrero Power Plant Unit 7 alternative could substantially affect surface water quality if the once-through cooling option is selected. Approximately 158,000 gallons per minute of seawater would be circulated for the heat rejection cycle under this option. This would cause a discharge of a thermal plume and biological waste to the San Francisco Bay. Cooling water intake structures and thermal discharges are regulated through Section 316 of the Clean Water Act, which requires minimizing the environmental effects caused by the new structures and the associated thermal discharges. The U.S. EPA defines the standards for intake structures and would ensure that the best technology available (BTA) is used. The State Water Resources Control Board also manages the adverse effects of thermal waste through the California Thermal Plan.[3] The U.S. Army Corp of Engineers, the San Francisco Bay Regional Water Quality

[3] The official name of the California Thermal Plan is the 1972 Water Quality Control Plan for the Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California.

Control Board, and the Bay Conservation and Development Commission would also oversee various aspects of the dredging, installation, and operation of the intake structure. Compared to the proposed project, which would not use seawater for any purpose, construction and operation of the Unit 7 alternative with the once-through cooling option would cause substantially greater impacts to marine water quality.

The Potrero Power Plant Unit 7 alternative with the hybrid cooling option would avoid the impacts to marine water quality by eliminating use of seawater for any purpose. This option would use recycled water from the SEWPCP for cooling. The secondary effluent water would be delivered from the SEWPCP and returned as blowdown and sludge water in new pipelines that would essentially avoid impacts to surface water during all phases of operation. With the hybrid cooling option, the Unit 7 alternative would result in impacts to water and soil resources that would be similar to those of the proposed SFERP.

Worker Safety and Fire Protection

The Potrero Power Plant Unit 7 alternative would be located within an existing industrial area that is currently served by the San Francisco Fire Department. The fire risks of this alternative would be similar to those of the surrounding existing uses, including the existing Potrero Unit 3 Power Plant, and thus would pose no new or different demands on local services.

Similar to the proposed project, it would be appropriate for the project to provide a Project Demolition and Construction Injury and Illness Prevention Program and a Project Operations Safety and Health Program in order to ensure adequate levels of industrial safety.

Engineering Assessment for Potrero Unit 7 Alternative

Facility Design

The facility design of the Potrero Power Plant Unit 7 would be similar to that of the SFERP. A combined-cycle plant (i.e., Potrero Unit 7) would require more major equipment and structures than a simple-cycle plant (i.e., SFERP) due to the addition of the steam turbine(s), Heat Recovery Steam Generator Unit(s), and the condenser and cooling system. However, these equipment and structures are standard and staff does not analyze them in the Facility Design section.

Therefore, similar to the proposed project, staff-recommended measures may be appropriate to ensure compliance with engineering laws, ordinances, regulations and standards applicable to the design and construction of the project.

Geology and Paleontology

Strong seismic ground shaking (peak ground acceleration of 0.6g to 0.65g) is probable at the site, although no active faults are known to cross this site. Liquefaction potential also presents an adverse site condition. Adequate design parameters for the facility would need to be determined through a site-specific evaluation by a Certified Engineering Geologist or Geotechnical Engineer.

Impacts due to seismic hazards and soil conditions would be addressed by compliance with the requirements and design standards of the California Building Code. Based on the previous staff assessment for Potrero Power Plant Unit 7, impacts to geologic resources would not be expected (CEC 2002a). Mitigation of potential impacts to paleontological resources could be accomplished with construction monitoring by a paleontological resources specialist and salvaging of any identified fossils. These impacts and the measures for mitigation would be similar to those of the proposed project.

Power Plant Efficiency

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. The two-on-one combined-cycle power plant design of the Potrero Power Plant Unit 7 project is capable of achieving an overall fuel efficiency of approximately 56 percent. The SFERP, a simple-cycle peaking facility, would achieve an efficiency of approximately 36 percent (SFERP 2004a). Although the efficiency of SFERP is high for a simple cycle plant, the Potrero Power Plant Unit 7 would provide a much higher thermal efficiency. Unfortunately, the two-on-one combined cycle configuration of the Potrero Power Plant Unit 7, which is well suited for baseload electrical generation, is not suitable to meet the project objective of supplying peaking power to the City of San Francisco. The simple cycle configuration of the SFERP is well suited for providing peaking power due to its short start-up time and fast ramping[4] capability, which the combined cycle configuration of the Potrero Power Plant Unit 7 is not able to achieve.

The gas turbines that would be employed in either Potrero Power Plant Unit 7 or the SFERP represent two of the most modern and efficient such machines now available.

Power Plant Reliability

Industry statistics for availability factors (as well as many other related reliability data) are kept by the North American Electric Reliability Council (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). The Potrero Power Plant Unit 7 combined cycle facility would be designed to operate as a baseload facility. NERC reports that the availability factor for combined cycle units of all sizes was 89.94 percent as compared to the 91.05 percent for simple cycle units of all sizes, for the years 1998 through 2002 (NERC 2003). While the SFERP, which is designed as a simple cycle peaking facility, enjoys a slight advantage in overall availability over the combined cycle facility, any difference between the two configurations in overall availability will be relatively insignificant.

The gas turbines that will be employed in either the Potrero Power Plant Unit 7 or the SFERP have been on the market for several years now, and can be expected to exhibit typically high availability to operate when called upon.

[4] Ramping is increasing and decreasing electrical output to meet fluctuating load requirements.

The fact that the Potrero Power Plant Unit 7 project consists of two trains of gas turbine generators/HRSGs provides inherent reliability. Failure of a non-redundant component of one train should not cause the other train to fail, thus allowing the plant to continue to generate at reduced output. The SFERP consists of three combustion turbine generators configured as independent equipment trains, which also provides inherent reliability. A single equipment failure cannot disable more than one train, thus allowing the plant to continue to generate (at reduced output).

Therefore, both the SFERP and the Potrero Power Plant Unit 7 project should provide an adequate level of reliability, however Potrero Unit 7 is slightly less preferred because a simple cycle plant, such as SFERP, would be able to get online faster and the Potrero Unit 7 design would have only a single condenser servicing all of the turbines, which could create a redundancy problem that could lead to the entire facility going down in the event of failure. At SFERP, each of the three turbines could continue to operate independent of problems at the other turbines.

Transmission System Engineering

The Potrero Power Plant Unit 7 combined-cycle facility would satisfy a basic objective of SFERP to provide generation within San Francisco. Compared to the proposed SFERP, the substantially greater electrical output of this alternative would require some mitigation measures potentially including a system protection scheme and replacement of circuit breakers. SFERP requires no mitigation measures. The electricity from the Potrero Power Plant Unit 7 alternative would travel through two paths: an interconnection to the existing Potrero Substation, and an underground 115 kV transmission line for approximately 1.8 miles in city streets to the Hunters Point Substation. Compared to the proposed project, this alternative would alleviate the need for future transmission improvements in the region by introducing a substantial new source of reliable, base-load power within San Francisco.

TRANS BAY CABLE PROJECT

Background

The CA ISO's San Francisco Action Plan, approved by the CA ISO Board in November 2004, defines the new facilities that are necessary before the CA ISO would release all existing in-City generation at Hunter's Point and Potrero Power Plants from applicable RMR agreements (SFPUC 2005a). The SF Action Plan represents the interests of stakeholders who have participated in the public process, and is considered by those stakeholders to be the most direct path to achieving the goal of retirement of all older generation at Hunters Point and Potrero, while at the same time meeting the reliability requirements for the entire San Francisco Peninsula Area (DeShazo 2005). Assuming the approval of the SFERP, the Plan will be fully implemented by the end of 2007 with the proposed SFERP as an integral part of the Plan.

From the CA ISO's perspective, for the Trans Bay Cable Project to be considered an alternative to the SFERP would imply that the Trans Bay Cable Project could replace the SFERP in the SF Action Plan. Neither the CA ISO nor the stakeholders concur with that assertion, because the Trans Bay Cable is being planned to *follow* the SF Action Plan to establish a long-term reliable load-serving project for importation of electric power. The Trans Bay Cable is tentatively scheduled for completion in the fourth quarter of 2008 which is beyond the need of the SF Action Plan (DeShazo 2005). The CA ISO considers the Trans Bay Cable as an alternative to the SFERP only in that it would augment the long-term load serving capability for the San Francisco Peninsula Area, but the implementation of the SF Action Plan (which includes SFERP) is presently the appropriate solution for the San Francisco Peninsula Area to remove the existing Hunters Point and Potrero Power Plant generator units from RMR status as soon as possible (DeShazo 2005). Overall, in the CA ISO's view, the 400-MW Trans Bay Cable Project would add its load-serving capability *in addition to* the SF Action Plan and it would not take the place of part(s) of it. The timing of the Trans Bay Cable Project is to be in place as needed and justified following successful completion of all parts of the Action Plan.

In deciding on a preferred long-term alternative to serve load beyond 2007, the reliability and economic aspects of the Trans Bay Cable are currently being evaluated against other transmission alternatives which could be built by PG&E (DeShazo 2005). As stated in the SF Action Plan, "at this time, the proposed DC Cable is an alternative to augment long-term load serving capability for the San Francisco Peninsula area. In deciding on a preferred long-term alternative to serve load beyond 2007, the reliability and economic aspects of the proposed project will be considered and compared to PG&E reinforcing the existing transmission system or building a new 230 kV line to increase power imported into the San Francisco Peninsula" (Edwards 2004a).

The environmental review process and the preparation of an Environmental Impact Report for the Trans Bay Cable Project are scheduled to occur in 2005-2006.

While the Trans Bay Cable Project is an "alternative" means of satisfying load demands on the San Francisco peninsula and it is thus included as an alternative in this Staff Assessment, it would fail to meet the critical project objective of satisfying the CA ISO reliability criteria such that it would allow the shutdown of older, existing generation at Hunters Point and Potrero Power Plants. It would thus fail to feasibility attain the key project objective, which would allow for the closure of existing, higher-polluting generation in the City (Cal. Code Regs., tit. 14 §15126.6). As a result of continued operation of those older facilities, it would not in an overall sense "substantially lessen the significant adverse impacts of the proposed project on the environment" (Cal. Code Regs., tit. 20, §1765).

Alternative Description

The Trans Bay Cable Project is a high voltage direct current (HVDC) transmission line that is being proposed by Trans Bay Cable LLC, an affiliate of Babcock & Brown, a Sydney, Australia-based Company with its major overseas office based in San Francisco, in cooperation with the City of Pittsburg and Pittsburg Power Company, a municipal utility. Siemens Transmission and Distribution Company, using Pirelli cable and installation technology, will provide converter technology and construction management. The City of Pittsburg will serve as the lead agency for the purposes of CEQA review and compliance. The Project would transmit electrical power and provide a dedicated connection between the East Bay and the electrical system in San Francisco.

The Trans Bay Cable Project is presently configured to extend from PG&E's Pittsburg Substation near Pittsburg, California to PG&E's Potrero Substation in San Francisco. At each end of the HVDC transmission line, a converter station will be installed to convert the power from system alternating current (AC) to or from direct current (DC) (Babcock & Brown 2004).

The Pittsburg converter station would be located at 1301 Standard Oil Avenue. The site is zoned General Industrial (IG) and it is currently used as an auto storage yard with two abandoned water storage tanks (approximately 4,000 square feet combined) on the site. The Pittsburg location was chosen was chosen for the origination of Trans Bay Cable project in part because of the large amount of available generation in the area. In Contra Costa County there are 26 operational power plants (listed in **ALTERNATIVES Table 4**) with total online output of approximately 4,364 MW into the regional grid (though not all of this generation would be transmitted via the Trans Bay Cable). In addition, an additional 530-MW plant (Mirant's Contra Costa Unit 8) was approved by the Energy Commission in May 2001, but has not yet been constructed.

ALTERNATIVES Table 4
Operational Power Plants in Contra Costa County

Plant Name/Unit #	Capacity (MW)	Plant Name/Unit #	Capacity (MW)
Pittsburg #5 and #6	1,332	Tosco SFAR Carbon	27
Delta Energy Center	861	Wilbur East Coal Power Plant	19
Contra Costa #6 and #7	672	Wilbur West Coal Power Plant	19
Los Medanos Energy Center	555	Loveridge Rd Coal Power Plant	19
Crockett Cogen	247	E. Third Street Coal Power Plant	19
Richmond Cogen	125	Nichols Road Coal Power Plant	19
Foster-Wheeler Martinez Cogen	113	C & H Sugar #1, #2, #3	10
Martinez Refining Co.	99	Rhone-Poulenc-Stauffer Chem.	4
Calpine Pittsburg	74	Chevron – Concord	3
San Francisco Refinery	49	Nove WTE Power Plant	3
Riverview Energy Center	47	Brookside Hospital	1
Mobile GT #1, #2, and #3	45	City of Concord	0.1

Source: Energy Commission Energy Facilities Status at http://www.energy.ca.gov/sitingcases/all_projects.html

At the San Francisco end, a second converter station would be installed to convert the electrical power from DC back to system AC. The applicant is exploring various site options for the San Francisco converter station and has not yet selected a preferred site. However, in this analysis, the HWC Property, located east of Illinois Street between 23rd and 24th Streets, is assumed. The analysis presented herein would need to be modified based on the final site selection.

The Trans Bay Cable Project would include installation of approximately 59 miles of HVDC sub-sea cable in the bottom of San Francisco Bay from a Converter Station to be constructed in the City of Pittsburg in Contra Costa County to a Converter Station to be constructed in the City of San Francisco on near Potrero Point.

The primary goal of the Trans Bay Cable Project is to deliver generator-like electricity to San Francisco to meet demand projected for the period 2011 and beyond. The project is anticipated to meet the CA ISO planning and reliability standards and would decrease transmission grid congestion in the East Bay, reduce transmission losses, increase the overall security and reliability of the electrical system, and provide potential savings to ratepayers. The Trans Bay Cable Project would consist of the following major components:

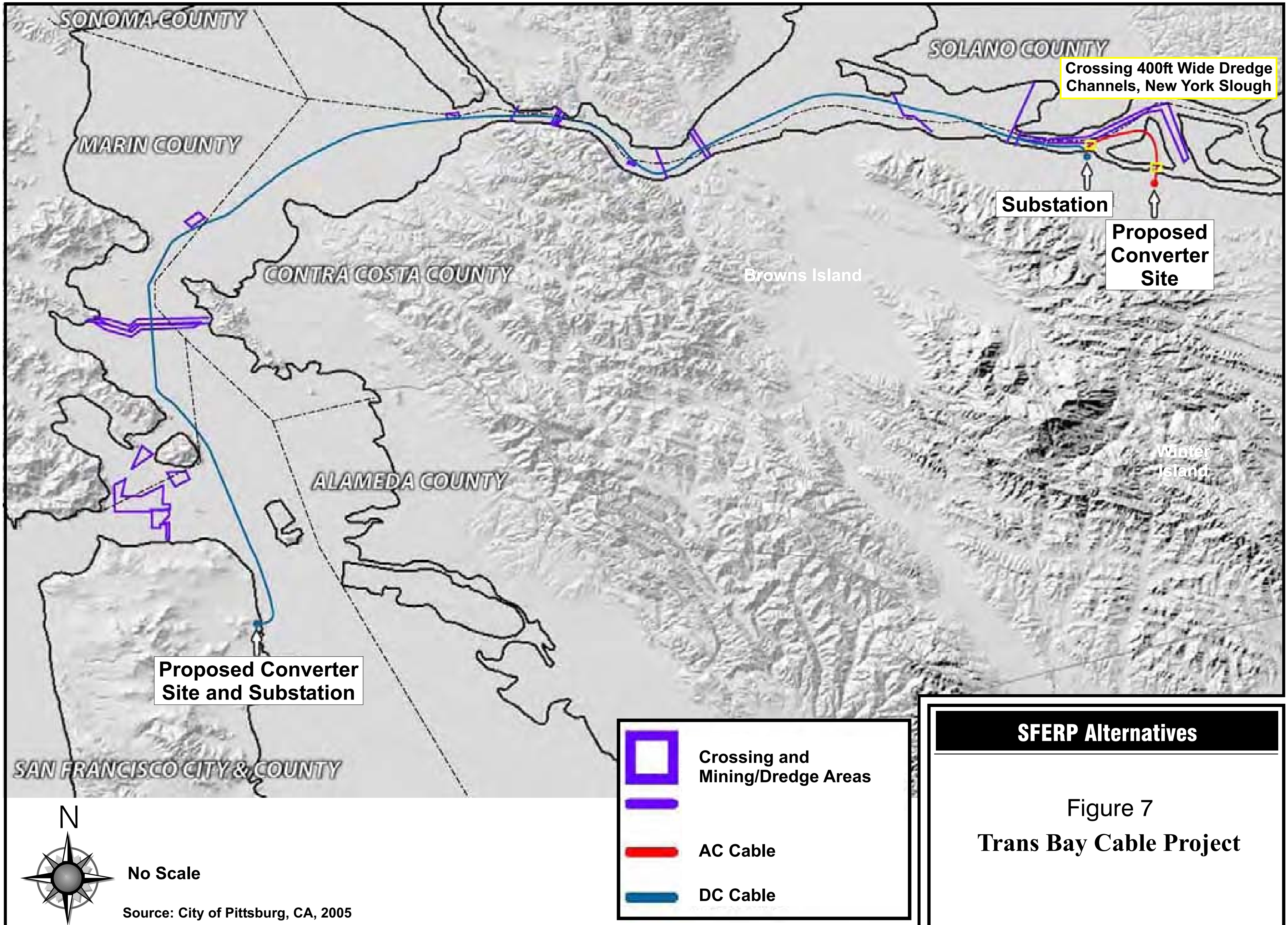
- Approximately 59 miles of sub-sea HVDC cable transmitting up to 400 MW of electrical power utilizing 400 kV DC from Pittsburg to San Francisco.
- Proposed 7.5-acre Converter Station site in Pittsburg (AC/DC).
- Proposed 6.1-acres Converter Station site in San Francisco, (DC/AC).
- Short segments of AC interties between the proposed Converter Stations and the existing electrical substations (i.e., PG&E's 230 kV Pittsburg Substation in East Bay and the PG&E's Potrero 115 kV substation in San Francisco).
- Connections to the existing PG&E Pittsburg and Potrero substations.

The project is scheduled to take approximately 27 months to engineer, manufacture, construct, start up, test and bring into commercial operation. Project approvals, permitting and development activities are scheduled to be complete by the summer of 2006. Following permit approvals, detailed engineering and construction activities would begin. Based on this current schedule, the Trans Bay Cable Project would be ready for commercial operation in late 2008.

See **ALTERNATIVES Figure 7** for the proposed cable route and Converter Station locations. See **ALTERNATIVES Figures 8** and **9** for preliminary diagrams of the proposed Converter Station locations and related facilities in Pittsburg and San Francisco, respectively. The proposed cable route is anticipated to cross several sub-sea pipelines and utility cables. The project will be designed to minimize any potential impacts to these existing facilities.

Pittsburg Converter Station. The preferred location for the Converter Station in Pittsburg is at 1301 Standard Oil Avenue (APN 073-023-07), on a lot of approximately 7.5 acres in size (see **ALTERNATIVES Figure 8**). The zoning is IG (General Industrial), and the current land use is as an auto storage yard. There are currently two existing, but abandoned, water storage tanks on the site, but no other structures. The Station will consist of an approximately 60-foot-high DC valve hall, and control building enclosure. This enclosure will occupy approximately 47,000 square feet. The balance of the site is open and will be occupied by AC and DC bus work, AC filters, a closed loop cooling system, and transformers. The site will be surrounded by an architecturally-appropriate wall or chain-link fence. The site is located within the City of Pittsburg limits and is currently occupied by an automotive recycling facility and other small businesses. The AC intertie will consist of a 3 phase, 230 kV transmission line of about 4.5 miles.

San Francisco Converter Station. The applicant is exploring various site options for the San Francisco converter station and has not yet selected a preferred site. However, the analysis presented herein assumes that the Converter Station in San Francisco would be located on the HWC Property, which is east of Illinois Street between 23rd and 24th Streets (see **ALTERNATIVES Figure 9**), south of the existing Potrero Power Plant and substation and north of the proposed SFERP. The portion of the site to be utilized will be approximately 6.1 acres in size and will consist of an approximately 60-foot-high DC valve hall, and control building enclosure. This enclosure will occupy approximately 47,000 square feet. The balance of the site will contain AC and DC bus work, AC filters, a closed loop cooling system, and transformers. The AC transmission line will connect the converter station to the Potrero Substation at 115 kV; the 115 kV line between the two facilities would be installed within 23rd and Humboldt Streets, as well as private roadway within Mirant's Potrero Power Plant property. The converter station in San Francisco would be designed to blend in with the surrounding environment and minimize visual impacts, as practical. (refer to **ALTERNATIVES Figure 9**).



SFERP Alternatives

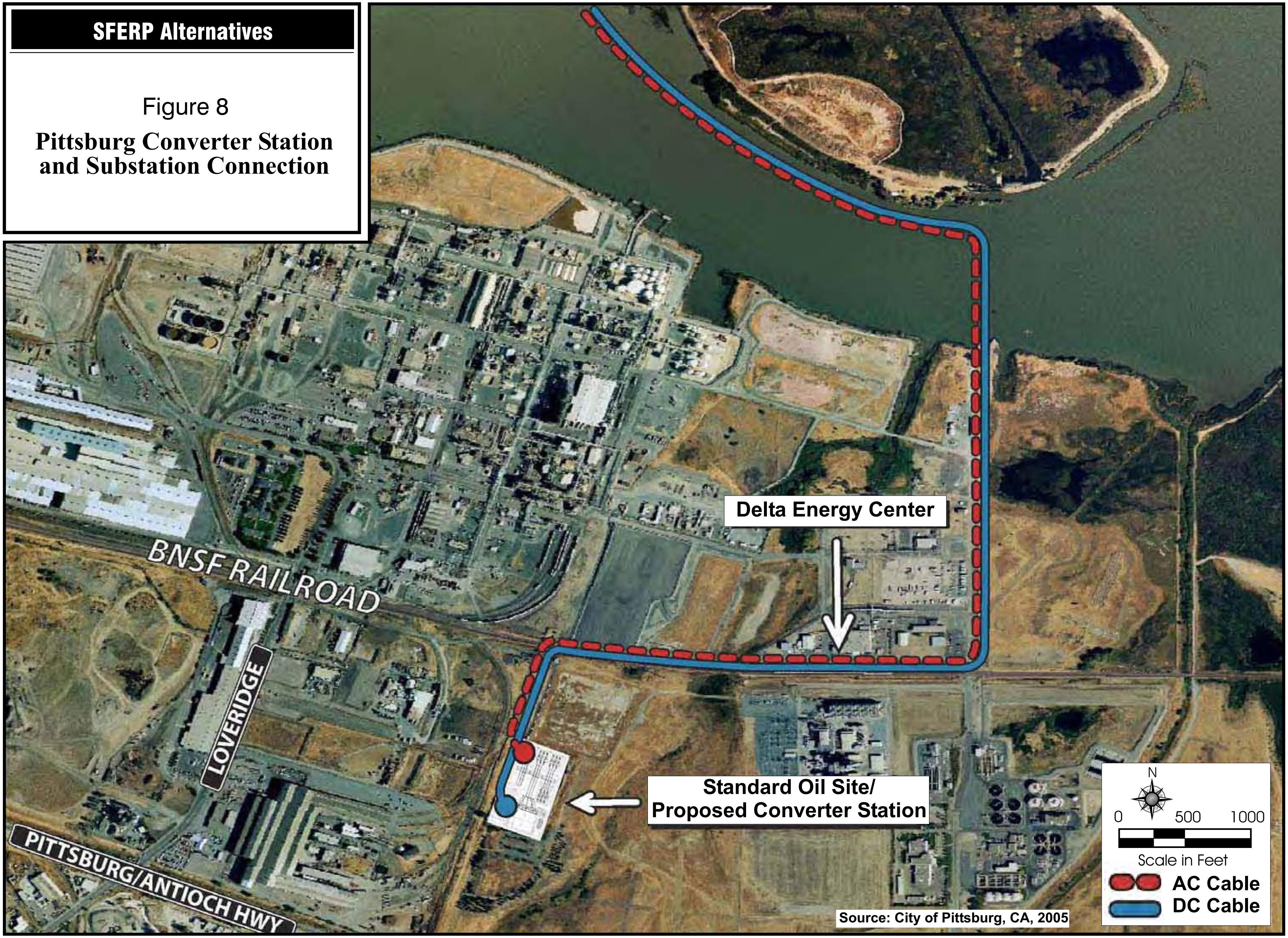
Figure 7

Trans Bay Cable Project

SFERP Alternatives

Figure 8

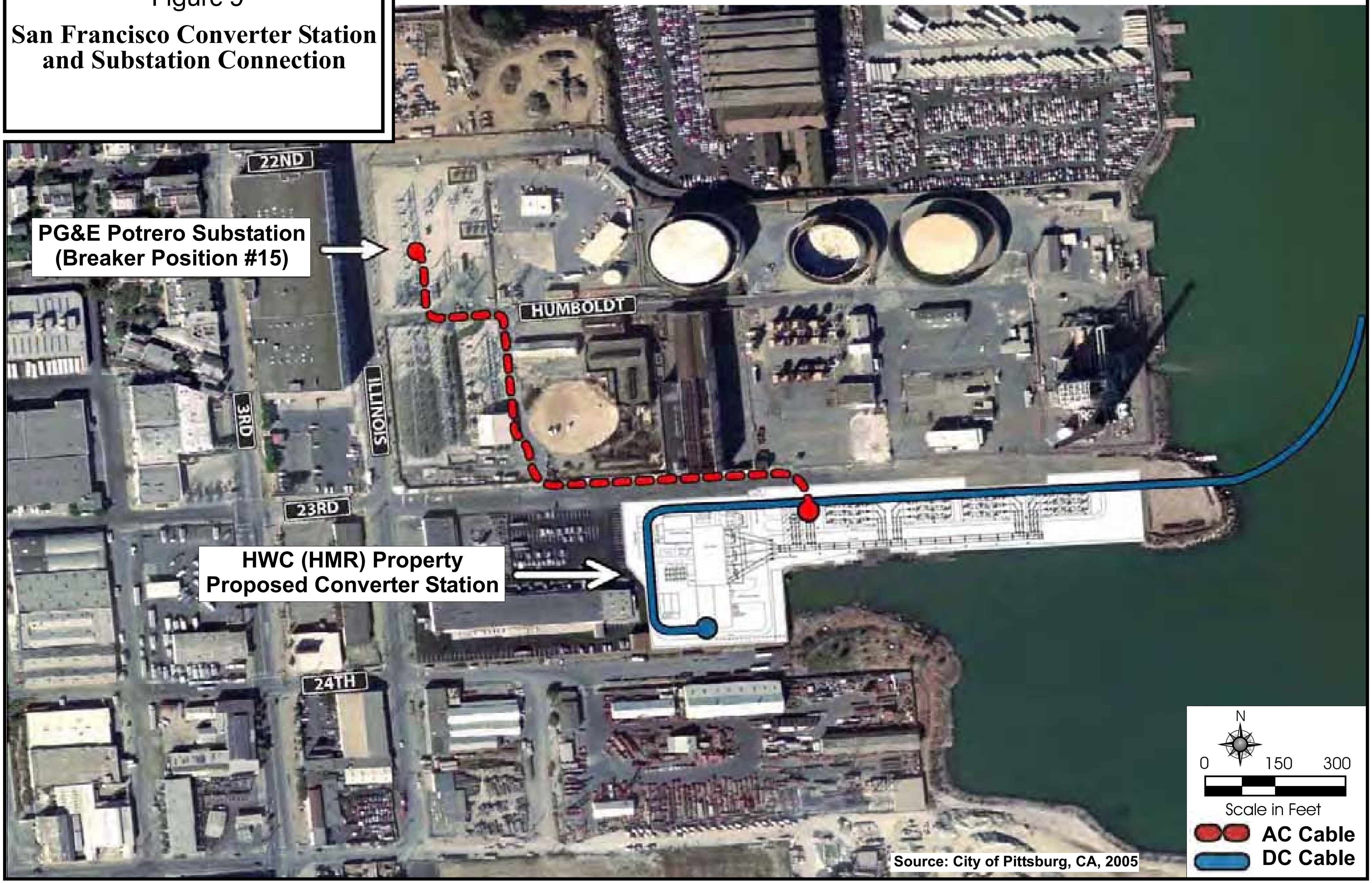
Pittsburg Converter Station and Substation Connection



SFERP Alternatives

Figure 9

San Francisco Converter Station and Substation Connection



Source: City of Pittsburg, CA, 2005

Technology Utilized by the Project

The Trans Bay Cable Project would use both High Voltage Direct Current (HVDC) and High Voltage Alternative Current technologies. HVDC cable would be used for the entire underwater cable segment between Pittsburg and San Francisco. However, HVAC cables would be used to connect each converter station with PG&E substations.

HVDC technology is available from several manufacturers and has been installed in a growing list of projects around the world. For this project, the proponent believes that HVDC technology has several distinct advantages over High Voltage Alternating Current (HVAC) technology. It is controllable in a manner that mimics generation on the power delivery end and functions somewhat independently of problems in the AC grid. It has negligible magnetic fields and can be more easily and inexpensively buried underground or underwater. HVDC becomes cost effective when transmission efficiency and reduced cable cost, over longer distances, offset the power losses and costs for the HVAC to HVDC conversion stations.

Technology of High Voltage DC Power Transmission

HVDC electric power is transmitted by providing a constant voltage to one end of a transmission line. The current in the line is variable and adjusts itself to respond to the load on the other end of the transmission line. HVDC transmission is controllable in a manner that mimics generation on the power delivery end and is able to function independently of problems in the AC grid. Electric power is transmitted at high voltage to minimize losses and allow use of smaller conductors. For a given conductor size, HVDC systems are able to transmit more power with less transmission loss than are HVAC systems.

Most electric power systems are standardized such that power is generated, transmitted, distributed and utilized as AC power. An HVDC transmission system, such as the proposed Trans Bay Cable Project, must therefore have a converter station to convert HVAC power to HVDC power at the supply end of the transmission system and another station to convert power back to HVAC at the delivery end. A significant advantage of HVDC is that HVDC transmissions lines longer than approximately 25 miles can become more cost efficient than HVAC transmission lines. At these distances, the proponent states that the efficiency of the HVDC system more than exceeds the cost and efficiency associated with the converter stations.

Technology of High Voltage AC Power Transmission

Most electric power transmission and distribution systems are designed to deliver AC power to industrial, commercial and residential customers at voltages required by these users. For AC power, voltage and current vary cyclically at a frequency of 60 Hz by rotating AC generators (1 Hertz = 1 cycle per second). AC power is typically generated in three alternating phases, each of which is converted to transmission voltage and delivered via a separate transmission conductor.

Electric and magnetic fields (EMF) generated by HVAC transmission systems can be problematic. HVDC lines generate a static magnetic field similar to the geomagnetic field of the earth. Unlike HVAC lines, the magnetic field for HVDC lines is not fluctuating due to the line frequency. Therefore, a magnetic field from a HVDC line will not induce currents in other wires or objects like a HVAC field will. As a result, aboveground HVAC transmission systems require wide, tall towers to provide adequate separation between phases and adequate separation of electric and magnetic fields from the ground, obstacles, vegetation, people and animals. When buried, on land or underwater, HVAC systems require three highly insulated cables. These cables are generally bundled or laid close together so that magnetic fields are reduced as much as possible. However, without very special and expensive configurations and construction techniques, buried HVAC cables are not suitable for transmission of power over long distances, such as is proposed for the HVDC Trans Bay Cable Project.

Description of HVDC Cable

The proposed Trans Bay Cable Project selected Siemens and Pirelli, one of several available manufacturers of HVDC transmission systems designed for underground or buried submarine installation. The HVDC system utilizes the Siemens converter station technology and the Pirelli cable design and installation technology.

The construction of the cables is made up of numerous layers of electrical insulation and other materials that ensure that the cable surface voltage remains at zero, protect the cable against water infiltration, and provide physical protection against breakage of the cable. The cable(s) will be shipped from the manufacturing site to the installation site in coils of appropriate size for the selected installation equipment and methods.

Submarine Cable Installation

With the preferred routing, the HVDC cable will be buried underwater in Honker Bay, Suisun Bay, the Carquinez Strait, San Pablo Bay, and San Francisco Bay. The cable installation will use a specialized cable laying ship and/or barge and specialized equipment to bury the cable. Cable burial depths will nominally be 3 to 6 feet deep in areas of the Bay containing soft sediments. Depths are expected to vary in response to the geophysical make up of the bay floor sediments. Where possible, the cable route selected will avoid shipping channels, anchorages, dredge disposal areas and all other known obstacles. In areas where the cable route crosses shipping channels, the cable will be buried below the maximum dredging depth in accordance with the U.S. Army Corps of Engineers maintenance dredging program.

The cable will be coiled in one or more lengths that will fit on the specially designed cable laying ship and/or barge. It is expected that the cable can be laid in two lengths, of approximately 25 miles each, requiring only a single splice in the underwater section. However, it may be necessary to have more splices if it is necessary to go under (instead of over) existing utility lines (e.g., pipelines and cables) in the Bay. The cable will normally be buried in the floor of the Bay using a jet plow and/or a water-jet trenching machine. Where the cable must be installed at a greater depth (e.g., where it crosses a dredged shipping channel), it may be necessary to utilize a standard clamshell dredge. Where appropriate, the cable will be protected using concrete mattresses, cast iron shells, and/or plastic/rubber sleeves. It is expected that the underwater section of the Trans Bay Cable can be installed in less than 30 working days.

Land-Based Cable Installation

It is expected that a land-based cable installation will require a somewhat different cable specification than a submarine installation. A second cable specification may be required to suit the thermal properties of the underground locations. It is currently anticipated that directional drilling will be utilized where the submarine cable transitions to land. This eliminates the need to trench in shallow water and across the tidal zone in potentially sensitive biological habitat. It is also currently anticipated that the cable will be installed on land via typical cut-and-cover trenching and burial techniques to a depth of approximately 3 feet.

Permits Required

The Trans Bay Cable would have to acquire a variety of permits for its onshore and offshore components. Permitting agencies and jurisdictions would include the following: City of Pittsburg, CCSF, City of San Rafael, California State Lands Commission (CSLC), Bay Conservation and Development Commission (BCDC), U.S. Army Corps of Engineers (USACE), U.S. Coast Guard, California Coastal Commission (CCC), Regional Water Quality Control Board (RWQCB), and National Oceanic and Atmospheric Administration (NOAA).

The major permits for the offshore portion are those required for compliance with the Clean Water Act and the McAteer-Petris Act. Those two permits are described in this section.

Clean Water Act Permitting – U.S. Army Corps of Engineers. Clean Water Act Section 10 and 404 permits from the U.S. Army Corps of Engineers (USACE) would be required in order to lay marine cable across the San Francisco Bay. Nationwide Permit 12 under the Clean Water Act for standard utility line activity could also apply if general conditions are met. This USACE permit would be simpler than receiving the individual Section 10 and 404 permits. While there are several potential environmental and design concerns regarding the permitting, the USACE has stated that a bay crossing would be feasible according to its regulations (USACE 2003). The biggest concerns are the potential for impedance of navigation and/or dredging and the potential impacts to sensitive eelgrass habitat at the bay margins. The Port of Oakland is in the process of analyzing its future operation, which may involve allowing shipments from Pacific Rim ships, which have a deeper draft than the present ships. This allowance would involve deeper (minimum of 50 feet) and/or more frequent dredging of the federally maintained shipping channel beneath the Bay Bridge. A transmission cable would have to be deep enough not to affect this dredging.

McAteer-Petris Act Permitting – Bay Conservation and Development Commission (BCDC). An electric cable installed across the San Francisco Bay would require a permit from the BCDC. Because the proposed SFERP Project is a feasible upland alternative that would avoid a bay crossing, there are regulatory feasibility constraints associated with the BCDC under the McAteer-Petris Act and the *San Francisco Bay Plan* that greatly question the ability to acquire project approval in a reasonable period of time (BCDC 2003).

The BCDC's findings and declarations for this alternative would be based on the McAteer-Petris Act, the *San Francisco Bay Plan* (Bay Plan), their federally approved management plan for the San Francisco Bay, and the federal Coastal Zone Management Act (CZMA). According to the McAteer-Petris Act, installation of a submarine cable would be considered as “fill” within the Bay. Section 66605 of that Act mentioned above states that the BCDC cannot approve a project that requires bay fill unless there are no feasible upland alternatives. While the BCDC can override this provision if a project has public benefit that is found to outweigh the impacts of the project, the BCDC has recently been unwilling to approve overrides in similar situations (e.g., Potrero Power Plant Unit 4) (BCDC 2001).

Section 66602 of the McAteer-Petris Act states, in part, that: “. . . existing public access to the shoreline and waters of the San Francisco Bay is inadequate and that maximum feasible public access, consistent with a Proposed Project, should be provided.” Section 66632 states, in part, that “[w]hen considering whether a project provides maximum feasible public access in areas of sensitive habitat, including tidal marshlands and mudflats, the Commission shall, after consultation with the Department of Fish and Game, and using the best available scientific evidence, determine whether the access is compatible with wildlife protection in the Bay.” The *San Francisco Bay Plan* policies on public access further state that “. . . maximum feasible public access should be provided in and through every new development in the Bay or on the shoreline . . . the access should be permanently guaranteed . . . should be consistent with the physical environment . . . provide for the public’s safety and convenience . . . and be built to encourage diverse Bay related activities and movement to and along the shoreline.”

The *Bay Plan* policies on Appearance, Design, and Scenic Views state that, “[t]o enhance the visual quality of development around the Bay and to take maximum advantage of the attractive setting it provides, the shores of the Bay should be developed in accordance with the Public Access Design Guidelines . . . . All bayfront development should be designed to enhance the pleasure of the user or viewer of the Bay and maximum efforts should be made to provide, enhance, or preserve views of the Bay and shoreline, especially from public areas, from the Bay itself, and from the opposite shore” (Policies 1 and 2).

Finally, Section 66605(a) and (d) of the McAteer-Petris Act, cited above, provides the Commission authority to require mitigation for loss of surface water area and water volume and other adverse impacts to the Bay bottom habitat. The *Bay Plan* policies on mitigation state, in part, that “[m]itigation should consist of measures to compensate for the adverse impacts of the fill to the natural resources of the Bay . . . [and should provide] area and enhancement resulting in characteristics and values similar to . . . [those] . . . adversely affected . . . [and should be provided] at the fill site, or if the Commission determines that on-site mitigation is not feasible, as close as possible . . . and provided concurrently with those parts of the project causing adverse impacts . . . .” Assuming BCDC would permit the project, the BCDC noted that a project such as installation of a submarine cable would require that CCSF provide mitigation for Bay impacts.

Environmental Assessment for Trans Bay Cable Alternative

The City of Pittsburg, as CEQA Lead Agency for consideration of the Trans Bay Cable Project, issued a Notice of Preparation of an Environmental Impact Report (EIR) in late August 2004. A complete EIR will be prepared to evaluate the Trans Bay Cable Project, as well as alternatives to that project. However, because that EIR was not available at the time that this Staff Assessment was prepared, Energy Commission staff prepared the summary analysis presented in the following paragraphs.

Air Quality

This alternative would cause short-term emissions from site preparation and cable installation during construction. Heavy-duty off-road construction equipment, similar to that needed for SFERP construction, would be used to develop the two converter stations and connections to the existing substations. Similar to the construction of SFERP, Energy Commission mitigation would be necessary to avoid significant air quality impacts, especially from dust that would potentially affect sensitive land uses near the converter stations.

Specialized marine vessels would be used to install the cable in the bay. Power for the marine vessels, including propulsion, plowing, hydraulic systems, and other mechanical systems, would likely come from diesel-powered engines and generator systems on board the vessels. Dredging equipment, if needed, would also be diesel-powered. The marine vessels and generator systems would be large sources of nitrogen oxides, diesel particulate matter, and other contaminants of combustion. These emissions would be similar to those of the heavy-duty off-road equipment used on land, and as with all construction phase emissions, marine vessel emissions would be short-term. The impacts associated with installation of the Trans Bay Cable Alternative would therefore be similar in nature to those of the SFERP, and Energy Commission mitigation could be necessary for ensuring that marine vessel emissions would be minimized.

After construction, the cable would be energized with power provided to the Pittsburg Substation by a number of existing power plants (see **ALTERNATIVES Table 4**, above). Power generated for the cable would cause emissions from a variety of existing and possibly new power plants. Although it would be impossible to identify which power plants would energize the cable, the emissions from each plant would not be beyond those allowed by approvals the Energy Commission licensing process or other approvals. Each plant would need to continue to comply with the air permitting requirements of the Bay Area Air Quality Management District, as they must presently comply in the existing conditions. Staff assumes that no additional generating facility would be built to energize the cable.

The most likely source of power for the cable would probably be Mirant's Contra Costa Unit 8. Approvals for that plant allow emissions of up to 0.075 pounds of NOx per megawatt-hour (MW-hr) (CEC 2002a). This is compared to the SFERP, which would create 0.09 lb/MW-hr (SFERP 2004a). Although there is no way to accurately predict which generating facilities would provide power to the cable (this depends on market conditions and CA ISO dispatch), importing power from Contra Costa County could lead to reduced use of the existing Potrero Power Plant, thus reducing air emissions within San Francisco.

The operations at each end of the HVDC transmission line, the converter stations, and activities at the Pittsburg and Potrero Substations would not be likely to produce measurable emissions. Because no new generating facilities would be built under this alternative, no substantial new air quality impacts are expected to occur during long-term operation, and no locally-oriented mitigation would be necessary.

Biological Resources - Aquatic

Construction of the Trans Bay Cable alternative could have short-term and long-term impacts on the Bay ecosystem; project construction would result in immediate localized effects to the bottom life. Direct impacts could include the loss of coastal salt marsh and eelgrass beds during project construction in the shoreline zone. Indirect impacts could include localized species composition changes in the bay due to changes in predators, prey and competitors. Recolonization could take several months or years after construction is completed.

