DOCKETED	
Docket Number:	06-AFC-02
Project Title:	High Grove Power Project AES 300 Megawatt Simple Cycle Power Plant, City of Grand Terrance San Bernardino County
TN #:	233647-8
Document Title:	Application for Certification AES Highgrove PT 10
Description:	Document was on proceeding webpage and is now moved over to the docket log.
Filer:	Raquel Rodriguez
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	6/25/2020 11:41:58 AM
Docketed Date:	6/25/2020

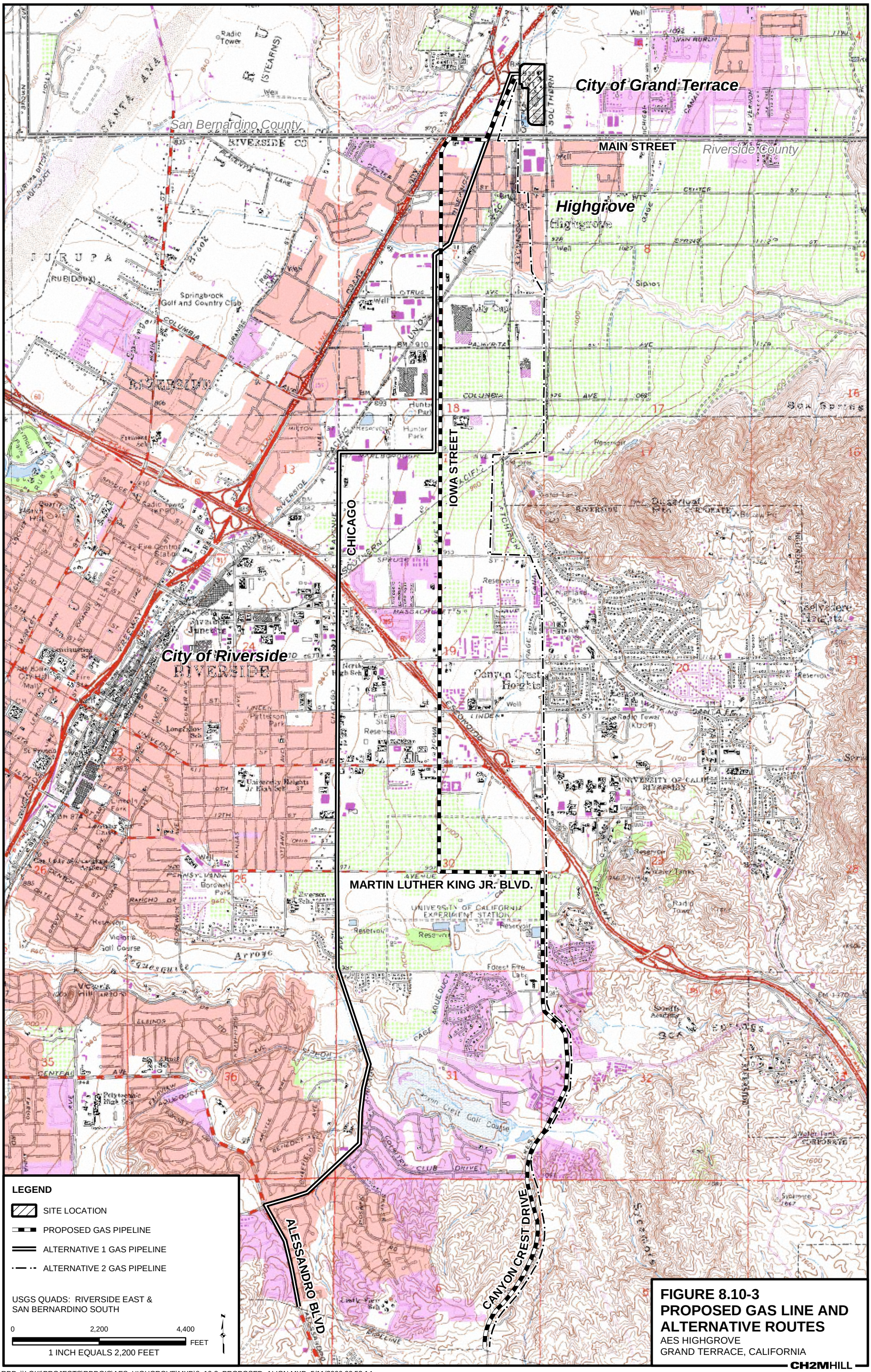


FIGURE 8.10-3
PROPOSED GAS LINE AND ALTERNATIVE ROUTES
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

CH2MHILL

RDD \\LOKI\PROJECTS\RDDGIS\AES_HIGHGROVE\MXD\8_10-3_PROPOSED_ALIGN.MXD 5/11/2006 09:52:14

FIGURE 8.10-4
LOCAL ROADWAY NETWORK IN THE VICINITY OF THE PROJECT SITE
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

CH2MHILL

RDD \\LOKI\PROJECTS\RDDGIS\AES_HIGHGROVE\MXD\8_10-4_LOCAL_ROADWAYS.MXD 5/11/2006 09:48:47

8.11 Visual Resources

Visual resources are the natural and cultural features of the landscape that can be seen and that contribute to the public's appreciative enjoyment of the environment. Visual resources or aesthetic impacts are generally defined in terms of a project's physical characteristics and potential visibility and the extent to which the project would change the perceived visual quality of the environment in which it would be located.

This section was prepared following the California Energy Commission (CEC) guidelines for preparing visual impact assessments for Applications for Certification (AFCs). Subsection 8.11.1 documents the visual conditions that currently exist in the project area. Subsection 8.11.2 discusses the potential environmental effects of the project as they relate to visual resources. Subsection 8.11.3 discusses the potential cumulative impacts of this and other projects in the area. Subsection 8.11.4 summarizes the mitigation measures proposed to reduce project impacts on visual resources. Subsection 8.11.5 describes the applicable laws, ordinances, regulations, and standards applicable to the project. Subsection 8.11.6 lists the references used in preparation of this section.

Figure 8.11-1 shows an aerial view of the project site and the location of character photos. Figure 8.11-2 shows the project viewshed and location of the project's Key Observation Point (KOP). The character photos and existing and simulated views from the KOP follow as Figures 8.11-3 through 8.11-5. Figure 8.11-6 depicts a preliminary landscaping plan proposed for the project. All figures for this section are located at the end of the section.

8.11.1 Affected Environment

8.11.1.1 Regional Setting

The proposed power plant site is located in the City of Grand Terrace, in southern San Bernardino County (Figure 1.1-1). The community of Highgrove, in Riverside County, lies to the south of Grand Terrace, while the City of Colton borders Grand Terrace on the west, and to the north.

The City of Grand Terrace is located in the flat lands of the San Bernardino Valley, and extends onto the slopes of Blue Mountain on the east and the La Loma hills on the west. The community's western edge is bisected by Interstate 215, which travels through the valley in a north-south direction. The western edge of Grand Terrace is also crossed by two major north-south rail corridors. Although some large areas of open agricultural lands and hillside grasslands remain, much of Grand Terrace has been built out with a low density pattern of urbanization. In the corridor along the freeway and railroad lines in the western side of the city, industrial and warehouse uses predominate, creating a zone in which there are industrial-appearing structures; many large, boxy warehouse buildings; and large paved areas in which trucks and containers are a prominent part of the view. The portions of the community to the west and east of this corridor are characterized by neighborhoods of primarily single-family homes. From many of these neighborhoods, there are scenic views of nearby hills and the valley to the north of the city as well as more distant mountain ridges.

8.11.1.2 Project Site and Vicinity

The proposed generating facility is located at 12700 Taylor Street, north of the intersection of Taylor and Main streets. The 17.3-acre Project Site is made up of two parcels, a parcel containing the former Highgrove Generating Station (the "Generating Station Property") previously owned by Southern California Edison (SCE) and now owned by AES Highgrove. LLC, and an adjacent city-owned parcel formerly occupied by a tank farm (the "Tank Farm Property") associated with the power plant when owned by SCE.

8.11.1.3 Generating Station Property

Prominent features on the Generating Station Property include several large structures associated with the former gas- and oil-fired units, four large stacks, multi-level boiler structures consisting of structural steel platforms and steam piping, four large cooling towers, storage tanks and associated equipment. One of the noticeable features of the Generating Station Property is that many of the large structures are in close proximity to Taylor Street. The structures on the property extend approximately 950 feet along the frontage of Taylor Street.

The 50-year-old Generating Station can be characterized as an aging power plant with a strong, industrial appearance. Unlike modern power plants, the Generating Station has minimal screening, and was not built with uniform paint treatment of surfaces. The predominant features are four large boiler structures, approximately 4 stories tall, with scaffolding and interconnecting piping between stories and four large cooling towers. Two of the four exhaust stacks are approximately 80 feet tall. Much of the generating station equipment has been constructed with minimal setback from Taylor Street. These features can be seen in Figures 8.11-3a and 8.11-3b, photos of the existing view looking into the Generating Station Property from Taylor Road. As a part of the project, the existing structures on the Generating Station Property will be removed.

8.11.1.4 Tank Farm Property

The Tank Farm Property was previously used by SCE to store fuel oil associated with the power plant. Although the tanks have been removed, this portion of the site still retains a recessed bermed area in which the tanks were located. Existing transmission lines and associated pole and tower structures, which are part of the SCE electricity distribution grid and estimated to be over 65 feet tall, border this portion of the site along its northern and western edges. Figures 8.11-4a and 8.11-4b are photos of the view looking northwest across the Tank Farm Property.

8.11.1.5 SCE Substation Property

A 115-kilovolt (kV) substation owned by SCE is located directly west of the Generating Station Property. Once demolition activities on the Generating Station Property are completed, the SCE substation equipment and associated transmission lines, which are an integral part of the electricity supply grid, will be visible from Taylor Street.

8.11.1.6 Project Site

The Applicant proposes to construct the new facility on a parcel comprised primarily of the Tank Farm Property with a portion of the Generating Station Property ("Project Site")

instead of building the facility on the footprint of the existing generating station. This project site was selected such that the major structures could be located to maximize setback from Taylor Street and because the dimensions of the site allow plant frontage along Taylor Street to be minimized. In addition, the plant will be recessed within the depression created by the berms to further lower the plant's elevation and profile.

The transmission lines connecting the new power plant to the SCE substation will be located on property now occupied by equipment that is a part of the existing Generating Station.

The project site is located in an industrially zoned area of the City of Grand Terrace. The area surrounding the proposed site consists of industrial and commercial development, residential areas, and agricultural fields. Industrial uses, including a transmission line corridor, canal, railroad tracks, and an interstate highway are located to the west. The area to the north of the site is currently vacant or used for industrial storage. The area east of the site currently includes open agricultural lands, railroad tracks, a public park and residences. Located to the south are Cage Park Property, a large lumberyard, a former chrome plating facility, and residences. There are no scenic highways in Grand Terrace.

Future development plans are associated with the areas east and north of the site. The agricultural lands and lumber area east of the site is the proposed location of the Colton Joint Unified School District Proposed High School #3, which will consist of a high school and athletic fields. The area to the north of the site is part of the proposed Outdoor Adventures Center Specific Plan, a planned approximately 100-acre commercial development to be developed by the City; the intended use for this parcel is described further in Section 8.4, Land Use.

8.11.1.7 Linear Facilities

The location of the proposed power plant site and the routes of the natural gas supply pipeline and potable water supply line for the proposed project are indicated on Figure 2.1-1.

Potable water will be provided by a short connection to the existing city water main located under Taylor Street in front of the project site. Sanitary sewer service will be provided by connection to a city sanitary sewer line located on Taylor Street in front of the site.

Natural gas will be delivered to the site by means of an approximately 7-mile-long underground pipeline to a main gas line owned by SoCalGas. The proposed gas line from the AES Highgrove Project would exit the west side of the Project Site and follow the Riverside Canal southwest to Main Street. It would turn west on Main Street to Iowa Street and head south on Iowa Street to Martin Luther King Boulevard. It would turn east on Martin Luther King Boulevard to Canyon Crest Drive. On Canyon Crest Drive, the line would head south and end at Via Vista Drive, where it would connect into Line 2001.

Development along Main Street is primarily industrial; Iowa Street has primarily commercial/industrial development with some scattered residential areas. Martin Luther King Boulevard has agricultural development on both sides; Canyon Crest Drive has a mixture of agricultural, commercial, and residential development, and open space.

8.11.1.8 Construction Laydown Area

As shown in Figure 2.2-6, the project construction laydown and parking areas will be within the former plant site, on the Generating Station Property immediately south of the area where the new power plant will be built.

8.11.1.9 Sensitive Viewing Areas and Key Observation Points

As the first step in structuring the analysis of the project's effects on visual resources, a determination was made of the project's viewshed, or the area from which the project would have the potential to be visible. This area is indicated on Figure 8.11-2. Because the viewshed depicted on this figure is based on consideration of topography only, the project's actual visibility is likely to be considerably less because of the screening provided by structures and trees in the foreground of views. Within the area from which the project has the potential to be visible, the view areas that would be the most sensitive to the project's potential visual impacts and the sensitive receptors in those areas were identified. Representative viewpoints from these sensitive receptor locations are referred to as Key Observation Points (KOPs). Based on consultation with CEC staff, one KOP (KOP-1) was selected for detailed analysis for the proposed project. This KOP was selected based on the sensitivity of the location and proximity of project facilities. The location of this KOP is indicated on Figure 8.11-2.

Based on fieldwork conducted in May 2005, the existing visual conditions of the views from the KOP were documented and evaluated. An assessment of the existing level of scenic quality was made based on professional judgment that took a broad spectrum of factors into consideration, including:

- Natural features, including topography, water courses, rock outcrops, and natural vegetation
- The positive and negative effects of man-made alterations and built structures on visual quality
- Visual composition, including an assessment of the vividness, intactness, and unity of patterns in the landscape[1]

The final scenic quality ratings assigned to each view fit within the rating scale summarized in Table 8.11-1. Development of this scale builds on a scale developed for use with an artificial intelligence system for evaluation of landscape visual quality (Buhyoff et al., 1994), and incorporates landscape assessment concepts applied by the U.S. Forest Service and the U.S. Department of Transportation.

[1] Vividness is the memorability of the visual impression received from contrasting landscape elements as they combine to form a striking and distinctive visual pattern. Intactness is the integrity of visual order in the natural and man-built landscape, and the extent to which the landscape is free from visual encroachment. Unity is the degree to which the visual resources of the landscape join together to form a coherent, harmonious visual pattern. Unity refers to the compositional harmony of intercompatibility between landscape elements. (US DOT FHWA 1988)

TABLE 8.11-1
Landscape Scenic Quality Scale

Rating	Explanation
Outstanding Visual Quality	A rating reserved for landscapes with exceptionally high visual quality. These landscapes are significant nationally or regionally. They usually contain exceptional natural or cultural features that contribute to this rating. They are what we think of as "picture post card" landscapes. People are attracted to these landscapes to view them.
High Visual Quality	Landscapes that have high quality scenic value. This may be due to cultural or natural features contained in the landscape or to the arrangement of spaces contained in the landscape that causes the landscape to be visually interesting or a particularly comfortable place for people. These landscapes have high levels of vividness, unity, and intactness.
Moderately High Visual Quality	Landscapes that have above average scenic value but are not of high scenic value. The scenic value of these landscapes may be due to man-made or natural features contained within the landscape, to the arrangement of spaces, in the landscape or to the two-dimensional attributes of the landscape. Levels of vividness, unity, and intactness are moderate to high.
Moderate Visual Quality	Landscapes, that are common or typical landscapes that have, average scenic value. They usually lack significant man-made or natural features. Their scenic value is primarily a result of the arrangement of spaces contained in the landscape and the two-dimensional visual attributes of the landscape. Levels of vividness, unity, and intactness are average.
Moderately Low Visual Quality	Landscapes that have below average scenic value but not low scenic value. They may contain visually discordant man-made alterations, but these features do not dominate the landscape. They often lack spaces that people will perceive as inviting and provide little interest in terms of two-dimensional visual attributes of the landscape.
Low Visual Quality	Landscapes that have below average scenic value. They may contain visually discordant man-made alterations, and often provide little interest in terms of two-dimensional visual attributes of the landscape. Levels of vividness, unity, and intactness are below average.

Note: Rating scale based on Buhyoff et al., 1994; U.S. DOT Federal Highway Administration, 1988, and United States Department of Agriculture Forest Service. 1995.

8.11.1.9.1 KOP-1: Pico Park

KOP-1 is located directly east of the plant site, in the middle of the parking lot for Pico Park, as shown in Figure 8.11-2. Pico Park is the only public park/open space area in the project vicinity. This park is operated by the City of Grand Terrace Department of Parks and Recreation. It is open from 10:00 a.m. to dusk, and facilities include 3 baseball/softball fields, 2 basketball courts, restrooms, 9 picnic tables, a toddler playground, and parking for 90 vehicles. Because there is an open field between Pico Park and the plant site, there would be direct views of the power plant from Pico Park.

The existing view from KOP-1 is shown in Figure 8.11-5a. The major components of this view are the parking lot of Pico Park and the fence delineating the western extent of the park, both in the foreground. A vacant field and row of mature trees highlight the middle-ground, while undeveloped foothills comprise the background. Applying the Buhyoff landscape visual quality scale, the view seen in this photograph would be classified as having a moderate level of visual quality. The level of visual quality is average. The low hills in the background provide a moderate level of vividness, and patterns created by the trees in the view create a moderate level of visual unity. The parking lot, chain link fences and signs detract to some degree from the scene's overall sense of intactness.

The field in the middle-ground of the photograph is part of the area proposed for development of the proposed High School 3. The preliminary site plans for the educational facility show that there may be a number of sports facilities in the future between Pico Park and the plant site, including baseball diamonds, tennis courts and a parking lot (CJUSD, 2005). In addition, the area on the east side of Taylor Street and immediately in front of the row of trees seen in the middle-ground of this view has been designated by the City of Grand Terrace for retail development.

The future view of the power plant from Pico Park may be obscured to some degree by a combination of the sports facilities that will be developed as a part of the educational complex and/or commercial buildings or development that has the potential to be built along the east side of Taylor Street. This KOP was selected to represent both the views from Pico Park and the views from the future sports facilities. The term sensitivity is used to describe the sensitivity of the viewers who may experience the particular view and potential alteration of that view. The degree of sensitivity assumed is related to the activity a viewer is engaged in, the importance of the view to that activity, and the degree of community or cultural significance of the visual resource. Higher sensitivity views include those seen from designated scenic areas or viewpoints, from parks that are intended for appreciation of the landscape, and from residential areas Views from areas devoted to active recreation and from commercial areas are assumed to have a lower level of sensitivity. The lowest levels of visual sensitivity are assumed to be found in areas devoted to warehouses, industry and other utilitarian activities. Because the view from KOP 1 is now seen by users of Pico Park, a highly modified landscape that has been developed primarily with facilities for active recreation, as opposed to landscape appreciation, the sensitivity of this view is assumed to be moderate to moderately high.

8.11.2 Environmental Analysis

8.11.2.1 Analysis Procedure

This analysis of the visual effects of changes that might be brought about by the Highgrove Project is based on field observations and review of the following information: local planning documents, project maps and drawings, photographs of the project area, a computer-generated visual simulation from the KOP, and research on design measures for integrating electric facilities into their environmental settings.

Site reconnaissance was conducted to view the site and surrounding area, to identify potential key observation points, and to take representative photographs of existing visual conditions. A single-lens reflex 35-millimeter (mm) camera with a 50-mm lens (view angle 40 degrees) was used to shoot site photographs.

Page-size photographs are presented to represent the “before” conditions from the KOP. A visual simulation was produced to illustrate the “after” visual conditions from this point, which provides the viewer with a clear image of the location, scale, and visual appearance of the proposed project. For the KOP, an “after” image was prepared. This simulation image represents the project’s appearance in the period immediately after completion of construction and installation of the landscaping. The computer-generated simulations are the result of an objective analytical and computer modeling process described briefly below. The images are accurate within the constraints of the available site and project data.

Computer modeling and rendering techniques were used to produce the simulated images of the views of the site as they would appear after development of the project. Existing topographic and site data provided the basis for developing an initial digital model. The project engineers provided site plans and digital data for the proposed generation facility, and site plans and elevations for the components of the transmission system. These were used to create three-dimensional (3-D) digital models of these facilities. These models were combined with the digital site model to produce a complete computer model of the generating facility.

For each viewpoint, viewer location was digitized from topographic maps and scaled aerial photos, using 5 feet as the assumed eye level. Computer "wire frame" perspective plots were then overlaid on the photographs of the views from the KOP to verify scale and viewpoint location. Digital visual simulation images were produced as a next step based on computer renderings of the 3-D model combined with high-resolution digital versions of base photographs. The final "hardcopy" visual simulation images that appear in this AFC document were produced from the digital image files using a color printer.

8.11.2.2 Impact Evaluation Criteria

Analysis of the project's impacts was based on evaluation of the changes to the existing visual resources that would result from construction and operation of Highgrove Project. An important aspect of this analysis was evaluation of the "after" views provided by the computer-generated visual simulations, and their comparison to the existing visual environment. In making a determination of the extent and implications of the visual changes, consideration was given to:

- The specific changes in the affected visual environment's composition, character, and any specially valued qualities
- The affected visual environment's context
- The extent to which the affected environment contains places or features that have been designated in plans and policies for protection or special consideration
- The numbers of viewers, their activities, and the extent to which these activities are related to the aesthetic qualities affected by the likely changes

Significance criteria for impacts to aesthetic resources were developed from California Environmental Quality Act (CEQA) guidelines and the CEQA Checklist to evaluate the potential environmental impacts to the project, the following criteria were applied:

- Would the project have a substantial adverse effect on a scenic vista?
- Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?
- Would the project substantially degrade the existing visual character or quality of the site and its surroundings?
- Would the project create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?

8.11.2.3 Project Appearance

8.11.2.3.1 Removal of Existing Power Plant and other Site Improvements

The proposed project includes the removal of the existing Generating Station, located on the Generating Station Property. After plant demolition and site clearing, all of the old power plant structures visible in Figures 8.11-3a and 8.11-3b will have been removed, and most of this site will have the appearance of an open, vacant lot. The remaining view will be of the equipment within the SCE Highgrove Substation and its associated transmission towers.

8.11.2.3.2 Project Structures and Dimensions

The proposed project facilities are described in detail in Section 2.0, Project Description. Figure 2.2-1 shows the general arrangement and layout of the proposed project features on the site, and Figure 2.2-2 provides typical elevation views. Table 8.11-2 summarizes the dimensions of the generating facility's major features.

TABLE 8.11-2
Approximate Dimensions of the Major Project Features

Feature	Height (feet)	Length (feet)	Width (feet)	Diameter (feet)
Air filters	39	29.5	11	
Air ducts	39	37	22	
Main units	15	60	15	
Intercoolers	14	39	11	
VBV stacks	54	-	-	12
Water skids	12	40	12	
Ventilator exhausts	40	13	11	
Generators	30	28	13	
Selective Catalytic Reduction (SCR) Housing	37		33	
Exhaust stacks	80	-	-	13.5
Power control modules	10	50	15	
Cooling towers (each 2-cell tower)	30		22	28
Raw water tank	32	-	-	44
Demineralized water tank	24			27
Control/shop/water treatment/administration building	24	240	65	
Gas compressor building	10	55	30	
Transmission towers	100			5

The exteriors of all major project equipment will be treated with a neutral gray finish intended to optimize its visual integration with the surrounding environment. The project site will be surrounded by an 8-foot-high chain link security fence on the north, west, and south sides. To reduce visual impacts, an 8-foot-high screening wall (which will be

constructed in accordance with City guidance) will be constructed on the top of a berm (approximately 4 to 8 feet high) on the east side of the site, and a 30-foot-wide strip between the screening wall and the edge of the widened Taylor Street right-of-way will be devoted to landscaping. On the northern side of the site along the newly-constructed Adventure Way, there will be a short segment of berm with a screening wall on the top, as well as a wide strip to the west of the berm that will be available for screening landscaping.

8.11.2.3.3 Transmission Line

Power generated by the Highgrove Project will be connected via overhead cables to SCE's 115-kV substation, which is located immediately south of the project site, adjacent to the existing power plant.

8.11.2.3.4 Pipelines

The project will use an onsite well for the power plant process water supply. Potable water for drinking and sanitary uses will be provided by the Riverside Highland Water Company from a water main in adjacent Taylor Street. Similarly, sanitary wastewater disposal will be to the City's sanitary sewer. The natural gas line will be buried and will thus not be visible. Construction of the gas line will require excavation along the 7-mile route between the Highgrove Project site and SoCalGas' Line 2001. During construction of the pipeline, the ground surface of the areas in the alignment will be temporarily disrupted by the presence of construction equipment, excavated piles of dirt, concrete, pavement, and construction personnel and vehicles. These effects will be minor and temporary. After construction, the ground surfaces will be restored and the pipelines will not create a long-term change to the visual environment.

8.11.2.3.5 Construction Laydown Area

As detailed in Section 2.2.15, construction of the project is to take place between the second quarters of 2007 and 2008. Construction laydown and parking areas will be within the former plant site, south of the construction area. During this time, construction materials, construction equipment, trucks, and parked vehicles will be visible on the site.

8.11.2.3.6 Landscaping

The facility would be landscaped on the eastern side of the site, between the screening wall and Taylor Street, and on the northern side, on the berm that extends along a portion of the site's boundary. Figure 8.11-6 shows the preliminary landscaping plan that has been proposed as a part of the project's development. This preliminary landscape plan was designed to be consistent with the landscape concept specified in the Outdoor Adventures Center Specific Plan, which will apply to the area to the immediate north and east of the project site. The preliminary landscape plan calls for planting of redwood trees in overlapping rows to create a screen for views of the power plant's facilities from nearby areas and western redbud trees in the street right-of-way. Redwoods were selected because they are specified for use in the Outdoor Adventures Center Specific Plan and because of their rapid growth and high density features. Redbuds were selected because they are also specified for use in the Specific Plan and will provide blossom and foliage interest. Both the redwoods and redbuds will tie in visually within the landscape theme of the surrounding Outdoor Adventures Center.

8.11.2.3.7 Lighting

Although the proposed power plant is a simple-cycle unit designed to supply power during times of peak demand, which are most likely to occur during the daytime. The plant will require onsite nighttime lighting for safety and security. To reduce offsite lighting impacts, lighting at the facility will be restricted to areas required for safety, security, and operation. Exterior lights will be hooded, and lights will be directed onsite so that significant light or glare would be minimized. Low-pressure sodium lamps and fixtures of a non-glare type will be specified. For areas where lighting is not required for normal operation, safety, or security, switched lighting circuits will be provided, thus allowing these areas to remain unilluminated (dark) at most times, minimizing the amount of lighting potentially visible offsite.

During some construction periods and during the startup phase of the project, some activities may occur 24 hours a day, 7 days a week. If there are periods when nighttime construction activities take place, illumination that meets state, and federal worker safety regulations will be used. To the extent possible, the nighttime construction lighting will be erected pointing toward the center of the site where activities are occurring, and will be shielded. Task-specific lighting will be used to the extent practical while complying with worker safety regulations.

8.11.2.3.8 Water Vapor Plumes

Operation of the proposed power plant will result in release of moist air from the exhaust stacks and from the cooling towers that has the potential, at times when the air in the atmosphere is cold and damp, to create visible water vapor plumes.

8.11.2.4 Assessment of Visual Effects

8.11.2.4.1 Removal of Existing Generating Station

As described previously, the existing Generating Station has a neglected and run-down appearance (Figures 8.11-3a and 8.11-3b). The removal of the Generating Station will improve the visual character of the site as viewed from surrounding areas. Views closest to the Generating Station will be the most improved, particularly those from Taylor Street, the proposed high school, and the residences located on the south side of Main Street. Views from Pico Park and more distant residences will also be improved.

8.11.2.4.2 KOP-1: Pico Park

Figure 8.11-5b is a simulated view of the Highgrove Project generating facility as it would appear from KOP-1 five years after construction of the project. In the simulated view, the rows of trees that currently exist on the east side of the Tank Farm Property have been removed. The Outdoor Adventures Center Specific Plan, a future development proposed by the City of Grand Terrace, includes a widening and extension of Taylor Street northward to connect with future streets associated with that development. The existing trees are located on property currently owned by the City and may be removed as part of the Taylor Street widening project. To be conservative, the visual simulation has assumed the trees have been removed by the City and will not be available to serve as an additional visual screen.

As described above, a preliminary landscape plan has been prepared that incorporates redwood trees located on a new elevated berm along Taylor Street and redbud trees in the street right-of-way, as shown in Figure 8.11-6. Within 5 years of their installation, the

redwood trees will provide substantial screening of the project's equipment and together with the redbud trees will be harmonious with the landscaping associated with the future development proposed for the area surrounding the power plant. The simulated view incorporates the berm, redwood trees, and redbud trees.

To determine whether the project has a significant impact on visual resources, an assessment of the effects on visual quality was performed based on vividness, intactness, and visual character.

- **Vividness and Visual Intactness and Unity**—The level of vividness will remain the same, but the presence of the stacks will reduce the level of visual intactness to some to some extent, although this reduction will not be substantial. Because the proposed berm and landscaping will screen the plant's lower elements, and because the project features that will be visible will have an orderly appearance, the change in the scene's overall level of visual unity will be relatively small.
- **Visual Character**—With development of the project, the stacks and small portions of the air intake filters would be visible above the proposed landscaping. The presence of these features will change the visual character of the view from KOP-1 to some extent, adding stacks to a view where they do not now exist, making the view somewhat more industrial in character. However because the stacks would appear to be substantially lower in height than the hills in the backdrop and would, to some degree, be visually absorbed by them, they would not dominate the view. An additional factor to consider in evaluating the project's impacts on this view is that development of the sports fields in the area to the immediate west of the park and of a retail facility on the parcel that borders the eastern side of Taylor Street have the potential to give the middle-ground of this view a more highly developed character, and to partially block the view toward the project.

8.11.2.4.3 Light and Glare

The project's effects on visual conditions during hours of darkness will be limited. As indicated previously, some night lighting would be required for operational safety and security. There would be additional visible lighting associated with the project stacks, and open site areas. High illumination areas not occupied on a regular basis would be provided with switches or motion detectors to light these areas only when occupied. At times when lights are turned on, the lighting would not be highly visible offsite and would not produce offsite glare effects. The offsite visibility and potential glare of the lighting would be restricted by specification of non-glare fixtures and placement of lights to direct illumination into only those areas where it is needed. With implementation of the project, the overall change in ambient lighting conditions at the project site, as viewed from nearby locations would not be substantial. Additionally, lighting required for the developments proposed to be constructed adjacent to the proposed project (Colton Joint Unified School District High School 3 and the Outdoor Adventures Center) would likely be significant and include 24-hour security lighting in addition to full visibility lighting during dark evening hours. This additional lighting surrounding the proposed project would likely be substantially greater than the safety and security lighting required for the proposed project.

Lighting that may be required to facilitate nighttime construction activities would, to the extent feasible and consistent with worker safety codes, be directed toward the center of the construction site and shielded to prevent light from straying offsite. Task-specific

construction lighting would be used to the extent practical while complying with worker safety regulations.

