South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 · www.aqmd.gov

June 25, 2009

DOCKET
07-AFC-9
DATE 06/25/09
RECD. 07/06/09

Christopher W. Walker
Senior Vice President
B & C Awnings
3082 E. Miraloma Avenue
Anaheim, CA 92806

Subject: Canyon Power Plant (Facility ID No. 153992)

Dear Mr. Walker:

Thank you for providing us your follow-up comment letter, dated March 14, 2009, concerning the South Coast Air Quality Management District's (AQMD's) public notice ("Notice of Intent to Issue Permit Pursuant to AQMD Rules 212 and 3006") distributed on February 25, 2009 regarding the City of Anaheim's applications to construct and operate the proposed Canyon Power Plant (CPP). The CPP is a new 200 megawatt (MW) power plant to be located at 3071 E. Miraloma Avenue in Anaheim, California. Your interest and willingness to express your concern is the type of citizen involvement that is critical to the effort to achieve healthful air quality in Southern California.

Please note that the public notice was issued after a thorough review and evaluation of the proposed CPP project for compliance with all applicable air quality rules and regulations by the AQMD staff. The intent of the public notice is to provide interested parties with an opportunity to comment during a 30-day comment period on the AQMD's proposed decision to issue permits. The notice is distributed for two reasons. The first reason is to inform the community of the project. The second reason is to allow the community an opportunity to provide new information that the AQMD staff can use to better evaluate the project relative to any and all applicable air quality rules, regulations and requirements.

The AQMD is required to issue a permit because the equipment to be permitted complies with all applicable AQMD rules and regulations. The decision to install new equipment is solely the responsibility of the company applying for a permit and the AQMD is under law required to review the applications and is not in a position to question the company's business decisions. Further, the decision on the appropriateness of locating the equipment in Anaheim based on land use and zoning is not one the AQMD is authorized to make. If you are concerned primarily about zoning decisions and the process by which the facility has been sited in this location, please contact Steve Sciortino (SSciortino@anaheim.net), City of Anaheim Public Utilities Dept., at (714) 765-5137, or Eric Solorio (ESolorio@energy.state.ca.us), California Energy Commission (CEC), at (916) 651-0966. However, as indicated earlier, AQMD is responsible and required to review and evaluate each application and make a determination on whether or not the project as designed, constructed and operated complies with all applicable air quality rules, regulations and requirements. That is exactly what AQMD has done and the reason for issuance of the February 25, 2009 public notice providing our preliminary determination of compliance.

The AQMD also held a joint public meeting with the CEC on May 21, 2009, at the City of Anaheim, City Hall Council Chambers, where we responded to comments and questions from interested members of the public. Also a copy of the public notice for the meeting was mailed to you in advance of the meeting.

Your letter inquires about the health impacts of the proposed project. These impacts are studied as part of the implementation of AQMD Rule 1401, and are included in the environmental assessment for the project that was prepared for the CEC. AQMD determined that the project will comply with Rule 1401. Also, the environmental analysis concluded that the project emissions are not expected to pose a significant increase in carcinogenic health risks or alter Rule 1401 criteria. A copy of Chapter 6.16 of the CEC environmental analysis is included for your information.

You letter also inquired as to whether alternatives to the project, such as a photovoltaic power facility, have been considered. These alternatives are considered by the CEC as part of the project siting decision. The alternatives analysis did consider photovoltaic, as well as other alternatives, but concluded that photovoltaics would not be cost-effective. A copy of Chapter 5.0, the alternatives analysis, is enclosed for your information.

Finally, you inquired whether AQMD would compensate local property owners for depreciation in property values resulting from issuing the proposed permit. Our legal department advises that the AQMD is, under State law, not liable for monetary damages due to injury caused by issuance of a permit (California Government Code 0818.4)

The AQMD appreciates your comments regarding the CPP project. If you should have any further questions or need additional information, please call me at (909) 396-2578.

Sincerely,

Michael D. Mills

Michael D. Mills, P.E.
Senior Engineering Manager
General Commercial & Energy Team
Engineering & Compliance

MDM:vl
Attachment
cc: Steve Sciortino, City of Anaheim
✓Eric Solorio, CEC

5.1 INTRODUCTION

This chapter discusses alternatives to the proposed Canyon Power Plant (CPP) project. Alternatives were evaluated and considered as part of the initial project assessment. In addition, the California Energy Commission (CEC) requires a review of reasonable alternatives to satisfy the requirements of the California Environmental Quality Act (CEQA).

According to CEQA, the focus of the alternatives analysis is on alternatives that could "feasibly accomplish most of the basic objectives of the project and could avoid or substantially lessen one or more of the significant effects" (CEQA, 14 CCR 1516.6(c)). A range of alternatives that could feasibly accomplish most of the project's objectives are described below. In addition to the project alternatives considered, CEQA requires an evaluation of a No Project Alternative, which is also described below. The alternatives are:

- No Project Alternative (no project would be undertaken), described in Section 5.3
- Alternative site locations, described in Section 5.4
- Alternative energy generation technologies, described in Section 5.5

5.2 PROJECT OBJECTIVES

The objective of the CPP is to design, build and operate a 200 MW natural gas-fired simple-cycle generating facility that can provide peak load generation to support the local peak demand and reserve margins for the City of Anaheim (COA). The CPP will assist the COA in meeting its reliability mandates for load serving entities in California. The COA is required to carry 15 percent above its peak demand as capacity reserves by both AB 380 (Resource Adequacy) and by the California Independent System Operator (CAISO). In addition, the CAISO requires considerable generation be provided in the Los Angeles Basin for local reliability purposes. Based on 2008 Local Capacity technical assessment study by the CAISO, the COA is obligated to have 350 MW as Basin generation (CAISO, 2007). The COA has just one 46 MW peaking facility at this time. The objectives for the CPP are summarized below:

- Construct and operate a natural gas-fired simple-cycle generating facility that can provide peak load generation to support the local peak demand, local reliability, and reserve margins for the COA.
- Develop a site consistent with the goals and policies of the community planning documents and supported by the local community.
- To site the project with ready access to natural gas and electrical interconnection.
- Safely produce electricity without creating significant environmental impacts.
- Reduce the current reliance on out-of-state energy.

- Provide a backup for as-available wind energy.
- To build new generation that requires minimal additional project-specific transmission system upgrades.

5.3 NO PROJECT ALTERNATIVE

The No Project Alternative is an alternative required by CEC's regulations and CEQA. Denial of this application by the CEC would, in effect, be the No Project Alternative. Should this occur, the primary result would be the loss of a 200 MW power generation facility to provide energy to the State of California. If the No Project Alternative was selected:

- Approximately 10 acres of land would be developed with another use.
- Approximately one acre of right-of-way would remain undisturbed from the installation of pipelines and transmission lines.

The No Project Alternative would result in continued reliance on out of state energy resources for supplying existing and certainly future peak load demands for the COA. In summary, this alternative would not serve the needs of the COA and California businesses and residents for economical, reliable and environmentally sound generation resources.

5.4 ALTERNATIVE SITE LOCATIONS

The COA Public Utility Department conducted two siting studies and evaluated nine locations within the COA before selecting and purchasing the proposed CPP project site for development (URS, 2003, 2006). The nine sites that were studied are identified in Table 5.4-1 and their locations illustrated on Figure 5-1. Site 9 is the proposed CPP site described in this AFC. The proposed site was determined to be the least environmentally sensitive site based on the proximity of sensitive receptors, biological resources and land use compatibility issues.

Sites 1 thru 8 were evaluated in the 2003 study but a second siting study was conducted in 2006 because three sites evaluated in 2003 had to be eliminated (Sites 4, 5, and 8), one site was modified (Site 6), and a new site was identified (Site 9). Site 4 was eliminated because it had been developed with residential units, Site 5 was eliminated because it became unavailable for development, and Site 8 was eliminated at the onset of the 2003 siting study because it is crossed by an overhead Southern California Edison 500 kV line, rendering it unusable for the construction of a power generation facility. As a result of these changes, the 2006 siting study focused on the feasibility of Sites 1, 2, 3, 6, 7, and 9. However, since site 6 is currently utilized as a power facility, it is excluded from further review.

The sites were evaluated to assess the feasibility of constructing and operating a power project in the COA. Factors considered were proximity to gas, transmission and water

TABLE 5.4-1
ALTERNATIVE SITE LOCATIONS

Site Number	Site Name	Site Location
1	Maintenance Yard	Near Vermont Avenue and East Street
2	Metal Site	Along the south side of SR 91, east of Kraemer Boulevard
3	OCWD Site	North of the 91 Freeway, west of Richfield Road
4	Disney Parking Lot	At the intersection of Katella Avenue and Haster Street
5	San Farrel	At 3000 La Jolla Street
6	Dowling and CT	At Dowling Substation and existing combustion turbine site, at Kraemer Boulevard and Coronado Street
7	Lewis Street	Near the Intersection of Lewis Street and Cerritos Avenue
8	Car Lot Site	At La Palma Avenue and Yorba Linda Boulevard
9	OC Food Services	Along East Miraloma Avenue, west of Kraemer Boulevard

infrastructure that would minimize construction impacts. In addition, the sites were reviewed based on the potential for site related environmental impacts. These would include land use inconsistencies, community cohesion, biological concerns and other environmental concerns. Generally, an industrial site was preferred due to the proximity of infrastructure and land use consistency.

5.4.1 Site 1

Site 1 is currently used as the Utility Department storage and maintenance yard. The entire site is paved and a warehouse is located on the property. The site has reasonable access to infrastructure including transmission. No biological or cultural resources were identified in the area.

The site does include sensitive receptors in the vicinity. These sensitive receptors include residential uses, elementary schools and plans for a multi-family residential development. These sensitive receptors are closer to Site 1 than the proposed CPP site and therefore, this site was not considered further.