If project construction occurs in relatively polluted areas (e.g., portions of the Carquinez Strait), contaminated sediments are likely to be dispersed into the water column, resulting in localized, temporary increases in contaminant concentrations that may affect fish and invertebrates.

Although an increase in turbidity resulting from cable installation would not last for long, there could be longer-term consequences for sensitive biological resources. Increased turbidity can reduce the survival of herring eggs, which are attached to hard surfaces on the Central Coast shorelines, potentially resulting in reduced recruitment and abundance of this important Bay species. In certain locations, and during certain times of year, increased turbidity can affect the survival of larval and juvenile stages of certain sensitive fish species, as well as the feeding and migration of adults.

Turbidity could reduce visibility, causing difficulty locating prey. Suspended sediments could also clog gills. Generally, bottom dwelling fish are most tolerant of suspended solids, and filter feeding fish are the most sensitive. Bay bottom disturbance from the Trans Bay Cable installation in the Central Bay during summer months could affect the migration of protected species such as steelhead and Chinook salmon. The San Francisco Bay is an important nursery habitat for juvenile Dungeness crabs, and summer construction activity could affect this important commercial species.

Due to these biological resource concerns, staff believes that the impacts associated with installation of the Trans Bay Cable would be far greater and more damaging to Bay species and their habitats than the proposed project.

Biological Resources - Terrestrial

Construction of landing sites and converter stations could affect state and federal listed species and their habitats such as coastal salt marsh and eelgrass beds located near the shoreline. Since the proposed project will not have any such effects, the Trans Bay Cable alternative is likely to have far greater terrestrial biological resource impacts than the proposed project. However, if the Trans Bay Cable alternative project were implemented, it would not have any NOx emission concerns for biological resources unlike the proposed project and the other alternatives.

Cultural Resources

Record searches (California Historical Resource Information System and State Lands Commission) and detailed surveys (terrestrial and underwater) for cultural resources that might be affected by the Trans Bay Cable Project alternative need to be conducted. Buildings and structures adjacent to the converter sites have not been evaluated to determine if they met the eligibility requirements for the CRHR. The shoreline environment and bay floor is sensitive for prehistoric and historic period cultural resources. Buried cultural resources may be present at the converter sites and in the vicinity of linear facilities (terrestrial and underwater). After underwater and terrestrial surveys, identified resources that could not be avoided would need to be evaluated for eligibility to the CRHR. If resources are found to meet the eligibility requirements for the CRHR, then mitigation measures would need to be developed to reduce the impacts to less than significant, if possible. Compared to the SFERP site, developing the Trans Bay Cable Project may have the potential to have more of an impact on cultural and historical resources due to the greater ground disturbance required from the DC and AC lines and converter station construction.

To avoid impacts potentially caused by disturbing buried cultural and historical resources from the construction of the Trans Bay Cable Project, mitigation requiring oversight of a cultural resources specialist would likely be necessary during construction.

Hazardous Materials Management

Little hazardous materials would be used in the construction of ancillary land-based facilities and none would be used along the 55-mile underwater cable route. Typical hazardous materials found in similar construction of power grid-related facilities include fuels, welding gases, and solvents. Once construction is completed, no hazardous materials would be used or stored at the converter stations. In regards to hazardous materials, therefore, this alternative would be far superior to the proposed SFERP.

Land Use

The land use analysis focuses on the project's compatibility with the existing and planned land uses, and the project's consistency with local land use plans, ordinances, and policies.

The Trans Bay Cable project would be subject to a number of environmental and regulatory reviews including a federal consistency determination and permit from the San Francisco BCDC. The project would also have to conform to all applicable regulations and general plan goals of the City of Pittsburg, Contra Costa and Solano Counties and the CCSF.

The Pittsburg converter station would be located at 1301 Standard Oil Avenue in the City of Pittsburg. The site is zoned General Industrial (IG) and it is currently used as an auto storage yard with two abandoned water storage tanks (approximately 4,000 square feet combined) on the site. Surrounding land uses are also industrial related. Within the City of Pittsburg the AC transmission line from the converter station to New York Slough will angle its way through an industrial (IG) zoned district.

At the San Francisco end, a second converter station would be installed to convert the electrical power from DC back to system AC. The applicant is exploring various site options for the San Francisco converter station and has not yet selected a preferred site. However, assuming the Western Pacific site is selected, the site is zoned Heavy Industrial and is surrounded by industrially zoned land uses.

The transmission cable line between the two terminals would consist of one HVDC transmission cable with a separate metallic return cable and one fiber optic communication cable to be fastened in a bundle. The primary and return cables, each approximately 5 and 4 inches in diameter, respectively, would be buried underwater and routed from the Pittsburg converter station into the water at Suisun Bay (New York Slough), through the Carquinez Strait and San Francisco Bay to a landing point near the San Francisco-based converter station.

Impacts of the Converter Sites and Trans Bay Cable. Construction of the converter sites and transmission lines would require the temporary stockpiling of materials and equipment either within the project site or in approved areas. Any impacts to land use would be isolated and short term while construction vehicles and equipment go to and from the sites. The use of construction laydown areas along the transmission line right-of-way would also be temporary in nature and would not displace any existing use. Given the industrial nature of the neighborhoods surrounding the proposed laydown areas in Pittsburg and San Francisco, staff considers this activity compatible and would not be a significant impact.

As noted above in the alternative description, the installation of the bay cable line will be subject to a number of environmental and regulatory permits and reviews. The BCDC will require a federal consistency determination and permit, and other agencies such as the Fish and Wildlife Service, the Coast Guard and the Corp of Engineers will require regulatory permits.

Because of the recreational boating and commercial shipping activities within the Carquinez Strait, San Pablo Bay and the San Francisco Bay, there is some potential for disruption to boating and other marine uses during the installation of the cable along the bay floor. The cable installation activity would need to be scheduled to avoid the key times for commercial and recreational uses of the Bay.

Both the Western Pacific site (if selected) in San Francisco and the Pittsburg converter site are zoned industrial and surrounding land uses are primarily industrial so the proposed uses would be compatible. The sites would not conflict with applicable land use plans, policies, or regulations of the various local planning agencies.

The proposed converter stations and transmission line installations would not cause substantial changes in land use. Any disruption to adjacent uses during construction of transmission lines in the Pittsburg and San Francisco would be temporary in nature, and will not conflict with existing land uses along the transmission corridors. Since the transmission lines would be underground and likely within paved roads, they would not disrupt or divide the physical arrangement of an established community. Also for these reasons, the transmission line would not restrict existing or future land uses along the route. Overall, the Trans Bay Cable Alternative would be greatly preferred to the proposed SFERP.

Noise

The cable and both converter stations would lie on industrially-zoned property, a significant distance from sensitive noise receptors. During construction, typical construction practices, such as employing equipment with properly operating mufflers and restricting noisy work to daytime hours, would provide adequate protection from noise impacts. During operation, the cable itself would be silent. Noise from the converter stations (i.e., cooling fans) would be barely audible outside the facility boundaries, and inaudible at any sensitive receptor. Similar to the proposed SFERP, standard design practices and compliance with LORS would ensure no significant noise impacts.

Public Health

No direct public health impacts could be identified due to this alternative. There are no emissions of TACs from this alternative unless the power supply would run a longer period of time than otherwise. In that case, the health risks from emissions from gas turbines and cooling towers are typically below the level of significance. Cumulative impacts would have to be identified and would be dependent upon the incremental increase in operating hours required to provide power to SF and the existing emissions from other sources in the area of the power plant (in this case Contra Costa County). This cumulative impact, however, would be localized and most likely insignificant given past assessments conducted by the BAAQMD and CEC staff.

An indirect impact could potentially be serious if bay mud/sediments along the 55-mile bay cable route release significant amounts of bioavailable toxics such that an increase in fish tissue levels of PAHs, PCBs, mercury, and chlorinated dioxins occurs. Persons who rely heavily on subsistence fishing for their diets and the occasional fisherperson who might be sensitive (children and pregnant woman) might be impacted. An ecological risk assessment and a human health risk assessment would have to be prepared to assess this exposure and risk to public health.

In regards to direct public health impacts, this alternative would most likely be lower than the proposed SFERP. Indirect impacts might make this project equivalent to the SFERP.

Socioeconomics

Staff has estimated the potential socioeconomic benefits from the Trans Bay Cable alternative. This analysis focuses on the Pittsburg power plant site where one of the converter stations would be built; the other would be built near the SFERP site. The benefits from construction of the converter station in Pittsburg include increases in sales taxes, employment, and income for Contra Costa and neighboring counties (see **SOCIOECONOMICS Table 2** for data and information). Staff finds that the Trans Bay Cable project would not cause a significant adverse socioeconomic impact on the study area's housing, schools, police, emergency services, hospitals, and utilities. Based on staff's demographic screening analysis, the minority population within six miles of the Pittsburg converter station site is about 59 percent and it is 75 percent within one mile of the nearby Pittsburg Power Plant. The low-income population within six miles is 13 percent. In comparison, based on staff's demographic screening analysis for the proposed SFERP project, the minority population within six miles of the proposed power plant site at Potrero is less than 57 percent and the low-income population within six miles is slightly above 11 percent.

Staff finds that there would be no adverse socioeconomic impacts since most of the construction and operation workforce is within the regional or local labor market area and construction activities are short-term. Staff has determined that there would be no significant adverse direct or cumulative socioeconomic impacts and, therefore, there are no socioeconomic environmental justice issues. The Trans Bay Cable project would be consistent with the applicable socioeconomic LORS.

Traffic and Transportation

Traffic in the vicinity of the San Francisco and Pittsburg converter stations would be similar to that of the proposed SFERP. The high level of industrial activity of the surrounding uses generates a substantial level of truck traffic. Similar to the proposed project, before construction could occur for the Trans Bay Cable project, a construction traffic control and transportation demand implementation program would need to be developed in coordination with the City and County of San Francisco and Caltrans. These programs would limit construction-period truck and commute traffic to off-peak periods and avoid potential traffic and transportation impacts.

If barges and vessels used for the construction of the Trans Bay Cable project must anchor or moor in a manner other than to an existing approved dock or pier, they could create a safety hazard to shipping traffic. If the construction barges or vessels must anchor or moor for construction activity away from an approved dock or pier, then they must obtain a wavier from the U.S. Coast Guard Marine Safety Office San Francisco Bay. If this is done, then the Coast Guard will be able to inform barges and vessels operating in the area such that impacts on Bay shipping traffic would be insignificant.

Mitigation necessary to reduce the impacts of this alternative to less than significant levels would include the following: the applicant would inform and coordinate the construction activity with the U.S. Coast Guard, Water Management Branch if it must anchor or moor any barges or vessels associated with the project in any manner other than to an existing approved dock or pier. This would include a letter to the Commanding Officer of the U.S. Coast Guard Marine Safety Office San Francisco Bay, Attention Water Management Branch, Coast Guard Island, Building 14, Alameda, California 94501-5100. This letter would include:

- A full description of the existing conditions/situation, to be followed up with a detail drawing of the area showing large and small scale coverage, in the drawing it should also show the location of equipment and resources clearly marked and spelled out and well defined.
- A statement and similar description on the work to be done and why.

- A time schedule as to when work will start (date and time), how many hours a day operations will be conducted and an estimated date and time of project completion.
- Listing of all persons involved in the operation, their title and job description (Person in Charge of operations, Operations Manager or Site Manager) and information on how to contact this person and their availability.
- A barge break-away contingency plan.
- Listing of on-site communication cellular phone numbers and radio frequencies that are monitored. (Must be VHF-FM Marine Channels 14 and 13)
- A listing of all companies, agencies and groups involved in operation.

Therefore, prior to the start of construction activity in the Bay, the project owner would have to ensure that the U.S. Coast Guard Marine Safety Office is informed about its construction activity in the Bay, and shall obtain the necessary anchorage waiver. The project owner would also have to include in the Monthly Compliance Report, copies of all correspondence with the U.S. Coast Guard and copies of anchorage waivers received for work to be conducted in the Bay.

During construction the Trans Bay Cable Project would have greater traffic impacts resulting from construction activities at converter station sites in both San Francisco and Pittsburg, linear construction of underground transmission lines in roadways, and possible impacts associated with vessel use while constructing the underwater cable. Operational impacts would be similar and both projects would be consistent with the applicable traffic and transportation LORS.

Transmission Line Safety and Nuisance

This project would involve the use of a transmission system that would be much longer and more complex than with the SFERP system in terms of physical extent, reliability, maintainability, ease of repairs, shut-down frequency, and shock and obstruction hazard to fishermen and other marine users. This alternative would increase the sources of electric and magnetic fields and potential human exposures. Given the uncertainty about the health risks from human exposure to direct-current or alternative-current fields, any risk from such field exposures would be much lower for the proposed SFERP project than for this Trans Bay alternative. As a result, the Trans Bay Cable would be less preferable than the proposed SFERP in terms of Transmission Line Safety and Nuisance related to electric and magnetic fields.

Visual Resources

San Francisco Converter Station. The proposed AC-DC Converter Station site is located within San Francisco's eastern industrial waterfront area, near the India Basin Industrial Park. The San Francisco Municipal Railway has proposed the construction of their new Metro East Light Rail Maintenance and Operations Facility north of the site. A proposed main shop and administration building for the facility will be about 40 feet tall and 180,000 square feet.

The AC-DC Converter Station's most prominent visual features include a DC Hall, a Control Building and a switchyard. The 30-to-40-foot-tall DC Hall would be the tallest structure on the site. The DC Hall's height would be consistent with surrounding industrial buildings, which are 45 feet or less in height. The horizontal block forms and straight lines of the DC Hall's features would appear similar to the form of existing surrounding buildings, and smaller in scale when visually compared to existing structures at the Port of San Francisco North Container Terminal, the Potrero Power Plant and the expanse of San Francisco Bay. The site is partially screened by existing structures. The gray or silver color of the switchyard may contrast moderately with existing structures and the blue hue of the Bay.

Numerous residences at elevated locations on Potrero Hill may have a view of the Converter Station. While residents generally anticipate open, frontal views of a highly urbanized, industrial waterfront landscape, any new industrial features in the view of the Bay would be perceived as detracting from the more scenic elements of the view.

Mitigation would be required to minimize the visual effects of light and glare by such methods as shielding lights, surface treatments and screening in accordance with the CCSF's requirements. Also, BCDC visual policies may be applicable to the proposed Converter Station at this location.

Under the present circumstances, the Converter Station would appear to increase the structural density and limit views of the Bay. However, in the context of the existing complex industrial character surrounding this site and the appearance of various industrial structures and equipment, the Converter Station would not cause an adverse visual change or a significant visual impact. The Converter Station would visually relate to its immediate setting. The Converter Station would not result in a high degree of visual contrast or view blockage and would not be a dominant structure in the landscape.

Pittsburg Converter Site. The proposed AC-DC Converter Station would be located in the City of Pittsburg in a heavy industrial area. Major industrial facilities in the area include the DOW Chemical manufacturing facility and the USS-POSCO steel fabrication plant to the north, and the Delta Energy Center to the east. Also in the area, there are several small cogeneration plants. Power transmission lines, scattered exhaust stacks of industrial facilities, and several water towers are some of the larger, vertical features that are noticeable in the landscape. Steam plumes from a number of the industrial facilities in the region are regularly visible under certain meteorological conditions.

Viewer concern and exposure from Interstate Highway 4 is moderate to high and low to moderate from the Pittsburg-Antioch Highway. Both highways are south of the alternative project site. Views to the north from Highway 4 would include, in addition to the alternative site (undeveloped property), industrial facilities and power transmission lines which currently obstruct views towards New York Slough approximately ¾ of a mile away. Because of the mixed land use patterns visual quality is generally moderate to low.

Because open space areas and corridors with unobstructed views to the water and nearby hills are scarce in much of the region, these areas and corridors have been recognized as sensitive and important to protect by the City of Pittsburg. The City of Antioch, immediately east of the alternative project has identified the importance of preserving views of the river, distant hills, and local ridgelines and maintaining visual edges and gateways to maintain and enhance its community image. Contra Costa County has recognized that its scenic vistas, especially views of ridges, hillsides, and the Delta area, are major contributors to the perception that the county is a desirable place to live and work and preserving the quality of visually sensitive features of the landscape would help preserve and reinforce the county's landscape character and balance the effects of development (Contra Costa County 1991 General Plan).

In the context of the existing complex industrial character surrounding the site and the appearance of various industrial structures and equipment, this Converter Station alternative would not cause an adverse visual change or a significant visual impact. The Converter Station would visually relate to its immediate setting. The Converter Station would not result in a high degree of visual contrast or view blockage and would not be a dominant structure in the landscape.

As proposed, neither the SFERP nor the Trans-Bay Cable alternative would introduce a significant visual impact into their respective existing settings.

Waste Management

Little solid waste would be generated during the construction of ancillary land-based facilities or along the 55-mile underwater cable route. Typical solid and hazardous wastes generated in similar construction of power grid-related facilities include waste oil, paints, solvents, trash, and construction debris. Nonhazardous solid waste would be disposed of according to LORS. Because the 55-mile bay cable would be placed under bay mud and sediments, some of these sediments may be brought to the surface and collected. If so, these sediments would have to be tested and if determined to be hazardous, disposed of appropriately. Construction of land-based converter stations and perhaps expanded substations and the placing of land cables between these facilities might require the preparation of Phase 1 Environmental Site Assessments (ESAs) and perhaps Phase 2 ESAs. The results of these ESAs will determine the need for any site characterization and site remediation. Once construction is completed, no hazardous waste would be generated at the converter stations. Therefore, in regards to solid and hazardous wastes, this alternative would be either the same or a little better than the proposed SFERP.

Water and Soils

This option will create a significant water quality impact in the Bay. The suspended sediments will require mitigation. There are several permits, which must be obtained before the cable can be placed in the Bay. The construction of the converter stations will also have impacts, which will be similar to the impacts of the SFERP and the East Bay alternative. The permits will have to be obtained for each side of the bay.

Contaminated soils, bay sediments or groundwater could be encountered at the either converter station or in the Bay because of previous activities that may have resulted in chemical spills. Site assessment and remediation may be necessary prior to construction, which would involve participation of the San Francisco Bay Regional Water Quality Control Board, and possibly the City of Pittsburg Fire Department. During construction and site preparation, if contamination is encountered, mitigation measures consisting of proper testing, treatment, and disposal would be necessary.

Plans for grading and erosion control, dewatering, and storm water pollution prevention would also need to be reviewed by local agencies, including the San Francisco Bay Regional Water Quality Control Board, the San Francisco Public Utilities Commission Bureau of Environmental Regulation and Management, the City of Pittsburg Public Works Department, Contra Costa County Public Works Agency, and the State Water Resources Control Board. These plans, procedures, and measures would be similar to those necessary for development of SFERP.

The Trans Bay Cable Project would be the least favorable option from a water quality standpoint.

Worker Safety and Fire Protection

Worker safety would be protected by adherence to LORS, which include Cal-OSHA regulations. Special attention should be paid to worker safety in marine environments during cable-laying. Fire protection would also be assured by following LORS including the California Fire Code. The converter stations might need to be equipped with automatic fire suppression systems due to the presence of flammable mineral oil in transformers. It is doubtful that the presence of converter stations or expanded substations would place a significant burden on the existing fire or EMS response infrastructure. Therefore, this alternative would have a smaller impact in the areas of worker safety and fire protection than the proposed SFERP.

Engineering Assessment for Trans Bay Cable Alternative

Facility Design

The design and construction of the project shall be in compliance with applicable engineering laws, ordinances, regulations and standards.

Geology and Paleontology

Since the cable will be 4 to 5 inches in diameter and buried approximately 3 to 6 feet deep along the sea floor, except where existing cables will be crossed resulting in possibly deeper installation, unconsolidated marine deposits of varying thickness will underlie the majority of the alignment. The proposed cable will also cross near the Hayward Fault. The Western Pacific alternate site is underlain by artificial fill and at depth by younger bay mud. The Pittsburg terminus is underlain by unconsolidated marine deposits. As a result, strong seismic ground shaking, liquefaction, and possibly fault rupture represent the main geologic constraints for this alternate. Adequate design parameters for the facility would need to be determined through a site-specific evaluation by a Certified Engineering Geologist and/or Geotechnical Engineer.

Impacts due to seismic hazards would need to be mitigated by complying with the requirements and design standards of the California Building Code. Impacts to geologic resources would not be expected. Mitigation of potential impacts to paleontological resources could be accomplished by construction monitoring by a paleontological resources specialist and salvaging of any identified fossils. These impacts and the measures for mitigation would be similar to those of the proposed project.

Power Plant Efficiency

The Trans Bay Cable alternative does not impact Power Plant Efficiency.

Power Plant Reliability

The Trans Bay Cable alternative does not impact Power Plant Reliability.

Transmission System Engineering

While the CA ISO does not consider the Trans Bay Cable to be an alternative to SFERP, it is being considered by the CA ISO as a way to augment the long-term load serving capability for the San Francisco Peninsula Area (DeShazo 2005). In deciding on a preferred long-term alternative to serve load beyond 2007, the reliability and economic aspects of the Trans Bay Cable are currently being evaluated against other transmission alternatives which could be built by PG&E (DeShazo 2005). Construction of this alternative would avoid any adverse effects to the San Mateo-Martin corridor and at the Martin Substation that could be caused by the Brisbane or SFIA alternative.

Compared to repair of an overhead line or repair of a thermal power plant, repair of an undersea underground line would take much more time. Special techniques must be used to locate the problem and very sophisticated techniques to repair the damage. Unless imports to the Peninsula and local generation were sufficient, power outages could occur. The converter stations are also more susceptible to earthquake damage then power plants, which could result in significant loss of power for the Peninsula. Special design requirements may need to be incorporated to assure reliability of the Peninsula.

NO PROJECT ALTERNATIVE

CEQA requires an evaluation of the No Project Alternative in order that decision makers can compare the impacts of approving the project with what would likely occur if the project were not approved. According to CEQA Guidelines [Section 15126.6(e)], the No Project Alternative must include (a) the assumption that conditions at the time of the Notice of Preparation (i.e., baseline environmental conditions) would not be changed because the proposed project would not be installed, and (b) the events or actions that would be reasonably expected to occur in the foreseeable future if the project were not approved. The first condition is described in this Staff Assessment for each environmental discipline as the “environmental baseline,” since no impacts of the proposed project would be created. This section defines the second condition: reasonably foreseeable actions or events and the impacts of these actions.

In this case there is an overlap between the No Project Alternative and alternatives to the proposed project. In this case both the Trans Bay Cable and the Potrero Unit 7 Project are considered in both sections because (a) they meet the project objectives so are legitimate alternatives, and (b) they may occur if the SFERP is not constructed.

The No Project Alternative scenario is based primarily on a series of communications from the CA ISO to CCSF (see Appendix C). Based on these letters and consideration of the Bay Area's electrical situation, the components of the No Project Alternative are assumed to be the following (each component is described in more detail below):

1. **Potrero Power Plant Unit 7 would be installed**. The Potrero Power Plant Unit 7 project application could be reinstated and the project could move forward.
2. **Trans Bay Cable Project would be installed.** Construction of the Trans Bay Cable Project, a 600 MW DC cable from Pittsburg to CCSF, would occur.
3. Hunters Point Power Plant Unit 4 would be closed.
4. **PG&E system upgrades and improvements would occur.** Re-rating and upgrading of certain transmission lines, and installation of a new transformer would improve system reliability and service. The conversion of San Mateo-Martin #4 from 60 kV to 115 kV is now completed, but it is assumed that the Potrero-Hunters Point 115 kV underground cable and the Jefferson-Martin 230 kV Transmission Line Project would be constructed before the end of 2006.
5. **System management and planning would continue to occur.** PG&E and the CA ISO would continue to implement an Interruptible Load Program (allowing the selective load dropping during peak load periods), demand-side management would be encouraged, and curtailment of electric service would be required in the worst-case demand growth scenarios.
6. **Increased utilization of Special Protection Schemes (SPS)** – PG&E and CA ISO are evaluating the implementation of an SPS in CCSF. Though important to pursue regardless of the outcome of the Proposed Project, continued and increased reliance on SPS in CCSF would be insufficient to provide compliance with reliability criteria. Nonetheless, if no other alternative is pursued, at a minimum continued and increased use of SPS in CCSF would be required to provide for controlled involuntary load curtailment during "high load" operating conditions.
7. **Demand-side management would occur.** Energy conservation programs in place by the Energy Commission, CPUC, CCSF, and PG&E would continue to be implemented.
8. **Interruptible load program would be implemented.** This type of demand-side management program could be implemented, which in accordance with contractual arrangements, can interrupt consumer load at times of seasonal peak load by direct control of the utility system operator or by action of the consumer at the direct request of the system operator. This type of control usually involves commercial and industrial consumers.
9. **Curtailment of electric service could occur.** Consumer load would be interrupted at the time of annual peak load by direct control of the utility system operator by interrupting power supply to individual appliances or equipment on consumer premises. This type of control usually involves residential consumers.

POTRERO POWER PLANT UNIT 7

The Energy Commission's proceeding on the Potrero Power Plant Unit 7 Project was suspended based on Mirant's request, but the application could be re-activated. This project would provide a net increase in in-City generation. Because this project could be built in place of SFERP it has also been evaluated in this Staff Assessment as an alternative to the proposed project.

Mirant Corporation proposed to construct a 540 MW generating facility to expand the existing Potrero Power Plant. The proposed Unit 7 would be constructed adjacent to the existing Unit 3 generator. The Final Staff Assessment prepared by the Energy Commission staff identified significant impacts from use of cooling water from the San Francisco Bay and discharge of that water back to the bay, and prepared a report on alternative cooling technologies. Mirant submitted an AFC amendment presenting the option of using reclaimed water from the CCSF's SEWPCP, and hybrid cooling towers. As discussed above, the Potrero Unit 7 project has also been controversial for potential air quality impacts and environmental justice issues. There is no guarantee that this plant would be approved by the Energy Commission if the proceeding were reactivated. It could also possibly require approval by CCSF or a provision of City wastewater for cooling.

CLOSURE OF POTRERO POWER PLANT UNIT 3

Potrero Unit 3 (207 MW) is significantly beyond its expected 30-year lifetime and is, therefore, inefficient, highly polluting, and subject to frequent outages. As a part of the SF Action Plan (and prior to Unit 3's release from RMR agreements), a Selective Catalytic Reduction (SCR) retrofit of Unit 3 was completed in June 2005, which reduces the NOx emissions to a level of compliance with the air quality requirements of the BAAQMD.

CCSF has requested that the CA ISO define the conditions that would be required to allow closure of Potrero Unit 3, and CCSF believes that completion of the SFERP should provide for closure of generating units at the existing Potrero Power Plant complex (SFERP 2004aa). The SF Action Plan specifies that Potrero Power Plant Unit 3 can be released from the applicable RMR agreement once the three turbines that comprise SFERP and a fourth combustion turbine that CCSF intends to locate at the San Francisco International Airport are operational (SFPUC 2005a). Although the City cannot at this time guarantee that closure of in-City generation will in fact occur, it is the CCSF's objective in pursuing the SFERP to achieve this goal (SFERP 2004aa).

In the absence of the SFERP, given that Potrero Unit 3 would be the only baseload generating facility after closure of HPPP Unit 4, it seems unlikely that this plant would be closed. Therefore, the No Project scenario assumes continued operation of Potrero Unit 3.

TRANS BAY CABLE PROJECT

The Trans Bay Cable Project is a high voltage direct current (HVDC) transmission line that is being proposed by Trans Bay Cable LLC, an affiliate of Babcock & Brown, in cooperation with the City of Pittsburg and Pittsburg Power Company, a municipal utility. It is also included in the San Francisco Peninsula Long-Term Transmission Planning Study Phase 2 Study Plan, Version 3.0 (April 1, 2004). The Project would transmit up to 400 MW of electrical power and provide a dedicated connection between the East Bay and the electrical system in San Francisco. The City of Pittsburg is serving as the Lead

Agency for the purposes of CEQA for the project's upcoming environmental review process.

The Trans Bay Cable Project is described in detail above. The environmental review process and the preparation of an Environmental Impact Report will occur in 2005-2006. Although there is no certainty that this project will be approved and/or constructed, the Trans Bay Cable Project could be built independent of SFERP approval. Therefore, this project is evaluated under the No Project scenario as well as in this Staff Assessment as an alternative to the proposed project.

CLOSURE OF HUNTERS POINT POWER PLANT

HPPP Unit 4 can produce 170 MW and is one of only two baseload power plants in San Francisco (the other being Potrero Unit 3). Its closure, without other system improvements, would greatly affect local reliability. PG&E owns the power plant, and has an agreement with the CCSF to close it as soon as allowable, but the CA ISO is the authority that will determine when it can be closed in order that closure has no serious effects on the region's ability to provide electric service.

The CA ISO letter of April 18, 2003, and the other communications define specific conditions that would be required for the CA ISO to allow implementation of the agreement between PG&E and the CCSF to close Hunters Point Power Plant. While the timing of this closure cannot now be determined, it does now seem likely that the plant will be closed when the Jefferson-Martin Transmission Project is completed (summer 2006).

PG&E PROJECTS CURRENTLY BEING PLANNED OR CONSIDERED

In the revised SF Action Plan adopted in November 2004, the CA ISO listed the projects which are necessary to release Hunters Point and Potrero from their RMR Agreements, ultimately leading to their retirement. These projects are listed in **ALTERNATIVES Table 5**. These projects involve increasing emergency ratings, upgrading or installing new transformers, modifying protection equipment, reconductoring, transmission upgrades, and installing new transmission lines. While these projects would provide a benefit to San Francisco Peninsula electric service and reliability, none (aside from the Proposed Project itself) would provide enough benefits to meet project objectives.

ALTERNATIVES Table 5
PG&E Electric Transmission Projects

#	Project	Description	Schedule	Resolution of Issue
Release Hunters Point Units 2 & 3 from their RMR Agreements				
1	Potrero Static VAR Compensator	Install +240/-1100 MVAR Static VAR Compensator at Potrero Switchyard	Complete (December 2004)	This project allows ISO/PG&E to meet NERC/WECC/CA ISO planning requirements with HPPP Units 2 and 3 released from RMR Agreement.
Release Hunters Point Units 1 & 4 from their RMR Agreements				
2	San Mateo Martin No. 4 Line Voltage Conversion	Reconductor and convert 60 to 115 kV circuit; modify substations at Burlingame and Millbrae.	Complete (July 24, 2004)	This project in combination with other projects allows ISO/PG&E to meet NERC/WECC/CA ISO planning requirements with HPPP Units 1 and 4 released from RMR Agreement.
3	Ravenswood 2nd 230/115 kV Transformer	Install a new 420 MVA, 230/115 kV transformer at Ravenswood.	Complete (May 2004)	This project in combination with other projects allows ISO/PG&E to meet NERC/WECC/CA ISO planning requirements with HPPP Units 1 and 4 released from RMR Agreement.
4	San Francisco Internal Cable Higher Emergency Ratings	To be used upon completion of Jefferson-Martin 230 kV Project. In 2007, a 3rd Martin-Hunters Point 115 kV cable will replace the emergency ratings.	Complete	This project in combination with other projects allows ISO/PG&E to meet NERC/WECC/CA ISO planning requirements with HPPP Units 1 and 4 released from RMR Agreement.
5	Tesla-Newark #2 230 kV Line Reconductoring	Bundling of the Tesla to Newark #2 transmission line.	Complete (May 2005)	This project in combination with other projects allows ISO/PG&E to meet RMR criteria planning requirements with HPPP Units 1 and 4 released from RMR Agreement.
6	Ravenswood-Ames 115 kV Lines Reinforcement	Reconductor Ravenswood-Ames Nos. 1 and 2 115 kV lines with 477 SSAC conductors	Complete (May 2005)	This project in combination with other projects allows ISO/PG&E to meet RMR criteria planning requirements with HPPP Units 1 and 4 released from RMR Agreement.
7	San Mateo 230 kV Bus Insulator Replacement	Replace bus insulator, an operations requirement during San Mateo bus wash.	Complete (May 2005)	Eliminate bus wash at San Mateo 230 kV bus will reduce the 400 MW generation operational requirement down to less than 200 MW.
8	Potrero-Hunters Point (AP-1) 115 kV Underground Cable	Install new 115 kV underground cable; coordinated with CCSF 3rd Street Light Rail Project.	December 2005 (CPUC permit approval granted)	This project in combination with other projects allows ISO/PG&E to meet NERC/WECC/CA ISO planning requirements with HPPP Units 1 and 4 released from RMR Agreement.
9	Jefferson-Martin 230 kV Line	Construct a new 230 kV line from Jefferson Substation to Martin Substation	March 2006 (under construction)	This project in combination with other projects allows ISO/PG&E to meet NERC/WECC/CA ISO planning requirements with HPPP Units 1 and 4 released from RMR Agreement.

ALTERNATIVES Table 5
PG&E Electric Transmission Projects

#	Project	Description	Schedule	Resolution of Issue
10	Potrero 3 SCR Retrofit	Retrofit of Potrero Unit 3 SCR	Complete (June 2005)	This project ensures the availability of Potrero 3 at full capacity thereby reducing overall Greater Bay Area RMR requirements. This project or the reduced capacity available without the retrofit in combination with the other listed projects allows CA ISO/PG&E to meet NERC/WECC/CA ISO planning requirements with HPPP Units 1 and 4 released from RMR Agreements
Release Potrero Unit 3 from its RMR Agreement				
11	SFERP and SFIA Electric Reliability Plant	Construction of 3 combustion turbines north of Martin Substation at Potrero point and 1 combustion turbine at SFIA.	2007?	These projects will allow CA ISO/PG&E to meet NERC/WECC/CA ISO planning requirements with Potrero 3 released from RMR Agreements.
Release Potrero Units 4, 5, & 6 from their RMR Agreements (assumes previous completion of peaking power plants by CCSF)				
12	Newark-Dumbarton 115 kV Line	Upgrade Newark-Dumbarton 115 kV line	May 2006 (engineering in progress)	This upgrade is needed in combination with the other listed mitigations to allow ISO/PG&E to meet NERC/WECC/CA ISO planning requirements with Potrero 4, 5, & 6 released from RMR Agreement
13	Bair-Belmont 115 kV Line	Upgrade Bair-Belmont 115 kV Line (under evaluation by PG&E)	May 2007	This upgrade is needed in combination with the other listed mitigations to allow ISO/PG&E to meet NERC/WECC/CA ISO planning requirements with Potrero 4, 5, & 6 released from RMR Agreement
14	Metcalf-Hicks and Metcalf-Vasona 230 kV Lines	Upgrade Metcalf-Hicks and Metcalf-Vasona 230 kV Lines	May 2007	This upgrade is needed in combination with the other listed mitigations to allow ISO/PG&E to meet NERC/WECC/CA ISO planning requirements with Potrero 4, 5, & 6 released from RMR Agreement
15	Ravenswood Substation Voltage Support	Add voltage support at Ravenswood Substation	May 2007	This upgrade is needed in combination with the other listed mitigations to allow ISO/PG&E to meet NERC/WECC/CA ISO planning requirements with Potrero 4, 5, & 6 released from RMR Agreement

Source: Edwards 2004a and 2004b.

INTERRUPTIBLE LOAD PROGRAM

As an alternative to constructing various components of the project, selective load dropping[5] during peak load periods could be considered. During the summer of 2001, the CA ISO solicited bids for "interruptible load." This process took the form of two distinct but similar programs in which various loads (customers) would be paid to interrupt or curtail load during peak load conditions. The CA ISO had targeted approximately 2,800 MW of statewide load for these programs. Initially, the CA ISO received bids totaling about 580 MW and currently actual statewide participation amounts to 55 MW. While there are many and varied reasons for the small amount of capacity that is participating in these CA ISO programs, the results point to the fact that there are relatively small levels of load that can contribute in a manner that will effectively and reliably reduce peak loads. The failure to interrupt one's load at the times required is much the same as a local generator not being available or the occurrence of some other contingency. Given the level of constraints with the current PG&E system serving the Bay Area, it is doubtful that interruptible load sufficient to solve these problems could be placed under contract.

DEMAND-SIDE MANAGEMENT (CONSERVATION)

In July 2003, the San Francisco Board of Supervisors approved a $16.3 million joint energy efficiency pilot project with Pacific Gas and Electric Company (PG&E) and San Francisco's Department of the Environment (SF Environment). The San Francisco Peak Energy Pilot Program is designed to increase reliability by reducing peak energy demand for both residential and business customers.

This program is funded by California utility customers and administered by the investor owned utilities under the auspices of the CPUC. The ultimate goal of the program is to reduce electric demand during both the peak summer air conditioning and winter heating seasons. Implementation of the project will include nine energy efficient program elements aimed at reducing usage in San Francisco by 16 MW in January 2005 to assist in the closure of Hunter's Point Power Plant.

Through a portfolio of energy efficiency programs, PG&E and SF Environment will work with hotel/motel, restaurant, and apartment owners. The programs are also designed to assist low-income residents and a special emphasis will target the Bayview-Hunter's Point community.

In addition, PG&E, the investor-owned utility in the project area also uses a program of voluntary reduction in electricity use known as Customer Energy Efficiency (CEE). PG&E has had an active CEE program over the past two decades. Its cumulative reduction of use has been substantial. For any given planning area, the historical CEE energy and peak demand impacts have been subsumed within the peak load demands experienced year by year and thus their impacts are included in the forecast of peak growth. As for future potential CEE impacts, PG&E's Local Integrated Resource Plan (LIRP) study indicates that only 4 MW per year could be obtained through aggressive locally focused CEE.

---

[5] Load dropping can be at the discretion of the CA ISO and/or utility, or voluntarily at the discretion of the consumer.

Both of these programs provided important reductions in consumption, but they fall short of the long-term capacity needs in the project area, and therefore can only be viewed as an augmentation to other non-traditional wires solution options.

CURTAILMENT OF ELECTRIC SERVICE

During June of 2000, when exceptionally high demand due to a statewide heat wave coincided with the shutdown of units at local power plants and low hydroelectric generation in the northwest, PG&E was forced to institute rolling blackouts (for periods of one to three hours) at various locations throughout its territory. This type of scenario may have to be implemented again at times of peak demand if additional transmission and associated substation infrastructure is not provided. PG&E's load curtailment plans are structured so as to avoid curtailment of critical loads such as hospitals.

CONCLUSIONS REGARDING NO PROJECT ALTERNATIVE

If the No Project Alternative is selected, the SFERP would not be constructed. Energy required for local reliability and peaking requirements that would have been produced by the proposed facility would need to be generated by another source. Currently the sources of power that are available are older power generation facilities (Potrero and Hunters Point power plants). While HPPP Unit 4 is expected to close even in the absence of the SFERP when the Jefferson-Martin transmission line is online, the Potrero Power Plant is not expected to close absent the construction of new in-City generation. These power plants release larger quantities of NOx than the proposed facility and have questionable reliability because they are between 27 and 45 years old.

The proposed project will produce electricity to increase the local electrical system's reliability while discharging less NOx emissions for each energy unit generated when compared to other existing, older fossil fuel generation facilities. Further, the operating flexibility of the proposed combustion turbines, that is, a 10-minute start versus the current 24-hour start times for Potrero 3 and Hunters Point 4, affords operators greater flexibility in dispatching plants to meet system requirements. In addition, Potrero Unit 3 is a boiler facility and therefore has air emissions almost all the time (versus a simple cycle facility that only emits when operating). These characteristics provide beneficial environmental impacts. Potential environmental impacts from the No Project alternative would result in greater NOx emissions because new power plants, including the proposed project, would not be brought into operation to displace production from older, higher NOx -emitting plants.

Staff believes that, overall, the No Project Alternative is not superior to the proposed SFERP for the following reasons:

1. Without the proposed SFERP, it less likely that the Potrero Unit 3 Power Plant would be closed in a timely fashion. The Potrero Unit 3 plant is older, has relatively high emissions, and is not as reliable as a newer facility.

2. Without the SFERP project, staff expects the net emissions of NOx and PM10 in the State would be higher because other older, less efficient power plants (either inside or outside of CCSF) would be required to produce more power.

3. The No Project Alternative may result in (1) building of a power facility elsewhere on the northern San Francisco Peninsula, and/or (2) construction of additional transmission facilities to meet necessary reliability criteria. Depending on their location, these facilities would also have environmental impacts that could be significant.

4. The No Project Alternative would result in reduced reliability for San Francisco's electrical supply.

APPENDIX B: ALTERNATIVES ELIMINATED FROM FULL CONSIDERATION

Alternatives analyzed in detail are presented in Appendix A. This appendix addresses the following categories of alternatives that are not pursued for full analysis in this Staff Assessment:

- Alternative power plant sites
- Transmission alternatives
- Renewable resource alternatives
- Demand-side management
- Distributed generation
- Integrated resources alternative.

ALTERNATIVE POWER PLANT SITES

The alternative sites listed below were evaluated, but not retained for full consideration. Each site is described in the subsequent sections, and its rationale for elimination is described.

- Cesar Chavez Site
- Illinois Street Site
- Pier 70
- Western Pacific Site
- Jessie Street Site
- Southeast WPCP
- Treasure Island
- The Presidio
- Cargo Way
- Gilman Avenue
- East Jamie Court
- Potrero Power Plant Unit 7 FSA Alternatives
- San Francisco Energy Center FSA Alternatives

Cesar Chavez Site

Alternative Description

The Cesar Chavez site is located west of the Western Pacific site, but is not on Port of San Francisco property. The site does not contain historic buildings. The site was presented in the AFC and is located near the Port of San Francisco's container terminal, west of the Western Pacific site. The site is developed and zoned Heavy Industrial. The surrounding land uses are industrial, with the Port's container terminal located to the south, industrial uses to the north. The San Francisco Municipal Railway (MUNI) is currently building a new streetcar maintenance facility due west of the site. The site is 2.8 acres, and includes an occupied building that would require demolition.