8.11.2.4.4 Water Vapor Plumes

When the proposed power plant will be operating at times of low temperature and high humidity, the potential exists for the exhaust from the combustion turbine stacks and the cooling towers to condense and form visible water vapor plumes. However, experience with simple-cycle power plants of this type has demonstrated that the high velocity and temperature of the combustion turbine stack exhaust result in a quick dispersion of stack plumes, minimizing the probability that a visible plume would be created above the stacks. The cooling towers that are a part of this plant are small, and emit a relatively limited amount of moisture, reducing the potential for plume formation.

Based on previous experience with systems of this kind, it is likely that formation of visible plumes from the project would be a rare occurrence related to unusual combinations of cold and damp conditions and that, when present, the plumes would be relatively small.

The Highgrove Project will be designed as a peaking facility to serve load during periods of high demand and it is expected that it will operate at a 15 to 30 percent annual capacity factor. It is anticipated that much of the time that the plant operates will be during the summer, during hours when temperatures and thus electric loads are high. Because formation of visible plumes only takes place at times when ambient temperatures are low, there is little potential for plume formation during the high temperature periods when the plant is most likely to be in operation. In its evaluation of the Roseville Energy Project (03-AFC-01), the standard that CEC Staff applied in evaluating the visual impacts of visible water vapor plumes was that plume impacts are significant if plumes occur more than 20 percent of winter seasonal (October through March) daylight no rain/fog high visual contrast (i.e., clear) hours.[2] Given the plant's expected operational regime that will emphasize peaking power during high demand times in the summer, it is unlikely that the plant would be operated more than 20 percent of the non-rain, non-fog, clear daylight hours during the period from October through March, and that as a consequence it is very unlikely that visible water vapor plumes would be present during more than 20 percent of these hours.

8.11.2.4.5 Construction Period Impacts

During construction, construction materials, construction equipment, trucks, and parked vehicles may be visible on the project site. Construction activities would be conducted in a manner that would reduce dust from leaving the project site. The construction activities on the project site and the activities in the laydown areas would not contrast in a significant way with the existing industrial character of the area. During the construction period, the boundaries of the project site and laydown areas that border Taylor Street will be screened using chain link fencing covered with a screening fabric or Privamax. During construction of the pipeline, the ground surface of the areas in the alignment will be temporarily disrupted by the presence of construction equipment, excavated piles of dirt, concrete, and pavement, and construction personnel and vehicles. Any visual changes associated with construction period activities would be minor and temporary, and thus not significant.

[2] California Energy Commission. 2004. Final Staff Assessment for the Roseville SVEP. p. 4.12-13

8.11.2.5 Impact Significance

A discussion regarding whether the visual effects of the project would be significant pursuant to CEQA is provided below. The assessment of these impacts has been structured by applying the criteria set forth in Appendix G of the CEQA Guidelines. The CEQA Guidelines define a "significant effect" on the environment to mean a "substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project, including objects of historic or aesthetic significance (14 CCR 15382)." The four questions related to aesthetics that are posed for lead agencies and the answers to them are:

1. **Would the project have a substantial adverse effect on a scenic vista?**

   No. There are no vista points or roads that have a currently adopted scenic designation located in the nearby project vicinity.

2. **Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?**

   No. This question does not apply to the proposed project because none of the project facilities fall within the boundaries of a state scenic highway.

3. **Would the project substantially degrade the existing visual character or quality of the site and its surroundings?**

   No. The site of the new facility is primarily a vacant parcel in an industrially zoned area with no resources of scenic significance that would be affected by the project.

   The project involves demolition of an existing aging power plant and construction of a new generating facility on an adjacent parcel. The removal of the deteriorating Highgrove Generating Station will substantially improve views toward the project site by replacing older equipment with a modern facility that incorporates screening, more compact generating technology, and more uniform and harmonious exterior design surface treatments.

   The berm, screening wall, and landscaping proposed for the eastern side of the site and future development in the area between Pico Park and the power plant will result in substantial screening of the view of the power plant from Pico Park. However, the stacks will be visible from Pico Park (KOP-1), adding stacks into a view where they do not now exist. This change will cause some diminishment of the quality of the view seen from Pico Park, and will change the view's character to a moderate degree. However, these changes will not represent a substantial degradation of the character and quality of this view and will, therefore, not be significant. As indicated in the analysis above, given the plant's expected operational regime, it is highly unlikely that the plant would operate more than 20 percent of the non-rain, non-fog, clear daylight hours during the wintertime period from October through March and that, as a consequence, it is very unlikely that visible steam plumes would be present during more than 20 percent of these hours, staying below the threshold the CEC has established for significant impacts related to the presence of water vapor plumes.

4. Would the project create a new source of substantial light and glare that would adversely affect day or nighttime views in the area?

No. As described above, project light fixtures will be restricted to areas required for safety, security, and operations. Lighting will be directed onsite; it will be shielded from public view, and non-glare fixtures and use of switches, sensors, and timers to minimize the time that lights not needed for safety and security are on will be specified. These measures will substantially reduce the offsite visibility of project lighting.

Any lighting that will be installed to facilitate nighttime construction activities will, to the extent feasible and consistent with worker safety codes, be directed toward the center of the construction site and shielded to prevent light from straying offsite. Task-specific construction lighting will be used to the extent practical while complying with worker safety regulations. With these measures, lighting associated with the project construction and operation will not pose a hazard or adversely affect day or nighttime views toward the site.

8.11.3 Cumulative Impacts

The CEQA Guidelines (Section 15355) define cumulative impacts as "two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts."

The CEQA Guidelines further note that:

> The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor, but collectively significant, projects taking place over a period of time.

As indicated in the Land Use analysis (Section 8.4), the proposed project is consistent with the goals, objectives, and policies in industrial developments for the City of Grand Terrace. The proposed project is one of several proposed development plans occurring in the project vicinity over the next several years, including the proposed Colton Joint Unified School District High School #3, and City of Grand Terrace's commercial and retail development (Outdoor Adventures Center). Although the proposed project in combination with the other planned land uses will change the overall appearance of this area, these changes will not adversely affect identified scenic resources or protected scenic corridors and are not anticipated to degrade the area's current level of visual quality.

8.11.4 Mitigation Measures

This analysis has documented the fact that no significant visual impacts will result from implementation of the proposed project. Therefore, no mitigation measures are proposed. Project implementation will be subjected to the City of Grand Terrace's planning regulations. Specifically, a Site Development and Landscaping Plan will be prepared and submitted to the City for review and comment and CEC Compliance Project Manager for review and approval before construction begins. The site plan will comply with all applicable provisions of the Grand Terrace Zoning Ordinance, including provisions related to landscaping and project appearance.

8.11.5 Laws, Ordinances, Regulations, and Standards

8.11.5.1 Introduction

This section describes the Laws, Ordinances, Regulations, and Standards (LORS) relevant to the visual resource issues associated with the Highgrove Project. No federal, state, or regional visual resource LORS exist. However, visual resource and urban design concerns applicable to the project are addressed in the City of Grand Terrace General Plan, the City of Grand Terrace Zoning Ordinance, the Riverside County Comprehensive General Plan, and the Riverside County Zoning Ordinance.

Table 8.11-3 lists the plans and ordinances that are pertinent to the project. The specific provisions of each plan or ordinance that have potential relevance to the project are identified below. The General Plan for Riverside County and the City of Riverside would only apply to the gas pipeline.

TABLE 8.11-3
Laws, Ordinances, Regulations, and Standards Applicable to AES Highgrove Project Visual Resources

LORS	Purpose	AFC Section Explaining Conformance	Agency Contact
City of Grand Terrace General Plan (1988, 2003), and Zoning (2001, 2003)	To guide development in the City of Grand Terrace	8.11.5.2 8.11.5.3	John Lampe Planner City of Grand Terrace 22795 Barton Road Grand Terrace, CA 92313-5295 (909) 430-2225
Riverside County General Plan and Highgrove Area Plan (2003) and Zoning (2005, 2006)	To guide development in Riverside County	8.11.5.4	John Guerin, Senior Planner Riverside County Transportation and Land Management Agency, Planning Department Riverside County Administrative Center 4080 Lemon Street Riverside, CA 92502-1629 (951) 955-1872
City of Riverside General Plan (1994) and Zoning (1994)	To guide development in the City of Riverside	8.11.5.5	Sal Quintanilla Planner City of Riverside Planning Department 3900 Main Street Riverside, CA 92522 (951) 826-5371

8.11.5.2 City of Grand Terrace General Plan

The proposed power plant, potable water line, sewer line, and transmission line are all located within an existing industrial area within the city limits of the City of Grand Terrace, and are, therefore, subject to the provisions of the City of Grand Terrace General Plan. The project site is designated M2 (Industrial) according to the General Plan. The provisions of the City of Grand Terrace's General Plan that are applicable to the project are summarized and evaluated for project conformity in Table 8.11-4.

TABLE 8.11-4
Conformity of Highgrove Project with the City of Grand Terrace General Plan

Provision	Conformity?
Aesthetic, Cultural, and Recreational Resources Element Goal:	
Enrichment of the community by optimizing the availability and usefulness of the City's aesthetic, cultural and recreational resources.	Yes. The proposed power plant is located in an area designated for industrial uses and does not decrease the availability and usefulness of the City's aesthetic resources.
Visual Resources Implementation Policies:	
Scenic resources should be protected from harmful impacts and maintained as community assets. Design of new development shall respect and preserve the view opportunities of existing development in the area.	Yes. No scenic resources would be affected by the proposed project, and development of the proposed power plant would not interfere with view opportunities of existing development in the project vicinity.
Community Development Implementation Policies:	
Enhancement of the City's image shall be undertaken by the establishment of City entrances and development of unified streetscapes. Buffering to prevent potential land use incompatibilities between industrial areas and other areas shall be given special consideration. Specific features could include increased setbacks, walls, berms, and landscaping.	Yes. The proposed power plant would not interfere with the development of streetscapes which will be developed according to the Outdoor Adventures Center Specific Plan which applies to adjacent parcels. Appropriate buffering, consistent with the design standards included in the Outdoor Adventures Center Specific Plan, is included in the proposed power plant design, including setbacks, walls, berms, and landscaping.

8.11.5.3 City of Grand Terrace Zoning Code

The Tank Farm Property and the Generating Station Property are zoned M2 (Industrial) in the City of Grand Terrace Zoning Code. The site development standards of the City of Grand Terrace's M2 zoning that are applicable to the project are summarized and evaluated for project conformity in Table 8.11-6.

TABLE 8.11-6
Conformity of Highgrove Project with the City of Grand Terrace Zoning Code

Provision		Conformity?
M2 (Industrial) Zone Site Development Standards		Yes, with issuance of a variance. The proposed power plant would conform with the site development standards identified. However, the height of several structures onsite, as shown in Table 8.11-2, would exceed 35 feet. The proposed project would be subject to site review by the City of Grand Terrace and would require issuance of a variance for the height of structures over 35 feet.
Lot Area (minimum square feet)	10,000	
Lot Width (minimum linear feet)	70	
Lot Depth (minimum linear feet)	100	
Street Frontage (minimum linear feet)	70	
Setbacks (minimum linear feet)		
Front Yard	15	
Rear Yard	0	
Side Yard	0	
Height (Maximum linear feet)	35	
Lot Coverage (Maximum percent less the required parking, setbacks and landscaping	100	

8.11.5.4 Riverside County General Plan, Highgrove Area Plan, and Zoning

A portion of the natural gas pipeline for the proposed project lies within the County of Riverside and will thus be subject to the provisions of the Riverside County General Plan, Highgrove Area Plan, and Zoning Ordinance. Because the plans and zoning ordinance contain no provisions that specifically pertain to the visual resource issues associated with underground pipelines, the proposed project will not conflict with the plan or ordinance.

8.11.5.5 City of Riverside General Plan and Zoning

A portion of the natural gas pipeline for the proposed project lies within the City of Riverside and will thus be subject to the provisions of the City of Riverside General Plan and Zoning Ordinance. Because the plan and zoning ordinance contain no provisions that specifically pertain to the visual resource issues associated with underground pipelines, the proposed project will not conflict with the plan or ordinance.

8.11.6 References

Buhyoff, G. J., P. A. Miller, J. W. Roach, D. Zhou, and L. G. Fuller. 1994. An AI Methodology for Landscape Visual Assessments. AI Applications. Vol. 8, No. 1., pp. 1-13.

California Energy Commission. 2004. Final Staff Assessment for the Roseville SVEP. p. 4.12-13p.

City of Grand Terrace. 1988. City of Grand Terrace General Plan. Adopted December 8.

City of Grand Terrace. Undated. Grand Terrace Municipal Code – Zoning. Accessed online at http://www.cityofgrandterrace.org/business/zoning_code/zoning_nav.html on April 13, 2006.

City of Grand Terrace. 2004. Outdoor Adventures Center Specific Plan for the City of Grand Terrace. Approved September 9.

Colton Joint Unified School District (CJUSD). 2005. Grand Terrace Educational Facility Environmental Draft Impact Report. September.

Koontz, Gary. Community Development Planner. 2006. City of Grand Terrace. Personal communication with Brenda Eells/CH2M HILL on March 28.

Riverside County. 2005. County of Riverside Zoning. Accessed online at http://www.tlma.co.riverside.ca.us on April 13, 2006.

Riverside County. 2003. County of Riverside General Plan. Accessed online at http://www.rcip.org/generalplan.htm on April 13, 2006.

City of Riverside. 1994. City of Riverside General Plan. Accessed online at http://www.riversideca.gov/planning/genplan1994.htm on April 13, 2006.

City of Riverside. 2005. City of Riverside Zoning Code. Accessed online at http://www.riversideca.gov/municipal_code/pdf/Title_19_3_31_2005.pdf on April 13, 2006.

United States Department of Agriculture. Forest Service. 1995. *Landscape Aesthetics; A Handbook for Scenery Management* (Agriculture Handbook Number 701). Washington, DC: US Department of Agriculture.

United States Department of Transportation Federal Highway Administration (US DOT FHWA). 1988. Visual Impact Assessment for Highway Projects.

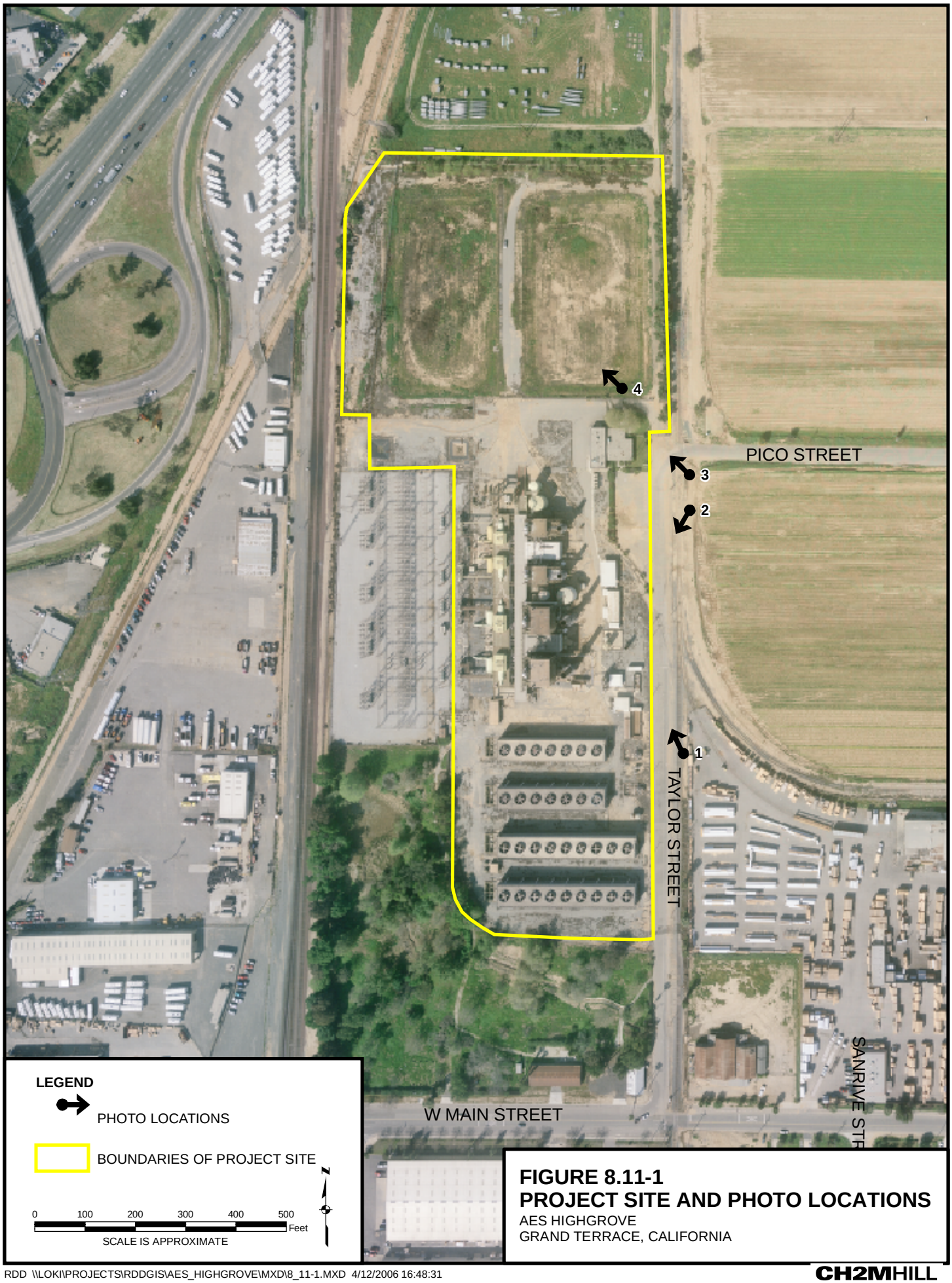


FIGURE 8.11-1
PROJECT SITE AND PHOTO LOCATIONS
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

N

0 2,000 4,000 Feet

LEGEND

- Proposed 80' Exhaust Stack
- 1 mile radius around Project Site
- Project Site
- Areas from which views of project will be screened by topography
- Key Observation Point (KOP)

KOP 1

Grand Terrace

Highgrove

RIVERSIDE

SAN BERNARDINO CO
RIVERSIDE CO

FIGURE 8.11-2
PROJECT VISIBILITY AND KOP LOCATION
HIGHGROVE ENERGY PROJECT
GRAND TERRACE, CALIFORNIA

CH2MHILL

8.11-3a. Photo 1. View looking north along Taylor Street. The former Highgrove Generating Station is visible to the left. The site of the proposed project is located in the area to the left of the short, bushy trees visible at the far end of Taylor Street.

8.11-3b. Photo 2. View looking south along Taylor Street toward the former Highgrove Generating Station.

FIGURE 8.11-3
CHARACTER PHOTOS
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

8.11-4a. Photo 3. View from the corner of Taylor and Pico Streets looking northwest toward the project site, which is located in the area to the immediate left of the row of short trees visible along the railroad tracks.

8.11-4b. Photo 4. View from the southeast corner of the main area of the project site looking northwest across the site. The area in the immediate foreground is the former tank farm site.

FIGURE 8.11-4
CHARACTER PHOTOS
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

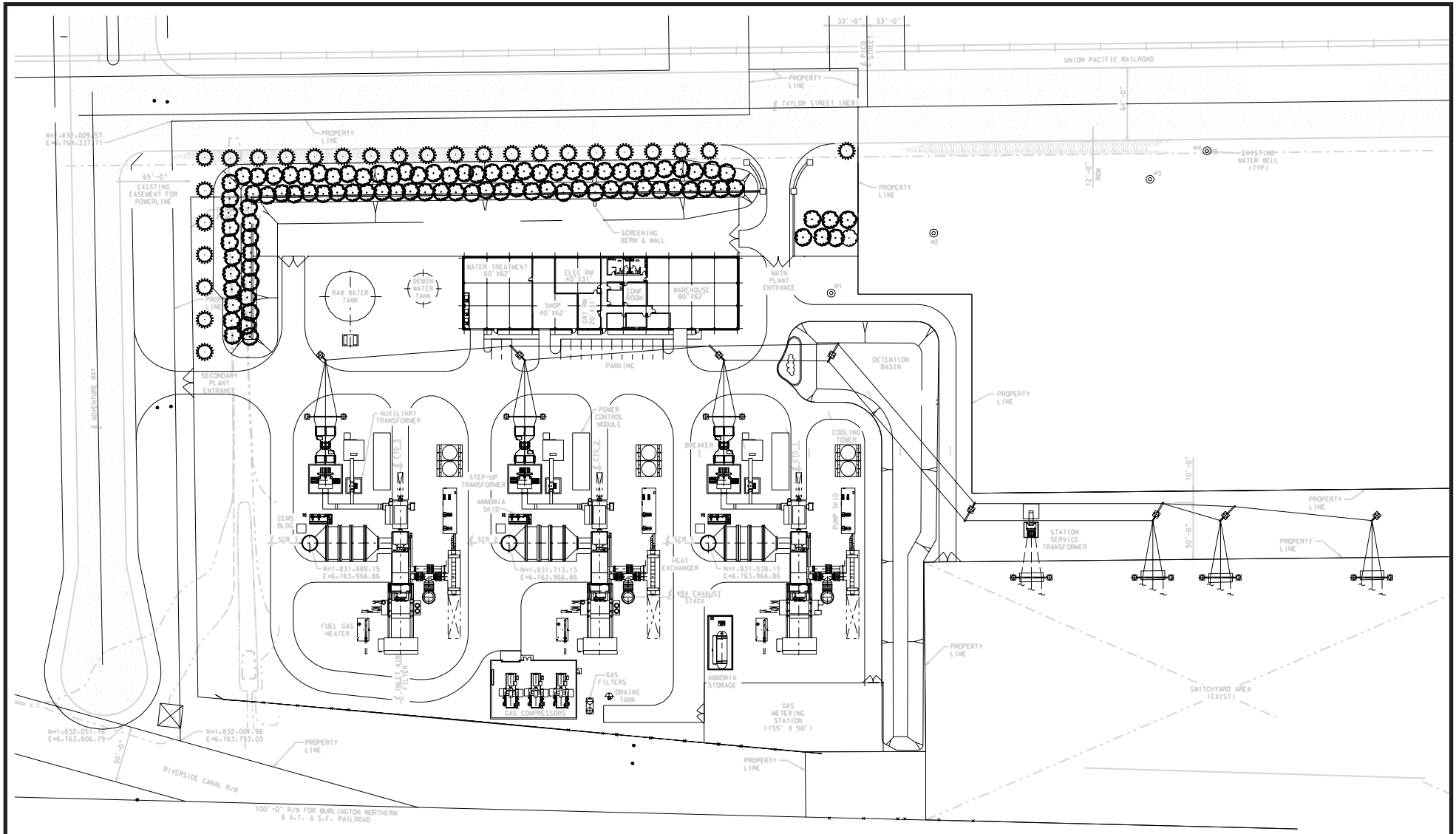
a. KOP 1 - Existing view from Pico Park looking west toward project site

b. KOP 1 - Simulated view from Pico Park looking west toward project in the time period five years after project construction

Figure 8.11-5
KOP 1 - View from Pico Park
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

IS032006003RDD_15 (5/5/06)

CH2MHILL



N

0 75 150

Approximate Scale In Feet

Proposed redwood trees *(sequoia sempervirens)*

Proposed redbud trees *(cercis occidentalis)*

FIGURE 8.11-6
CONCEPTUAL LANDSCAPE PLAN
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

CH2MHILL

WB022006009SAC figure_8_11_6a.ai 05-02-06 tdaus

8.12 Hazardous Materials Handling

8.12.1 Introduction

This subsection evaluates the potential effects on human health and the environment from the storage and use of hazardous materials in conjunction with the AES Highgrove Project. It presents the laws, ordinances, regulations, and standards (LORS) applicable to hazardous materials, describes the existing environment that may be affected, and identifies potential impacts on the environment and human health. The subsection also discusses the offsite migration modeling protocol, fire and explosion risk, potential cumulative impacts, and proposed mitigation measures.

8.12.2 Laws, Ordinances, Regulations, and Standards

The storage and use of hazardous materials and acutely hazardous materials at the Highgrove site are governed by federal, state, and local laws. Applicable laws and regulations address the use and storage of hazardous materials to protect the environment from contamination; they are also intended to protect facility workers and the surrounding community from exposure to hazardous and acutely hazardous materials. The LORS applicable to the Highgrove Project are summarized in Table 8.12-1.

TABLE 8.12-1
Applicable Laws, Ordinances, Regulations, and Standards

LORS	Applicability	Conformance (Section No.)
Federal CERCLA/SARA/EPCRA		
Section 302, EPCRA (Pub. L. 99–499, 42 USC 11022) Hazardous Chemical Reporting: Community Right-To-Know (40 CFR 370)	Requires one time notification if extremely hazardous substances are stored in excess of TPQs.	An HMBP will be prepared for submittal to the CUPA. (Section 8.12.8.4.2).
Section 304, EPCRA (Pub. L. 99–499, 42 USC 11002) Emergency Planning And Notification (40 CFR 355)	Requires notification when there is a release of hazardous material in excess of its RQ.	An HMBP will be prepared to describe notification and reporting procedures (Section 8.12.8.4.1).
Section 311, EPCRA (Pub. L. 99–499, 42 USC 11021) Hazardous Chemical Reporting: Community Right-To-Know (40 CFR 370)	Requires that either material safety data sheets (MSDSs) for all hazardous materials or a list of all hazardous materials be submitted to the State Emergency Response Commission (SERC), Local Emergency Planning Committee (LEPC), and San Bernardino County Fire Department	The HMBP to be prepared will include a list of hazardous materials for submission to agencies (Section 8.12.8.4.1)

TABLE 8.12-1
Applicable Laws, Ordinances, Regulations, and Standards

LORS	Applicability	Conformance (Section No.)
Section 313, EPCRA (Pub. L. 99–499, 42 USC 11023) Toxic Chemical Release Reporting: Community Right-To-Know (40 CFR 372)	Requires annual reporting of releases of hazardous materials.	The HMBP to be prepared will describe reporting procedures (Section 8.12.8.4.1).
Section 112, Clean Air Act Amendments (Pub. L. 101–549, 42 USC 7412) Chemical Accident Prevention Provisions (40 CFR 68)	Requires facilities that store a listed hazardous material at a quantity greater than the TQ to develop a Risk Management Plan. The facility will not have aqueous ammonia in concentrations greater than 20 percent in excess of the federal threshold quantity of 20,000 pounds. However, it will have greater than 500 pounds of a 19 percent solution of aqueous ammonia which exceeds the California TQ under the CalARP program (see state requirements below).	An RMP will not be required under the CAA because the Highgrove Project will not store regulated substances above federal TQs. However the state's CalARP program requirements will require an RMP for aqueous ammonia because the state's TQ is lower than the federal one. (Section 8.12.8.4.2)
Section 311, Clean Water Act (Pub. L. 92–500, 33 USC 1251 et seq.) Oil Pollution Prevention (40 CFR 112)	Requires preparation of an SPCC plan if oil is stored in a single aboveground storage tank with a capacity greater than 660 gallons or if the total petroleum storage (including ASTs, oil-filled equipment, and drums) is greater than 1,320 gallons. The facility will have petroleum in excess of the aggregate volume of 1,320 gallons.	An SPCC will be prepared (Section 8.12.8.4.3)
Pipeline Safety Laws (49 USC 60101 et seq.) Hazardous Materials Transportation Laws (49 USC 5101 et seq.) Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards (49 CFR 192)	Specifies natural gas pipeline construction, safety, and transportation requirements.	The natural gas pipeline will be constructed in accordance with 49 CFR requirements (Section 8.12.8.1)

TABLE 8.12-1
Applicable Laws, Ordinances, Regulations, and Standards

LORS	Applicability	Conformance (Section No.)
California		
Health and Safety Code, Section 25500, et seq. (HMBP)	Requires preparation of an HMBP if hazardous materials are handled or stored in excess of threshold quantities.	An HMBP will be prepared for submittal to the CUPA (Section 8.12.8.4.1)
Health and Safety Code, Section 25531 through 25543.4 (CalARP)	Requires registration with local CUPA or lead agency and preparation of an RMP if regulated substances are handled or stored in excess of TPQs.	An RMP will be prepared for submittal to the CUPA (Section 8.12.8.2)
Health and Safety Code, Section 25270 through 25270.13 (Aboveground Petroleum Storage Act)	Requires preparation of an SPCC plan if oil is stored in a single aboveground storage tank with a capacity greater than 660 gallons or if the total petroleum storage (including ASTs, oil-filled equipment, and drums) is greater than 1,320 gallons. The facility will have petroleum in excess of the aggregate volume of 1,320 gallons.	An SPCC plan will be prepared (Section 8.12.8.4.3)
Health and Safety Code, Section 25249.5 through 25249.13 (Safe Drinking Water and Toxics Enforcement Act) (Proposition 65)	Requires warning to persons exposed to a list of carcinogenic and reproductive toxins and protection of drinking water from same toxins.	The site will be appropriately labeled for chemicals on the Proposition 65 list. (Section 8.12.8.4.4)
California Public Utilities Commission (CPUC) General Order Nos. 112-E and 58-A	Specify standards for gas service and construction of gas gathering, transmission, and distribution piping systems.	Construction of the natural gas pipeline will comply with the standards specified in these General Orders (Section 8.12.8.1)
Local		
City of Riverside Municipal Code – Title 9, Chapter 9.48	Requires filing of a hazardous materials business plan with the fire department	An HMBP will not be required because hazardous materials will not be stored in quantities exceeding reporting thresholds during construction of the gas pipeline within the City limits (Section 8.12.8.4.1)
Riverside County Ordinance 651.3	Requires preparation of a Hazardous Materials Certificate of Registration and Hazardous Materials Business Plan for storage of hazardous materials.	A Hazardous Materials Certificate of Registration and HMBP will not be required because hazardous materials will not be stored in quantities exceeding reporting thresholds during construction of the gas pipeline in unincorporated areas of the County. (Section 8.5.7.3.1).

TABLE 8.12-1
Applicable Laws, Ordinances, Regulations, and Standards

LORS	Applicability	Conformance (Section No.)
Riverside County Ordinance 651.3, Section 9	Requires preparation of a Risk Management Plan for regulated substances.	An RMP is not necessary because regulated substances will not be used for construction of the gas pipeline in quantities exceeding RMP thresholds in the unincorporated area of Riverside County. (Section 8.5.7.3.1).
Riverside County Ordinance 787.2 Fire Code	Requires proper storage and handling of hazardous materials.	Riverside County Fire Code will be followed for design and construction of the hazardous materials handling facilities in the unincorporated areas of Riverside County during construction of the gas pipeline (Section 8.5.7.4).

Notes:

Cal ARP	California Accidental Release Program	MSDS	Material Safety Data Sheet
CAA	Clean Air Act [Amendments]	Pub. L.	Public Law
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act	RMP	Risk Management Plan
		RQ	Reportable Quantity
CFR	Code of Federal Regulations	SARA	Superfund Amendments and Reauthorization Act
CWA	Clean Water Act		
CUPA	Certified Unified Program Agency	SERC	state emergency response commission
EHS	extremely hazardous substance	SPCC	Spill Prevention Control and Countermeasure Plan
EPCRA	Emergency Planning and Community Right-to-Know Act		
HMBP	Hazardous Materials Business Plan	TPQ	Threshold Planning Quantity
LEPC	local emergency planning committee	TQ	Threshold Quantity
		USC	United States Code

8.12.2.1 Federal

Hazardous materials are governed under Title 29 of the US Code, Titles 29, 40, and 49 of the Code of Federal Regulations, the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Clean Air Act (CAA), and the Clean Water Act (CWA).