5.4.2 Site 2

Site 2 is currently used by Adams Metal, a metal recycling facility, a lumber yard, and rail car area. The site is partially paved and the rest is covered by gravel and dirt. The site is within the Specific Plan area 94-1 and is zoned as Zone 1 industrial. Infrastructure requirements can be reasonably obtained nearby. The property abuts the Santa Ana River to the south and residential development is located further south along the river. Development of this site would have the potential for impacts to sensitive biological resources due to the close proximity of the Santa Ana River. This site was removed from further consideration since the proposed CPP site would have less potential impacts to biological resources and sensitive receptors.

5.4.3 Site 3

Site 3 is currently owned by the Orange County Water District and is surrounded by the Warner Recharge Basin. The buildable area within this site is limited by water and is not continuous. Most of this site is currently used as a park. It may be possible to construct a facility on the south end of the site away from the park, but there currently is only a narrow road down to this location. The site is within the Specific Plan Area 94-1 and is zoned conservation/water uses. In addition, the area is within a State-designated scenic corridor. The COA General Plan Land Use map also shows that this site is designated parks and water uses. Site 3 abuts park/water uses to the east and west, the Santa Ana River to the south, and light industrial and offices to the north and northeast. Infrastructure needs are reasonably met within the area.

Use of this site for a 200 MW power facility would require a minimum of 4 acres. This site cannot provide that amount of contiguous area and was no longer considered viable. In addition, there would be a requirement for a rezone and General Plan Amendment in order to use this site for power generation. Due to these issues the CPP site would have fewer potential impacts to the surrounding area, and is more compatible for Land Use purposes.

5.4.4 Site 7

Site 7 is currently a vacant lot where the Salvation Army stores delivery/pickup trucks. Immediately adjacent to the northern border of the site is a ministry facility that includes a shelter with 50 or more beds, which is considered a sensitive use. The surrounding land use is light industrial. The land use designation and zoning for Site 7 is industrial. Infrastructure needs can be reasonably obtained in the area, however, the pipeline for GWRS water would be much longer than the proposed CPP site. The sensitive receptor location would be much closer than the CPP site and therefore, this site was not considered further.

5.5 ALTERNATIVE ENERGY GENERATION TECHNOLOGIES

The CPP will provide electricity for the COA's customers. It's operation would allow COA to keep its rates as low as possible. Alternate electrical generation technologies were considered using the selection methodology described below, however, these technologies were rejected in favor of the natural gas-fired, simple-cycle technology, which is the basis of this application.

5.5.1 Selection Methodology

Technologies considered were primarily those that would provide peak or intermittent electric power. The reason for using this screening criterion was the COA's mission to maintain its electrical rates as low as possible for its customers. Two intermittent technologies with no fuel cost namely solar and wind power were also examined to see if they might be economically viable.

The selection methodology included a stepped approach with each step containing a number of criteria. The selected technology would have to pass Steps 1 and 2 and provide the lowest or near lowest cost in Step 3. The steps are as follows:

- **Step 1 – Commercial Availability.** The technology had to be proven commercially practical with readily available and reliable equipment at an acceptable cost.
- **Step 2 – Implementable.** The technology had to be implementable; specifically, it could meet environmental, public safety, public acceptability, fuel availability, financial, and system integration requirements.
- **Step 3 – Cost-effective.** The technology had to be cost-effective when compared with existing peaking generating units. Cost included both capital as well as operation and maintenance costs, which would translate into a bus bar cost represented in cents per kilowatt-hour. The methodology was applied to a number of peaking electrical generation technologies in the following subsections.

5.5.2 Technologies Reviewed

The technologies reviewed can be grouped according to the fuel used. Fuels included were oil and natural gas, coal, nuclear reactions (usually using radioactive materials as fuel), water (hydro, ocean conversion, and geothermal), biomass, municipal solid waste, and solar radiation. However, due to the type of generating facility (a peaking generating facility) that the COA is proposing, several technologies were immediately rejected due to the infeasibility of these technologies to provide cost-effective peaking electricity. These technologies were steam generator boilers that generated electrical power by passing steam through a steam turbine (including natural gas fired, coal fired, oil fired, biomass, and nuclear), hydroelectric, and ocean energy.

5.5.2.1 Oil and Natural Gas

These technologies use oil or natural gas and include combustion turbines in various configurations, and fuel cells. The description of these technologies includes the proposed alternative of a simple-cycle combustion turbine.

5.5.2.2 Simple-cycle Combustion Turbine

This technology uses a combustion turbine to drive a generator. Air is compressed in the compressor section of the combustion turbine, passes into the combustion section where fuel is added and ignited, and the hot combustion gases pass through a turbine, which drives a generator and the compressor section of the combustion turbine. The combustion turbines have a relatively low capital cost with efficiencies approaching 40 percent in the larger units. Because the combustion turbines are fast starting and have a relatively low capital cost, they are used primarily for meeting high-peak demand, when their relatively low efficiency is not as great a concern. Applying the review methodology, this technology is commercially available, and could be easily implemented. The variable cost of generation is relatively high, approximately 5.5 to 7.5 cents per kilowatt-hour, depending on fuel costs. However, this technology typically is used to generate electrical power during peak-demand periods, when electricity costs are typically higher. Therefore, this technology satisfies Steps 1, 2, and 3.

5.5.2.3 Conventional Combined-cycle

This technology integrates combustion turbines and steam turbines to achieve higher overall plant efficiencies. The combustion turbine, which drives a generator, would normally exhaust its hot combustion gas directly to the atmosphere. However, with combined-cycle technology, the combustion turbine exhaust gas is passed through a heat recovery steam generator creating steam that is used to drive a steam turbine/generator thereby producing additional electricity with no additional fuel consumed. The resulting efficiency for the combined cycle technology is 50 to 54 percent, which is considerably greater than most other alternatives. In addition, natural gas fuel emits little sulfur dioxide and little particulate matter. For these reasons, the system is considered the benchmark against which all other base load technologies are compared. Applying the review methodology, this technology is commercially available, but cannot be implemented due to the long startup periods required to preheat the steam generation equipment and steam turbine. Therefore, this technology fails Step 2 and was rejected from further consideration.

5.5.2.4 Kalina Combined-cycle

This technology is similar to the conventional combined-cycle except water in the heat recovery boiler is replaced with a mixture of water and ammonia. Overall efficiency is expected to be increased 10 to 15 percent. However, this technology is still in the testing phase, with tests recently completed on a 3-MW unit in Southern California. Applying the review methodology, the technology fails to pass Step 1 because it is not commercially available, and therefore, was eliminated from consideration.

5.5.2.5 Advanced Combustion Turbine Cycles

There are numerous efforts to enhance the performance and/or efficiency of combustion turbines by injecting steam, intercooling, and staged firing. These include the steam-injected combustion turbine (SICT), the intercooled steam-recuperated combustion turbine, the chemically recuperated combustion turbine, and the humid air turbine cycle. With the exception of the SICT, none of these technologies are commercially available, and therefore, fail to pass Step 1 of the review methodology. The SICT is marginally commercially available and does not pass Steps 1 and 2. Consequently, this technology was eliminated from consideration.

5.5.2.6 Fuel Cells

This technology uses an electrochemical processes to combine hydrogen and oxygen to liberate electrons, thereby providing a flow of electrical current. Types of fuel cells include phosphoric acid, molten carbonate, solid oxide, alkaline, and proton exchange membrane technologies. With the exception of the phosphoric acid fuel cell and possibly the molten carbonate fuel cell, none of these technologies are commercially available, and therefore, fail Step 1. The phosphoric acid fuel cell has been operated in smaller-size units, and the molten carbonate fuel cell has completed testing. However, currently neither of these technologies are cost-competitive with conventional simple-cycle technology, and therefore, fail Step 3 of the review methodology.

5.5.2.7 Water

These technologies use water as "fuel" and include geothermal. Other water technologies (hydroelectric and ocean energy conversion) were excluded due to the inherent limitations in these technologies to provide peaking electrical generation.

5.5.2.8 Geothermal

These technologies use steam or high-temperature hot water (HTHW) obtained from naturally occurring geothermal reservoirs to drive steam turbine/generators. Vapor-dominated resources (dry, super-heated steam) and liquid-dominated resources HTHW use a number of techniques to extract energy from the HTHW. Geothermal is a commercially available technology. However, geothermal resources are limited, and most, if not all, economical resources have been discovered and developed in California. Therefore, this technology fails Steps 2 and 3. In addition, there are transmission limitations from the geothermal area and the resource does not meet local reliability of the CAISO.

5.5.2.9 Solar Radiation Technologies

Solar radiation (sunlight) can be collected directly to generate electricity with solar thermal and solar photovoltaic technologies, or indirectly through wind generation technology in which the sunlight causes thermal imbalance in the air mass, thereby creating wind. Wind generation and two types of solar generation, thermal conversion and photovoltaics, were considered as alternative technologies to the simple-cycle. These are described in the following subsections.

5.5.2.9.1 Thermal. Most of these technologies collect solar radiation, heat water to create steam, and use the steam to power a conventional steam turbine generator. The primary systems that have been used in the United States capture and concentrate the solar radiation with a receiver. The three main receiver types are mirrors located around a central receiver (power tower), parabolic dishes, and parabolic troughs. An alternate technology collects solar radiation energy in a salt pond and then uses the heat collected to generate steam and drive a conventional steam turbine generator. While one of these technologies might be considered to be marginally commercial (parabolic trough), the others are still in the experimental stage.

All of these technologies require considerable land area for the collection receivers and are best located in areas of high solar incidence. In addition, power is only available while the sun shines; therefore, the units do not supply power when clouds obscure the sun or from early evening to late morning. These factors translate into high cost to the ultimate customer. These systems for the most part fail Step 1, commercial availability, and may not be implementable due to land unavailability and/or the ability to finance (Step 2). However, they all fail in being cost-effective (Step 3), and therefore, were eliminated from consideration.

5.5.2.9.2 Photovoltaic. This technology uses photovoltaic cells to convert solar radiation directly into electricity. Photovoltaic cells can be located wherever sunlight is available. This technology is environmentally benign and is commercially available, because panels of cells can theoretically be connected to achieve any desired capacity. Currently the cost for this technology is very high. This technology fails Step 3, cost-effectiveness, and therefore, was eliminated from consideration.