The nearest residences are located approximately 1,300 feet from the Cesar Chavez site, as opposed to 600 feet from the proposed SFERP site. The site is 0.4 miles south of PG&E's Potrero Substation, requiring less than 1.0 miles of underground transmission line in roadways. Water supply and discharge would be via the combined sewer system. For the Cesar Chavez site, the transmission interconnection would be directly to the Potrero substation. Gas interconnection would be with the natural gas transmission line at Cesar Chavez and Illinois Streets (SFERP 2004a).

Rationale for Elimination

Due to the proximity of the Cesar Chavez Alternative to the SFERP site, impacts of this alternative would be similar to those of the proposed SFERP project. However, an additional disadvantage of the Cesar Chavez site as compared to the proposed SFERP site is that the owner has not shown any interest in selling the property to the City, notwithstanding a number of overtures by CCSF to commence negotiations. Moreover, according to the owner, the title to the property may become disputed as it is community property and the owner has been in the process of a divorce (SFERP 2004a).

A further disadvantage of the property is that the parcel size is small (2.8 acres), and at best minimally adequate for the installation of the SFERP. The applicant has indicated that 3.5 acres is the minimum size parcel to site 3 turbines (SFERP 2004q). The small size would require designing the power plant with a compressed layout. This effort would increase construction and maintenance costs for the project. In addition, there would be no space available for a water treatment facility, requiring that this equipment be located elsewhere. Therefore, although this alternative reduced cultural resources impacts and would be located approximately 700 feet farther from residences, due to feasibility issues associated with gaining site control and the small size of the parcel, while also being located in close proximity to the proposed project (approximately 0.4 miles south), this alternative was eliminated from full consideration.

Illinois Street Site

Alternative Description

The Illinois Street site is located 200 feet south-southeast across the street from the proposed project site on the southern side 23rd Street and Illinois Street. The site is approximately 11 acres of developed land that is zoned heavy industrial and is surrounded by industrial uses to the north, south, and east, with commercial/industrial land uses to the west. The setting of the Illinois Street site is very similar to that of the proposed site, and they have the same industrial surroundings (PG&E's Potrero Substation and Mirant's Potrero PP).

The presence of existing industrial structures on the site will require demolition and the site is within 500 feet of residential areas. Although the proposed site would also require the demolition of existing structures, an advantage of the Illinois site is that demolition of historic buildings required at the proposed site would not occur, whereas use of the Potrero site would require demolition of the Compressor House and Station A.

The site is near PG&E's Potrero Substation and natural gas pipeline. Water supply and discharge would be via the combined sewer system. For the Illinois Street site, the transmission interconnection would be directly to the Potrero Substation. Gas interconnection would be at the same interconnection point as the proposed SFERP project, approximately 200 feet from the proposed site (SFERP 2004a).

Rationale for Elimination

Due to their proximity, impacts of the Illinois Street Alternative would be similar to the proposed SFERP project. In addition, ownership of the Illinois Street site is complex, involving multiple owners and real estate trusts. These entities, as represented by the managing owner, have not appeared interested in selling the property to CCSF. Moreover, the shape of the parcel is irregular, including a large amount of land that would be of little use to the City and that contains buildings, such as warehouses from an old sugar refinery. In preliminary negotiations, CCSF was informed that if they proceeded with a transaction at all, the owners would likely insist on sale of the entire parcel because fragmentation would likely render the remaining property unsaleable. Thus, the cost to CCSF would likely increase because the City would be required to buy more property than it needs (SFERP 2004a).

Therefore, given the complex land ownership, and the general lack of interest in a sale on the part of the owners, CCSF deemed obtaining the Illinois Street property to be uncertain. A further disadvantage of the property is that it would likely have required CCSF to acquire substantially more property than needed to site the SFERP with the attendant additional costs and the site is approximately 100 feet closer to residences than the proposed SFERP site. This alternative would not reduce impacts of the proposed project without creating new impacts of its own, and, therefore, the Illinois Street Alternative was eliminated from further consideration.

Pier 70 Site

Alternative Description

This site was evaluated as an alternative in the AFC for this project. The site would be located at the eastern end of 22nd Street approximately 400 feet north of the proposed SFERP site. Most of the Port's property, including most of Pier 70, consists of former public tidelands, which are held in public trust for the people of California. As trustee since 1969 pursuant to the Burton Act, the Port Commission is responsible for managing this property on a self-supporting basis in conformance with the Public Trust Doctrine. Under this doctrine, the Port is required to promote navigation, fisheries, and maritime commerce, to protect natural resources and to develop recreational uses that attract people to enjoy the Bay and waterfront (Wilson 2004). The San Francisco Bay Conservation and Development Commission (BCDC) is charged with ensuring that development of public trust lands on the Bay occurs in the public interest (SFERP 2004a).

For several years the Port has been actively trying to find ways to preserve and develop the historic structures while preserving the present maritime uses. The Port has identified areas of Pier 70 outside of the ship repair area that it would like to find developers for.

A few years ago, a process was started that would have brought in two entities to develop different parts of the area. One entity was a private developer that planned on building several commercial buildings and the other was a group of arts organizations that hoped to develop several historic shipyard buildings into arts facilities. However, in the economic decline of the past 5 years, this initiative has failed.

The planners at the Port have become increasingly concerned about the condition of several of the historic buildings on the Pier 70 site. Two of the most important, Buildings 104 and 113, are unreinforced masonry. Recently the decision was made to mothball them, which means they may not be used or occupied in any way until they have been seismically strengthened. Other structural problems affect the historic structures, including leakage and broken windows. Port planners express a sense of urgency about pursuing “adaptive reuse” of the historic buildings as the only viable way of preserving them (Wilson 2004).

A major non-profit organization, the Exploratorium, expressed tentative interest in Pier 70 as a future home. This innovative science museum considered reusing a number of Pier 70 historic structures. Some public agencies also expressed interest, but were not in a position to move forward quickly. The Port responded to this interest by issuing a Request for Proposal (RFP). This effort began to detail the conditions required of an entity leasing and developing parts of Pier 70. In the spring of 2004, just as the RFP drafting process was nearing completion, the Exploratorium announced that it was looking at a different location on the waterfront for its future home, although a new location has not yet been decided. The Port then concluded that it would not go forward with an RFP at this time, therefore, the future use of this site is uncertain (Wilson 2004).

For the Pier 70 site, electrical interconnection would be to breaker bays located at the north end of the Potrero substation. Natural gas interconnection would be at the same interconnection point as the proposed SFERP project, approximately 750 feet south of this alternative site (SFERP 2004a).

Rationale for Elimination

Due to their proximity, impacts of the Pier 70 Alternative would be similar to the proposed SFERP project and the Pier 70 site would be approximately 400 feet farther from residences. In addition, the Port of San Francisco’s Pier 70 site is close to the required infrastructure (natural gas and the PG&E Substation). However, the site is part of a potential historic district and would require either the alteration of historic buildings or their removal. The Port also hopes to eventually redevelop this area in a manner consistent with the Public Trust Doctrine. The Pier 70 location includes significantly more historic structures than the proposed SFERP site. These buildings would either have to be incorporated into the plant design, substantially increasing the cost of the project, or demolished. Therefore, due to greater cultural resources impacts, inconsistency with the Public Trust Doctrine, and potential difficulties obtaining site control from the Port, this alternative would not reduce significant impacts of the proposed project without creating greater impacts of its own.

Western Pacific Alternative, San Francisco

Alternative Description

The Western Pacific Alternative is located in CCSF, adjacent and overlapping the proposed SFERP site on a 9-acre parcel within the San Francisco Port Commission’s jurisdiction. The parcel is adjacent to the Port’s container terminal, at the eastern end of Cesar Chavez and 25th Streets. The alternative site is undeveloped and borders the San Francisco Bay on its northern and eastern sides. The site is zoned Heavy Industrial and is surrounded by industrial facilities. The Port of San Francisco's Pier 80 marine terminal is located immediately adjacent and to the south; other industrial uses are located north of the site, and the San Francisco Municipal Railway (MUNI) is currently constructing a streetcar maintenance facility due west of the site. Water, gas, and transmission access would all be similar to the Proposed SFERP.

Rationale for Elimination

The Western Pacific Site is nearly identical to the proposed SFERP, but it is on a parcel further east and adjacent to the San Francisco Bay. Therefore, the construction of the three turbines at the site would create land use and regulatory feasibility concerns. The alternative site is in the State Land Trust and is subject to the public trust for navigation, waterborne commerce and fisheries. In the past, electric power plants that depend upon Bay water to operate have been permitted on trust lands. However, the three turbines that comprise the SFERP do not require a waterfront location for their operation. The common law Public Trust doctrine and the case law interpreting the doctrine recognize that trust lands may be used for purposes that are not inherently water dependent, as long as they directly promote trust purposes. Examples of this type of use would be cargo warehouses or railroad terminals. Since the SFERP does not clearly satisfy the criteria for trust permitted uses, a proposed use of the Western Pacific site for this purpose would be subject to scrutiny by the Attorney General, who is charged with enforcement of trust restrictions, and the State Lands Commission, a state agency responsible for overseeing local trust grantees (CEC 2002a).

The Port plans to develop and integrate the Western Pacific site into its Pier 80 operations through creation of a Pier 80 Terminal Complex, to add open yard and covered shed space to accommodate cargo distribution, assembly and processing related to the Pier 80 terminal operations (SFERP 2004a). As a result, the use of this alternative site may not be compatible with the Port's plans to enhance its marine terminal capabilities at Pier 80. In addition, given the issues of compatibility with the Port's marine terminal plans and the uncertainty as to consistency of the use under the trust doctrine, the use of this location would be lengthy and the outcome uncertain (SFERP 2004a).

The Western Pacific Alternative is also within the Bay Conservation and Development Commission's (BCDC) jurisdiction as the parcel is less than 100-feet inland from the Bay. The use of this site would need to be evaluated under BCDC's San Francisco Bay Plan. The primary issues that will need to be addressed are:

- Whether the project would provide maximum feasible access, consistent with the project;
- Whether the project is consistent with the Bay Plan policies on appearance, design and scenic views;
- Whether the project is consistent with the Bay Plan policies on water quality; and
- Whether the project is consistent with Section 66645 of the McAteer-Petris Act and the required "Power Plant Non-Siting Study" approved by the Bay Commission in compliance with the Act.

Use of the Western Pacific Alternative may conflict with plans of the Port of San Francisco, which may develop and integrate the Western Pacific site into its Pier 80 operations. Additionally, because the SFERP would not depend on seawater for any aspect of operations, use of this site may not be consistent with the common law Public Trust doctrine, which generally reserves the lands for uses that are water-dependent. The Western Pacific Alternative site would not reduce any potentially significant impacts of the proposed project yet would be more likely to create a land use conflict with the plans of the Port of San Francisco and the Public Trust doctrine, as well as raise additional BCDC issues. Therefore, it was eliminated from full consideration in this Staff Assessment.

Jessie Street Alternative

Alternative Description

The Jessie Street Alternative would be located at the NRG/SF Thermal facility at 460 Jessie Street between 5th and 6th Streets, near the U. S. Mint building in downtown San Francisco. The SF Thermal (NRG) facility provides steam heat from four old boilers to certain facilities in the downtown area around the clock. Steam demand varies from 40,000 to 340,000 pounds per hour. Besides the existing power plants at Hunters Point and Potrero, these boilers, which produce approximately 20 ppm of NOx in their emissions, represent the largest stationary NOx emissions source in CCSF (SFERP 2004aa).

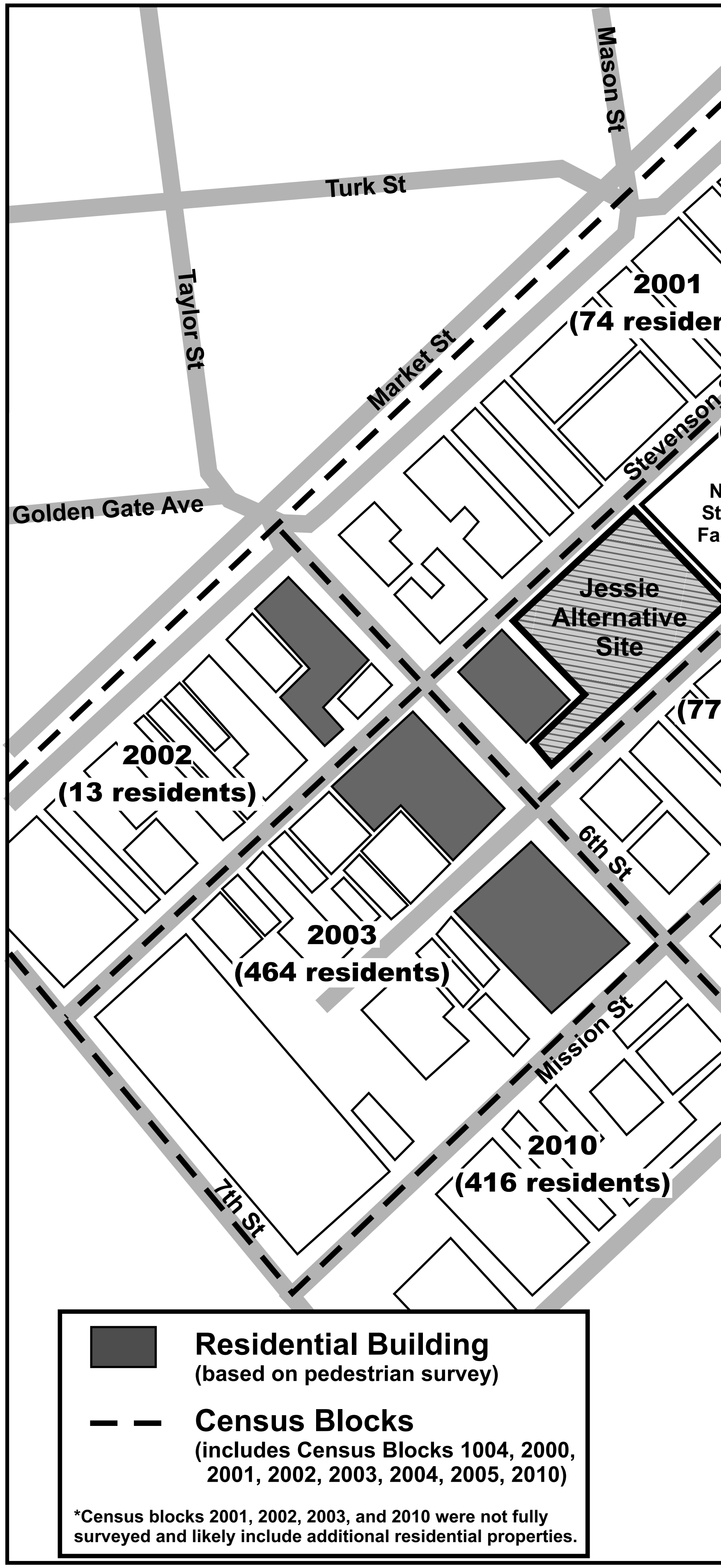
The NRG facility has an adjacent Priority Parking commercial parking lot immediately west of the steam plant that is approximately 204 feet long by 162 feet wide. The parking lot would likely be large enough for a maximum of one LM-6000 gas turbine-generator set. The parcel is zoned C-3-S (Downtown Commercial/Downtown Support). Uses are limited to commercial office, retail, and light manufacturing. In addition, the parcel is subject to two height restriction zones, 90-X and 160-F indicating maximum height of structures of 90 and 160 feet (based on an opinion issue in May 1995 by Robert Passmore, San Francisco City and County Zoning Administrator, a cogeneration plant would be exempt from this requirement) (CEC 1995).

ALTERNATIVES Figure 10 depicts residential buildings within the immediate vicinity of the Jessie Street Alternative site. Within a single city block to the east, south, and west of the alternative site, there are well over 620 residential units, all in the form of residential hotels offering weekly and monthly stays to low-income tenants. Immediately adjacent to and overlooking the western end of the parking lot where the turbine would be located there are four buildings containing more than 120 total units. In addition, the Bayanihan House, located at 88 6th Street on the corner of Mission Street (less than 500 feet from the site), is a low-income single-room occupancy (SRO) facility with 120 units. **ALTERNATIVES Table 6** lists the population and demographics for the U.S. Census Blocks of the alternative site and the surrounding area. Approximately 1,595 people live within two city blocks of the Jessie Alternative site with an average minority population of 72.5 percent (U.S. Census 2000).

ALTERNATIVES Table 6
Population and Demographics around the Jessie Alternative

Census Block*	Land Area (square meters)	Residential Population (single race)	Population Density (total population/ 1 square mile)	Non-White Population
1004	8,310	0	0	0
2000**	14,226	72	13,108	73.6%
2001	17,743	74	11,093	73.7%
2002	17,990	13	2,015	78.6%
2003	36,715	469	34,707	58.3%
2004	13,932	77	14,872	70.0%
2005	11,488	474	111,598	90.5%
2010	16,820	416	68,676	67.7%
TOTAL/ MEAN	137,224	1,595	36,581 (excluding Census Block 1004)	72.5%

Source: U.S. Census 2000
*All of the identified Census Blocks are within Census Tract 17601.
**The Jessie Alternative is located within Census Block 2000.



SFERP Alternative

Figure 10

Residential Land Uses Near the Jessie Street Alternative Site

Rationale for Elimination

The site is surrounded by inhabited commercial and residential buildings that are four or more stories in height. Because the design of a combustion turbine project must include cooling towers, special considerations would be required to ensure that cooling tower plume is dispersed away from and above these buildings. Similarly, exhaust gases from the gas turbine will need to be dispersed at an elevation higher than the roofline of the surrounding buildings. A chimney equal in height to that of the existing steam plant would probably be required. This may have a performance impact on the gas turbine since the manufacturer sets a maximum backpressure (measured in inches of water) at the turbine exhaust.

The NRG facility is a cogeneration facility that would produce steam for CCSF's steam loop. The electrical interconnection would require looping the 115 kV Potrero-Larkin transmission line, located one quarter of a mile from the proposed site, into a new plant substation. The natural gas interconnect was approximately 1.2 miles from the site at 17th and Missouri. A recycled water supply for the facility was not clearly identified but was at least 1.5 miles from the site (SFERP 2004aa)

The Jessie site was eliminated by CCSF due to the high capital costs and financial risks associated with stipulations in the DWR Power Purchase Agreement (PPA). The capital costs of the Jessie Alternative ($87 million) versus the airport ($38 million) differed on the order of $40 to $50 million and CCSF had been given informal indication by the DWR that it would resist paying those additional costs under the DWR PPA (SFERP 2004aa). Some of the factors that adversely affect the capital cost of the site include: high utility interconnection costs (especially the 1.2-mile natural gas and recycled water lines), the need to enclose the equipment in a building, limited building space and no construction lay-down area, high PG&E network costs, the need to build an elevated parking structure for NRG's use, and the difficulty in keeping the steam plant operational while the new plant within it is built. NRG has also demanded that the cogeneration design be oversized to meet their total steam load rather than economically designed to meet only part of their normal needs (SFERP 2004aa). The net effect is that the high plant capital costs at the Jessie site cannot be supported by electricity market prices, even estimating the potential impacts of locational marginal pricing. Therefore, CCSF would have to assume substantial risk for the NRG project to move forward.

In addition, under the DWR PPA, CCSF faced a site control deadline of December 1, 2003 and there were no prospects for any kind of agreement with NRG within that timeframe. In a meeting between NRG and CCSF, NRG had indicated that some of CCSF's assumptions about operations would not be workable given NRG's operational needs, resulting in additional costs at the site (SFERP 2004aa).

A power plant would not be consistent with land use restrictions imposed by the C-3-S zoning designation. In addition, there are also potential air emission impact concerns given the configuration of the residential and commercial buildings surrounding the site. With many residential units directly adjacent to the parking lot site to the west and over 620 units within a city block, there is high potential that air emissions would directly affect these residents. There would also be environmental justice concerns in the area, due to the low-income status of the residents.

From a purely technical standpoint, a cogeneration plant located at NRG could be permitted within accepted Federal and State air emissions standards (SFERP 2004aa). By displacing some of the output of the existing process steam boilers, that have relatively high emissions, with a modern combustion turbine in a cogeneration configuration, the net regional air emissions impact is reduced due to efficiency gains.

However, the cogeneration plant which now produces both electric and steam energy produces more total energy at the NRG location and so more fuel is consumed at this location. Correspondingly, net air emissions at the NRG location increase. Due to the combination of NRG's location near the downtown area and the relatively low buoyancy of the emission sources (due to the much cooler exhaust stack temperatures and adjacent tall buildings), the largest concentrations of these air emissions would occur in CCSF. In contrast, the largest concentrations of air emissions from combustion turbines located at either the airport or the proposed SFERP site will occur over the Bay. This is due to a combination of factors including the site location near the eastern shoreline, greater buoyancy of exhaust gases and predominant westerly winds at the time of year that the combustion turbines are most likely to operate (SFERP 2004aa).

Finally, this site would accommodate only a single turbine, and the SFERP project as proposed is for three turbines. For all of the reasons defined herein, consideration of this site as an alternative is not merited.

Southeast WPCP

Alternative Description

CCSF reviewed the Southeast Water Pollution Control Plant (SEWPCP), where the abandoned sludge drying facility is currently located, as a potential site for SFERP. The site is adjacent to an asphalt plant and I-280. Building a new combustion turbine would require removal of an existing exhaust stack that is taller than the combustion turbine stack.

Electrical interconnection would require looping the proposed Potrero-Hunters Point 115 kV cable[6] into the site. The site is located approximately 0.3 miles from the future location of the cable. Natural gas interconnection would be approximately 0.5 miles from the site near Highway 101. Water and sewer service would have been provided by the SEWPCP (SFERP 2004a).

Rationale for Elimination

This proposed site was not evaluated by CCSF because the communities in the vicinity of Hunters Point Substation have borne and continue to bear the impacts from substantial industrial activity, most notably the Hunters Point Power Plant and the SEWPCP itself (SFERP 2004a and SFPUC 2005a). In addition, there are potential land use impacts associated with nearby residences. Thus CCSF did not consider siting new City-sponsored generation in the Hunters Point area where the SEWPCP is located.

[6] PG&E has proposed construction of an underground 115 kV cable that would pass the northwest side of the WPCP along Evans Avenue. This proposal is currently being evaluated by the CPUC in Application A.03-12-039.

Treasure Island

Alternative Description

This alternative was suggested by members of the public during the course of the public scoping period for the SFERP. Treasure Island is a 450-acre manmade island, which is attached to a natural island, Yerba Buena Island (547 acres). It is located in the San Francisco Bay, approximately 2 miles east of San Francisco and 4 miles west of the Port of Oakland. The island can be reached by motor vehicle only via the San Francisco-Oakland Bay Bridge.

Treasure Island was constructed in 1938/1939 for the purpose of hosting the Golden Gate International Exposition to celebrate the engineering marvels achieved by the completion of both the Golden Gate and Bay Bridges, as well as acknowledge the ascendancy of California and San Francisco as an economic, political and cultural force in the increasingly important Pacific region (TIDA 2004). The construction of Treasure Island began in February 1936 and was completed in January 1939. To build the island, 29 million cubic yards of sand and gravel were dredged from the Bay and the Sacramento River delta and approximately 259 thousand tons of rock were used to create a rock seawall to contain the Island. Therefore, the island is generally underlain by about 30 feet of artificial fill material, which overlies 20 to 30 feet of soft, Young Bay Mud. Significant ground liquefaction occurred here during the Loma Prieta Earthquake in 1989 (CEC 1995).

Starting in 1997 when the naval station closed, CCSF became the primary steward of the island and created the Treasure Island Development Authority (TIDA), a non-profit, public benefit agency dedicated to the economic redevelopment of the island. The Treasure Island Conversion Act of 1997 granted the TIDA the powers of a California Redevelopment Agency, as well as the rights to administer Tidelands Trust property, subject to certain duties and responsibilities of the California State Lands Commission.

Although the availability of usable island space for a power plant is unknown, most likely such a facility would be sited on the north side of the island because it is more industrial (CEC 1995). Regardless of its location on the island, a power plant would most likely impact a variety of land uses. As a naval station, there were both industrial and residential areas on the island. Current land use on the island is also mixed, with former naval personnel and family housing, commercial land uses, small ship docking facilities, old service barracks, a combined elementary and middle school, a charter high school, and various entertainment and recreation facilities.

In January 1999 the TIDA authorized then-Executive Director Annemarie Conroy to sign a contract with the John Stewart Company to rehabilitate, rent and manage approximately 775 residential units on Treasure and Yerba Buena Islands. In addition, TIDA offered housing opportunities to the economically disadvantaged by signing a sublease with the Treasure Island Homeless Development Initiative (TIHDI), a coalition of service-providing organizations. In December 1999 about 50 pioneer families and individuals moved into TIHDI's newly renovated units. TIHDI member organizations now occupy a total of approximately 225 units (TIDA 2004).

Future redevelopment plans include the construction of 2,800 new housing units (33 percent would be made affordable), luxury hotels, a new ferry terminal, new conference and visitor centers, and more than 200 acres of recreational and open space. The Navy and CCSF are still negotiating the complete transfer of the property, which must first undergo extensive environmental cleanup at a cost of between $60 and $80 million.

Treasure Island, with a load of only 2 to 3 MW, receives its electricity at Western Area Power Administration rates via a submarine cable from PG&E's Davis Substation in Oakland. Natural gas is also received from Oakland via a 10-inch submarine pipeline, which operates at 120 psi (Zorzynski 2004). Water, however, is obtained from CCSF on the San Francisco span of the Bay Bridge to a filling reservoir on Yerba Buena Island, which drains down to Treasure Island.

Significant upgrades especially to the PG&E's transmission and natural gas distribution lines would be needed to handle the added capacity for the turbines. Given the construction of the new eastern span of the Bay Bridge, the existing transmission and gas submarine lines from Oakland will have to be relocated (Zorzynski 2004). Depending on the timing of the two projects, the added capacity could be incorporated into the plans for the new lines, however, the upgrades to the lines on the Island would still be necessary and submarine lines to San Francisco would have to be constructed to export the generated power to CCSF. Another option for transmission would be to build new lines to the closest major transmission interconnection at the Embarcadero Substation, located at First and Folsom Streets in San Francisco. This route would require over 2 miles of transmission line, either installed on the Bay Bridge (unlikely due to Caltrans' policies of not allowing new utilities in its ROW) or as submarine cable, and then undergrounded through a highly developed and congested areas in the City.

Rationale for Elimination

There is inadequate infrastructure (transmission lines, natural gas) and geotechnical concerns related to building on fill. Site contamination and cleanup activities associated with the transfer of property to CCSF would make it difficult to construct the turbines within the timeframe required in the DWR PPA, which requires commercial operation by June 1, 2005. Finally, the plans for residential development existing and proposed on the island would also make a power plant at this site incompatible with current and future land uses and the redevelopment plan, because the turbines would be in close proximity to a large number of residences.

The Presidio

Alternative Description

This alternative was suggested by members of the public during the course of the public scoping period for the SFERP. The Presidio is a 1,481-acre reserve, renowned for its scenic setting and rich historic and natural features. The Presidio is part of the Golden Gate National Recreation Area (GGNRA), and is managed by the Presidio Trust under the Presidio Trust Act, in partnership with the National Park Service. The Presidio has 991 acres of open space as well as 28.5 miles of hiking, biking, and multi-use trails, a golf course, a bowling alley, Rob Hill campground, picnic sites, tennis courts, ball fields, indoor swimming and gymnasium facilities, and windsurfing areas (Presidio 2004).

The Presidio's transformation from military post to national park began in 1972 when Congress created the GGNRA, a vast network of historic sites and preserved open space that today links 75,500 acres along the San Francisco Bay Area coast. In the legislation that established the GGNRA, Congress mandated that the Presidio, then an active U.S. Army post, would become part of the GGNRA if the installation became superfluous to the military.

Because of the former post's city-like infrastructure, its nearly 800 buildings, and its expansive cultivated forest and natural areas, funding the Presidio's operation and long-term care was much more costly than traditional parks. In 1996, Congress devised a management and funding model unique among national parks, and created the Presidio Trust to preserve the Presidio's natural, scenic, cultural, and recreational resources, and to become financially self-sufficient.

The National Park Service manages the Presidio's coastal areas. The Trust and National Park Service cooperate to preserve open space, plan for the trails system, provide for public safety, and offer public programs.

The Presidio itself is a National Historic Landmark with 768 structures, 469 of which are historic. The park includes architectural styles from every major military construction period since 1848, including Italianate, Greek Revival, Mediterranean, and Mission Revival and is a significant archaeology site, featuring prehistoric, 18th century Spanish, Mexican, and American artifacts (Presidio 2004).

In addition, the Presidio shelters 280 native plant species, 16 of which are rare or endangered, such as the San Francisco lessingia and the Raven's manzanita. It features a 300 acre planted historic forest; key species include Monterey cypress, Monterey pine, and blue gum eucalyptus. The Presidio is a refuge for more than 200 species of birds as well as a variety of mammals, reptiles, and aquatic species (Presidio 2004).

The Trust itself preserves, enhances, and maintains the Presidio's interior lands. Using annually declining federal appropriations as well as private investment, the agency is rehabilitating former Army buildings as civilian homes, workplaces, and public facilities. The revenues earned through leasing are used to operate the park, preserve its natural and cultural resources, maintain its infrastructure, and ensure its long-term care. The Presidio Trust is required to operate without direct federal appropriations following a 15-year transition period, which ends at the end of fiscal year 2012 (Presidio 2004).

None of the plans for the Presidio's future include power plant development. In fact, the Presidio Trust Act says, "as part of the Golden Gate National Recreation Area, the Presidio's significant natural, historic, scenic, cultural and recreational resources must be managed in a manner which is consistent with sound principles of land use planning and management, and which protects the Presidio from development and uses which would destroy the scenic beauty and historic and natural character of the area and cultural and recreational resources (P.L. 104-333)" (Presidio 2004). The Final General Management Plan Amendment for Presidio of San Francisco calls for the removal of 276 non-historic and historic buildings to enhance the site's recreational, cultural, and natural resources.

Open in June 2005 on the eastern end of The Presidio is the Letterman Digital Arts Center, a 23-acre campus that houses Lucasfilm divisions such as Industrial Light and Magic and LucasArts Entertainment Company. The Letterman Digital Arts Center is the largest development project approved by the Presidio Trust, which chose Lucasfilm to develop the site in 2000, after evaluating proposals from four finalists. The federal agency says Lucasfilm's $6 million in annual rent is vital for the park to reach financial self-sufficiency by 2013, as mandated by Congress.

Building 1040 was at one time designated as a powerhouse and steam plant. The steam plant consisted of four old boilers, which were used for district heating only for the former Letterman Hospital complex (CEC 1995). There is no power generation. Building 1040 is now closed as an historic building and there are no plans or funds identified for its rehabilitation. The most industrial area in the Presidio, and as a result the most likely location for turbines within the Presidio, would be along Doyle Drive (which is also in the vicinity of Building 1040), although the area is currently planned for redevelopment under the Doyle Drive Expansion project (Pelkas 2004).

At one time an independent developer approached the National Park Service (NPS) and offered to supply district heating at no cost, and sell excess electricity generated energy to PG&E. This offer was refused, because the plan was determined to be inconsistent with the Presidio’s national park status (CEC 1995).

Currently, approximately 2,000 people work for a mix of about 150 non-profit, for-profit, and government organizations within the park. Approximately 2,400 people live in the Presidio in 1,000 households (Presidio 2004).

The Presidio's utility systems date from almost every period of the Presidio's history of development as a military installation. Consequently, many of its older facilities have required significant upgrading and replacement and the Trust has an ongoing program of capital investment in its infrastructure systems. Utilities in the Presidio include water treatment, water distribution, wastewater collection, solid waste disposal, and electrical distribution. The Trust has water resource management responsibilities and authorities to provide water to Presidio users. Historically, the Presidio water needs have been met by Lobos Creek water, which is treated at the Presidio Water Treatment Plant (PWTP) and supplemented by water purchased from the SFPUC. In addition, the Army also operated several groundwater wells located near the existing PWTP, golf course and Mountain Lake. These wells were taken out of service before the Trust assumed jurisdiction, and the Trust has no plans to utilize groundwater for future water supplies (Presidio 2002).

Daily flow in Lobos Creek ranges from 1.2 million gallons per day (mgd) in dry years to 2.1 mgd in wet years. Between 0.7 and 1.6 mgd of Lobos Creek water is available in any given year for diversion, treatment and use at the Presidio. Historically the SFPUC has supplied up to one-third of the Presidio’s water demand, and several points of interconnection are currently maintained. The amount of water purchased varies by year, however, and last year the Trust purchased approximately 15% of the average daily amount used at the Presidio. In addition to the water conservation, the concept of providing recycled water as a way to reduce potable water consumption for non-potable uses (i.e., irrigation) has long been considered as a future goal at the Presidio (Presidio 2002). Water for the turbines would most likely have to be obtained from the SFPUC.

In 1999, 21,208 MW-hours of electricity were distributed at the Presidio serving 2.9 million square feet of buildings. The total load capacity of the Presidio's electrical infrastructure is 7,307 kilovolt amps (kVA). PG& E feeders entering into the Presidio currently have approximately 3,000 kVA of spare capacity. Existing current demand at the Presidio is 4,307 kVA (Presidio 2002).

The Trust operates and maintains the electrical distribution system at the Presidio. The system consists of approximately 42 miles of aboveground and underground electrical lines. The Presidio is a bundled service customer of PG& E, and receives electric service at primary voltage at two major points of connection (Greenwich and Main Post substations). The Trust's high voltage department then distributes power to the various facilities at the Presidio. The high voltage department maintains two major substations (Greenwich and Main Post), as well as 12 emergency backup generators at various buildings across the Presidio (Presidio 2002).

The Trust has several ongoing projects and practices to maintain the integrity and reliability of the electrical distribution system at the Presidio including substation upgrade and maintenance. Additionally, the trust is planning a major distribution system condition assessment to establish and prioritize long-term maintenance goals. The Trust is also in the process of completing an Energy Management Strategy, which will establish a framework for meeting projected energy demands at the Presidio. The strategy will evaluate the feasibility of implementing various on-site generation and cogeneration systems, including microturbines, fuel cells and photovoltaic panels. On-site generation will enhance the reliability of the Presidio's electrical supply and demonstrate the commercial viability of these emerging technologies (Presidio 2002).

The natural gas distribution facilities at the Presidio are owned and operated by PG&E. In 1990, 6.7 million therms of natural gas were distributed through the system to the U. S. Army and other users at the Presidio. In 1999, 1.2 million therms of natural gas were distributed to users throughout the Presidio (Presidio 2002). The turbine would likewise obtain natural gas from the PG&E system.

Rationale for Elimination

The Presidio is part of the National Park system, and siting a power plant at the Presidio would be viewed by the federal Government as an incompatible land use, inconsistent with the mission of the National Park Service. In addition, the use of a Presidio site has the potential to create significant environmental impacts (greater than those at the proposed SFERP site), most notably to residential land uses (2,400 people live in the Presidio), recreation, cultural, and visual resources. The site would require long transmission lines in order to connect to a 115 kV substation located in downtown San Francisco, and even longer water pipelines to either the SEWPCP (located at 3rd Street and Jerrold Avenue near the proposed SFERP site) or Oceanside Water Pollution Control Plant (adjacent to the San Francisco zoo in the western side of the City)

Cargo Way

This site was approved by the Energy Commission as the site for the San Francisco Energy Company's (SFEC) power plant in 1995. However, the project proponent was unable to secure a lease for the project from the Port Commission, so the power plant was never constructed. The site was also evaluated by Energy Commission staff as an alternative for the Potrero Unit 7 Project.

Alternative Description

This site is on Port of San Francisco land (property SWL 344.1) at the southwest corner of Cargo Way and Amador Street. This site was evaluated an alternative in Mirant's AFC for Potrero Unit 7 and it was evaluated by Energy Commission staff as an alternative for that project. The Cargo Way site is undeveloped but is surrounded by industrial land uses, and the closest residences are approximately five to six blocks to the south. This distance is farther from the nearest residences than is the proposed SFERP site, but generally closer to the Hunters Point residential area (CEC 2002a).

According to the CCSF, this site is zoned M-2, Heavy Industrial, with a maximum structure height restriction of 40 feet. This site is reserved for maritime support uses since it is near Islais Creek Channel. The Seaport Plan does not consider the power plants to be maritime uses. However, the Port of San Francisco in its Waterfront Land Use Plan has declared this site as surplus to maritime needs and recommends changing its designation to allow specified non-maritime uses. On January 10, 1995, the Seaport Plan Advisory Committee issued a set of proposed amendments to the Seaport Plan that would result in the removal of 22 acres from the maritime use restrictions established in the Seaport Plan. This acreage is enough to accommodate power-generating facilities without adversely impacting existing and future maritime uses in this area (CEC 2002a).

A 115 kV transmission line would have to be constructed to the Hunters Point Substation (approximately one mile to the southeast). Natural gas is available in proximity to the site. Water could be obtained from the SEWPCP approximately 0.5 miles south on Jerrold Street and Phelps Streets.

Rationale for Elimination

This alternative site was not evaluated by CCSF because the communities in the vicinity of Hunters Point Substation have borne and continue to bear the impacts from substantial industrial activity, most notably the Hunters Point Power Plant and the SEWPCP itself. In addition there are potential land use impacts associated with nearby residences. Thus CCSF did not consider siting new City-sponsored generation in the Hunters Point area (SFERP 2004a and SFPUC 2005a). The Cargo Way site is located less than 0.25 miles north of Hunters Boulevard and would encounter significant environmental justice concerns. In addition, this site would not reduce impacts of the proposed SFERP project in any issue areas other than cultural resources, without creating new potentially significant impacts of its own.

Gilman Avenue, 3Com Park Area

This site was also evaluated by Energy Commission staff as an alternative for the Potrero Unit 7 Project.

Alternative Description

The site is located immediately east of Arelious Walker Drive and north of Gilman Avenue in San Francisco. This site is currently vacant, and is used as a parking lot for events at 3Com Park. However, the future use of 3Com Park for major events (e.g., SF 49ers football) is in question, and closure of the Park would eliminate the need for use of this site for parking. East of this site is undeveloped park property owned by the State of California (CEC 2002a).

This site is located in a sub area of the South Bayshore Area Plan of the San Francisco Master Plan. This sub area is depicted by the Area Plan as strategic in improving land use quality and housing growth and to stimulate long term economic and employment growth in the perimeter of the Candlestick Point State Recreation Area. CCSF's General Plan identifies this site as a potential future park. This site and most of the surrounding lands are currently zoned M-1 (Light Industrial). However, with the Candlestick Point State Recreation Area and the existing residential neighborhood as the primary adjacent uses, this area is becoming less suitable for industry and more suitable in the long term for housing or live-work use (South Bayshore Area Plan, July 1995).

According to the South Bayshore Area Plan (July 1995), the M-1 zoning class prohibits manufacture, refining, distillation of abrasives, acid, alcohol, asbestos and similar hazardous chemicals as well as other heavy industries. This prohibition should be maintained to assure that these areas are adequately protected and insulated from the adverse impacts of toxic industries (CEC 2002a).

The 115 kV transmission system is less than one mile to the west, and a transmission interconnection to that line would be required. It is assumed that this connection would be underground, following a route generally due west to the Third Street corridor. Water would be obtained from the SEWPCP just one block west of the Third Street corridor at Jerrold Street, less than 2 miles north-northwest of the site. Natural gas is available in proximity to the site.

To the east of the site are the Candlestick RV Park and Candlestick Point State Recreation Area. To the south is 3Com Park with elevated residential areas on the hill slopes to the west of the park. To the immediate west of the site is a gated residential area (Alice Griffith Housing Project) under the jurisdiction of the San Francisco Housing Authority and zoned for moderate density residential uses. To the immediate north of the site are Bay wetlands and more residential areas on the southern slopes of Hunters Point. The True Hope Church of God in Christ, the Bret Harte School, and Gilman Park are also located near the site on Gilman Avenue between Hawes Street and Giants Drive. Gilman Park includes playing fields and playground facilities (CEC 2002a).

Rationale for Elimination

CCSF seeks to continue to develop this area with a mixture of housing types, including middle, moderate, and low-income housing that is reflective of the demographic character of the South Bayshore area. Given that CCSF seeks to avoid heavy industrial uses in this area, and the existence of several sensitive land uses (i.e., residences, schools, playgrounds, churches, recreation area, etc.) surrounding the site, project development at this site would be less desirable than at the SFERP site. Development of power generating facilities would not be consistent with CCSF's light industrial designation and would be incompatible with the surrounding residential and recreational uses and the associated sensitive receptors. In addition, development at this site could raise environmental justice issues. The Alice Griffith Housing Project, a low-income housing land use, is in close proximity to this site and could be disproportionately impacted by the adverse air quality, noise, and hazardous materials impacts of the proposed project. Therefore, this alternative was eliminated from full analysis.

East Jamie Court, South San Francisco

This alternative site was under consideration for a power plant by AES Corporation in 1998-1999, but an AFC was not submitted to the Energy Commission at that time. According to Steve Carlson, planner with the City of South San Francisco, the Jamie Court site is one of three potential sites in the South San Francisco area that have been under consideration for a power plant at various times between 1999 and during the alternatives screening process for the Potrero Unit 7 Project where it was evaluated as an alternative in 2002 (CEC 2002a). Besides Jamie Court, the other South San Francisco sites were: (1) adjacent to the water treatment plant (eliminated from this analysis due to its small size), and (2) at the San Francisco Airport (evaluated in this Staff Assessment as the SFIA Alternative).

Alternative Description

This site is south of East Jamie Court and east of Haskins Way, south of E. Grand Avenue, adjacent to the CCSF's recycling facility, on the Oyster Point peninsula near Point San Bruno that is due north of SFIA. The site is located directly on the San Francisco Bay (the San Bruno Channel passes adjacent to this shoreline). The site is a vacant lot of about 20 acres (CEC 2002a).

