## 7.16 PALEONTOLOGICAL RESOURCES

## 7.16 PALEONTOLOGICAL RESOURCES

In accordance with CEC regulations, this section of the application presents information on the paleontological resources of the region and a 1-mile site vicinity encompassed by the proposed San Gabriel Generating Station (SGSS) project. Paleontological resources, or fossils, are the remains of ancient plants and animals, as well as traces such as burrows or tracks, that can provide scientifically significant information on the history of life on earth. Assessments of the scientific significance of these remains are based on whether they can provide data on the taxonomy and phylogeny of ancient organisms, the paleoecology and nature of paleoenvironments in the geologic past, or the stratigraphy and age of geologic units. Fossils need not be mineralized to be of scientific significance. In areas that include geologically recent sedimentation, the bones off extinct Pleistocene megafauna are frequently unaltered and not mineralized.

This section describes the potential for paleontological resources in the area, provides an assessment of potential impacts to paleontological resources, and provides mitigation measures to reduce potentially significant impacts to less-than-significant levels. The analysis complies with standards and guidelines recommended for the assessment and mitigation of impacts to paleontological resources recommended by the Society of Vertebrate Paleontology (1994). Archival research, subsequent field surveys performed during September 2005 and February 2007, and assessments were made under the direction of Mr. David Lawler, who has undertaken a Paleontological Resources Sensitivity Analysis of the proposed SGGS that is based on (1) museum repository data and paleontological collection material, and (2) a published and unpublished scientific literature survey to provide relevant environmental overview data (Appendix T: submitted separately under rules of confidentiality).

Data for paleontological resources within the project area were compiled from published records of previous geologic and paleontological investigations and are included in the attached bibliography. Also included were additional published descriptions of the geology (including geologic maps), unpublished paleontological research papers, museum records, and interviews conducted with individuals having first-hand knowledge of resources within the project vicinity. Sources consulted on the general geology of the area included regional geologic maps compiled by the California Division of Mines and Geology (CDMG). More specific geologic information in the form of 1:24,000 to 1:250,000 scale U.S. Geological Survey and CDMG geologic maps were available for the project vicinity.

The compiled data have been vital in assessing paleontological resource sensitivity issues in relation to proposed project construction activities. This assessment is based both on known paleontological sites within the project vicinity, as well as extrapolated biostratigraphic information derived from rock units in adjacent areas or areas of regional context. Data sources vary from informant, archival, and published and unpublished technical reports, to technical information housed in designated museum repositories. Published geologic mapping that served as the most comprehensive data source was derived from several sources. It included the review of the San Bernardino Geologic Map Sheet (CDMG, Bortugno and Spittler, 1998, CDMG, Rogers, 1967, 1:250,000 scale) and Santa Ana Geologic Map Sheet (CDMG, Rogers, 1992, 1:250,000 scale). Matti and Carson (1983) have a published larger-scale geological mapping (1:24,000) of the paleontological resources study area and vicinity. Specific technical paleontological and detailed lithologic data were derived from both from local geoscientist informants at California colleges and universities, and the designated museum repositories at Los Angeles County Museum (LACM), University of California Museum of Paleontology, and the San Bernardino County Museum (SBCM).

The final portion of this section describes laws, ordinances, regulations, and standards (LORS) relevant to paleontological impacts of the project as well as the contacts in pertinent regulatory agencies. Required permits are also discussed.

## 7.16.1 Affected Environment

Regionally, the SGGS site is located in the southwestern portion of San Bernardino County within the City of Rancho Cucamonga. It is geographically situated in the southeastern portion of the Los Angeles Basin, adjacent to the base of the San Gabriel Mountains and Cajon Pass. The topography is very flat and represents a portion of a broad alluvial fan complex, which extends from the base of the San Gabriel Mountains south to the Chino Hills area. The project site is bounded on the west by a railroad spur; on the east by Etiwanda Avenue; on the south by 6th Street, and on the north side by the Burlington Northern Santa Fe Railroad right-of-way (see Figure 7.16-1).

The proposed facilities and laydown areas are described in Chapter 2, Facility Description and Location.

The paleontological potential of the proposed SGGS has been assessed within 1 mile of the existing EGS site (the paleontological resources study area). There are no known paleontological sites within the paleontological resources study area.

