SECTION 6.0

Alternatives

The following section discusses alternatives to the Chula Vista Energy Upgrade Project (CVEUP) as proposed in this Application for Certification (AFC). These include the "no project" alternative, power plant site alternatives, linear facility route alternatives, technology alternatives, water supply alternatives, and wastewater disposal alternatives. These alternatives are discussed in relation to the environmental, public policy, and business considerations involved in developing the project. The main objective of the CVEUP is to produce economical, reliable, and environmentally sound peaking electrical energy in the San Diego area.

The Energy Facilities Siting Regulations (Title 20, California Code of Regulations [CCR], Appendix B) guidelines titled *Information Requirements for an Application* require:

> *A discussion of the range of reasonable alternatives to the project, including the no project alternative… which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and an evaluation of the comparative merits of the alternatives.*

The regulations also require:

> *A discussion of the applicant's site selection criteria, any alternative sites considered for the project and the reasons why the applicant chose the proposed site.*

6.1 Project Objectives

The key objective of the CVEUP is to provide more efficient peaking capacity available cost-effectively to the growing San Diego area market. A portion of the project site is currently occupied by MMC Energy Inc.'s (MMC) Chula Vista Power Plant, a 44.5-mega watt (MW) simple-cycle peaking power plant using Pratt & Whitney FT8 Twinpac™ technology. The proposed project includes the demolition of the existing power plant and construction of the new 100-MW facility on a currently unoccupied portion of the existing parcel. As part of this effort, the Applicant has identified the General Electric (GE) Energy LM6000 as one of the most efficient generation technologies currently available. The GE LM6000 has rapid start capability and load-following capability to make it excellent technology to provide peaking capacity. Using a more efficient peaking technology minimizes the use of natural gas for each kilowatt-hour of electrical energy produced.

The CVEUP will provide needed peak electric generation capacity with improved efficiency. San Diego Gas and Electric Company (SDG&E) recently circulated a Request For Offers (RFO) indicating that additional peak electric generation capacity is needed in the vicinity. Peaking capacity is needed to respond to the local demand for electricity that increases typically in the afternoons of summer days or to support steep increases in power demands as larger units start up. A facility that provides peaking capacity must be able to be up and running at baseload within 10 minutes to meet California Independent System Operator (CAISO) requirements. As a peaking facility, the CVEUP would not run continuously, but

instead would start, run for as many hours as necessary, and then shut down. The CVEUP is designed to reliably provide this type of fast-start capability. The CVEUP also includes "black start" capability as required by the RFO from SDG&E. Black start capability allows the CVEUP to start up when the power grid is down and support re-energizing the power grid.

In addition, the CAISO has identified a local reliability area that includes the cities of Chula Vista and San Diego, where power generation is needed to support local demand for electricity. Thus, the CVEUP would help to meet identified local generation needs. Of equal or greater importance, however is the CVEUP's ability to produce electricity more efficiently than the current plant and thereby further the statewide goals of limiting the environmental effects of power generation.

In addition to technology alternatives, an objective of the site selection was to minimize or eliminate the length of any project linears, including gas and water supply lines, discharge lines, and transmission interconnections. This objective both minimizes potential offsite environmental impacts and cost of construction.

To respond to the need for peaking capacity in San Diego, MMC considered several key factors for power plant siting:

- Site control readily available
- Adjacent to or near an existing substation where additional peaking capacity would serve growing markets near load centers and provide system stability as well as peaking energy
- Adjacent to or near high-pressure natural gas transmission lines
- Adjacent to or near water supply for process and sanitary purposes to maximize efficiency
- Industrial land use designation with consistent zoning
- Potential environmental impacts can be mitigated and minimized

The existing Chula Vista Power Plant site meets all of these siting objectives. In addition, the plant site has sufficient vacant land available to construct the newer, more efficient plant while continuing to operate the existing plant during construction.

The CVEUP will provide peaking power to the grid to help meet the demand for electricity and to help replace less efficient fossil fuel generation resources retired because of age or cost of producing power. The CVEUP will enhance the reliability of the State's electrical system by providing peaking power generation near the centers of electrical demand. In addition, as demonstrated by the analyses contained in this AFC, the project would not result in any significant environmental impacts. Therefore, as will be demonstrated below, there are no alternatives that would be preferred over the project as proposed.