According to the South San Francisco General Plan this site is within an area designated as Mixed Industrial and Coastal Commercial with a 161-foot height limit for structures according to the General Plan's Airport Related Height Limitations. The Mixed Industrial designation is intended to provide and protect industrial lands for a wide range of manufacturing, industrial processing, general service, warehousing, storage and distribution, and service commercial uses. Industries producing substantial amounts of hazardous waste or odor and other pollutants are not permitted under the Mixed Industrial designation. The Coastal Commercial designation allows for a variety of office, limited retail and other low-scale commercial uses with a coastal orientation (CEC 2002a). There are no residences in the immediate vicinity.

The transmission system is approximately 1.3 miles to the west, so construction of an interconnection would be required. Natural gas would be supplied from Line 101 near the Highway 101 corridor.

Rationale for Elimination

This alternative would be south of Martin Substation and would therefore not fulfill the reliability siting objective of CCSF based on CA ISO analysis to ensure the closure of Hunters Point Power Plant (SFERP 2004q). Regardless, a similar site in the vicinity, the SFIA Alternative, was fully evaluated in this Staff Assessment. The SFIA Alternative was chosen for full evaluation because it was found to be preferable to the East Jamie Court site due to of better access to infrastructure (i.e., transmission, water, and natural gas). The East Jamie Court site would have had similar impacts, but would have also required substantially longer linear routes for transmission, water, and natural gas, creating greater environmental impacts.

Potrero Power Plant Unit 7 Project FSA Alternatives

In the FSA for the Potrero Power Plant Unit 7, Staff identified and considered a broad range of potential alternatives to the proposed project in selecting those that qualified for detailed evaluation. The alternatives identified and considered were:

- No Project Alternative
- Five alternative sites (Cargo Way, Tuntex [Brisbane], Gilman Avenue [3Com Park Area], East Jamie Court [South San Francisco], UGG [SFIA])

Other alternatives that were eliminated from detailed consideration in that FSA were:

- Transmission alternatives
- Technology alternatives
- Demand side management
- Distributed generation
- Renewable resources (solar, wind, biomass, hydropower, geothermal)
- Integrated resources alternative.

Several of the sites evaluated in the Potrero Power Plant FSA are addressed above. The following four additional alternative sites beyond those addressed above were addressed (but not evaluated in detail):

- **City Asphalt Plant**: This asphalt preparation facility is located at the corner of Quint and Jerrold Streets in the Bayview-Hunters Point neighborhood, near the SEWPCP. The site is small and triangular-shaped (adjacent to the railroad) and was eliminated from initial screening because, with residential neighborhoods only two to three blocks away to the east, it would not reduce or eliminate any impacts of the proposed project. This site was also considered for the SFEC project, but rejected at the time due to nearby residences and inconsistency with zoning regulations (it is zoned P, public district, limiting uses to governmental services or uses permitted in any NC, neighborhood-commercial zone, within a quarter mile of the subject parcel) (CEC 1995).
- **Carroll Avenue, North of 3Com Park**: This site is currently used as a parking lot for events at 3Com Park, and is located at the east end of Carroll Avenue adjacent to State Park lands. The vacant lot may become less used as events at 3Com Park

are discontinued. However, this site was eliminated because there are residential properties located less than one block away, to the south.

- **South San Francisco, Belle Air Road**: This site is within an industrial area of the City of South San Francisco, east of the 101 Freeway and north of North Access Road near SFIA. The land is used primarily for the City's water treatment facilities, and only a small area would be available for use as a power plant. Therefore the site was eliminated from analysis as an alternative to Potrero Unit 7 due to feasibility concerns and was not considered for SFERP because it is in the same vicinity as the SFIA Alternative but would have greater impacts.
- **3Com Park**: Since the stadium itself may become obsolete in the future, its location was considered for a power plant site. However, because the timing of the potential discontinued use is not certain, there are residences to the north and west. In addition, parklands surround the site. As a result, the site was eliminated from consideration.

San Francisco Energy Company FSA Alternatives

For the Energy Commission's analysis of the San Francisco Energy Company's (SFEC) Project (94-AFC-1), staff initially surveyed approximately 150 sites on the northern San Francisco peninsula and within CCSF. Most were eliminated because of land use incompatibility and the land requirements (a single city block with at least 3 acres). The most promising alternatives that resulted from the SFEC analysis are listed below, along with their rationale for elimination. **ALTERNATIVES Table 7** (following the list) presents a summary of SFEC alternatives (CEC 1995).

- **Port Site:** Proposed site for the SFEC Project (see Cargo Way Site, above), near the Islais Creek Channel and Piers 90 and 92. The Port Site's immediate neighbors were industrial and commercial. However, applicant and the Port were unable to agree on the terms of a lease for this site, therefore, it was never built.
- **Innes Avenue Site**: While SFEC was unable to lease the Port Site, this nearby, privately-owned parcel could have been leased. Located at Innes Avenue, south of India Basin, this site was directly adjacent to a residential neighborhood. SFEC still hoped to lease the Port Site, but felt it had to achieve site control under the Biennial Resource Plan Update (BRPU). The SFEC AFC was thus filed with the facility located at either the Innes Avenue Site or the Port Site. The AFC designated Innes Avenue as "the proposed site" and the Port Site as "the alternative site." Based upon the potential for significant adverse environmental impacts due to the proximity of residences, the Innes Avenue site was found to be greatly inferior to the Port Site (CEC 1995).
- **City Asphalt Plant:** See Potrero Unit 7 Alternatives above.
- **SF Thermal Plant:** See Potrero Unit 7 Alternatives above and the Jessie Alternative under Alternatives Eliminated.
- **Hunters Point Power Plant:** See discussion of sites near Hunters Point Substation in the Alternatives Analysis Completed by the Applicant section above.
- **China Basin Stadium Site:** Immediately south of Southern Pacific Terminal (Caltrain station) bounded by I-280 off ramp and Caltrain at 4th and Berry Streets. A

cogeneration plant was found to be incompatible with the retail and general commercial uses in the immediate vicinity of the site. In addition, because of its proximity to the Caltrain terminal, it could supplant uses, such as office, commercial, and light industrial, that would be more able to take advantage of the proximity to the transit option that the passenger terminal represents. In addition, at the time Caltrans was planning the terminus of the off ramps for I-280 to be on the site.

- **Mission Bay Development:** Bounded on the east by 3rd and the south by 16th Street. To the north and west is the China Basin estuary. Initial analysis at the time indicated that a cogeneration plant would not be compatible with the development plans approved by the City and being implemented by the property owner, Catellus Corporation. While it would be consistent with zoning and height standards, construction of a power plant at this site would have negated years of planning intended to convert this area, formerly rail yards, into a community of residential and commercial uses. Changes to the plan would have required amendments to the Mission Bay specific plan and, hence, the City and County Master Plan (CEC 1995).
- **Rail Yard South of China Basin:** An old Santa Fe rail yard south of China Basin and north of Central Basin. Illinois Street is on the south and Terry Francois Street (also known as China Basin Street) is on the east. This parcel is within the jurisdiction boundaries of the Port of San Francisco and identified in the San Francisco Bay Plan and Waterfront Special Area Plan as reserved for Port priority, or maritime uses. Therefore, this site was eliminated from consideration for SFEC.
- **Cow Palace Site, Daly City:** This site is located on the Cow Palace grounds, an exhibition facility, less than 0.5 miles from Martin Substation. It was eliminated by the SFEC because it was found by the applicant to have poor access to cooling water and natural gas supply constraints. The applicant also stated in their AFC that the site size and configuration would make facility design difficult and zoning changes would be required.
- **Cow Palace Basin**: On the northeast corner of Carter and Martin Streets in Daly City is a deep canyon, which bounds the southwest corner of the Cow Palace Site, behind the old Geneva Drive-In to the west. If graded, there would be approximately 7 acres available for this site. The site is zoned C-3, Heavy Commercial, and land uses in the vicinity are primarily non-industrial. A power plant at this location would be inconsistent with the land use limitations imposed by the C-3 zoning designation and would be highly visible. In addition, the area surrounding the site is a developing residential area.
- **Treasure Island** The rationale for elimination is discussed for the Treasure Island Alternative under Alternatives Eliminated.
- **Hunters Point Naval Shipyard:** South end of Innes or Crisp Avenue. This site was eliminated for the SFEC because a preferred land use alternative was developed and was under review at the time that emphasized low intensity and light industrial uses. The shipyard property was also highly contaminated and undergoing a remediation process.
- **PG&E's H. Martin Substation, Daly City:** This site is located on the southwest corner of Geneva Avenue and Bayshore Boulevard in the far eastern portion of the Daly City panhandle in the Bayshore community planning area. It is designated in

the Daly City General Plan as PU, Public Utility, and most of the site is occupied by PG&E's Martin substation. In addition, the site is in close proximity to numerous single-family residences, an elementary school, and a community park to the south and west of the site.

- **Tuntex Site:** This site is considered as an alternative to Potrero Unit 7 Project and herein as the Brisbane Alternative. It is part of a larger vacant parcel located between Bayshore Boulevard to the west and Highway 101. It was eliminated from SFEC because public infrastructure (i.e., water, sewer, access, etc.) was nonexistent and because the Brisbane General Plan designated the area PD/TC, Trade Commercial Planned Unit Development, which would not support the location of heavy industrial uses in the area.
- **Potrero Site:** Bordered by Humboldt Street (north), 23rd Street (south), Illinois Street (west), and Potrero Point (east). The 540 MW combined cycle Potrero Unit 7 Project, which is considered as an alternative in this Staff Assessment, is located on this site. This alternative site was found to be less compatible with existing and future uses than the SFEC proposed site, because the parcel was closer to active maritime uses existing to the south at the terminus of Army Street and was more likely to be influenced by its port priority use designation and be used for maritime uses.
- **SF Airport Site:** This site was considered as an alternative to Potrero Unit 7 and is also evaluated herein as the SFIA Alternative. No specific site was identified during the SFEC environmental review process but it generally referred to the industrial area east of Highway 101 and north of the main airport terminal. The airport site was less preferred because expanded operations at the airport as illustrated in the Airport Master Plan would have required subsequent expansion and intensification of aviation support services in the vicinity of the airport. Lands used by the SFEC could have displaced necessary airport-related uses. In addition, land uses within and near the runway approach zones are subject to federally mandated height limitations that would preclude construction of a cogeneration plant in a number of locations in this area.
- **Catellus/Port Authority Site (also known as Western Pacific Site):** This site was considered by the applicant in the SFERP AFC. This site is located at 25th Street between Illinois and Michigan Streets. Energy Commission staff fully analyzed this site for the SFEC project and found it to be feasible. At the time to parcel was involved in a transfer of ownership to the Port of San Francisco.

Intervenors for the SFEC project also suggested consideration of other sites, which were deemed infeasible:

- **The Presidio**: See description under Alternatives Eliminated (Appendix B).
- **Alcatraz Island**: As part of the Golden Gate National Recreation Area, Alcatraz Island is under the administration of the National Park Service and was found to be regulatorily infeasible. Space concerns as well as significant environmental impacts were identified, specifically to visual, cultural, and biological resources.
- **Oceanside Water Pollution Control Plant:** adjacent to U.S. National Guard Armory and SF Fleishacker Playground and Zoo, bordered by Great Highway to the

west and Sloat Blvd to the north. It was eliminated from analysis because the site had been approved to house the zoo's mammal conservation center and an avian conservation center and, therefore, would be an incompatible land use and would preclude future recreational use.

- **Vacant lot on Sloat Boulevard**. Since it was smaller than 3 acres, this site, located at 2900 Sloat Boulevard, had space constraints. In addition, land use in the area is primarily residential with light commercial intermixed along Sloat Boulevard, and there was a planned residential development for 16 buildings and 33 dwellings underway at the time, which has since constructed.

ALTERNATIVES Table 7. Alternative Sites Considered in the San Francisco Energy Company (SFEC) FSA (94-AFC-1)

Alternatives	Qualify ?	If Not, Why Not?
Innes Avenue	No	No environmental benefit (proximity of residences)
City Asphalt Plant	No	Too small for 540 MW
SF Thermal Plant	No	Too small for 540 MW
Hunters Point Power Plant	No	No environmental benefit
China Basin Stadium Site	No	Unavailable due to Mission Bay development underway
Mission Bay Development	No	Unavailable due to Mission Bay development underway
Rail Yard South of China Basin	No	Unavailable due to Mission Bay development underway
Cow Palace, Daly City	No	No environmental benefit (residential developments now surround available land)
Treasure Island	No	Inadequate infrastructure (transmission lines, natural gas) and geotechnical concerns related to building on fill
Hunters Point Naval Shipyard	No	Development plans underway for residential and other uses
PG&E's Martin Substation, Daly City	No	Inadequate land available
Tuntex Site	Yes	Considered herein as the Brisbane Alternative
Potrero Site	Yes	Considered herein as the Potrero Unit 7 Project alternative.
SF Airport Site	Yes	Considered herein as the SFIA Alternative
Catellus/Port Authority Site	No	Similar to site of proposed SFERP, but no environmental benefit (land use conflicts and regulatory feasibility issues)
Oceanside Water Pollution Control Plant	No	Incompatible land use with the SF Zoo and would preclude future recreational use

TRANSMISSION ALTERNATIVES

Two transmission alternatives (San Mateo-Martin and several similar East Bay to SF options) were considered in the San Francisco Long-Term Electric Transmission Planning Technical Study, October 24, 2000 (the study that ultimately recommended the

Jefferson-Martin Project). These same alternatives are also being considered in the San Francisco Peninsula Long-Term Transmission Planning Study, Phase 2 Study Plan, Version 3.0 (April 1, 2004). The other two projects (Jefferson-Martin and the Trans Bay Cable) are addressed elsewhere in this Staff Assessment, so are only briefly summarized here.

Jefferson-Martin 230 kV Transmission Project. This transmission alternative could be considered to be an alternative to the SFERP. It is included in the Revised San Francisco Action Plan (see **ALTERNATIVES Table 5**) as one of the nine necessary projects to release HPPP Units 1 & 4 from their RMR Agreements, but it would *not* release Potrero Unit 3 from its RMR Agreement, which is a major objective of the proposed SFERP (Edwards 2004a and 2004b). This project was approved by the CPUC on August 19, 2004. Construction is currently underway and the line should be operational by summer 2006. This project does in part meet the objectives of the SFERP: it will improve the City of San Francisco's electricity reliability; it will help to facilitate the shutdown of HPPP, and it creates no local impacts from electrical generation. However, given that this project has already been approved, it is considered in this analysis as part of the No Project Alternative.

Trans Bay Cable Project. This project would result in installation of a DC cable from Pittsburg (Contra Costa County) to the Potrero Substation. It is fully evaluated as an alternative to the SFERP (see Appendix A, Alternatives Evaluated in Detail).

<u>San Mateo Substation to Martin Substation</u>

Alternative Description

This alternative would consist of a new 14.3-mile 230 kV underground cable constructed between San Mateo and Martin Substations in the Cities of San Mateo, Burlingame, Millbrae, San Bruno, South San Francisco, and Brisbane. The routing of this alternative as suggested in the CA ISO Study would be in the same ROW as the existing underground 230 kV transmission line between San Mateo and Martin Substations.

This alternative would require internal transmission reinforcement and reactive support. Martin Substation is an outdoor 230/115kV transmission substation that has property available for substation facilities expansion.

The alternative would follow the existing 230 kV underground route, departing northward out of San Mateo Substation and heading across the Coyote Point Recreation Area (across the golf course) to the Highway 101 corridor. The route would roughly parallel Highway 101 along Airport Boulevard/Old Bayshore Highway. From the corner of Millbrae Avenue and El Camino Real (State Highway 82), the route heads north in El Camino Real for 1.3 miles. From this intersection to the north, El Camino Real is a major commercial roadway with at least 4 lanes and generally with a center median. The route turns east for two blocks just south of Santa Maria Avenue, and then turns north into San Antonio/Huntington Avenues (the BART ROW) for approximately 1.3 miles. Land uses along Huntington are residential and light industrial.

Immediately south of I-380, this route would turn east, cross under the freeway, and turn immediately north in Herman Street, which is a wide roadway with a railroad corridor to the east and residential land uses to the west. After 0.6 miles in Herman Street, the route turns into Linden Avenue for 0.9 miles, traveling into central South San Francisco. Linden Avenue is fairly wide with mostly industrial and commercial enterprises along the roadway and some residences around Village Avenue. On Linden, the route would have to be bored below a railroad crossing (at Railroad Avenue) and a canal, crossing Linden at Canal Street. The route turns east on Baden Avenue for one block, then north into Bayshore Boulevard.

The alternative route would follow the existing 230 kV underground line in Bayshore Boulevard for 4.0 miles, around the east side of San Bruno Mountain to the east to Martin Substation. Bayshore Boulevard is mostly light industrial with several scattered residences west of the road around San Bruno Mountain. There is ongoing construction along Bayshore at the South San Francisco Highway 101 off-ramp that constricts Bayshore to a single lane, but aside from that temporary construction, Bayshore Boulevard is generally wide and well used (CPUC 2003).

Rationale for Elimination

Currently the San Mateo Substation is essentially the only source of externally generated power to the CCSF and northern San Mateo County. With this alternative, if there were a loss of 230 kV power at the San Mateo Substation, the CCSF would lose nearly all of its ability to import power.

The major feasibility concern related to this alternative is availability of adequate space within the city streets, given that the existing 230 kV transmission line is already located there and there are also other underground utilities. The proposed new underground transmission line would need to be separated from PG&E's existing underground line by at least 10 feet (preferably 15 feet) in order to prevent the heat generated by each line from affecting the transmission capacity of the other line. There would also be concerns about physically damaging the other utilities during construction. A buffer of at least five feet between the proposed trench and the nearest other utility would be necessary (CPUC 2003).

According to City of San Bruno, Huntington Avenue in the area of the PG&E's existing 230 kV line is one of the area's most tightly packed utility corridors. Utilities in this portion of Huntington Avenue include a 23-inch storm drain, a 16-inch gas pipe, a water line, and a sewer line. These utilities are primarily on the west side of Huntington Boulevard. In addition, there are many other utilities that perpendicularly cross Huntington Avenue. There would be space constraint issues with the addition of another 230 kV line within the road, but it would be feasible. However, there are major space constraints in Linden Avenue and Bayshore/Airport Boulevard through the City of South San Francisco (CPUC 2003).

Moraga or Sobrante Substation to Potrero Substation

Alternative Description

An approximately 20-mile kV circuit would be constructed connecting the Moraga and Potrero Substations. The route would utilize an existing transmission corridor from Moraga Substation to Claremont Substation and would then for the most part utilize a common corridor from the Claremont Substation, through Oakland, to the east side of the San Francisco Bay. Initiating from Moraga Substation in the City of Orinda in Contra Costa County the line would travel northwest for approximately 1.3 miles before crossing Brookside Road and turning west.

The Sobrante Substation is located east of Bear Creek Road and south of the Briones Dam in the City of Orinda in Contra Costa County, about 4.6 miles north-northwest of the Moraga Substation. The line would travel south from the Sobrante Substation for approximately 3.3 miles and would join the Moraga line just north of Brookside Road in the City of Orinda. From that point the route would turn west and would be identical to the Moraga alternatives mentioned above.

From their joining point, the overhead line would continue in unincorporated Contra Costa County, Robert Sibley Volcanic Regional Preserve, part of the East Bay Regional Park District (EBRPD), and the City of Oakland in Alameda County where it would transition underground at Claremont Substation. From Claremont Substation, the underground line would continue through urbanized areas in the City of Oakland to the eastern edge of the San Francisco Bay.

There are four options for bringing the transmission line across the San Francisco Bay: (a) run the cable through the BART service tunnel (between the two tunnels for the eastbound and westbound trains); (b) hang the cables from the Bay Bridge (new bridge in east half; existing bridge in west half); (c) lay a new submarine cable; or (d) use a combination of hanging on the Bay Bridge and a submarine cable.

Within the CCSF after the Bay crossing, assuming a landing south of I-80, the route could travel south along The Embarcadero, turn west onto King Street, then southwest onto 3rd Street where it would pass through the Mission Bay development. The route would turn south onto Illinois Street and follow it to the Potrero Substation at the corner of 23rd Street Land use along the transmission line route within the CCSF would be primarily industrial and commercial.

The use of HVDC Light™ technology[7] for the Moraga to Potrero route (330 MW or 540 MW) has been informally proposed by Sea Breeze Pacific Regional Transmission System, Inc. and the concept is in the beginning stages of discussion at the CAISO San Francisco Stakeholders Study Group as of July 26, 2005. The Sea Breeze proponents have requested that the CAISO delay approval of the Trans Bay Cable to allow consideration of this competing project. However, it is too early in the planning stages for the Sea Breeze project to be considered as a viable alternative for SFERP within the project timeframe.

Rationale for Elimination

Any cross-bay transmission alternative originating at the Moraga or Sobrante Substations would require construction of 4.7 miles of overhead transmission line through the City of Orinda and East Bay Hills (open space east of Oakland where a

[7] HVDC Light™ was developed by ABB Power Technologies AB as a transmission technology based on voltage source converters (VSCs) and insulated gate bipolar transistors (IGBTs) linked together by underground/undersea cables. HVDC Light™ can operate at low short circuit power levels thereby extending the economical power range of HVDC transmission down to just a few MW. It also improves the stability and reactive power control at each end of the network and connects more easily into the AC system than the Conventional HVDC. Although HVDC Light™ was originally developed in 1997, it has only been within the past year that the technology has been developed for capacities over 330 MW (for more information on HVDC Light™, see http://www.abb.com/hvdc).

wide range of wildlife species and special status plants would be affected). The route would pass through Robert Sibley Volcanic Regional Preserve, one of the EBRPD's original parks, for approximately 0.9 miles. Sibley Volcanic Preserve's main entrance is on Skyline Boulevard just east of the intersection with Grizzly Peak Boulevard in the Oakland hills.

Round Top, a peak within Sibley preserve approximately 0.5 miles south of the transmission line route is one of the highest peaks in the Oakland hills and provides an unsurpassed outdoor laboratory for the study of volcanism in the Central Coast Ranges. Volcanic dikes, mudflows, lava flows, and other evidence of the extinct volcanoes are visible throughout the park's 660 acres. There are also vistas of Mt. Diablo and the hills of Las Trampas, and beautiful displays of wildflowers in season. This alternative would pass through the park, widening the existing ROW, which already contains three transmission lines so incremental additional impacts would be created. The route would also cross a Bay Area Ridge Trail within the EBRPD. Large towers and transmission lines could biologically, geologically, recreationally, and visually affect this important preserve area. There may be public concerns about upgrading the existing 115 kV corridor to a 230 kV corridor, especially regarding EMF.

One segment of the overhead line would pass adjacent to residences: on Broadway Terrace in the City of Oakland for approximately 0.2 miles. The line would transition to underground at PG&E's existing Claremont Substation. South of the Claremont Substation, there would be an additional 9.2 miles of underground construction in Oakland, passing through industrial, commercial, and some residential areas. The underground construction through Oakland would have very similar types of impacts to those of the SFERP's short underground transmission line segment. However, approximately 8.6 miles of the Oakland underground route are through industrial and commercial land uses, with approximately 0.6 miles in residential areas on Peralta Street, Claremont Avenue, and Forest Street.

While there are several options for crossing the Bay, the specific technology of the bay crossing has not been defined. There would be marine impacts resulting from installation of a submarine cable. There is also reliability risk to submarine cables from ship anchors and dredging activities, so the line would have to be buried well below dredging depths. Beyond navigation and dredging concerns of the USACE, there would be biological concerns with construction impacts to essential fish habitat. Most of the route of the proposed transmission line is in an area that is regularly disturbed by dredging so marine impacts in that area are not of major concern, but at both the east and west Bay margins, there could be significant biological effects, especially in areas of eel grass. There could also be cultural resources issues associated with shipwrecks and the closer proximity to the Bay increases chance of significant resources. Use of the BART tunnel for a bay crossing would not affect the resources of the San Francisco Bay.

A submarine crossing of the bay would require a permit from the BCDC for compliance with the McAteer-Petris Act and the San Francisco Bay Plan. This permit could be granted only if upland alternatives were not available, so as an alternative to a power plant, BCDC permitting may not be attainable.

In order for the Bay Bridge to be used to support a transmission line, the crossing would require that Caltrans grant an exception to its policy prohibiting longitudinal encroachment within its rights-of way, which is very unlikely. The timeline and coordination with the Bay Bridge Retrofit Project could also conflict with this project. If the transmission line is placed on the existing bridge now, there will be problems when the eastern span replacement project (now under construction) is completed in the future.

The BART tunnel Bay-crossing option would also be considered infeasible due to limited space available in the BART service tunnel, heat generation by the 230 kV cables, and BART worker safety concerns.

RENEWABLE RESOURCE ALTERNATIVES

Aggressive efforts are now being made to increase the renewable resource component of California's generation supply. In the year 2002, California had over 7,000 MW of renewable energy capacity, including solid-fuel biomass, geothermal, wind, small hydroelectric (30 MW or less), concentrating solar power (CSP), photovoltaic systems (PV), landfill gas, digester gas, and municipal solid waste (MSW) facilities (CEC 2003b). These facilities produced about 28,900 GWh in 2002, about 11 percent of the electricity used in California (CEC 2003b). This section considers the principal renewable electricity generation technologies that could serve as alternatives to the SFERP. These technologies are wind, solar, tidal, wave, geothermal, and biomass energy. The technologies are attractive from an environmental perspective because of the absence or reduced level of air pollutant emissions. However, these technologies also have environmental consequences, feasibility problems, and they may not meet the objectives of the SFERP.

Renewable Portfolio Standard Program. The Energy Commission, in collaboration with the California Public Utilities Commission (CPUC), has initiated a proceeding to implement the State's Renewable Portfolio Standard Program as mandated by Senate Bill 1078 (SB 1078, Sher, Chapter 516, Statutes of 2002) under Public Utilities Code sections 381, 383.5, 399.11 through 399.15, and 445. California's Renewable Portfolio Standard (RPS) requires retail sellers of electricity to increase their procurement of eligible renewable energy resources by at least 1 percent per year so that 20 percent of their retail sales are procured from eligible renewable energy resources by 2017. The RPS legislation requires that the CPUC and Energy Commission work collaboratively to implement the RPS and assigns specific roles to each agency. Pursuant to SB 1078, the Energy Commission's responsibilities include:

- Certifying eligible renewable resources that meet criteria contained in the bill, including those generating out-of-state
- Designing and implementing a tracking and verification system to ensure that renewable energy output is counted only once for the purpose of the RPS and for verifying retail product claims in California or other states
- Allocating and awarding supplemental energy payments as specified in SB 1038 to eligible renewable energy resources to cover above-market costs of renewable energy.

As a part of this process, the Energy Commission formally adopted *Renewable Portfolio Standard Guidelines* on February 19, 2003, pursuant to Public Utilities Code section

383.5, subdivision (h), and subsequently revised pursuant to this authority and Public Resources Code section 25747 (a) on April 21, 2004, and May 19, 2004. These *Guidelines* were adopted to govern the Renewable Energy Program and its various program elements under SB 1038 and SB 1078, to assist interested applicants in applying for Program funds and RPS certification, and for verifying RPS compliance. The *Guidelines* are divided into six separate documents including:

- Overall Program Guidebook
- Existing Renewable Facilities Program Guidebook
- Emerging Renewable Program Guidebook
- Renewable Resource Consumer Education Guidebook
- New Renewable Facilities Program Guidebook
- Renewables Portfolio Standard Eligibility Guidebook

The CPUC is addressing its responsibilities in implementing the RPS through a separate proceeding titled, Order Instituting Rulemaking to Establish Policies and Cost Recovery Mechanisms for Generation Procurement and Renewable Resource Development (R. 01-10-24). The CPUC's responsibilities include:

- Establishing a process to determine market price referents, setting the criteria for IOU ranking of renewable bids by least cost and best fit, and establishing flexible compliance rules, penalty mechanisms and standard contract terms and conditions
- Establishing initial renewable generation baselines for each IOU, making subsequent changes to these baselines as needed, and determining annual procurement targets
- Directing the IOUs to develop procurement plans, and approving, amending or rejecting the plans
- Making specific determinations of market price referents for products under contract
- Approving or rejecting IOU requests to enter specific contracts for renewable power, including determining if a solicitation was adequately competitive
- Factoring transmission and imbalance costs into the RPS process and identifying the transmission grid implications of renewable development
- Defining rules for the participation of renewable Distributed Generation (DG), Electric Service Providers (ESP), Community Choice Aggregators (CCA), and potential Procurement Entities.

The CPUC and the Energy Commission have developed a schedule for addressing RPS issues, and have established guidelines for how the two agencies work collaboratively on the RPS. The schedule and collaborative process are described in the Energy Commission's Committee Order on RPS Proceeding and CPUC's Collaborative Guidelines. The Order also describes administrative procedures for interested parties who wish to participate in the Energy Commission's RPS proceeding.

San Francisco Electricity Resource Plan. The Electricity Resource Plan, a joint effort by the SFPUC and San Francisco's Department of the Environment, proposes a plan to avoid future energy crises through energy efficiency, new cleaner generation and imported power, and provides a framework for shifting San Francisco's dependence on fossil-fuel burning power plants to clean, renewable forms of energy. The Board of Supervisors in the May 2001 “Maxwell Ordinance” entitled “Human Health and Environmental Protections for New Electric Generation” directed the agencies to produce the Plan. Mayor Willie Brown signed the Plan in December 2002 (SF Environment 2002).

The purpose of the Plan is to show how CCSF can meet its future electricity by building cleaner in-City generation, implementing aggressive energy efficiency and peak load management, as well as supporting completion of planned transmission upgrades. At the same time, the Plan assumes that PG&E's Hunters Point Power Plant and Mirant’s Potrero Power Plant Unit 3 can be shut down, and that CCSF will require no new large-scale central electricity generation.

Before drafting the Plan, SF Environment and SFPUC held numerous public meetings in neighborhoods across CCSF to identify resident and business community priorities. Major concerns include reliability, efficiency, affordability, and the reduction of harmful emissions associated with the production of electricity. In answer to these concerns, the plan provides a means to shut down Hunters Point Power Plant, and reduce operation at the existing plant on Potrero Hill by releasing them from their RMR Agreements with the CA ISO. This will be accomplished by developing sufficient replacement power through a combination of aggressive energy efficiency and conservation programs, and by building new renewable and cleaner, smaller scale fossil fuel generation.

Some of the renewable projects proposed in the Plan included a football field-sized solar photovoltaic system at the new Moscone Center (operational since March 2004), and a second solar installation planned for the SEWPCP. The Plan also addresses the potential for wind turbines to be placed outside CCSF in the Altamont Pass, and tidal current and wave generation could be developed in cooperation with other municipalities at various locations in the Bay. Other proposed municipal sites for development of renewable power projects include the airport and the port.

CCSF also has a 2 MW cogeneration plant at the SEWPCP that uses waste gas from the plant to process heat and produce energy. The plant is currently inactive because a new gas clean-up system needs to be installed before the plant can reopen (Doyle 2005).

<u>Wind Technology</u>

Alternative Description

Wind carries kinetic energy that can be utilized to spin the blades of a wind turbine rotor and an electrical generator, which then feeds alternating current (AC) into the utility grid. Most state-of-the-art wind turbines operating today convert 35 to 40 percent of the wind’s kinetic energy into electricity. A single 1.5 MW turbine operating at a 40 percent capacity factor generates 2,100 MWh annually. Modern wind turbines represent viable alternatives to large bulk power fossil power plants as well as small-scale distributed systems. Wind turbines being manufactured now have power ratings ranging from 250 watts to 1.8 MW, and units larger than 4 MW in capacity are now under development (AWEA 2004). The average capacity of wind turbines today is 750 kW (CEC 2004 - Comparative Study of Transmission Alternatives, Background Report).

California was the first U.S. state in which large wind farms were developed, beginning in the early 1980's, and the state still leads the nation in wind power generation. However, 16 other states are considered to have greater overall wind generation potential. California currently has an installed capacity of 2,051 MW, and an additional over 300 MW are planned (AWEA 2004).

The perception of wind as an emerging energy source reached a peak in the early 1980s, when wind turbine generators to convert wind power into electricity were being installed in California at a rate of nearly 2,000 per year. Progress slowed a few years later, however, as startup tax subsidies disappeared and experience demonstrated some deficiencies in design. At the present time, technological progress again has caught up, contributing lower cost, greater reliability, and reason for genuine optimism for the future (Lamarre, 1992). A major factor has been the inclusion of environmental externalities by electric utilities in their resource planning programs. The more penetrating analysis, which has included these potential costs, has shown wind power to be substantially more economically attractive than was previously thought.

The technology is now well developed, and can be used to generate significant amounts of relatively low-cost power.

Wind turbines can create other environmental impacts, as summarized below (AWEA 2004):

- Erosion can be a concern in certain habitats such as the desert or on mountain ridgelines. Standard engineering practices can be used to reduce erosion potential.
- Birds collide with wind turbines. Avian deaths have become a concern at Altamont Pass in California, which is an area of extensive wind development and also high year-round raptor use.
- Wind energy can negatively impact birds and other wildlife by fragmenting habitat, both through installation and operation of wind turbines themselves and through the roads and power lines that may be needed.
- Bat collisions at wind plants generally tend to be low in number and to involve common species, which are quite numerous. A high number of bat kills at a new wind plant in West Virginia in the fall of 2003 has raised concerns, and the problem of bat mortality at that site is currently under investigation.
- Visual impacts of wind power fields can be significant, and installation in scenic and high traffic areas often results in strong local opposition.
- Noise was an issue with some early wind turbine designs, but it has been largely eliminated as a problem through improved engineering and through appropriate use of setbacks from nearby residences. Aerodynamic noise has been reduced by changing the thickness of the blades' trailing edges and by making machines "upwind" rather than "downwind" so that the wind hits the rotor blades first, then the tower (on downwind designs where the wind hits the tower first, its "shadow" can cause a thumping noise each time a blade passes behind the tower). A small amount of noise is generated by the mechanical components of the turbine.

In open, flat terrain, a utility-scale wind plant would require about 60 acres per MW of installed capacity. However, only 5 percent (3 acres) or less of this area would actually be occupied by turbines, access roads, and other equipment. The remainder could be used for other compatible uses such as farming or ranching. A wind plant located on a ridgeline in hilly terrain will require much less space, as little as two acres per MW (AWEA 2004).

Rationale for Elimination

The large area needed for wind electricity generation would create significant land use, biological, cultural, and visual concerns. In addition, wind turbines would have noise impacts associated with both construction and operation. Wind turbines have been documented to kill large numbers of raptors because these fast-flying birds do not account for movement of the rotating blades.

In addition, there are reliability concerns with wind technology because of the need for a consistent wind source. Extensive wind generation would also require additional transmission to serve areas of high demand. The extensive land required to generate enough electricity to meet demand is not available in the project area.

Wind generation is possible in other locations throughout California. San Francisco could possibly obtain significant amounts of wind power in areas such as the Altamont Pass, where wind speeds are high and other conditions like proximity to transmission can be met. As a result of the Energy Plan, CCSF is currently looking at several sites including those adjacent to its own Bay Area reservoirs. However, because generation is not feasible locally, any power generated would require substantial transmission to import the power to CCSF, which would create greater environmental impacts over a larger area.

Wind technology has the advantage of not requiring the burning of fossil fuels and the resulting environmental and resource impacts associated with natural gas fired power. However, wind has the potential to cause significant land use, biological, cultural resources, and visual impacts.

Solar Technology

Alternative Description

Electricity generation from solar technologies, including both photovoltaic and solar thermal systems, currently totals about 0.3 percent of the state's electricity production (CEC 2004 - Comparative Study of Transmission Alternatives, Background Report). Maximum power output of PV systems closely matches California’s peak electrical demands. Currently, there are two types of solar generation available: solar thermal power and photovoltaic (PV) power generation.

Solar thermal power generation uses high temperature solar collectors to convert the sun’s radiation into heat energy, which is then used to run steam power systems. Solar thermal is suitable for distributed or centralized generation, but requires far more land than conventional natural gas power plants. Solar parabolic trough systems, for instance, use approximately five acres to generate one megawatt. Although significant improvements have been made in technology advances and cost reductions, additional research and development is needed for concentrating solar power to be cost-competitive with conventional fossil fuel plants. Solar thermal facilities will likely not come into play until the 2008-2017 timeframe (CEC 2003a).

Photovoltaic (PV) power generation uses special semiconductor panels to directly convert sunlight into electricity. Arrays built from the panels can be mounted on the ground or on buildings, where they can also serve as roofing material. Unless PV systems are constructed as integral parts of buildings, the most efficient PV systems require about four acres of ground area per megawatt of generation.

PV power systems require approximately one acre per 250 kW at 50 percent area coverage and 10 percent system efficiency. Systems up to about 250 kW are often placed on buildings, and are commonly referred to as building-integrated PV or dual use systems. For systems larger than 250 kW, ground-mount installations are more common. Ground-mount sites require environmental impact reviews because in order to achieve power levels comparable to conventional fossil-fueled peaking combustion plants, large areas are required. For a 50 MW system, over 200 acres would be required. This could be achieved as a single system or as a number of smaller systems distributed on building roofs, covered parking structures, or similar “community integrated” deployments (CEC 2004 - Comparative Study of Transmission Alternatives, Background Report).

The use of solar energy in California offers obvious promise as an environmentally preferred resource. However, it is limited by its availability (only during daytime hours) and by the relatively high cost of solar panels. Clouds, fog and shading limit the amount of power that a system produces. The intermittent nature of the power, however, makes PV systems unsuitable for base-load applications. Solar is, however, particularly valuable when used at the local level to reduce peak power usage and to defer distribution infrastructure development.

San Francisco Electricity Resource Plan. This planning effort provides a local example of an aggressive solar energy program. In an effort to address the CCSF electricity issues, the San Francisco Electricity Resource Plan was adopted by the Board of Supervisors and signed by Mayor Willie Brown in December 2002 as a policy guide to be used in proposing and implementing specific actions related to providing electricity to San Francisco. Those actions that require the expenditure of CCSF funds or require compliance with environmental laws will likely require additional analysis and public review. This Plan provides a long-term vision of the CCSF’s possible electricity future. Because the Plan extends over a ten-year time horizon, it may need to be adapted and revised to accommodate changing circumstances.

The CCSF in November of 2001 passed a proposition that would provide $100 million to support solar power and other renewable programs. In addition and discussed earlier, CCSF has prepared an Energy Resource Plan (in accordance with the Maxwell Ordinance[8]) to guide the various energy efforts underway in the City. These programs will result in increased solar (or other renewable) generation within the CCSF. The City has not yet determined the amount of power that might be generated with the $100

[8] The Maxwell Ordinance, also titled “Human Health and Environmental Protections for New Electric Generation" was passed by the SF Board of Supervisors in May 2001 and directed the City to prepare the Electricity Resource Plan, setting forth the means by which the City would reduce its reliance on in-City fossil fuel generation (CCSF, 2002).

million investment, nor do they know how long it will take to invest the $100 million in order to fully implement the program.

CCSF's first large solar power development was at the City's convention center, Moscone Center. With approximately 60,000 square feet of perfectly flat unshaded roof, this football-field sized showpiece has significantly reduced Moscone's purchase of power and provides a solar showplace for visitors from all over the world. The Moscone solar installation generates 674 kW of electricity (SF Visitor 2004). Through the Mayor's Energy Conservation Account (MECA) funding, other current solar projects in development in CCSF include the following sites: Moscone West (300 kW), NorCal Pier 96 (255 kW), Northpoint Water Pollution Control Plant (300 kW), SEWPCP (255 kW), San Francisco General Hospital (500 kW), San Francisco International Airport (500 kW), and at the SFPUC Water Department (500 kW). In addition, 10 other sites (6 schools, 2 public health facilities, and 2 libraries) for a total of 45 kW are in the bidding process as of July 2005 (Doyle 2005).

The SFPUC has also installed radiometers at eleven sites on City buildings and schools to collect data about the availability of sunlight. The variability in solar incidence is based on microclimate and geography, and when cross-referenced with availability of appropriate space, limits the application of solar technologies in some areas of CCSF. To develop a well thought-out strategy of implementation, CCSF needs to understand the resource and develop it where it is most cost effective. If sufficient participation by commercial and residential customers is obtained, 50 MW of solar could be installed in San Francisco. Price of systems is a major consideration in achieving this magnitude of installation. A sustained program to develop solar in San Francisco can help reduce the overall cost of solar technologies.

Rationale for Elimination

Solar generation facilities are attractive because they do not generate air emissions and have relatively low water requirements. However, there are other potential impacts associated with their use. Construction of solar thermal plants can lead to habitat destruction and visual impacts. PV systems can also have negative visual impacts, especially if ground-mounted. Furthermore, PV installations are highly capital intensive and manufacturing of the panels generates some hazardous wastes.

There are reliability concerns with the technology and the need for a consistent solar source. Both solar thermal and PV facilities generate power during peak usage periods since they collect the sun's radiation during daylight hours. However, solar energy technologies cannot provide full-time availability due to the natural intermittent availability of solar resources. Extensive solar generation would also require additional transmission to serve areas of high demand. Therefore, solar generation technology would not meet the project's goal, which is to provide immediate power to meet peaks in demand. The extensive land required to generate electricity entirely from solar sources is not available in San Francisco and transmission would still be required to transport the power in from other areas.

As demonstrated by the Moscone Center 674 kW and $4.2 million project, solar photovoltaics are technically feasible and California clearly has a climate where this technology would be useful (Vote Solar 2005). However, the cost of these systems currently prohibits their widespread use. Solar generation is a feasible technology on a small scale, but it cannot reliably generate 145 MW of power, as required for the SFERP Project.

Given the project objective of providing reliable electric power to the CCSF in the near term, this technology is not considered to be a feasible project alternative. Therefore, this alternative was eliminated from further consideration.