5.5.2.10 Wind Generation

This technology uses a wind-driven turbine to turn a generator and generate electricity. Only certain sites have adequate wind to allow for the installation of wind generators, and most of the sites that have not been developed are remote from electric load centers. Capacity from this technology is not always available because even in prime locations the wind does not blow continuously. In California, the average wind generation capacity factor has been relatively low in the range of 15 to 30 percent. In addition, this technology cannot be depended upon to be available during periods of peak load because the peak may occur when the wind is not blowing. The technology is commercially available and probably implementable at the proposed sites, although financing may not be available due to its perceived risk. The technology is relatively benign environmentally although visual impacts, land consumption, and effects on raptors are a concern. The cost of generation is approximately 5 to 10 cents per kilowatt-hour, which is above the cost of the preferred alternative. The technology fails Step 3, cost effectiveness, and therefore was eliminated from consideration.

5.5.3 Conclusions

All feasible technologies that might be available for peaking load operation in California were reviewed using a methodology that considered commercial availability, ability to implement, and cost-effectiveness. Although some technologies, other than the simple-cycle combustion turbine, were commercially available and could be implemented, most would not result in fewer environmental effects than the natural gas-fired, simple-cycle technology. In addition, for all alternatives that are commercially available, implementable technologies were considered to be less cost-effective than the simple-cycle combustion turbine technology, and therefore, would not be consistent with the COA's fiduciary duty to provide low-cost power for its customers. Consequently, the conventional simple-cycle combustion turbine technology using natural gas as fuel is the best available technology for a peaking plant service and the one that should be employed for the CPP.

5.6 REFERENCES

California Independent System Operator (CAISO). 2007. 2008 Load Capacity Technical Analysis. March 9.

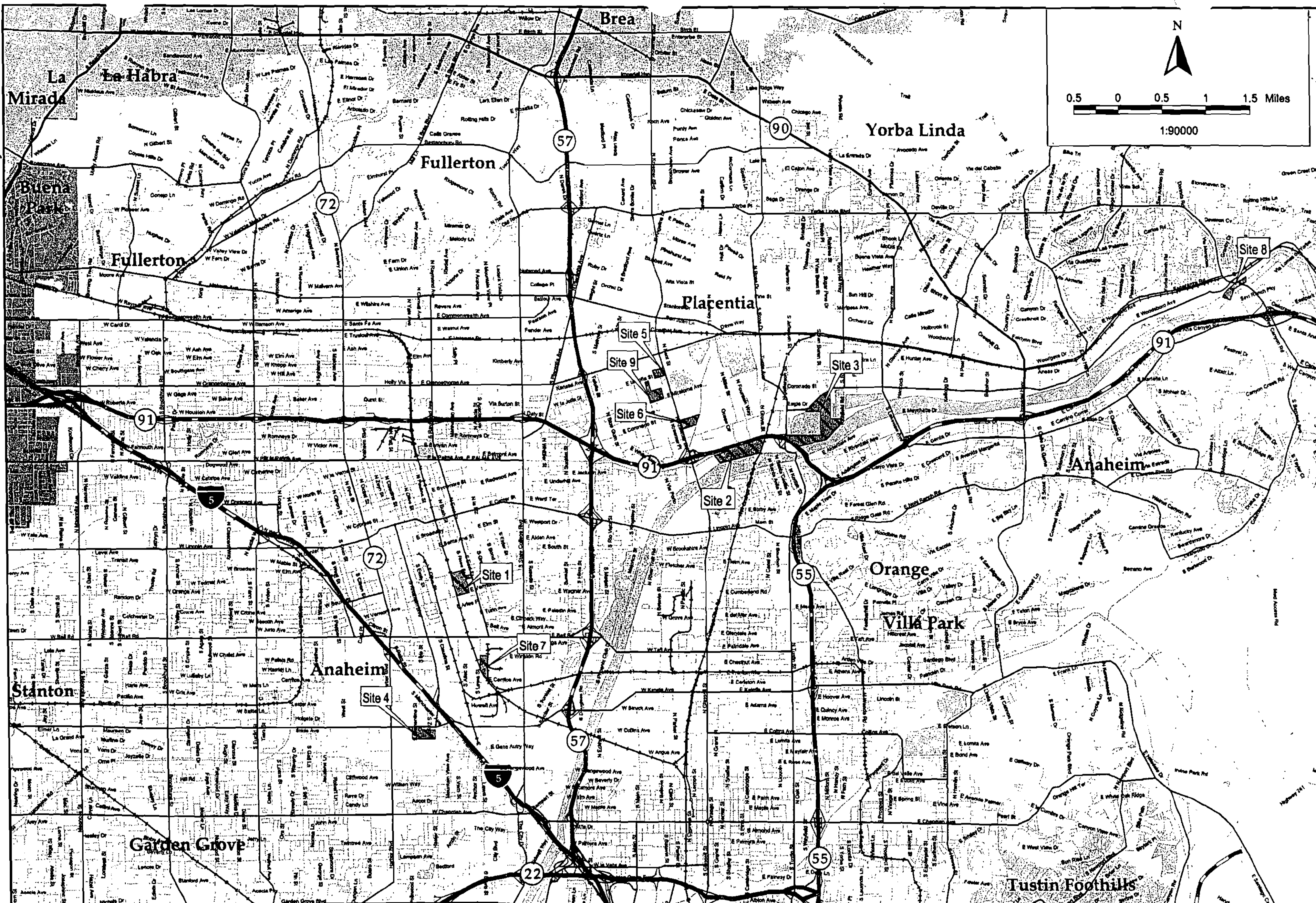
California Natural Diversity Database (CNDDB). 2005. California Department of Fish and Game, Rare Find Natural Diversity Database.

City of Anaheim (COA). 2004. City of Anaheim General Plan.

Santa Ana Watershed Project Authority. 2006. *Santa Ana Regional Interceptor (SARI) Business Plan.* June.

URS Corporation. 2003. Critical Issues Assessment, Anaheim Peaking Power Siting Study. September.

2006. Critical Issues Assessment, Anaheim Peaking Power Siting Study. October.



T/Ladd/AnaheimCanyonPowerPlant/1006-193A

Canyon Power Plant	Figure 5.-1. SITES EVALUATED IN THE 2006 SITING STUDY	December 2007
URS Corporation		

6.16 PUBLIC HEALTH

The Canyon Power Plant (CPP) will consist of a nominal 200-megawatt (MW) simple-cycle plant, using four natural gas-fired General Electric LM 6000PC Sprint combustion turbines and associated infrastructure. The project site is located at 3071 East Miraloma Avenue, in a City of Anaheim (COA)-designated industrial zone.

The CPP and associated construction laydown areas will be located on approximately 10 acres of disturbed land located at 3071 East Miraloma Avenue. Main access to the CPP site will be at the southeast corner of the project site from East Miraloma Avenue. A second gated entrance will be accessible via East Miraloma Avenue with a third gate off the alley to the east of the site. (Total land disturbance will be approximately 10 acres.)

The existing CPP site is predominantly paved (concrete and asphalt). Principal land use for the site was food catering for a fleet of approximately 75 to 100 trucks, formerly operated by Orange County Food Service. Onsite structures include a kitchen/warehouse building, maintenance garage (9 service bays), truck wash facility (5 bays), two ice manufacturing buildings, several storage sheds, and an outdoor truck repair shop which includes storage lockers and petroleum products, all of which will be demolished as a part of the CPP project.

The following activities are not part of the CPP project:

- Three residential houses along East Miraloma Avenue have recently been removed and are not a part of this Application for Certification (AFC). The COA Risk Manager and Fire Department determined that the residential units posed security and fire risks, and therefore they were removed. A letter from the COA Risk Manager to the Public Utilities Department is included in Appendix Q.
- Soil remediation activities associated with Phase I, Phase II, and Supplemental Phase II reports. The COA, now as owner of the property, has determined that it will conduct any soil remediation activities to limit its environmental liability for future uses of the site. These activities will occur regardless of whether the CPP project obtains a CEC license.
- Installation of a temporary, 8-foot-high security fence around the perimeter of the entire 10-acre site.
- General maintenance activities including site cleanup and trash removal.

The project will include the construction and/or installation of the following components:

- **Proposed CPP site.** In addition to the four natural gas-fired GE LM 6000PC Sprint gas turbines, the plant will include generator step-up transformers (GSUs), a 69 kilovolt (kV) switchyard, onsite fuel gas compressors, a gas pressure control and metering station, a packaged chilled water system for combustion turbine engine (CTG) power augmentation with associated heating ventilation and air conditioning (HVAC)-type four-cell cooling tower, selective catalytic reduction system (SCR) emission control systems, and other associated plant infrastructure.

- **Gas pipeline.** Natural gas will be provided via a new 3,240-foot-long, 12-inch, 350 pounds per square inch gauge (psig) gas line owned and maintained by SoCal Gas Company (SCGC), which will be connected to new onsite fuel gas compressors that will be part of the CPP facility. From the CPP site, this new pipeline will run approximately 580 feet east in East Miraloma Avenue to Kraemer Boulevard, then north 2,660 feet in Kraemer Boulevard to East Orangethorpe Avenue to connect into SCGC's transmission line L-1218 in East Orangethorpe Avenue. (Total land disturbance will be 0.219 acre.)
- **Process water.** Process water for the project will be recycled water supplied from the Orange County groundwater replenishment system (GWRS) via a new 2,185-foot-long, 14-inch pipeline utilizing a new offsite booster pump station. The water pipeline will run east of the site on the north side of East Miraloma Avenue for 1,850 feet to the new pumping station located north of the curb in the COA-owned easement of East Miraloma Avenue, then north 210 feet in new easement from the Orange County Water District (OCWD), then 125 feet easterly in new easement to the GWRS line on the western side of the Carbon Canyon Diversion Channel. There, it will connect to the 60-inch-diameter GWRS recycled water line at an existing 36-inch stub up. (Total land disturbance for both line and pumping station will be 0.246 acre.)
- **Electrical interconnection.** Underground 69 kV cables will connect from GSUs to the onsite switchyard, which will use gas-insulated switchgear (GIS). There will be four new underground 69 kV circuits leaving the site. Two will proceed underneath and to the south side of East Miraloma Avenue approximately 100 feet to rise up and connect to the existing 69 kV overhead Vermont-Yorba lines via two new transition structures. The second two 69 kV underground circuits will proceed eastward approximately 4,000 feet in East Miraloma Avenue, turn south on Miller, then proceed approximately 3,000 feet to connect to the Dowling-Yorba 69 kV line at East La Palma Avenue. (Total land disturbance for both sets of cables will be 0.489 acre.)
- **Communications.** Fiber optic cable will run in a common trench with the approximately 7,000-foot 69 kV electric cables, where it will tie into existing underground fiber optic cable for the supervisory control and data acquisition (SCADA) system.