### 7.16.1.1 Regional Geology and Stratigraphy

Surficial sedimentary units of predominantly Pleistocene and Holocene age underlie the entire proposed project site vicinity. These sediments include depositional sources that range from continental, alluvial fan-derived sediments to subaerial floodplain. Lithologies include sand, gravel, silt and clay, all of which are potentially favorable to the preservation of paleontological resources.

Pleistocene age geologic units occur as surficial deposits in the project vicinity and have been mapped by California Division of Mines and Geology (CDMG) geologists (1976). Subsurface sedimentary deposits as old as Miocene age are found in this portion of the Los Angeles Basin area. These Los Angeles Basin sedimentary units have been described and mapped previously by Brandy and Emery (1954), Yerkes et al. (1965), Cleveland (1976), and Bortugno and Spittler (1998).

The lateral extent of major west-flowing river drainages of Pleistocene age has been determined from petroleum exploration and development by geological subsurface mapping (Wright, 1987a, 1987b).

The Cenozoic rock formations range in facies type from conglomerates to sandstones to unconsolidated siltstone and clays, all of which are either fossiliferous or potentially fossiliferous.

Gradual, long-term erosion has removed parts of the Tertiary and Quaternary rock formations so that these rocks and their contained fossils are now at or near the surface throughout most of the project site. These formations occur at or near the surface as rock outcrops of varying widths. However, these outcrops have been obscured in most areas by industrial development and surficial sediments. Visual detection of fossils is possible in those areas where natural erosion or man-made excavations during road, pipeline, or building site excavation or grading operations have removed surficial deposits or artificial fill material. The majority of the SGGS plant site is reportedly overlain by imported fill material or unconsolidated sediments of Holocene age.

### 7.16.1.2 Regional Paleontology

Paleontological resource sensitivity varies according to geologic rock unit. Fossil vertebrate resources are considered rare in respect to the identified geological formations and geologic periods.

From a regional perspective, occurrences of paleontological resources from the Quaternary age units (*Qof)* and *Qw*) record evidence of Pleistocene age fossil vertebrates in this southeastern part of the Los Angeles Basin region of Southern California. The Los Angeles Basin contains a diverse record of geologic and biologic history, which spans more than 30 million years, dating from the Miocene period.

Under the combined influences of regional tectonic events, such as the deposition of sedimentary sequences within the Los Angeles Basin and fluctuating worldwide sea level changes over geologic time, fossils of marine and terrestrial organisms have accumulated to produce a significant record of prehistoric life.

The areas of greatest paleontological interest within the Los Angeles Basin are the well-known discoveries of Pleistocene age fossil vertebrate fauna in both the Palos Verdes Sand and the San Pedro Formation (Miller, 1971). One of the earliest fossil vertebrates found in Southern California and described was that of a mastodon tooth (Blake, 1855). Identification and scientific description of both of these diverse fossil vertebrate assemblages provides one of the best known records of late Pleistocene faunas in California (Hay, 1927; Jefferson, 1991). Pleistocene continental as well as nearshore marine sedimentary deposits provided favorable conditions for preserving vertebrate fossil remains in these geologic units.

The La Brea Tar Pit fossil mammal assemblage of upper Pleistocene age is well known worldwide and is derived from the Palos Verdes Sand in the northwestern portion of the Los Angeles Basin. This assemblage includes a wide variety of carnivores (canids and felids); small to large ungulate herbivores (cervids, antilocaprids, camelids, equids, suiids); edentates (sloths); and a myriad of small mammals including lagomorphs (rabbits), rodents, insectivores, and a variety of birds and lower vertebrates (frogs, lizards and snakes). Many of the fossil specimens represent the best-preserved specimens of particular taxa found to date. The bird fauna has been well described by Miller (1912) and Miller and DeMay (1942).

The geology of the La Brea deposits has been described by Wright (1987a, 1987b) and Woodward and Marcus (1973). These workers have subdivided the Palos Verdes Sand into three members (units A, B, and C) that document the gradual transition from deep-water marine conditions to non-marine alluvial plain deposition in this area of the Los Angeles Basin. None of the scientific literature reviewed to date has recognized these subdivisions of the Palos Verdes Sand in the project vicinity.

### 7.16.1.3 Paleontological Sensitivity of the Proposed Project Vicinity

The following sections discuss the paleontologic sensitivity of the geologic units identified in the proposed project vicinity. Three categories of paleontological potential have been assigned to portions of the project site underlain by unconsolidated and consolidated alluvial units of Pleistocene and Holocene geologic ages according to CEC standards: High Potential, Moderate Potential, and Low Potential ratings, which are defined below. Rating categories are to be considered interpretive and subject to change as new information is obtained.