6.2 The "No Project" Alternative

If the Applicant were to not build the CVEUP (the "no project" alternative), it would not be possible to meet the project objectives. The "no project" alternative would forego all of the

benefits associated with the CVEUP project. In addition, the "no project" alternative would result in more energy production from the existing onsite power plant than would otherwise occur, and these currently include older, less efficient, and less environmentally sound generating units. This would have negative economic consequences for the region's commercial and residential rate-payers and for the regional economy. CVEUP's location within the Southern California Import Transmission area (SCIT) provides important grid stability benefits, because CAISO operation rules for grid stability require at least 40 percent of electricity requirements within SCIT to be generated there.

In summary, the "no project" alternative would not serve the growing needs of the San Diego County and California's businesses and residents for economical, reliable, and environmentally sound generation resources. Given the "no project" alternative, the existing Chula Vista Power Plant would continue to operate, using older and less efficient technology that produces much higher concentrations of air pollutants than the proposed plant.

6.3 Power Plant Site Alternatives

For comparison purposes, and to meet the requirements of the California Environmental Quality Act (CEQA) and Title 20, alternative sites were chosen that could feasibly attain most of the project's basic objectives. The alternative sites are shown in Figure 6.3-1. The key siting criteria in considering these alternatives and the proposed CVEUP site included the following factors:

- Location near the centers of demand for maximum efficiency and system benefit
- Land zoned for industrial use
- Location near electrical transmission facilities
- Location near reliable natural gas supply
- A parcel or adjoining parcels of sufficient size for a power plant and construction laydown areas
- Site control (lease or ownership) feasibility
- Ability to minimize construction impacts to existing residences and businesses
- Feasible mitigation of potential environmental impacts

6.3.1 Proposed Chula Vista Energy Upgrade Project Site

The proposed site for the CVEUP at 3497 Main Street, in Chula Vista, meets all of the project's objectives and, in addition, would have no significant, unmitigated, environmental impacts. The proposed site is approximately 3.8 acres. The site is currently leased by MMC. The CVEUP site is:

- Located at the existing MMC Chula Vista Power Plant, which will be demolished prior to operation of CVEUP.
- Near SDG&E's Otay Substation. The project capacity would serve the need for reliable peaking power in the vicinity of the Otay Substation. Interconnection will be to an existing tie-in at the project site.

- Adjacent to a high-pressure natural gas transmission line and gas metering stations located on the eastern side of the CVEUP site.
- Adjacent to existing Sweetwater Authority water supply lines located in a utility easement on the eastern side of the CVEUP site.
- Adjacent to a sanitary sewer trunk line that is located in a utility easement on the project site and that is capable of receiving the project's effluent.
- Designated for industrial land use with zoning that permits utility land uses.
- Large enough to accommodate the proposed project.

6.3.2 Alternative 1: 4th Avenue Site

This alternative is located approximately 0.5 mile west of the CVEUP site near the intersection of Main Street and 4th Avenue. This property is currently used for strawberry farming and is approximately 3.87 acres in size. The property is zoned limited industrial, and is located near both a gas line and water line that runs along Main Street. This site would require a 0.6-mile long electrical transmission line to be built to the Otay Substation. It is unknown if site control is possible at this location.

6.3.3 Alternative 2: Faivre Street Site

This alternative is located approximately 1 mile west of the CVEUP site near the intersection of Faivre Street and Broadway. This property is currently undeveloped, and is approximately 2.57 acres in size. This property is zoned limited industrial and is located near the natural gas line and is likely served by a Sweetwater Authority water pipeline running along Faivre Street. This site would require a 1.2-mile-long electrical transmission line be built to the Otay Substation. In addition, it is unknown if site control is possible at this location.

6.4 Comparative Evaluation of Alternative Sites

In the discussion that follows, the sites are compared in terms of each of the 16 topic areas required in the AFC, as well as in terms of project development constraints. The most useful topics for comparison are as follows:

- **Project Development Constraints—**Are there site characteristics that would prohibit or seriously constrain development, such as significant contamination problems, or lack of fuel, transmission capacity, or water?
- **Land Use Compatibility—**Is the parcel zoned appropriately for industrial use and compatible with local land use policies?
- **Routing and Length of Linear Facilities—**Can linear facilities be routed to the site along existing transmission lines, pipelines, and roads? Will linear facilities be significantly shorter for a given site?