8.12.2.1.3 CERCLA

The Superfund Amendments and Reauthorization Act (SARA) amends CERCLA and governs hazardous substances. The applicable part of SARA for the proposed project is Title III, otherwise known as the Emergency Planning and Community Right-To-Know Act of 1986 (EPCRA). Title III requires states to establish a process for developing local chemical emergency preparedness programs and to receive and disseminate information on hazardous substances present at facilities in local communities. The law provides primarily for planning, reporting, and notification concerning hazardous substances. Key sections of the law are:

- Section 302—Requires one time notification when extremely hazardous substances (EHSs) are present in excess of their TPQs. EHSs and their TPQs are found in Appendices A and B to 40 Code of Federal Regulations (CFR) Part 355.

- Section 304—Requires immediate notification to the local emergency planning committee (LEPC) and the state emergency response commission (SERC) when a hazardous material is released in excess of its RQ. If a CERCLA-listed hazardous substance RQ is released, notification must also be given to the National Response Center in Washington, D.C. (RQs are listed in 40 CFR Part 302, Table 302.4). These notifications are in addition to notifications given to the local emergency response team or fire personnel.
- Section 311—Requires that either material safety data sheets (MSDSs) for all hazardous materials or a list of all hazardous materials be submitted to the SERC, LEPC, and local fire department.
- Section 313—Requires annual reporting of hazardous materials released into the environment either routinely or as a result of an accident.

8.12.2.1.4 Clean Air Act

Regulations (40 CFR 68) under the CAA are designed to prevent accidental releases of hazardous materials. The regulations require facilities that store a Threshold Quantity (TQ) or greater of listed regulated substances to develop a Risk Management Plan (RMP), including hazard assessments and response programs to prevent accidental releases of listed chemicals. Section 112(r)(5) of the CAA discusses the regulated substances. These substances are listed in 40 CFR 68.130.

8.12.2.1.5 Clean Water Act

The Spill Prevention Control and Countermeasures (SPCC) program under the CWA is designed to prevent or contain the discharge or threat of discharge of oil into navigable waters or adjoining shorelines. Regulations under the CWA (40 CFR 112) require facilities to prepare a written SPCC Plan if they store oil and its release would pose a threat to navigable waters. The SPCC program is applicable if a facility has a single oil aboveground storage tank (AST) with a capacity greater than 660 gallons, total AST storage greater than 1,320 gallons, or underground storage capacity greater than 42,000 gallons.

8.12.2.1.6 Natural Gas Pipeline Construction and Safety

Title 40 of the Code of Federal Regulations, parts 190 through 192, specifies safety and construction requirements for natural gas pipelines. Part 190 outlines pipeline safety procedures, Part 191 requires a written report for any reportable incident, and Part 192 specifies minimum safety requirements for pipelines.

8.12.2.1.7. Other

Other related federal laws that address hazardous materials but do not specifically address their handling are the Resource Conservation and Recovery Act (RCRA), which is discussed in Subsection 8.13, and the Occupational Safety and Health Act (OSHA), which is discussed in Subsection 8.7.

8.12.2.2 State

California laws and regulations relevant to hazardous materials handling at the Highgrove Project site include Title 8 of the California Code of Regulations, Health and Safety Code Section 25500 (hazardous materials), Health and Safety Code Section 25531 (acutely

hazardous materials), and the Aboveground Petroleum Storage Act (petroleum in aboveground tanks).

8.12.2.2.1 Health and Safety Code Section 25500

This law is found in the California Health and Safety Code, Section 25500, et seq., and in the regulations contained in 19 CCR Section 2620, et seq. The law requires local governments to regulate business storage of hazardous materials in excess of certain quantities. The law also requires that entities storing hazardous materials be prepared to respond to releases. Those using and storing hazardous materials are required to submit an HMBP to their local administering agency (i.e., CUPA). They must also report releases to their CUPA and the Governor's Office of Emergency Services. The threshold quantities for hazardous materials are 55 gallons for liquids, 500 pounds for solids, and 200 cubic feet for compressed gases measured at standard temperature and pressure.

8.12.2.2.3 Health and Safety Code Section 25531

This law regulates the registration and handling of regulated substances, per California Health and Safety Code, Section 25531, et seq. Regulated substances are any chemicals designated under 40 CFR 68.130 as part of the CAA's Accidental Release Prevention Program or designated by the state of California under its CalARP program. Facilities handling or storing regulated substances at or above threshold quantities (TQs) must register with their local CUPA and, if requested, must prepare an RMP.

8.12.2.2.4 Aboveground Petroleum Storage Act

This law is found in the Health and Safety Code at Sections 25270 to 25270.13 and is intended to ensure compliance with the federal CWA. The law applies if a facility has an AST with a capacity greater than 660 gallons or a combined AST capacity greater than 1,320 gallons and if there is a reasonable possibility that the tank(s) may discharge oil in "harmful quantities" into navigable waters or adjoining shore lands. If a facility falls under these criteria, it must prepare an SPCC Plan. The law does not cover AST design, engineering, construction, or other technical requirements, which are usually determined by local fire departments.

8.12.2.2.5 Safe Drinking Water and Toxics Enforcement Act (Proposition 65)

This law identifies chemicals that cause cancer and reproductive toxicity, informs the public, and prevents discharge of the chemicals into sources of drinking water. Lists of the chemicals of concern are published and updated periodically. The Act is administered by California's Office of Environmental Health Hazard Assessment. Some of the chemicals to be used at the Highgrove Project facility are on the cancer-causing lists of the Act.

8.12.2.2.6 California Fire Code, Article 80 and others

The code includes provisions for storage and handling of hazardous materials. There is considerable overlap between this code and Chapter 6.95 of the California Health & Safety Code. The fire code, however, contains independent provisions regarding fire protection and neutralization systems for emergency venting [see Section 80.303, D (compressed gases)]. Article 4 establishes hazardous materials storage thresholds above which a permit is required. Article 79 presents requirements for combustible and flammable liquids.

8.12.2.2.7 Natural Gas Pipeline Construction and Safety

The California Public Utilities Commission enforces General Order No. 58-A specifying standards for natural gas service in the State of California, and General Order No. 112-E specifying rules governing the design, construction, testing, operation, and maintenance of natural gas gathering, transmission, and distribution piping systems.

8.12.2.3 Local

The San Bernardino County Fire Department is the designated CUPA for the proposed plant site and is responsible for administering HMBPs/HMMPs, SPCC plans, and RMPs filed by businesses located in the county. The Fire Department is also responsible under the CUPA program for underground storage tank compliance. In addition, the CUPA is the regulatory body for all hazardous waste generated in the County (see Section 8.14, Waste Management). The CUPA is responsible for ensuring that businesses and industry store and use hazardous materials safely and in conformance with various regulatory codes. The CUPA performs inspections at established facilities to verify that hazardous materials are properly stored and handled and that the types and quantities of materials reported in a firm's HMBP are accurate. The City of Grand Terrace does not have LORS that apply to Hazardous Materials Handling.

Similarly, as described above, the pipeline construction is addressed by State LORS. In addition, hazardous materials storage requirements promulgated by the City of Riverside and Riverside County are similar to State requirements under the California Health and Safety Code and the California Fire Code.

8.12.2.4 Other Codes

The design, engineering, and construction of hazardous materials storage and dispensing systems will be in accordance with all applicable codes and standards, including the following:

- California Vehicle Code, 13 CCR 1160, et seq.—Provides the CHP with authority to adopt regulations for the transportation of hazardous materials in California.
- State Building Standard Code, Health and Safety Code Sections 18901 to 18949—Incorporates the Uniform Building Code (UBC), Uniform Fire Code, and the Uniform Plumbing Code.
- American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section VIII.
- American National Standards Institute (ANSI) K61.1.

8.12.3 Affected Environment

The project site is located in an industrially zoned area of the City of Grand Terrace in San Bernardino County (Figure 2.1-1). Identification of sensitive receptor facilities (such as schools, day-care facilities, convalescent centers, or hospitals) within 6 miles of the project site was performed by Environmental Data Resources Inc. (EDR). The nearest sensitive receptors would be a proposed high school, Colton Joint Union High School #3, which would be located across Taylor Street (with the nearest classrooms about 1,000 feet to the southeast of the project site) and Pico Park located 0.20 mile due east of the site. In addition,

Immanuel Baptist School and Preschool, the Highgrove Elementary School, and the Highgrove United Methodist Church are each located approximately 0.60 mile from the site.

Sensitive receptors within a 6-mile radius of the project site are provided in the EDR report in Appendix 8.6A. It also contains a description of the receptors.

8.12.4 Potential Environmental and Human Health Effects

Hazardous materials to be used at the Highgrove Project during construction and operation were evaluated for hazardous characteristics. That evaluation is discussed in this subsection. Some of these materials will be stored at the generating site continuously. Others will be brought onsite for the initial startup and periodic maintenance (every 3 to 5 years). Some materials will be used only during startup. Hazardous materials will not be stored or used in the gas supply line, water supply line, or electric transmission line corridors during operations. Storage locations are described in Table 8.12-2. Table 8.12-3 presents information about these materials, including trade names; chemical names; Chemical Abstract Service (CAS) numbers; maximum quantities onsite; reportable quantities (RQs); threshold planning quantities (TPQs); threshold quantities (TQs); and status as a Proposition 65 chemical (a chemical known to be carcinogenic or cause reproductive problems in humans). Toxicity characteristics and the exposure level criteria for regulated substances that will be handled at the Highgrove Project facility in quantities exceeding TQs are shown in Table 8.12-4. Health hazards and flammability data are summarized in Table 8.12-5. Table 8.12-5 also contains information on incompatible chemicals (e.g., sodium hypochlorite and ammonia). Measures to mitigate the potential effects from the hazardous materials are presented in Subsection 8.12.8. Due to the size of these tables, Tables 8.12-2 through 8.12-5 have been moved to the end of this section.

8.12.4.1 Construction Phase

During construction of the project and linear facilities, regulated substances, as defined in California's Health and Safety Code, Section 25531, will not be used. Therefore, no discussion of regulated substance storage or handling is included in this subsection.

Hazardous materials to be used during construction of the project and its associated linear facilities will include gasoline, diesel fuel, motor oil, hydraulic fluid, solvents, cleaners, sealants, welding flux, various lubricants, paint, and paint thinner. There are no feasible alternatives to motor fuels and oils for operating construction equipment. The types of paint required are dictated by the types of equipment and structures that must be coated and by the manufacturers' requirements for coating.

The quantities of hazardous materials that will be onsite during construction are small, relative to the quantities used during operation. Construction personnel will be trained to handle the materials properly. The most likely possible incidents will involve the potential for fuels, oil, and grease dripping from construction equipment. The small quantities of fuel, oil, and grease that might drip from construction equipment will have relatively low toxicity and will be biodegradable. Therefore, the expected environmental impact is minimal.

Small oil spills may also occur during onsite refueling. Equipment refueling will be performed away from water bodies to prevent contamination of water in the event of a fuel spill. Therefore, the potential environmental effects from fueling operations are expected to

be limited to small areas of contaminated soil. If a fuel spill occurs on soil, the contaminated soil will be placed into barrels or trucks for offsite disposal as a hazardous waste. The worst-case scenario for a chemical release from fueling operations would be a vehicle accident involving a service or refueling truck. Handling procedures for the hazardous materials to be used onsite during construction are presented in Subsection 8.12.8.1.

The quantities of hazardous materials that will be handled during construction are relatively small and Best Management Practices (BMPs) will be implemented by contractor personnel. Therefore, the potential for environmental effects is expected to be small.

8.12.4.2 Operations Phase

Several hazardous materials, including one regulated substance, will be stored at the generating site during operation. An RMP will be prepared consistent with the CalARP program requirements. Many of the hazardous materials that will be stored onsite are corrosive and are a threat to humans (particularly workers at the site) if inhaled, ingested, or contacted with the skin. The hazardous characteristics of materials being used at the site are summarized in Table 8.12-5. Table 8.12-5 also contains information on incompatible chemicals. Mixing incompatible chemicals can generate toxic gases. Measures to keep incompatible chemicals separated include separate storage and containment areas and/or berming (see Subsection 8.12.8).

Potential environmental and/or human health effects could be caused by accidental releases, accidental mixing of incompatible chemicals, fires, and injury to facility personnel from contact with a hazardous material. The accidental release of aqueous ammonia might present the most serious potential for effects on the environment and/or human health.

The Highgrove Project facility will store the 19-percent aqueous ammonia solution in a single stationary aboveground storage tank (AST). The capacity of the tank will be approximately 16,000 gallons, but will be limited by regulation to storing a maximum amount of 13,600 gallons (85 percent capacity). The tank will be surrounded by a secondary containment structure capable of holding the full contents of the tank, approximately 1,100 square feet (22 feet by 50 feet).

Aqueous ammonia will be delivered to the plant by truck transport. The truck unloading area will be located on an unloading apron adjacent to the storage tank. The truck unloading area would be surrounded by a berm sufficient to contain the contents of the truck. The use of 19 percent aqueous ammonia will require an average of approximately 4deliveries of ammonia per month during the peak period.

Pure ammonia (NH_3) is a volatile chemical that is stored under pressure as a liquid and becomes a toxic gas if released. The odor threshold of ammonia is about 5 parts per million (ppm), and minor irritation of the nose and throat will occur at 30 to 50 ppm. Concentrations greater than 140 ppm will cause detectable effects on lung function even for short-term exposures (0.5 to 2 hours).

At higher concentrations of 700 to 1,700 ppm, ammonia gas will cause severe effects; death occurs at concentrations of 2,500 to 7,000 ppm. The hazard to facility workers will be mitigated by facility safety equipment, hazardous materials training, and emergency response planning (see Subsection 8.7, Worker Health and Safety). The results of an Offsite

Consequences Analysis presented in Subsection 8.12.5, Offsite Migration Modeling, show that a release of a 19 percent solution of aqueous ammonia under a worst-case scenario will not cause significant offsite impacts to public health or safety.

Sulfuric acid, an extremely hazardous substance, is a very corrosive chemical that can cause severe harm to humans if ingested, inhaled, or contacted. However, sulfuric acid has a very low vapor pressure and will not readily volatilize upon release. Therefore, the potential for harm to humans offsite is minimal. Sulfuric acid is identified as a regulated substance under the CalARP program, but only if it is concentrated with greater than 100 pounds of sulfur trioxide, if it meets the definition of oleum, or if it is stored in a container with flammable hydrocarbons. The sulfuric acid that will be used at the Highgrove Project facility does not contain more than 100 pounds of sulfur trioxide or meet the definition of oleum. In addition, it will not be stored in a container with flammable hydrocarbons. Therefore, sulfuric acid is not subject to the RMP requirements under CalARP.

The remaining materials in Table 8.12-3 are also considered to be hazardous, but they pose less threat to humans than aqueous ammonia and sulfuric acid. Some materials (citric acid and sodium nitrate) will be used at the site only during initial commissioning and during periodic maintenance (once every 3 to 5 years). Therefore, the potential for environmental or health effects will exist only during those rare occasions when the materials are onsite.

8.12.5 Offsite Consequence Analysis

Because there is human activity in the vicinity of the proposed site, a vulnerability analysis was performed to assess the risk to humans from release of aqueous ammonia. Dispersion modeling was conducted using the SLAB numerical dispersion model (LLNL, 1990).

The worst-case accidental release scenario assumed that the aqueous ammonia storage tank was punctured and the entire contents of the tank were released into the spill vault. An initial ammonia emission rate for an evaporating pool of 19 percent aqueous ammonia solution was calculated pursuant to the guidance given in *RMP Offsite Consequence Analysis Guidance, EPA, April 1999,* and using the "evaporation calculator" provided by the National Oceanic and Atmospheric Administration (NOAA, 2004). An initial ammonia evaporation rate was calculated and assumed to occur for one hour. For concentrated solutions, the initial evaporation rate is substantially higher than the rate averaged over time periods of a few minutes or more since the concentration of the solution immediately begins to decrease as evaporation begins. However, using the initial evaporation rate results in a worst-case ammonia emission rate for the evaporating pool of ammonia. Release rates for ammonia vapor from an evaporating 19-percent solution of aqueous ammonia were calculated assuming mass transfer of ammonia across the liquid surface occurs according to principles of heat transfer by natural convection. The ammonia release rate was calculated using the evaporation calculator, meteorological data listed below and the dimensions of the secondary containment area. The offsite consequence analysis is provided as Appendix 8.12A.

Parameters used to calculate the ammonia emission rates include an atmospheric stability classification of "F," a wind speed of 1.5 meters/second and a temperature of 116 degrees Fahrenheit (°F), which represents the highest temperature recorded over the past 75 years.

Using these parameters, the ammonia plume was predicted—using a height of 1.6 meters—to extend approximately 12.10 2 meters (39.70 feet) from the ammonia storage tank at a

concentration of 150 ppm. At a concentration of 75 ppm, the distance was 12.22 meters (40.09 feet) from the tank (see Table 8.12-6). The assumptions used in the ammonia analysis include the following:

- A total release of ammonia is assumed to occur over 1 hour, representing an evaporating pool of 13,600 gallons of a 19 percent ammonia solution
- An ammonia storage temperature of 116°F (highest temperature recorded near to proposed site in 75 years)
- A diked secondary containment area of 1,100 square feet (22 feet by 50 feet)

TABLE 8.12-6
Gaseous Ammonia Concentrations in the Event of a Release

Concentration (ppm)	Distance in meters from Ammonia Tank to Plume Edge (feet)	
	0-Meter Receptor Height	1.6-Meter Receptor Height
300 ppm (OSHA's IDLH)	10.11 (33.16)	11.90 (39.04)
150 ppm (AIHA's ERPG)	10.38 (34.06)	12.10 (39.70)
75 ppm (CEC Significance Value)	10.52 (34.51)	12.22 (40.09)

Notes:
The complete Offsite Consequence Analysis may be found in Appendix 8.12A.
Distances calculated at ground level and based on the height of the average human (1.6 m).

Based on this conservative modeling analysis, the worst case accident is not expected to result in an offsite concentration greater than 75 ppm at the property fenceline, located about 65 feet west of the ammonia tank storage area, at the nearest point. Since the general public will not be exposed to ammonia concentrations above 75 ppm during a worst-case release scenario, the storage of aqueous ammonia onsite will not pose a significant risk to the public.

8.12.6 Fire and Explosion Risk

As shown in Table 8.12-5, many of the hazardous materials are non-flammable. Aqueous ammonia, which constitutes the largest quantity of hazardous materials onsite (except for the mineral oil in the transformers), is incombustible in its liquid state. Ammonia evaporating as a gas from a leak or spill of the aqueous solution is combustible within a narrow range of concentrations in air. However, the evaporation rate is sufficiently low that the lower explosive limit (LEL) will not be reached. The lubrication oil and diesel fuel are flammable and will be handled in accordance with a HMBP to be approved by San Bernardino Fire Department, Hazardous Materials Division. Hydraulic oil, which is classified as combustible, will also be handled in compliance with the HMBP. With proper storage and handling of flammable materials in accordance with the HMBP, the risk of fire and explosion at the generating facility should be minimal.

The natural gas that will provide the Highgrove Project with fuel for the combustion turbines is flammable and could leak from the supply line that brings gas from the SCGC gas line. The risk of leakage is the normal type of risk encountered with transmitting natural gas via

pipeline. Proper design, construction, and maintenance of the line will minimize leaks and the risk of fire or explosion. The line will be buried primarily in or adjacent to roadways.

Upon discovering that the Colton Joint Unified School District was conducting an environmental review of its Proposed High School Site Number 3, the Applicant commissioned a study to analyze the new proposed gas pipeline in accordance with California Department of Education Pipeline Risk Analysis protocol. The proposed new gas pipeline will run within approximately 1,500 feet of the proposed high school. The analysis specifically addressed the risk of pipeline rupture due to various forms of failures and then evaluated the probability of such occurrence and the potential affect on the school. The study used conservative assumptions based on older pipelines and therefore its results predict a greater probability of pipeline failure than would be expected from a new pipeline constructed to today's stringent pipeline standards. Even with the conservative assumptions, the analysis concluded that due to the relatively small diameter and location of the pipeline will not expose students or school employees to significant hazards associated with operation of the natural gas pipeline. The complete pipeline risk assessment is provided in Appendix 8.12B.

The San Bernardino County Fire Department Station No. 23 in Grand Terrace is the primary response unit and is located 1.7 miles northeast of the site.

8.12.7 Cumulative Impacts

The primary potential cumulative impact from the use and storage of hazardous materials will be a simultaneous release from two or more sites of a chemical that will migrate offsite. Potentially, the two or more migrating releases could combine; thereby posing a greater threat to the offsite population than a single release by any single site.

Hazardous materials that do not migrate, such as sulfuric acid, would not present a potential cumulative impact. The only hazardous material that has the potential to migrate offsite from the Highgrove Project is ammonia vapor released from spilled aqueous ammonia. Based on the offsite consequences analysis (OCA) results for the Highgrove, Project ammonia vapor concentrations are not expected to occur offsite. In the unlikely event that an aqueous ammonia spill occurred at the Highgrove Project at the same time as a chemical spill at another nearby industrial facility, offsite ammonia levels from the Highgrove Project will not be sufficient to cause cumulative impacts.

8.12.8 Proposed Mitigation Measures

The following subsections present measures that the Applicant would implement during project construction and operation phases to mitigate risks in handling hazardous materials, particularly the risk of inadvertent spills or leaks that might pose a hazard to human health or the environment.

8.12.8.1 Construction Phase

During facility construction, hazardous materials stored onsite will include small quantities of paints, thinners, solvents, cleaners, sealants, lubricants, and 5-gallon emergency fuel containers. This subsection describes measures that will be taken to mitigate potential risks from hazardous material usage. Paints, thinners, solvents, cleaners, sealants, and lubricants

will be stored in a locked utility building. These materials will be handled per the manufacturers' directions and will be replenished as needed. The emergency fuel containers will be Department of Transportation (DOT)-approved, 5-gallon safety containers, secured to the construction equipment. The emergency fuel will be used only when regular vehicle fueling is unavailable.

Fuel, oil, and hydraulic fluids will be transferred directly from a service truck to construction equipment tanks and will not otherwise be stored onsite. Fueling will be performed by designated, trained service personnel either before or at the end of the workday. Service personnel will follow standard operating procedures (SOPs) for filling and servicing construction equipment and vehicles. The SOPs, which are designed to reduce the potential for incidents involving the hazardous materials, include the following:

- Refueling and maintenance of vehicles and equipment will occur in designated areas that are equipped with spill control features (e.g., berms, paved surfaces, spill response kits, etc.).
- Vehicle and equipment service and maintenance will be conducted by authorized personnel only.
- Refueling will be conducted only with approved pumps, hoses, and nozzles.
- Catch-pans will be placed under equipment to catch potential spills during servicing.
- All disconnected hoses will be placed in containers to collect residual fuel from the hose.
- Vehicle engines will be shut down during refueling.
- No smoking, open flames, or welding will be allowed in refueling or service areas.
- Refueling will be performed away from bodies of water to prevent contamination of water in the event of a leak or spill.
- When refueling is completed, the service truck will leave the project site.
- Service trucks will be provided with fire extinguishers and spill containment equipment, such as absorbents.
- Should a spill contaminate soil, the soil will be put in containers for offsite disposal as a hazardous waste.
- All maintenance and refueling areas will be inspected monthly. Results of inspections will be recorded in a logbook that will be maintained onsite.

Small spills will be contained and cleaned up immediately by trained, onsite personnel. Larger spills will be reported via emergency phone numbers to obtain help from offsite containment and cleanup crews. Personnel working on the project during the construction phase will be trained in handling of and the dangers associated with hazardous materials. An onsite health and safety person will be designated to implement health and safety guidelines and contact emergency response personnel and the local hospital, if necessary.

If a spill involves hazardous materials equal to or greater than the specific reportable quantity, all federal, state, and local reporting requirements will be followed. The California

Water Code, Section 13272(f), establishes a reportable quantity of 42 gallons for spills of petroleum products in water bodies. In the event of a fire or injury, the local fire department will be called (San Bernardino County Fire Department Station No. 23, at 22592 City Center Court in the City of Grand Terrace).

8.12.8.2 Operation Phase

During operation, some hazardous materials will be stored onsite. Listed below are management and mitigation measures for minimizing the risks of hazardous material handling during facility operation.

8.12.8.2.1 Aqueous Ammonia

The aqueous ammonia storage and handling facilities will be equipped with a tank level monitor, temperature and pressure monitors and alarms, and excess flow and emergency block valves. Secondary containment will be provided. If there is an inadvertent release from the storage tank, the liquid will be contained within the secondary containment structure.

8.12.8.2.2 Other Hazardous Materials

All hazardous materials will be handled and stored in accordance with applicable codes and regulations. All containers used to store hazardous materials will be inspected regularly for signs of leaking or failure. Incompatible materials will be stored in separate storage and containment areas. Areas susceptible to potential leaks and/or spills will be paved and bermed. Containment areas may drain to a collection area, such as an oil/water separator or a waste collection tank. Piping and tanks will be protected from potential traffic hazards by concrete or pipe-type traffic bollards and barriers.

If a spill involves hazardous materials equal to or greater than the specific reportable quantity all federal, state, and local reporting requirements will be followed. The California Water Code, Section 13272(f), establishes a reportable quantity of 42 gallons for spills of petroleum products in water bodies.

A worker safety plan, in compliance with applicable regulations, will be implemented. It will include training for contractors and operations personnel. Training programs will include safe operating procedures, the operation and maintenance of hazardous materials systems, proper use of personal protective equipment (PPE), fire safety, and emergency communication and response procedures. All plant personnel will be trained in emergency procedures, including plant evacuation and fire prevention. In addition, designated personnel will be trained as members of a plant hazardous material response team; team members will receive the first responder and hazardous material technical training to be developed in the HMBP (Subsection 8.12.8.4). For emergency spills, San Bernardino County Fire Department has a formally trained Hazardous Materials Response Team to provide assistance during a spill cleanup. The County Fire Department will respond and will identify the type and source of the hazardous material, oversee evacuation of people, and confine the spilled material if possible. Cleanup of the material is the responsibility of the facility causing the spill. The San Bernardino County Fire Department Station No. 23 in Grand Terrace is the primary response unit. This station is backed up by the City of Colton Fire Department in Colton California. The Hazardous Materials Response Team is located at the San Bernardino County Fire Department Station No. 74. This response team is also supported by Hazardous Materials Specialists employed by the County (Palkiewicz, 2005).

8.12.8.3 Transportation/Delivery of Hazardous Materials

Hazardous materials will be delivered periodically to Highgrove Project. Transportation will comply with the applicable regulations for transporting hazardous materials, including DOT, U.S. Environmental Protection Agency (USEPA), California Department of Toxic Substances Control (DTSC), CHP, and California State Fire Marshal. Under the California Vehicle Code, the CHP has the authority to adopt regulations for transporting hazardous materials in California. The CHP can issue permits and specify the route for hazardous material delivery. The key hazardous material that will be delivered to the Highgrove Project site is aqueous ammonia, and the Vehicle Code has special regulations for the transportation of hazardous materials that pose an inhalation hazard (Vehicle Code Section 32100.5). These and other regulations concerning any of the other hazardous materials delivered to the Highgrove Project will be fully satisfied.

8.12.8.4 Schools

The nearest school to Highgrove Project will be the proposed Colton High School #3, which will be located across Taylor Street from the plant. The school facilities located closest to the plant are parking areas and the football field/track complex. The nearest classrooms are about 1,000 feet southeast of the plant. The proposed transport route for regulated materials such as aqueous ammonia, as well as for all other hazardous materials used at the Highgrove Project, would travel down Taylor Street, but would not pass in front of the school class facilities on Main Street.

8.12.8.4 Hazardous Materials Plans

Hazardous materials handling and storage, and training in the handling of hazardous materials will be set forth in more detail in hazardous materials plans that will be developed by the Applicant.

8.12.8.4.1 Hazardous Materials Business Plan

A Hazardous Materials Business Plan (HMBP) is required by Title 19 California Code of Regulations (CCR) and the Health and Safety Code (Section 25504). The plan will include an inventory and location map of hazardous materials onsite and an emergency response plan for hazardous materials incidents. The topics to be covered in the plan are:

- Facility identification
- Emergency contacts
- Inventory information (for every hazardous material)
- Material Safety Data Sheets (MSDSs) for every hazardous material
- Site map
- Emergency notification data
- Procedures to control actual or threatened releases
- Emergency response procedures
- Training procedures
- Certification

The HMBP will be filed with the San Bernardino County Fire Department, Hazardous Materials Division, the designated CUPA for the project site.

8.12.8.4.2 Risk Management Plan

The requirements for a Risk Management Plan (RMP) are found in California's Accidental Release Prevention Program (CalARP) pursuant to Health and Safety Code Sections 25331 through 25543.3 and in 19 CCR, Section 2735.1 et seq. The California program is similar to the federal RMP program. An RMP is required for regulated substances listed in 19 CCR 2770.5 that exceed designated threshold levels (known as Threshold Quantities or TQs). Under federal regulations, the TQ for aqueous ammonia is 20,000 pounds (for a concentration of 20 percent or greater) and 500 pounds under state regulations regardless of concentration.

The federal TQ will not be triggered by the Highgrove Project because a 19 percent concentration of aqueous ammonia will be used. However, because aqueous ammonia will be stored and used at the Highgrove Project facility in quantities exceeding the state threshold quantity, an RMP will be required, if requested by the local agency.

If requested, an RMP for aqueous ammonia will be filed with the San Bernardino County Fire Department, Hazardous Materials Division, the designated CUPA for the project site. The RMP will include a hazard assessment to evaluate the potential effects of accidental releases; a program for preventing accidental releases; and a program for responding to accidental releases to protect human health and the environment.

The basic elements of an RMP are:

- Management System
- Hazard Assessment
- Prevention Program
- Emergency Response

8.12.8.4.3 Spill Prevention Control and Countermeasure Plan

Federal and California regulations require a Spill Prevention Control and Countermeasures (SPCC) Plan if petroleum products above certain quantities are stored in aboveground storage tanks. Both federal and state laws apply only to petroleum products that might be discharged to navigable waters. If stored quantities are equal to or greater than 660 gallons for a single tank, or equal to or greater than 1,320 gallons total, an SPCC Plan must be prepared. The key elements of an SPCC Plan are:

- Name, location, and telephone number of the facility
- Spill record of the facility and lessons learned
- Analysis of the facility, including:
  - Description of the facilities and engineering calculations
  - Map of the site
  - Storage tanks and containment areas
  - Fuel transfer and storage and facility drainage
  - Prediction and prevention of potential spills
- Spill response procedures
- Agency notification
- Personnel training and spill prevention

The Highgrove Project will store up to 70,000 gallons of turbine lubrication oil onsite. The nearest waterway is the Riverside Canal located on the northwest corner of the site, approximately 40 feet from the proposed power plant.

8.12.8.4.4 Proposition 65

The facility will use lubricating and turbine oils and diesel fuel. These materials are included in the State of California's Prop 65 list of chemicals known to the state to cause cancer. The site will be appropriately labeled for all chemicals on the Proposition 65 list.

8.12.8.5 Monitoring

An extensive monitoring program will not be required because environmental effects during the construction and operation phases of the facility are expected to be minimal. However, sufficient monitoring will be performed during the construction and operation phases to ensure that the proposed mitigation measures are satisfied and that they are effective in mitigating any potential environmental effects.