- **High Potential Rating –** Rock units with a High Potential for significant paleontological resources are known to have yielded vertebrate fossils within the SGGS site or region. This does not necessarily imply that vertebrate fossils will always be recovered from a High Potential-rated rock unit, but only that there are recorded occurrences within the unit. Additional factors that are considered in making a determination pertain to inferred depositional environment and lithology.

- **Moderate Potential Rating –** A Moderate Potential rating is applied to rock units possessing some degree of potential, such as a favorable depositional environment for resource preservation or possessing characteristics of lithologically similar rock units in the region that have yielded vertebrate fossils. All Moderate Potential-rated rock units are recommended for field survey and construction monitoring.

- **Low Potential Rating –** A Low Potential rating is applied to rock units containing lithologies that are do not commonly preserve significant fossil resources (i.e., coarse boulder conglomerates or welded [ignimbrite] volcanic ash deposits). Igneous rocks, such as the granodiorite outcrops, are precluded from preservation of paleontological resources, due to their genesis within a magmatic environment.

### Cenozoic Rock Units– Quaternary-age Deposits

Quaternary-age deposits of Pleistocene and Holocene age occur locally within the SGGS site. Earlier editions of the regional scale San Bernardino geologic map depict the SGGS site geologic units as Quaternary alluvium *(Qal)* and Pleistocene nonmarine *(Qc)* (Rogers, 1967). The most recent regional San Bernardino Quadrangle map currently has designated the Quaternary-age SGGS site geologic units as Quaternary older alluvium *(Qof)* and Quaternary wash *(Qw)* deposits (Bortugno and Spittler, 1986). This analysis uses the Quaternary geologic units as described and mapped by Bortugno and Spittler (1986) (see Table 7.16-1). Paleontological resources are known to vary widely in stratigraphic distribution within these generalized Quaternary-age geologic unit.

**Table 7.16-1**
**San Gabriel Generating Station Project Paleontological Sensitivity and Geologic Units**

| **Plant Site Area** | | |
|---|---|---|
| **Area** | **Rock Formation** | **Sensitivity Rating** |
| Plant | *Qof* | High |
| **Laydown Areas** | | |
| **Area** | **Rock Formation** | **Sensitivity Rating** |
| Offsite Laydown Area | *Qof*<br>*Qw* | High<br>Low |
| Area 1 (Reliant Power Plant) | *Qof* | High |
| Area 2 (Reliant Power Plant) | *Qof* | High |
| Area 3 (Reliant Power Plant) | *Qof* | High |
| Area 4 (Reliant Power Plant) | *Qof* | High |
| Area 5 (Reliant Power Plant) | *Qof* | High |
| Area 6 (Reliant Power Plant) | *Qof* | High |
| Area 7 (Reliant Power Plant) | *Qof* | High |
| Area 8 (Reliant Power Plant) | *Qof* | High |
| Area 9 (Reliant Power Plant) | *Qof* | High |

### Pleistocene-age Sediments (Older Alluvium*)*

The Quaternary older alluvium *(Qof)* deposits of Pleistocene age are of considerable paleontological interest. These older alluvial-fan derived deposits are known to exist under surficial Quaternary wash *(Qw),* which represent Holocene to Recent alluvial fan deposits. These older deposits are best exposed in the northwest part of SGGS site and consist of fine to medium sand, silt, and clay with some cobbles.

Coarser rock-unit lithologies (e.g., gravel) are generally more favorable to the preservation of large vertebrate fossils while finer grained lithologies (e.g., sand and clay) are more favorable for the preservation of rodent-sized animals.

Fossil vertebrate specimens of Pleistocene age occur locally and have been recovered within a 5-mile radius of the project site within this rock unit. A *Mammuthus* (mammoth) specimen was recovered from a locality roughly 2.5 miles south in sediments approximately 20 feet below grade. A S*milodon* (extinct saber-tooth cat) specimen was recovered from a locality roughly 3 miles southeast in Fontana. Also, an *Odocoileus* (extinct deer) specimen was recovered from a locality roughly 5 miles east, probably from the same geologic unit (*Qof*) .