Visual Resources—Are there significant differences between the sites in their potential for impact on valuable or protected viewsheds?

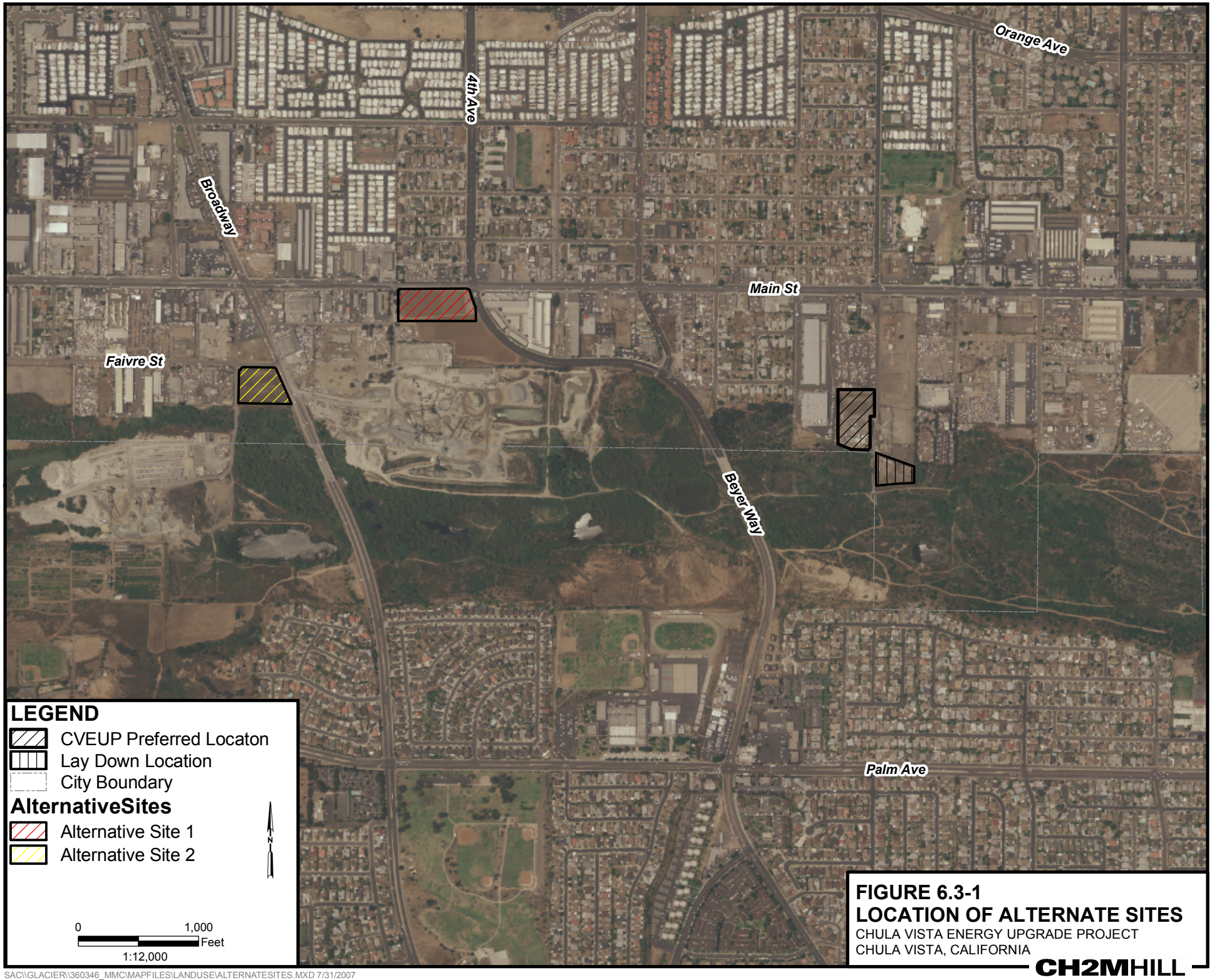

FIGURE 6.3-1
LOCATION OF ALTERNATE SITES
CHULA VISTA ENERGY UPGRADE PROJECT
CHULA VISTA, CALIFORNIA

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- **Biological Resources—**Would there be significant impacts to wetlands or threatened or endangered species such that mitigation of these effects would be unduly expensive or constrain the supply of available mitigation resources?
- **Contamination—**Is there significant contamination on site, such that cleanup expense would be high or such that cleanup would cause significant schedule delay?
- **Noise—**Is the site sufficiently near a sensitive receptor area such that it would be difficult to mitigate potential noise impacts below the level of significance?
- **Use of Previously Disturbed Areas—**Has the site been previously disturbed? Does the site minimize the need for clearing vegetation and otherwise present low potential for impact on biological and cultural resources?
- **Other Environmental Categories—**Are there significant differences between the sites in their potential for impact in other environmental categories?

There is no precise mathematical weighting system established for considering potential impacts in alternatives analyses. Some of the criteria used to compare the alternatives are more or less important to consider than others. For example, an impact that could affect public health and safety or could result in significant environmental impacts is obviously of greater concern than a purely aesthetic issue associated with an advisory design guideline. It is important in comparing alternatives to focus on the key siting advantages and the potential adverse environmental effects of a particular site. Comparing each of the environmental disciplines and giving each discipline equal weight would provide a misleading analysis because effects in one area are not necessarily equivalent in importance to effects in another area.

For example, though the sites may differ in terms of available local road and street capacities and the current levels of traffic congestion, the number of workers during the operational phase of the project is low and would be unlikely to have a significant effect on local traffic. The sites may differ widely in the amount of traffic congestion they would cause during construction, but this is a temporary impact and should not be a strong consideration in site selection, as long as measures to mitigate this impact are feasible. The sites would not differ significantly in terms of geological hazards, though close proximity to a major fault would call for more rigorous and expensive seismic engineering. Hazardous materials handling and worker health and safety issues