8.12.9 Involved Agencies and Agency Contacts

Several agencies regulate hazardous materials, and they will be involved in regulating the hazardous materials stored and used at the Highgrove Project facility. At the federal level, the USEPA will be involved; at the state level, the California Environmental Protection Agency (CalEPA) will be involved. However, local agencies primarily enforce hazardous materials laws. For the Highgrove Project, the primary local agency with jurisdiction will be the San Bernardino County Fire Department, Hazardous Materials Division. The persons to contact are listed in Table 8.12-7.

TABLE 8.12-7
Agency Contacts

Type Material	Agency	Contact	Title	Telephone
Hazardous Materials Business Plan and Risk Management Plan	San Bernardino County Fire Department	Doug Snyder	Supervisor, Hazardous Materials Division CUPA Program	(909) 386-8401
Hazardous Materials Response	San Bernardino County Fire Department	Joe Ashbaker	Supervisor, Hazardous Materials Division Emergency Response Program	(909) 386-8430

8.12.10 Permits Required and Permit Schedule

The City of Grand Terrace requires the following permits listed in Table 8.12-8.

TABLE 8.12-8
Permits Required and Permit Schedule for AES Highgrove Hazardous Material Handling

Permit	Schedule	Applicability
Unified program facility permit	Prior to storage of hazardous materials at the site.	Requires that businesses obtain permits for hazardous materials storage.
Flammable or Combustible Liquids Storage Permit	San Bernardino County Fire Code requires that businesses obtain permits for the use and storage of flammable and combustible liquid wastes.	Prior to storage of flammable or combustible liquid wastes at the site.

8.12.11 References

Lawrence Livermore National Laboratory (LLNL). 1990. User's Manual for SLAB: An Atmospheric Dispersion Model for Denser-than-Air Releases. Lawrence Livermore National Laboratory. June.

Lewis, R.J. Sr. 1991. *Hazardous Chemical Desk Reference*, 2nd Edition.

National Oceanic & Atmospheric Administration (NOAA). 2004. Evaporation Calculator. http://archive.orr.noaa.gov/cameo/evapcalc/evap.html

Palkiewicz, J. 2005. County of San Bernardino Fire Department, Station No. 23, Grand Terrace. Personal communication. April 12.

U.S. Department of Health and Human Services, Public Health Service Centers for Disease Control. National Institute for Occupational Safety and Health. 1990. NIOSH Pocket Guide to Chemical Hazards.

U.S. Environmental Protection Agency (USEPA). 1999. RMP Offsite Consequence Analysis Guidance. April.

TABLE 8.12-2
Use and Location of Hazardous Materials

Chemical	Use	Storage Location	State	Type of Storage
Aqueous ammonia (19% NH_3 by weight)	Control oxides of nitrogen (NO_x) emissions through selective catalytic reduction	Outside, west of turbines	Liquid	Continuously onsite
Antifreeze	Closed loop cooling systems	Maintenance shop	Liquid	Continuously onsite
Antiscalant	Prevent scale in reverse osmosis membranes	Water treatment building	Liquid	Continuously onsite
Sodium bisulfite	Reduce chlorine in reverse osmosis feedwater	Water treatment building	Liquid	Continuously onsite
Coagulant polymer	Coagulate particles in multimedia filter feedwater	Water treatment building	Liquid	Continuously onsite
Cleaning chemicals/detergents	Periodic cleaning combustion turbine	Maintenance shop	Liquid	Continuously onsite
Corrosion Inhibitor (NALCO 8305 Plus)	Cooling tower cooling water corrosion inhibitor	Cooling tower chemical feed area	Liquid	Continuously onsite
Dispersant (NALCO TRASAR 23263)	Cooling tower cooling water dispersant	Cooling tower chemical feed area	Liquid	Continuously onsite
Hydraulic oil	High-pressure combustion turbine starting system, turbine control valve actuators	Contained within equipment	Liquid	Continuously onsite
Laboratory reagents	Water/wastewater laboratory analysis	Water treatment building	Liquid and granular solid	Continuously onsite
Lubrication oil	Lubricate rotating equipment (e.g., gas turbine bearings)	Contained within equipment	Liquid	Continuously onsite
Mineral insulating oil	Transformers/switchyard	Contained within transformers	Liquid	Continuously onsite
Non-oxidizing biocide (e.g., NALCO 7330)	Cooling tower biological control, used periodically	Cooling tower chemical feed area	Liquid	Continuously onsite
Scale inhibitor (polyacrylate)	Cooling tower scale inhibitor	Cooling tower chemical feed area	Liquid	Continuously onsite
Sodium bromide	Cooling tower biocide	Cooling tower chemical feed area	Liquid	Continuously onsite
Sodium hypochlorite (NaOCl)	Biocide for circulating water system and process water pretreatment	Water treatment building	Liquid	Continuously onsite
Stabilized bromine (e.g., NALCO STABREX ST70)	Biocide for circulating water system	Water treatment building	Liquid	Continuously onsite
Sulfur hexafluoride	Switchyard/switchgear devices	Contained within equipment	Liquefied gas	Continuously onsite
Sulfuric acid (H_2SO_4)	Circulating water pH control	Near cooling tower chemical feed building	Liquid	Continuously onsite

TABLE 8.12-3
Chemical Inventory, Description of Hazardous Materials Stored Onsite, and Reportable Quantities

Trade Name	Chemical Name	CAS Number	Maximum Quantity Onsite	CERCLA SARA RQ[a]	RQ of Material as Used Onsite[b]	LaFollette Bill TPQ[c]	Prop 65
Aqueous ammonia (19% solution)	Ammonium hydroxide	1336-21-6 (for NH_3–H_2O)	16,000 gal	100 lb	500 lb	500 lb	No
Antifreeze	Propylene glycol	57-55-6	55 gal	[e]	[e]	[e]	No
Antiscalant	Anti-scalant	None	200 gal	[e]	[e]	[e]	No
Cleaning chemicals/detergents	Various	None	20 gal	[e]	[e]	[e]	No
Coagulant Aid Polymer (e.g., NALCO NALCOLYTE 8799)	Sodium chloride	7647-14-5	400 gal	[e]	[e]	[e]	No
	Polyquaternary amine	20507700000-5062P		[e]	[e]	[e]	
Corrosion Inhibitor (NALCO 8305 Plus)	Cooling tower cooling water corrosion inhibitor	None	200 gal	[e]	[e]	[e]	No
Dispersant (NALCO TRASAR 23263)	Cooling tower cooling water dispersant	64665-57-2	200 gal	[e]	[e]	[e]	No
Hydraulic oil	Oil	None	500 gal	42 gal[f, g]	42 gal[f, g]	[e]	No
Laboratory reagents (liquid)	Various	None	20 gal	[e]	[e]	[e]	No
Laboratory reagents (solid)	Various	None	100 lb	[e]	[e]	[e]	No
Turbine and generator lubrication oil	Oil	None	20,000 gal	42 gal[f]	[g]	[e]	Yes
Mineral transformer insulating oil	Oil	8012-95-1	50,000 gal	42 gal[f]	[g]	[e]	Yes
Non-oxidizing biocide (e.g., NALCO 7330)	5-chloro-2-methyl-4-isothiazolin-3-one (0.3%)	2682-20-4	200 gal	[e]	[e]	[e]	No
Scale inhibitors (various)	Polyacrylate	Various	400 gal	[e]	[e]	[e]	No
Sodium bisulfite	Sodium bisulfite (38 to 40%)	7631-90-5	450 gal	5,000 lb		[e]	No
Sodium bromide	Sodium hydroxide (1 to 5%)	1310-73-2	200 gal	1,000 lb	20,000 lb	[e]	No
Sodium hypochlorite (bleach)	Sodium hypochlorite (10.3 to 12 %)	7681-52-9	400 gal	100 lb	1,000 lb	[e]	No

TABLE 8.12-3
Chemical Inventory, Description of Hazardous Materials Stored Onsite, and Reportable Quantities

Trade Name	Chemical Name	CAS Number	Maximum Quantity Onsite	CERCLA SARA RQ[a]	RQ of Material as Used Onsite[b]	LaFollette Bill TPQ[c]	Prop 65
Stabilized bromine (NALCO STABREX ST70)	Sodium hydroxide (1 to 5%)	1310-73-2	2,000 gal	1,000 lb	20,000 lb	[e]	No
	Sodium hypobromite (10 to 50%)	13824-96-9					
Sulfur hexaflouride	Sulfur hexafluoride	2551-62-4	200 lb	[e]	[e]	[e]	No
Sulfuric acid	Sulfuric acid (93 to 98 %)	7664-93-0	400 gal	1,000 lb	1,075 lb	[e]	No

[a] Reportable quantity for a pure chemical, per the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) [Ref. 40 CFR 302, Table 302.4]. Release equal to or greater than RQ must be reported. Under California law, any amount that has a realistic potential to adversely affect the environment or human health or safety must be reported.

[b] Reportable quantity for materials as used onsite. Since some of the hazardous materials are mixtures that contain only a percentage of a reportable chemical, the reportable quantity of the mixture can be different than for a pure chemical. For example, if a material only contains 10 percent of a reportable chemical and the RQ is 100 lb, the reportable quantity for that material would be (100 lb)/(10%) = 1,000 lb.

[c] Threshold Planning Quantity [Ref. 40 CFR Part 355, Appendix A]. If quantities of extremely hazardous materials equal to or greater than TPQ are handled or stored, they must be registered with the local Administering Agency.

[d] Some of the chemicals have alternatives, thus the maximum quantity stored onsite can be zero if an alternative chemical is being used.

[e] No reporting requirement. Chemical has no listed RQ or TPQ.

[f] State reportable quantity for oil spills that will reach California state waters [Ref. CA Water Code Section 13272(f)].

[g] Per the California Regional Water Quality Control Board, they would like all oil spills to surface water reported, even for less than the state reportable quantity of 42 gal.

TABLE 8.12-4
Toxicity, Reactivity, and Flammability of Hazardous and Regulated Substances Stored Onsite

Hazardous Materials	Physical Description	Health Hazard	Reactive and Incompatibles	Flammability*
Aqueous ammonia	Liquid, vapor is colorless gas with pungent odor	Corrosive: Irritation to permanent damage from inhalation, ingestion, and skin contact	Acids, halogens (e.g., chlorine), strong oxidizers, salts of silver and zinc	Liquid is incombustible; vapor is combustible, but difficult to burn
Antifreeze	Green, sweet smelling viscous liquid	Causes irritation	Strong oxidizing agents	Combustible
Antiscalant	Amber liquid	May cause slight irritation to the skin and moderate irrigation to the eyes	None	Nonflammable
Cleaning chemicals/detergents	Liquid	Refer to individual chemical labels	Refer to individual chemical labels	Refer to individual chemical labels
Coagulant aid polymer (e.g., NALCO NALCOLYTE 8799)	Light yellow liquid	May cause irritation to skin and eyes with prolonged contact	Strong oxidizers	Nonflammable
Corrosion inhibitor (NALCO 8305 Plus)	Light yellow liquid, sweet organic odor	Irritant to eyes, skin, and respiratory tract	Strong oxidizers, strong acids, and reactive metals	Nonflammable
Dispersant (NALCO TRASAR 23263)	Clear amber liquid	None	None	Nonflammable
Hydraulic oil	Oily, dark liquid	Hazardous if ingested	Sodium hypochlorite	Combustible
Laboratory reagents	Liquid and solid	Refer to individual chemical labels	Refer to individual chemical labels	Refer to individual chemical labels
Lubrication oil	Oily, dark liquid	Hazardous if ingested	Sodium hypochlorite	Flammable
Mineral insulating oil	Oily, clear liquid	Minor health hazard	Sodium hypochlorite	Can be combustible, depending on manufacturer
Scale inhibitors (polyacrylate)	Yellow green liquid	Corrosive and toxic: slight to moderate toxicity; irritation to skin and eyes	Strong acids	Nonflammable
Sodium bisulfite	Yellow liquid	Corrosive: irritation to eyes, skin, and lungs; may be harmful if digested	Strong acids and strong oxidizing agents	Nonflammable

TABLE 8.12-4
Toxicity, Reactivity, and Flammability of Hazardous and Regulated Substances Stored Onsite

Hazardous Materials	Physical Description	Health Hazard	Reactive and Incompatibles	Flammability*
Sodium bromide	White crystals, granules, or powder; odorless	Causes irritation to skin, eyes, and respiratory tract; can cause damage to central nervous system if ingested	Acids, alkaloid and heavy metal salts, oxidizers, and bromine trifluoride	Nonflammable
Sodium hypochlorite (bleach)	Pale green; sweet, disagreeable odor. Usually in solution with H_2O or sodium hydroxide	Corrosive and toxic: toxic by ingestion; strong irritant to tissue	Ammonia and organic materials	Fire risk when in contact with organic materials
Stabilized bromine (e.g., NALCO STABREX ST70)	Clear, light yellow liquid	Corrosive: irritant to eyes and skin. Harmful if ingested or inhaled	Strong acids, organic materials, sodium hypochlorite	Nonflammable
Sulfur hexafluoride	Colorless gas with no odor.	Hazardous if inhaled	Disilane	Nonflammable
Sulfuric acid	Colorless, dense, oily liquid	Strongly corrosive: strong irritant to all tissue; minor burns to permanent damage to tissue	Organic materials, chlorates, carbides, fulminates, metals in powdered form; reacts violently with water	Nonflammable

Data were obtained from Material Safety Data Sheets (MSDSs) and Lewis, 1991.

* Per Department of Transportation regulations, under 49 CFR 173: “Flammable” liquids have a flash point less than or equal to 141° F; “Combustible” liquids have a flash point greater than 141° F.

TABLE 8.12-5
Toxic Effects and Exposure Levels of Regulated Substances

Name	Toxic Effects	Exposure Levels—Pure NH_3
Aqueous ammonia (19 percent solution)	Toxic effects for contact with pure liquid or vapor causes eye, nose, and throat irritation, skin burns, and vesiculation. Ingestion or inhalation causes burning pain in mouth, throat, stomach, and thorax, constriction of thorax, and coughing followed by vomiting blood, breathing difficulties, convulsions, and shock. Other symptoms include dyspnea, bronchospasms, pulmonary edema, and pink frothy sputum. Contact or inhalation overexposure can cause burns of the skin and mucous membranes, headache, salivation, nausea, and vomiting. Other symptoms include labored breathing, bloody mucous discharge, bronchitis, laryngitis, hemmoptysis, and pneumonitis. Damage to eyes may be permanent, including ulceration of conjunctiva and cornea and corneal and lenticular opacities.	Occupational Exposures: PEL = 35 mg/m^3 OSHA TLV = 18 mg/m^3 ACGIH TWA = 25 mg/m^3 NIOSH STEL = 35 mg/m^3 Hazardous Concentrations: IDLH = 500 ppm LD_{50} = 350 mg/kg—oral, rat ingestion of 3 to 4 ml may be fatal Sensitive Receptors: ERPG-1 = 25 ppm ERPG-2 = 200 ppm ERPG-3 = 1,000 ppm

ACGIH	American Conference of Government Industrial Hygienists
ERPG	Emergency Response Planning Guideline
ERPG-1	Maximum airborne concentration below which nearly all individuals could be exposed for up to 1 hour without experiencing other than mild transient adverse health effects
ERPG-2	Maximum airborne concentration below which nearly all individuals could be exposed for up to 1 hour without developing irreversible or serious health effects
ERPG-3	Maximum airborne concentration below which nearly all individuals could be exposed for up to 1 hour without experiencing life-threatening health effects
IDLH	Immediately dangerous to life and health
LD_{50}	Dose lethal to 50 percent of those tested
mg/kg	Milligrams per kilogram
mg/m^3	Milligrams per cubic meter
NIOSH	National Institute of Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PEL	OSHA permissible exposure limit for 8-hr workday
ppm	parts per million
STEL	Short-term exposure limit, 15-min. exposure
TCLO	Lowest published toxic concentration
TLV	ACGIH threshold limit value for 8-hr workday
TWA	NIOSH time-weighted average for 8-hr workday

8.13 Waste Management

This subsection evaluates the potential effects on human health and the environment from nonhazardous and hazardous waste generated at the AES Highgrove Project and describes the regulatory framework pertaining to cleanup and demolition activities associated with development of the project. This subsection also presents an overview of the Highgrove Project and a description of the various properties that will be involved in the demolition and construction activities. It describes waste disposal sites for nonhazardous and hazardous waste and methods that will be employed to manage the generated waste and mitigate its impacts on the environment.

8.13.1 Project Site Overview

The new facility will be located on property that was once part of Southern California Edison's (SCE) former Highgrove Generating Station, which was constructed in the 1950s. Equipment in the Highgrove Generating Station consisted of four thermal generating units with a nominal capacity of 154 megawatts (MW) (combined), cooling towers, boilers, tanks, and associated equipment. The station initially used both fuel oil and natural gas for fuel supply. The fuel oil storage tanks were located north of the generating equipment.

The existing plant, currently known as Riverside Canal Power Company, was used for peaking service before and during the 2000-2001 California power crisis. The plant was decommissioned shortly after being acquired by AES in 2001 due to the lack of environmental controls.

When the Highgrove Generating Station was under SCE ownership, different areas of the property were characterized by four general areas of activity:

- SCE's 115-kilovolt (kV) electrical substation (Highgrove Substation)
- Generating equipment (boilers, steam turbine-generators, cooling towers and auxiliary equipment, etc.) and controls for the SCE 115-kV substation located in the generator control room (Generating Station Property)
- Fuel oil storage tanks (Tank Farm Property)
- Cage Park Property, a privately-owned park used by SCE and its employees

Figure 2.1-2 shows the location of each of these areas. Activities associated with each area, with respect to this project, are described below.

8.13.1.1 Highgrove Substation

The 115-kV Highgrove Substation property is a 3.1-acre parcel owned by SCE and located west of the Generating Station equipment. The Substation is an integral part of the SCE-owned regional grid. Controls for the substation are located inside the control rooms of the existing Generating Station.

Before demolition of the existing plant can occur, the substation controls will need to be relocated. It is anticipated that the substation controls and associated telecommunications

equipment will be housed in a new building located inside the existing substation boundaries to provide SCE with sole access to SCE's equipment.

The new facility will interconnect to the electrical grid using existing substation bays that will be vacated when the existing plant is demolished. Therefore, the only other project activity that will occur on the Substation property will be those activities associated with the interconnection of the new facility.

8.13.1.2 Generating Station Property

The Generating Station Property encompasses approximately 10.1 acres with frontage on Taylor Street. Equipment currently located on the Generating Station Property includes 4 small thermal units rated at 30 to 40 MW each, steam turbine-generators and condensers, control buildings, cooling towers, onsite wells for process and non-potable domestic water supply, administration and maintenance building, storage tanks and fuel delivery equipment. The property is currently owned by a wholly owned subsidiary of AES and is currently operating as Riverside Canal Power Company.

Project activities associated with this property will include demolition of the existing equipment and grading to allow continued access from Taylor Street. The existing plant includes some asbestos-insulated piping, and some steel outdoor structures painted with lead-based paint. Removal of these components will be handled by specialty contractors authorized to perform necessary abatement activities in accordance with applicable laws, ordinances, regulations, and standards (LORS). The majority of site demolition activities will include removal of steel structures and equipment that will either be recycled or taken to an appropriate offsite landfill. Demolition activities will include foundation removal and removal of underground piping. A portion of the Generating Station Property will also be used for parking and laydown area during construction.

8.13.1.3 Tank Farm Property

The Tank Farm Property encompasses approximately 7.6 acres north of the Generating Station Property. At one time, three large storage tanks were located on the property to store fuel oil for the existing plant. When SCE sold the Generating Station property, the Tank Farm Property was excluded from the sale. The oil storage tanks were originally constructed approximately 10 feet below grade inside bermed areas. The fuel oil tanks were later removed from the Tank Farm Property by SCE, and the Tank Farm Property was sold to the City of Grand Terrace Redevelopment Agency, the current owner. All that remains on the vacant site are the berms that used to contain the storage tanks.

8.13.1.4 Project Site

AES has entered into an agreement with the Redevelopment Agency to acquire the Tank Farm Property. The agreement provides that AES will remove existing equipment from the Generating Station Property. Once these demolition activities are complete, the Redevelopment Agency may, at its option, elect to take title to the Generating Station Property or be compensated in full for the Tank Farm Property. The Agreement further provides for a parcel line split and lot line adjustment such that the parties each retain title to a parcel of comparable size to the one they began with. After these changes, AES will own a 9.8-acre parcel, on which the new facility will be constructed (Project Site).

Therefore, the Project Site will include all of the Tank Farm Property and a portion of the Generating Station Property that currently abuts the Tank Farm Property on its south boundary as shown on Figure 2.2-1.

8.13.1.5 Cage Park Property

Cage Park Property is a 6.5-acre parcel located south of the Generating Station Property. The property was used in the past by SCE as a privately owned park and is currently owned by AES. This property is not part of, nor will it be affected by, the project.

8.13.2 Laws, Ordinances, Regulations, and Standards

Nonhazardous and hazardous waste handling at the Highgrove Project will be governed by federal, state, and local laws. Applicable laws and regulations address proper waste handling, storage, and disposal practices to protect the environment from contamination and protect facility workers and the surrounding community from exposure to nonhazardous and hazardous waste. The LORS applicable to waste handling and to closure of the former SCE hazardous waste management units and corrective action for solid waste management units and other areas of concern are summarized in Table 8.13-1.

TABLE 8.13-1
Laws, Ordinances, Regulations, and Standards Applicable to AES Highgrove Waste Management

LORS	Purpose	Applicability (AFC Section Explaining Conformance)
Federal		
RCRA Subtitle D	Regulates design and operation of solid waste landfills	Solid waste will be collected and disposed of by a collection company in conformance with Subtitle D (Subsections 8.13.6.1, 8.13.7, 8.13.3.1).
RCRA Subtitle C	Controls storage, treatment, and disposal of hazardous waste.	Hazardous waste will be handled by contractors in conformance with Subtitle C (Subsection 8.13.7).
CWA	Controls discharge of wastewater to the surface waters of the U.S.	The Highgrove Project will not discharge industrial wastewater to surface waters. Sanitary wastewater will be discharged to the City of Grand Terrace's sanitary sewer. Industrial wastewater will be discharged to the SARI brine line (Subsections 8.13.5, 8.13.9, and 8.14).
Title 40 CFR, Part 265	Requires closure certification for hazardous waste treatment, storage, and disposal units operating under permit or interim status.	SCE, as the former owner/operator, is in the process of completing a closure demonstration report certifying clean closure of their formerly operated hazardous waste management units and ancillary features located within the Project Site. (See Subsection 8.13.10)
RCRA 3008(h)	Requires corrective action for hazardous constituent releases at facilities operating under Interim Status.	SCE, as the former property owner, is responsible for completing corrective action for solid waste management units and other areas of concern at the site under oversight from DTSC. (See Subsection 8.13.10)

TABLE 8.13-1
Laws, Ordinances, Regulations, and Standards Applicable to AES Highgrove Waste Management

LORS	Purpose	Applicability (AFC Section Explaining Conformance)
State		
California Integrated Waste Management Act (CIWMA)	Controls solid waste collectors, recyclers, and depositors.	Solid waste will be collected and disposed of by a collection company in conformance with the CIWMA (Subsections 8.13.5.1, 8.13.6.1 and 8.13.6).
CA Hazardous Waste Control Law (HWCL)	Controls storage, treatment, and disposal of hazardous waste.	Hazardous waste will be handled by contractors in conformance with the HWCL (Subsections 8.13.6.1 and 8.13.6.2).
Title 22 CCR, Section 66265 et seq.	Requires closure of federal and state regulated hazardous waste management units.	SCE, as the former owner/operator, is in the process of completing a closure demonstration report certifying clean closure of the former hazardous waste management units located within the Project Site. (See Subsection 8.13.10)
Health & Safety Code Section 25187, Section 25200.10	Requires corrective action for hazardous constituent releases at facilities operating under state and/or federal hazardous waste permits.	SCE, as the former operator, is responsible for conducting corrective action for solid waste management units and other areas of concern at the facility under oversight from DSTSC. (See Subsection 8.13.10)
Porter-Cologne Water Quality Control Act	Controls discharge of wastewater to the surface and ground waters of California.	The Highgrove Project will not discharge industrial wastewater to surface or ground water. Sanitary wastewater will be discharged to the City of Grand Terrace's sanitary sewer. Industrial wastewater will be discharged to the SARI brine line (Subsections 8.13.4, 8.13.8 and 8.14).
California Fire Code	Controls storage of hazardous materials and wastes and the use and storage of flammable/combustible liquids.	Wastes will be accumulated and stored in accordance with Fire Code requirements. Permits for storage containers will be obtained, as needed, from the San Bernardino County Fire Department (Subsection 8.13.10).

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
SARA	Superfund Amendments and Reauthorization Act
RMP	Risk Management Plan
TPQ	Threshold Planning Quantity
HMBP	Hazardous Materials Business Plan
CAA	Clean Air Act
CUPA	Certified Unified Program Agency
EHS	Extremely hazardous substance
SERC	State emergency response commission
LEPC	Local emergency planning committee
RCRA	Resource Conservation and Recovery Act
DTSC	Department of Toxic Substances Control

8.13.2.1 Federal

Wastewater is regulated by U.S. Environmental Protection Agency (USEPA) under the Clean Water Act (CWA). Industrial wastewater will be discharged to the Santa Ana Regional Interceptor (SARI) brine line, as described in Section 2.0. Sanitary wastewater will be discharged to the City sanitary sewer (see Subsection 8.14).

The federal statute that controls both nonhazardous and hazardous waste is the Resource Conservation and Recovery Act (RCRA), 42 USC 6901, et seq. RCRA's implementing regulations are found at 40 CFR 260, et seq. Subtitle D makes the regulation of nonhazardous waste the responsibility of the states; federal involvement is limited to establishing minimum criteria that prescribe the best practicable controls and monitoring requirements for solid waste disposal facilities. Subtitle C controls the generation, transportation, treatment, storage, and disposal of hazardous waste through a comprehensive "cradle-to-grave" system of hazardous waste management techniques and requirements. It applies to all states and to all generators of hazardous waste (above certain levels of waste produced). The Highgrove Project will conform with this law in its generation, storage, transport, and disposal of any hazardous waste generated at the facility. The USEPA has delegated its authority for implementing the law to the State of California.

As discussed above, the Project Site is located on a portion of the property formerly owned and used by SCE as part of its Highgrove generating station. The SCE plant operated various RCRA hazardous waste management treatment and storage units under RCRA Interim Status (ISD) pursuant to 40 CFR 265, and these units require closure pursuant to federal and California hazardous waste closure regulations contained in 22 CCR 66265. The California Environmental Protection Agency's Department of Toxic Substances Control (DTSC) is the lead agency responsible for oversight of the RCRA closure process. The DTSC is also responsible for oversight of a RCRA Corrective Action for the former SCE facility pursuant to the 1984 Hazardous and Solid Waste Amendments (HSWA) to RCRA. Specifically, Section 3008(h) of RCRA provides authority for issuance of administrative orders to require corrective action when there is, or has been, a release of hazardous constituents from a facility operating under an ISD. The process requires facilities that operated hazardous waste management units to identify, investigate, and remediate solid waste management units (SWMUs) and other areas of concern identified as having potentially released hazardous substances to the environment (see Subsection 8.13.10).

8.13.2.2 State

Nonhazardous solid waste is regulated by the California Integrated Waste Management Act (CIWMA) of 1989, found in Public Resources Code (PRC) Section 40000, et seq. This law provides an integrated statewide system of solid waste management by coordinating state and local efforts in source reduction, recycling, and land disposal safety. Counties are required to submit Integrated Waste Management Plans to the state. This law directly affects San Bernardino County and the solid waste hauler and disposer that will collect the Highgrove Project's solid waste. It also affects the Highgrove Project to the extent that hazardous wastes are not to be disposed of with solid waste.

Wastewater is regulated by the State and Regional Water Quality Control Boards under the Porter-Cologne Water Quality Control Act. They regulate both sanitary and industrial

wastewater, which are discharged to the City of Grand Terrace's sanitary sewer and the SARI brine line, respectively (see Subsection 8.14).

RCRA allows states to develop their own programs to regulate hazardous waste. The programs must be at least as stringent as RCRA. California has developed its own program in the California Hazardous Waste Control Law (HWCL) (Health and Safety Code Section 25100, et seq.). The HWCL performs essentially the same regulatory functions as RCRA and is the law that will regulate hazardous waste at the Highgrove Project, since California has elected to develop its own program. However, the HWCL includes hazardous wastes that are not classified as hazardous under RCRA. Since hazardous wastes will be generated at the power plant during construction and operation, the HWCL will require the Applicant to adhere to storage, recordkeeping, reporting, and training requirements for these wastes.

Since the HWCL is broader in application than RCRA, certain units (e.g., wastewater treatment units) that are exempt from RCRA hazardous waste management requirements are subject to the California hazardous waste management regulations under 22 CCR 66260 et seq. These regulations require DTSC to authorize the operation of these units and to approve the closure of these units. The California Health and Safety Code, Section 25187 and 25200.10 provides DTSC the authority to implement and to oversee corrective action to ensure potential releases of hazardous constituents to the environment from the regulated units and other facility features are investigated and mitigated appropriately. Therefore, in addition to the RCRA units, the SCE plant contained additional California hazardous waste regulated units within the Project Site that also require closure and trigger corrective action under DTSC or local unified program agencies (see Subsection 8.13.10).

8.13.2.3 Local

The County of San Bernardino Solid Waste Management Division will have the responsibility for administering and enforcing the CIWMA for solid, nonhazardous waste for the Highgrove Project.

For hazardous waste, local regulation consists primarily of the administration and enforcement of the HWCL. The San Bernardino County CUPA is the local entity that will regulate hazardous waste at the Highgrove Project. The San Bernardino County Fire Department is the designated CUPA for San Bernardino County. San Bernardino has a formally trained Hazardous Materials Response Team to provide assistance during a spill cleanup. The County Fire Department will respond and will identify the type and source of the hazardous material, oversee evacuation of people, and confine the spilled material if possible. Cleanup of the material is the responsibility of the facility causing the spill. The San Bernardino County Fire Department Station No. 23 in Grand Terrace is the primary response unit. This station is backed up by the City of Colton Fire Department in Colton California. The Hazardous Materials Response Team is located at the San Bernardino County Fire Department Station No. 74. This response team is also supported by Hazardous Materials Specialists employed by the County (Palkiewicz, 2005).