This section presents the methodology and results of a human Health Risk Assessment (HRA) performed to assess potential public health impacts associated with the air toxic emissions from the CPP Project. The purpose of the HRA is to evaluate potential public exposure and the potential for adverse health effects due to pollutant emissions from routine project operations. Impacts due to the proposed project's emissions of criteria pollutants (i.e., pollutants for which federal or California ambient air quality standards have been promulgated) are described in Section 6.2, Air Quality. Potential public exposure to accidental releases of hazardous materials on the proposed project site during operation is addressed in Section 6.15, Hazardous Materials Handling.

6.16.1 Affected Environment

The CPP project is located approximately 3.25 miles northeast of the downtown area of the COA and 25 miles southeast of downtown Los Angeles. The area within a 3-kilometer radius of the site is mainly industrial/urban area with few residences, thus for modeling purposes the region is considered urban.

Within a 5-mile radius of the CPP site the terrain slopes gradually up from the west to the east, but at approximately 6 miles to the north and east the Chino Hills and Santa Ana Mountains rise steeply.

Certain groups of individuals may be more susceptible to health risks due to chemical exposure, including children, pregnant women, the elderly, and people with chronic illnesses who could have higher sensitivity to toxic pollutants. Consequently, sensitive receptors, such as schools (public and private), day care facilities, convalescent homes, parks, and hospitals receive particular attention in the health risk analysis. All sensitive receptors located within a 3-mile radius of the site were included in the HRA. The closest residence is located at 2983 East Miraloma Ave, approximately 887 feet to the west of the site fence line. This site is being redeveloped for commercial use, but a caretaker unit will be a part of this development. The sensitive receptors and nearby residents included in the HRA modeling are shown on Figure 6.16-1, and presented in Appendix I-1. The current and future residential areas surrounding the CPP site are presented in Figure 6.16-2 which shows the areas currently zoned for residential use.

The local public health department, Orange County Health Care Agency, was contacted to determine if any health risk studies have been conducted in the neighborhoods within 6 miles of the proposed project site. An internet search was also conducted, and the following describes the two health risk studies that were identified.

Concern has been raised about the pollution emitted from locomotive rail yards in southern California, based on a study conducted in Roseville. The Anaheim yard was identified as one of 19 yards of concern. To address the concern about pollution from these yards, South Coast Air Quality Management District (SCAQMD) Rule 3503 was adopted to calculate the diesel particulate matter (PM) cancer risk and notify the public of any yard about the SCAQMD standard. Studies are presently being conducted (SCAQMD, 2006).

SCAQMD's Multiple Air Toxics Exposure Study (MATES-II) in the South Coast Air Basin (SCAQMD, 2000) consisted of a comprehensive monitoring program, an updated emissions inventory of toxic air contaminants (TACs), and a modeling effort to fully characterize the

Basin health risk. The South Coast Air Basin carcinogenic risk was estimated to be 1,400 per million, with mobile sources (e.g., cars, trucks, trains, ships, or aircraft) identified as the greatest contributing source category. About 70 percent of all risk is attributed to diesel particulate emissions; about 20 percent is attributed to other toxics associated with mobile sources (including benzene, butadiene, and formaldehyde); about 10 percent of all risk is attributed to stationary sources, which include industries and other certain businesses such as dry cleaners and chrome plating operations.

The MATES-II fixed monitoring site closest to the proposed project site is the Anaheim station, about 4 miles from the proposed project site. The MATES-II microscale monitoring site closest to the project site is called the Anaheim microscale station, and is approximately 1 mile from the proposed project site. The average modeled cancer risk in Orange County was 940 per million. Table 6.6-1 shows the cancer risk predicted from data measured at the Anaheim station. It also shows the cancer risk predicted from data measured at the remaining eight stations in the South Coast Air Basin (that measured all TACs) and the risk predicted from the MATES-II model.

TABLE 6.16-1
COMPARISON OF THE MEASURED AND MODELED CANCER RISK FROM THE MATES-II STUDY[1] (1 IN 1 MILLION)

Location	Benzene	1,3 Butadiene	Other	Diesel	Total
Anaheim (fixed station)[2]	119	87	161	963	1,330
Monitored Average[3]	92	118	187	1,017	1,414
MATES-II Model Average[3]	83	53	147	898	1,182

1 Source: MATES-II, SCAQMD, 2000

2 Anaheim fixed monitoring site address: 1010 S. Harbor Blvd., Anaheim, California 92805

3 Average from the MATES-II monitoring sites, excluding Wilmington and Compton, where not all TACs were measured

6.16.2 Environmental Consequences

This section describes the potential public health risks due to construction and operation of the proposed project, and the methodology and results of the HRA. Significant impacts are defined as a maximum incremental cancer risk greater than 10 in 1 million, a chronic total hazard index (THI) over 1.0, or an acute THI over 1.0. Also, uncertainties in the HRA are discussed and other potential health impacts of the proposed project are described.

6.16.2.1 Public Health Impact Assessment Approach

The potential human health risks posed by the proposed project's emissions were assessed using procedures consistent with the SCAQMD Risk Assessment Procedures for Rules 1401 and 212 (SCAQMD, 2005a), Supplemental Guidelines for Preparing Risk Assessments for the Toxics Hot Spots Information and Assessment Act (AB2588) (SCAQMD, 2005b), and Office of Environmental Health Hazard Assessment (OEHHA) Air Toxics Hot Spots Program Risk Assessment Guidelines (Cal-EPA/OEHHA, 2000). As recommended by the SCAQMD guideline, the California Air Resources Board (CARB) Hotspots Analysis and Reporting Program (HARP) (CARB, 2003) was used to perform a refined SCAQMD Tier 4 and OEHHA Tier 1 HRA for the proposed project. The SCAQMD and OEHHA guidelines were developed to provide risk assessment procedures, as required under the Air Toxics Hot Spots Information and Assessment Act of 1987, Assembly Bill 2588 (Health and Safety Code Sections 44360 et seq.). The Hot Spots law established a statewide program to inventory air toxics emissions from individual facilities, as well as guidance for execution of risk assessments and requirements for public notification of potential health risks.

The HRA was conducted in four steps using the HARP risk assessment model:

- Hazard identification and emission quantification
- Exposure assessment
- Dose-response assessment
- Risk characterization

First, hazard identification was performed to determine the potential health effects that could be associated with the proposed project emissions. The purpose was to identify whether pollutants emitted from the proposed project during plant operation could be characterized as potential human carcinogens, or associated with other types of adverse health effects. From the SCAQMD and OEHHA guidelines, a list of pollutants with potential cancer and non-cancer health effects associated with the emissions from the proposed project are presented in Table 6.16-2.

Second, an exposure assessment was conducted to estimate the extent of public exposure to the proposed project emissions. Public exposure is dependent on the short- and long-term ground-level concentrations resulting from emissions, the route of exposure, and the duration of exposure to those emissions. Dispersion modeling was performed using the ISCST3 model within HARP to estimate the ground-level concentrations near the proposed project site. The methods used in the dispersion modeling were consistent with the approach described in Section 6.2, Air Quality, and the modeling protocol submitted for the CPP project (URS, 2007).

Third, a dose-response assessment was performed in HARP to characterize the relationship between pollutant exposure and the incidence of an adverse health effect in exposed populations. The dose-response relationship is expressed in terms of potency factors for cancer risk and reference exposure levels (RELs) for acute and chronic non-cancer risks. The OEHHA guidelines provide potency factors and RELs for an extensive list of TACs. Potency

TABLE 6.16-2
TOXICITY VALUES USED TO CHARACTERIZE HEALTH RISKS

Compound	Sources of Emissions	Inhalation Cancer Potency Factor (mg/kg-day)$^{-1}$	Chronic REL (µg/m^3)	Acute REL (µg/m^3)
Diesel particulate (PM_{10})	Black start engine	1.10E+00	5.00E+00	--
Ammonia	Gas turbine stacks	--	2.00E+02	3.20E+03
1,3-Butadiene	Gas turbine stacks	6.00E-01	2.00E+01	--
Acetaldehyde	Gas turbine stacks	1.00E-02	9.00E+00	--
Acrolein	Gas turbine stacks	--	6.00E-02	1.90E-01
Benzene	Gas turbine stacks	1.00E-01	6.00E+01	1.30E+03
Ethylbenzene	Gas turbine stacks	--	2.00E+03	--
Formaldehyde	Gas turbine stacks	2.10E-02	3.00E+00	9.40E+01
Propylene oxide	Gas turbine stacks	1.30E-02	3.00E+01	3.10E+03
Toluene	Gas turbine stacks	--	3.00E+02	3.70E+04
Xylenes	Gas turbine stacks	--	7.00E+02	2.20E+04
Benzo(a)anthracene	Gas turbine stacks	3.90E-01	--	--
Benzo(a)pyrene	Gas turbine stacks	3.90E+00	--	--
Benzo(b)fluoranthene	Gas turbine stacks	3.90E-01	--	--
Benzo(k)fluoranthene	Gas turbine stacks	3.90E-01	--	--
Chrysene	Gas turbine stacks	3.90E-02	--	--
Dibenz(a,h)anthracene	Gas turbine stacks	4.10E+00	--	--
Indeno(1,2,3-cd)pyrene	Gas turbine stacks	3.90E-01	--	--
Naphthalene	Gas turbine stacks	1.20E-01	9.00E+00	--
Antimony	Cooling tower	--	2.00E-01	--
Arsenic	Cooling tower	1.20E+01	3.00E-02	1.90E-01
Beryllium	Cooling tower	8.4 E+01	3.00E-02	1.90E-01
Cadmium	Cooling tower	1.5 E+01	2.00E-02	--
Chlorine	Cooling tower	--	2.00E-01	2.10E+02
Chromium	Cooling tower	5.10E+02	2.00E-01	--
Copper	Cooling tower	--	2.40E+00	1.00E+02
Cyanide	Cooling tower	--	--	3.4E+02
Fluoride	Cooling tower	--	1.30E+01	2.40E+02
Lead	Cooling tower	4.20E-02	--	--
Manganese	Cooling tower	--	2.0E-01	--
Mercury	Cooling tower	--	9.0E-02	1.8E+00
Nickel	Cooling tower	9.1E-01	5.00E-02	6.0E+00