would be the same or nearly the same for most sites. Though the risk of a release of hazardous materials during transport might be seen as more or less likely depending on location (roadway hazards, in particular), the record of safe transport and handling of such materials is clear. Further, the sites considered here are all in or near urban areas that are served by good transportation networks and are close to the sources of supply.

Similarly, project effects on paleontological and cultural resources are not often consequential in comparing alternatives. Once an initial screening for effects on highly significant sites is completed, the probabilities of encountering hidden paleontological or cultural resources during construction are difficult to calculate or compare.

6.4.1 Project Development Constraints

As indicated in the introductory descriptions of each of the alternative sites, the basic needs of power plant siting for land, access to electrical transmission, gas supply, and water, are met at the CVEUP site. Both the 4th Avenue site and Faivre Street sites are not located near the substation and would require a new transmission line to be built. The CVEUP site is ideally located in this regard, as fuel gas, water supply, electrical transmission and wastewater discharge all have existing tie-ins on site. The 4th Avenue site would require a 0.6-mile electrical transmission line, and the Faivre Street site would require a 1.2-mile electrical transmission line.

6.4.2 Air Quality

The quantity of emissions from project operation would be the same at any of the sites. Each of the sites has similar contributions to airsheds and would, therefore, be subject to similar review, emission reduction crediting, and permitting requirements. Each site is located in relatively flat terrain that will help to promote dispersion of emissions. The differences between the sites in terms of their distances from the nearest residences should not make a significant difference in air quality impacts at these residences. Mitigation would bring any potential impacts to a level below significance for any of the alternatives.

6.4.3 Biological Resources

The CVEUP site has virtually no biological resources or habitat value. The entire site is either covered by the existing plant, graveled over, or disturbed. The 4th Avenue site is currently in use as a strawberry field. The Faivre Street site is undeveloped land adjacent to the Otay Mesa Regional Park, and could provide some habitat for wildlife.

6.4.4 Cultural Resources

There are no known cultural resources at the CVEUP site. Resources of the 4th Avenue and Faivre Street sites are unknown. Each of the sites has approximately the same general cultural resources sensitivity; however, the CVEUP site will be constructed entirely on fill and so impacts to buried cultural resources are very unlikely.