8.13.2.4 Codes

The design, engineering, and construction of hazardous waste storage and handling systems will be in accordance with all applicable codes and standards, including:

- The Uniform Fire Code
- The Uniform Building Code
- The Uniform Plumbing Code
- California Building Code
- California Fire Code

8.13.3 Environmental Condition of Site

Several environmental investigations have been conducted incorporating the Project Site, in whole or in part, and adjoining facilities, including:

- Annual Groundwater Monitoring Report, Groundwater Detection Monitoring Program, Highgrove Generating Station, February 16, 2004; prepared for Southern California Edison by P. Hamilton, CEG.
- RCRA Facility Assessment for Riverside Canal Power Company, September 2001; prepared by Golder Associates.
- Final Remediation Report, Station Fuel Oil Facilities, Highgrove Tank Farm Decommissioning, April 2001; prepared by Engineering & Technical Services, Southern California Edison Company.
- Phase I Environmental Site Assessment for EPTC Property at Former Highgrove Generating Station, March 3, 2000; prepared by ARCADIS Geraghty & Miller, Inc. for SCE (copy provided in Appendix 8.13A).
- Soil Gas Sampling, West Retention Basin, Riverside Canal Power Company, Grand Terrace, California, November 1999; prepared for Thermo Ecotek Corporation by Golder Associates, Inc.
- Phase II Environmental Site Assessment, Retention Basins, Riverside Canal Power Company, Grand Terrace, California, March 1999; prepared for Thermo Ecotek Corporation by Golder Associates, Inc.
- Groundwater Assessment, Riverside Canal Power Company, Grand Terrace, California, January 1999; prepared for Thermo Ecotek Corporation by Golder Associates, Inc.
- Phase II Environmental Site Assessment Highgrove Generating Station, March 1998; prepared by Golder Associates, Inc. for Thermo Ecotek Corporation.
- Highgrove Generating Station Phase II Environmental Site Assessment, June 6, 1997; Prepared by Geraghty & Miller, Inc. for SCE.
- Leak Detection Investigation, Highgrove Generating Station, May 5, 1997; prepared by P. Hamilton, CEG, for SCE.

- Phase I Environmental Site Assessment Highgrove Generating Station, May 1997; prepared for Southern California Edison Company by CH2M HILL (copy provided in Appendix 8.13A).
- Sump Integrity Report, February 28, 1997, prepared by P. Hamilton, CEG, for SCE.
- Baseline Tank Study Report, Above Ground Oil Storage Tanks 1, 2, 3 and Day Tanks 1 and 2, Highgrove Generating Station, February 19, 1996; prepared by Southern California Edison Company EPE&C Geotechnical Group.
- Other investigations have been conducted and are included in whole or in part within appendices of the above-referenced reports.

As discussed above, the majority of the Project Site includes the Tank Farm Property, which historically was occupied by three 80,000-barrel aboveground storage tanks (ASTs) that contained No. 6 fuel oil and diesel fuel, a pump house, a 39,000-gallon AST, associated pipelines, and a former acid tank/sludge disposal area along the western fence line. The southern portion of the Project Site includes a portion of the Generating Station Property and is currently occupied by structures including a floor drain retention basin (west basin), boiler wastewater pond (east basin), pipelines, a septic tank and seepage pits, demineralizer sump, acid/caustic tanks and oil/water separator pond. These features and the results of pertinent environmental investigations are discussed in Subsection 8.13.3.1.

Features on the portion of the Generating Station Property that will not be incorporated into the Project Site have been identified as potential environmental concerns during environmental investigations. The discussion in Subsection 8.13.3.2 summarizes the conclusions of the environmental investigations conducted for specific features of that portion of the Generating Station Property that will not be incorporated into the Project Site, but may be relevant to demolition activities (although not directly affecting the development of the project within the Project Site boundaries).

Additionally, surrounding properties subjected to environmental investigation included the Cage Park Property located south of the Generating Station Property, agricultural lands located east of the Project Site, and a former plating facility located southeast of the Generating Station Property.

8.13.3.1 Project Site Portion of Tank Farm Property

A Phase I Environmental Site Assessment (ESA) for the Tank Farm Property portion of the Project Site was conducted in accordance with the ASTM Standard E 1527-97, Standard Practice for Environmental Site Assessments. The ESA report, prepared by ARCADIS Geraghty & Miller, Inc., for SCE, dated March 3, 2000, did not identify any recognized environmental conditions (RECs) resulting from present or past activities on the Tank Farm Property. This Phase I ESA report was prepared prior to decommissioning of the three 80,000-barrel (ASTs), the pump house, and associated piping.

A summary of historic structures and associated activities on the Tank Farm Property is presented below.

- **Acid Tank Sludge Disposal Area:** An acid tank sludge disposal area located near the western fence line and west of the location of the westernmost 80,000-barrell AST

(Tank #3) was used to dispose of residues from acid/caustic tank removal on the Highgrove Generating Station. This disposal activity resulted in a limited area of impacted soil containing low pH (<1.0 to 4.3) and elevated cadmium concentrations. This area of impacted soil was reportedly removed by SCE, with metals concentrations returned to background concentrations and soil pH near neutral (Geraghty & Miller, 1997 Phase II ESA).

- **Pipelines:** No affected soils related to the fuel pipelines have been reported, except for a minor concentration of total petroleum hydrocarbons (TPH), below the regulatory screening level, and an arsenic concentration of 7.6 mg/kg, which is above the preliminary regulatory screening level of 2.4 mg/kg; both results were reported by Geraghty & Miller (Phase II ESA; 1997) in sample OM-1, collected near the western fence line, northwest of Tank #3, at 9 feet below ground surface (bgs). The significance of the arsenic concentration reported requires further evaluation in comparison to background concentrations, and natural variability within local soils. In general, California soils often contain naturally-elevated concentrations of arsenic above USEPA Preliminary Remediation Goals for Industrial Site Soils; however, a site-specific screening concentration has not been established with the regulatory agencies.

- **Aboveground Tanks:** The Tank Farm Property was investigated for potential environmental contamination in 1996 (SCE EPE&C Geotechnical Group). During this investigation, four trenches were excavated around the perimeter of each of the three 80,000-barrell aboveground storage tanks to depths of approximately 2 to 3 feet below ground surface (bgs) and soil samples were collected and analyzed for TPH by EPA Method 418.1. Only low concentrations of TPH were detected in the soil samples, all below regulatory screening levels (100 milligrams per kilogram [mg/kg]), except a single shallow sample reported with 110 mg/kg TPH. The slightly elevated TPH appeared to be associated with an anti-corrosion coating on a tank.

- **Demolition Activities and Confirmation Sampling:** In February 2001, the three ASTs, pump house, and associated pipelines were removed. Following demolition activities, soil samples were collected and analyzed from beneath each AST and the former pump house location. As reported by Engineering & Technical Services, Southern California Edison Company (April, 2001), petroleum hydrocarbons were not detected in soil samples collected following demolition of the ASTs or pump house. Soil samples collected following demolition activities included five soil samples beneath each AST and two samples collected beneath the pump house. According to the April 2001 report, visual inspections beneath pipeline areas and the containment basin areas did not reveal any indications of contamination.

Based on the results of these previous investigations, no impacted soils have been identified as remaining on the Tank Farm Property, except for a concentration of arsenic slightly above a preliminary screening level. However, identification of site-specific screening levels for arsenic may identify this single detection as not requiring any further action.

8.13.3.2 Project Site Portion of Generating Station Property

Features identified as potential environmental concerns on that portion of the Generating Station Property that will be incorporated into the Project Site are discussed below.

- **Floor Drain Retention Basin (West Basin) and Boiler Wastewater Pond (East Basin):** Several phases of investigation of the East and West Basins have been conducted to determine if releases from the Basins occurred. Based on the results of shallow and deep soils investigations of both basins and soil gas investigation at the West Basin, no releases from the basins are reported. According to recent informal communications with DTSC (May 2006), no further investigations of the East or West Basin appears to be required at this time.

- **Highgrove Substation:** An investigation was conducted of the perimeter of the Highgrove Substation (also referred to as the Electrical Switchyard) (Phase II ESA; Geraghty & Miller, 1997) in areas of likely surface water runoff and potential sources of TPH and polychlorinated biphenyls (PCBs). No PCBs or TPH were reported in the five soil borings sampled, which were sampled and analyzed at nominal depths of approximately 1 foot and 3 feet bgs from each boring. Based on these sampling results, no affected soil along the perimeter of the Highgrove Substation has been identified. Transformers are currently located on the Generating Station Property along the eastern perimeter of the Highgrove Substation. The demolition activities will include removal of these transformers as this portion of the Generating Station Property will be included in the Project Site and used for interconnection of the transmission line to the Highgrove Substation. If during transformer removal activities evidence of a release is discovered, further investigation may be required.

- **Septic Tank and Seepage Pits:** A septic tank and seepage pits are located on the portion of the Generating Station Property that will be incorporated into the Project Site. The results of Phase II investigation (Geraghty & Miller, 1997) within the Septic Tank and associated Seepage Pit area did not identify impacts from VOCs, TPH, acidic or basic soils, or metals, except for a concentration of arsenic in a soil sample from 60 feet bgs in boring SP-1 of 2.9 mg/kg, slightly exceeding the preliminary screening concentration of 2.4 mg/kg. This concentration of arsenic at 60 feet bgs does not pose a direct-exposure pathway to the surface environment, and therefore is not considered significant. However, as arsenic has been detected in other samples from the site at concentrations greater than the preliminary screening concentration, establishment of a regulatory agency-accepted site-specific screening concentration for arsenic is recommended, to verify that no additional investigation, remediation, or risk-management is required for arsenic.

- **Demineralizer Sump and Acid/Caustic Tanks:** The demineralizer sump, located in the northern portion of the Generating Station Property, south of the East Basin, was investigated for potential leaks in 1996 (P. Hamilton; February, 1997). One soil boring from the eastern portion of the Demineralizer Sump was reported as containing low pH soils (pH 3.60 to 4.37) at depths of up to 7 feet bgs. Elevated sulfate and calcium were also reported in this boring. However, the report did not conclude that the sump leaked, as a nearby sulfuric acid AST located east of the sump was identified as a potential source of the release (see discussion below).

  The acid/caustic tank area, located southeast of the East Basin and east of the demineralizer sump, was investigated for potential impacts to soil via a single soil boring sample collected at 5.5 feet bgs (Phase II ESA; Geraghty & Miller, 1997). Although

surface degradation of the asphalt was noted near the sulfuric acid tank dispensing area, soil pH at 5.5 feet bgs was reported as 8.73. Based upon this single sample result, it does not appear that a release has occurred from the acid/caustic ASTs. Additional soil samples were analyzed by Golder Associates, Inc., (Phase II ESA; 1998), in the vicinity of the Demineralizer Sump, and reported results indicated that soils in the vicinity were slightly basic. Therefore, a localized release of acids may have occurred in the Demineralizer Sump area, which may require further investigation and possible localized remediation during demolition activities.

- **Oil/Water Separator Pond:** An oil/water separator pond is located near the East Basin. Results of a Phase II ESA (Golder Associates, Inc., 1998) reported a minor concentration of TPH (20 mg/kg) in a sample collected at 10 feet bgs in a soil boring adjacent to the oil/water separator. TPH was not detected at 15 or 20 feet bgs in this boring, and VOCs were not detected in the soil samples. Elevated photoionization detector soil-headspace readings were also reported in the soil boring sample containing TPH. Based on these results, a minor release may have occurred from the oil/water separator; however, soil sample results for TPH did not exceed regulatory screening levels. Further investigation and potentially localized remedial action (soil removal) may be required if impacted soils are encountered during demolition activities.

8.13.3.3 Portions of the Generating Station Property Not Incorporated Into Project Site

The following features of the Generating Station Property, while not directly affecting the Project Site, may be relevant to regulatory agency closure matters related to the overall Generating Station Property and associated demolition activities.

- Additional features of the adjoining Generating Station Property that were identified during the Phase II assessment (Geraghty & Miller, Inc., 1997) as potentially requiring additional investigation and potential remediation during demolition activities include:
  - Transformers with reported releases of PCBs to soil exceeding 50 parts per million (ppm) were reported near four transformers.
  - Areas of the power block that have not been accessible for sampling during previous site assessments.

As discussed previously, arsenic concentrations above preliminary screening levels have been reported in various areas of the Project Site and are also reported in some areas of the Generating Station Property that will not be incorporated into the Project Site. Further evaluation of the significance of these arsenic concentrations will be required following future negotiations with regulatory agencies regarding applicable site-specific screening levels for arsenic.

Other regulated areas of the Highgrove Generating Station have been investigated during Phase II site assessments; based on the results of these previous investigations, environmental impacts at these areas have not been identified at this time.

8.13.3.4 Other Surrounding Properties

The K&N Plating facility, located at 21750 Main Street, has been identified with past hazardous waste discharging activities at the facility, including acid solutions likely

containing metals. Although no documentation exists linking these discharges to impacts on either the Project Site, or portions of the Generating Station Property that will not be incorporated into the Project Site, these releases are a potential threat to the environment from surface runoff and impacts to groundwater at project facilities.

Adjoining agricultural areas to the east and north of the Project Site and Generating Station Property have been investigated for potential impacts to the environment. Pesticides, PCBs and TPH were not detected in the samples collected, except for low concentrations of pesticides and TPH below applicable screening criteria. Concentrations of arsenic were detected slight above preliminary screening criteria; however, these concentrations would not pose an environmental risk for the Project Site.

8.13.3.5 Groundwater

Groundwater in the vicinity of the East and West Basins is subject to on-going monitoring. The February 2004, Annual Groundwater Monitoring Report for the Highgrove Generating Station (P. Hamilton, 2004), indicates that groundwater is present at depths of approximately 120 feet bgs, with a very slight gradient (0.0005 foot per foot) toward the southwest. This gradient and groundwater depth were generally consistent during the year of monitoring; however, groundwater production well pumping to the north of the Project Site may influence groundwater depths and gradients. The sampling events have not indicated any groundwater impacts related to the overlying Basins. Chromium-VI has been detected consistently in monitoring wells at the site, including an upgradient monitoring well, with a maximum concentration reported of 1.6 micrograms per liter (µg/L). The presence of chromium-VI in the upgradient well indicates this constituent is generally present in the aquifer.

8.13.4 Project Waste Generation

Wastewater, solid nonhazardous waste, and liquid and solid hazardous waste will be generated at the power plant site during facility construction and operation. Solid nonhazardous waste will also be generated during the construction of the electric transmission line, the natural gas supply line, and waterlines.

8.13.4.1 Construction Phase

During construction, the primary waste generated will be solid nonhazardous waste. However, some nonhazardous liquid waste and hazardous waste (solid and liquid) will also be generated. Most of the hazardous wastes will be generated at the plant site, but a minimal quantity of hazardous waste will be generated during construction of the natural gas supply line, water supply and sanitary sewer line, and from demolition of the existing plant. The types of waste and their estimated quantities are described below.

8.13.4.1.1 Nonhazardous Solid Waste

Listed below are nonhazardous waste streams that could potentially be generated from construction of the new generating facility, the natural gas supply line, and the water supply line and from demolition of the existing plant.

Demolition Waste

Demolition of the old plant will generate an estimated 4,000 cubic yards of nonrecyclable nonhazardous waste materials. Nonrecyclable materials will be disposed of at a landfill. Reusable metals are expected to consist of an additional 6,200 cubic yards of material that will be sold as scrap. Concrete foundations will be chipped into 2-inch pieces and used onsite as fill material or trucked offsite at an acceptable disposal facility.

In addition to the nonhazardous waste from demolition, materials containing asbestos and lead-based paint will be generated during the project. Waste soil containing site contaminants may be generated during the removal of underground infrastructure of the old plant. These materials are described in Subsection 8.13.4.1.2 below.

Construction Waste

Paper, Wood, Glass, and Plastics. Paper, wood, glass, and plastics will be generated from packing materials, waste lumber, insulation, and empty nonhazardous chemical containers. Approximately 36 tons of these wastes will be generated during project construction. These wastes will be recycled where practical. Waste that cannot be recycled will be disposed of weekly in a Class III landfill. Onsite, the waste will be placed in dumpsters.

Concrete. Approximately 24 tons of excess concrete will be generated during construction. Waste concrete will be disposed of weekly in a Class III landfill or at clean fill sites, if available.

Metal. Metal will include steel from welding/cutting operations, packing materials, salvaged rebar, and empty nonhazardous chemical containers. Aluminum waste will be generated from packing materials and electrical wiring. Approximately 9 tons of metal will be generated during construction. Waste will be recycled where practical and non-recyclable waste will be deposited in a Class III landfill.

Drilling Mud. Some drilling could be required to install the natural gas pipeline. Most pipeline installation involves excavation of trenches, but crossing water features and sometimes roads can involve trenchless construction techniques (e.g., horizontal directional drilling) to avoid disturbance of the feature. Drilling mud, consisting of nontoxic bentonite clay, is used to lubricate and cool the drilling bit. For this project, only one crossing is assumed to involve horizontal directional drilling. Approximately 160 tons of drilling fluid is used in drilling each half-mile crossing of a creek or street. The single crossing that may require drilling on this project is only 250 feet long, so will generate only 10 percent of the volume of waste, or 16 tons of drilling mud. In addition, an estimated 3.5 cubic yards (5 tons) of soil cuttings will be generated by the drilling process. An additional 2 cubic yards (3 tons) of soil cuttings will be generated by the trenching or jack-and-bore methods used for the other crossings. This waste will require disposal at a Class II or III landfill.

Soil. Waste soil may be generated during foundation and underground utility excavation activities if the soil is not suitable for reuse at the site due to contaminant levels or other properties. Additionally, waste soil may be generated as a result of site remediation activities, if required. This material is further discussed in Subsection 8.13.4.1.3 below.

8.13.4.1.2 Nonhazardous Wastewater

Nonhazardous wastewater will be generated during construction and demolition activities, including sanitary wastewater, equipment wash water, stormwater runoff, and wastewater

from pressure testing the gas supply line. Sanitary waste will be collected in portable, self-contained toilets. Equipment wash water will be contained at specifically designated wash areas and disposed of offsite. Stormwater runoff will be managed in accordance with the contractor-developed stormwater pollution prevention plan (SWPPP) that will be approved by the appropriate agencies prior to the start of construction. The SWPPP will include site-specific measures to address the presence of soil contaminants at the site.

The gas supply pipeline hydrostatic test water will be filtered to collect any sediment and welding fragments. The water will be collected, tested, and discharged into the local storm drain per a permit obtained by SoCalGas from the appropriate water quality control board. If the water does not pass the required testing, it will be disposed of offsite.

8.13.4.1.3 Hazardous Waste

Most of the hazardous waste generated during construction will consist of liquid waste, such as flushing and cleaning fluids, passivating fluid (to prepare pipes for use), and solvents. Some hazardous solid waste, such as welding materials and dried paint, may also be generated. Hazardous waste that will be generated during demolition includes asbestos-containing building materials and lead-based paint. Additionally, hazardous soil waste may be generated during site remediation and site preparation excavation activities.

Demolition Waste. Approximately 500 tons of asbestos waste, including asbestos-containing building materials, and exterior insulation and interior refractory materials from the old generating units, associated piping, and turbines, will be produced during demolition. This waste will be shipped offsite to a hazardous waste landfill in Arizona. This waste is considered hazardous by the state of California if it contains one percent or more of friable asbestos.

Asbestos waste will be managed by a licensed asbestos abatement contractor. The appropriate notice will be filed with the South Coast Air Quality Management District prior to beginning removal of asbestos-containing materials.

Structural components containing lead-based paint will be removed by a contractor and shipped to an appropriate disposal facility. Structures with paint intact will be cut with a torch and are not required to be sprayed with water or have other methods employed to control loose or flaking paint.

Any soil excavated in conjunction with the removal of underground utilities and structure foundations associated with the Generating Station during demolition will be characterized to determine appropriate soil management protocol and disposition. Any soil removed from the site will be disposed of at an appropriate landfill facility based on characterization results.

Construction Waste. Flushing and cleaning waste liquid will be generated when pipes and boilers are cleaned and flushed. Passivating fluid waste is generated when high temperature pipes are treated with either a phosphate or nitrate solution. The volume of flushing, cleaning and passivating liquid waste generated is estimated to be one to two times the internal volume of the pipes cleaned. The quantity of welding, solvent, and paint waste is expected to be minimal.

Any soil excavated and removed from the site for the purpose of site remediation or excavations for underground utilities and structure foundations will be characterized to determine appropriate soil management protocol and whether the soil requires disposal as a hazardous or non-hazardous waste. It is currently unknown whether soil excavation and disposal will be required for the purpose of site environmental remediation. Underground utility and foundation excavations are not expected to generate excess soil; all soil will remain onsite unless contaminant levels require offsite disposal of excavated materials. Any soil removed from the site will be disposed of at an appropriate landfill facility based on characterization results.

The construction contractor will be considered the generator of hazardous construction waste and will be responsible for proper handling of hazardous waste in compliance with all applicable federal, state, and local laws and regulations, including licensing, personnel training, accumulation limits and times, and reporting and recordkeeping. The hazardous waste will be collected in satellite accumulation containers near the points of generation. It will be moved daily to the contractor's 90-day hazardous waste storage area, located at the site construction laydown area. The waste will be removed from the site by a certified hazardous waste collection company and delivered to an authorized hazardous waste management facility, prior to expiration of the 90-day storage limit.

8.13.4.2 Operation Phase

During facility operation, the primary waste generated will be nonhazardous solid waste. Varying quantities of both solid and liquid hazardous waste will also be generated periodically. The types of waste and their estimated quantities are discussed below.

8.13.4.2.1 Nonhazardous Solid Waste

The majority of solid waste will include rags, turbine air filters, broken and rusted metal and machine parts, defective or broken electrical materials, empty containers, the typical refuse generated by workers and small office operations, and other miscellaneous solid wastes. The quantity generated is estimated to be about 30 cubic yards per year (approximately 21 tons per year). Large metal parts will be recycled.

8.13.4.2.2 Nonhazardous Wastewater

Water balance diagrams, provided in Figures 7.1-2a and 7.1-2b, illustrate the expected liquid waste streams and flow rates for the AES Highgrove generating facility. The wastewater collection system will collect sanitary wastewater from sinks, toilets, and other sanitary facilities to be discharged to the City of Grand Terrace's sanitary sewer.

Plant Drains-Oil/Water Separator. General facility drainage will consist of area washdown, sample drains, equipment leakage, and drainage from facility equipment areas. Water from these areas will be collected in a system of floor drains, hub drains, sumps, and piping and routed to the facility wastewater collection system. Drains that could contain oil or grease will first be routed through an oil/water separator. Water from the plant wastewater collection system will be recycled to the cooling tower basin. Wastewater from combustion turbine water washes will be collected in a holding tank. If cleaning chemicals were not used during the water wash procedure, the wastewater will be discharged to the oil/water separator. Wastewater containing cleaning chemicals will be trucked offsite for disposal at an approved wastewater disposal facility.

8.13.4.2.3 Hazardous Waste

Hazardous waste generated will include waste lubricating oil, used oil filters, spent selective catalytic reduction (SCR) and oxidation catalysts, and chemical cleaning wastes. The catalyst units will contain heavy metals that are considered hazardous. Chemical cleaning wastes will be generated from the periodic cleaning of the turbines. They will consist of alkaline cleaning solutions used during chemical cleaning of the turbine wash. These wastes generally contain high concentrations of heavy metals and will be collected for offsite disposal.

The chemical feed area drains will collect spillage, tank overflows, effluent from maintenance operations, and liquid from area washdowns. After neutralization, if required, water collected from the chemical storage areas will be directed to the cooling tower basin. The quantity of this effluent is expected to be minimal.

Wastes that will be generated at the facility are summarized in Table 8.13-2.

TABLE 8.13-2
Hazardous Wastes Generated at the AES Highgrove Facility

Waste	Origin	Composition	Estimated Quantity	Classification	Disposal
Lubricating oil	Small leaks and spills from the gas turbine lubricating oil system	Hydrocarbons	180 lb/year	Hazardous	Cleaned up using sorbent and rags – disposed of by certified oil recycler
Lubricating oil filters	Gas turbine lubricating oil system	Paper, metal, and hydrocarbons	360 lb/year	Hazardous	Recycled by certified oil recycler
Laboratory analysis waste	Water treatment	Sulfuric acid	240 gals/year	Hazardous	Recycled by certified recycler
SCR catalyst units	SCR system (Warranty is 3 years; use tends to be 3 to 5 years)	Metal and heavy metals, including vanadium	360 lb every 3 to 5 years	Hazardous	Recycled by SCR manufacturer or disposed of in Class I landfill
CO catalyst units	Auxiliary boiler (Use tends to be 3 to 5 years)	Metal and heavy metals, including vanadium	360 lb every 3 to 5 years	Hazardous	Recycled by manufacturer
Oily rags	Maintenance, wipe down of equipment, etc.	Hydrocarbons, cloth	120 lb/year (~300 rags/year)	Hazardous	Recycled by certified oil recycler
Oil sorbents	Cleanup of small spills	Hydrocarbons	90 lb/year	Hazardous	Recycled or disposed of by certified oil recycler
Cooling tower sludge	Deposited in cooling tower basin by cooling water	Dirt from air	60 tons/year	Could be hazardous, but usually not	Class II landfill if nonhazardous; Class I if hazardous

TABLE 8.13-2
Hazardous Wastes Generated at the AES Highgrove Facility

Waste	Origin	Composition	Estimated Quantity	Classification	Disposal
Chemical feed area drainage	Spillage, tank overflow, area washdown water	Water with water treatment chemicals	Minimal	May be hazardous if corrosive	Onsite neutralization, if required, then discharged to cooling tower basin

8.13.5 Waste Disposal Sites

Nonhazardous solid waste (often referred to as solid waste, municipal solid waste (MSW), or garbage) will be recycled or deposited in a Class III landfill. Hazardous wastes, both solid and liquid, will be delivered to a permitted offsite Treatment, Storage, and Disposal (TSD) facility for treatment or recycling or deposited in a permitted Class I landfill. The following subsections describe the waste disposal sites feasible for disposal of the Highgrove Project wastes.

8.13.5.1 Nonhazardous Waste

The County of San Bernardino Department of Public Works Solid Waste Management Division (SWMD) is responsible for the operation and management of the County of San Bernardino's solid waste disposal system, which consists of six regional landfills, eight transfer stations and five community collection centers. The County contracts with Burrtec Waste Industries for disposal site operations and maintenance.

In addition, the Division administers the County's solid waste handling franchise program and the refuse collection permit program that authorizes and regulates trash collection by private haulers in the unincorporated area (source: http://www.sbcounty.gov/wsd/).

For the City of Grand Terrace, solid waste hauling is exclusively contracted with Waste Management of the Inland Empire. All containers and hauling services, for solid waste and recyclables produced during the construction period, will be provided by Waste Management. Waste Management of the Inland Empire hauls all solid waste to San Timoteo Landfill in Redlands, California and Colton Landfill in Colton, California. These landfills have adequate capacity to handle and dispose of solid waste generated by the Highgrove Project facility, as shown in Table 8.13-3. Colton Landfill is in the process of expanding its life expectancy. There are no open enforcement actions against either the Colton or San Timoteo Landfill (Hurse, 2005).

TABLE 8.13-3
Solid Waste Disposal Facilities for AES Highgrove Waste

Landfill/MRF/ Transfer Station	Location	Class[a]	Permitted Capacity[a]	Permitted Throughput[a]	Remaining Capacity[a]	Estimated Closure Date[a]	Comments
San Timoteo Sanitary Landfill	Redlands	III	20.4 million cubic yards	1,000 tons/day	2 million cubic yards	2016	Operated by County of San Bernardino Solid Waste Management Division. No record of enforcement actions[a]
Colton Sanitary Landfill	Colton	III	13.3 million cubic yards	3,100 tons/day	380,716 cubic yards (2001)	2006[b]	Operated by County of San Bernardino Solid Waste Management Division. In the process of extending permitted operating life.[b] No record of enforcement actions[a]
Mid-Valley Sanitary Landfill	Rialto	III	62 million cubic yards	7,500 tons/day	72.3 million cubic yards[a]	2033	Operated by County of San Bernardino Solid Waste Management Division. No record of enforcement actions[a]
California Street Landfill	Redlands	III	10 million cubic yards	829 tons/day	473,888 cubic yards	2031	Operated by County of San Bernardino Solid Waste Management Division. No record of enforcement actions[a]
Victorville Sanitary Landfill	Victorville	III	83.2 million cubic yards[d]	1,600 tons/ day	721,913 cubic yards (2001)	2059[b]	Operated by County of San Bernardino Solid Waste Management Division. In the process of extending permitted operating life.[b] No record of enforcement actions[a]
Barstow Sanitary Landfill	Barstow	III	3.6 million cubic yards	750 tons/day	218,492 cubic yards (2001)	2012[b]	Operated by County of San Bernardino Solid Waste Management Division. In the process of extending permitted operating life.[b] No record of enforcement actions[a]

TABLE 8.13-3
Solid Waste Disposal Facilities for AES Highgrove Waste

Landfill/MRF/ Transfer Station	Location	Class[a]	Permitted Capacity[a]	Permitted Throughput[a]	Remaining Capacity[a]	Estimated Closure Date[a]	Comments
Landers Sanitary Landfill	Landers	III	3.1 million cubic yards	1,200 tons/day	463,785 cubic yards (2001)	2008[b]	Operated by County of San Bernardino Solid Waste Management Division. In the process of extending permitted operating life.[b] No record of enforcement actions[a]
Badlands Landfill	Moreno Valley	III	30.4 million cubic yards	4,000 tons/day	21.9 million cubic yards	2016	Operated by County of Riverside Waste Management Dept. No records of enforcement actions.[a]
El Sobrante Landfill	Corona	III	185 million tons	10,000 tons/day	173 million tons	2030	Operated by USA Waste Services of California, Inc. No record of enforcement actions[a]
Blythe Sanitary Landfill	Blythe	III	4.6 million cubic yards	400 tons/day	2.3 million cubic yards	2034	Operated by County of Riverside Waste Management Dept. No records of enforcement actions[a]
Lamb Canyon Sanitary Landfill	Beaumont	III	34.3 million cubic yards	3,000 tons/day	20.9 million cubic yards	2023	Operated by County of Riverside Waste Management Dept. No record of enforcement actions[a]

[a] CIWMB, 2006a. California Integrated Waste Management Board Solid Waste Information System (SWIS) database.
[b] The county is in the process of extending the permitted life of this landfill (Hurse, 2005).

Other landfills in the area include the Mid Valley Sanitary Landfill in Rialto and the California Street Landfill in Redlands, California. Regional landfills and transfer stations are shown in Table 8.13-3. Disposal of solid nonhazardous waste will not be a constraint on the Highgrove Project development.

8.13.5.2 Hazardous Waste

Hazardous waste generated at the Highgrove Project will be stored at that facility for less than 90 days. The waste will then be transported by a permitted hazardous waste transporter to a TSD facility. These facilities vary considerably in what they can do with the hazardous waste they receive. Some can only store waste, some can treat the waste to recover usable products, and others can dispose of the waste by incineration, deep-well injection, or landfilling. (Incineration and deep-well injection are not permitted in California.)

According to the California Environmental Protection Agency's (Cal/EPA) Department of Toxic Substance Control (DTSC), there are 64 facilities in California that can accept

hazardous waste for treatment or disposal (DTSC, 2005). The closest commercial hazardous waste treatment facility is Filter Recycling Service, Inc. in Rialto, California. Other TSD facilities in the regional area include a Clean Harbors (Safety Kleen) facility in Highland, California, and Advanced Environmental Inc. in Fontana, California.

For ultimate disposal, California has three hazardous waste (Class I) landfills, as described in the following subsections.

8.13.5.2.1 Clean Harbors' Buttonwillow Landfill in Kern County

This landfill is permitted at 13.25 million cubic yards and, as of March 2005, has approximately 10.15 million cubic yards of remaining space. The annual deposit rate is currently 130,000 to 350,000 cubic yards. At the current deposit rate, the landfill can accept hazardous waste until approximately 2068 to 2078. Buttonwillow has been permitted to accept all hazardous wastes except flammables, PCB with a concentration greater than 50 ppm, medical waste, explosives, and radioactive waste with radioactivity greater than 20,000 picocuries (Buoni, 2005).