TABLE 6.16-2 (CONTINUED)
TOXICITY VALUES USED TO CHARACTERIZE HEALTH RISKS

Compound	Sources of Emissions	Inhalation Cancer Potency Factor (mg/kg-day)$^{-1}$	Chronic REL (μg/m^3)	Acute REL (μg/m^3)
Selenium	Cooling tower	--	2.00E+01	--
Silica	Cooling tower	--	3.00E+00	--
Sulfate	Cooling tower	--	2.50E+01	1.20E+02
Zinc	Cooling tower	--	3.50E+01	--

Source: Cal-EPA/OEHHA, 2005.
Notes:
-- = not applicable.
mg/kg-day = milligrams per kilogram per day.
μg/m^3 = micrograms per cubic meter.
REL = reference exposure levels.

factors and RELs are constantly being revised by the OEHHA, and the most recent values were applied in this HRA (Cal-EPA/OEHHA, 2005). All exposure pathways were included in this analysis, except the dairy milk, local meat, eggs, and fish ingestion, and drinking water consumption pathways, because the site is in an urban area and no drinking water sources are near the proposed project site. For the calculation of cancer risk, the duration of exposure to project emissions was assumed to be 24 hours per day, 365 days per year, for 70 years, at all receptors. The cancer risk was calculated in HARP using the Derived (Adjusted) Method, and the chronic THI was calculated in HARP using the Derived (OEHHA) Method.

Fourth, risk characterization was performed to integrate the health effects and public exposure information and provide qualitative estimates of health risks from project emissions. Risk modeling was performed using HARP to estimate cancer and non-cancer health risks for the project. The HARP model uses OEHHA equations and algorithms to calculate health risks based on input parameters such as emissions, "unit" ground-level concentrations, and toxicological data.

Detailed descriptions of the model input parameters and results of the HRA are provided in the following sections.

6.16.2.2 Construction Emissions

Due to the relatively short duration of the proposed project construction (i.e., 12 months, including commissioning), significant long-term public health effects are not expected to occur as a result of project construction emissions. Diesel particulate exhaust is the air pollutant with the largest potential for human health risk emitted during the construction period. Diesel particulate has been classified as a TAC and a carcinogen. However, the exposure assessment conducted for carcinogens is typically 70 years; due to the short duration of the construction effort, carcinogenic health risks are not predicted.

To ensure worker safety during actual construction, safe work practices will be followed (see Section 6.17, Worker Safety). A detailed analysis of the potential environmental impacts due to criteria pollutant emissions during construction and control of these emissions is discussed in Section 6.2, Air Quality.

6.16.2.3 Operations Emissions

Facility operations were evaluated to determine whether particular substances would be used or generated at the proposed site project that could cause adverse health effects upon their release to the air. The primary sources of potential emissions from facility operations would be the four natural gas-fired CTGs, as well as the ammonia slip stream from the selective catalytic reduction (SCR) control system on each CTG. Secondary project sources of potential emissions are the chiller cooling tower and diesel fuel combustion in the black start engine. The black start engine will normally be operated only for short periods in testing mode to ensure operability if needed. The chiller cooling tower will employ a high-efficiency drift elimination system to minimize the release of drift droplets containing trace amounts of hazardous substances. The substances that would be emitted from facility operations (with potential toxicological impacts) are shown in Table 6.16-2. These potential air toxic species were identified from emission factors published in U.S. Environmental Protection Agency (USEPA) AP-42 (USEPA, 1995), California Air Toxic Emission Factors (CATEFs) (CARB, 1996), and from analysis of the cooling tower water.

Worst-case estimates of hourly and annual turbine emissions were made by assuming that all turbines would operate simultaneously under full load conditions with a maximum higher heating value (HHV) fuel energy input rate of 480.6 million British thermal units per hour (MMBtu/hr) (100 percent load at 59 degrees Fahrenheit [°F]). For the annual emission calculations it was assumed that each turbine would operate for a maximum of 1,061 hours per year (1,001.5 hours of normal operations plus 128.5 startups and shutdowns).

Emission factors for natural gas-fired turbines were obtained from the AP-42 Table 3.1-3 for natural gas-fired stationary turbines (USEPA, 1995), per SCAQMD recommendations, and the speciated polycyclic aromatic hydrocarbons (PAH) emissions came from the CATEF database for natural gas-fired combustion turbines with SCR and CO catalyst systems. In addition, potential emissions of ammonia slip from the SCR systems were included. The emission factors and estimated maximum hourly and annual turbine emissions are summarized in Table 6.16-3.

TABLE 6.16-3
TOXIC AIR CONTAMINANT EMISSION RATES FROM OPERATION OF THE NATURAL GAS-FIRED COMBUSTION TURBINES

Chemical Species	Emission Factor (lb/MMBtu)[1]	Maximum Hourly Emissions per Turbine (lb/hr)	Annual Emissions Per Turbine (lb/hr)
Ammonia[2]		3.64	3.86E+03
1,3-Butadiene	4.30E-07	2.07E-04	2.19E-01
Acetaldehyde	4.00E-05	1.92E-02	2.04E+01
Acrolein	3.62E-06	1.74E-03	1.85E+00
Benzene	3.26E-06	1.57E-03	1.66E+00
Ethylbenzene	3.20E-05	1.54E-02	1.63E+01
Formaldehyde	3.60E-04	1.73E-01	1.84E+02
Propylene Oxide	2.90E-05	1.39E-02	1.48E+01
Toluene	1.30E-04	6.25E-02	6.63E+02
Xylenes	6.40E-05	3.08E-02	3.26E+02
Polycyclic Aromatic Hydrocarbons (PAH)			
Benzo(a)anthracene	2.23E-08	1.07E-05	1.14E-02
Benzo(a)pyrene	1.37E-08	6.60E-06	1.32E-01
Benzo(b)fluoranthene	1.12E-08	5.37E-06	5.69E-03
Benzo(k)fluoranthene	1.09E-08	5.22E-06	5.54E-02
Chrysene	2.49E-08	1.20E-05	1.27E-02
Dibenz(a,h)anthracene	2.32E-08	1.12E-05	1.18E-02
Indeno(1,2,3-cd)pyrene	2.32E-08	1.12E-05	1.18E-02
Naphthalene	1.64E-06	7.88E-04	8.36E-01

Notes:

1 See Appendix I-2 for detailed emission calculations. Emission factors obtained from USEPA AP-42 Table 3.1-3 for uncontrolled natural gas-fired stationary turbines. Formaldehyde, Benzene, and Acrolein emission factors are from the Background document for AP-42 Section 3.1, Table 3.4-1 for a natural gas-fired combustion turbine with a CO catalyst. PAH emission factors obtained from the CATEF database for natural gas-fired combustion turbines with SCR and CO catalyst.

2 Not a Clean Air Act Hazardous Air Pollutant (HAP).

lb/hr = pounds per hour.
lb/yr = pounds per year.
lb/MMBtu = pounds per million British thermal units.
ppm = parts per million.

Trace levels of inorganic particles are indicated in the analysis of the source water for the 4-cell chiller cooling tower and low-level emissions of these pollutants would therefore be contained in the particulate matter emitted as drift from the cooling tower. To calculate the cooling tower emissions, a water circulating rate of 7,740 gallons per minute with 10 cycles of concentration was used, and a drift elimination system capable of limiting drift to no more than 0.001 percent of the circulating water rate, as guaranteed by the equipment vendor. Water anticipated to be used in the cooling tower was sampled to determine the maximum concentrations of inorganic chemicals. These values were then used to determine the maximum TAC emissions from the cooling tower. For the annual emission calculations it was assumed that the cooling tower would operate for a maximum of 4,006 hours per year. Emission factors and estimated maximum hourly and annual emissions from the entire cooling tower are summarized in Table 6.16-4.

TABLE 6.16-4
TOXIC AIR CONTAMINANT EMISSION RATES
FROM OPERATION OF THE CHILLER COOLING TOWER

Chemical Species	TAC Concentration in Water (µg/L)[1]	Maximum Hourly Emissions (lb/hr)	Annual Emissions (lb/yr)
Antimony	0.6	2.33E-07	9.31E-04
Arsenic	4.8	1.86E-06	7.45E-03
Beryllium	0.1	3.88E-08	1.55E-04
Cadmium	0.1	3.88E-08	1.55E-04
Chlorine	9,300	3.60E-03	1.44E+01
Chromium	1.1	4.26E-07	1.71E-03
Copper[2]	28	1.09E-05	4.35E-02
Cyanide	46	1.78E-05	7.14E-02
Fluoride[2]	30	1.16E-05	4.66E-02
Lead	1.6	6.20E-07	2.48E-03
Manganese	9.2	3.57E-06	1.43E-02
Mercury	0.05	1.94E-08	7.76E-05
Nickel	0.1	3.88E-08	1.55E-04
Selenium	16	6.20E-06	2.48E-02
Silica[2]	970	3.76E-04	1.51E+00
Sulfate[2]	2,550	9.88E-04	3.96E+00
Zinc[2]	5	1.94E-06	7.76E-03

Notes:

[1] See Appendix I-2 for detailed emission calculations. The maximum concentration for each TAC as determined from water samples collected from the water for use with the CPP cooling tower.