6.4.5 Geological Resources and Hazards

There would be no significant differences between the sites in terms of geological resources and hazards. There are no geological resources located on or near any of the sites.

6.4.6 Hazardous Materials Handling

There would be no significant difference between the site locations in terms of hazardous materials handling. The uses of hazardous materials would be the same for any of the sites. Though there might be differences in the distances that trucks carrying hazardous materials would travel to deliver the materials, these differences would be minor and would not necessarily be consequential, given the effective mitigation measures available and the excellent safety record for transport of these materials.

6.4.7 Land Use

All of the sites are zoned industrial and are located in highly developed urban areas. None of the sites presents a significant land use conflict.

6.4.8 Noise

Developments at each site would be able to meet the City of Chula Vista and San Diego County noise standards. The proposed CVEUP site is located approximately 500 feet from the nearest residence, while both the 4th Avenue and Faivre Street sites are located approximately 300 feet from the nearest residence. In addition, the proposed CVEUP site has both a sound wall surrounding the southern boundary of the site, as well as a large warehouse located to the west which further blocks noise to the nearest residence.

6.4.9 Paleontology

There would be no significant differences between the sites in terms of potential effects on paleontological resources. The probability of encountering significant fossils is approximately the same at each site.

6.4.10 Public Health

The project would not be likely to cause significant adverse long-term health impacts (either cancer or non-cancer) from exposure to toxic emissions, regardless of the site chosen.

6.4.11 Socioeconomics

All three sites are located in San Diego County. The number of workers, construction costs, payroll, and property tax revenues would be nearly the same for the project at each of the sites. The majority of the workers would come from the greater San Diego County area depending on the site. Most workers would commute daily or weekly to the plant site. Some may move temporarily to the local area during construction, causing site-specific impacts to schools, utilities, and emergency services. These impacts would be temporary. Disproportionate impacts to minority and low income populations would be unlikely since minority populations are not concentrated in an area or areas that are also high potential impact areas. The project is not likely to cause significant adverse public health impacts to areas that are disproportionately minority or low income.

6.4.12 Soils and Agriculture

The proposed CVEUP site is located in an area without agriculture. The 4th Avenue site is currently cultivated for strawberries, and the Faivre Street site is currently disturbed, but is not developed. The CVEUP site is developed, urban land. Use of the 4th Avenue site would involve the conversion of agricultural land to industrial uses, but this site is located in a designated industrial corridor.

6.4.13 Traffic and Transportation

The number of employees working at a given time during project operation (approximately two) will not significantly impact local traffic conditions at any of the sites. The peak number of employees during construction (160) will have much more impact, but the impact will be temporary, and can be mitigated by transportation management planning.

The effect on construction-phase traffic, therefore, should not figure as a major consideration in evaluating or comparing the sites.

6.4.14 Visual Resources

None of the sites is located in an area with protected viewshed or in a designated viewshed corridor. The visual effects are roughly the same for both the CVEUP and Faivre Street sites. From both these sites, the project would be visible at a distance from residences on the south side of the Otay Valley Regional Park. At the 4th Avenue site, the southern view from the residences on the south side of Otay Valley Regional Park would be blocked somewhat by existing facilities including a gravel mining area to the south, but the facility would be very visible and evident to residents on the north side of Main Street and travelers along Main and 4th Streets.

6.4.15 Water Resources

Each of the sites would use potable water for power plant operations and sanitary purposes. All three sites are sited adjacent to a water supply tie-in. Recycled or reclaimed wastewater is not currently available in this area of Chula Vista.

6.4.16 Waste Management

The management of wastes would differ slightly between the proposed project site and the two alternatives, though these differences would not necessarily lead to a site preference. Two of the three sites would be vacant at the time MMC assumes site control, and no demolition would be necessary. Some demolition would be required for the proposed project site, but much of the equipment will be reused, and there is sufficient landfill capacity in the region to handle these wastes.