Regionally, these paleontological localities serve as a partial record of scientifically important paleontological resources that represent a wide variety of terrestrial and aquatic vertebrate taxa (fossil horse, bison, rabbit, and rodent terrestrial mammals).

Artificial fill and cement materials at the SGGS site are expected to have either removed or obscured potentially fossiliferous exposures within the site. However, occurrence of nonmarine, continental, alluvial fan-derived Older Fan (*Qof*) stratigraphic unit at shallow depths is quite likely, given the known depths at which vertebrate fossils have been recovered in the proposed project region.

### Holocene and Post-Holocene Age Sediments (Alluvial Wash*)*

The Alluvial Wash *(Qw)* deposits are of probable Holocene or post-Holocene age and are considered are to be of limited or low paleontological interest and thus considered inconsequential. These are mainly alluvial wash deposits that occur in modern braided channels and streams of young alluvial fan features. These deposits are best exposed in the northwest part of project site and consist of fine-to-medium sand, silt, and clay with some cobbles.

## 7.16.2 Paleontological Sensitivity Ratings Results

The sensitivity ratings results for the SGGS are shown in Table 7.16-1. These ratings are derived from the analysis of preconstruction field survey data and museum record and specimen collections data combined with the distribution of known fossil localities in the region. These factors, in combination with geologic maps, permitted classification of paleontological resource sensitivity areas and coincident with known geologic formation outcrop patterns, provide the data required to reach informed conclusions about the relative sensitivity of the SGGS site location. This methodology provides a coarse-scale resolution of areas likely to contain fossils in specific types of sedimentary facies.

It should be noted that sensitivity ratings could change as paleontological surveys are undertaken in the future and add to the existing database. Identification of significant vertebrate or microvertebrate sites and materials of scientific significance can elevate a particular rock unit's paleontological resource rating.

### 7.16.2.1 Paleontological Sensitivity Analysis

#### Power Plant Site

Table 7.16-1 summarizes the paleontological sensitivity rating for the SGGS site, which is partially paved and contains a highly developed industrial infrastructure. Pleistocene-age older fan deposits *(Qof*) and Holocene-age wash deposits (*Qw*) have been assigned a High and Low sensitivity rating, respectively, for excavations beneath asphalt and artificial fill materials. A maximum excavation depth of 15 to 20 feet is estimated for installation the major and ancillary power plant components**.**

#### Laydown Areas

Ten proposed laydown areas have been evaluated. Nine laydown areas are within the SGGS site (Figure 2.7-4a). These sites are partially paved and contain a highly developed industrial infrastructure. The offsite construction laydown area is not within the SGGS site, but is located west of the site (Figure 7.16-1). Pleistocene-age older fan deposits (*Qof*) and Holocene-age wash deposits (*Qw*) have been assigned a High and Low sensitivity rating, respectively, for excavations beneath asphalt and/or artificial fill materials. A maximum excavation depth of 4 feet is estimated for grading of the laydown area**.**

### 7.16.3 Environmental Consequences

Significance criteria were established that follow CEQA Guidelines (Appendix G, Environmental Checklist, approved January 1999), on performance standards and thresholds adopted by agencies charged with management of these resources and compliance oversight, and guidelines adopted by the Society of Vertebrate Paleontology (1995). An impact may be considered significant if the project results in:

- Disturbance or destruction of an intact fossil bed in a manner such that its scientific data and educational potential would be lost or destroyed;
- The scientifically uncontrolled removal, or destruction, of identifiable vertebrate invertebrate, or paleobotanical remains; or
- The disturbance or destruction of a unique paleontological resource or site.

Construction of the proposed project would impact Pleistocene-age older fan deposits, which has been assigned a High paleontologic rating. The proposed offsite laydown area to the west of the proposed project would impact both Pleistocene-age older fan deposits and Holocene-age wash deposits. The Holocene-age wash deposit has been assigned a Low paleontologic rating. Construction-related excavations within the Pleistocene-age older fan deposits have the potential to impact significant paleontological resources. These impacts would include the destruction of nonrenewable paleontological resources as a consequence of disturbance by earth—moving machinery, and the consequent loss of their scientific data and educational potential.

### 7.16.4 Cumulative Impacts

Past and current development in the project vicinity has resulted in cumulatively significant impacts on paleontological resources by virtue of ground disturbance in an area of high paleontological sensitivity. Relevant future projects identified in Section 7.4.3 could, unless fully mitigated, further contribute to cumulative impacts. The proposed project would not result in effects to known paleontological resources. Mitigation measures identified in Section 7.16.5 would fully mitigate for impacts to paleontological resources discovered during ground disturbing activities associated with project construction. Therefore,

the proposed project's contribution to this impact would not be cumulatively considerable. The proposed project's cumulative impact would therefore be less than significant.