Tidal Technology

Alternative Description

The San Francisco Board of Supervisors approved a resolution on May 6, 2003 for a pilot project to explore using tides to make electricity. The board asked CCSF's Department of the Environment to head the project. The project, approved unanimously by the City's Board of Supervisors, is part of San Francisco's efforts to pursue nonpolluting energy (see above description of the Energy Resource Plan). The pilot project in San Francisco would be the first working project in the United States to test tidal power. This effort stems from California's recent energy shortages and the City's plan to decommission HPPP.

The initial project goal was to create one megawatt of renewable tidal energy, but the project has been scaled back to 150 kW. The details to be worked out are funding, which has lead to project delays, and where along the bay or ocean shoreline the power project should be built. The supervisors also asked Marin County and the cities of Richmond and Vallejo to participate in a regional task force that will look at creating other tidal energy projects in the Bay Area.

Each day, nearly 400 billion gallons of water pass through the mouth of San Francisco Bay under the Golden Gate Bridge, which has been estimated by IEEE Power Engineering Society to be enough to generate an estimated 2,500 MW (more than twice the City's peak power demand) with a conservative 3-knot average tidal current (IEEE 2005). If harnessed, the energy from this water could be an answer to the CCSF's power needs (Llanos 2003). The system would not impact shipping since it would be far below the surface, probably on the sea floor itself. The cost of building a 1,000 MW system is estimated at $600 million, but San Francisco's Environment Department estimates that over 30 years, costs would average out to 6 cents per kilowatt-hour—about the same as natural gas and less than what San Franciscans now pay for power (Llanos 2003). Within 10 years, San Francisco could build enough clean tidal power to meet its daily energy needs, as well as generate surplus energy to sell—all with a price tag of about one-third the cost per megawatt of solar power.

A major drawback of tidal power stations is that they can only generate when the tide is flowing in or out. However, unlike the sun and wind, tidal current is consistent and predictable, so regulators can plan to have other power stations generating at those times when the tidal station is out of action. Overall, tidal generators could produce electricity up to 16 hours a day.

Background

The oldest technology to harness tidal power for the generation of electricity involves building a dam, known as a barrage, across a bay or estuary that has large differences in elevation between high and low tides. Water retained behind a dam at high tide generates a power head sufficient to generate electricity as the tide ebbs and water released from within the dam turns conventional turbines.

Certain coastal regions experience higher tides than others. This is a result of the amplification of tides caused by local geographical features such as bays and inlets. In order to produce practical amounts of power for tidal barrages, a difference between high and low tides of at least five meters is required. There are about 40 sites around the world with this magnitude of tidal range. In Canada, the only practical site for exploiting tidal energy is the Bay of Fundy between New Brunswick and Nova Scotia. The higher the tides, the more electricity can be generated from a given site, and the lower the cost of electricity produced. Worldwide, approximately 3,000 GW of energy is continuously available from the action of tides. Due to the locational constraints, it has been estimated that only 2 percent or 60 GW can potentially be recovered for electricity generation (Baird 1993).

Currently, although the technology required to harness tidal energy is well established, tidal power is expensive, and there is only one major tidal generating station in operation. This is a 240-MW station at the mouth of the La Rance river estuary on the northern coast of France near St. Malo. The La Rance generating station has been in operation since 1966 and has been a very reliable source of electricity for France. La Rance was supposed to be one of many tidal power plants in France, until their nuclear program was greatly expanded in the late 1960's. Elsewhere there is a 20 MW experimental facility at Annapolis Royal in Nova Scotia built in 1984. The smallest tidal plant is located at Kislaya Guba on the White Sea in Russia. It has a 0.5 MW capacity. There are approximately 10 small barrages scattered throughout the world, but they are not intended for commercial power generation. For example, there is a 200-kW tidal barrage on the River Tawe in Swansea Bay, Wales that operates the gates of a lock. China has several tidal barrages of 400 kW or less in size.

Numerous studies have been conducted for large-scale tidal barrages in a variety of locations, but the biggest proposal was for the 8,640-MW Severn Tidal Barrage (STB). A broad range of studies was conducted from 1974 to 1987 on this proposal to dam the Severn Estuary between Wales and England. It has been estimated that the barrage across the Severn River in western England could supply as much as 10 to 12 percent of the country's electricity needs (12 GW). The proposal was shelved in 1987 due to "economic problems," but the proposal would have likely met with fierce opposition from an array of environmental groups and local residents. Similarly, several sites in the Bay of Fundy, Cook Inlet in Alaska, and the White Sea in Russia have been found to have the potential to generate large amounts of electricity.

Despite the success of La Rance, no other major tidal barrages have been built since, due in some part to environmental concerns. Barrages present a barrier to navigation by boats and fish alike; reduced tidal range (difference between high and low water levels) can destroy much of the inter-tidal habitat used by wading birds; and sediment trapped behind the barrage could also reduce the volume of the estuary over time. By the early 1990s, interest in estuarine-derived tidal power had largely ceased, and scientists and engineers began to look at the potential of tidally-generated coastal currents instead.

As tides ebb and flow, currents are often generated in coastal waters (quite often in areas far-removed from bays and estuaries). In many places the shape of the seabed forces water to flow through narrow channels, or around headlands (much like the wind howls through narrow valleys and around hills). However, seawater has a much higher density than air, meaning that currents of 5 to 8 knots generate as much energy as winds of much higher velocity. In addition, unlike the wind rushing through a valley or over hilltops, tidally-generated coastal currents are predictable. The tide comes in and out every twelve hours, resulting in currents which reach peak velocity four times every day. Two rival technologies -- tidal fences and tidal turbines -- are now being developed to catch the energy of these currents.

Coastal currents are strongest at the margins of the world's larger oceans. A review of likely tidal power sites in the late 1980s estimated the energy resource was in excess of 330,000 MW. South East Asia is one area where it is likely such currents could be exploited for energy. In particular, the Chinese and Japanese coasts, and the large number of straits between the islands of the Philippines are suitable for development of power generation from coastal currents.

Tidal Fences. Tidal fences are effectively barrages, which completely block a channel. As discussed above, if deployed across the mouth of an estuary they can be very environmentally destructive. However, in the 1990s their deployment in channels between small islands or in straights between the mainland and island has increasingly been considered as a viable option for generation of large amounts of electricity.

The advantage of a tidal fence is that all the electrical equipment (generators and transformers) can be kept high above the water. Also, by decreasing the cross-section of the channel, current velocity through the turbines is significantly increased.

The first large-scale commercial fences are likely to be built in South East Asia. The most advanced plan is for a scheme for a fence across the Dalupiri Passage between the islands of Dalupiri and Samar in the Philippines, agreed between the Philippines Government and Energy Engineering Company of Vancouver, Canada in late 1997. The site, on the south side of the San Bernardino Strait, is approx. 41 m deep (with a relatively flat bottom) and has a peak tidal current of about 8 knots. As a result, the fence is expected to generate up to 2,200 MW of peak power (with a base daily average of 1,100 MW) (Osborne 2000).

Tidal Turbines. Tidal turbines are the chief competition to the tidal fence and are what are being proposed for the San Francisco Pilot Project. Looking like an underwater wind turbine they offer a number of advantages over the tidal fence. They are less disruptive to wildlife, allow small boats to continue to use the area, and have much lower material requirements than the fence.

Tidal turbines function well where coastal currents run at 2 to 2.5 m/s (slower currents tend to be uneconomic while larger ones put a lot of stress on the equipment). Such currents provide an energy density four times greater than air, meaning that a 15-meter diameter turbine will generate as much energy as a 60-meter diameter windmill. In addition, tidal currents are both predictable and reliable, a feature which gives them an advantage over both wind and solar systems. The tidal turbine also offers significant environmental advantages over wind and solar systems; the majority of the assembly is hidden below the waterline, and all cabling is along the seabed.

There are many sites around the world where tidal turbines could be effectively installed. The ideal site is close to shore (within 1 km) in water depths of about 20-30 meters. Peter Fraenkel, director of UK-based Marine Current Turbines, believes the best sites could generate more than 10 megawatts of energy per square kilometer. The European Union has already identified 106 sites which would be suitable for the turbines, 42 of them around the UK. Further afield, Fraenkel believes the Philippines, Indonesia, China and Japan could all develop underwater turbine farms (Osborne 2000).

Rationale for Elimination

There are reliability concerns with the technology because it is so new. San Francisco has been looking closely at technology developed by HydroVenturi Inc., which started in London and now has a San Francisco office. Expanding from a test to an underwater grid powering the entire city would take many years (beyond the timeframe of the Proposed Project) and would need to overcome environmental hurdles (see below).

There would be regulatory feasibility issues associated with permitting from the USACE, BCDC, and/or the California Coastal Commission (depending on the location) for the large underwater area required for tidal energy generation. This technology is also new, and it is not clear whether the technology is feasible.

In addition, extensive underwater acreage would be required to generate enough electricity to meet demand. Tidal technologies have the potential to cause significant biological impacts, especially to marine species and habitats. Fish could be caught in the unit's fins by the sudden drop in pressure near the unit. The passageways, more than 15 feet high and probably sitting on the bay floor, could squeeze out marine life that lives there or alter the tidal flow, sediment build-up, and the ecosystem in general. San Francisco's test project as well as environmental impact studies would be necessary to determine potential significant impacts. Also, depending on its location commercial shipping could be disrupted during construction.

In summary, tidal generation is not yet a feasible technology on the scale required to replace a 145 MW generation project in the San Francisco area. In addition, it has the potential to create significant impacts, which would result in potential regulatory infeasibility. Therefore, this alternative was eliminated from further consideration.

Wave Technology

Alternative Description

Wave power technologies have been around for nearly thirty years. Setbacks and a general lack of confidence have contributed to slow progress towards proven devices that would have a good probability of becoming commercial sources of electrical power.

The highest energy waves are concentrated off the western coasts in the 40^{o} to 60^{o} latitude range north and south. The power in the wave fronts varies in these areas between 30 and 70 kW/m with peaks to 100kW/m in the Atlantic southwest of Ireland, the Southern Ocean and off Cape Horn. The capability to supply electricity from this resource is such that, if harnessed appropriately, 10 percent of the current level of world supply could be provided (WEC 2001). Work is still needed to determine how much more may be captured by other products (such as pumped water for desalination or electrolysis), once the storage technology for hydrogen is suitably developed.

The total power of waves breaking on the world's coastlines is estimated at 2 to 3 million megawatts. In favorable locations, wave energy density can average 65 MW-per-mile of coastline. Three approaches to capturing wave energy are:

- **Floats or Pitching Devices.** These devices generate electricity from the bobbing or pitching action of a floating object. The object can be mounted to a floating raft or to a device fixed on the ocean floor.
- **Oscillating Water Columns (OWC).** These devices generate electricity from the wave-driven rise and fall of water in a cylindrical shaft. The rising and falling water column drives air into and out of the top of the shaft, powering an air-driven turbine.
- **Wave Surge or Focusing Devices.** These shoreline devices, also called "tapered channel" or "tapchan" systems, rely on a shore-mounted structure to channel and concentrate the waves, driving them into an elevated reservoir. Water flow out of this reservoir is used to generate electricity, using standard hydropower technologies.

An experimental wave project was run in summer 2004 by Ocean Power Delivery Ltd in the Scottish Orkneys, which successfully provided power to 500 homes through Scottish Power. Marine power research has received millions of dollars worth of government subsidies in Scotland, but the United States currently has no federal program.

In summer 2005, Verdant Power is scheduled to place six turbines on the bottom of New York City’s East River to supply power to a food market on Roosevelt Island in the river, which separates Manhattan from the boroughs of Brooklyn and Queens. The company is seeking the go-ahead to install as many as 200 to 300 turbines in the East River. If expanded, the project could produce five to 10 MW of electricity at an initial cost of $20 million (Anderson and Gardner 2005).

The United States does not have any wave energy facilities to date, but many coastal communities have toyed with the notion. In fact, about 30 wave-energy ventures have been tried somewhere around the world in recent years--and most have foundered. Some systems have managed to move from drawing boards to the sea, where they are actually producing small amounts of power, including such projects as the Pelamis in Scotland and the Limpet in Ireland. But, generally speaking, wave energy technology has been unsuccessful. In most coastal areas, waves are intermittent, which means energy production is spotty. Virtually all of the devices tested in the past only produced electricity when the surf was up, with no means of storing power.

The devices typically produce what's known as low-frequency power, which can be difficult and expensive to convert to high-frequency electrical grids. Also, many of the devices are complicated and somewhat fragile, and do not stand up well to heavy surf.

And past wave technologies involved lots of electrical components, hydraulic fluids and oils, all presenting pollution risk.

Currently, the most ambitious project is planned for Humboldt's remote and battered coast, where a Minnesota energy-engineering company will introduce the Seadog, a pump that operates on wave motion. The Seadog, say its inventors, represents a different, simpler and more rugged approach that can actually turn an elusive dream into a commercial reality (Martin 2004).

Manufactured by Independent Natural Resources Inc. of Eden Prairie, MN, the device is an anchored mechanical pump that uses wave action to transport seawater to an elevated reservoir onshore. Water from the reservoir is then released down a flume to turn a turbine, which produces high-frequency electricity. Energy is stored latently, as water in the reservoir. When more electricity is needed, more water is released down the flume. The system involves no hydraulics, no noxious fluids, and no submerged cables.

Laboratory trials last year by the Offshore Technology Research Center at Texas A&M University showed the Seadog, in 26-inch surf, generated an operational pressure of 125 to 168 pounds per square inch, enough to push water almost 400 feet. That was within 95 to 98 percent of the performance figures cited by the company, and confirmed that the device could theoretically do what it was claimed to do.

Mark Thomas, the founder and president of Independent Natural Resources, said the Seadog evolved from a related energy production device that drove a motor by using the compressed air that is routinely fed into pipelines to move natural gas from one location to another. Bolstered by $270,000 in venture capital, Thomas plans to have a single unit installed off the Humboldt coast by the end of the year to demonstrate the essential feasibility of the technology in the real marine world. The project must be approved by the California Coastal Commission and the State Lands Commission.

If the pump isn't battered into flotsam by Humboldt's heavy surf, a 16-pump project will follow, hooked up to a 50,000- gallon tank to store seawater for the hydropower production. That would cost about $3 million and yield about 537 kilowatts, enough power to service about 600 homes.

A 200-pump, 6,700-kilowatt system would follow, powering more than 7,000 homes. According to the company's business plan, that would cost about $16 million to build and require about $1.6 million in annual maintenance and operational costs. Its electricity would cost about 31/2 cents a kilowatt-hour, which, generally speaking, is comparable to the cost of coal-generated electricity, cheaper than natural gas generation and more expensive than nuclear.

Ultimately, said Thomas, a 1-square-mile array could be built, generating about 750 MW, enough power for about 100,000 homes. If things ever get that far, such a plant would cost $217 million to construct, cost about $110 million a year to operate, and yield power priced at 2.08 cents a kilowatt-hour (Martin 2004).

CCSF co-hosted a conference on wave energy projects in September 2004 and is working on a demonstration project with Scotland's Ocean Power and the Palo Alto-based Electric Power Research Institute (EPRI). The Scotland's Ocean Power Orkney project uses a floating steel cylindrical device, about the length of four train cars, with sections connected by hinged joints. Rolling waves move against the sections to pump high-pressure oil through hydraulic motors that generate electricity which is sent through a cable to the grid (Anderson and Gardner 2005). Hawaii, Oregon, and Massachusetts are participating in similar tests.

Rationale for Elimination

More than 1,000 patents for wave power machines are registered in the world today. The main parts of these patents are in the theoretical stages and only few plants have been built and tested. No commercial plants have been built yet. Therefore, wave power is new and may not be technologically feasible as an alternative to the SFERP. There would also be regulatory feasibility issues associated with permitting from the California Coastal Commission and the California State Lands Commission and also possible the USACE or the BCDC depending on location.

One big problem thus far with wave power systems is that of building and anchoring something that can withstand the roughest conditions at sea, yet can generate a reasonable amount of power from small waves. Wave power must be located where waves are consistently strong and even so the production of power depends on the size of waves resulting in large differences in the amount of energy produced. Unlike tidal energy, wave energy is much harder to predict and it is not consistent. Therefore in addition to feasibility concerns, there are reliability concerns, which would not make it a viable alternative.

Geothermal Resources

Alternative Description

Geothermal technologies use steam or high-temperature water (HTW) obtained from naturally occurring geothermal reservoirs to drive steam turbine/generators. There are vapor dominated resources (dry, super-heated steam) and liquid-dominated resources where various techniques are utilized to extract energy from the HTW.

Geothermal plants account for approximately five percent of California's power, and range in size from under 1 MW to 110 MW. Geothermal plants typically operate as base-load facilities and require 0.2 to 0.5 acre/MW. California is the largest geothermal power producer in the United States, with about 2,560 MW installed gross capacity and 1,754 MW net capacity (CEC 2003a). Geothermal plants provide highly reliable base-load power, with capacity factors from 90 to 98 percent.

Geothermal plants must be built near geothermal reservoir sites, because steam and hot water cannot be transported long distances without significant thermal energy loss. Geothermal power plants are operating in the following California counties: Lake, Sonoma, Imperial, Inyo, Mono, and Lassen. The gross capacity of The Geysers, located in Sonoma and Lake Counties near the City of Santa Rosa, is currently about 1,700 MW from 21 power plants.

Geothermal projects have fairly high capital costs, as compared to many other power generation technologies. New plants that are expansions of fields, such as in the

Imperial Valley, will be less expensive than the construction of geothermal plants in new fields. This aspect has been a deterrent for some developers. The total capital cost to build a 25 to 50 MW flash plant in today's market varies from about $2,100/kW to $2,600/kW. The capital costs of developing 10 to 30 MW binary plants range from $3,000/kW to $3,300/kW. Many factors dictate the ultimate capital costs including resource temperature and chemistry, productivity of each well, size of the facility, type of terrain, H_2S abatement requirements, etc. The turbines are generally custom made (from standard frame sizes) to match the characteristics of the resource and the design approach to the other major plant equipment (CEC 2004 - Comparative Study of Transmission Alternatives, Background Report).

Rationale for Elimination

Geothermal is a commercially available technology, but it is limited to areas geologic conditions resulting in high subsurface temperatures. Even in areas where such conditions are present, there have been issues with the reliability of the steam supply and the corrosiveness of the supply. There are no viable geothermal resources in the CCSF region.

Biomass

Alternative Description

Biomass electricity is generated by burning organic fuels in a boiler to produce steam, which then turns a turbine. Biomass can also be converted into a fuel gas such as methane and burned. Wood is the most commonly used biomass for power generation. Major biomass fuels include forestry and mill wastes, agricultural field crop and food processing wastes, and construction and urban wood wastes. Several techniques are used to convert these fuels to electricity, including direct combustion, gasification, and anaerobic fermentation. Biomass facilities do not require the extensive amount of land as the other renewable energy sources discussed above.

Currently, 2.2 percent of the state's electricity derives from biomass and waste-to-energy sources. Most biomass plant capacities are in the 3 to 10 MW range and typically operate as base-load capacity. Unlike other renewables, the locational flexibility of biomass facilities would reduce the need for significant transmission investments. The total California plant operating capacity is about 610 MW, and the idle capacity is about 122 MW. A number of biomass plants have been dismantled (CBEA 2003).

Rationale for Elimination

Most biomass facilities produce only small amounts of electricity (in the range of 3 to 10 MW), and so could not meet project objectives. There is no source of fuel (usually agricultural waste) for biomass facilities in the San Francisco area. Biomass facilities also generate significant air emissions and require numerous truck deliveries to supply the plant with the waste. Also, in waste-to-energy facilities there is some concern regarding the emission of toxic chemicals, such as dioxin, and the disposal of the resultant toxic ash.

DEMAND-SIDE MANAGEMENT

Alternative Description

The Warren-Alquist Act specifically prohibits the Energy Commission from considering conservation programs as alternatives to a proposed generation project. Public Resources Code Section 25305(c) states that conservation, load management, or other demand reducing measures reasonably expected to occur shall be explicitly examined in the Energy Commission's energy forecasts and shall not be considered as alternatives to a proposed facility during the siting process. Therefore, the approximate effect of such programs has already been accounted for in the agency's "integrated assessment of need," and the programs would not in themselves be sufficient to substitute for the additional generation calculated to be needed. The forecast that will address this issue is the Energy Commission's California Energy Outlook. The Warren-Alquist Act was amended in 1999 to delete the necessity of an Energy Commission finding of "need" in power plant licensing cases.

While these load management tools are not fully analyzed as alternatives to the SFERP project they are described herein for the benefit of the public and decisionmakers.

Demand-side management programs are designed to reduce customer energy consumption. Regulatory requirements dictate that supply-side and demand-side resource options should be considered on an equal basis in a utility's plan to acquire lowest cost resources. One goal of these programs is to reduce overall electricity use. Some programs also attempt to shift such energy use to off-peak periods.

Demand-side management includes a variety of approaches, including energy efficiency and conservation, building and appliance standards, load management and fuel substitution. Since 1975, the displaced peak demand from all of these efforts has been roughly the equivalent of eighteen 500 MW power plants. The annual impact of building and appliance standards has increased steadily, from 600 MW in 1980 to 5,400 MW in 2000, as more new buildings and homes are built under increasingly efficient standards (CEC 2003b). Savings from energy efficiency programs implemented by utilities and state agencies have also increased (from 750 to 3,300 MW). During the summer of 2001, between 70 to 75 percent of the peak load reductions came from consumer conservation efforts, while 25 to 30 percent came from energy efficiency investments (CEC 2003b).

California Energy Commission

One alternative to a power generation project could be programs to reduce energy consumption. In spite of the State's success in reducing demand in 2001, California continues to grow and overall demand is increasing. The 2002-2012 Electricity Outlook Report (CEC 2002c) concludes that, despite exceptional conservation efforts in 2001, voluntary demand reduction will likely decrease over time.

While conservation and demand reduction programs are not considered as alternatives to a proposed project, the Energy Commission is responsible for several such programs, the most notable of which are energy efficiency standards for new buildings and for major appliances. These programs are typically called "energy efficiency," "conservation," or "demand side management" programs. One goal of these programs is to reduce overall electricity use; some programs also attempt to shift such energy use to off-peak periods.

The Energy Commission's Energy Efficiency Standards for Residential and Nonresidential Buildings (Title 24, Part 6) were established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods. The Energy Commission adopted new standards in 2001, as mandated by Assembly Bill 970 to reduce California's electricity demand. The new standards went into effect on June 1, 2001. In 2004, the Energy Commission adopted updated and more stringent standards that supersede the 2001 standards and will take effect on October 1, 2005, following their publication as part of the State Building Code (CEC 2005 - Title 24, Part 6, of the California Code of Regulations: California's Energy Efficiency Standards for Residential and Nonresidential Buildings). Since 1975, the displaced peak demand from these conservation efforts has been roughly the equivalent of eighteen 500 MW power plants. The annual impact of building and appliance standards has increased steadily, from 600 MW in 1980 to 5,400 MW in 2000, as more buildings and homes are built under increasingly efficient standards (CEC 2002c).

After the California Independent System Operator (CA ISO) ordered rolling blackouts in January 2001 as a result of statewide electricity shortages, conservation efforts initially resulted in dramatic reductions in electricity use. Electricity use for each month in 2001 ranged from 5 percent to 12 percent less than it was in 2000. However, by 2002 demand began to increase as the memories of rolling blackouts faded.

The Energy Commission is also responsible for determining what the state's energy needs are in the future, using 5- and 12-year forecasts of both energy supply and demand. The Energy Commission calculates the energy use reduction measures discussed above into these forecasts when determining what future electricity needs are, and how much additional generation will be necessary to satisfy the state's needs.

Having considered all of the demand side management that is "reasonably expected to occur" in its forecasts, the Energy Commission then determines how much electricity is needed. The most recent estimation of electricity needs is found in the 2002-2002 Electricity Outlook Report (available on the Energy Commission's website).

The California Energy Commission's forecasts contain assumptions regarding conservation. As detailed in the Energy Commission's 2002-2012 Electricity Outlook Report, February 2002, "The uncertainty about what caused the demand reduction in the summer of 2001, in particular, the uncertainty about how much was due to temporary, behavioral changes and how much was due to permanent, equipment changes contributes to increased uncertainty about future electricity use trends. The three scenarios discussed in this chapter were developed to provide a range of possible electricity futures that account for the demand reductions of the summer of 2001 and uncertainties about future demand reductions and future economic growth. These scenarios combine different levels of temporary and permanent reductions to capture a reasonable range of possible electricity futures."

The Energy Commission report describes the three scenarios as follows: "The most likely scenario, labeled "Slower Growth in Program Reductions, Faster Drop in Voluntary Reductions . . .," assumes that program benefits increase in 2002 but stay constant after that, while voluntary impacts on energy consumption reduction decrease more rapidly starting with a drop of 1,500 MW in 2002. The lower scenario, labeled "Slow Growth in Program Reductions, Slow Decline in Voluntary Reductions," assumes that program impacts grow from 2001 to 2006 while benefits of voluntary reductions drop slowly over the period after a drop of 1,000 MW in 2002. The higher scenario, labeled 'No growth, then drop in Program Reductions, No Voluntary Reductions," assumes that there are no benefits from voluntary actions in 2002 and after, while benefits of programs stay constant until 2005 and then start declining."

California Public Utilities Commission

In addition, the CPUC supervises various demand-side management programs administered by the regulated utilities, and many municipal electric utilities have their own demand-side management programs. The combination of these programs constitutes the most ambitious overall approach to reducing electricity demand administered by any state in the nation. In spite of the state's success in reducing demand to some extent in 2001, California continues to grow and overall demand is increasing. Economic and price considerations but also long-term impacts of state-sponsored conservation efforts, such as the Governor's 20/20 rebate program and new appliance efficiency standards are considered in load forecasts. However, there are electricity-trend uncertainties about how much the demand reduction in the summer of 2001 was due to temporary behavioral changes and how much was due to permanent equipment changes.

City and County of San Francisco

In July 2003, the San Francisco Board of Supervisors approved a $16.3 million joint energy efficiency pilot project with Pacific Gas and Electric Company (PG&E) and San Francisco's Environment Department (SF Environment). The San Francisco Peak Energy Pilot Program is designed to increase reliability by reducing peak energy demand for both residential and business customers.

This program is funded by California utility customers and administered by the investor owned utilities under the auspices of the California Public Utilities Commission. The ultimate goal of the program is to reduce electric demand during both the peak summer air conditioning and winter heating seasons. Implementation of the project will include nine energy efficient program elements aimed at reducing usage in San Francisco by 16 MW by January 2005 to assist in the closure of Hunter's Point Power Plant.

Through a portfolio of energy efficiency programs, PG&E and SF Environment will work with hotel/motel, restaurant, and apartment owners. The programs are also designed to assist low-income residents and a special emphasis will target the Bayview-Hunter's Point community. Some of the many programs include the following for each of the customer classes (SF Environment 2003):

Residential:

- **Residential Direct Install Program:** PG&E will leverage contacts being made by the Low Income Energy Efficiency Program to identify homes that qualify for the direct installation of a variety of energy efficiency measures including interior hardwired fixtures, compact fluorescent lamps, programmable thermostats, increased incentives for second refrigerator turn in and halogen torchiere turn in/exchange. Special emphasis will be placed on working with CARE participants, seniors and board and care facilities.

- **Multifamily Energy Efficiency Rebate (MF):** Cash rebates will be available for the installation of qualified energy efficiency products in apartment dwelling units and common areas of apartment and condominium complexes.
- **Residential Case Studies:** SF Environment and PG&E will study residential building types in order to verify San Francisco's residential electric heating peak and how energy efficiency and other measures may be used to manage this peak.

Businesses:

- **Cash Rebates for Business Customers:** Cash rebates will be available for all business customers who replace old equipment with new energy efficient technologies.
- **Standard Performance Contracts (SPC):** SPC will offer business customer's financial incentives based on verified energy savings and demand reductions resulting from custom-designed projects.
- **Targeted System Energy Audits:** PG&E will provide specialized energy audits to large commercial customers who have a high potential for peak demand reduction.
- **Commercial Turnkey Services for Small and Medium Businesses:** SF Environment and PG&E will assist business customers to identify potential energy-saving opportunities and will help business customers find service providers to install energy efficient equipment and complete paperwork for applicable financial incentive programs.
- **Codes and Standards Support:** PG&E and SF Environment's building and planning department will provide energy efficiency review and recommendations on building projects that come to the planning department, promote incentive programs applicable to such projects, and analyze and draft potential energy efficiency ordinances to be considered for adoption for both existing and new buildings.
- **Emerging Technologies:** PG&E will demonstrate several new technologies for peak load reduction at customer sites in the city and promote project results to the applicable customer sectors.

Pacific Gas and Electric

Finally, PG&E themselves uses a program of voluntary reduction in electricity use known as Customer Energy Efficiency (CEE) in the project area. PG&E has had an active CEE program over the past two decades. Its cumulative reduction of use has been substantial. For any given planning area, the historical CEE energy and peak demand impacts have been subsumed within the peak load demands experienced year by year and thus their impacts are included in the forecast of peak growth. As for future potential CEE impacts, PG&E's Local Integrated Resource Plan (LIRP) study indicates that only 4 MW per year could be obtained through aggressive locally focused CEE.

Rationale for Elimination

Demand management can reduce energy consumption, thus reducing the need for gas-fired power generation. If demand were sufficiently reduced, all the effects of the Proposed Project would be avoided. However, as stated above, the Warren-Alquist Act specifically prohibits the Energy Commission from considering conservation programs as alternatives to a proposed generation project. In addition, demand-side management has been shown to be effective only at a relatively small scale, but not on a scale that would be required to replace the 145 MW SFERP.

DISTRIBUTED GENERATION

Alternative Description

The Energy Commission defines DG as "generation, storage, or demand-side management devices, measures, and/or technologies connected to the distribution level of the transportation and distribution grid, usually located at or near the intended place of use (CEC 2002b). There are many DG technologies, including microturbines, internal combustion engines, combined heat and power (CHP) applications, fuel cells, photovoltaics and other solar energy systems, wind, landfill gas, digester gas and geothermal power generation technologies. Distributed power units may be owned by electric or gas utilities, by industrial, commercial, institutional or residential energy consumers, or by independent energy producers. To the extent that it is established, DG acts to either reduce the load on the PG&E system or be applied as additional system generation. In either case, it would help to support PG&E's ability to meet the applicable reliability criteria.

Distributed generation is the generation of electricity from facilities that are smaller than 50 MW in net generating capacity. Local jurisdictions—cities, counties and air districts—conduct all environmental reviews and issue all required approvals or permits for these facilities. Most DG facilities are very small, for example, a fuel cell can provide power in peak demand periods for a single hotel building. More than 2,000 MW of DG is now in place in California.

There are several incentive programs designed to provide financial assistance to those interested in operating Distributed Generation systems in California. Senate Bill 1345 (Statutes of 2000, Chapter 537, Peace, signed by Governor Davis in September 2000) directs the Energy Commission to develop and administer a grant program to support the purchase and installation of solar energy and small distributed generation systems. Solar energy systems include solar energy conversion to produce hot water, swimming pool heating, and electricity, as well as battery backup for PV applications. Small distributed generation systems include micro-cogeneration, gas turbines, fuel cells, electricity storage technologies (in systems other than PV), and reciprocating internal combustion engines.

Some problems of specific types of distributed generation include the following:

- **Renewable Energy Sources.** As discussed above, the high cost and limited dis-patchability of small-scale renewable energy sources such as solar and wind power essentially inhibit their market penetration (Iannucci, et al., 2000; see the following section for discussion of larger scale renewable energy). In addition, biomass and wind facilities require specific circumstances for siting (i.e., near sources of bio-fuel or in high wind areas), and have their own environmental consequences (e.g., requiring large land areas or resulting in large quantities of air emissions).

- **Fuel Cells.** The present high cost of and small generation capacity of fuel cells precludes their widespread use.
- **Other Fossil-fueled Systems.** Microturbines and various types of engines can also be used for distributed generation; these technologies are advancing quickly, becoming more flexible, and impacts are being reduced. However, they are still fossil-fueled technologies with the potential for significant environmental impacts, including noise. Such systems also have the potential for significant cumulative air quality impacts because individually they are typically small enough to avoid the regulatory requirements for air pollution control. Therefore, use of enough of these systems to constitute an alternative to the Proposed Project would potentially cause significant unmitigated air quality impacts.

Rationale for Elimination

While DG technologies are recognized as important resources to the region's ability to meet its long-term energy needs, DG does not provide a means for the applicant to meet its objectives for the Project because of the comparatively small capacity of DG systems and the relatively high cost.

Consideration of DG as an alternative to the SFERP is not feasible because no single entity has proposed implementing a substantial DG program. Also, a number of serious barriers, including technical issues, business practices, and regulatory policies, make interconnection to the electrical grid in the United States difficult. Broad use of distributed resources would likely require regulatory support and technological improvements. There could be regulatory feasibility issues with the lengthy permitting process. Air permits are generally the first permits sought for DG facilities because air district requirements influence equipment selection. Once the DG equipment has been selected, the land use approval process can begin. Local governments must know what makes and models of equipment will be installed to evaluate potential significant environmental impacts (e.g., noise and aesthetics) and to specify mitigation measures. Building permits are sought last because construction plans must incorporate all project changes required by the local government planning authority to mitigate environmental impacts. This lengthy permitting process would make it impossible to construct this technology within the timeframe of the SFERP.

In a report on DG (January 2002) the Energy Commission concluded that "DG is capable of providing several Transmission and Distribution (T&D) services, but the extent to which DG can be successfully deployed to effectively supply them are limited by (1) the technical capabilities of various DG technologies; (2) technical requirements imposed by the grid and grid operators; (3) business practices by T&D companies; and (4) regulatory rules and requirements . . . some technical barriers resulting from key characteristics of the prime mover will prevent some DG technologies from providing certain T&D services."

Potential new impacts created by DG would depend on the type of generation that would be used. Impacts of solar and wind facilities are addressed above. Other types of DG have air quality and noise impacts.

INTEGRATED RESOURCES ALTERNATIVE

Alternative Description

An integrated resources alternative could be made up of several components, rather than consideration of only a generation project. The components could include a combination of the following:

- Demand-side management
- Transmission system upgrades
- Development of solar power and other renewables
- Distributed generation
- Generating facilities or co-generation facilities.

Integrated resource planning (IRP) emerged in the 1980s as an analytic means of incorporating demand-side resources (i.e., energy efficiency and load management) into resource planning, as well as incorporating other factors such as uncertainty and environmental quality. As a planning methodology IRP integrates supply and demand-side options for providing energy services at a cost that appropriately balances the interests of all stakeholders. It incorporates into electricity planning the environmental and social aspects of electricity production, as well as the potential for reducing or shaping electricity demand. Whereas traditional planning for the energy sector primarily focused on energy supply and the financial interests of the power company, IRP aims at providing energy services (as distinct from energy per se) to the society at lowest cost and with the least negative impacts. Systematic analysis of all possible strategies to meet the energy service needs is undertaken, taking into account all future scenarios. This poses an analytical challenge, which is met through twin concepts of transparency and expert review.

The objective of IRP is to determine the least-cost solution to a capacity shortage or reliability problem by evaluating the cost-effectiveness of distributed resources, such as small-scale distributed generation (DG) and demand-side management (DSM) technologies, as well as proposed T&D capacity expansion projects. Under IRP, measures to reduce demand for power through energy efficiency and conservation would have to be considered on an equal footing with new proposals for power production. Uncertainties and risks with respect to demand and financial consequences are explicitly recognized and strategies are evolved to manage them. Importantly, the environmental and social impacts of strategies are fully integrated into the decision making process. It is recognized that as long as alternate resources are ranked according to economic criteria alone, neither the criterion of sustainability nor that of least total cost to society could be met.

This type of integrated resources planning is being implemented by the CCSF, with the combination of its Electricity Resource Plan discussed above.

Rationale for Elimination

None of these alternatives individually meet the stated project objectives. Depending on which configuration of the options would be implemented would determine overall effects of this alternative. The individual discussions above address potential impacts that would be created by the individual technology options.

Taken together and if implemented, they would diversify the system and would add needed capacity. Each of these components is technically feasible, and each could be implemented on a limited scale in CCSF, but there is no certainty of their implementation, especially within the timeframe required under the DWR Power Purchase Agreement (PPA).

Each also has environmental and regulatory obstacles to their implementation (described in the individual sections above). The combination of these alternatives would have no fewer obstacles than they would individually. Furthermore, implementation of a combination of resources could not be accomplished by the applicant in this project, and would require regulatory changes or financial incentives that are not available in today’s market.

APPENDIX C. CA ISO COMMUNICATIONS

Following this page are copies of the following communications:

- April 18, 2003 CA ISO letter;
- October 22, 2003 CA ISO letter;
- CA ISO Matrix forwarded to CCSF on February 9, 2004
- July 1, 2004 letter
- CA ISO San Francisco Action Plan, September 2004
- CA ISO San Francisco Revised Action Plan, approved November 5, 2004
- CA ISO Response to September 14, 2004 CCSF Letter

CALIFORNIA ISO

California Independent System Operator

Terry M. Winter
President and Chief Executive Officer

April 18, 2003

Mr. Kevin Dasso
Director, Electric T&D Engineering
Pacific Gas and Electric Company
PO Box 770000; Mail Code H11J
San Francisco, CA 94177-0001

Ms. Theresa Mueller
Deputy City Attorney
City and County of San Francisco
City Attorney's Office
City Hall, Room 234
San Francisco, CA 94102

Subject: ISO Management Position on the Retirement of Hunters Point Unit 4

Dear Mr. Dasso and Ms. Mueller:

As you know, uncertainty surrounding the future continued operation of existing generation at Hunters Point Power Plant and Potrero Power Plant Unit 3 is a major consideration in assessing reliability issues in the San Francisco Peninsula Area. While these generating facilities provide a significant amount of load serving benefit to the San Francisco Peninsula Area, their continued operation beyond 2005 is questionable without addressing the upgrades that would be required at these plants to meet new air emission limitations that have been imposed on the Bay Area air quality region. ISO Management believes it is prudent to move forward with the installation of improved air pollution equipment for Potrero Power Plant Unit 3 to assure that there will continue to be base load generation available to serve existing and future Pacific Gas & Electric Company ("PG&E") customers beyond 2005. However, the future need for generation at Hunters Point, specifically Unit 4, continues to remain murky due to its age, the cost effectiveness of investing additional dollars towards upgrading this plant, and local community concerns related to the emissions from the plant.

In response to the uncertain availability of generation within the City of San Francisco ("City"), the ISO is aware of two generation projects that are currently being proposed for location within the San Francisco Peninsula Area. One project is by Mirant, who is proposing to construct Potrero Unit 7, a new 540 MW combined-cycle generating plant located within Mirant's existing Potrero Power Plant site. The ISO has provided testimony at the California Energy Commission Potrero 7 Application for Certification hearings in support of Unit 7 on the basis that it would be a suitable replacement for the aging Hunters Point Unit 4.

The second proposed generation project is by the City, who, as part of the settlement of a lawsuit brought against the Williams Companies by the State of California and the City, will receive four General Electric LM6000 gas turbines that could be sited at locations within the San Francisco Peninsula Area. The City has informed the ISO of its specific intent to locate these gas turbines in a manner that would enhance the electric reliability of San Francisco and enable the shutdown of Unit 4. Through technical analysis performed in cooperation with PG&E, the ISO has determined that the City's goal can best be served by siting the four Combustion Turbines ("CTs") where they can be directly connected to the existing 115kV transmission network within the City. The City has informed ISO Staff that their ability to site these new turbines within the City is justified if they directly support the retirement of Hunters Point Unit 4. As such, they have requested the ISO to provide them specific, additional conditions under which the ISO would not renew the Reliability Must-Run Contract for Hunters Point Unit 4 if the four CTs were sited within the City of San Francisco. The four CTs represent a total output of 180 MW, an amount slightly greater than the maximum output of Unit 4 (170 MW).

In March 2003, the ISO released a draft report entitled "San Francisco Peninsula Load Serving Capability" which documents a rather significant and comprehensive study mounted by the ISO to address questions being raised by stakeholders relating to San Francisco Peninsula Area load serving capability. The objective of the ISO's study was to provide stakeholders an independent, comprehensive determination of the maximum San Francisco Peninsula Area load serving capability under a multitude of future generation and transmission scenarios. The study provides a broad based understanding of the load serving needs of the San Francisco Peninsula Area and how existing and proposed transmission and generation facilities can reliably serve the load in this area. In particular, the study provides insight into the viability of the request by the City and PG&E to replace Hunters Point Unit 4 with four CTs.

While the ISO's comprehensive San Francisco Peninsula Area load serving capability study provides key load serving information about the San Francisco Peninsula Area, a companion ten-year load forecast for the area is needed to thoroughly assess the City's proposal. PG&E's most recent load forecasts for the San Francisco Peninsula Area have been recently distributed. The ISO has extensively reviewed this forecast and considers it to be representative of the expected "1 in 10 Year" electric demand for the San Francisco Peninsula Area through 2013.

Based on the results of the ISO's comprehensive study, the ISO has concluded that if Hunters Point Unit 4 is retired before 2005, there is inadequate load serving capability to serve the expected load in the San Francisco Peninsula Area unless additional generation and/or transmission reinforcement is constructed to support load growth in the area. In consideration of the request by the City and PG&E, the ISO has evaluated the viability of replacing Hunters Point Unit 4 with the four CTs proposed by the City. Again, based on the results of the ISO's comprehensive load serving study, the ISO has determined that the CTs, if located within the City, would be a suitable replacement for Hunters Point Unit 4, if and only if all the transmission system reinforcements, as indicated in the attached "ISO Terms and Conditions Allowing the Replacement/Shutdown of Hunters Point Unit 4", are completed and placed in-service prior to the retirement of Hunters

Point Unit 4. Once these conditions are met, the ISO will not renew the RMR Contract for Hunters Point Unit 4.