8.13.5.2.2 Clean Harbors' Westmorland Landfill in Imperial County

This facility is not currently accepting waste since the Buttonwillow facility is accommodating the current hazardous waste generation rate. The facility is, however, available in reserve (Buoni, 2005). The landfill's conditional use permit (CUP) prohibits the acceptance of some types of waste, including radioactive (except geothermal) waste, flammables, biological hazard waste (medical), PCB, dioxins, air- and water-reactive wastes, and strong oxidizers.

8.13.5.2.3 Chemical Waste Management's Kettleman Hills Landfill in Kings County

This landfill has 6 million cubic yards of remaining permitted capacity for hazardous waste (Class I). They also accept Class II and Class III wastes. The current annual deposit rate is about 1.0 million cubic yards per year (for Class I wastes). According to Chemical Waste, the landfill will be open for at least another 20 years, though they could permit additional capacity, if necessary. The Class I landfill is permitted for and will accept all hazardous wastes except radioactive, medical, and unexploded ordnance (UXO) (Yarbrough, 2005).

In addition to landfills, there are numerous offsite commercial hazardous waste treatment and recycling facilities in California. These facilities have sufficient capacity to recycle and/or treat hazardous waste generated in California. All hazardous waste will be removed and delivered to a TSD facility. Used oil will be collected by a permitted oil recycler.

8.13.6 Waste Management Methods and Mitigation

The handling and management of waste generated by the Highgrove Project will follow the hierarchical approach of source reduction, recycling, treatment, and disposal. The first priority will be to reduce the quantity of waste generated through pollution prevention methods (e.g., high-efficiency cleaning methods). The next level of waste management will involve the reuse or recycle of wastes (e.g., used oil recycling). For wastes that cannot be recycled, treatment will be used, if possible, to make the waste non-hazardous (e.g., neutralization). Finally, offsite disposal will be used to dispose of residual wastes that cannot be reused, recycled, or treated.

The following subsections present methods for managing both nonhazardous and hazardous waste generated by the Highgrove Project.

8.13.6.1 Construction Phase

Nonhazardous solid waste generated during construction will be collected in onsite dumpsters and picked up periodically by Waste Management of the Inland Empire. The waste will then be taken to the San Timoteo Landfill or another local landfill. Recyclable materials can be segregated and transported by construction contractors or other private haulers to an area recycling facility.

Wastewater generated during construction will include sanitary waste and could include equipment washwater and stormwater runoff. Sanitary waste will be collected in portable, self-contained toilets. Equipment washwater will be contained at designated wash areas and will be disposed of offsite. Stormwater runoff will be managed in accordance with a stormwater management permit, which will be obtained prior to the start of construction. The generation of nonhazardous wastewater will be minimized through water conservation and reuse measures.

Most of the hazardous waste generated during construction will consist of liquid waste, such as flushing and cleaning fluids, passivating fluids, and solvents. Some solid waste in the form of welding materials and dried paint may also be generated. Nonhazardous materials will be used whenever possible to minimize the quantity of hazardous waste generated. The construction contractor will be the generator of hazardous construction waste and will be responsible for proper handling in compliance with all applicable federal, state, and local laws and regulations, including licensing, training of personnel, accumulation limits and times, and reporting and recordkeeping. The hazardous waste will be collected in satellite accumulation containers near the points of generation. This waste will be moved daily to the contractor's 90-day hazardous waste storage area, located at the plant construction laydown area. The waste will be delivered to an authorized hazardous waste management facility, prior to the expiration of the 90-day storage limit.

Any soil or liquid wastes generated during construction or remediation activities will characterized to determine whether they require management and disposal as non-hazardous or hazardous wastes. Best management practices (BMPs) including stockpile liners, stockpile covering, secondary containment, and truck load covering will be employed as appropriate based on regulatory requirements and approved management plans. Onsite management and offsite transportation and disposal of soil will be performed in accordance with all applicable regulatory requirements.

8.13.6.2 Operation Phase

Nonhazardous solid waste will be generated from plant operations, as well as varying quantities of liquid and solid hazardous waste. Handling and mitigation of these wastes is described in the following subsections.

8.13.6.2.1 Nonhazardous Wastes

Wastewater from facility sinks and toilets will be discharged to the sanitary sewer.

Nonhazardous solid waste or refuse will be collected and deposited in a local landfill. Whenever possible, recycling will be implemented throughout the facility to minimize the quantity of nonhazardous waste that must be disposed of in a landfill.

8.13.6.2.2 Hazardous Wastes

To avoid the potential effects on human health and the environment from the handling and disposal of hazardous wastes, procedures will be developed to ensure proper labeling, storage, packaging, recordkeeping, and disposal of all hazardous wastes. The following general procedures will be employed:

- The Highgrove Project will be classified as a hazardous waste generator. Prior to facility startup, application will be made to CalEPA for a USEPA identification number.
- Hazardous wastes will not be stored onsite for more than 90 days and will be accumulated according to CCR Title 22.
- Hazardous wastes will be stored in appropriately segregated storage areas surrounded by berms to contain leaks and spills. The bermed areas will be sized to hold the full contents of the largest single container and, if not roofed, sized for an additional 20 percent to allow for rainfall. These areas will be inspected daily.
- Hazardous wastes will be collected by a licensed hazardous waste hauler, using a hazardous waste manifest. Wastes will only be shipped to authorized hazardous waste management facilities. Biannual hazardous waste generator reports will be prepared and submitted to the Department of Toxic Substances Control (DTSC). Copies of manifests, reports, waste analyses, and other documents will be kept onsite and remain accessible for inspection for at least 3 years.
- Employees will be trained in hazardous waste procedures, spill contingencies, and waste minimization.
- Procedures will be developed to reduce the quantity of hazardous waste generated. Nonhazardous materials will be used instead of hazardous materials whenever possible, and wastes will be recycled whenever possible.

Specifically, hazardous waste handling will include the following practices. Handling of hazardous wastes in this way will minimize the quantity of waste deposited to landfills:

- Waste lubricating oil will be recovered and recycled by a waste oil recycling contractor, such as Mark Alarcon's Waste Oil Service. Spent oil filters and oily rags will be recycled.
- Spent SCR and oxidation catalysts will be recycled by the supplier, if possible, or disposed of in a Class I landfill.
- Chemical cleaning wastes will consist of alkaline cleaning solutions used during turbine wash. These wastes, which are subject to high metal concentrations, will be stored temporarily onsite in portable containers and disposed of offsite, in accordance with applicable regulatory requirements. Disposal may consist of offsite treatment, recovery of metals, and/or landfilling.

8.13.6.3 Facility Closure

When the Highgrove Project is closed, both nonhazardous and hazardous wastes must be handled properly. Closure can be temporary or permanent. Temporary closure would be for a period of time greater than the time required for normal maintenance. Causes for temporary closure could be a disruption in the supply of natural gas, flooding of the site, or damage to the plant from earthquake, fire, storm, or other natural causes. Permanent closure would consist of a cessation in operations with no intent to restart and could be due to the age of the plant, damage to the plant beyond repair, economic conditions, or other unforeseen reasons. Handling of wastes for these two types of closure are discussed below.

8.13.6.3.1 Temporary Closure

For a temporary closure, where there is no release of hazardous materials, facility security will be deployed on a 24-hour basis, and the CEC will be notified. Depending on the length of shutdown necessary, a contingency plan for the temporary cessation of operations will be implemented. This plan will be prepared prior to the Highgrove Project startup. The plan will be developed to ensure conformance with all applicable LORS and the protection of public health and safety and the environment. The plan, depending on the expected duration of the shutdown, could include draining all chemicals from storage tanks and other equipment and the safe shutdown of all equipment. All wastes will be disposed of according to applicable LORS, as discussed in Subsection 8.13.2.

Where the temporary closure is in response to facility damage, or where there is a release or threatened release of hazardous waste or materials into the environment, procedures will be followed as set forth in a Risk Management Plan (RMP). The RMP is described in Subsection 8.12.8.4. Procedures include methods to control releases, notification of applicable authorities and the public, emergency response, and training for generating facility personnel in responding to and controlling releases of hazardous materials and hazardous waste. Once the immediate problem of hazardous waste and materials release is contained and cleaned up, temporary closure will proceed as described for a closure where there is no release of hazardous materials or waste.

8.13.6.3.2 Permanent Closure

The planned life of the generation facility is 30 years, though operation could be longer. When the facility is permanently closed, the handling of nonhazardous and hazardous waste and hazardous materials will be part of a general closure plan that will attempt to maximize the recycling of all facility components. Unused chemicals will be sold back to the suppliers or other purchasers or users. All equipment containing chemicals will be drained and shut down to protect public health and safety and the environment. All nonhazardous wastes will be collected and disposed of in appropriate landfills or waste collection facilities. All hazardous wastes will be disposed of according to applicable LORS. The site will be secured 24 hours per day during the decommissioning activities.

8.13.7 Cumulative Impacts

The Highgrove Project facility will generate nonhazardous solid waste that will add to the total waste generated in San Bernardino County and in California. However, there is adequate recycling and landfill capacity in California to recycle and dispose of the waste generated by the Highgrove Project. It is estimated that the plant will generate

approximately 534 tons of solid waste during construction, 569 tons during demolition and about 8,400 tons a year from operations (including approximately 2 tons of hazardous waste). Compared to the total amount of solid waste landfilled in San Bernardino County in the year 2004 of 1,791,864 tons, the Highgrove Project's contribution will represent less than 1 percent of total county waste disposal (CIWMB, 2006b). Therefore, the impact of the project on solid waste recycling and disposal capacity is not significant.

Hazardous waste generated will consist of waste oil, filters, SCR and oxidation catalysts, and fluids used to clean the piping. The waste oil and catalysts will be recycled. Cleaning and flushing fluids will be removed and disposed of offsite. Cleaning and flushing will occur only periodically. Hazardous waste treatment and disposal capacity in California is more than adequate. Therefore, the effect of the Highgrove Project on hazardous waste recycling, treatment, and disposal capability is not significant.

8.13.8 Monitoring

Because the environmental impacts caused by construction and operation of the facility are expected to be minimal, extensive monitoring programs will not be required. Generated waste, both nonhazardous and hazardous, will be monitored during project construction and operation in accordance with the monitoring and reporting requirements mandated by the regulatory permits to be obtained for construction and operation.

8.13.9 Involved Agencies

Several agencies, including USEPA at the federal level and Cal/EPA at the state level, regulate nonhazardous and hazardous waste and will be involved in the regulation of the waste generated by the Highgrove Project. The hazardous waste laws, however, are administered and enforced primarily through local agencies. For the Highgrove Project, the primary agency for hazardous waste issues will be the San Bernardino County Fire Department Hazardous Materials Division, which is the designated CUPA for the area. The agencies and persons to contact for each type of waste are shown in Table 8.13-4.

The DTSC is responsible for overseeing implementation of corrective action to investigate and remediate releases of hazardous constituents from operation of the former SCE facility. DTSC is also responsible for approving closure certification of the former SCE hazardous waste management units some of which are located within the Project Site.

TABLE 8.13-4
Agency Contacts for AES Highgrove Waste Management

Topic	Agency	Address	Contact	Title	Telephone
Nonhazardous Waste					
Solid Waste	County of San Bernardino Department of Public Works—Solid Waste Management Division	222 W. Hospitality Lane Second Floor San Bernardino, CA. 92415-0017	Peter Wulfman	Division Manager	(909) 386-8701

TABLE 8.13-4
Agency Contacts for AES Highgrove Waste Management

Topic	Agency	Address	Contact	Title	Telephone
Hazardous Waste					
Hazardous	San Bernardino County Fire Department—Hazardous Materials Division—Certified Unified Program Agency (CUPA) Program	620 South "E" Street San Bernardino, CA 92415-0153	Doug Snyder	Supervisor	(909) 386-8401
RCRA Closure and Corrective Action	DTSC, Permitting and Corrective Action Branch	1011 N. Grandview Glendale, CA 91201	Chia-Rin Yen	Hazardous Substances Scientist	(818) 551-2182

8.13.10 Permits Required and Permit Schedule

Table 8.13-5 lists the permits required by San Bernardino County and DTSC.

TABLE 8.13-5
Permits Required and Permit Schedule for AES Highgrove Waste Management

Permit	Applicability	Schedule for Permit
Flammable or Combustible Liquids Storage Permit	San Bernardino County Fire Code requires that businesses obtain permits for the use and storage of flammable and combustible liquid wastes.	Prior to storage of flammable or combustible liquid wastes at the site.
Closure certification of former hazardous waste management units operated by SCE.	DTSC requires the former hazardous waste management units to close in accordance with state and federal regulations.	A Closure Demonstration Report certifying clean closure of several hazardous waste management units is currently under preparation by SCE. Closure certification acceptance from DTSC is anticipated prior to commencement of AES construction.
Corrective Action of former SCE hazardous constituent releases from solid waste management units and other areas of concern located upon the Project Site.	The DTSC is responsible for overseeing corrective action for hazardous substance releases at hazardous waste management facilities.	Solid waste management units requiring additional investigation or remediation are unlikely within the construction area for the Project Site.

In addition to the permits required for operation, the former generating plant operation requires closure of hazardous waste management units under RCRA and California regulations. Hazardous waste management units operated by SCE included a hazardous waste container storage area, a container crushing area, the East and West Basins, and several associated units including the oil/water separator, the demineralizer sump, the neutralizer sump, and ancillary piping and floor and yard drains associated with the wastewater treatment system. SCE is currently in the process of closing these units located

within the Project Site. SCE has conducted iterative investigations of these areas under DTSC's oversight and is in the process of completing a Closure Demonstration Report certifying clean closure of these units. Once accepted by DTSC, the report will undergo public comment and is expected to be formally approved by DTSC within the next few months. AES anticipates that these units within the Project Site will be closed prior to commencement of construction of the Highgrove Project.

The former SCE operations also trigger RCRA and California corrective action requirements pursuant to RCRA 3008(h) and California Health & Safety Code Sections 25187 and 25200.10. These provisions require assessment of other areas within the former SCE facility that may have released hazardous constituents to the environment. Areas determined to be impacted with hazardous contaminants above health-based levels may require mitigation to levels protective of future site uses. Based on a draft RCRA Facility Assessment (RFA) completed in 2001, the only solid waste management units or areas of concern (other than the units currently undergoing closure as discussed above) identified within the proposed Project Site area include the former 12,000-gallon acid and 2,500-gallon caustic tanks. The 12,000-gallon acid tank was removed from service in 1988 and the 2,500-gallon caustic tank was removed from the facility in 1996. Based on the existing site investigation data, it is unlikely additional investigation will be required in the area of the former acid and caustic tanks. The area of the former RCRA-exempt oil storage tanks located within the Project Site has been investigated thoroughly by SCE. It is expected that no further action will be required to investigate potential releases from this area.

8.13.11 References

ARCADIS Geraghty & Miller, Inc. 2000. Phase I Environmental Site Assessment for EPTC Property at Former Highgrove Generating Station, March 3.

Berry, S. 2005. City Hall, City of Grand Terrace. Personal communication. March 1.

Bingham, K. 2005. County of San Bernardino Solid Waste Management Division. Personal communication. February 28.

Buoni, M. 2005. Clean Harbors Buttonwillow, California RCRA Hazardous Waste Disposal Site General Manager. Personal communication. March 4.

CIWMB. 2006a. "Solid Waste Information System (SWIS) Database." http://www.ciwmb.ca.gov/SWIS/. March 3.

CIWMB, 2006b."2004 Landfill Summary Tonnage Report." http://www.ciwmb.ca.gov/Landfills/Tonnages/. March 3.

California Environmental Protection Agency, Department of Toxic Substance Control (DTSC). 2005. "California Commercial Offsite Hazardous Waste Management Facilities." http://www.dtsc.ca.gov/HazardousWaste/index.html. November 8.

County of San Bernardino Department of Public Works—Solid Waste Management Division. 2006. http://www.sbcounty.gov/wsd/.

DTSC. 1995. Stipulation and Order. February 1.

EPE&C Geotechnical Group. 1996. Baseline Tank Study Report, Above Ground Oil Storage Tanks 1, 2, 3 and Day Tanks 1 and 2, Highgrove Generating Station. February 19.

Geraghty & Miller, Inc. 1997. Highgrove Generating Station Phase II Environmental Site Assessment. June 6.

Golder Associates. 2001. RCRA Facility Assessment for Riverside Canal Power Company, September.

Golder Associates, Inc. 1999a. Soil Gas Sampling, West Retention Basin, Riverside Canal Power Company, Grand Terrace, California, November.

Golder Associates, Inc. 1999b. Phase II Environmental Site Assessment, Retention Basins. Riverside Canal Power Company, Grand Terrace, California. March.

Golder Associates, Inc. 1999c. Groundwater Assessment, Riverside Canal Power Company, Grand Terrace, California. January.

Golder Associates, Inc. 1998. Phase II Environmental Site Assessment Highgrove Generating Station. March.

Hamilton, P. 2004. Annual Groundwater Monitoring Report, Groundwater Detection Monitoring Program, Highgrove Generating Station, February 16.

Hamilton, P. 1997a. Leak Detection Investigation, Highgrove Generating Station. May 5.

Hamilton, P. 1997b. Sump Integrity Report. February 28.

Hurse, E.2005. County of San Bernardino Solid Waste Management Division. Personal communication. March 1.

Palkiewicz, J. 2005. County of San Bernardino Fire Department, Station No. 23, Grand Terrace. Personal communication. April 12.

Sisto, L. 2005. Waste Management of the Inland Empire. Personal communication. February 22.

Southern California Edison Company (SEC). 2001. Final Remediation Report, Station Fuel Oil Facilities, Highgrove Tank Farm Decommissioning. April.

Valenzuela, C. 2005. County of San Bernardino Solid Waste Management Division. Personal communication. February 22.

8.14 Water Resources

This section provides a discussion of the existing water resources in the vicinity of the Highgrove Project site and assesses the potential effects of project construction and operations on water resources. Specifically, this chapter discusses the project and its potential effects in the following areas:

- Proposed use of groundwater for cooling and process water needs
- Water supply and quality
- Disposal of wastewater
- Compliance with federal, state, and local water policies
- Storm water discharge
- Flooding

8.14.1 Applicable Laws, Ordinances, Regulations, and Standards

Federal, state, and local LORS applicable to water resources and conformance are discussed in this section and summarized in Table 8.14-1.

8.14.1.1 Federal

The Clean Water Act authorizes the U.S. Environmental Protection Agency (USEPA) to regulate discharges of wastewater and stormwater into surface waters by issuing National Pollutant Discharge Elimination System (NPDES) permits and setting pretreatment standards. In California, the State Water Resources Control Board, acting through its Regional Water Quality Control Boards, implements these permits consistent with a Memorandum of Understanding with the USEPA. For this reason, relevant NPDES permits are discussed below under State LORS.

8.14.1.2 State

8.14.1.2.1 State Water Resources Control Board and Santa Ana Regional Water Quality Control Board *Industrial Stormwater NPDES Permit* The State Water Resources Control Board (SWRCB) implements regulations under the federal Clean Water Act requiring stormwater discharges associated with industrial activity to be regulated by an NPDES permit (SWRCB, 1997). The SWRCB has issued a statewide General Permit and Waste Discharge Requirements (WDRs) for discharges of stormwater associated with industrial activities (such as the proposed project), excluding construction activities. This is SWRCB Order 97-03-DWQ. To be covered under Order 97-03-DWQ, the project would implement a Stormwater Pollution Prevention Plan (SWPPP) including good housekeeping practices and Best Management Practices (BMPs) during project operation. The Santa Ana Regional Water Quality Control Board (SARWQCB) requires a Notice of Intent to be filed for industrial activities to be covered under the statewide General Permit.

TABLE 8.14-1
Laws, Ordinances, Regulations, and Standards Applicable to Highgrove Project Water Resources

LORS	Applicability	How Conformance Is Achieved	Agency/Contact
Federal			
Clean Water Act/Water Pollution Control Act. P.L. 92-500, 1972; amended by Water Quality Act of 1987, P.L. 100-4 (33 USC 466 et seq.); National Pollutant Discharge Elimination System (NPDES) (CWA, Section 402)	Prohibits discharge of pollutants to receiving waters unless the discharge is in compliance with an NPDES permit. Applies to all point-source discharges, including industrial wastewater and stormwater runoff, during both construction and operation.	NPDES permits for construction and industrial stormwater prior to construction and plant operation.	See below under "State"
State			
Federal Clean Water Act (implemented by State of California) and Porter-Cologne Water Quality Control Act	Implements and enforces the federal NPDES permit program through conformance with beneficial uses and water quality objectives in the Basin Plan, as well as conformance with any applicable Total Maximum Daily Load requirements and industrial pretreatment requirements.	NPDES permits for construction and industrial stormwater prior to construction and plant operation.	Santa Ana RWQCB 3737 Main St., Suite 500 Riverside, CA 92501 951-782-4130
Local			
City of Colton, Section 13.08 of the Municipal Code (Ordinance 0-03-98 § 1)	Sets forth uniform requirements for all users of the Colton wastewater collection and treatment system.	For the discharge of sanitary wastewater, the Highgrove Project will obtain a Connection Permit from the City of Grand Terrace.	Steve Berry Assistant City Manager City of Grand Terrace 22795 Barton Road Grand Terrace, CA 92313 (909) 430-2245
San Bernardino Valley Municipal Water District Ordinance No. 73-SARI to be implemented for the Highgrove Project by the City of San Bernardino Municipal Water Department	Plant wastewater will be transported to the Santa Ana Regional Interceptor (SARI) brine line by truck.	The City of San Bernardino Municipal Water Department will issue a conditional Indirect Industrial User Permit and the applicant will use a company that has a Liquid Wastehauler Permit. The applicant also will comply with all waste discharge requirements.	Mike Placentia Environmental Control Section San Bernardino Municipal Water Department 300 North D Street San Bernardino, CA 92418 (909) 384-5141

TABLE 8.14-1
Laws, Ordinances, Regulations, and Standards Applicable to Highgrove Project Water Resources

LORS	Applicability	How Conformance Is Achieved	Agency/Contact
City of Grand Terrace, Grading Permit	Regulates grading, erosion and sediment control for construction projects within City limits.	The applicant will obtain a Grading Permit and the project will comply with all practices prescribed in the Erosion and Sediment Control Plan and SWPPP.	John Lampe or Rich Shield, Planners Planning and Community Development City of Grand Terrace 22795 Barton Road Grand Terrace, CA 92324 909-430-2256

Construction Stormwater NPDES Permit The federal Clean Water Act effectively prohibits discharges of stormwater from construction sites unless the discharge is in compliance with an NPDES permit. The SWRCB is the permitting authority in California and has adopted a statewide General Permit for Stormwater Discharges Associated with Construction Activity (General Construction Permit; SWRCB, 1999) that applies to projects resulting in one or more acres of soil disturbance. This is SWRCB Order 99-08-DWQ. The proposed project would result in disturbance of more than one acre of soil; therefore, the project will require coverage under the statewide General Permit. This includes the preparation of a SWPPP that would specify site management activities to be implemented during site development. These management activities will include construction stormwater BMPs, dewatering runoff controls, and construction equipment decontamination. The Santa Ana RWQCB requires that a Notice of Intent be filed prior to construction activities, and that the SWPPP be maintained onsite during construction.

Municipal Stormwater NPDES Permit A Municipal Stormwater NPDES Permit Order No. R8-2002-0012, was issued to San Bernardino County and 16 incorporated cities in San Bernardino County (including Grand Terrace) by the Santa Ana RWQCB on April 26, 2002. The municipal permit requires the development and implementation of an effective stormwater management program to protect the beneficial uses of all receiving waters. Because the municipal stormwater standards would be enforced by the City of Grand Terrace, they are discussed below under local regulations.

8.14.1.3 Local

8.14.1.3.1 Industrial Wastewater

Industrial wastewater will be truck-hauled to the SARI brine line, which conveys saline wastewater (high in total dissolved solids) to the Pacific Ocean. The SARI system was constructed to limit the discharge of saline wastewater into the Santa Ana River. In the project area, the "San Bernardino Municipal Water District Ordinance No. 73-SARI" provides regulations for the use of the SARI system. Based on the plant's location, the Highgrove Project must obtain from the City of San Bernardino Municipal Water Department an Indirect Industrial User Permit, including a laboratory analysis of a sample from the proposed discharge and a Liquid Wastehauler permit application to discharge waste at the truck disposal station.

Ordinance No. 73-SARI requires that pretreatment systems reduce pollutants to levels specified by federal and local limitations. Wastewater discharges must be in accordance with the general pretreatment regulations as stated in Section 403.2 of Title 40 of the Federal Code of Regulations. In addition, the ordinance specifies local discharge limits consistent with the operational requirements of the SARI system's NPDES permit with the Santa Ana RWQCB. Table 8.14-2 shows the constituent limits for discharge to the SARI System.

TABLE 8.14-2
Limitations for Industrial Discharges to SARI

Parameter	SARI Discharge Limit (mg/L)
pH	6-12 units
Arsenic	2.0

Cadmium	1.0
Chromium	2.0
Copper	3.0
Lead	2.0
Mercury	0.03
Nickel	10.0
Silver	5.0
Zinc	10.0
Cyanide (total)	5.0
Cyanide (Amenable)	1.0
Polychlorinated Biphenyls	0.01
Pesticides	0.01
Total Toxic Organics	0.58
Sulfide (total)	5.0
Sulfide (dissolved)	0.5
Oil and Grease (petroleum)	100 tph

Sanitary Wastewater Sanitary wastewater will be discharged to the City of Grand Terrace's sewer system, which is operated by the City of Colton. Section 13.08 of the City of Colton Municipal Code sets forth uniform requirements for all users of the Colton wastewater collection and treatment system. Grand Terrace is required by the "Joint Powers Agreement for Pretreatment Program Responsibilities and Authority in the Colton Wastewater Treatment Plant Service Area," dated November 15, 1990, to establish and maintain legal authority within its sewer service area to assure that its ordinance provisions and wastewater discharge limits are as restrictive as those specified by the City of Colton. Because only sanitary wastewater would be discharged, discretionary review in accordance with the provisions of Section 13.08 would not be required. The Highgrove Project will request a connection permit to hook up to the City of Grand Terrace wastewater system (Ethridge, 2006).

Stormwater The Municipal Stormwater NPDES Permit Order No. R8-2002-0012, NPDES Permit No. CAS618036, was issued to San Bernardino County and the 16 incorporated cities of San Bernardino County (including Grand Terrace) by the Santa Ana RWQCB on April 26, 2002. It requires the development and implementation of a Water Quality Management Plan (WQMP) to protect the beneficial uses of all receiving waters.

Under Order No. R8-2002-0012, the San Bernardino County Flood Control District, as the principal permittee for San Bernardino County, was required to develop a model WQMP to reduce pollutants and runoff flows from all new development and significant redevelopment programs. The Highgrove Project falls into the category of "redevelopment," and is thus required to follow the guidelines outlined in the Plan. Guidelines of the WQMP

include steps to identify and mitigate pollutants and conditions of concern. Projects must incorporate and implement best management practices to control erosion and sedimentation during project construction and operations. These requirements are similar to those of the statewide General Permits for construction and industrial activities, and have been incorporated into the draft Storm Water Pollution Prevention Plan contained in Appendix 8.14A.

8.14.1.3.2 Grading The City of Grand Terrace has established an ordinance for grading, erosion, and sediment control. This ordinance establishes permitting requirements and exemptions for general earthwork operations, sediment transport, and erosion control activities that can cause the discharge of pollutants into stormwater systems or watercourses. These requirements, including implementation of best management practices, are similar to those of the statewide General Permit for construction activities. The requirements have been incorporated into the draft Storm Water Pollution Prevention Plan contained in Appendix 8.14A.

8.14.1.3.3 California Energy Commission Policy The California Energy Commission adopted in its 2003 Integrated Energy Policy Report policy guidance on the use of water for power plant cooling. The Highgrove Project is proposing to use onsite wells to meet its small cooling water demands because at this time there is no suitable alternative water supply source available. For a complete discussion of all the alternative water supply sources considered, see Section 9.0, Alternatives.

8.14.2 Hydrologic Setting

8.14.2.1 Surface Water

The City of Grand Terrace, in which the Highgrove Project will be sited, is located in the Santa Ana Region of California's Regional Water Quality Control Boards. The Santa Ana River Basin is the major watershed within this Region. This watershed is divided into the lower Santa Ana River, middle Santa Ana River, Chino basin, upper Santa Ana and Big Bear Lake watersheds. The lower Santa Ana River Basin includes the Orange County drainage areas. The rest of the Santa Ana River Basin includes the San Bernardino County and the Riverside County drainage areas.

Surface waters in the vicinity of the project include the Santa Ana River, Riverside Canal, and Gage Canal. Figure 8.14-1 shows the surface water features in the project vicinity; surface water features that will be crossed by the proposed gas pipeline for the project are described in more detail in Subsection 8.2, Biological Resources.

8.14.2.1.1 Santa Ana River The Santa Ana River, located approximately 1.75 miles west of the site, is the Region's main surface water body, flowing southwest toward the Pacific Ocean, approximately 50 miles away.

The Santa Ana RWQCB divides the River into six "reaches" the project site is located near Reach 4. Although Reach 4 of the Santa Ana River is considered an "impaired water body" (as defined by Section 303(d) of the Clean Water Act) due to pathogens (USEPA, 2002), beneficial uses along the entire Reach include groundwater recharge, water contact recreation, non-water contact recreation, warm freshwater fish habitat, and wildlife habitat (Santa Ana RWQCB, 1994). The Santa Ana River is "effluent-dominated," as treated

wastewater discharges, which total approximately 140,000 acre-feet per year (AFY), comprise more than 90 percent of the baseflow of the Santa Ana River during dry months. Within Reach 4, a portion of flow is provided by discharges from local wastewater treatment plants.

8.14.2.1.2 Riverside and Gage Canals Both the Riverside and Gage Canals are approximately 20 miles in length and are water features with historical significance as they provided irrigation water that helped stimulate economic growth in the vicinity of the project.

Riverside Canal passes the northwest side of the project site. The Riverside Canal is a concrete-lined waterway that flows northeast to southwest from near the City of Colton to the City of Corona. It is currently used primarily as a conveyance for non-potable water for agricultural use. No water quality data are available for Riverside Canal. The Gage Canal is located approximately ½ mile south of the site. The Gage Canal is an irrigation canal between the Santa Ana River and Riverside. The canal supplies water to local citrus ranches and the groves of California Citrus State Historic Park. No water quality data are available for Gage Canal.

8.14.2.2 Groundwater

Extensive groundwater basins underlie much of the Region in the Santa Ana Basin. A map showing the groundwater basins in the vicinity of the project is shown in Figure 8.14-2. The project is location within the Riverside groundwater basin. A recent amendment to the Basin Plan for the Santa Ana Region divided the Riverside Basin into seven subbasins, known as Riverside A through Riverside F (SARWQCB, 2004). The project is located in the basin designated as Riverside F (Figure 8.14-2).

Deterioration of groundwater quality in the Region is a significant issue due to increasing salt levels. The Regional Board has been active, for instance, in helping to develop desalination projects to intercept and desalt poor quality groundwater with the goal of protecting downstream water supplies as well as developing strategies to protect water quality and optimize water resources development.