### 7.16.5 Mitigation Measures

In order to mitigate the potential for impacts from earth-moving machinery and construction-related excavations, the following mitigation measures would be implemented:

**PALEO-1 Pre-Construction Meetings.** Pre-construction meetings will be held with key construction personnel to provide brief discussions pertaining to paleontological resource significance, visual identification, and fossil discovery notification procedures.

**PALEO-2 Monitoring and Salvage.** Field monitoring activities will include:

- All areas containing geologic units designated with a potentially sensitive rating shall be monitored by a professional paleontologist when initial ground disturbance occurs, to insure that subsurface paleontological resources are adequately assessed as to their significance. If deemed significant, these shall be salvaged according to professional paleontological standards (e.g., Society of Vertebrate Paleontology standards). This will include removal of identifiable paleontological remains, fossil preparation, and subsequent curation of these remains.

- Continue intermittent field monitoring of sites slated for subsurface disturbance.

- Halt all construction activity should inadvertent discovery of paleontological remains occur. Follow proper notification procedures provided during preconstruction meeting. The decision to conduct salvage operations will be determined by the project paleontologist in consultation with CEC staff and project management.

With implementation of Mitigation Measures PALEO-1 and PALEO-2, impacts to paleontological resources would be less than significant.

### 7.16.6 Laws, Ordinances, Regulations, and Standards

The proposed project will be constructed and operated in accordance with all LORS applicable to paleontologic resources. LORS relevant to this project are summarized in Table 7.16-2 and are discussed briefly below.

**Table 7.16-2**
**Applicable Paleontological Resources Laws, Ordinances, Regulations, and Standards**

| Laws, Ordinances, Regulations, and Standards | Applicability | Administering Agency | AFC Section |
|---|---|---|---|
| **Federal** | | | |
| SVP (Society of Vertebrate Paleontologists) | Paleontological Resources – Nationwide. Recommended set of procedures and standards for assessing and mitigating impacts to vertebrate paleontological resources (adopted October 1994). | N/A | 7.16.2, 7.16.3, 7.16.4 |

**Table 7.16-2**
**Applicable Paleontological Resources Laws, Ordinances, Regulations, and Standards**

| Laws, Ordinances, Regulations, and Standards | Applicability | Administering Agency | AFC Section |
|---|---|---|---|
| **State** | | | |
| CEQA Guidelines (California Environmental Quality Act) | Regulates industrial/ residential development projects. Project direct or indirect impacts on unique paleontological resources or sites — resource assessment, monitoring and mitigation required (superceded by CEC process). | State California | 7.16.2, 7.16.3, 7.16.4 |
| **Local** | | | |
| None identified | – | – | – |

CEQA = California Environmental Quality Act
LORS = laws, ordinances, regulations, and standards
N/A = not applicable
NEPA = National Environmental Policy Act
SVP = Society of Vertebrate Paleontologists

### 7.16.6.1 Federal

The Antiquities Act (1906) and National Environmental Protection Act (NEPA) regulate disturbance to paleontological/prehistoric resources on federal lands. The overseeing agencies are the Federal Energy Regulatory Commission, U.S. Forest Service, and U.S. Bureau of Land Management. The regulations pertain to project direct or indirect impacts on unique paleontological resources or sites and apply to federal lands or federally funded projects. Resource conservation is stipulated.

### 7.16.6.2 State

The CEQA Guidelines regulate project direct or indirect impacts on unique paleontological resources or sites, requiring resource assessment, monitoring, and mitigation. The Secretary of Resources has deemed the CEC permitting process as a certified regulatory program demonstrating compliance with CEQA.

### 7.16.6.3 Local

No local agency regulations are known to apply to paleontologic resources.

## 7.16.7 Involved Agencies and Agency Contacts

| Issue | Agency/Address | Contact/Title | Telephone |
|---|---|---|---|
| Paleontological resources | California Division of Mines and Geology, Office of the State Geologist<br>801 "K" Street<br>Mail Stop 1230<br>Sacramento, CA 95814 | Jim Davis,<br>State Geologist | (916) 445-1923 |

### 7.16.8 Permits Required and Permit Schedule

This project does not require federal, state, or local permits for paleontological resource issues.