In closing, I want to reiterate ISO Staff comments which have been made to the City of San Francisco, PG&E, and other stakeholders; that the ISO shares the City's and PG&E's desire to retire all generation at Hunters Point in a manner that maintains a level of system reliability which the ISO is charged with providing. The ISO supports the City of San Francisco and PG&E's step-wise approach to addressing the retirement of generation at Hunters Point, and working towards retiring Hunters Point Unit 4 is a first step. ISO Management is expecting a continued, positive working relationship with the City of San Francisco and PG&E towards also addressing and facilitating the ultimate retirement of Hunters Point Unit 1.

If you have any questions, please contact Armando Perez at (916) 351-4400 or Gary DeShazo at (916) 608-5880.

Sincerely,

Terry M. Winter

Terry M. Winter
President and Chief Executive Officer

Attachment

cc: CAISO Board of Governors
CAISO Board Assistants
CAISO Officers
Armando J. Perez, CAISO
Gary DeShazo, CAISO
Richard Cashdollar, CAISO
Jeanne Sole, CAISO
Ed Smeloff, City of San Francisco
Ralph Hollenbacher, City of San Francisco
David Freeman, California Power Authority
Dick Ferreira, California Power Authority
Kellan Fluckinger, California Power Authority
Manho Yeung, Pacific Gas and Electric Company

ISO Terms and Conditions
Allowing the Replacement/Shutdown of Hunters Point 4
Through the Installation of Four CTs

The following list of conditions describes the conditions under which the ISO would not renew the RMR Contract for Hunters Point 4 and allow it's retirement. Full completion of these conditions would be required to allow the shutdown of Hunters Point 4: delays, partial completion, or omission of any item may prolong the need to retain Hunters Point 4 as an RMR unit unless agreed to by the ISO.

Baseline Assumptions

Hunters Point 4 retirement conditions are predicated on several critical baseline assumptions and present-day elements which are assumed in place at the time of retirement. These are as follows:

1. Potrero Unit 3 (206MW), and Units 4, 5, and 6 (52MW each) remain operational and fully available at their present day capacity.

2. Mirant will complete the installation of the Potrero 3 SCR, expected by second quarter 2005.

3. Hunters Point Combustion Turbine Unit 1 (52MW) will remain operational and fully available at its present day capacity.

4. Hunters Point Units 2 and 3 are fully operational as synchronous condensers, or a comparable replacement of reactive support is installed. A comparable replacement would be PG&E's presently proposed project to install a +240/-100 MVAR Static VAR Compensator at Potrero Switchyard. This project has already been approved by the ISO and is expected to be operational by September 2004.

5. Critical elements of the present-day Greater Bay Area transmission system are available at their present day capacity. For example, it is assumed that existing 115kV internal SF underground cables will not have experienced any permanent failures or abandonment. Alternatively, it is assumed that facilities such as the Tesla 500/230kV transformer #6 are still in service at its present capacity.

Future Requirements

The following future events and grid upgrades must be completed to allow the retirement and shutdown of Hunters Point Unit 4. It should be noted that any deviations from these required projects may require additional reinforcements to address these deviations.

1. **Installation of four 45 MW combustion turbines electrically connected to the internal San Francisco 115kV transmission network.** This installation (or an equivalent or greater generation project) must be fully installed and capable of providing no less than 495,000MWhrs per year[1]. The ISO will require overlapping availability of Hunters Point 4 and the new generation project until the turbine project has completed a performance test agreed to be sufficient by the ISO. ***Status:*** *On April 10, 2003 CCSF initiated the generation interconnection study for this project and it's various alternatives. Expected completion date unknown, tentatively expected third quarter 2005?*

2. **Newark-Ravenswood 230kV Line Rerate.** PG&E to increase the emergency rating of the Newark-Ravenswood 230kV line using a higher wind speed assumption, and replace 230kV switches. The line's emergency rating will be increased from 2,110 Amps to 2,500 Amps. ***Status:*** *COMPLETE, and the CAISO Transmission Registry has been updated.*

3. **Ravenswood-San Mateo 115kV Line Rerate.** PG&E to increase the emergency rating of the Ravenswood-San Mateo 115kV line using a higher wind speed assumption. The line's emergency rating will be increased from 522 Amps to 618 Amps. ***Status:*** *COMPLETE, and PG&E has requested the ISO to update the Transmission Registry.*

4. **Tesla-Newark #2 230kV Line Rerate/Upgrade.** PG&E to increase the emergency rating of the Tesla-Newark #2 230kV line using a higher wind speed assumption, and replace 230kV switches. The line's emergency rating will be increased from 1,714 Amps to 1,954 Amps. ***Status:*** *UNDER CONSTRUCTION, completion expected May 2003.*

5. **Ravenswood 230/115kV Transformer.** PG&E to Install a new second 230/115kV transformer (420MVA) at Ravenswood. ***Status:*** *ENGINEERING & PROCUREMENT, completion expected May 2004.*

6. **San Mateo-Martin #4 Line 60-115kV Voltage Conversion.** PG&E to reconductor and convert the San Mateo-Martin 60kV circuit to 115kV operation. Substation modifications are also needed at Burlingame and Millbrae. ***Status:*** *Permit application filed with the CPUC in November 2002; PEA Application deemed complete on March 24, 2003. Expected completion of June 2004 <u>or later</u> depending on permit requirements.*

---

[1] Based on 2003 Contracted RMR MWHrs for HP4; HP4 2002 actual MWHrs = 448,371.

7. **Potrero-Hunters Point ("AP-1") 115kV Underground Cable.** PG&E to complete construction of a new 115kV underground cable between Potrero and Hunters Point. ***Status:*** *PG&E and CCSF are working on a joint project and completing the needed environmental impact report, June 2004 <u>or later</u> depending on permit requirements.*

CALIFORNIA ISO

California Independent System Operator

Terry M. Winter
President and Chief Executive Officer

October 22, 2003

Via Facsimile and US Mail

Office of Supervisor Sophie Maxwell
Board of Supervisors of the City and County of San Francisco
1 Dr. Carlton B. Goodlett Place, Room 279
San Francisco, CA 94102

Subject: Request for Additional Information on Shutting Down Generation At the Hunters Point and Potrero Power Plants

Dear Supervisor Maxwell:

Thank you for your letter dated September 23, 2003, addressing the concerns of the City and County of San Francisco ("City") related to the future operation of generator units within the City. Over the past year ISO staff has spent a great deal of time and effort working with stakeholders representing the City, Pacific Gas and Electric Company ("PG&E"), and many members of the Potrero and Hunters Point/Bayshore communities. The ISO recognizes that there are wide-ranging interests regarding the future of generation at Hunters Point Power Plant ("Hunters Point") and Potrero Power Plant ("Potrero") and that the concerns and issues voiced by all stakeholders are an important part of deciding how best to serve the demand for energy in San Francisco. The ISO staff has participated in numerous community and City forums where our goal has been twofold; 1) Raise stakeholder's technical understanding of how the electrical system within the San Francisco Peninsula Area[1] works to serve the load in this area and 2) Pursue the ISO's mandated mission to assure a reliable transmission system is in place to serve the load.

<u>San Francisco Peninsula Load Serving Capability Study</u>

In July 2003, the ISO finalized its report entitled "San Francisco Peninsula Load Serving Capability" which documents a rather significant and comprehensive study mounted by the ISO to address questions being raised by stakeholders relating to San Francisco Peninsula Area load serving capability. While the stated objective of the ISO's study was to provide stakeholders an independent, comprehensive determination of the maximum San Francisco Peninsula Area load-serving capability under a multitude of future generation and transmission scenarios, its true value has been to provide stakeholders meaningful information to allow them to make informed decisions. This study, which had broad stakeholder input, is the first of its kind to be performed for this area and has, much to its credit, redefined the technical approach to assessing its reliability needs. PG&E and the City support the study's methodology and it will be the benchmark that

[1] In the testimony for the Jefferson-Martin Transmission Line, currently before the California Public Utilities Commission, the ISO refers to the City and County of San Francisco and the San Francisco Peninsula as the "San Francisco Peninsula Area." For clarity in this letter, the ISO will delineate separately, when necessary, the City, the Peninsula, and the Greater Bay Area even though the City is included in the Peninsula, which is included in the Greater Bay Area.

defines how all transmission assessment initiatives in this area will likely be performed from this point forward. The ISO has relied on this study's results and conclusions in addressing your questions and those of other stakeholders.

Retirement of Hunters Point Unit 1 and Unit 4

The ISO acknowledges the importance to the City and its citizens of retiring all generation at Hunters Point as well the City's desire to implement its Electricity Resource Plan. As such, the ISO remains committed to the goal of closing Hunters Point and will continue to work with the City and other stakeholders.

The City and PG&E have reached a conclusion that if all of the conditions outlined in the April 18, 2003 letter are met then Hunters Point Unit 1 can also be retired with Hunters Point Unit 4. The ISO does not agree with this conclusion. The ISO has consistently stated that generation within the City is needed to mitigate local area reliability constraints within the City, the Peninsula, and the Greater Bay Area. Put another way, the need for generation in the City is based not only on load-serving constraints within the City, but also throughout the Peninsula as well as the Greater Bay Area. Constraints outside of the City currently exist; and the ISO's "San Francisco Peninsula Load Serving Capability" study extensively documents them. It is the ISO's position that all constraints must be addressed to determine the need for generation within the City. Consistent with this position, the April 18, 2003, letter appropriately considers the entire Greater Bay Area when it delineates the conditions under which the ISO would not extend the RMR Contract for Hunters Point Unit 4. Without some suitable generation replacement or additional transmission infrastructure beyond what has been identified in the ISO's April 18, 2003 letter, Hunters Point Unit 1 is still needed to meet the local area reliability needs for the City, the Peninsula, and the Greater Bay Area.

The ISO has continued to assess the load serving capability of the City and the Peninsula and has come to the conclusion that in order to meet all grid planning and operational needs in this area approximately 400 MW[2] of generation must be located north of San Mateo. The four proposed combustion turbines being sited at or near Potrero is a necessary component to meeting this generation requirement to assure the future reliability of the City, the Peninsula, and the Greater Bay Area systems. This assessment is what led the ISO to conclude that the siting of four combustion turbines, totaling approximately 180 MW at or near Potrero, while a step in the right direction, is not enough to allow the retirement of all generation at Hunters Point. It is imperative that other transmission additions accompany the siting of the City's combustion turbine project in order to close all generation at Hunters Point.

To this end, the ISO and PG&E have proactively worked together over the past six months to define the necessary transmission additions that support our mutual goal of retiring generation at Hunters Point while maintaining the required level of reliability mandated by the ISO's Planning Standards. The culmination of our joint efforts is reflected in PG&E's near final 2003 ten-year transmission expansion plan, as presented to the stakeholders on October 14, 2003. The 2003 transmission expansion plan includes all transmission reinforcements delineated in the ISO's April 18, 2003 letter as well as other key projects that are necessary to retire all generation at Hunters Point provided the City's combustion turbine project is successfully sited at or near Potrero (see attachment 1). The ISO believes that while maintaining their commitment to retire

[2] The determination of 400MW was based on the following: 1) expected 2006 system configuration that assumes the Jefferson-Martin Project in-service; 2) a peak weekend San Francisco Forecast of 750MW; 3) and typical San Mateo wash clearance conditions. Changes in system configuration and/or load forecast projections may change the generation need.

Hunters Point, PG&E should remain focused on completing the necessary transmission upgrades/additions they have included in their 2003 transmission expansion plan. The ISO encourages the City and all community members to fully support these projects to assure that they will be completed in a timely manner.

Your September 23, 2003 letter posed several questions that directly relate to the conclusion that the ISO has reached with regard to generation at Hunters Point. Hopefully, our answers to your questions will provide you a better understanding of our position. For your convenience, we have inserted your questions in italics followed by the ISO's answer.

Q1) *Since your April letter outlining the conditions under which Hunters Point (HP) 4 could be released from its RMR contract, PG&E has completed its "San Francisco Internal Transmission System After AP-1 Technical Study." This study shows that under assumed new emergency ratings for the existing cables in the City, the need for local generation to serve internal City needs is substantially decreased. PG&E has also indicated its intention to reinforce the Tesla-Newark 230kv lines by the summer of 2005. Please indicate whether these changing circumstances will also allow the shutdown of HP1 and/or Potrero 3 with the installation of four turbines the City is attempting to install. Would the above answer change if only three turbines are installed? In your answer, please indicate whether the local remaining needs for local generation are dictated by local and Bay Area grid planning, RMR and/or operational needs. Please answer the above both with and without the addition of the Jefferson-Martin transmission project.*

A1) The City's Internal 115 kV Cable System:

To understand the ISO's position on the reliability needs for this area, it is important to understand the context in which PG&E's "San Francisco Internal Transmission System After AP-1 Technical Study" was performed.

The ISO's "San Francisco Peninsula Load Serving Capability" report identified, among other things, the need to address cable constraints internal to the 115kV system within the City. While the ISO's load-serving study assumed that a "cable fix" would be implemented by PG&E, the study did not recommend a specific transmission solution to resolve these constraints. Instead, the ISO recommended that PG&E undertake its own study of the City's 115kV cable system to identify an appropriate cable project to submit to the ISO for approval. PG&E performed the "San Francisco Internal Transmission System After AP-1 Technical Study" but PG&E limited the study's scope to the City's 115kV cable system. As a result, PG&E's study results, conclusions, and recommendations are reflective of that limited scope. While in concurrence with most of PG&E's study recommendations, the ISO has repeatedly stated that the ISO's own load-serving study clearly illustrates that transmission constraints exist not only within the City, but throughout the entire San Francisco Peninsula Area. In fact, the ISO load-serving study concludes that the load-serving capability of the San Francisco Peninsula Area is directly related to the capability of the transmission system in the San Mateo-Martin Corridor, the 230kV system south of San Mateo, and local transmission along the San Francisco Peninsula. The study also concludes that an accurate load-serving capability can be determined only if all San Francisco Peninsula Area constraints are appropriately addressed. Because PG&E limited the scope of their study to the system within the City, it is inappropriate to apply these results to the larger San Francisco Peninsula Area because they overstate the ability to serve load within the City.

Without Jefferson-Martin Transmission Line:

Given the above, the ISO has concluded that all generation at Hunters Point can be retired if the following is successfully completed:

1) All transmission and generation requirements identified in the ISO's April 18, 2003 letter;
2) The Tesla – Newark # 2 - 230kV line bundling is completed; and
3) The Ravenswood – Ames 115kV lines #1 & #2 are reconductored.

While the projects mentioned above support the local and Greater Bay Area grid planning standards, RMR requirements, and operational needs of the area, the Tesla-Newark project is key to reducing the RMR requirement within the Greater Bay Area. The Jefferson-Martin Project is a suitable replacement for the Tesla-Newark and Ravenswood-Ames projects from a local and Greater Bay Area grid planning and operational standards perspective, because they increase the transmission capacity through the San Francisco Peninsula. However, these projects have little impact on the RMR need for the Greater Bay Area. Therefore, while all of the projects mentioned above are needed to import the power required to meet area load serving needs, it is the Tesla-Newark project that is needed to effectively reduce the Greater Bay Area RMR requirement that is, in part, being met by the generation located within the City.

Installation of Only Three Combustion Turbines:

Given the current PG&E load forecast for the San Francisco Peninsula area, the installation of only three turbines at or near Potrero is not enough to meet the ISO Grid Planning Standards nor to meet the Operational need in the City and Peninsula. A net reduction in generation within the City must be countered by an increased flow of power over the transmission systems leading into and through the Peninsula and the City in order to serve the load in these areas. This added power flow places additional stress on these transmission systems and therefore has the overall impact of advancing the need for additional transmission infrastructure within these areas.

Potrero Unit 3:

Based on the generation needs that the ISO has identified, Potrero Unit 3 is required to be in-service. The ISO has not studied retirement of Potrero Unit 3, but it is expected that another 230kV import line similar to the Jefferson – Martin Project would be needed. As such, it is imperative that stakeholders next focus on the future transmission requirements of the Greater Bay Area to assure adequate planning for a robust system that optimizes the generation and transmission service to the City, the Peninsula, and the Greater Bay Area. This work will be carried forward in 2004 through the ISO's San Francisco Stakeholder Study Group. The City and all stakeholders are encouraged to participate in this study group.

Q2) PG&E states in its August 5, 2003 letter to "Fellow San Franciscans," that any delays in PG&E projects which require approval by the CPUC "will make it unlikely that the CAISO will allow us to close the Hunters Point Power Plant by the end of 2005." We would like the ISO to allow the shutdown of HP immediately. If this is not possible, we certainly want to avoid the circumstance of

PG&E retrofitting HP 4 just before the system additions that allow it to be closed are made. We are concerned that purposely removing HP 4 from service to install retrofits would jeopardize reliability to the City. And doing so just before other improvements are made to the electric system that would remove the need for HP 4 would not be cost effective. Please confirm that the ISO will consider a plan for PG&E to operate the Plant, as needed, through obtaining and utilizing interchangeable emission reduction credits (IERC), until the other improvements are in place.

A2) PG&E is correct that any delays in PG&E's proposed projects will impact the continued need to extend the RMR Agreement for Hunters Point Units 1 and 4. The ISO has consistently maintained that the generation at Hunters Point and Potrero play a key role in the overall reliability of this area and believes that the timely completion of PG&E's projects as well as the City's combustion turbine project are necessary components to achieve the retirement of generation at Hunters Point by the end of 2005.

Securing additional IERCs to operate Hunters Point Unit 4 beyond 2005 is the responsibility of PG&E as the plant owner and the Bay Area Air Quality Management District. The ISO would be supportive of any reasonable plan that would allow sufficient time for other transmission and/or generation alternatives to develop and avert a retrofit of Hunters Point Unit 4, provided the City, the communities, and the Bay Area Air Quality Management District are able to settle on a compliance plan. However, there is uncertainty in successfully achieving such a plan. Time is running very short on concrete solutions to this issue and at this point, in order to meet its reliability mandates, the ISO must approve a retrofit of Hunters Point Unit 4.

The ISO urges the City, PG&E, and community members to move expeditiously towards consensus on solutions such as supporting the City's combustion turbine project, the Jefferson – Martin Project, as well as all applicable transmission projects currently included in PG&E's draft 2003 transmission expansion plan.

Q3) Similarly, assuming Mirant were able to operate Potrero 3 using IERCs, would the ISO be willing to defer the retrofit of Potrero 3 until a time when the plant could be removed from service for a retrofit at less risk to the reliable electric service in San Francisco? And, to the extent this is not answered above, under what conditions would the ISO agree not to retrofit Potrero 3 and allow it to be retired completely?

A3) The answer to this question is similar the ISO's response to question 2. Again, securing additional IERCs to operate Potrero Unit 3 beyond 2004 is the responsibility of Mirant as the plant owner and the Bay Area Air Quality Management District. While the ISO would be supportive of any reasonable plan that would allow additional time to adjust the Potrero Unit 3 retrofit, it is highly unlikely that such alternatives can be secured in time to alter the current Potrero Unit 3 retrofit schedule. PG&E has informed the ISO that it intends to operate Hunters Point Unit 4 through 2005 to allow for the completion of the Potrero Unit 3 retrofit and the Jefferson – Martin 230kV Transmission Project. However, both of these projects face significant barriers to their successful completion such that their availability by the end of 2005 remains uncertain at best. To defer the Potrero Unit 3 retrofit to a later date is not in the best interests of PG&E's customers. Therefore, the ISO will proceed with the requirement to retrofit Potrero Unit 3.

The ISO urges the City, PG&E, and community members to move expeditiously towards consensus on solutions such as supporting the City's combustion turbine project, the Jefferson – Martin Project, as well as all applicable transmission projects currently included in PG&E's draft 2003 transmission expansion plan.

Q4) *PG&E has proposed to adopt emergency ratings for the old underground cables in San Francisco. This is consistent with the City's desire to reduce in-City generation. However, we want to ensure that it is also consistent with providing reliable service. Does the ISO believe that this re-rating is appropriate? If this re-rating is adopted, will the ISO require any additional measures to ensure reliability?*

A4) At this point in time, the ISO does not support the conclusion that PG&E has reached regarding the capability of the cables. These cables are very old and the ISO is concerned that they may be placed in higher stress situations than the engineering and operating assumptions used to calculate the ratings, exposing them to an increased risk of failure. The ISO is currently working with PG&E to resolve the issues surrounding the emergency ratings of the cables in the City. While PG&E retains the right to rate their facilities, the ISO has an obligation to assure itself and all stakeholders that new or changed ratings proposed by PG&E are based on good utility practice and that reasonable engineering and operating assumptions are used. The ISO is currently working with PG&E to clarify the foundational assumptions on which the proposed re-rates are based.

The ISO hopes that the information that has been provided has been informative and will help you in addressing your concerns. If you have any questions, please call Julie Gill at (916) 351-2221 or Gary DeShazo at (916) 608-5880.

Sincerely,

ORIGINAL SIGNED BY

Terry M. Winter
President & Chief Executive Officer

Cc: Gary DeShazo, ISO
Julie Gill, ISO
Kevin Dasso, PG&E
Edward Smeloff, SFPUC
Jared Blumenfeld, SFDoE
Theresa Mueller, Deputy City Attorney
Barry Flynn, Flynn & Associates

Attachment 1
Reference List of Projects

1. **Installation of four 45 MW combustion turbines electrically connected to the internal San Francisco 115kV transmission network.** This installation (or an equivalent or greater generation project) must be fully installed and capable of providing no less than 495,000MWhrs per year[3]. The ISO will require overlapping availability of Hunters Point 4 and the new generation project until the turbine project has completed a performance test agreed to be sufficient by the ISO. ***Status:*** *On April 10, 2003 CCSF initiated the generation interconnection study for this project and it's various alternatives. Expected completion date unknown, tentatively expected by end of 2005.*

2. **Jefferson-Martin 230 kV Line Project.** PG&E to increase the import capability into the San Francisco Area through building a new 230 kV line between Jefferson and Martin Substations. This line may be partly or all an underground cable. ***Status:*** *This project has been approved by the CA ISO and is presently within the CPUC CPCN process. The line is scheduled to be in Operation by Sept. 2005*

3. **Newark-Ravenswood 230kV Line Rerate.** PG&E to increase the emergency rating of the Newark-Ravenswood 230kV line using a higher wind speed assumption, and replace 230kV switches. The line's emergency rating will be increased from 2,110 Amps to 2,500 Amps. ***Status:*** *Completed*

4. **Ravenswood-San Mateo 115kV Line Rerate.** PG&E to increase the emergency rating of the Ravenswood-San Mateo 115kV line using a higher wind speed assumption. The line's emergency rating will be increased from 522 Amps to 618 Amps. ***Status:*** *Completed.*

5. **Tesla-Newark #2 230kV Line Rerate.** PG&E to increase the emergency rating of the Tesla-Newark #2 230kV line using a higher wind speed assumption, and replace 230kV switches. The line's emergency rating will be increased from 1,714 Amps to 1,954 Amps. ***Status:*** *Completed.*

6. **Tesla-Newark #2 230kV Line Upgrade.** PG&E to increase the rating by completing the bundling of the Tesla-Newark #2 230kV line with 954 ACSS conductor for approximately 8 miles out from Tesla Substation. ***Status:*** *Proposed within PG&E's 2003 Transmission Expansion Plan for May 2005 operation.*

7. **Ravenswood 230/115kV Transformer.** PG&E to install a new second 230/115kV transformer (420MVA) at Ravenswood. ***Status:*** *ENGINEERING & PROCUREMENT, completion expected May 2004.*

8. **Ravenswood-Ames #1 & #2 115 kV lines Reinforcement.** PG&E to increase the rating of the Ravenswood-Ames #1 & #2 115 kV lines by reconductoring them with 477 ACSS

[3] Based on 2003 Contracted RMR MWHrs for HP4; HP4 2002 actual MWHrs = 448,371.

conductor. ***Status:*** *Proposed within PG&E's 2003 Transmission Expansion Plan for May 2005 operation.*

9. **San Mateo-Martin #4 Line 60-115kV Voltage Conversion**. PG&E to reconductor and convert the San Mateo-Martin 60kV circuit to 115kV operation. Substation modifications are also needed at Burlingame and Millbrae. ***Status:*** *Permit application approved by the CPUC in October 2003; Expected completion of June 2004.*

10. **Potrero-Hunters Point ("AP-1") 115kV Underground Cable.** PG&E to complete construction of a new 115kV underground cable between Potrero and Hunters Point. ***Status:*** *PG&E and CCSF are working on a joint project and completing the needed environmental impact report, operation is scheduled for June 2004 <u>or later</u> depending on permit requirements.*

Friday 2:30 PM

ISO GRID PLANNING DRAFT

February 09, 2004

The objective of San Francisco is to shut down Hunter Point Power Plant. The objective of ISO is to ensure RMR, Operational and Reliability criteria are met.

There are several combinations of transmission and generation projects that appear capable of meeting both set objectives through 2006 (note the conditions). The combinations narrow when considering the conditions and compliance through 2010.

Transmission and Generation Combinations	Release Hunters Point 4 From Its RMR Contract	Release Hunters Point 4 & 1 From RMR Contracts	ISO San Francisco Operational and Reliability Criteria	
			Thru 2006	Thru 2010
Trans + OTP	No	No	No	No
Trans + 4 CTs	Yes	No	Yes	No
Trans + J-M	Yes *	No	Yes *	No
Trans + OTP + 3 CTs	Yes	Yes	Yes	No
Trans + OTP + (3+1) CTs	Yes	Yes	Yes	No
Trans + OTP + 4 CTs	Yes	Yes	Yes	No
1 or 2 CTs + Trans + J-M	Yes *	Yes **	Yes *	No
3 or 4 CTs + Trans + J-M	Yes	Yes	Yes	Yes

Trans – the six PG&E transmission system upgrades noted in April 18, 2003 letter

CTs – the City owned peaking power plants (have not begun permitting)

(3+1 CTs) – 3 CTs cited in the city and fourth at SF Airport

J-M – The Jefferson-Martin transmission project plus two associated transmission projects in Maxwell letter (J-M is in permitting)

OTP – Tesla – Newark #2 230kV Line Upgrade and Ravenswood – Ames #1 & #2 115kV Line Reinforcement

* Conditioned on using higher emergency ratings transmission internal to the City per a PG&E proposal. ISO and PG&E are currently addressing the viability of using these ratings. Resolution is expected in Q1, 2004.

** Conditioned on new Martin-Hunters Point transmission project going into service in 2007 per PG&E 2003 Expansion Plan. ISO will consider this condition as having been met when the Martin-Hunters Point transmission project is approved by the ISO Board, permitted and in operation. This line is currently scheduled for Q4 2007.

Further Considerations:

- PG&E and the City have an agreement that Hunters Point plants will be shut down when released from RMR contracts.
- The City may not understand that what is needed to release Hunters Point 4 from its RMR contract may not be sufficient to shut down both Hunters Point 1 & 4
- The City is contractually obligated to CERS to have purchased land by May 1, 2004. The dates have been extended once. ISO will not include the peakers in its assumptions until they are permitted and under construction.
- The six PG&E transmission projects identified in Terry Winter's April 18, 2003 letter are or near complete
- The Jefferson-Martin transmission project is being permitted. ISO includes this project in its assumptions for planning studies.

DATA RESPONSE ALT-16A3

CALIFORNIA ISO

California Independent
System Operator

Jim Detmers
Vice President, Grid Operations

July 1, 2004

Via Facsimile and US Mail

The Honorable Gavin Newsom, Mayor of the City and County of San Francisco
Ms. Sophie Maxwell, City and County of San Francisco Board of Supervisors
Mr. Jeffrey D. Butler, Pacific Gas and Electric Senior Vice President, Transmission and Distribution
Mr. Ralph Hollenbacher, San Francisco Public Utilities Commission

Subject: Shutting Down Generation At the Hunters Point and Potrero Power Plants

Dear Mayor Newsom, Ms. Maxwell, Mr. Butler, and Mr. Hollenbacher:

The California Independent System Operator Corporation ("ISO") has received letters from each of you concerning the shut down of generation at Hunters Point Power Plant ("Hunters Point") and Potrero Power Plant ("Potrero"). Because the questions being asked are similar, the ISO has taken the liberty of addressing all of the questions in this letter.

Over the past several years, ISO staff has spent a great deal of time and effort working with the City and County of San Francisco ("City"), Pacific Gas and Electric Company ("PG&E"), and many members of the Potrero and Hunters Point/Bayshore communities ("Parties") to address concerns and questions related to the need for generation at Hunters Point and Potrero. The ISO recognizes that there are wide-ranging interests regarding the future of generation at the Hunters Point Power Plant and the Potrero Power Plant and that the concerns and issues voiced by all stakeholders are an important part of deciding how best to serve the demand for energy in San Francisco. The ISO also believes that all parties share a common goal of providing the City[1] with reliable, secure and environmentally responsible electric service and that, although complex, resolving the issues that constrain the retirement of generation in San Francisco is obtainable over time. To this end, the ISO remains fully committed to supporting the City and PG&E in successfully achieving their goals while maintaining the reliability needs of the entire San Francisco Peninsula Area.

On April 15, 2004, ISO and PG&E representatives met to discuss the retirement of Hunters Point and the transmission upgrades necessary to allow the ISO to discontinue extending the Reliability Must Run ("RMR") Agreement for any of the Hunters Point units. ISO staff has worked closely with PG&E to make sure that all load serving capability, RMR, and operational reliability issues have been appropriately identified and addressed in PG&E's 2003 transmission expansion plan. In addition, PG&E informed the ISO that it intends to move forward with replacing the insulators on the San Mateo 230kV bus to eliminate the need to perform required maintenance washes during the summer months. This decision resolves the final operational reliability issue that, based on current studies, required the continued operation of Hunters

[1] In the testimony for the Jefferson-Martin Transmission Line, currently before the California Public Utilities Commission, the ISO refers to the City and County of San Francisco and the San Francisco Peninsula as the "San Francisco Peninsula Area." For clarity in this letter, the ISO will delineate separately, when necessary, the City, the Peninsula, and the Greater Bay Area even though the City is included in the Peninsula, which is included in the Greater Bay Area.

151 Blue Ravine Road Folsom, California 95630 Telephone: 916 351-4400

Point Unit 1 beyond 2005. Therefore, based on PG&E's completion of the 2003 Transmission Expansion Plan items outlined in your May 4, 2004 letter prior to the end of 2005 and the other critical assumptions listed below, the ISO anticipates being able to discontinue renewing the RMR Agreement for Hunters Point Units 1, 2, 3, and 4 for 2006.

As stated in their May 4, 2004 letter, PG&E shares the ISO's commitment to retiring Hunters Point in a manner that assures adequate load serving capability and system reliability. And while the ISO and PG&E are in agreement on what is needed to remove the Hunters Point facilities from their RMR designations at the end of 2005, this agreement is predicated upon the expectation that the retirement of these units will *not unduly jeopardize reliable electric service to PG&E's customers in the City and the San Francisco Peninsula Area*. Put another way, the ISO's support for retiring generation in the City is based on certain "critical assumptions" that are reasonably expected to occur. Of significant importance is the successful retrofit of Potrero Unit 3 with selective catalytic reducers. Retrofitting Potrero 3 has constituted a "critical assumption" in all conclusions that the ISO has presented to the parties today and in all previous ISO correspondence. Reiterating previous statements, the ISO has not studied or prepared scenarios without Potrero Unit 3 in place. Therefore, it should be clearly understood that the technical conclusions that allow for the retirement of generation at Hunters Point would be altered should Potrero Unit 3 not be able to operate beyond 2005. Notwithstanding the continued operation of Potrero Unit 3, other "critical assumptions" such as an accelerated increase in local area load growth, the unexpected retirement and/or failure of other local area generation in the Greater Bay Area, and/or the unexpected failure of critical elements of the transmission system that supports the City and San Francisco Peninsula Area, among others, would also have an impact on the ISO's technical conclusions that allow for the ISO to discontinue renewing the RMR Agreement for Hunters Point. While changes in these "critical assumptions" are uncontrollable, the ISO remains committed to work with PG&E to retire the Hunters Point facility by the end of 2005. It is anticipated that the ISO Board will make the final decision at its September 2005 meeting.

Of particular concern to the ISO is the timely completion of the Jefferson – Martin 230kV Transmission Project and the inability of Hunters Point Unit 4 to operate beyond 2005 due to Bay Area Air Quality issues. Even though PG&E clearly remains dedicated to completing this project on time, a reasonable probability still remains that Jefferson – Martin could be delayed until sometime in 2006. As the ISO stated in its October 22, 2003 letter to Supervisor Sophie Maxwell, securing the necessary interchangeable emission reduction credits ("IERC") to operate Hunters Point Unit 4 beyond 2005 is the responsibility of PG&E as the plant owner. In PG&E's direct testimony regarding the need for the Jefferson – Martin 230kV Transmission Project submitted to the Public Utilities Commission of the State of California, PG&E correctly acknowledged that the ISO would require PG&E to delay closure of Hunters Point until the Jefferson – Martin 230kV Transmission Project becomes operational.[2] Based on this testimony, it is the ISO's understanding that PG&E will take the required steps to secure the necessary IERCs to operate Hunters Point Unit 4 beyond 2005 should the need arise. The ISO believes this to be a prudent and necessary step to assure that San Francisco area reliability can be sufficiently maintained should the operation of Jefferson – Martin be unavoidably delayed.

On May 28, 2004 the ISO received a letter from Gavin Newsom, Mayor of San Francisco and Sophie Maxwell, Member of the Board of Supervisors asking for the ISO's continued assistance in helping the City plan for cleaner, more reliable and more efficient electric resources. The May 28, 2004 letter posed several

[2] Direct Testimony of Pacific Gas and Electric Company Regarding Need for the Jefferson-Martin 230 kV Transmission Project, A.02-09-043 (Oct. 10, 2003), at p. 85-86.

questions that relate to generation facilities at Hunters Point and Potrero. These questions are restated below in italics followed by the ISO's answer.

Q1a) *The City seeks a commitment by the ISO to release Hunters Point Units 1 and 4 from any RMR obligations no later than December 2005.*

A1a) As stated above, based on PG&E's commitment to successfully complete the 2003 Transmission Expansion Plan items outlined in their May 4, 2004 letter, the ISO is in agreement with PG&E concerning the retirement of Hunters Point Power Plant. Assuming that these facilities are in operation prior to the end of 2005 and the other critical assumptions listed above allow the ISO to discontinue renewing the RMR Agreement for Hunters Point, the ISO would not renew the RMR Agreement for Hunters Point Units 1 and 4 for 2006. It is anticipated that the ISO Board at its September 2005 meeting will make the final decision.

Q1b) *The City seeks confirmation from the ISO that it will release Hunters Point Units 1 and 4 from any RMR obligations on completion of the transmission projects identified in the attachment to PG&E's May 4, 2004 letter.*

A1b) See A1a.

Q1c) *The City seeks a commitment by the ISO to release Hunters Point Units 1 and 4 from any RMR obligations provided that three turbines are <u>connected to the internal San Francisco 115 kV</u> transmission network and the eight transmission projects identified in your October 22, 2003 letter (which excludes Jefferson–Martin) are completed.*

A1c) Assuming the installed capacity of the City's three new combustion turbines is 145 MW, the information stated in the ISO's October 22, 2003 letter to Supervisor Maxwell and the matrix provided to the City in February 2004, is correct through 2006. Providing the transmission projects identified in these documents are in operation prior to the end of 2005 and the other critical assumptions listed above allow the ISO to discontinue renewing the RMR Agreement for Hunters Point, the ISO would not renew the RMR Agreement for Hunters Point Units 1 and 4 for 2006. It is anticipated that the ISO Board at its September 2005 meeting will make the final decision.

Q2) *The City would like to ensure the closure of <u>all existing generation at Potrero as soon as possible</u>. PG&E's May 2, 2004 letter suggests that this should be possible in the near future. PG&E's May 2, 2004 letter indicates that with the Jefferson-Martin and other transmission project set forth in the attachment to the letter, only 200 MW of generation would be needed north of San Mateo substation. If this is correct, the ISO should be able to release all existing Potrero units from any RMR obligation once 1) Jefferson-Martin and the other transmission project identified by PG&E are completed, 2) Hunters Point is closed, and 3) three new turbines at Potrero and a fourth turbine at the Airport are placed in service. Please confirm that this is correct. If this is not correct, please 1) explains why not, 2) detail which units at Potrero Power Plant could be released of any RMR obligations in this scenario, and 3) describe what additional resources or load reduction would be required to provide for the release of all of the Potrero Power Plant units from any RMR obligations.*

A2) As stated above and in the ISO's October 22, 2003 letter to Supervisor Maxwell, the ISO has not fully studied what grid enhancement would be necessary to enable the retirement of Potrero Unit 3.

Accordingly, the ISO is not prepared to provide an answer to this question at this time. However, the ISO recognizes the importance and significance the Potrero community and the City confers to the retirement of Potrero Unit 3 at the earliest possible time and remains committed to continue meeting with Potrero community group leaders to discuss the future need for Potrero 3. In order to address the lack of a plan to retire Potrero Unit 3 and in the spirit in which the ISO has committed to proactively work with the Potrero community group leaders, the ISO proposes to immediately begin working with the Potrero community group leaders, the City, and PG&E to develop a plan that would allow the ISO to discontinue renewing the RMR Agreement for Potrero Units 3, 4, 5, and 6 and that this effort be coordinated with the ongoing work that is currently being undertaken by the San Francisco Stakeholder Study Group.

I have endeavored to provide as complete an explanation as possible to the questions posed from all of you, at least based upon the information known today. As mentioned, we remain sincerely committed to work with you and affected communities to reach our mutual goal to obtain a reliable, affordable and environmentally responsible energy future. If you have any questions, please call Julie Gill at (916) 351-2221 or Gary DeShazo at (916) 608-5880.

Sincerely,

Jim Detmers
Vice President, Grid Operations
Acting Chief Operations Officer

Attachments

Cc:
Jesse Blout, City and County of San Francisco
Steve Huhman, Mirant
Armando J. Perez, ISO
Gary DeShazo, ISO
Julie Gill, ISO

CALIFORNIA ISO

California Independent
System Operator

Memorandum

To: ISO Board of Governors

From: Marcie Edwards, Interim CEO

cc: ISO Officers; Board Assistants

Date: September 10, 2004

Re: Action Plan for San Francisco, Options and Risks

This memorandum does not require Board action.

Purpose of Memo

This is in response to questions about the electric infrastructure of San Francisco that came up at the Board of Governor's July 29, 2004 meeting. This memo provides analysis and recommendations as to:

- The Action Plan for release of PG&E owned generation at Hunters Point and Mirant owned generation at Potrero from ISO Reliability Must Run (RMR) Agreements,
- An analysis of the retrofit of the Potrero 3 Power Plant with emissions control technology and how that impacts the Action Plan, and
- A discussion of the reliability of Hunters Point Unit 4 and the appropriateness of its designation as a RMR generation unit.

Action Plan to Release Hunters Point and Potrero from their RMR Agreements – An Action Plan acceptable to the ISO for release of the existing generation at Hunters Point and Potrero from RMR contracts involves successful completion of a total of 12 transmission projects by PG&E, four peaking power plants by the City, and the Mirant retrofit of Potrero 3 with emissions control technology for its temporary operation. The ISO does not control the dates of completion of these projects, nor does it control the permanent shutdown of the Hunters Point and Potrero generation.

The action plan acceptable to the ISO for the shut down of Hunters Point and Potrero units is based on assumptions that are subject to change. Such assumptions include current and expected status of transmission, generation, and customer demand. Any significant change to the assumptions underlying our analysis may change our conclusions. If such significant changes do occur, the ISO is obligated to review the continued acceptability of this action plan.

To release Hunters Point and Potrero Generation from their RMR Agreements requires the following:

- **Hunters Point 2 and 3**
  Completion of one transmission project – scheduled for completion by PG&E in December 2004. These units are recommended to be released from their RMR Agreements in <u>September 2004</u> for the 2005 RMR Year.

- **Hunters Point 1 and 4**
  Completion of seven transmission projects and the retrofit of Potrero 3 – the final project (Jefferson – Martin) is scheduled for completion sometime between December 2005 and March 2006. Therefore, these units are planned to be recommended for release from the RMR Agreements in <u>September 2005</u> for the 2006 RMR Year.
- **Potrero 4, 5, 6**
  Completion of Peaking Power Plants by City – the scheduled completion is December 2006. Therefore, these units are planned to be recommended for release from their RMR Agreements in <u>September 2006</u> for the 2007 RMR Year.
- **Potrero 3**
  Completion of four transmission projects and assuming previous completion of the Peaking Power Plants referenced above – PG&E is currently evaluating the project completion dates, but believes they are likely to be scheduled for 2007. Were this to occur, the ISO would plan to recommend this unit for release from its RMR Agreement in <u>September 2007</u> for the 2008 RMR year.

(See Attachment 1 for a list of the projects and Attachment 2 for a detailed discussion of the Action Plan.)

The Action Plan is based on compliance with regional and national requirements. Those standards also include the Greater Bay Area Generation Outage Standard adopted by the Board as a result of rolling blackouts initiated in the San Francisco Bay Area on June 14, 2000 to protect against the potential for voltage collapse.

Analysis of Retrofit of Potrero 3 with Emission Control Technology – The Action Plan for the release of all Hunters Point generation from RMR contracts assumes Potrero 3 is retrofitted with emission control technology. Potrero 3 would then operate cleaner until it can be released from its RMR contract, assuming all needed projects are completed. The retrofit, with an estimated cost in excess of $20 million (cost information provided by Mirant), is deemed necessary to ensure there is sufficient generation to serve customer load consistent with power system planning criteria. Further, the retrofit of Potrero 3 is viewed as a superior option when taking into consideration air quality and cost.

Timely completion of the retrofit is now in question - Potrero 3 is a 206 MW power plant. Without a retrofit, its air permit will limit its output to 140 MW provided its emissions are offset by cleaner emissions from other SCR retrofitted units owned by Mirant that are located within the NOx bubble. These units include Pittsburg Units 5 and 6 and Contra Costa Unit 7. Studies show that this “non-retrofit” option increases the costs to PG&E’s ratepayers (an additional $30M per year) and increase NOx emissions (by up to 1,150%).