6.4.17 Summary and Comparison

Based on the site selection criteria as described in Section 6.3, it is clear that power plant siting is feasible at all three sites. Following is a summary of site selection factors:

- **Location near the centers of electrical demand—**Each of the sites is located in the urban, developed area of San Diego County, where electrical demand is high.
- **Land zoned for industrial use—**Each of the sites is zoned industrial or manufacturing.
- **Location near a sufficient source of operation water, preferably treated wastewater—**Potable water is available at all three sites. Treated wastewater is not currently available in Chula Vista.
- **Location near electrical transmission facilities—**The CVEUP site has an existing onsite tie-in to the Otay Substation. A 1.2-mile-long transmission line would have to be constructed to connect the Faivre Street Site with the Otay Substation. For the 4th Avenue site, a 0.6-mile-long transmission line would have to be constructed to the Otay Substation.

- **Location near ample natural gas supply—**Each of the sites is located near a sufficient source of fuel gas. There is a pre-existing gas line and gas metering station on the CVEUP site. Availability of gas at the 4th Avenue and Faivre Street sites is unknown, although due to the proximity of other industrial facilities nearby, it is likely a gas line runs along Main Street and both sites could tie in to this pipeline.
- **Parcel or adjoining parcels of sufficient size for a power plant—**There is sufficient land available at each parcel to develop a power plant, although the Faivre Street site is somewhat constrained in size.
- **Site control feasible—**Site control is feasible at the CVEUP site. It is unknown if the 4th Avenue site or the Faivre Street site are available for lease or purchase. Feasibility is, therefore, undetermined.
- **Mitigation of potential impacts feasible—**Mitigation of potentially significant environmental impacts appears feasible at each of the sites.

In conclusion, the CVEUP site offers some project design advantages over the both the Faivre Street and 4th Avenue sites. Most importantly, the site has preexisting tie-ins to the natural gas pipeline, potable water supply, and electric transmission lines. The two alternative sites would both require a new transmission line, but would be able to tap into the existing water and gas line. At both alternative sites, the construction of a transmission line would be costly and would raise the possibility of additional environmental impacts. The CVEUP site would have no biological resources impacts, whereas the Faivre Street site would involve conversion of open space and plant and wildlife habitat. In addition, it is unknown if either the 4th Avenue site or the Faivre Street site are available for long-term lease or purchase. The surrounding area of both of these sites is highly industrial, and demand may be high for areas that are currently undeveloped, so site control in this location may be difficult or infeasible.

6.5 Alternative Project Design Features

The following section addresses alternatives to some of the CVEUP design features, such as the locations of the natural gas supply pipeline, electrical transmission line, and water supply pipeline.

6.5.1 Alternative Natural Gas Supply Pipeline Routes

Because an existing high-pressure natural gas line and metering station is available on site no other alternatives are deemed feasible for consideration.

6.5.2 Electrical Transmission System Alternatives

Because an existing 69-kV tie-in is available on site no other alternatives are deemed feasible for consideration.

6.5.3 Water Supply Alternatives

Because an existing water supply pipeline tie-in is available on site no other alternatives are deemed feasible for consideration.

6.6 Technology Alternatives

The configuration of the CVEUP was selected from a wide array of technology alternatives. These include generation technology alternatives, fuel technology alternatives, combustion turbine alternatives, nitrogen oxide (NO_x) control alternatives.

6.6.1 Generation Technology Alternatives

Selection of the power generation technology focused on those technologies that can utilize the natural gas readily available from the existing transmission system. Following is a discussion of the suitability of such technologies for application to the CVEUP.

6.6.1.1 Conventional Boiler and Steam Turbine

This technology burns fuel in the furnace of a conventional boiler to create steam. The steam is used to drive a steam turbine-generator, and the steam is then condensed and returned to the boiler. This is an outdated technology that is able to achieve thermal efficiencies up to approximately 36 percent when utilizing natural gas, although efficiencies are somewhat higher when utilizing oil or coal. Because of this low efficiency and large space requirement, the conventional boiler and steam turbine technology was eliminated from consideration.

6.6.1.2 Conventional Combined-Cycle

This technology integrates combustion turbines and steam turbines to achieve higher efficiencies. The combustion turbine's hot exhaust is passed through a heat recovery system generator (HRSG) to create steam used to drive a steam turbine-generator. This technology is able to achieve high thermal efficiencies. The combined-cycle alternative, however, requires very large capital cost more appropriate for a baseload facility, a large site, and very large quantities of water for cooling. In addition, conventional combined-cycle technology cannot match the GE Energy LM 6000 technology for rapid startup, sustained hot-day power, efficient cycling, and high part-power efficiency and load following capability. These are essential characteristics for a peaking facility.