[2] Not a Clean Air Act Hazardous Air Pollutant (HAP).

µg/L = micrograms per liter.
lb/hr = pounds per hour.
lb/yr = pounds per year.

Fine particulate (PM_{10}) emission factors for the diesel-fired black start engine were obtained from the equipment vendor, and are based on the USEPA Tier 2 emission limit for new diesel engines. PM_{10} emissions from the diesel-fired black start engine were estimated assuming it would run at its full rated capacity of 750 kW for one hour per month to test the engine. Actual emergency use of the diesel engine was not included. Emission factors and estimated maximum hourly and annual emissions from the black start engine are summarized in Table 6.16-5.

TABLE 6.16-5
TOXIC AIR CONTAMINANT EMISSION RATES FROM OPERATION OF THE DIESEL BLACK START ENGINE

Engine	Chemical Species	Emission Factor[1]	Maximum Hourly Emissions per Engine (lb/hr)	Annual Emissions Per Engine (lb/yr)
Black Start	Diesel Particulate (PM_{10})[2]	0.20 g/kW-hr	0.330	3.965

Notes:
1 See Appendix I-2 for detailed emission calculations. Emission factors obtained from engine vendors.
2 Not a Clean Air Act Hazardous Air Pollutant (HAP).
g/kW-hr = grams per kilowatt hour.
lb/hr = pounds per hour.
lb/yr = pounds per year.

6.16.2.4 Model Input Parameters

The HRA was conducted using worst-case emissions for each source (short- and long-term) as described above. Cancer and chronic non-cancer health effects were evaluated using the HARP model with annual emission estimates. Acute non-cancer health effects were analyzed, based on the worst-case maximum hourly emissions for all sources.

Dispersion modeling was performed using the ISCST3 model in HARP and methods consistent with the approach described in Section 6.2, Air Quality, and the modeling protocol submitted for the proposed project (URS, 2007). The HARP modeling analysis used similar source parameters except that the ISCST3 control parameter NOCALMS was selected per SCAQMD requirements for HRAs. The ISCST3 model was run with turbine stack parameters for the 100 percent load 59°F case to calculate the concentration of TACs per unit emission rate. HARP then uses this information along with the emission rates for specific TAC compounds (provided in the input file as described above) to calculate ground-level concentrations for each chemical species.

The meteorological input data used in the HARP/ISC modeling come from SCAQMD. The data are from the SCAQMD Anaheim station for 1981, were processed by SCAQMD and are ISCST3 model ready.

Risk values were modeled for all sensitive receptors, grid, boundary, and census receptors within 6 miles of the project site. Boundary receptors were placed every 82 feet (25 meters) along the property fence line. Grid receptors were spaced every 328 feet (100 meters) out to 6 miles (10 kilometers) from the site in every direction. Any risks calculated by the HARP model at onsite receptor locations were ignored. To ensure that the maximum potential risks resulting from proposed project emissions would be addressed, all receptors were treated as sensitive receptors.

Toxicological data, cancer potency factors and RELs for specific chemicals are built into the CARB's HARP model. The pollutant-specific cancer potency factors and RELs used in the HRA are listed in Table 6.16-2. The HARP model uses the toxicological data in conjunction with the other input data described above to perform health risk estimates based on OEHHA equations and algorithms.

6.16.2.5 Calculation of Health Effects

Adverse health effects are expressed in terms of cancer or non-cancer health risks. Cancer risk is typically reported as "lifetime cancer risk," which is the estimated maximum increase of risk of developing cancer caused by long-term exposure to a pollutant suspected of being a carcinogen. The calculation of cancer risk conservatively assumes an individual is exposed continuously to the maximum pollutant concentrations 24 hours per day for 70 years. Although such continuous lifetime exposure to maximum TAC levels is unlikely, the goal of the approach is to produce a conservative worst-case estimate of potential cancer risk. When a cancer risk of greater than one in one million is predicted, then cancer burden is calculated. Cancer burden is the estimated increase in the occurrence of cancer cases within the portion of the population subject to a cancer risk greater than or equal to one in one million (1.0×10^{-6}) resulting from exposure to TACs.

Non-cancer risk is typically reported as a THI. The THI is calculated for each target organ as a fraction of the maximum acceptable exposure level to a pollutant. The acceptable exposure level is generally the level at (or below) which no adverse health effects are expected. The THIs are calculated for both short-term (acute) and long-term (chronic) noncarcinogenic exposures.

Both cancer and non-cancer risk estimates produced by the HRA represent incremental risks (i.e., risks due to proposed project sources only) and do not include potential health risks posed by existing background concentrations. The HARP model performs all of the necessary calculations to estimate the potential lifetime cancer risk and the acute and chronic non-cancer THIs posed by proposed project emissions.

6.16.2.6 Health Effects Significance Criteria

Various state and local agencies provide different significance criteria for cancer and non-cancer health effects. For the proposed project, the SCAQMD and California Energy Commission (CEC) guidelines provide the significance criteria for potential cancer and non-cancer health effects from project-related emissions. For carcinogenic health effects, an exposure is considered potentially significant when the predicted increase in lifetime cancer risk exceeds 10 in 1 million (1.0×10^{-5}). For noncarcinogenic health effects, an exposure that affects each target organ is considered potentially significant when the THI exceeds a value of 1.0.

In order to have access to the emission reduction credits in the SCAQMD Priority Reserve (Rule 1309.1), new power plant projects within an Environmental Justice Area that have a generating capacity less than or equal to 500 MW must meet the cancer risk threshold of 1 in a million, cancer burden of 0.1 (based on a 1 in 10 million risk level) and acute and chronic non-cancer hazard indices of 0.5.

6.16.2.7 Estimated Lifetime Cancer Risk

The maximum incremental cancer risk resulting from project emissions was estimated to be 0.266 in 1 million, at a location on the northern property boundary near the east edge of the site (receptor located at 420,287 m east, 3,746,910 m north[1]). The maximum incremental cancer risk predicted at a sensitive receptor was estimated to be 0.045 in 1 million, which is a residence located approximately 2,000 feet (600 meters) southwest of the property edge (419,563 m east, 3,746,289 m north). Table 6.16-6 presents the detailed cancer risk results of the HRA for the proposed project operations. The cancer burden is predicted to be 0 based on a cancer risk of 1 in 10 million.

TABLE 6.16-6
TOTAL PROJECT ESTIMATED CANCER RISK AND ACUTE AND CHRONIC NON-CANCER TOTAL HAZARD INDICES

Location	Cancer Risk	Cancer Burden[1]	Chronic Hazard Index	Acute Risk Hazard Index
Point of maximum impact	0.266 excess risk in 1 million	0	0.006 total hazard index	0.016 total hazard index
Nearest sensitive receptor	0.045 excess risk in 1 million	0	0.001 total hazard index	0.016 total hazard index
Nearest School – Melrose	0.022 excess risk in 1 million	0	0.005 total hazard index	0.003 total hazard index

[1] Based on a cancer risk of 1 in 10 million.

[1] Coordinates are provided in accordance with the Universal Transverse Mercator and North American Datum, 1983, Zone 11.

The estimated cancer risks at all locations are well below the significance criterion of 10 in 1 million and the Priority Reserve threshold of 1 in a million. Thus, the proposed project emissions are expected to pose a less-than-significant increase in carcinogenic health risk. All HARP model files and all air quality modeling files are provided electronically on a DVD that is supplied separately with this AFC.

SCAQMD Rule 1401.1 provides additional health based criteria for projects that are within 1,000 feet of a school. The closest school to the CPP is Melrose Elementary School located approximately 3,000 feet from the stacks. While this distance is sufficient such that the SCAQMD does not require the HRA to estimate the potential public health effects at the school, the HRA performed for the CPP did perform the modeling, and the results shown in Table 6.16-6 demonstrate that the potential public health impacts at the school are significantly less than the maximum public health impacts identified above, and are well below acceptable standards. Therefore the CPP will not cause public health impacts at Melrose Elementary School.

6.16.2.8 Estimated Chronic and Acute Total Hazard Indices

The maximum chronic THI resulting from proposed project's operational emissions was estimated to be 0.006 at a location on the northern property boundary near the east edge of site (receptor located at 420,287 m east, 3,746,910 m north). The maximum predicted chronic THI at a sensitive receptor due to TAC emissions of the proposed project was 0.001. This receptor is a residence located approximately 1,640 feet (500 meters) east of the project fenceline (at 420,880 m east, 3,746,899 m north).

The maximum acute THI resulting from the proposed project emissions was estimated to be 0.016 at a grid receptor located approximately 1.86 miles (3 kilometers) southeast of the project (at 422,572 m east, 3,744,781 m north). The maximum acute THI at a sensitive receptor was estimated to be 0.016 at Placentia Veterinary Clinic, which is approximately 2.05 miles (3.3 kilometers) north of the proposed project site (at 420,384 m east, 3,750,118 m north). Table 6.16-6 presents the detailed results of the HRA for the proposed project operations.

The estimated chronic and acute THIs are well below the significance criterion of 1.0 and the Priority Reserve threshold of 0.5. Thus, the proposed project emissions of noncarcinogenic TACs would not be expected to pose a significant risk.

To satisfy SCAQMD Rule 1401, the maximum cancer risk and non-cancer chronic and acute hazard indices from each permitted unit must be below the significance thresholds of 10 in a million and 1, respectively. Since the total project cancer risk, non-cancer acute and chronic hazard indices are all below the significance thresholds, each permit unit will individually be below the significance thresholds.

6.16.2.9 Conservative Nature of the Public Health Impact Assessment

Sources of uncertainty in the results of HRAs include emissions estimates, dispersion modeling, exposure characteristics, and extrapolation of toxicity data in animals to humans. For this reason, assumptions used in HRAs are typically designed to provide sufficient health protection to avoid underestimation of risk to the public. Some sources of uncertainty applicable to this HRA are discussed below.