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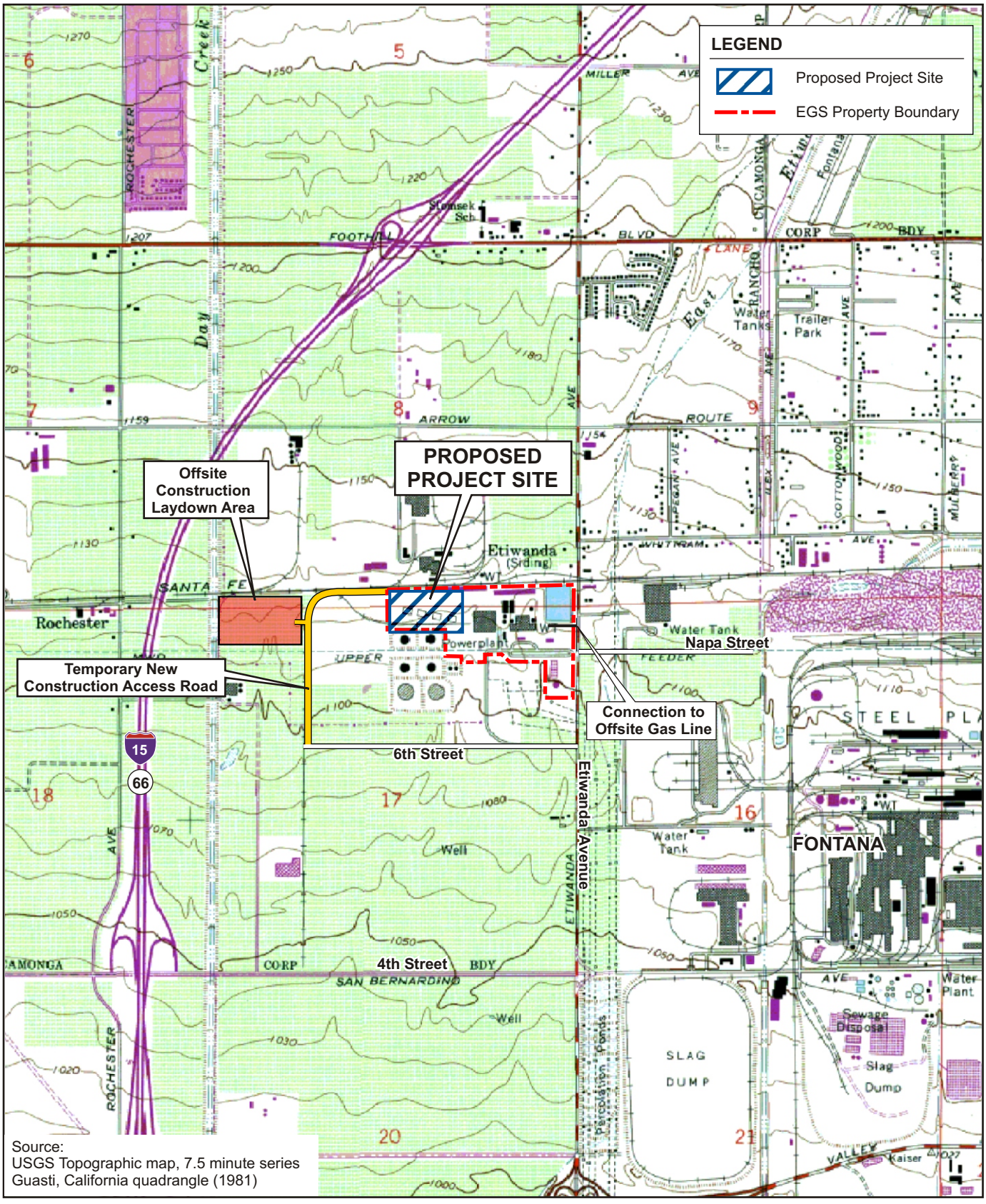


Source:
USGS Topographic map, 7.5 minute series
Guasti, California quadrangle (1981)

0 2000 4000
Scale in Feet
1:24,000

N

**PROJECT LOCATION MAP**

April 2007
28067169

San Gabriel Generating Station
San Gabriel Power Generation, LLC
Rancho Cucamonga, California

URS

**FIGURE 7.16-1**

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