The Riverside Basin as a whole is bounded by impermeable rocks of Box Springs Mountains on the southeast, Arlington Mountain on the south, La Sierra Heights and Mount Rubidoux on the northwest, and the Jurupa Mountains on the north. The northeast boundary is formed by the Rialto-Colton fault, and a portion of the northern boundary is a groundwater divide beneath the City of Bloomington. The Santa Ana River flows over the northern portion of the basin (DWR, 2004) and provides some of the recharge for the basin. Other recharge sources include underflow past the Rialto-Colton fault, Chino basin inflows, return irrigation flow, and deep percolation of precipitation. Beneficial uses of the Riverside Basin include municipal and domestic supply, agricultural supply, industrial service supply, and industrial process supply (SARWQCB, 1994).

Groundwater in the basin is found mainly in alluvial deposits. Quaternary age alluvial deposits in the subbasin consist of sand, gravel, silt, and clay deposited by the Santa Ana River and its tributaries. The upper 30-foot section of deposits below the site is likely perched groundwater and is composed of clay with silt and sand interbeds with varying density and degree of cementation (ARCADIS, 2000). Based on a March 1999, Phase II Site Assessment, the surface soils at the site are Pleistocene alluvial fan deposits that have been

dissected by the modern drainage courses to form remnant terraces. The deposits include decomposed clay-rich alluvium. Well driller's logs indicate that these materials extend to about 420 feet below the site and rest on granitic rocks that are considered non-water bearing. Subsurface material in the upper 80 feet has been observed to consist of varying densities of silts and sands with occasional pebbles or gravel (Golder Associates, 1999). The aquifer below the site is semi-confined with groundwater occurring at an average depth of approximately 100 feet below ground surface (bgs). Historically, depths to groundwater have ranged from 80 to 120 feet bgs at the project site.

Groundwater in this basin is dominantly calcium-sodium bicarbonate, with ranges from 320 milligrams per liter (mg/L) to 756 mg/L (DWR, 2004). Groundwater quality samples were taken from one of the existing onsite wells and are reported in Table 7.1-2 (Calscience Environmental Laboratories, 2004).

8.14.2.2.1 Santa Ana River Stipulated Judgment In the 1960s, overuse of the Santa Ana River reduced summer flows and water quality to downstream users (Orange County and others), which resulted in a lawsuit seeking to adjudication of water rights against upstream users. The case was settled through an engineered solution (Stipulated Judgment 78426, April 17, 1969), and resulted in an agreement by the four largest water districts -- San Bernardino Valley Municipal Water District (MWD), Chino Basin MWD, Western MWD, and Orange County WD to implement a physical solution. The judgment establishes minimum average annual flows and guaranteed quality (total dissolved solids, or TDS) from the San Bernardino area to and through the Riverside Narrows requirements, as well as flows from the upper basin to the lower basin (Orange County), measured at Prado Dam. The Santa Ana River Watermaster verifies extractions and prepares an annual report to ensure these minimum standards are met. Extraction credits and obligations are tracked against a basis of historical use (defined as the base period from 1959-1963).

Application of the Santa Ana River Stipulated Judgment to the Riverside Basin Unlike the San Bernardino Basin, no safe yield has been established for the Riverside Basin because it has never been limited. Therefore, the Riverside Basin, in which the project is located, is not subject to the adjudication. Instead, extractions are compared by the Watermaster against the historical levels (1959-1963 average) as established in the Judgment. Provided minimum water surface elevations, within the Colton Basin and that portion of Riverside Basin Area within San Bernardino County, are maintained by San Bernardino Valley Municipal Water District, extractions from the Colton Basin Area and that portion of the Riverside Basin Area within San Bernardino County for use within San Bernardino Valley are not limited; and therefore, verification of such amounts are not specifically required by the Judgment. However, because of the interrelated nature of the basin, proper allocation of the total extractions from these areas for use on areas outside San Bernardino Valley necessitates the verification of these extractions.

During the 1959-1963 base period, groundwater extractions by the Highgrove Generating Station, which is now owned by AES and operated as Riverside Canal Power Company, averaged 1,031 acre feet (Western-San Bernardino Watermaster, 2005). This represents about 3.1 percent of the total base period extractions (33,729 acre feet) from the Riverside Basin within San Bernardino County.

The provisions of the Judgment require that Western and San Bernardino Valley provide groundwater replenishment if certain base rights are exceeded. To date, the base rights have not been exceeded. However, if the provisions of the Judgment are not met in the future, then allocations would be made in accordance with the base period extractions—defined as the average usage between 1959-1963. Based on discussions with the local watermaster, there would be no objections to using the onsite wells to serve the expected annual average demand for the new facility of 358 acre-feet since it represents a significantly lower value than historical usage (1,031 acre feet).

Riverside Basin Capacity The provisions of Judgment 78246 are implemented by the Western-San Bernardino Watermaster, who prepares annual reports that summarize extractions from the groundwater basins subject to the Judgment, and the distribution of those extractions to the various service areas. The Watermaster determines the average annual extractions from the Riverside Basin within San Bernardino County for use outside the boundaries of SBVMWD. In addition, although this is not specifically required by Judgment 78426, the Watermaster also verifies extractions from the Riverside Basin for use within San Bernardino County. The Watermaster performs this additional verification to ensure proper allocation of the total extractions from the Riverside Basin for use in areas outside SBVMWD.

Table 8.14-3 summarizes extractions from the Riverside Basin within San Bernardino County for the recent 12-year period of 1992-2003. Extractions in 2003 (totaling 27,143 acre feet) were less than those during the (1959-1963) base period extractions of 33,729 acre feet.

TABLE 8.14-3
Verified Extractions from the Riverside Basin within San Bernardino County (1992-2001), in acre-feet per year

Year	Extracted by San Bernardino County Entities	Extracted by Riverside County Entities*	Total Extractions (Base Period: 33,729)
1992	5,652	16,307	21,959
1993	5,428	16,438	21,866
1994	5,711	13,950	19,661
1995	6,223	17,642	23,865
1996	11,986	14,712	26,698
1997	17,887	12,391	30,278
1998	22,112	10,998	33,110
1999	21,785	13,582	35,367
2000	23,310	12,489	35,799
2001	20,705	10,393	31,098
2002	13,602	14,115	27,717
2003	16,209	10,937	27,143

* Most of this water is used in Riverside County.
Source: Western-San Bernardino Watermaster, 2005

Another of the required determinations is the average static water levels within the Riverside Basin within San Bernardino County. The baseline water level, based on the average 1963 water surface elevations in the 3 reference wells, is 822.04 feet. During 2004, the average of the lowest static water surface elevations at each of the 3 wells was 859.27 feet (Western-San Bernardino Watermaster, 2005). According to the Judgment, extractions in the Riverside Basin within San Bernardino County are not limited, provided the minimum static water surface elevation of 822.04 feet is maintained. Consequently, extractions have not been limited in the project area because the actual water surface elevation has remained higher than the specified minimum. SBVMWD is required to ensure that the minimum static water surface elevation is maintained.

8.14.2.3 Flooding Potential

The plant site is not located within a flood hazard zone as defined by the Federal Emergency Management Agency (Figure 8.14-3) (FEMA, 1997).

8.14.3 Water Use and Disposal

8.14.3.1 Water Use

Based on a maximum expected capacity factor of 30 percent, the Highgrove Project is expected to use an average of 358 acre-feet per year for potable, process, and landscape irrigation water needs (based on an annual average temperature during peaking operation of 80°F). The instantaneous, or steady-state, flow corresponding to this condition is approximately 737 gpm. Of the 358 acre-feet per year water use, approximately 60 percent (or 209 acre-feet per year) is used for power plant cooling. On a peak summer day (at an ambient condition of 97°F), the instantaneous water consumption for process water needs is expected to be 854 gpm. These water consumption figures assume all CTGs are operating at 100 percent load. Potable water demands are estimated to average 4.0 gpm, or approximately 2 acre-feet per year.

This information is also provided in the water balance diagrams in Section 7.0, Water Supply (Figures 7.1-2a and 7.1-2b). For a more detailed description of water uses, please see Section 2.2.7, Project Description, and Section 7.0, Water Supply. A discussion of water supply alternatives is addressed in Section 9.0, Alternatives.

8.14.3.2 Wastewater Discharges and Disposal

This section describes wastewater discharges from plant processes (cooling tower blowdown), plant drains, and domestic use. Most of the wastewater generated by the project would be from cooling tower blowdown. A portion of the concentrated cooling water would be removed from the cooling tower via blowdown to prevent mineral scale formation on heat transfer surfaces. When operating at 6.5 cycles of concentration, the volume of blowdown is expected to be about 42 acre-feet per year under annual average climatic conditions and about 98 gpm under maximum daily climatic conditions. The blowdown would be combined with discharge from the plant drain system and trucked offsite to the Santa Ana Regional Interceptor (SARI) pipeline system.

Miscellaneous general plant drainage would consist of cleanup, sample drainage, equipment leakage, and drainage from facility containment areas. Water from these areas

would be collected in systems of floor drains, sumps, and pipes within the facility and discharged to an oil/water separator. The oil-free discharge water would be combined with the cooling tower blowdown and trucked offsite to the SARI pipeline. An average flow of 2 gpm and a peak flow of 5 gpm are projected for these plant service water uses. Potable water from the Riverside Highland Water Company would be used for these purposes.

Sanitary wastewater would be discharged to the City of Grand Terrace's sewer system by interconnecting to an existing pipeline in Taylor Street adjacent to the site. Sanitary wastewater includes wastewater from sinks, toilets, showers and other sanitary facilities. The sanitary wastewater flow would average about 2.0 gpm (2,880 gpd on a 24-hour basis) and the City has indicated that it can accommodate the minimal amount of sanitary wastewater.

The SARI line is a regional brine interceptor that was constructed to protect water quality in the Santa Ana River. The SARI line conveys industrial brine and low quality/high TDS wastewater from the Inland Empire to the Orange County Sanitation District's Plant No. 2, where it is treated and discharged to the ocean via an ocean outfall. The Santa Ana Watershed Project Authority (SAWPA) is the regional entity charged with operating the SARI line; direct or indirect connections to the SARI for private users must be made with the local agency who establishes fees for their portion or lateral pipeline of the SARI line. For the Highgrove Project, wastewater would be transported by truck to the nearest truck dump station, which is located at the San Bernardino Water Reclamation Plant, approximately 5 miles northeast of the project site. Permits for truck disposal and payment of disposal fees will be coordinated through the City of San Bernardino Municipal Water Department. The SARI line is designed to convey up to 30 million gallons per day (mgd) to Orange County Sanitation District and currently conveys flows of 9.7 mgd northeast the Orange County border. This indicates excess capacity in the SARI system (Kennedy/Jenks Consultants, 2006). For reference, the Highgrove Project's discharge of up to 103 gpm (combined process and drain flows) would result in adding 0.1 mgd to the SARI line.

Table 8.14-4 provides the estimated average and maximum daily and average annual water discharge rates for process wastewater (including from plant drains) and sanitary wastewater.

TABLE 8.14-4
Average and Maximum Daily and Average Annual Water Discharge Rates*

		Daily Discharge (gpm)		
Waste Discharge Stream	**Discharge Location**	**Average**	**Maximum**	**Annual Discharge (AFY)**
Plant process wastewater	SARI Line	88	103	42
Sanitary sewage	City sewer system	2	3	1

* Average annual use is equal to the average daily water use multiplied by the number of hours the plant would operate per year under the base operating scenario. See Chapter 2 for a full description of the operating parameters

gpm = gallons per minute
AFY = acre-feet per year

8.14.4 Precipitation, Stormwater Runoff, and Drainage

8.14.4.1 Precipitation

Most of the precipitation in the project area falls between November and April. Monthly average rainfall at the Riverside Municipal Airport, which is similar to that at the project site, is presented in Table 8.14-5. The total annual average rainfall at the Riverside Municipal Airport is 9.95 inches.

TABLE 8.14-5
Average Monthly Rainfall near the Proposed Project Site (2001 to 2005)

Precipitation	Total	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average	9.95	1.81	3.72	1.10	0.62	0.09	0.01	0.03	0.00	0.01	0.78	0.70	1.09
Maximum		6.04	6.48	2.95	1.43	0.24	0.03	0.14	0.00	0.06	2.55	1.20	2.13
Minimum		0.01	0.04	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.32

Average Monthly Rainfall at Riverside Municipal Airport approximately 6 miles from project site.

8.14.4.2 Stormwater Runoff Prior to Construction

The Highgrove Project will be located mostly on a former oil tank farm site (the Tank Farm Property), located north of the former Highgrove Generating Station. The Tank Farm Property included berms to contain any oil resulting from a potential tank rupture. These berms still exist and the plant will be built below grade inside the bermed area. The current "runoff rate" from that portion of the project area within the berms (approximately 6.55 acres) is approximately 10.1 cubic feet per second (cfs) based on an undeveloped site with prior industrial use and a 100-year rainfall intensity. However, since this site is a bermed area, the stormwater does not actually run off the site but stays within the berms until it evaporates. Additional runoff from the Tank Farm Property (outside of the bermed area) flows either into the bermed area or to an existing storm drain on the west side of the property. The project also includes demolition of the existing Highgrove Generating Station and use of that property for construction laydown. Runoff from the Generating Station Property generally flows to the west toward the Cage Park Property pond or to the storm drains on the western part of the Tank Farm Property. The Cage Park Property pond was used as a detention basin during operation of the Highgrove Generating Station, and received water from various plant and non-plant sources. Ultimately, all stormwater runoff from the site (outside of the bermed area on the Tank Farm Property) flows to the Santa Ana River. The Generating Station Property (approximately 10.1 acres) has a runoff rate of approximately 36.5 cfs, for the developed site and a 100-year rainfall intensity.

8.14.4.3 Storm Runoff after Construction

Implementation of the project will alter existing drainage patterns. After construction, the rate of stormwater runoff would increase because of increased impervious surfaces, and would be directed to a detention pond via sheet flow with no curb and gutter. Figure 8.14-4 shows the post-construction runoff and drainage patterns. The total stormwater runoff rate for the area of the Project Site that sits below the street grade would be approximately 23.51 cfs at a 100-year rainfall intensity. Assuming a 10-year storm (4.31 inches of rain in a 24-hour period), the developed Project Site would generate a volume of 1.6 acre-feet of

water. The planned onsite detention basin has been designed to contain this volume. Stormwater calculations are attached as Appendix 8.14B.

Following demolition of the existing Highgrove Generating Station and use of that property for construction laydown, runoff from the southern portion of the site would continue to drain to the west toward the Cage Park Property and/or the widened Taylor Street stormdrain system. Following completion of construction activities, this portion of the project area is expected to have a drainage rate of 15.6 cfs at a 100-year rainfall intensity. This is less than the existing drainage rate because the impervious surfaces associated with the Highgrove Generating Station would be removed. However, final grading of the site will depend on the City Redevelopment Agency, who will become the new owner.

8.14.5 Effects on Water Resources

Significance criteria are derived from the CEQA Appendix G checklist. The project is considered to have a potentially significant effect if it would:

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or offsite or in flooding on- or offsite.
- Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.
- Violate any water quality standards or waste discharge requirements or otherwise substantially degrade water quality.
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted).
- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.
- Place within a 100-year flood hazard area structures that would impede or redirect flood flows.
- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.
- Cause inundation by seiche, tsunami, or mudflow.

8.14.5.1 Surface Water

There are no significant natural surface waters in the project vicinity. The project would not substantially alter existing drainage patterns. Therefore, the project would cause no substantial erosion or siltation on- or offsite. Similarly, the volume and rate of runoff from the project site would not be substantially altered as a result of project development, nor would the project alter the course of any stream or river. The project would capture and

detain stormwater runoff in an onsite detention basin, so the project would not exceed the capacity of existing or planned stormwater drainage systems.

8.14.5.2 Groundwater

As described above in Section 8.14.2.2, annual reports by the Western-San Bernardino Watermaster show that groundwater extractions in the project area are not limited according to the provisions of Judgment 78426, and total extractions are below the base level. In other words, there are no limits on groundwater production based on the Judgment 78426 and pumping up to the base amount would be approved (Steve Mains, 2006).

The main source of process and make-up water would be groundwater from an onsite well. As described in Section 8.14.3.1, the amount of water required for plant processes is 358 AFY. Based on the 2004 total extractions from the Riverside Basin for use within San Bernardino County, the water supply needed for the project represents approximately 1.3 percent of the total extractions. Compared to the 1959-1963 base conditions established pursuant to Judgment 78426, this percentage falls to approximately 1.1 percent. Both percentages are less than the 3.1 percent contribution of extractions by the Riverside Canal Power Company during the base condition years.

Use of Riverside Basin groundwater will continue in the future. Most of the Riverside Basin is within Riverside County, with major groundwater users such as the City of Riverside. Groundwater from both the San Bernardino (Bunker Hill) Basin and the Riverside Basin are the primary source of potable water supply for the Riverside Public Utilities' service area (Riverside Public Utilities, 2004).[1] The Urban Water Management Plan, published by the City of Riverside Public Utilities Department most recently in 2004, has projected total use through 2030. Total water use is expected to increase from a 2005 level of 77,529 AFY to a 2030 level of 101,499 AFY, reflecting a planned increase in population from a 2005 level of 255,346 people to a 2030 level of 329,001 people. Water supplies are expected to grow to 116,421 AFY. Some of the increase in water supply would come from new groundwater development in Downtown Riverside, but Riverside Public Utilities would not pump water from the Riverside Basin in excess of the 1959-1963 historical use described in Judgment 78426.

Within the local area, groundwater is extracted from the Riverside Basin primarily by Riverside Highland Water Company (the potable water provider for the City of Grand Terrace) and by the City of Riverside, Department of Public Utilities. The closest active production well to the onsite wells is State Well No. 2S4W06R01 (also known as RN #7) operated by Riverside Highland Water Company. This well is located near the northwest corner of Main Street and Taylor Road, approximately 1,200 feet south of the Highgrove Project site. Well RN #7 provides potable water (over 1,000 acre-feet in 2002) to Riverside Highland Water Company customers. The Riverside Department of Public Utilities has 8 wells within 1 mile of the project site, 4 of which are operational (DeBerry, Van Buren #1, Van Buren #2, and Electric Street). The DeBerry, Van Buren #1, and Van Buren #2 wells are located northeast of the project site in San Bernardino County, and the Electric Street well is

[1] Groundwater from the San Bernardino Basin and the northern portion of the Riverside Basin (within San Bernardino County) are imported to the Riverside Public Utilities service area by various pipelines. Additionally, the City of Riverside has benefited in recent years by additional imports from the San Bernardino Basin; high groundwater levels have required excess pumping to avoid property damage.

located southwest of the project site in Riverside County. Water pumped from these wells is discharged into pipelines that transport the water to the Riverside Public Utilities service area. Riverside Public Utilities' non-operational Highgrove #1, Highgrove #2, Highgrove #3, and Center Street wells are located southeast of the project site in Riverside County.

Based on a review of data provided by Riverside Highland Water Company, which includes water level data (Riverside Highland Water Company, 2006a) and the Drinking Water Source Assessment (Riverside Highland Water Company, 2006b) of the well, a transmissivity value for RN #7 is estimated to be on the order of 300,000 gallons per day per foot (gpd/ft). This value, although high, is generally consistent with sand and gravel aquifers (Todd, 1980). The screened interval for RN#7 is approximately 300 feet and the well taps the shallowest groundwater (Riverside Highland Water Company, 2006b). Although the screened interval of the onsite Well #1 (State of California Well No. 2S4W06J01) is not known, it is estimated to be on the order of 100 feet based on the total boring depth of 184 feet and available water levels measured in the 1950s. Based on these screen lengths, the transmissivity value of Well #1 is estimated to be 100,000 gpd/ft.

Based on a peak day demand of 854 gpm for the facility, the estimated drawdown at RN#7, which is located approximately 1,200 ft south of Well #1, is estimated to be 1 foot or less. Because both RN#7 and Well #1 are older wells, lithologic logs are not available. However, based on a review of the lithologic logs of City of Riverside wells Highgrove #2 and #3, which are located approximately 600-700 feet southeast of RN #7, it appears that much of the production from RN#7 is a result of a relatively shallow, more highly transmissive section of the aquifer consisting of sands and gravels. This would mean the drawdown at RN #7 may be less than that estimated above.

The impact or drawdown expected at the nearby City of Riverside wells is likely negligible. The current status and well construction details for the wells are provided via various email communications by the City of Riverside (2006).

- Two municipal wells that are active, Van Buren #1 and Van Buren #2, located 1,900 feet and 1,400 feet northwest of Well #1, respectively, are completed deeper than the onsite well, so impact should be minimal, if any.
- DeBerry, an active municipal well, is completed slightly deeper than Well #1; however, because it is located almost 4,000 feet northeast of the onsite well, the impact is expected to be minimal, if any.
- Electric Street, also an active municipal well, is completed at similar depths as Well #1; however, because it is located more than 1 mile southwest of the onsite well, the impact is expected to be minimal, if any.
- Four agricultural wells, Highgrove #1 to #3 and Center Street, located between 2,000 and 4,000 feet southeast of Well #1, are out of service or inactive.

To minimize groundwater use, the project would recover wastewater sources from other uses within the plant and use these sources as water supply to the cooling tower. In addition, the cooling tower water, concentrated through evaporative cooling losses, would be operated at high cycles of concentration to minimize blowdown and limit makeup water needs.

During construction of the project, water will be required primarily for dust suppression. This water will be supplied either by onsite wells or from Riverside Highland Water Company. Because of the short duration of construction activities and the relatively limited water requirements of the construction phase of the project, no significant adverse impacts to water supply are expected to result.

8.14.5.3 Stormwater

Development of the site would change the general slope and aspect, and drainage would be conveyed to an onsite detention pond. The detention pond, shown in Figure 8.14-4, will be configured and sized to retain onsite drainage for a 10-year, 48-hour storm; this will be confirmed during the detailed, final design stage of the project.

Implementation of BMPs during construction and operation would be sufficient to control offsite runoff and prevent offsite sedimentation. During construction and operation, BMPs documented in the SWPPP for erosion and sediment control would be implemented to avoid polluting surface waters. BMPs include designating locations of vehicle parking and maintenance, waste disposal areas, silt fencing, and installation of oil-water separators to prevent pollutants from entering the stormwater system. The project would have no offsite discharges to surface water and, therefore, would not violate water quality standards or waste discharge requirements nor substantially degrade water quality.

To ensure that stormwater from the Highgrove Generating Station Property is not discharged into the Cage Park Property during demolition or construction staging, the construction SWPPP will include measures to detain any excess runoff on the laydown site. This could include a temporary detention basin at the south end of the site. The SWPPP also will include measures to ensure that stormwater does not penetrate the existing groundwater wells located in the laydown area.

8.14.5.4 Water Quality

Local surface water and groundwater quality would not be affected by the project. All process wastewater would be directed to the SARI system and would meet regulatory standards for industrial discharges to the truck disposal station (Table 8.14-6). Sanitary wastes would be sent to the City of Grand Terrace's sanitary sewer system. Water quality effects from stormwater runoff are addressed above in Section 8.14.5.3.

TABLE 8.14-6
Discharge Water Quality

Constituent	Influent (mg/L)	Effluent (mg/L)	SARI Discharge Limit (mg/L)
Arsenic	0.000637	0.004	2.0
Cadmium	Not Detected	Likely 0[a]	1.0
Chromium	Not Detected	Likely 0[a]	2.0
Copper	0.00159	0.01	3.0
Lead	Not Detected	Likely 0[a]	2.0
Mercury	Not Detected	Likely 0[a]	0.03
Nickel	0.00182	0.01	10.0

TABLE 8.14-6
Discharge Water Quality

Constituent	Influent (mg/L)	Effluent (mg/L)	SARI Discharge Limit (mg/L)
Arsenic	0.000637	0.004	2.0
Cadmium	Not Detected	Likely 0[a]	1.0
Silver	0.00736	0.04	5.0
Zinc	Not Detected	Likely 0[a]	10.0
Cyanide (total)	Not Detected[b]	Likely 0[a]	5.0
Cyanide (Amenable)	Not Tested[c]	-	1.0
Polychlorinated Biphenyls	Not Detected	Likely 0[a]	0.01
Pesticides	Not Detected	Likely 0[a]	0.01
Total Toxic Organics	Not Detected	Likely 0[a]	0.58
Sulfide (total)	Not Detected	Likely 0[a]	5.0
Sulfide (dissolved)	Not Tested	-[d]	0.5

[a] This constituent was not detected in onsite well water, either because it was not present in the sample or was present at concentrations below the detection limit. In either case, the discharge standard is likely to be met.

[b] Cyanide was not tested in the AES Highgrove wells. Cyanide was not detected in recent testing of Riverside Highland Water Company Well RN #7, located about 1,200 feet south of the onsite well.

[c] Because total cyanide was not detected in Riverside Highlands Water District Well RN #7, amenable cyanide likely would also be not detected.

[d] Because total sulfide was not detected, dissolved sulfides would likewise be absent or close to a concentration of 0 mg/L.

No areas of pollution/plumes for the Riverside Basin were identified either in the Riverside Highland Water Company Water Supply Assessment of the *Final Environmental Impact Report for the Outdoor Adventures Center Specific Plan* (Lilburn Corporation, 2004) or the Drinking Water Source Assessment for RN #7 (Riverside Highland Water Company, 2006b). However, the Drinking Water Source Assessment for RN #7 (Riverside Highland Water Company, 2006b) discusses the well's vulnerabilities to the following activities:

- Automobile – Repair shops
- Farm chemical distributor/application service
- Fleet/truck/bus terminals
- Home manufacturing
- Machine shops
- Utility stations – maintenance areas
- Wood/pulp/paper processing and mills
- Automobile – Gas stations
- Metal plating/finishing/fabricating
- Underground storage tanks – Confirmed leaking tanks

Because of the proximity of the Highgrove Project wells to RN #7, the onsite well can be expected to be vulnerable to the same activities.

Based on water quality data reported for RN #7 between 2003 and 2005, nitrate appears to be the only potential water quality issue. The Riverside Highland Water Company reported nitrate values ranging from 17 to 29 milligrams per liter (mg/L) (Riverside Highland Water Company, 2006c). The Maximum Contaminant Level (MCL) for nitrate is 45 mg/L (reported as nitrate). Based on water quality data provided by the City of Riverside (2006), nitrate appears also to be an issue for several of the City's wells: Van Buren #1 (2 to 15 mg/L), Van Buren #2 (4 to 17 mg/L), DeBerry (5 to 20 mg/L), Electric Street (as high as 60 mg/L), and Center Street is noted to have been "…capped due to high nitrate." Nitrate appears to be an ongoing issue within the local area; pumping the onsite well is not expected to negatively impact the nitrate situation.

No detections of volatile organic compounds (VOCs), including methyl tertiary butyl ether (MTBE); unregulated organic chemicals; and perchlorate are reported in RN #7. However, low levels (below MCLs) of VOCs are reported in two of the wells operated by the City of Riverside, Van Buren #1 (tetrachloroethylene [PCE]) and Electric Street (trichloroethylene [TCE] and PCE). The MCLs for PCE and TCE are both 5 micrograms per liter. However, because of the deeper well completion of Van Buren #1 and the relatively large distance (more than 1 mile apart) between the onsite well and Electric Street, the potential for mobilizing the low levels of VOCs is minimal.

8.14.5.5 Flooding Potential

The project is not located in the 100-year floodplain defined by FEMA (see Figure 8.14-3). Therefore, it would not place housing or structures in the 100-year flood hazard area, nor place structures that would impede or redirect flood flows.

The project would convert approximately one-half of the developed project area to impervious surfaces. An onsite stormwater detention pond would be used to contain stormwater runoff within the bermed area.

There are no significant dams or levees in the project vicinity. Therefore, the project would not expose people or structures to significant risk of loss, injury or death resulting from a levee or dam failure. Similarly, the project is located approximately 50 miles from the Pacific Ocean, and any potential inundation from seiche, tsunami, or mudflow is remote.

8.14.6 Mitigation

Implementation of the Highgrove Project with the following measures would effectively reduce impacts to ground or surface water to less-than-significant.

- In accordance with regulatory requirements to prepare a SWPPP and an Erosion and Sediment Control Plan, the project would implement BMPs during construction and operation to avoid contamination of any groundwater or surface waters.

8.14.7 Proposed Monitoring Plans and Compliance Verification Procedures

Routine monitoring and compliance verification would be required as part of the stormwater NPDES permitting of the project. The Applicant would be required to prepare a SWPPP specifying BMPs, monitoring and compliance measures to avoid adverse impacts to water quality. This would occur for both the construction phase and for long-term project

operations. No additional monitoring of surface or groundwater would be required because no water quality impacts are expected to occur.

8.14.8 Cumulative Impacts

Cumulative impacts to water resources could occur through the use of groundwater, the contribution of sanitary wastewater, or stormwater runoff. None of these categories of water use is expected to result in significant cumulative impacts to area water resources:

- **Surface Water:** The project area is relatively flat and there are no natural surface water features in the vicinity. Implementation of BMPs during construction and operation would avoid the potential for adverse impacts to surface water from the project.
- **Plant Sewage**: The proposed plant will generate 1 AFY of sanitary wastewater that would be discharged to the City of Colton Wastewater Treatment Plant. The cumulative impacts from this additional waste load would not be significant.
- **Industrial Discharge**: The proposed plant will generate 42 AFY of industrial discharge that would be truck-hauled to a SARI disposal station. The cumulative impacts from this additional waste load would not be significant.
- **Groundwater**: The project's groundwater requirements of 358 AFY are a very small portion of the overall water demands from the Riverside Basin and would not be significant and, therefore, would cause no adverse impacts to groundwater resources.
- **Stormwater**: Implementation of the project would increase runoff on up to 9.8 acres, due to impervious surfaces. The impacts of the increased runoff will be mitigated through the use of an onsite stormwater detention pond designed to contain the discharge of stormwater.

8.14.9 Permits Required

Water quality permits required for the project include the following:

- RWQCB construction activity NPDES stormwater permit, general permit
- RWQCB general industrial NPDES stormwater permit, general permit
- Waste discharge permit for disposal of sanitary wastewater
- Indirect connection permit for disposal of industrial wastewater
- Liquid wastehauler permit for transport of industrial wastewater to SARI
- City of Grand Terrace, grading permit

8.14.10 Agency Contacts

Agency contacts and required permits are listed in Table 8.14-7.

TABLE 8.14-7
Permits and Permitting Agencies for Highgrove Water Resources

Permit	Schedule	Agency
NPDES General Permit for Stormwater discharges associated with Construction Activities	Submit Notice of Intent 30 days prior to start of construction	Santa Ana RWQCB 3737 Main St., Suite 500 Riverside, CA 92501

TABLE 8.14-7
Permits and Permitting Agencies for Highgrove Water Resources

Permit	Schedule	Agency
		951-782-4130
NPDES General Permit for stormwater discharges associated with Industrial Activities	Submit Notice of Intent 30 days prior to start of operation	Santa Ana RWQCB 3737 Main St., Suite 500 Riverside, CA 92501 951-782-4130
Connection Permit for disposal of sanitary wastewater	Hookup permit will be issued and fees collected during the building permit process	Richard Shields Building Official City of Grand Terrace 22795 Barton Road Grand Terrace, CA 92313 (909) 430-2250
Indirect Connection Permit for disposal of Industrial Wastewater	Submit application 60 days prior to the date upon which any discharge would begin	Western Municipal Water District 450 Alessandro Blvd Riverside, CA 92508 (951) 789-5000
Liquid Wastehauler Permit for transport of Industrial Wastewater to SARI	Submit application 60 days prior to the date upon which any discharge would begin	Western Municipal Water District 450 Alessandro Blvd Riverside, CA 92508 (951) 789-5000
City of Grand Terrace, Grading Permit	Submit application 90 days prior to construction	John Lampe or Rich Shield, Planners Planning and Community Development City of Grand Terrace 22795 Barton Road Grand Terrace, CA 92324 909-430-2256
Application of Service for Potable Water		Riverside Highland Water Company 1450 E. Washington Street Colton, CA 92324 Contact: Don Hough, General Manager (909) 825-4128

8.14.11 References

ARCADIS Geraghty & Miller, Inc. 2000. Phase I Environmental Site Assessment for EPIC Property at former Highgrove Generating Station (CA000391.0001.00002).