The Action Plan for release of Hunters Point currently includes the retrofit of Potrero 3. The “non-retrofit” alternative provides less of a cushion for continued reliable operation of the San Francisco grid and, as stated, will increase cost and emissions (See Attachment 3 and 4 for supporting discussion). Throughout these discussions, the ISO has communicated its position on the Potrero retrofit to all interested parties.

At the September 15, 2004 ISO Board of Governor’s meeting, the Board will be asked to approve the slate of RMR units for the 2005 Year. As stated previously, staff is recommending that Hunters Point Units 1 & 4 continue as RMR units for the 2005 Year until the projects that support their removal from RMR status have been completed. All units at Potrero are being recommended for RMR status for the 2005 Year as well, given that none of the projects to support their release have been completed.

In addition, note that in the 2005 RMR Board Action item, staff has recommended that Pittsburg 6 continue as RMR for the 2005 calendar year. This is to allow forward movement with the projects needed to ultimately release both Hunters Point and Potrero from RMR given the assumption that a retrofit of Potrero 3 might be delayed indefinitely. Understand that air quality limitations affecting Potrero 3 will cause the unit to be limited to 140 MW in 2005 and remote generators will be required to operate at their maximum in order to meet air quality limits. In order to keep the unit running under its new air quality limitations beyond 2005, Unit 3 will continue to be limited to 140 MW and remote generators will continue to be required to operate at their maximum in order to meet air quality limits. So, without the Potrero 3 retrofit, Option 2, (See Attachment 3) is the automatic default. Potrero generation, meaning the existing CT's and some portion of Unit 3 are needed in order to release Hunter's Point from their RMR agreements; a fact which the ISO has long made plain.

Reliance on Hunters Point Unit 4 to Maintain Reliability – This is in response to the Board inquiry into how the historical availability of a generating unit factors into the ISO RMR analysis.

The historical availability of a generating unit is not explicitly factored into the analysis. Instead, the RMR analysis assumes only one generating unit is out at any one time. So Hunters Point 4 is assumed available and operating when any other generating unit is not.

When there is a pool of generation that is available, we seek the selection of units that are the more reliable. However, all the generation in the City is needed, so we do not have the ability to be selective. Since 2000, the availability of Hunters Point 4 has been above 60% in all but one year.

ISO grid planning studies, RMR studies, and operational studies confirm that Hunters Point 1 & 4 and Potrero 3, 4, 5, and 6 are required in order for customers in SF and SF/Peninsula NOT to be subjected to possible blackouts in 2005 stemming from a violation of planning criteria. The ISO, therefore, will recommend the re-designation of Hunters Point 4 (as well as Hunters Point Unit 1 and the Potrero units) as 2005 RMR units.

Attachment 1

PG&E Transmission Projects, City Peaking Power Plants and Mirant Retrofit of Potrero 3 Necessary
To Meet NERC/WECC/CAISO Planning Requirements,

Project		Estimated Completion Date/Status	Issue	**Resolution of Issue**
Release Hunters Point Units 2 & 3 From Their RMR Agreements				
1	Potrero Static VAR Compensator	December 2004, Under Construction	NERC/WECC/CAISO Planning Standards	This project allows ISO/PG&E to meet planning requirements with Hunters Point Power Plant Units 2 and 3 released from their RMR Agreement
Release Hunters Point Units 1 & 4 From Their RMR Agreements				
2	San Mateo-Martin No. 4 Line Voltage Conversion	Completed	NERC/WECC/CAISO Planning Standards	This project in combination with the other listed projects allows ISO/PG&E to meet planning requirements with Hunters Point Power Plant Units 1 and 4 released from their RMR Agreement
3	Ravenswood 2nd 230/115 kV Transformer Project	Completed	NERC/WECC/CAISO Planning Standards	This project in combination with the other listed projects allows ISO/PG&E to meet planning requirements with Hunters Point Power Plant Units 1 and 4 released from their RMR Agreement
4	San Francisco Internal Cable Higher Emergency Ratings	Completed: To Be Used Upon Completion of the Jefferson-Martin 230kV Project	NERC/WECC/CAISO Planning Standards	These ratings are an interim solution that in combination with the other listed projects allows PG&E to meet planning requirements with Hunters Point Power Plant Units 1 and 4 released from their RMR Agreements. In 2007, a third Martin-Hunters Point 115 kV cable will replace the emergency ratings.
5	Tesla-Newark No. 2 230 kV Line Reconductoring	May 2005, Construction in Progress	RMR Criteria	This project in combination with the other listed projects allows ISO/PG&E to meet planning requirements with Hunters Point Power Plant Units 1 and 4 released from their RMR Agreement
6	Ravenswood-Ames 115 kV Lines Reinforcement	May 2005, Engineering in Progress	RMR Criteria	This project in combination with the other listed projects allows ISO/PG&E to meet planning requirements with Hunters Point Power Plant Units 1 and 4 released from their RMR Agreement
7	San Mateo 230 kV Bus Insulator Replacement	May 2005, Engineering in Progress	Operations Requirement During San Mateo Bus Wash	Eliminate bus wash at San Mateo 230 kV bus will reduce the 400 MW generation operational requirement down to less than 200 MW
8	Potrero-Hunters Point (AP-1) 115 kV Cable	December 2005 Pending CPUC Permit Approval	NERC/WECC/CAISO Planning Standards	This project in combination with the other listed projects allows ISO/PG&E to meet planning requirements with Hunters Point Power Plant Units 1 and 4 released from their RMR Agreement

9	Jefferson-Martin 230 kV Line	December 2005 to March 2006	NERC/WECC/CAISO Planning Standards	This project in combination with the other listed projects allows ISO/PG&E to meet planning requirements with Hunters Point Power Plant Units 1 and 4 released from their RMR Agreement
10	Potrero 3 SCR retrofit	February 2005	NERC/WECC/CAISO Planning Standards	This project ensures the availability of Potrero 3 at full capacity thereby reducing overall Greater Bay Area RMR requirements. This project in combination with the other listed projects allows ISO/PG&E to meet planning requirements with Hunters Point Power Plant Units 1 and 4 released from their RMR Agreements
Release Potrero Units 4, 5, & 6 From Their RMR Agreements				
11	San Francisco Electric Reliability Project and San Francisco Airport Electric Reliability Plant	December 2006	NERC/WECC/CAISO Planning Standards	These projects will allow ISO/PG&E to meet planning requirements with Potrero 4, 5, and 6 released from their RMR Agreements
Release Potrero Unit 3 From Its RMR Agreement (assumes previous completion of Peaking Power Plants by the City)				
12	Upgrade the Newark-Dumbarton 115kV line	May 2006	NERC/WECC/CAISO Planning Standards	This upgrade is needed in combination with the other listed mitigations to allow ISO/PG&E to meet planning requirements with Potrero Unit 3 released from its RMR Agreement
13	Upgrade the Bair-Belmont 115kV Line	Under Evaluation By PG&E, likely to be scheduled for 2007	NERC/WECC/CAISO Planning Standards	This upgrade is needed in combination with the other listed mitigations to allow ISO/PG&E to meet planning requirements with Potrero Unit 3 released from its RMR Agreement
14	Upgrade the Metcalf-Hicks & Metcalf-Vasona 230 kV lines	Under Evaluation By PG&E, likely to be scheduled for 2007	NERC/WECC/CAISO Planning Standards	This upgrade is needed in combination with the other listed mitigations to allow ISO/PG&E to meet planning requirements with Potrero Unit 3 released from its RMR Agreement
15	Add voltage support at Ravenswood substation	Under Evaluation By PG&E, likely to be scheduled for 2007	NERC/WECC/CAISO Planning Standards	This upgrade is needed in combination with the other listed mitigations to allow ISO/PG&E to meet planning requirements with Potrero Unit 3 released from its RMR Agreement

Attachment 2

Action Plan for Release of Existing Hunters Point and Potrero Generation from RMR Contracts

Background

The mission of the California Independent System Operator (ISO) is to plan and operate the ISO control area safely and reliably. The ISO sets its reliability standards in compliance with regional and national requirements (Western Electricity Coordinating Council and North American Electric Reliability Council, respectively). We also apply standards that have been developed by the California ISO Planning Standards Committee for application to the ISO control area. The ultimate goal of these standards is to ensure continuous supply of electricity and to avert the risk of blackouts.

The ability to reliably provide electricity to the San Francisco Peninsula Area[1] is based on three critical "load serving" conditions:

1. There is sufficient power to serve the electric needs of customers in local areas;
2. The transmission system is capable of delivering that power to the local area where it is distributed to customers;
3. Power System operators can perform routine equipment maintenance and continue to reliably serve customers even after certain equipment failures occur.

The Action Plan to release existing Hunters Point and Potrero generation from RMR contracts identifies the transmission and generation infrastructure necessary to meet the applicable national, regional, and ISO reliability standards. The dates set forth in this memo are based on expected completion dates and were provided by Pacific Gas and Electric Company (PG&E), the City and County of San Francisco (City) and Mirant who are the entities responsible for completing the transmission and generation projects. PG&E and Mirant are the owners of Hunters Point and Potrero Power Plants, respectively, and control the subsequent shutdown of the power plants.

In 1998, the City entered into an agreement with PG&E to close the Hunters Point Power Plant (Hunters Point) as soon as it is released from the Reliability Must Run Agreement (RMR Agreement). To that end, in approving the Jefferson Martin transmission line, the ISO Board of Governors provided the directive to the ISO to work with the City and County of San Francisco and interested stakeholders with the goal of closing Hunters Point.

Over the past several years and continuing here, the ISO is fulfilling its mission by working with representatives of the City, PG&E, and the Potrero and Hunters Point/Bayshore communities to facilitate appropriate investment in electric transmission and generation infrastructure that will maintain the reliability of the electric system while they pursue the shutdown of existing generation within the City.

[1] In the testimony for the Jefferson-Martin Transmission Line, approved by the California Public Utilities Commission on August 19, 2004, the ISO refers to the City and County of San Francisco and the San Francisco Peninsula as the "San Francisco Peninsula Area." For clarity in this memo, the ISO will delineate separately, when necessary, the City, the Peninsula, and the Greater Bay Area even though the City is included in the Peninsula, which is included in the Greater Bay Area.

PG&E and the ISO jointly developed the list of reliability upgrades needed to establish a clear transmission plan to release all of Hunters Point generation from RMR contracts (refer to Attachment 1). It is important to note that the ISO cannot decommission the generation facilities; the ISO will release the Units from their RMR Agreements and PG&E as the plant owner is responsible for the decommissioning process.

Hunters Point Detail

By the end of 2004, PG&E will have completed the one project necessary to allow the release of Hunters Point Units 2 & 3 from their RMR Agreements. The project is the Potrero Static VAR Compensator that will provide enough voltage support for the San Francisco Peninsula Area to displace the need to continue operating Hunters Point Units 2 & 3, which are currently operated as synchronous condensers. However, ISO management will request the re-designation of Hunters Point Units 1 & 4 for the 2005 Contract Year, given that the projects to support the removal of the RMR agreement are not yet completed.

The release of Hunters Point 1 & 4 from RMR obligations are conditioned on completion of the noted transmission projects and the retrofit of Potrero 3. PG&E has continued to move towards completing all of their transmission projects by the end of 2005. And with the recent approval of the Jefferson – Martin 230kV line by the CPUC, the way has been cleared for the last remaining piece of transmission infrastructure to be in-service by the end of 2005 or the first quarter of 2006. Therefore, the continued operation of Hunters Point Units 1 & 4 through 2005 is necessary to serve customer demand for power and provide operational support until those transmission projects are completed. The ISO's current plan is to recommend that the ISO Board of Governors release Hunters Point Units 1 & 4 from their RMR agreements at the September 2005 Board meeting for the 2006 Contract Year.

Potrero Detail

The ISO has determined that generation located in the City will remain critical to the long-term ability to serve load in the San Francisco Peninsula Area. Therefore, following the retirement of Hunters Point, the retirement of any existing Potrero generation requires an equivalent offset of new transmission and/or generation infrastructure. The only new generation currently being proposed is by the City through their San Francisco Electric Reliability Project (SFERP) and the San Francisco Airport Electric Reliability Plant (SFAERP). The SFERP proposes to install three new 48 MW combustion turbines at the existing Potrero Power Plant site and the SFAERP proposes to install one 48 MW combustion turbine at the San Francisco International Airport. The City proposes to have these two projects (collectively the "CT Project") in-service by the end of 2006. Completion of the San Francisco Electric Reliability Project will allow for the release of Potrero Units 4, 5, and 6 from RMR obligations. The current plan is to recommend that the ISO Board of Governors release Potrero 4, 5, and 6 from their RMR agreements at the September 2006 Board meeting for the 2007 Contract Year.

PG&E and ISO have tentatively agreed to evaluate additional transmission projects and the addition of voltage support to achieve the release of Potrero 3 from its RMR obligations. The completion date of these projects is to be determined, but PG&E indicates they are likely to be scheduled for 2007. We will continue to keep the Board of Governors appraised of the progress of this effort. As with the release of other projects from RMR obligations, we expect to release Potrero 3 when the last of these projects are completed.

DC Cable Detail

A High Voltage Direct Current line (DC Cable) capable of carrying 400-600 MW has been proposed by Trans Bay Cable LLC (an affiliate of Babcock & Brown LP). This DC Cable would run between the City of

Pittsburg and the Potrero Substation in San Francisco. This DC Cable is tentatively scheduled for operation by summer 2008. At this time, the proposed DC Cable is an alternative to augment long-term load serving capability for the San Francisco Peninsula area. In deciding on a preferred long-term alternative to serve load beyond 2007, the reliability and economic aspects of the proposed project will be considered and compared to PG&E reinforcing the existing transmission system or building a new 230 kV line to increase power imported into the San Francisco Peninsula.

Attachment 3

Analysis of Options to the Retrofit of Potrero 3

(Based on current ISO 2005 RMR analysis which includes Hunters Point Units 1 & 4)

- **Option 1: Potrero 3 available; retrofitted (ISO Preferred Approach)**
    - Load shedding exposure: None
    - RMR Exposure
        - Release Pittsburg 6 (clean and expensive)
        - Release Pittsburg 7 (dirty and expensive)
    - Operational exposure
        - Increased use of other generating facilities (clean and less expensive than Pittsburg 6)
    - Cost exposure
        - Information released by Mirant puts the retrofit costs at approximately $20M.
    - Environmental exposure
        - The emissions from Potrero Unit 3 are reduced by 80% (reduction of one ton NOx/day). In other words, a retrofitted Potrero 3 only emits 15 lbs/hour

- **Option 2: Potrero 3 available; not retrofitted; operated at reduced level.**
    - Load shedding exposure: None
    - RMR exposure
        - Continue to RMR Pittsburg 6 (clean and expensive)
        - Simultaneously run Pittsburg 5 & 6 and Contra Costa 7 at their maximum in order to operate Potrero 3 up to 140 MW (Overall NOx bubble requirement)
    - Operating exposure
        - Reduced use of remote generating resources that are cleaner and less expensive than Pittsburg 6, given that the Pittsburg 5 & 6 and Contra Costa 7 must run as RMR units. In short, other less expensive/cleaner options will have to be backed down.
    - Cost exposure
        - Additional $30,000,000/year (additional RMR costs incurred by retaining units under RMR that would have otherwise been released if Potrero 3 was retrofit.)
    - Environmental exposure
        - Total lbs/hour of NOx increase by 108 to172 lbs/hour or from 700% to 1,150% over Option 1 emissions

- **Option 3: Potrero 3 not available (Note: This option violates planning criteria and is provided simply to outline the associated risks.)**
    - Load exposure
        - San Francisco Peninsula Area load shedding could be required; up to 50 to 100 MW
        - Up to 30-70 hours per year
    - RMR Exposure
        - Continue to RMR Pittsburg 7 (dirty and expensive)
        - Continue to RMR Pittsburg 6 (clean and expensive)
    - Cost Exposure
        - Additional cost of $100,000,000 - $120,000,000/year (additional RMR costs incurred by retaining units under RMR that would have otherwise been released if Potrero 3 was retrofit.)
    - Operating exposure
        - Does not meet NERC/WECC or MORC Standards
        - Simultaneously run Pittsburg 5 & 6 and Contra Costa 7 at their maximum in order to operate Pittsburg 7 (Overall NOx bubble requirement)
        - Reduced use of other generation (clean & less expensive than Pittsburg 6)
    - Environmental exposure
        - Total lbs/hour of NOx increase by 175 to 239 lbs/hour or 1,166% to 1,593% over Option 1 emissions.

Attachment 4

Discussion of the Potrero 3 Retrofit

Key Study Assumptions in Creating a Potrero Retirement Plan

The retrofit of Potrero 3 continues to be part of the Action Plan to release Hunters Point from its RMR contract. The retrofit is to install emission control technology that will allow the unit to operate at its current 207 MW capacity. Potrero 3 will operate cleaner until it is shut down after the projects listed in Attachment 1 are completed.

The ISO was asked to evaluate the release of Hunters Point from its RMR obligations in early 2003. We responded in a letter to the City dated April 18, 2003 that outlined a plan for the retirement of Hunters Point 4 and identified the Potrero 3 retrofit as part of the plan. We have reiterated our support for the retrofit in subsequent 2003 and 2004 correspondence. We also encouraged the timely completion of the City's combustion turbine project, the Jefferson-Martin transmission project, and other PG&E transmission projects.

Since our initial discussions, PG&E's Jefferson-Martin transmission project and the City's combustion turbine project have been delayed to early and late 2006, respectively. A description of the legal challenges to the Potrero retrofit follows.

Challenge to Potrero Retrofit

On July 14, 2004, an appeal was filed with the San Francisco Board of Appeals challenging the granting of permits by the Planning and Building Departments that are necessary for the retrofit of Potrero Unit 3. The filing of an appeal in San Francisco stays the permit, and Mirant has been unable to proceed with any work on their retrofit. This has changed the outage schedule for this unit and alters the sequenced and interdependent outages coordinated in this area for both generation and transmission. In addition, a lawsuit has been filed at the San Francisco Superior Court on September 2, 2004, challenging the Bay Area Air Quality Management District's approval of the SCR for Potrero Unit 3. These actions have already delayed the retrofit of Potrero Unit 3 at a minimum, and could result in Potrero Unit 3 not being retrofitted as originally contemplated in the ISO's previous plans. In order to proceed with the analysis, staff felt that several alternative approaches must be assessed to outline for the Board the available options and the consequences associated with the operation of Potrero Unit 3 both with and without the retrofit. Following is a discussion of the options in detail (Attachment 3).

Operation of Potrero Unit 3 With and Without the Retrofit for 2005

Anticipating that the retrofit of Potrero Unit 3 could not be achieved in 2005, ISO Staff has assessed the opportunity to continue to operate Potrero Unit 3 without the proposed SCR retrofit. The continued operation of Potrero Unit 3 without an SCR retrofit is possible, provided its emissions are offset by cleaner emissions from other SCR retrofitted Mirant units located within the Bay Area NOx bubble. At present, Mirant owns Potrero as well as generation units at Pittsburg and Contra Costa. Pittsburg Units 5 and 6 and Contra Costa Unit 7 have already been SCR retrofitted and more than meet the NOx requirements for 2005 and beyond. Potrero Unit 3 could continue to be operated at a reduced level of 140 MW, provided

Pittsburg Units 5 and 6 and Contra Costa Unit 7 are run concurrently to meet Mirant's overall Bay Area NOx limit requirement. With Mirant running the Pittsburg and Contra Costa units that have combined emissions less than allowed by the 2005 standard, "room" within the NOx Bubble is created to operate Potrero Unit 3 at a reduced level. This level of generation is projected to be sufficient to meet San Francisco Peninsula Area reliability requirements in 2005, provided Hunters Point Units 1 and 4 remain available through 2005 or until all the identified transmission projects are placed in-service.

Release of Potrero Units 4, 5, and 6 from the RMR Agreement

The ISO has determined that generation located in the City will remain critical to the long-term ability to provide the capacity and energy needed to serve load in the San Francisco Peninsula Area. Therefore, following the retirement of Hunters Point, the retirement of any existing Potrero generation requires an equivalent offset of new transmission and/or generation infrastructure. The only new generation currently being proposed is by the City through their San Francisco Electric Reliability Project (SFERP) and the San Francisco Airport Electric Reliability Plant (SFAERP). The SFERP proposes to install three new 48 MW combustion turbines at the existing Potrero Power Plant site and the SFAERP proposes to install one 48 MW combustion turbine at the San Francisco International Airport. The City proposes to have these two projects (collectively the "CT Project") in-service by the end of 2006. The ISO has determined that the CT Project will provide the needed capacity and energy required to replace the older Potrero combustion turbine units and to continue the forward movement needed to ultimately release Potrero Unit 3 from its RMR Agreements. Therefore, once the CT Project is placed in-service, the ISO will release Potrero Units 4, 5, and 6 from their RMR Agreement.

Release of Potrero Unit 3 From the RMR Agreement

At the present time, the ISO assumes that the City's electric reliability projects will replace the existing Potrero combustion turbine Units 4, 5, and 6. Unfortunately, the load serving capability that the City's generation projects provide to the San Francisco Peninsula Area is approximately 40 MW greater than the 150 MW of existing combustion turbine generation it replaces, falling short of the Area's projected electric growth that is expected to occur during this time frame if Potrero Unit 3 were also retired[2]. As such, additional transmission facilities beyond those already identified for retiring Hunters Point are needed to not only make up this shortfall, but also provide additional load serving capacity many years into the future.

ISO Staff supports transmission system reinforcements to allow for reliable electric system operation with the Potrero Unit 3 released from its RMR contract. This involves reinforcement of the existing transmission system through mitigating certain transmission line overloads that are projected to occur under contingency conditions and adding the necessary voltage support to account for the impacts of increased imported power into San Francisco. The transmission overloads that need to be addressed before Potrero Unit 3 can be retired are listed in Attachment 1. ISO Staff has discussed these transmission overloads with PG&E and requested them to assess and determine the appropriate transmission projects for relieving them. Until PG&E has had an opportunity to conduct an in-depth review, these transmission needs and their corresponding transmission projects, identifiable in-service dates cannot be accurately determined; however, PG&E indicates that they are likely to be scheduled for 2007. PG&E has agreed to include all of these upgrades in their 2005 transmission expansion assessment.

---

[2] San Francisco reached a new peak on September 7, 2004 of 931 MW. This number represents the peak forecast for 2006 (936 MW) and it is already being reached in 2004.

Notwithstanding PG&E's final review of these transmission requirements, the ISO hopes that the necessary transmission upgrades could be in place as soon as possible to allow for the retirement of Potrero Unit 3 at the earliest possible time. To this end, the ISO remains committed to a continued and positive working relationship with PG&E towards the timely completion of these necessary transmission upgrades.

Attachment 5

What is RMR, and Why are Hunters Point and Potrero Units Under RMR Contracts

Over the years, many generation and transmission expansion projects were built to serve the increasing consumer load growth. These projects were integrated with the facilities that preceded them. In many cases, certain generation-related components, in whole or in part, complement transmission-related components. For example, generation-related components complement the transmission grid in several ways; providing voltage support, reducing heavy power flows on certain transmission lines, and minimizing the oscillatory nature of the electric system, among others. In these situations, generation and transmission facilities are interdependent in maintaining grid reliability such that changes in either could have a detrimental impact on the acceptable performance and operation of the interconnected transmission grid.

Prior to the restructuring of the electricity market in California, generation was owned and operated by the investor owned utilities and was operated as an integral part of the utilities interconnected transmission grid in a manner to reliably serve their load. Because some generation is located in critical local areas, its dispatch was required, sometimes uneconomically, to meet the system's reliability needs. California's restructured electric market allowed for the majority of the generation owned by investor owned utilities to be sold to third parties. With this change in ownership, generator owners were not obligated to run their generator units in this manner and the CAISO did not have the ability to achieve this must-run requirement without a contracted requirement. As a result of this change, Reliability Must Run ("RMR") was established where generation can be dispatched by the CAISO to primarily assure local area reliability needs are met and local area load can be reliably served[3] and secondly to mitigate the local market power that owners can exercise. In short, an RMR designation of any generation facility is to simply say that a set of power system conditions can exist in a particular geographic area that can only be remedied by localized support from a specific generator.

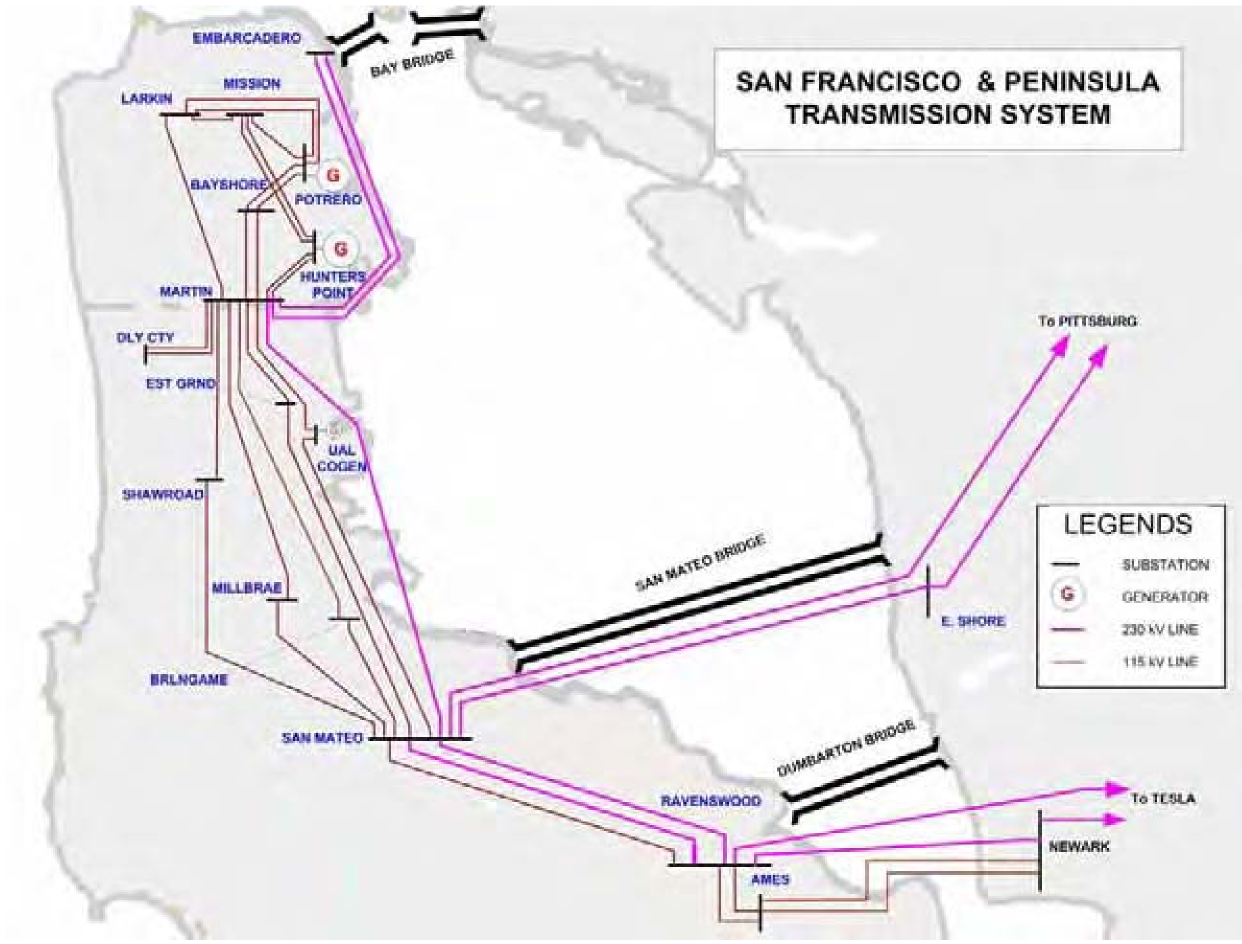
The San Francisco Peninsula Area is a local area Reliability Must-Run sub-area that is considered in the ISO's annual RMR assessment. This is a sub-area within the Greater Bay Area local RMR area. The San Francisco Peninsula Area is generally represented by PG&E's service territory running north from Ravenswood substation (in the vicinity of the City of Palo Alto) and including the City and County of San Francisco ("San Francisco"). The ability to serve electric load in this area is impacted by not only generation and transmission facilities within this area, but also transmission facilities connecting from the Greater Bay Area.

Two key generation facilities for serving load within the San Francisco Peninsula, Hunters Point and Potrero, are located within the city of San Francisco. They are currently under RMR contract for 2004 and are being re-designated for an RMR contract for 2005. For 2004, RMR generation at Hunters Point and

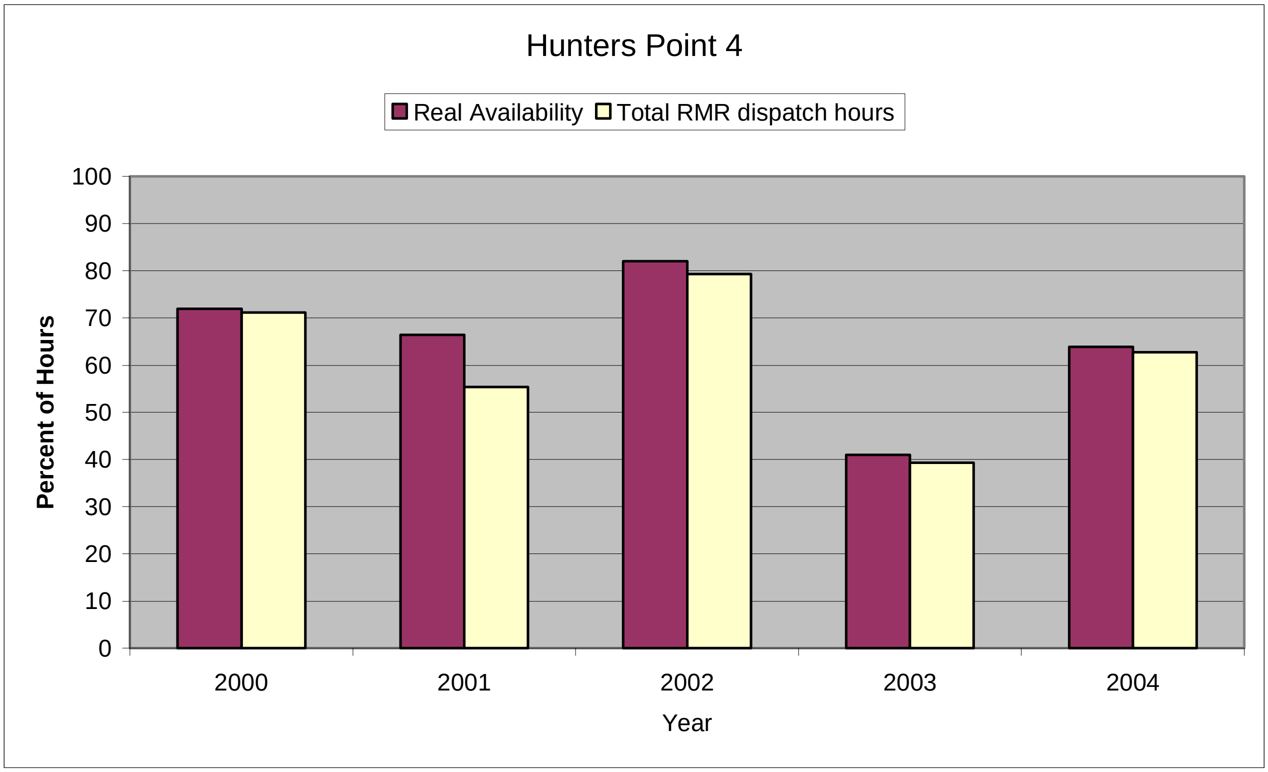
[3] **Reliability Must-Run Generation -** Generation that the ISO determines is required to be on line to meet Applicable Reliability Criteria requirements. This includes i) Generation constrained on line to meet NERC and WECC reliability criteria for interconnected systems operation; ii) Generation needed to meet Load demand in constrained areas; and iii) Generation needed to be operated to provide voltage or security support of the ISO or a local area.

Potrero is mainly determined by an outage of the Tesla – Metcalf 500kV line and the Delta Energy Center. The system limitation that determines the amount of RMR generation is the resulting loading on the Tesla – Newark #2 230kV line. As a result of the 2004 RMR designation, PG&E proposed to upgrade the Tesla – Newark #2 230kV line to mitigate this overload and to assist in addressing the need to RMR generation at Hunters Point. The ISO accepted PG&E's proposal and PG&E included the project in their 2004 Transmission Expansion Plan as a transmission RMR project for completion by May 1, 2005.

The 2005 RMR process has been completed and ISO staff will again recommend the re-designation of all generator units at Hunters Point and Potrero Power Plants except Hunters Point Units #2 & #3. Units #2 & #3 have been operating as synchronous condensers for the last three years where they have only been supplying needed voltage support. They will be replaced by a Static Var Compensator currently under construction at Potrero Substation and scheduled for operation in December 2004. For 2005, the amount of required RMR generation for San Francisco is determined by an outage of the Newark – Ravenswood 230kV line and Potrero Unit 3. The system limitation that determines the amount of required RMR generation is the loading on the Newark – Ames 115kV lines. These lines are part of the 230 and 115 kV lines over which power is imported into the San Francisco Peninsula area.


SAN FRANCISCO & PENINSULA
TRANSMISSION SYSTEM
EMBARCADERO
BAY BRIDGE
LARKIN
MISSION
BAYSHORE
POTRERO
HUNTERS
POINT
MARTIN
DLY CTY
EST GRND
UAL
COGEN
SHAWROAD
MILLBRAE
BRLNGAME
SAN MATEO
SAN MATEO BRIDGE
To PITTSBURG
E. SHORE
LEGENDS
SUBSTATION
GENERATOR
230 kV LINE
115 kV LINE
DUMBARTON BRIDGE
RAVENSWOOD
To TESLA
NEWARK
AMES

Attachment 6



Based on past maintenance records, PG&E has already overhauled the boiler, generator (rotor) and low-pressure turbine and modified and tuned the NOx emission controls. These items required long periods of downtime for the unit and contributed to the low availability of this unit in the past. One could conclude that the unit's availability outlook for 2005 should be better then average (>65%) since most of the major items are now in good shape.

In the past the ISO has used very few RMR starts for this unit (0-5 per year). When available this unit is dispatched to maintain the reliability of the local area. Limiting the starts protects the area residents from high emission pollutants during start-up.

CALIFORNIA ISO

Attachment 2

October 27, 2004

Via Facsimile and US Mail Delivery

The Honorable Mayor Gavin Newsom
The Honorable Supervisor Sophenia Maxwell
The Honorable City Attorney Dennis Herrera
City and County of San Francisco
City Hall
One Carlton B. Goodlett Place
San Francisco, CA 94102

RE: September 14, 2004 Letter to Marcie Edwards, California ISO Interim CEO

Thank you for your expression of appreciation for the efforts of the California Independent System Operator (ISO) to provide an Action Plan that will release all existing in-City generation from their Reliability Must Run (RMR) Agreements. I am pleased you find the Action Plan a significant step toward achieving the mutual interests of the City of San Francisco (City), its constituents, and the California ISO. I appreciate the leadership and support you and your staff has shown for new generation and transmission infrastructure in San Francisco. As such, the ISO views the City peaking power plants as an integral part of the Action Plan and continued reliability of the San Francisco power supply.

This letter is in response to the subject letter and comments made by Deputy City Attorney Theresa Mueller during the September 15, 2004 ISO Board of Governors meeting. In addition to answering your questions, we have provided our assessment of some of the areas of risk that load serving entities and policy makers should consider when planning for their energy future. I expect that you will find this response helpful as you balance the myriad interests of San Francisco.

Potrero 3 Retrofit: The ISO remains prepared to release Hunters Point 1 & 4 from the RMR Agreement once Jefferson-Martin and the eight previously defined transmission projects are in place. As we have described in all of our planning documents on this issue, Potrero 3 must be available to provide energy in order to allow for the release of Hunters Point generation. Potrero Unit 3 can operate in two ways. The first is with the environmental retrofit that will allow the unit to operate cleaner, more reliably, and produce more energy. However, the second way is without the retrofit, which will allow the unit to operate, but at a lower output level, greater pollution impact to the Greater Bay Area, higher cost to PG&E ratepayers, and an overall lower level of reliability to the San Francisco Peninsula Area. Due to the retrofit of Potrero 3 being in jeopardy, we have initiated steps to implement the non-retrofit alternative. This being said, we continue to prefer the retrofit of Potrero 3 because the non-retrofit alternative creates a greater zone of risk to the reliability of the area. The energy represented between the two alternatives is approximately 70 MWs that allows for the local area to be operated above the reliability requirements. This enhances the ability to reliably serve load and provides greater operational flexibility.

Release of Potrero 3 from RMR Agreement: As requested and then studied, the Action Plan has been revised to allow the release of Potrero 3 power plant before the release of Potrero 4, 5, and 6 from the RMR Agreement. This determination assumes that the City peaking power plants are interconnected at Potrero and licensed to operate 4,000 hours at full output, as indicated by their application for construction. We understand that other sites are being considered for the City peaking power plants. If the City peaking power plant installation location and/or the interconnection point is revised or the operating hours are reduced, further study would be required and could jeopardize our original Action Plan to release existing San Francisco generation from the RMR Agreements. Attached is the table originally presented to the ISO Board of Governors revised to show the change in sequence of release from the RMR Agreement of Potrero Unit 3 with Potrero Units 4, 5, and 6 (Attachment 1). As promised, the forecasted load growth and the capability of the infrastructure assumed in the Action Plan are attached for your reference (Attachment 2).

As much as the Action Plan is intended to provide a bright line, it must allow for adjustments if the carefully sequenced projects slip or if we find that the load growth exceeds both those assumed in the planning analyses and the capability of the infrastructure itself. The Action Plan was provided on an expedited basis and does not benefit from the customary peer review such significant system changes typically receive. We are confident that the Action Plan complies with the reliability standards and will continue to analyze system conditions to verify the sustained compliance. This continuous monitoring of system conditions is also customary and will help avoid any surprises or unanticipated circumstances to occur that would jeopardize the Action Plan.

Risk Assessment: As we all understand, the consideration of risk is an integral component for policy makers as they make determinations affecting the energy future of a critical load center such as San Francisco. The ISO remains committed to the Action Plan; however, the implementation of this Plan results in a fundamental shift in how load in San Francisco will be served in the future and is not without some risk. Per the Action Plan, there will be a net removal of over 300 MW of generation in this local area. Importing remote generation into San Francisco through the underlying transmission infrastructure will make up this difference. Although this meets the required reliability standards, it does decrease the overall flexibility that the operators have at their disposal to manage unforeseen emergencies (Attachment 3).

In closing, we consider this Action Plan as one step in achieving the broader and long-term energy plan goals of San Francisco. The ISO commits to work with the City, PG&E, and all interested stakeholders as you identify future infrastructure projects that will be required to meet the electric demands of the City's businesses and families.