6.6.1.3 Kalina Combined-Cycle

This technology is similar to the conventional combined-cycle, except a mixture of ammonia and water is used in place of pure water in the steam cycle. The Kalina cycle could potentially increase combined-cycle thermal efficiencies by several percentage points. However, because this technology is still in the development phase and has not been commercially demonstrated, it was eliminated from consideration.

6.6.1.4 Advanced Combustion Turbine Engines

There are a number of efforts to enhance the thermal efficiency of combustion turbines by injecting steam or staged firing. These include the steam-injected gas turbine (STIG), the intercooled steam-recuperated gas turbine (ISRGT), the chemically recuperated gas turbine (CRGT), and the humid air turbine (HAT) cycle. The STIG is less efficient than other technologies, uses large amounts of de-ionized water and is only able to achieve thermal efficiencies up to approximately 40 percent. None of the remaining technologies, ISRGT, CRGT, or HAT, is commercially available. Consequently, all of these technologies were eliminated from consideration.

6.6.2 Fuel Technology Alternatives

Technologies based on fuels other than natural gas were eliminated from consideration because they do not meet the project objective of utilizing natural gas available from the existing transmission system. Additional factors rendering alternative fuel technologies unsuitable for the proposed project are as follows:

- No geothermal or hydroelectric resources exist in San Diego County.
- Biomass fuels such as wood waste are not locally available in sufficient quantities to make them a practical alternative fuel and CVEUP site space is limited.
- Solar and wind technologies are generally not dispatchable and are, therefore, not capable of producing ancillary services other than reactive power, and CVEUP site space is limited.
- Coal and oil technologies emit more air pollutants than technologies utilizing natural gas.
- The availability of the natural gas resource provided by SDB&E, as well as the environmental and operational advantages of natural gas technologies, make natural gas the logical choice for the proposed project.

6.6.3 NO_x Control Alternatives

To minimize NO_x emissions from the CVEUP, the combustion turbine generators (CTGs) will be equipped with CTG inlet fogging cooling and selective catalytic reduction (SCR) using aqueous ammonia as the reducing agent. The following combustion turbine NO_x control alternatives were considered:

- Steam injection (capable of 25 to 42 parts per million [ppm] NO_x)
- Water injection (capable of 25 to 42 ppm NO_x)
- Dry low NO_x combustors (capable of 15 to 25 ppm NO_x)

Water injection or dry low NO_x were selected because these allow for lower acceptable NO_x emissions while being able to achieve an output turndown rate of 30 percent. This turndown is necessary to meet variable load demand.

Two post-combustion NO_x control alternatives were considered:

- SCR
- $SCONO_x$™

SCR is a proven technology and is used frequently in combined-cycle applications. Ammonia is injected into the exhaust gas upstream of a catalyst. The ammonia reacts with NO_x in the presence of the catalyst to form nitrogen and water.

$SCONO_x$™ is a new technology and there has been only one implementation; a 25-MW combined-cycle plant. $SCONO_x$™ consists of an oxidation catalyst, which oxidizes carbon monoxide to carbon dioxide and nitric oxide to nitrogen dioxide. The nitrogen dioxide is adsorbed onto the catalyst, and the catalyst is periodically regenerated. Although a potentially promising technology, $SCONO_x$™ has not been commercially demonstrated on a large power plant. There are several technological and commercial issues remaining to be

resolved prior to application of this new technology to the class of combustion turbines selected for the proposed project.

The following reducing agent alternatives were considered for use with the SCR system:

- Anhydrous ammonia
- Aqueous ammonia
- Urea

Anhydrous ammonia is used in many combined-cycle facilities for NO_x control, but is more hazardous than diluted forms of ammonia. Aqueous ammonia (a 19-percent ammonia, 81-percent water solution) is proposed for the CVEUP because of its safety characteristics. Urea has not been commercially demonstrated for long-term use with SCR and was, therefore, eliminated from consideration.