Ethridge, Gary. 2005. Consultant for the City of Colton City Manager. Meeting with Scott Lynch/CH2M HILL. February 24, 2005. Personal communications with Isoefa Matagi/CH2M HILL. February 28, 2005.

Ethridge, Gary. 2006. Consultant for the City of Colton City Manager. Personal communication, telephone conversation with Matt Franck/CH2M HILL, May 2, 2006.

Federal Emergency Management Agency (FEMA). 1997. Flood Insurance Rate Map: County of San Bernardino (panel number 060270)/City of Grand Terrace (panel number 060737).

Golder Associates. 1999. Phase II Environmental Site Assessment Retention Basins Riverside Canal Power Company, Grand Terrace, California (Project Number 993-1986).

Kennedy/Jenks Consultants. 2006. Santa Ana Regional Interceptor Hydraulic Model and Capacity Assessment. January 2006.

Mains, Steve. 2006. Watermaster Services, Inc. Personal communication, March 7 and 9.

National Oceanic and Atmospheric Administration (NOAA). Not dated. Atlas 2, Volume XI. U.S.

Department of Agriculture, Soil Conservation Service, Engineering Division.

Santa Ana Regional Water Quality Control Board (SARWQCB). 2004. Resolution R8-2004-0001. Resolution Amending the Water Quality Control Plan for the Santa Ana River Basin to Incorporate an Updated Total Dissolved Solids (TDS) and Nitrogen Management Plan for the Santa Ana Region Including Revised Groundwater Subbasin Boundaries, Revised TDS and Nitrate-Nitrogen Quality Objectives for Groundwater, Revised TDS and Nitrogen Wasteload Allocations, and Revised Reach Designations, TDS and Nitrogen Objectives and Beneficial Uses for Specific Surface Waters. Adopted by the SARWQCB January 22, 2004.

Santa Ana Regional Water Quality Control Board (SARWQCB). 1994. *Water Quality Control Plan, Santa Ana Region*. Adopted, March 11.

U.S. Environmental Protection Agency (USEPA). 2002. Section 303(d) List Fact Sheet for Watershed: Santa Ana. http://oaspub.epa.gov/pls/tmdl/huc_rept.control?p_huc=18070203&p_huc_desc=SANTA%20ANA. Accessed February 2, 2006.

Santa Ana River
San Bernardino County
City of Grand Terrace
MAIN STREET
Riverside County
Riverside Canal
Spring Brook
Highgrove
Spring Brook
IOWA STREET
Riverside Canal
City of Riverside
Gage Canal
MARTIN LUTHER KING JR. BLVD.
Box Springs Canyon
Gage Canal
Tequesquite Arroyo
CANYON CREST DRIVE

LEGEND

- PROPOSED GAS PIPELINE
- HYDROLOGY
- SITE
- GOLF COURSE/FLOOD INUNDATION AREA

0 2,100 4,200 FEET

1 INCH EQUALS 2,101 FEET

N

FIGURE 8.14-1
LOCAL SURFACE WATER FEATURES
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

CH2MHILL

RDD \\LOKI\PROJECTS\RDDGIS\AES_HIGHGROVE\MXD\8_14-1_SURFACEWATER.MXD 5/11/2006 09:30:40

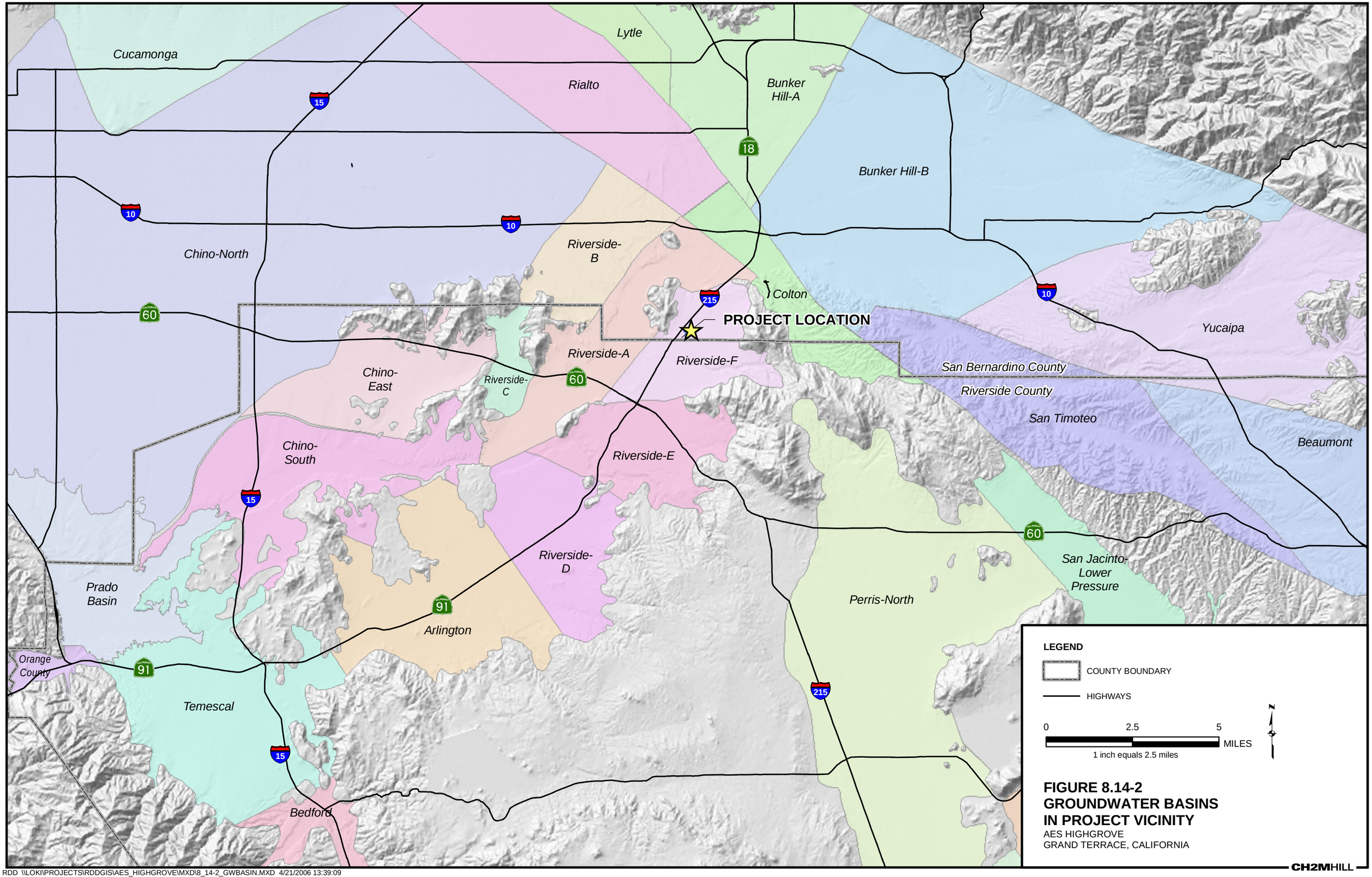


FIGURE 8.14-2
GROUNDWATER BASINS IN PROJECT VICINITY
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

CH2MHILL

RDD \\LOKI\PROJECTS\RDDGIS\AES_HIGHGROVE\MXD\8_14-2_GWBASIN.MXD 4/21/2006 13:39:09

City of Grand Terrace

San Bernardino County

MAIN STREET

Riverside County

Highgrove

IOWA STREET

City of Riverside

MARTIN LUTHER KING JR. BLVD.

CANYON CREST DRIVE

LEGEND

SITE

PROPOSED GAS PIPELINE

ZONE

A — AN AREA INUNDATED BY 100-YEAR FLOODING; BASE FLOOD ELEVATIONS ARE NOT DETERMINED.

D — AN AREA OF UNDETERMINED BUT POSSIBLE FLOOD HAZARDS

X500 — AN AREA INUNDATED BY 500-YEAR FLOODING; AN AREA INUNDATED BY 100-YEAR FLOODING WITH AVERAGE DEPTHS OF LESS THAN 1 FOOT OR WITH DRAINAGE AREAS LESS THAN 1 SQUARE MILE; OR AN AREA PROTECTED BY LEVEES FROM 100-YEAR FLOODING.

0 2,100 4,200 FEET

1 INCH EQUALS 2,100 FEET

N

FIGURE 8.14-3
100-YEAR FLOODPLAIN MAP
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

CH2MHILL

RDD \\LOKI\PROJECTS\RDDGIS\AES_HIGHGROVE\MXD\8_14-3_FLOOD.MXD 5/11/2006 09:31:25

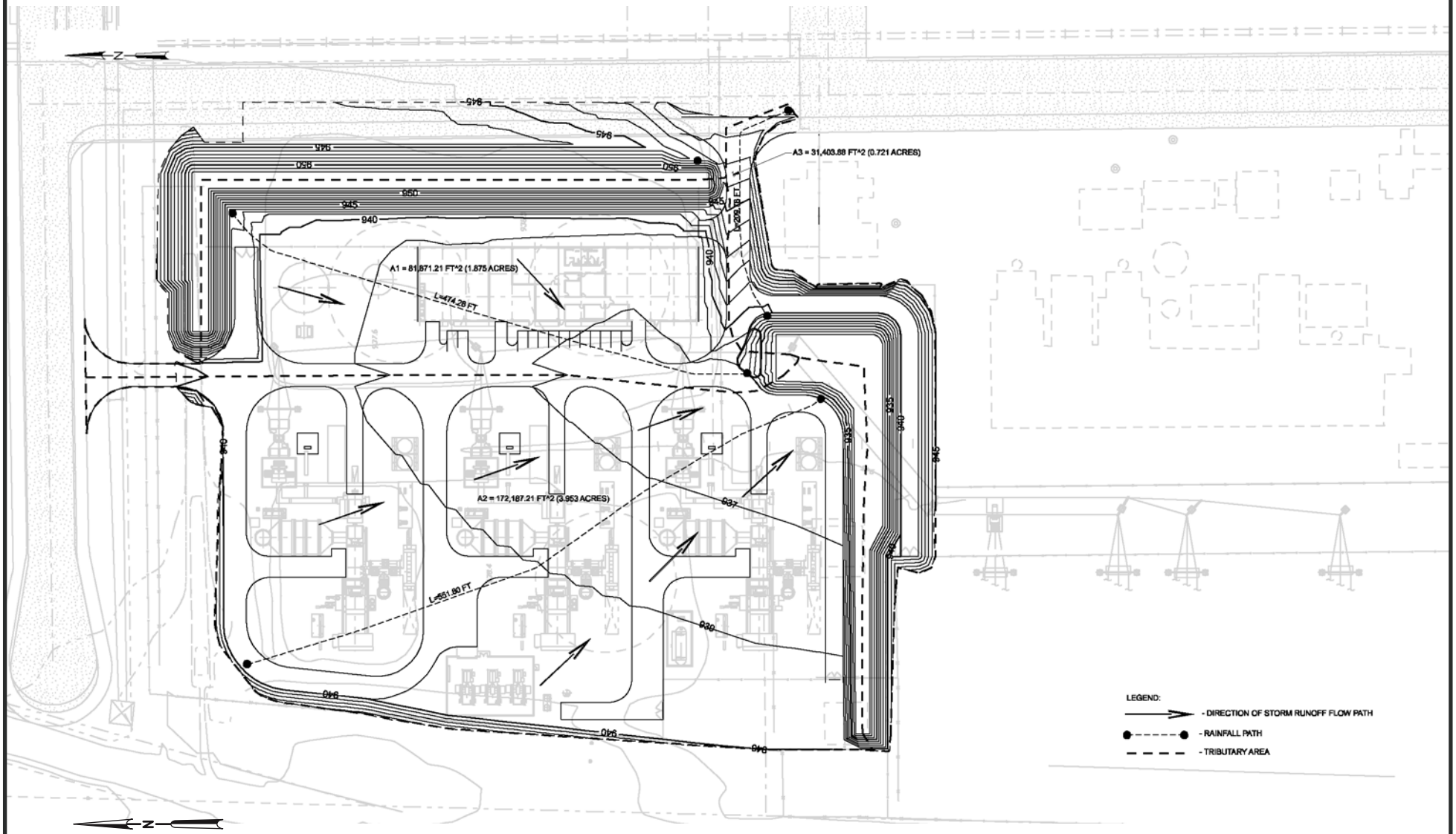


FIGURE 8.14-4
PROPOSED DRAINAGE FACILITIES
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

IS032006003RDD_17 (5/8/06)

CH2MHILL

8.15 Geologic Hazards and Resources

8.15.1 Introduction

This subsection evaluates the effect of geologic hazards and resources that might be encountered on the AES Highgrove project site. The objective of this evaluation is to identify site conditions and the potential impacts from the construction or operation of the project. This subsection presents a summary of the relevant laws, ordinances, regulations, and standards (LORS); the existing site conditions; and the expected direct, indirect, and cumulative impacts because of construction, operation, and maintenance of the project. Proposed mitigation measures and the effectiveness and monitoring plans are also described. Permits that are required and permitting agencies are identified.

8.15.2 Laws, Ordinances, Regulations, and Standards

The LORS that apply to geologic hazards and resources are summarized in Table 8.15-1.

TABLE 8.15-1
Laws, Ordinances, Regulations, and Standards Applicable to Geologic Hazards and Resources

Jurisdiction	Authority	Administering Agency	Compliance
State/Local	California Building Code (CBC), 2001.	California Building Standards Commission, State of California, and City of Grand Terrace Building Department	Acceptable design criteria for structures with respect to seismic design and load-bearing capacity.
State/Local	Alquist Priolo Earthquake Fault Zoning Act	Title 14, Division 2, Chapter 8, Subchapter 1, Article 3, California Code of Regulations.	Identifies areas subject to surface rupture from active faults
State /Local	The Seismic Hazards Mapping Act	Title 14, Division 2, Chapter 8, Subchapter 1, Article 10, California Code of Regulations.	Identifies non-surface fault rupture earthquake hazards, including liquefaction and seismically induced landslides
Local	City of Grand General Plan	City of Chula Vista	Compliance with the Safety Element of the General Plan
	City of Riverside	City of Riverside	
	County of Riverside	County of Riverside	

8.15.3 Affected Environment

The proposed AES Highgrove project site is a 9.8-acre parcel in the City of Grand Terrace, San Bernardino County, California, located along the western side of Taylor Street, north of Main Street. The elevation of the site is approximately 940 feet above mean sea level. The project also includes a natural gas pipeline that extends approximately 7 miles (11.5 km) south of the plant site to connection with a regional gas pipeline and will involve the demolition of the existing generating equipment located on the Generating Station Property.

The project area lies in the Inland Empire area of southern California between the San Bernardino and San Jacinto Mountains of the Transverse Ranges to the east, and the Chino Hills and Santa Ana Mountains to the west. Physiographically, it lies on the northwestern portion of the Perris Block, an eroded surface of Mesozoic crystalline rock between the Santa Ana and the San Jacinto Mountains. The Box Springs Mountains lie immediately to the east of the pipeline route. The La Loma Hills lie immediately to the west and northwest of the plant site. Farther to the east, the San Jacinto Fault Zone lies at the eastern base of the Box Springs Mountains and marks the eastern edge of the Perris Block. To the west, the Elsinore and Chino Fault Zones lie along the eastern margin of the Santa Ana Mountains and mark the western limit of the Perris Block.

The project area is considered to be seismically active and is designated as a California UBC Seismic Zone 4.

8.15.3.1 Regional Geology

The geology of the vicinity is complex, largely a result of the interaction of numerous faults that are present in the southern California area. The project area lies in the Inland Empire area of southern California between the San Bernardino and San Jacinto Mountains of the Transverse Ranges to the east, and the Chino Hills and Santa Ana Mountains to the west. Physiographically, it lies on the northwestern portion of the Perris Block, an eroded surface of Mesozoic crystalline rock between the Santa Ana and the San Jacinto Mountains (Woodford et al., 1971). The Box Springs Mountains lie immediately to the east of the pipeline route. The La Loma Hills lie immediately to the west and northwest of the plant site. Father to the east, the San Jacinto Fault Zone lies at the eastern base of the Box Springs Mountains and marks the eastern edge of the Perris Block. To the west, the Elsinore and Chino Fault Zones lie along the eastern margin of the Santa Ana Mountains and mark the western limit of the Perris Block.

8.15.3.2 Local Geology and Stratigraphy

Very limited exposures of metamorphic rocks of probable Paleozoic age are present in the project area. These rocks, originally sedimentary in nature, were subject to high-temperature metamorphism during the emplacement of the Mesozoic igneous batholith in this area. They include biotite schist, impure quartzite, marble, and other calc-silicate rocks (Morton and Cox, 2001).

Igneous rocks emplaced in the crust primarily during the Late Mesozoic dominate the basement geology. In the project area these rocks are of the Peninsular Range Batholith (Morton and Miller, 2003), in most areas overlain by varying depths of Quaternary alluvium and, in some cases, by artificial fill (Morton and Cox, 2001). Rocks of the Peninsular Range Batholith were emplaced during the Cretaceous Epoch, which ended about 64 million years ago. These granitic rocks vary in mineralogical composition and, in the project area, are principally tonalite and granodiorite (Morton and Cox, 2001).

Quaternary (Pleistocene and Holocene) sediments exposed in the project area are primarily alluvial fan deposits issuing from the Box Springs Mountains to the east along the northern 5 miles (8.2 km) of the pipeline route and the plant site. Older alluvium of less certain provenance lies along the southern 2 miles (3.3 km) of the pipeline route on the northwest edge of the Perris Plain, as well as beneath the northern approximately 1 mile (1.6 km) of the

pipeline route and beneath the generating site. Artificial fill and Holocene eolian and sheet wash sediments typically mantle these units. Figure 8.15-1 (figures are located at the end of the subsection) shows the stratigraphic units, strata, and geographic features within a 2-mile radius of the Highgrove project site. Figure 8.15-2 shows the geology within a ¼-mile buffer along the gas pipeline linear.

8.15.3.3 Seismicity

The Highgrove project site lies within a seismically active region. Large earthquakes have occurred in the past and will occur in the future. The region is influenced by the San Andreas Fault system that separates the North American and Pacific plate boundaries. This boundary has been the site of numerous large-scale earthquakes. Numerous active faults are in the vicinity of Grand Terrace although none are known to exist within the city (Bortogno and Spittler, 1986). These include the Rialto-Colton fault (4 miles north of site), San Jacinto fault zone (3 miles east of site),), the San Andreas fault zone (10 miles north of site), Cucamonga fault (13 miles northwest of site), Whittier-Elsinore fault (20 miles southwest of site). The site is not located within a special study zone, as delineated by the Alquist-Priolo Special Studies Zone Act of 1972; and no known fault, active or inactive, reaches the surface within the project area (Jennings, 1994). However, the San Jacinto Fault Zone that is less than 3 miles from the site is state-designated fault with a ground rupture hazard area. The significant faults in the study area are described below and are shown on Figure 8.15-3.

8.15.3.3.1 San Andreas Fault

The nearest major fault is the San Andreas fault, which is approximately 10 miles north of the site. This fault is the largest active fault in California and extends from the Gulf of California to Cape Mendocino in northern California (Jennings, 1994). The fault is divided into numerous segments. The segment nearest the site is the San Bernardino segment and has been assigned individual maximum moment magnitude (Mmax) of 7.5, by the Working Group on California Earthquake Potential (WGCEP, 2002).

8.15.3.3.2 San Jacinto Fault Zone

Northeast of the site is the San Jacinto Fault Zone. This fault is approximately 3 miles from the Highgrove project site and is considered to be an active Holocene fault and is an Alquist-Priolo Special Studies fault zone. It is approximately 160 miles long and runs from southern end of the Imperial Valley south of the Salton Sea to the eastern San Gabriel Mountains at the San Andreas fault (Jennings, 1994). The Mmax from this fault is 6.7 (WGCEP, 2002).

8.15.3.3.3 Whittier-Elsinore Fault Zone

The Whittier-Elsinore Fault Zone lies approximately 20 miles southwest of the site. The fault system essentially parallels the San Jacinto fault zone and extends from Whittier in Los Angeles County to the southern end of Imperial Valley south of the Salton Sea (Jennings, 1994). According to the WGCEP (2002), the Whittier-Elsinore Fault Zone has been assigned a Mmax of 6.8.

8.15.3.4 Geologic Hazards

A site-specific geotechnical investigation is being planned for the Highgrove project site. Results will be provided upon its completion.

The following subsections discuss the potential geologic hazards that might occur in the project area.

8.15.3.4.1 Ground Rupture

Ground rupture is caused when an earthquake event along a fault creates rupture at the surface. Since no known faults exist at the Highgrove project site, the likelihood of ground rupture to occur at the project site is low.

8.15.3.4.2 Seismic Shaking

The Inland Empire of southern California has experienced strong ground motion in the past and will do so in the future. Mualchin (1996) estimated that the ground-shaking of a moment magnitude 7.50 earthquake along the San Jacinto Fault Zone system could produce peak bedrock acceleration of up to 0.55g (where g is gravity) in the vicinity of the Highgrove Project. A preliminary review of the probabilistic peak ground acceleration (PGA) with a return period of 475 years, indicates that the PGA will be on the order of 0.7g at the site (California Geological Survey, 2003).

8.15.3.4.3 Liquefaction

During strong ground-shaking, loose, saturated, cohesionless soils can experience a temporary loss of shear strength. This phenomenon is known as liquefaction. Liquefaction is dependent on grain size distribution, relative density of the soils, degree of saturation, and intensity and duration of the earthquake. The potential hazard associated with liquefaction is seismically induced settlement. The depth to groundwater at the Highgrove project site is relatively shallow, less than 50 feet, and the soil types generally consist of alluvial sediments. According to the City of Grand Terrace General Plan, the southwestern part of the city is susceptible to liquefaction due to high water table. Therefore, the likelihood that liquefaction will occur is considered high.

8.15.3.4.4 Mass Wasting

Mass wasting depends on steepness of the slope, underlying geology, surface soil strength, and moisture in the soil. Significant excavating, grading, or fill work during construction might introduce mass wasting hazards at the Highgrove project site. Because the Highgrove project site is relatively flat and no significant excavation is planned during site construction, the potential for direct impact from mass wasting at the site is considered low to negligible.

8.15.3.4.5 Subsidence

Subsidence can be a natural or man-made phenomenon resulting from tectonic movement, consolidation, hydrocompaction, or rapid sedimentation. Given that the site is underlain by dense alluvial fan deposits, the potential for subsidence, as a hazard that could affect the project site, is low.

8.15.3.4.6 Expansive Soils

Expansive soils shrink and swell with wetting and drying. The shrink-swell capacity of expansive soils can result in differential movement beneath foundations. Expansive soils have not been identified as a potential hazard in the Grand Terrace area. Based on this, the likelihood of expansive soils to be present at the site is low.

8.15.3.4.7 Geologic Resources of Recreational, Commercial, or Scientific Value

Geologic resources of recreational, commercial, or scientific value in the project vicinity that could be affected include aggregate and gas reserves. Geologic resources of value are discussed in the next paragraph.

8.15.3.4.8 Aggregate Resources

In 1995, the California Division of Mines and Geology performed a mineral land classification of part of the San Bernardino Valley area. According to the published report, the entire Highgrove project site was classified as Mineral Resource Zone (MRZ)-3 that is defined as "areas of undetermined mineral resource significance (State of California, 1995). An area to the west of the site, all along the Santa Ana River flood plain was classified as MRZ-2, "Areas of identified Mineral Resource Significance." This classification is primarily due to the presence of portland cement-grade aggregate and limestone.

8.15.3.4.9 Natural Gas

No oil or gas fields are present in the project vicinity, according to online maps from the California Division of Oil, Gas and Geothermal Resources (CDOGGR, 2004).

There are no known geologic resources that provide a significant scientific or recreational value in the vicinity of the site.

8.15.4 Environmental Impacts

8.15.4.1 Generating Facility and Pipelines

8.15.4.1.1 Geologic Hazards

Ground-shaking and liquefaction present the most significant geologic hazard to the proposed Highgrove project site and project linear. Table 8.15-2 summarizes the geologic hazards associated with the project.

TABLE 8.15-2
Summary of Potential Geologic Hazards

Project Component	Area of Potential Concern	Geologic Hazards of Potential Concern
Proposed generating facility site (up to 9.8 acres)	Entire site	Seismic ground-shaking. Liquefaction
Water pipeline	Entire length of pipeline	Seismic ground-shaking, Liquefaction
Gas pipeline	Entire length of pipeline	Seismic ground-shaking, Liquefaction

8.15.4.1.2 Geologic Conditions and Topography

Construction will require minor grading and excavation, thereby altering the terrain of the Highgrove site. Impacts on the geologic conditions involve changes in drainage, cuts, and fills. Since the site is generally level, site grading is not expected to adversely impact the geologic environment.

8.15.4.2 Geologic Resources of Recreational, Commercial, and Scientific Value

No known natural resources occur in the Highgrove project site area. The MRZ-2 area identified along the Santa Ana River is not being actively developed. No significant impact to geologic resources would occur with the project.

8.15.5 Mitigation Measures

The following subsections describe mitigation measures that could be used to reduce impacts from geologic hazards.

8.15.5.1 Ground Rupture

No active faults cross the Highgrove site or project linear (Jennings, 1994). Therefore, no mitigation measures are required to reduce the hazard from surface faulting rupture.

8.15.5.2 Ground-Shaking

The Highgrove site and pipelines will need to be designed and constructed to withstand strong earthquake-shaking as specified in the 2001 CBC for Seismic Zone 4. A site-specific geotechnical investigation (forthcoming) will aid in the development of the seismic design criteria.

8.15.5.3 Liquefaction

The soil types present at the Highgrove site and along the pipeline routehave been mapped as being conducive to liquefaction. A site-specific geotechnical investigation currently being planned will aid in the full assessment of liquefaction potential and lateral spreading.

8.15.5.4 Subsidence

Based on site-specific data, subsidence is not considered to be a hazard at the site and mitigation would not be required.

8.15.5.5 Expansive Soils

Expansive soils can be mitigated by removing the soil and backfilling with non-expansive soil, instituting chemical stabilization of the soil, or constructing a foundation treatment that resists uplift of the expansive soil. Expansive soils have not been identified as potential hazard at the site. Mitigation measures would likely not be required at the site, however, borings that will be drilled at the site during the geotechnical study will identify any potential soils that would be prone to expansion.

8.15.6 Involved Agencies and Agency Contacts

No permits are required for compliance with geological LORS. However, the City of Grand Terrace, and the County of San Bernardino are responsible for enforcing compliance with building standards.

8.15.7 Permits Required and Permit Schedule

Compliance of building construction with CBC standards is covered under engineering and construction permits for the project. There are no other permit requirements that specifically address geologic resources and hazards. However, excavation/grading and inspection

permits will be required prior to construction and will be included in the overall project construction permit. Borings planned for the geotechnical investigation will require a permit from the County of San Bernardino since they will likely penetrate groundwater (borings that do not encounter groundwater and are immediately grouted up do not require a permit). According to the City of Grand Terrace, no separate drilling permit is required for private property (Glander, 2005). The County of San Bernardino Geologist, may be required to review geotechnical reports and/or design documents as part of land use permitting. Required permits and agency contact information is summarized in Table 8.15-3.

TABLE 8.15-3
Permits and Agency Contact Information

Agency	Contact	Telephone
County of San Bernardino, Dept of Environmental Health	Steve Sassler	(909) 387-4666
County of San Bernardino, Land Use Dept, County Geologist	Wes Reader	(909) 387 4240

8.15.8 References

Bortogno, E.J. and T.E. Spittler. 1986. Geologic Map of the San Bernardino Quadrangle. Regional Geologic Map Series, 1:250000 scale. State of California, Department of Conservation, Division of Mines and Geology.

California, State of. 1995. Mineral Land Classification of a Part of Southwest San Bernardino Valley Area, California, State of California, Department of Conservation, Division of Mines and Geology. Open-File Report 94-08.

California Geological Survey. 2003. Probabilistic Seismic Hazards Mapping Ground Motion Page Based on the USGS/CGS Probabilistic Seismic Hazards Assessment (PSHA) Model, 2002 (revised April 2003).
http://www.consrv.ca.gov/CGS/rghm/pshamap/pshamain.html.

California Division of Oil, Gas, and Geothermal Resources (CDOGGR). 2004. Oil and Gas Field Maps. http://www.consrv.ca.gov/dog.

Glander, Jerry. 2005. Personal communication between CH2M HILL staff and Mr. Jerry Glander, Director of Building and Safety, Public Works and Housing Department, City of Grand Terrace, CA. (909) 430 2250. February 18.

Jennings, C.W. 1994. Fault Activity Map of California and Adjacent Areas. Division of Mines and Geology.

Morton, D.M., and B. Cox. 2001. Geologic Map of the Riverside East 7.5′ Quadrangle, Riverside County, California. U.S. Geological Survey Open-File Report 01-452. Denver Federal Center, Boulder, CO.

Morton, D.M. and F.K. Miller. 2003. Preliminary Digital Geologic Map of the San Bernardino 30′ x 60′ Quadrangle, California, Version 1.0. U.S. Geological Survey Open-File Report 03-293. Denver Federal Center, Boulder, CO.

Mualchin, L. 1996. A Technical Report to Accompany the Caltrans California Seismic Hazard Map. Prepared for Caltrans by the Office of Earthquake Engineering. July.

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

U.S. Geological Survey (USGS). 2002. National Seismic Hazard Mapping Project. http://geohazards.cr.usgs.gov/eq/

Working Group On California Earthquake Potential (WGCEP). 2002. Appendix A. California Fault Parameters. Division of Mines and Geology. Update to Open-File Report 96-08.

Qow

Kqd

Qw

Qof

Kgr

LEGEND

- SITE LOCATION
- Kgr — CRETACEOUS GRANITIC ROCKS
- Kqd — JURASSIC QUARTZ DIORITE
- Qof — OLDER QUATERNARY ALLUVIAL FAN DEPOSITS
- Qow — OLDER QUATERNARY WASH DEPOSITS (ALLUVIAL DEPOSITS OF ABANDONED WASHES)
- Qw — QUATERNARY WASH DEPOSITS (ALLUVIAL DEPOSITS OF MODERN WASHES)

SOURCE: BORTUGNO, E.J., AND SPITTLER, T.G., 1986, GEOLOGIC MAP OF THE SAN BERNARDINO QUADRANGLE

0 2,000 4,000 FEET

1 INCH EQUALS 2,000 FEET

FIGURE 8.15-1
AREA GEOLOGY WITHIN 2 MILES OF AES SITE
AES HIGHGROVE
GRAND TERRACE, CALIFORNIA

CH2MHILL

RDD \\LOKI\PROJECTS\RDDGIS\AES_HIGHGROVE\MXD\8_15-1_GEOLOGY.MXD 4/11/2006 14:34:57