Sincerely,

ORIGINAL SIGNED BY

Marcie L. Edwards
Interim Chief Executive Officer

ATTACHMENT 1 – Revised Action Plan
ATTACHMENT 2 – Load Forecast/Load Serving Capability Chart
ATTACHMENT 3 – Risk Assessment

Cc: Michael Kahn
Mike Florio
Tim Gage
Ed Cazalet
Ken Wiseman
Randy Abernathy
Charles Robinson
Jim Detmers
Armando Perez
Gary DeShazo
Julietta Gill
Joseph Desmond

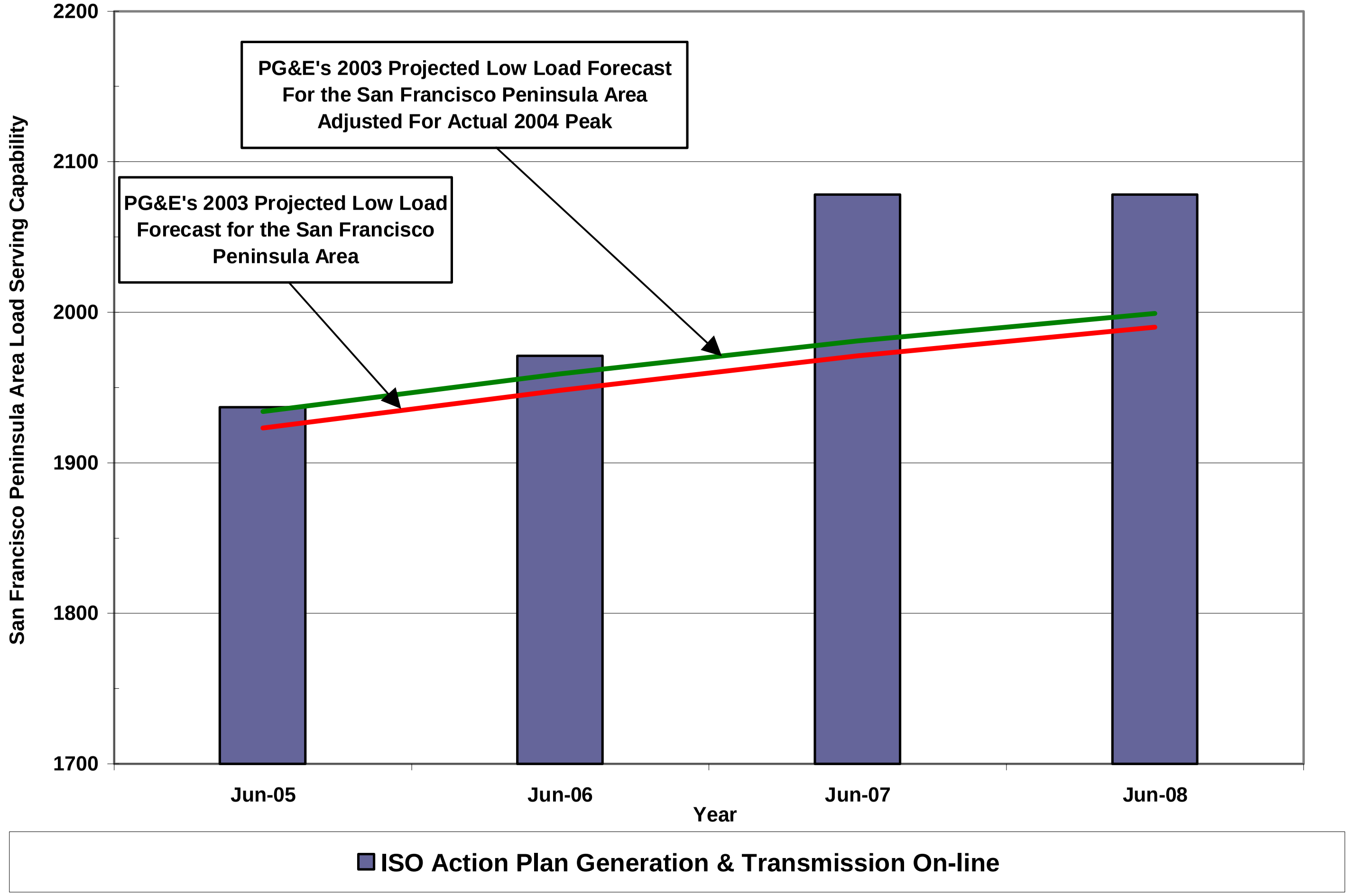
Attachment 1

PG&E Transmission Projects, City Peaking Power Plants and Mirant Retrofit of Potrero 3 Necessary
To Meet NERC/WECC/CAISO Planning Requirements

	Project	*Estimated Completion Date/Status*	*Issue*	**Resolution of Issue**
Release Hunters Point Units 2 & 3 From Their RMR Agreements				
1	Potrero Static VAR Compensator	December 2004, Under Construction	NERC/WECC/CAISO Planning Standards	This project allows ISO/PG&E to meet planning requirements with Hunters Point Power Plant Units 2 and 3 released from their RMR Agreement
Release Hunters Point Units 1 & 4 From Their RMR Agreements				
2	San Mateo-Martin No. 4 Line Voltage Conversion	Completed	NERC/WECC/CAISO Planning Standards	This project in combination with the other listed projects allows ISO/PG&E to meet planning requirements with Hunters Point Power Plant Units 1 and 4 released from their RMR Agreement
3	Ravenswood 2nd 230/115 kV Transformer Project	Completed	NERC/WECC/CAISO Planning Standards	This project in combination with the other listed projects allows ISO/PG&E to meet planning requirements with Hunters Point Power Plant Units 1 and 4 released from their RMR Agreement
4	San Francisco Internal Cable Higher Emergency Ratings	Completed: To Be Used Upon Completion of the Jefferson-Martin 230kV Project	NERC/WECC/CAISO Planning Standards	These ratings are an interim solution that in combination with the other listed projects allows PG&E to meet planning requirements with Hunters Point Power Plant Units 1 and 4 released from their RMR Agreements. In 2007, a third Martin-Hunters Point 115 kV cable will replace the emergency ratings.
5	Tesla-Newark No. 2 230 kV Line Reconductoring	May 2005, Construction in Progress	RMR Criteria	This project in combination with the other listed projects allows ISO/PG&E to meet planning requirements with Hunters Point Power Plant Units 1 and 4 released from their RMR Agreement
6	Ravenswood-Ames 115 kV Lines Reinforcement	May 2005, Engineering in Progress	RMR Criteria	This project in combination with the other listed projects allows ISO/PG&E to meet planning requirements with Hunters Point Power Plant Units 1 and 4 released from their RMR Agreement
7	San Mateo 230 kV Bus Insulator Replacement	May 2005, Engineering in Progress	Operations Requirement During San Mateo Bus Wash	Eliminate bus wash at San Mateo 230 kV bus will reduce the 400 MW generation operational requirement down to less than 200 MW
8	Potrero-Hunters Point (AP-1) 115 kV Cable	December 2005 Pending CPUC	NERC/WECC/CAISO Planning Standards	This project in combination with the other listed projects allows ISO/PG&E to meet planning requirements with Hunters Point Power

		Permit Approval		Plant Units 1 and 4 released from their RMR Agreement
9	Jefferson-Martin 230 kV Line	December 2005 to March 2006	NERC/WECC/CAISO Planning Standards	This project in combination with the other listed projects allows ISO/PG&E to meet planning requirements with Hunters Point Power Plant Units 1 and 4 released from their RMR Agreement
10	Potrero 3 SCR retrofit	Permit Authority Under Appeal	NERC/WECC/CAISO Planning Standards	This project ensures the availability of Potrero 3 at full capacity thereby reducing overall Greater Bay Area RMR requirements. This project or the reduced capacity available without the retrofit in combination with the other listed projects allows ISO/PG&E to meet planning requirements with Hunters Point Power Plant Units 1 and 4 released from their RMR Agreements
Release Potrero Unit 3 From Its RMR Agreement				
11	San Francisco Electric Reliability Project and San Francisco Airport Electric Reliability Plant	December 2006	NERC/WECC/CAISO Planning Standards	These projects will allow ISO/PG&E to meet planning requirements with Potrero 4, 5, and 6 released from their RMR Agreements
Release Potrero Units 4, 5, & 6 From Their RMR Agreements (assumes previous completion of Peaking Power Plants by the City)				
12	Upgrade the Newark-Dumbarton 115kV line	May 2006	NERC/WECC/CAISO Planning Standards	This upgrade is needed in combination with the other listed mitigations to allow ISO/PG&E to meet planning requirements with Potrero Unit 3 released from its RMR Agreement
13	Upgrade the Bair-Belmont 115kV Line	Under Evaluation By PG&E, likely to be scheduled for 2007	NERC/WECC/CAISO Planning Standards	This upgrade is needed in combination with the other listed mitigations to allow ISO/PG&E to meet planning requirements with Potrero Unit 3 released from its RMR Agreement
14	Upgrade the Metcalf-Hicks & Metcalf-Vasona 230 kV lines	Under Evaluation By PG&E, likely to be scheduled for 2007	NERC/WECC/CAISO Planning Standards	This upgrade is needed in combination with the other listed mitigations to allow ISO/PG&E to meet planning requirements with Potrero Unit 3 released from its RMR Agreement
15	Add voltage support at Ravenswood substation	Under Evaluation By PG&E, likely to be scheduled for 2007	NERC/WECC/CAISO Planning Standards	This upgrade is needed in combination with the other listed mitigations to allow ISO/PG&E to meet planning requirements with Potrero Unit 3 released from its RMR Agreement

Attachment 2
San Francisco Peninsula Area Load Serving Capability
Based On the Revised Action Plan



Note: The columns represent the aggregate capability to serve load in the San Francisco Peninsula Area
ISO Grid Planning 10/18/2004

Attachment 3

Zones of discretionary risk associated with energy planning for the San Francisco Peninsula

Via the Action Plan, the ISO has outlined a sequence of transmission and generation additions that will permit the release of Hunters Point and Potrero Generation from their RMR Agreements. The Action Plan meets all established reliability planning criteria using the best information currently available.

However, it should be noted that the Action Plan meets only the *minimum* standards, and is therefore not without some risk. Therefore, in order to assist San Francisco in its overall long term planning effort, the ISO has attempted to quantify those zones of risk that San Francisco should consider when planning for their energy future.

The following are items to consider in assessing the level of acceptable risk:

- The original design and subsequent configuration of the power system in San Francisco was based on more local generation versus imported generation. The Action Plan moves away from the original design in the area, and therefore creates greater dependency on imported energy. This increased dependency translates into understanding that a loss of a transmission circuit(s) supplying the SF area may result in customer power outages in situations wherein the remaining amount of local generation may be insufficient to eliminate. In short, the customer demand on the Peninsula at a peak load period is estimated at 1,970 MW in 2007. Local generation, assuming full use of the planned City peaking power plants, without both Hunters Point and Potrero, and assuming all the transmission enhancements outlined in the action plan are completed, will be approximately 192 MW. The difference (nearly 1,800 MW) is the amount upon which the peninsula will be dependent upon the transmission system. Risks are potentially small that multiple transmission outages will occur during peak periods, but it should be understood that choosing to minimize the amount of local generation thereby minimizes the choices available during emergency conditions such as loss of a transmission circuit(s).

- The reality of all generation is that at one point or another the units will trip off-line or break down. Again, without having more local generation immediately available, dependency on imports is increased. In other words, while the minimum planning criteria will have been met, the loss of the associated operational flexibility carries risk under peak load/multiple equipment outage scenarios.

- Greater dependency on external generation as opposed to local generation also carries with it a greater risk in areas that are prone to natural disasters. Natural disasters such as earthquakes, fires, and hurricanes play havoc with power lines. Much like bridges, transmission lines can fail in natural disasters, thereby isolating customers from their generation when that generation is not local.

- While every effort has been made to model San Francisco's projected energy requirements, there remains a number of potential projects that may notably increase the City's energy needs over and above that currently forecast. An example is the proposed cruise ship terminal where the ships would be required to interconnect with the Control Grid to operate while in port instead of relying on their 10 MW diesel generators that would pollute the area. Each 10 MW ship would consume the margin that was allowed in the Action Plan for one year's load growth. Activities such as this will require more generation to operate, and hasten the need for more projects to serve this volume of load.

- There are load-dropping schemes in place to assure compliance with the Reliability Criteria for critical double contingencies. Reducing San Francisco generation, as outlined in the Action Plan, may result in the need to increase the amount of load that is shed in the San Francisco Peninsula Area to mitigate line overloads for these critical double contingencies.

The ISO supports the interests of both the City and the community to allow for the existing generation to be released once the elements of the Action Plan are in place, but we caution the City that there are associated risks in operating a system at the minimum reliability required. The ISO remains supportive of the new City peaking power plant project and encourages the City to move forward expeditiously with the siting. You will therefore see that the City peaking power plant project is an integral part of the Action Plan and the continued reliability of the San Francisco power supply. We strongly encourage the City to foster new generation and transmission opportunities to further enhance both their ability to meet projected customer demand as well as provide critical operational flexibility in emergencies.

CALIFORNIA ISO

California Independent
System Operator

To: ISO Board of Governors

From: Marcie Edwards, Interim CEO

CC: ISO Officers; Board Assistant

Date: November 5, 2004

Re: ***Board Endorsement of Revised Action Plan for San Francisco***

This memorandum requires Board action.

EXECUTIVE SUMMARY

The purpose of this memo is to seek Board endorsement of the Revised Action Plan for San Francisco ("Revised Action Plan") to release existing generation located within the City of San Francisco from Reliability Must Run ("RMR") Agreements with the ISO.

Management recommends that the Board adopt the following motion:

MOVED,

> ***That the ISO Governing Board approves the Revised Action Plan attached to the memorandum dated November 5, 2004. Furthermore, the ISO Governing Board directs Management to forward said Revised Action Plan to the parties ultimately responsible for implementing the projects identified in the Revised Action plan, indicating that the ISO Governing Board fully endorses the Revised Action Plan.***

BACKGROUND

Original Action Plan – The reliability of the San Francisco power supply relies on old power plants that are coming to the end of their useful life. Over the course of several years the City and County of San Francisco ("City"), Pacific Gas & Electric ("PG&E") and the ISO have worked closely to identify new transmission and generation projects that can be used both to replace the existing generation and maintain the reliability of the San Francisco power supply. On September 10, 2004 you were provided an Action Plan that listed a combination of 14 transmission projects and 4 peaking power plants that allow the sequential shutdown of the existing generation.

On September 14, 2004 the ISO received a letter from the City seeking clarification of the need for the retrofit of Potrero 3 power plant and inquiring about the feasibility of changing the sequence of the shutdown of the Potrero power plants. The City also spoke to the same matters during the September 15, 2004 Board meeting.

Revised Action Plan – On October 27, 2004 the ISO informed the City that Potrero 3 could be released from its RMR contract before Potrero 4, 5, and 6. This Revised Action Plan remains conditioned on the completion of the 14 PG&E transmission projects and the 4 City peaking power plants, as well as continued compliance with national and state reliability criteria. **Attachment 1** sets forth the list of transmission and generation projects that comprise the Revised Action Plan. Other than switching the order in which Potrero units are planned to be released from RMR, (and that adjustment was made at the request of the City of San Francisco) the action plan otherwise remains unchanged from the one that was provided to the Board at the September 15, 2006 Board meeting. **Attachment 2** contains a letter responding to questions raised by the City of San Francisco and information regarding forecasted capability of the local electric infrastructure, as well as zones of risk associated with maintaining electric system reliability.

Members of the community as well as representatives from Citizens for a Better Environment (CBE) seek the Board's endorsement of the Revised Action Plan as assurance that the ISO will make a good faith commitment to the plan. Management considers this an important gesture of the ISO 's intent and is therefore supportive of that commitment.

Management also takes this opportunity to commend the City and PG&E for the steps each have taken to identify and advance these and future infrastructure projects and looks forward to their continued efforts in these areas.

MANAGEMENT RECOMMENDATION

Management recommends that the Board approve the Revised Action Plan and direct Management to forward such approved action plan to the parties responsible for developing the projects identified in the plan. Management commits to regularly update the Board on the parties' progress in implementing the Revised Action Plan.

MOVED,

> ***That the ISO Governing Board approves the Revised Action Plan attached to the memorandum dated November 5, 2004. Furthermore, the ISO Governing Board directs Management to forward said Revised Action Plan to the parties ultimately responsible for implementing the projects identified in the Revised Action Plan, indicating that the ISO Governing Board fully endorses the Revised Action Plan.***

Revised Action Plan

Attachment 1

PG&E Transmission Projects and City Peaking Power Plants Necessary
To Meet NERC/WECC/CAISO Planning Requirements

	Project	Estimated Completion Date/Status	Issue	Resolution of Issue
Release Hunters Point Units 2 & 3 From Their RMR Agreements				
1	Potrero Static VAR Compensator	December 2004, Under Construction	NERC/WECC/CAISO Planning Standards	This project allows ISO/PG&E to meet planning requirements with Hunters Point Power Plant Units 2 and 3 released from their RMR Agreement
Release Hunters Point Units 1 & 4 From Their RMR Agreements				
2	San Mateo-Martin No. 4 Line Voltage Conversion	Completed	NERC/WECC/CAISO Planning Standards	This project in combination with the other listed projects allows ISO/PG&E to meet planning requirements with Hunters Point Power Plant Units 1 and 4 released from their RMR Agreement
3	Ravenswood 2nd 230/115 kV Transformer Project	Completed	NERC/WECC/CAISO Planning Standards	This project in combination with the other listed projects allows ISO/PG&E to meet planning requirements with Hunters Point Power Plant Units 1 and 4 released from their RMR Agreement
4	San Francisco Internal Cable Higher Emergency Ratings	Completed: To Be Used Upon Completion of the Jefferson-Martin 230kV Project	NERC/WECC/CAISO Planning Standards	These ratings are an interim solution that in combination with the other listed projects allows PG&E to meet planning requirements with Hunters Point Power Plant Units 1 and 4 released from their RMR Agreements. In 2007, a third Martin-Hunters Point 115 kV cable will replace the emergency ratings.
5	Tesla-Newark No. 2 230 kV Line Reconductoring	May 2005, Construction in Progress	RMR Criteria	This project in combination with the other listed projects allows ISO/PG&E to meet planning requirements with Hunters Point Power Plant Units 1 and 4 released from their RMR Agreement
6	Ravenswood-Ames 115 kV Lines Reinforcement	May 2005, Engineering in Progress	RMR Criteria	This project in combination with the other listed projects allows ISO/PG&E to meet planning requirements with Hunters Point Power Plant Units 1 and 4 released from their RMR Agreement
7	San Mateo 230 kV Bus Insulator Replacement	May 2005, Engineering in Progress	Operations Requirement During San Mateo Bus Wash	Eliminate bus wash at San Mateo 230 kV bus will reduce the 400 MW generation operational requirement down to less than 200 MW

8	Potrero-Hunters Point (AP-1) 115 kV Cable	December 2005 Pending CPUC Permit Approval	NERC/WECC/CAISO Planning Standards	This project in combination with the other listed projects allows ISO/PG&E to meet planning requirements with Hunters Point Power Plant Units 1 and 4 released from their RMR Agreement
9	Jefferson-Martin 230 kV Line	December 2005 to March 2006	NERC/WECC/CAISO Planning Standards	This project in combination with the other listed projects allows ISO/PG&E to meet planning requirements with Hunters Point Power Plant Units 1 and 4 released from their RMR Agreement
10	Potrero 3 SCR retrofit	Permit Authority Under Appeal	NERC/WECC/CAISO Planning Standards	This project ensures the availability of Potrero 3 at full capacity thereby reducing overall Greater Bay Area RMR requirements. This project or the reduced capacity available without the retrofit in combination with the other listed projects allows ISO/PG&E to meet planning requirements with Hunters Point Power Plant Units 1 and 4 released from their RMR Agreements
Release Potrero Unit 3 From Its RMR Agreement				
11	San Francisco Electric Reliability Project and San Francisco Airport Electric Reliability Plant	December 2006	NERC/WECC/CAISO Planning Standards	These projects will allow ISO/PG&E to meet planning requirements with Potrero 3 released from its RMR Agreement
Release Potrero Units 4, 5, & 6 From Their RMR Agreements (assumes previous completion of Peaking Power Plants by the City)				
12	Upgrade the Newark-Dumbarton 115kV line	May 2006	NERC/WECC/CAISO Planning Standards	This upgrade is needed in combination with the other listed mitigations to allow ISO/PG&E to meet planning requirements with Potrero Units 4, 5, and 6 released from their RMR Agreement
13	Upgrade the Bair-Belmont 115kV Line	Under Evaluation By PG&E, likely to be scheduled for 2007	NERC/WECC/CAISO Planning Standards	This upgrade is needed in combination with the other listed mitigations to allow ISO/PG&E to meet planning requirements with Potrero Units 4, 5, and 6 released from their RMR Agreement
14	Upgrade the Metcalf-Hicks & Metcalf-Vasona 230 kV lines	Under Evaluation By PG&E, likely to be scheduled for 2007	NERC/WECC/CAISO Planning Standards	This upgrade is needed in combination with the other listed mitigations to allow ISO/PG&E to meet planning requirements with Potrero Units 4, 5, and 6 released from their RMR Agreement
15	Add voltage support at Ravenswood substation	Under Evaluation By PG&E, likely to be scheduled for 2007	NERC/WECC/CAISO Planning Standards	This upgrade is needed in combination with the other listed mitigations to allow ISO/PG&E to meet planning requirements with Potrero Units 4, 5, and 6 released from their RMR Agreement

REFERENCES

Anderson, Leonard, and Timothy Gardner. 2005. New York City taps tide for electricity: Project is one of several worldwide to harness marine power. Online at http://msnbc.msn.com/id/6968256/. Accessed on July 5, 2005.

Appell, David 2001. "The New Uncertainty Principle." Scientific American, January 2001. Online at http://www.biotech-info.net/uncertainty.html.

ASPEN 2004a – Aspen Consultants/Lee (tn:32020). Report of Conversation re: Trans Bay Cable Project (as alternative to SFERP). Submitted to CEC/Dockets on 8/3/04.

AWEA 2004 – American Wind Energy Association. Online at http://www.awea.org. Accessed on August 26.

Babcock & Brown 2004. Summary Project Description, Trans Bay Cable Project, 08/03/04 Draft. August 3.

Baird, Stuart 1993. Energy Fact Sheet: Tidal Energy. Originally published by the Energy Educators of Ontario. Online at http://www.iclei.org/EFACTS/TIDAL.HTM. Accessed on 8/24/04.

BCDC 2001 - San Francisco Bay Conservation and Development Commission. Staff Recommendation on the Commission's Report to the California Energy Commission on the Potrero Power Plant Expansion. September 28.

BCDC 2003 - San Francisco Bay Conservation and Development Commission. Personal Communication by Susan Lee (Aspen Environmental Group) with Lindy Lowe, Bay Conservation & Development Commission, on April 11.

CA ISO 2004 – California Independent System Operator. Revised Action Plan Attachment 1: PG&E Transmission Projects and City Peaking Power Plants Necessary To Meet NERC/WECC/CAISO Planning Requirements. Online at http://www.caiso.com/docs/2004/11/05/2004110512085728502.html. Accessed on June 22, 2005.

Calpine 2001. Application for Certification for the Russell City Energy Center – 600-megawatt natural-gas fired power plant located in Hayward. Submitted to CEC/Larson/Dockets on 5/22/01.

CBEA 2003 - California Biomass Energy Alliance. Biomass 101. Online at http://www.calbiomass.org. December.

CCSF 2004 – City and County of San Francisco, Planning Department. Notification of Project Receiving Environmental Review. August 24.

CEC 1995. San Francisco Energy Company Staff Assessment (94-AFC-1). June.

CEC 2001. United Golden Gate Phase 1 Final Staff Assessment (00-AFC-5). January 11.

CEC 2002a. Potrero Power Plant Unit 7 Final Staff Assessment (00-AFC-4). February 13.

CEC 2002b. Russell City Energy Center Final Staff Assessment (01-AFC-7). June 10.

CEC 2002c. 2002-2012 Electricity Outlook Report. Publication 700-01-004F, Originally online February 14.

CEC 2003a. Unpublished Report Prepared for the Energy Commission by Aspen Environmental Group under Work Authorization 309. Submitted to Dave Maul.

CEC 2003b. 2003 Environmental Performance Report. Publication 100-03-010. August.

CEC 2004 - Comparative Study of Transmission Alternatives, Background Report. Publication 700-04-006. Placed online June 8.

CEC 2004 - Energy Commission Energy Facilities Status. Online at http://www.energy.ca.gov/sitingcases/all_projects.html. Accessed on July 22.

CEC 2005 - Title 24, Part 6, of the California Code of Regulations: California's Energy Efficiency Standards for Residential and Nonresidential Buildings. Online at http://www.energy.ca.gov/title24/. Accessed on June 17, 2005.

CPUC 2003 – California Public Utilities Commission. Final Environmental Impact Report for the Jefferson-Martin 230 kV Transmission Project (02-09-043). Prepared for the CPUC by Aspen Environmental Group. October.

DeShazo, Gary 2005. Personal Communication by Hedy Born (Aspen Environmental Group) with Gary DeShazo, California Independent System Operator (CA ISO), on 6/22/05.

Doyle, John 2005. Personal Communication by Hedy Born (Aspen Environmental Group) with John Doyle, SFPUC, on 7/5/05.

DTSC 2004 - Department of Toxic Substances Control. Site Cleanup – Site Mitigation and Brownfields Reuse Program Database. Southern Pacific – Brisbane. Online at http://www.dtsc.ca.gov/database/Calsites/. Accessed on June 29.

Edwards, Marcie 2004a. Interim CEO, CAISO, memorandum to the CAISO Board of Governors: Action Plan for San Francisco, Options and Risks. September 10.

Edwards, Marcie 2004b. Interim CEO, CAISO, memorandum to the CAISO Board of Governors: Board Endorsement of Revised Action Plan for San Francisco. November 5.

Ianucci, Joseph, et al. 2000 - Joseph Iannucci, Susan Horgan, James Eyer, and Lloyd Cibulka. Air Pollution Emission Impacts Associated with Economic Market Potential of Distributed Generation in California. Prepared for the California Air

Resources Board and the California Environmental Protection Agency. Contract 97-326, Amendment 2. Online at http://www.energy.ca.gov/distgen_oii/documents/dgwg/R+D-11.pdf. Published in June.

IEEE. 2005 - IEEE Power Engineering Society, Energy Development And Power Generation Committee. 2005 Panel Session: Harnessing The Untapped Energy Potential Of The Oceans: Tidal, Wave, Currents And OTEC. Chaired by Peter Meisen and Tom Hammons. Dated June. Online at http://www.ewh.ieee.org/cmte/ips/2005GM/oceans.pdf. Accessed on September 2.

Llanos, Miguel. 2003. "San Francisco to test tides for energy." MSNBC website. Online at http://www.msnbc.com/news/910115.asp?vts=050820031455&cp1=1. Accessed on May 8.

Martin, Glen 2004. "Wave power plan gets a test; Town hopes new device will tap surf for energy." San Francisco Chronicle. Online at http://www.sfgate.com. Dated August 4. Accessed on 8/24/04.

NERC 2003 – North American Electric Reliability Council. NERC Generating Availability Data System (GADS). Online at http://www.nerc.com. Accessed in August 2004.

Osborne, Peter 2000. Electricity from the Sea. Originally published in September 1998, web version updated in July 2000. Online at http://www.fujitaresearch.com/reports/tidalpower.html. Accessed on 8/24/04.

Pelkas, John 2004. Personal Communication by Hedy Born (Aspen Environmental Group) with John Pelkas, The Presidio Trust, Planning, on 9/1/04.

Presidio 2002 - The Presidio of San Francisco. Presidio Trust Management Plan (PTMP): Land Use Policies For Area B Of The Presidio Of San Francisco, Final Environmental Impact Statement And Environmental Review Process. Chapter 3. Adopted 8/23/02. Online at http://www.presidiotrust.gov/documents/ptip/EIS/volume1/Chapt3_utilities.pdf.

Presidio 2004 – The Presidio of San Francisco. Online at http://www.presidio.gov. Accessed on August 26.

RCEC 2002 - Russell City Energy Center LLC. Environmental Assessment of Reconductoring the East Shore to San Mateo 230 kV Transmission Line (01-AFC-7). Submitted to CEC on 5/6/02.

SECAL 2000 – Southern Energy California. Application for Certification for the Potrero Power Plant Unit 7 Project – a 580 MW natural gas-fired, combined cycle power generating facility. Submitted to the CEC/Librarian/Dockets on 6/7/00.

SF Environment 2002 – San Francisco Office of the Environment. Press Release: City Electricity Plan details critical energy shortfall if needed in-city generation not in place by 2005. Online at http://temp.sfgov.org/sfenvironment/articles_pr/2002/pr/082002.htm. Dated 8/20/02. Accessed on 8/26/04.

SF Environment 2003 – San Francisco Department of the Environment. "Supervisors approve $16 million energy efficiency program for businesses and residential customers in San Francisco." Online at http://temp.sfgov.org/sfenvironment/articles_pr/2003/pr/072303.htm. Dated July 23. Accessed on August 16, 2004.

SF Visitor 2004 – San Francisco Convention and Visitors Bureau. Press Releases: Mayor Newsom Dedicates Historic Solar Installation. Online at http://www.sfvisitor.org/travelmedia/press. Accessed on August 26. Dated March.

SFERP 2004a - City and County of San Francisco/Blout (tn:31130). Application for Certification San Francisco Electric Reliability Project - 145-megawatt natural gas-fired peaking power plant located in San Francisco. Submitted to CEC/Therkelsen/Dockets on 3/18/04.

SFERP 2004q – CH2MHill/Carrier (tn:31854). Data Responses Set 1A. Response to Staff's Data Requests dated 6/4/04. Submitted to CEC/Pfanner/Dockets on 7/6/04.

SFERP 2004aa – CH2MHill (tn: 32141). Response to Data Requests 1 through 9, Set 1. Submitted to CEC/Dockets on 8/18/04.

SFPUC 2005a – San Francisco Public Utilities Commission/Hale (tn: 34403). Amendment A of the Application for Certification. Submitted to CEC/Therkelsen/Dockets on 3/25/05.

Taylor, Tricia 2004. Personal Communication by Hedy Born (Aspen Environmental Group) with Tricia Taylor, City of Brisbane Building and Planning Department, on 6/29/04.

TIDA 2004 – Treasure Island Development Authority. Online at http://www.ci.sf.ca.us/site/treasureisland. Accessed on August 26.

U.S. Census 2000 – United States Census Bureau. Bay Area Census. Online at http://www.bayareacensus.ca.gov/small/small.htm. Accessed on August 31, 2004.

UGGPC 2001 - United Golden Gate Power Company LLC. Application for Certification for the Golden Gate Power Project – 570-megawatt natural-gas fired power plant located at the San Francisco International Airport. Submitted to CEC/Larson/Dockets on 3/19/01.

USACE 2003 - U.S. Army Corps of Engineers. Personal Communication by Hedy Born (Aspen Environmental Group) with Clyde Davis, USACE Dredging Manager, on March 24.

Vote Solar 2005. The Moscone Convention Center Solar Project. Online at http://www.votesolar.org/moscone.html. Accessed June 21, 2005.

WEC 2001 – World Energy Council. WEC Survey of Energy Resources 2001 – Wave Energy. Online at http://www.worldenergy.org/wec-geis/publications/reports/ser/wave/wave.asp. Published in October. Accessed on 8/24/04.

Wilson, Ralph 2004. The Planning Process for Pier 70. Online at http://www.pier70sf.org/future/planning.html. Accessed on June 29.

Zorzynski, Vic 2004. Personal Communication by Hedy Born (Aspen Environmental Group) with Vic Zorzynski, Treasure Island Utilities, on 9/1/04.

GENERAL CONDITIONS
INCLUDING
COMPLIANCE MONITORING AND CLOSURE PLAN

Marc S. Pryor

INTRODUCTION

The project General Conditions 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, 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.
- 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 to an insignificant level. 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 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. Fencing for the site is also considered part of site mobilization. Walking, driving or parking a passenger vehicle, pickup truck and light vehicles is allowable during site mobilization.

CONSTRUCTION GROUND DISTURBANCE

Construction-related ground disturbance refers to activities that result in the removal of top soil or vegetation at the site and for access roads and linear facilities.

CONSTRUCTION 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.

CONSTRUCTION

[From section 25105 of the Warren-Alquist Act.] Onsite work to install permanent equipment or structures for any facility. 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; or
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, where the power plant has reached reliable steady-state production of electricity at the rated capacity. For example, 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) will oversee the compliance monitoring and shall be 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, and ownership or operational control;
4. documenting and tracking compliance filings; and
5. ensuring that the compliance files are maintained and accessible.

The CPM is the contact person for the Energy Commission and will consult with appropriate responsible agencies and the Energy Commission 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.

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 will be to assemble both the Energy Commission's and the 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 to confirm that they 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 as a public record, in either the Compliance file or Docket 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 general compliance conditions and all of the other conditions of certification that appear in the staff assessment sections are satisfied. The general 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 general 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 General Conditions of Certification is included as **Compliance Table 1** at the conclusion of this section. The designation after each of the following summaries of the General Compliance Conditions (**COMPLIANCE-1, COMPLIANCE-2,** etc.) refers to the specific General Compliance Condition contained in **Compliance Table 1.**

GENERAL CONDITIONS OF CERTIFICATION

Construction Milestones, Compliance Condition of Certification 1 (COMPLIANCE-1)

The Monthly Compliance Report is the vehicle for notifying the CPM of applicable construction milestones, or for amending previously established milestones, for pre-construction and construction phases of the project. The project owner may also send a letter, an e-mail message, or make a phone call to notify the CPM of planned changes to the milestones.

A. ESTABLISH PRE-CONSTRUCTION MILESTONES TO ENABLE START OF CONSTRUCTION (WITHIN ONE YEAR OF CERTIFICATION WHEN REQUIRED)

   1. Obtain site control
   2. Obtain financing

B. ESTABLISH CONSTRUCTION MILESTONES FROM DATE OF START OF CONSTRUCTION

   1. Begin pouring major foundation concrete
   2. Begin installation of major equipment
   3. Complete installation of major equipment
   4. Begin gas pipeline construction
   5. Complete gas pipeline interconnection
   6. Begin T-line construction
   7. Complete T-line interconnection

The CPM will negotiate the above-cited pre-construction and construction milestones with the project owner based on an expected schedule of construction. The CPM may agree to modify the final milestones from those listed above at any time prior to or during construction if the project owner demonstrates good cause for not meeting the originally-established milestones.

A. FINDING THAT THERE IS GOOD CAUSE FOR FAILURE TO MEET MILESTONES WILL BE MADE IF ANY OF THE FOLLOWING CRITERIA ARE MET:

   1. The change in any milestone does not change the established commercial operation date milestone.
   2. The milestone will be missed due to circumstances beyond the project owner’s control.
   3. The milestone will be missed, but the project owner demonstrates a good-faith effort to meet the project milestone.
   4. The milestone will be missed due to unforeseen natural disasters or acts of God that prevent timely completion of the milestones.
   5. The milestone will be missed due to requirements of the California ISO.

Unrestricted Access (COMPLIANCE-2)

The CPM, responsible Energy Commission staff, and delegate 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-3)

The project owner shall maintain project files onsite 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, all documents submitted as verification for conditions, and all other project-related documents.

Energy Commission staff and delegate agencies shall, upon request to the project owner, be given unrestricted access to the files.

Compliance Verification Submittals (COMPLIANCE-4)

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, and in most cases without full Energy Commission approval.

Verification of compliance with the conditions of certification can be accomplished by:

1. reporting on the work done and providing the pertinent documentation in monthly and/or annual compliance reports filed by the project owner or authorized agent as required by the specific conditions of certification;
2. providing appropriate letters from delegate agencies verifying compliance;
3. Energy Commission staff audits of project records; and/or
4. Energy Commission staff inspections of mitigation or other evidence of mitigation.

Verificaion lead times (e.g., 90, 60 and 30-days) 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 involved condition(s) of certification by condition number and include 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.

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 submittals shall be addressed as follows:

> **Compliance Project Manager**
> **California Energy Commission**
> **1516 Ninth Street (MS-2000)**
> **Sacramento, CA 95814**

If the project owner desires Energy Commission staff action by a specific date, they shall so state in their submittal cover letter and include a detailed explanation of the effects on the project if this date is not met.

Pre-Construction Matrix and Tasks Prior to Start of Construction (COMPLIANCE-5)

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 in the same format as the compliance matrix referenced above.

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 (e.g., 30, 60, 90 days) 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 starting 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. This is important if the required lead-time for a required compliance event extends beyond the date anticipated for start of construction. It is also important that the project owner 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 Final 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 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-6)

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 compliance conditions 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; and
7. the compliance status of each condition, e.g., “not started,” “in progress” or “completed” (include the date).

Satisfied conditions do not need to be included in the compliance matrix after they have been identified as satisfied in at least one monthly or annual compliance report.

Monthly Compliance Report (COMPLIANCE-7)

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 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 this section.**

During pre-construction and construction of the project, the project owner or authorized agent shall submit an original and five copies 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, and should be submitted as attachments to the Monthly Compliance Report;
3. an initial, and thereafter updated, compliance matrix showing the status of all conditions of certification and pre-construction and construction milestones (fully

satisfied conditions do not need to be included in the matrix after they have been reported as closed);

4. a list of conditions and milestones 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 or milestones;
9. a listing of the month's additions to the on-site compliance file;
10. any requests to dispose of items that are required to be maintained in the project owner's compliance file; and
11. a listing of complaints, notices of violation, official warnings, and citations received during the month, a description of the resolution of the resolved complaints, and the status of any unresolved complaints.

Annual Compliance Report (COMPLIANCE-8)

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 identify the reporting period and shall contain the following:

1. an updated compliance matrix showing the status of all conditions of certification (fully satisfied and/or closed conditions do not need to be included in the matrix after they have been reported as closed);
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, and should be 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 General 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 complaints, and the status of any unresolved complaints.

Confidential Information (COMPLIANCE-9)

Any information that the project owner deems confidential shall be submitted to the Energy Commission's Docket 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-10)

Pursuant to the provisions of Section 25806(b) of the Public Resources Code, the project owner is required to pay an annual fee which may be adjusted annually. The initial payment is due on the date 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-11)

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 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, 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 at the end of a project's life, 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 remains accountable for implementing the on-site contingency plan. It can also include unplanned closure where the project owner is unable to implement the contingency plan, and the project is essentially abandoned.

GENERAL CONDITIONS FOR FACILITY CLOSURE

Planned Closure (COMPLIANCE-12)

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 prior to commencement of closure activities (or other period of time agreed to by the CPM). 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 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 Energy Commission approval of the facility closure plan is obtained.

Unplanned Temporary Closure/On-Site Contingency Plan (COMPLIANCE-13)

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 that 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-14)

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 unlikely 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.

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.

Moreover, to ensure compliance with the terms and conditions of certification and applicable LORS, delegate agencies are authorized to take any action allowed by law in accordance with their statutory authority, regulations, and administrative procedures.

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 1230 et seq., 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 current law or regulations.

The Energy Commission has established a toll free compliance telephone number of **1-800-858-0784** for the public to contact the Energy Commission about power plant construction or operation-related questions, complaints or concerns.

Informal Dispute Resolution Procedure

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 this procedure for resolving a dispute. Disputes may pertain to actions or decisions made by any party, including the Energy Commission's delegate agents. This procedure may precede the more formal complaint and investigation procedure specified in Title 20, California Code of Regulations, section 1230 et seq., 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 procedure 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 referred to the full Energy Commission for consideration via the complaint and investigation process. The procedure for informal dispute resolution is as follows:

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 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 and within seven working days of the CPM's request, 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 provide an initial report, within 48 hours, followed by a written report filed within seven days.

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; and
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 conclusions 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

If either the project owner, Energy Commission staff, or the party requesting an investigation is not satisfied with the results of the informal dispute resolution process, such party may file a complaint or a request for an investigation with the Energy Commission's General Counsel. Disputes may pertain to actions or decisions made by any party including the Energy Commission's delegate agents. Requirements for complaint filings and a description of how complaints are processed are in Title 20, California Code of Regulations, section 1230 et seq.

The Energy Commission Chair, upon receipt of a written request stating the basis of the dispute, may grant a hearing on the matter, consistent with the requirements of noticing provisions. The Energy Commission shall have the authority to consider all relevant facts involved and make any appropriate orders consistent with its jurisdiction (Cal. Code Regs., tit. 20, §§ 1232-1236).

POST CERTIFICATION CHANGES TO THE ENERGY COMMISSION DECISION: AMENDMENTS, OWNERSHIP CHANGES, INSIGNIFICANT PROJECT CHANGES AND VERIFICATION CHANGES (COMPLIANCE-15)

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 **insignificant project changes** as specified below. 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 Docket 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.

AMENDMENT

The project owner shall petition the Energy Commission, pursuant to Title 20, California Code of Regulations, Section 1769, 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. This process takes approximately two to three months to complete, and possibly longer for complex project modifications.

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 takes approximately one month to complete, and requires public notice and approval by the full Commission.

INSIGNIFICANT PROJECT CHANGE

Modifications that do not result in deletions or changes to conditions of certification, and that are compliant with laws, ordinances, regulations and standards may be authorized by the CPM as an insignificant project change pursuant to section 1769(a) (2). This process usually takes less than one month to complete, and it requires a 14-day public review of the Notice of Insignificant Project Change that includes staff's intention to approve the modification unless substantive objections are filed.

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. This process usually takes less than five working days to complete.

KEY EVENTS LIST

PROJECT: ______________________________

DOCKET #: ______________________________

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	
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	

GENERAL CONDITIONS TABLE 1
COMPLIANCE SECTION
SUMMARY of GENERAL CONDITIONS OF CERTIFICATION

CONDITION NUMBER	SUBJECT	DESCRIPTION
COMPLIANCE-1	Construction Milestones	The project owner shall establish specific performance milestones for pre-construction and construction phases of the project.
COMPLIANCE-2	Access	The project owner shall grant Energy Commission staff and delegate agencies or consultants unrestricted access to the power plant site.
COMPLIANCE-3	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-4	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-5	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-6	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-7	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-8	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-9	Confidential Information	Any information the project owner deems confidential shall be submitted to the Energy Commission's Dockets Unit.
COMPLIANCE-10	Annual fees	Payment of Annual Energy Facility Compliance Fee.
COMPLIANCE-11	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-12	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-13	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-14	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-15	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.

ATTACHMENT A

COMPLAINT REPORT/RESOLUTION FORM

PROJECT NAME: AFC Number:
COMPLAINT LOG NUMBER ____________ Complainant's name and address: Phone number: ____________________
Date and time complaint received: Indicate if by telephone or in writing (attach copy if written): Date of first occurrence:
Description of complaint (including dates, frequency, and duration):
Findings of investigation by plant personnel: Indicate if complaint relates to violation of a CEC requirement: Date complainant contacted to discuss findings: ___________________
Description of corrective measures taken or other complaint resolution: Indicate if complainant agrees with proposed resolution: If not, explain: Other relevant information:
If corrective action necessary, date 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: _____________________________ Date:

(Attach additional pages and supporting documentation, as required.)

SAN FRANCISCO ELECTRIC RELIABILITY PROJECT
04-AFC-1
PREPARATION TEAM

Executive Summary .... William Pfanner

Introduction .... William Pfanner

Project Description .... William Pfanner

Environmental Assessment

Air Quality .... Tuan Ngo

Biological Resources…………..… .... Susan D. Sanders

Cultural Resources .... Beverly E. Bastion and Gary Reinoehl

Hazardous Materials Management .... Alvin J. Greenberg, Ph.D. and Rick Tyler

Land Use .... David Flores

Noise and Vibration .... Steve Baker

Public Health .... Alvin J. Greenberg, Ph.D.

Socioeconomic Resources .... James Adams

Soil and Water Resources .... Mark Lindley, Vince Geronimo, and Philip Luecking

Traffic and Transportation .... James Adams

Transmission Line Safety and Nuisance .... Obed Odoemelam, Ph.D

Visual Resources .... Mark R. Hamblin

Waste Management .... Alvin J Greenberg, Ph.D.

Worker Safety and Fire Protection .... Alvin J. Greenberg, Ph.D. and Rick Tyler

Engineering Assessment

Facility Design .... Shahab Khoshmashrab, Mark Hesters, and Steve Baker

Geology and Paleontology .... Patrick Pilling, Ph.D., P.E., G.E.

Power Plant Efficiency .... Kevin Robinson and Steve Baker

Power Plant Reliability .... Kevin Robinson and Steve Baker

Transmission System Engineering ....Mark Hesters

Local System Effect ....Mark Hesters and Ajoy Guha

Alternatives .... William P

Compliance Monitoring and Facility Closure... Marc Pryor

Project Secretary ....Theresa Epps