The turbine emission rates were derived using vendor data for ammonia slip and from emission factors from AP-42 (USEPA, 1995) and CATEF (1996) for the other air toxics. Both the short- and long-term turbine emissions estimates were developed assuming all turbines would operate at full load and continuously at the same time. Under actual operating conditions, the turbines would operate less hours per year and at a lower load. Consequently, the emissions used for this HRA are likely to be higher than what would be experienced under normal plant operation.

Dispersion models approved for regulatory applications contain assumptions that tend to overpredict ground-level concentrations. For example, the modeling performed in the HRA assumed a conservation of mass (i.e., all of the pollutants emitted from the sources remained in the atmosphere while being transported downwind). During the transport of pollutants from sources toward receptors, none of the emitted material was assumed to be removed from the source plumes through chemical reaction or lost at the ground surface through reaction, gravitational settling, or turbulent impaction. In reality, these mechanisms work to reduce the level of pollutants remaining in the atmosphere during plume travel.

The exposure characteristics assessed in the HRA included the assumption that residents would be exposed to turbine emissions continuously at the same location for 24 hours per day, 365 days per year, for 70 years. It is extremely unlikely that any resident would meet this condition. The conservative exposure assumption tends to overpredict risk estimates in the HRA process.

The toxicity data used in the HRA contain uncertainties due to the extrapolation of data from animals to humans. Typically, safety factors are applied when doing the extrapolation. Furthermore, the human population is much more diverse, both genetically and culturally, than bred experimental animals. The interspecies variability among humans is expected to be much greater than in laboratory animals. With all of the uncertainty in the assumptions used to extrapolate toxicity data, significant measures are taken to ensure that sufficient health protection is built into the available health effects data.

Conservative measures to compensate for all of these uncertainties and ensure that potential health risks are not underestimated are compounded in the final HRA predictions. Therefore, the actual risk numbers are expected to be well below the values presented in this analysis.

6.16.2.10 Criteria Pollutants

The dispersion of the criteria pollutants (NO_2, CO, SO_2, PM_{10}, and $PM_{2.5}$) was modeled, and an evaluation of their impacts on air quality is presented in Section 6.2, Air Quality. The federal and state ambient air quality standards (AAQS) set limits on the allowable level of air pollutants in the ambient air necessary to protect public health. The results show that the proposed project would not cause a violation of any state or federal AAQS and would not significantly contribute to existing violations of federal and state PM_{10} and $PM_{2.5}$ standards. In addition all emissions of criteria pollutants and their precursors will be mitigated by obtaining emission reduction credits as offsets. Therefore, no significant adverse health effects are anticipated from the proposed project's criteria pollutant emissions.

6.16.3 Cumulative Impacts

Risks from the proposed project are evaluated on their own and then compared to the applicable significance criteria. The cumulative effects from sources other than the proposed project are not considered. CEC requirements specify that an analysis must be conducted to determine the cumulative impacts of the project and other projects within a 6-mile radius that have received construction permits but are not yet operational or that are in the permitting process or can be expected to do so in the near future. Information requests have been made to SCAQMD to obtain data on new projects planned within six miles from the proposed site. When this information is received, it will be forwarded to CEC for approval as the basis for the full cumulative analysis. The results of the final cumulative impact analysis will be reported under separate cover.

6.16.4 Mitigation Measures

The criteria pollutant emissions from the proposed project will be mitigated by the use of Best Available Control Technology (BACT) and through emissions offsets; these measures are presented in Section 6.2, Air Quality. The toxic pollutant emissions from the proposed project will also be mitigated by the exclusive use of natural gas fuel in the four gas turbine generators. In addition, pollution control technologies employed to control criteria pollutants (specifically, the oxidation catalyst on the turbines) will also significantly reduce organic TACs, such as those listed in Table 6.16-2. These measures satisfy the SCAQMD requirements for toxics (T-BACT) for natural gas-fired generation units.

The HRA presented in the foregoing subsections shows that the maximum health effects impacts of the project as proposed would be well below the significance thresholds identified in Section 6.16.2.6. Therefore, no further mitigation of emissions from the proposed project is required to protect public health.

6.16.5 Laws, Ordinances, Regulations, and Standards (LORS)

The proposed project will be constructed and operated in accordance with all LORS applicable to protecting public health. The applicable LORS related to public health impacts from the proposed project are identified in Table 6.16-7. This table also summarizes the agencies that are principally responsible for public health, as well as the general category(ies) of public health concerns regulated by each of these agencies. The conformity of the project to each of the LORS applicable to public health is also presented in this table, as well as references to the locations in this document where each of these issues is addressed.

6.16.6 Involved Agencies and Agency Contacts

Table 6.16-8 provides a list of involved agencies and agency contacts.

6.16.7 Permits Required and Permit Schedule

The Permit to Construct (PTC) permitting process that would otherwise apply is superseded in the case of CEC licensing projects by the Determination of Compliance (DOC) process which is its functional equivalent. The CEC's final decision on this AFC application will serve as the principal approval required to ensure that the project's impacts to public health would be within acceptable levels. However, a Permit to Operate (PTO) would be awarded following SCAQMD confirmation that the project has been constructed to operate as described in the permit applications.

6.16.8 References

California Environmental Protection Agency and Office of Environmental Health Hazard Assessment (Cal-EPA/OEHHA). 1999. Air Toxics Hot Spots Risk Assessment Guidelines, Part I. Technical Support Document for the Determination of Acute Reference Exposure Levels for Airborne Toxicants.

2000. Air Toxics Hot Spots Program Risk Assessment Guidelines – The Air Toxics Hot Spots Program Guidance Manual for EPA Preparation of Health Risk Assessments; Air Toxics Hot Spots Risk Assessment Guidelines, Part III: Technical Support Document for the Determination of Noncancer Chronic Reference Exposure Levels.

2005. Air Toxics Hot Spots Risk Assessment Guidelines, Part II: Technical Support Document for Describing Available Cancer Potency Factors.

California Air Resources Board (Cal-EPA/CARB). 2003. HARP User Guide – Software for Emission Inventory Database Management, Air Dispersion Modeling Analyses, and Health Risk Assessment version 1.3, Air Resources, Board, California Environmental Protection Agency. December 2003.

TABLE 6.16-7
APPLICABLE LORS

Authority	Administering Agency	Requirement	Project Compliance
Federal			
Clean Air Act (CAA)	USEPA CARB SCAQMD	Protect public from unhealthful exposure to air pollutants.	Based on the results of the risk assessment, health risks due to proposed project emissions of air toxics would not exceed acceptable levels (Section 6.16, Public Health). Emissions of criteria pollutants will be minimized by applying BACT to the facility. Increases in emissions of criteria pollutants will be fully offset (Section 6.2 Air Quality).
State			
California Public Resource Code § 25523(a); 20 CCR § 1752.5, 2300-2309, and Division 2 Chapter 5, Article 1, Appendix B, Part (1)	CEC	Assure protection of environmental quality; requires quantitative HRA.	The HRA in Section 6.16, Public Health, of this AFC satisfies this requirement.
California Clean Air Act, TAC Program, H&SC § 39650, et seq.	SCAQMD with CARB oversight	Requires quantification of TAC emissions, use of BACT, and preparation of an HRA.	The proposed project would not cause unsafe exposure to TACs based on results of HRA (Section 6.16, Public Health), and has performed a BACT assessment (Section 6.2, Air Quality).
H&SC, Part 6, § 44300 et seq. (Air Toxics "Hot Spots")	SCAQMD with CARB/OEHHA oversight	Requires inventorying of TACs and HRA, as well as public notification of predicted health risks.	The HRA presented in Section 6.16, Public Health, of this AFC satisfies this requirement.
H&SC § 41700	SCAQMD with CARB oversight	Prohibits emissions in quantities that adversely affect public health, other businesses or property.	Section 6.2, Air Quality, and the HRA (Section 6.16, Public Health) presented in this AFC satisfy this requirement.
Local			
SCAQMD Rule 1401	SCAQMD	Requires use of T-BACT for major sources and an HRA to predict health risks.	T-BACT will be applied. The HRA presented in Section 6.16, Public Health, of this AFC has been conducted in accordance with requirements of this rule.

TABLE 6.16-7 (CONTINUED) APPLICABLE LORS

Authority	Administering Agency	Requirement	Project Compliance
SCAQMD Rule 1309.1	SCAQMD	To have access to the SCAQMD Priority Reserve emission credit bank, stricter HRA significance thresholds must be met.	The HRA presented in Section 6.16, Public Health, of this AFC satisfies this requirement. Specifically, Section 6.16.2.7 and 6.16.2.8 demonstrate that the project meets the strict HRA significance thresholds.
SCAQMD Rule 301	SCAQMD	Requires annual fees for TACs or ozone depleting compounds.	The HRA presented in Section 6.16, Public Health, of this AFC and the payment of fees to SCAQMD will satisfy these requirements.
SCAQMD Rule 212	SCAQMD	Requires an HRA to estimate the maximum cancer risk for purpose of approving the permit to operate and issuing public notice if necessary.	The HRA presented in Section 6.16, Public Health, of this AFC satisfies this requirement.

Notes:
BACT = Best Available Control Technology
CARB = California Air Resources Board
CCR = California Code of Regulations
CEC = California Energy Commission
CUPA = Certified Unified Program Agency
H&SC = Health and Safety Code
HRA = Health Risk Assessment
SCAQMD = South Coast Air Quality Management District
LORS = Laws, Ordinances, Regulations, and Standards
OEHHA = Office of Environmental Health Hazard Assessment
OES = Office of Emergency Services
RMP = Risk Management Plan
AFC = Application for Certification
TAC = Toxic air contaminant
T-BACT = Toxic Best Available Control Technology
USEPA = United States Environmental Protection Agency

California Air Resources Board (CARB). 1996. California Air Toxics Emission Factor (CATEF) Database, Version 1.2. http://www.arb.ca.gov/app/emsinv/catef_form.html

South Coast Air Quality Management (SCAQMD). 2000. Multiple Air Toxics Exposure Study in the South Coast Air Basin MATES-II. March.

2005a. Risk Assessment Procedure for Rules 1401 and 212, Version 7. July.

TABLE 6.16-8
AGENCY CONTACTS

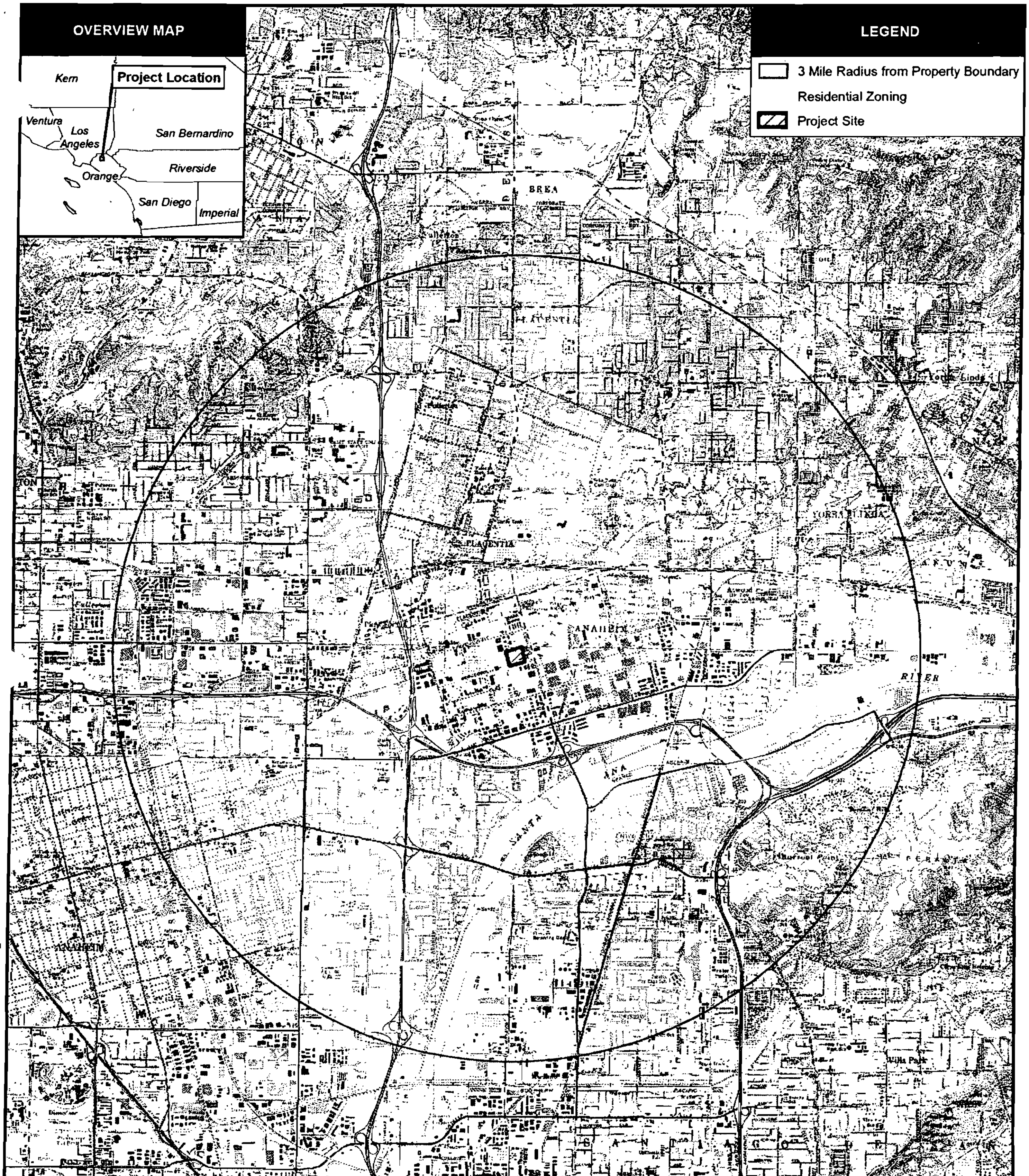
Agency	Contact/Title	Telephone
California Energy Commission	Keith Golden Air Quality Specialist 1516 Ninth Street Sacramento, CA 95814	(916) 654-4287
	Mike Ringer Public Health Specialist 1516 Ninth Street Sacramento, CA 95814	(916) 654-4287
California Air Resources Board	Mike Tollstrup 1001 I Street Sacramento, CA 95814	(916) 322-6026
South Coast Air Quality Management District	Tom Chico SCAQMD 21865 Copley Dr, Diamond Bar, CA 91765	(909) 396-3149

2005b. Supplemental Guidelines for Preparing Risk Assessments for the Toxics "Hot Spots" Information and Assessment Act (AB2588). July.

2006. Fact Sheet Locomotive Operations and Air Pollution in Southern California, February 2006. http://aqmd.gov/news1/2006/LocomotiveFactSheet2.html.

U.S. Environmental Protection Agency (USEPA). 1995. AP-42 Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, Fifth Edition.

URS Corporation. 2007. Air Quality Modeling Protocol for the Anaheim Municipal Power Station Project, Anaheim, California. Prepared by URS for South Coast Air Quality Management District and California Energy Commission.



SOURCES: USGS Topo Quad Maps (Santa Ana 1983, San Bernardino 1982); City of Anaheim (Land Use 2007); City of Fullerton (Land Use date unknown); City of Placentia (Land Use date unknown); City of Orange (Land Use 2006).

AREAS ZONED FOR RESIDENTIAL USE NEAR THE CPP SITE

URS

0.5 0 0.5 1 Miles

SCALE: 1" = 2000 Feet (1:24,000)
SCALE CORRECT WHEN PRINTED AT 8.5X11

CREATED BY CM	DATE: 12-2007	FIG. NO:
PM: CP	PROJ. NO: 28906973.01010	6.16-2

Path: G:\gis\proje 28906973\mxd\Air_Quality_Land_Use.mxd, 12/10/07, calin_mattison

Adequacy Issue: Adequate Inadequate **DATA ADEQUACY WORKSHEET** Revision No. 0 Date

Technical Area: **Public Health** Project: CPP Technical Staff:

Project Manager: Docket: Technical Senior:

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (g) (1)	...provide a discussion of the existing site conditions, the expected direct, indirect and cumulative impacts due to the construction, operation and maintenance of the project, the measures proposed to mitigate adverse environmental impacts of the project, the effectiveness of the proposed measures, and any monitoring plans proposed to verify the effectiveness of the mitigation.	Section 6.16.1 Section 6.16.2 Section 6.16.3 Section 6.16.4		
Appendix B (g) (9) (A)	An assessment of the potential risk to human health from the project's hazardous air emissions using the Air Resources Board Hotspots Analysis and Reporting Program (HARP) (HSC §§44360-44366) or its successor and Approved Risk Assessment Health Values. These values should include the cancer potency values and noncancer reference exposure levels approved by the Office of Environmental Health Hazard Assessment (OEHHA Guidelines, Cal-EPA 2005).	Section 6.16.2		
Appendix B (g) (9) (B)	A listing of the input data and output results, in both electronic and print formats, used to prepare the HARP health risk assessment.	Section 6.16.2 Modeling DVD		
Appendix B (g) (9) (C)	Identification of available health studies through the local public health department concerning the potentially affected population(s) within a six-mile radius of the proposed power plant site related to respiratory illnesses, cancers or related diseases.	Section 6.16.1		

Adequacy Issue: Adequate ____ Inadequate ____ **DATA ADEQUACY WORKSHEET** Revision No. 0 Date ____

Technical Area: Public Health Project: CPP Technical Staff: ____

Project Manager: ____ Docket: ____ Technical Senior: ____

Siting Regulations	Information	AFC Page Number and Section Number	Adequate Yes or No	Information Required to Make AFC Conform with Regulations
Appendix B (g) (9) (D)	A map showing sensitive receptors within the area exposed to the substances identified in subsection (g)(9)(A).	Figure 6.16-1		
Appendix B (g) (9) (E)	For purposes of this section, the following definitions apply:			
Appendix B (g) (9) (E) (i)	A sensitive receptor refers to infants and children, the elderly, and the chronically ill, and any other member of the general population who is more susceptible to the effects of the exposure than the population at large;	Section 6.16.1 Figure 6.16-1		
Appendix B (g) (9) (E) (ii)	An acute exposure is one which occurs over a time period of less than or equal to one (1) hour; and	Section 6.16.2		
Appendix B (g) (9) (E) (iii)	A chronic exposure is one which is greater than twelve (12) percent of a lifetime of seventy (70) years.	Section 6.16.2		
Appendix B (i) (1) (A)	Tables which identify laws, regulations, ordinances, standards, adopted local, regional, state, and federal land use plans, leases, and permits applicable to the proposed project, and a discussion of the applicability of, and conformance with each. The table or matrix shall explicitly reference pages in the application wherein conformance, with each law or standard during both construction and operation of the facility is discussed; and	Section 6.16.5		

Adequacy Issue: Adequate Inadequate

DATA ADEQUACY WORKSHEET

Revision No. 0 Date

Technical Area: **Public Health**
Project Manager:

Project: CPP
Docket:

Technical Staff:
Technical Senior:

SITING REGULATIONS	INFORMATION	AFC PAGE NUMBER AND SECTION NUMBER	ADEQUATE YES OR NO	INFORMATION REQUIRED TO MAKE AFC CONFORM WITH REGULATIONS
Appendix B (i) (1) (B)	Tables which identify each agency with jurisdiction to issue applicable permits, leases, and approvals or to enforce identified laws, regulations, standards, and adopted local, regional, state and federal land use plans, and agencies which would have permit approval or enforcement authority, but for the exclusive authority of the commission to certify sites and related facilities.	Section 6.16.5		
Appendix B (i) (2)	The name, title, phone number, address (required), and email address (if known), of an official who was contacted within each agency, and also provide the name of the official who will serve as a contact person for Commission staff.	Section 6.16.6		
Appendix B (i) (3)	A schedule indicating when permits outside the authority of the commission will be obtained and the steps the applicant has taken or plans to take to obtain such permits.	Section 6.16.7		