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5.8 PALEONTOLOGICAL RESOURCES

For the purposes of the California Environmental Quality Act (CEQA) and National Environmental Protection Act (NEPA), paleontological resources (fossils) are defined as the remains or other indications (trace fossils) of prehistoric organisms such as animals and plants. Fossils facilitate three areas of scientific investigation: (1) establishing the relative ages of geologic horizons that contain them, (2) reconstructing the ancient environments which these organisms inhabited, and (3) detecting the existence, distribution, and evolutionary trends of diverse types of organisms, many of which are now extinct. Investigation of the geologic events that deposited the fossils cannot adequately proceed without an understanding of the fossils.

The potential environmental impacts on paleontological resources that may result from construction and operation of the Pio Pico Energy Center (PPEC) are summarized in this section. Section 5.8.1 provides a description of the local environment that may be affected by construction and operation of the project. Section 5.8.2 describes these environmental consequences. Section 5.8.3 discusses potential cumulative impacts on paleontological resources. Section 5.8.4 presents proposed mitigation measures to reduce potential adverse impacts on paleontological resources. Applicable federal, state, and local laws, ordinances, regulations, and standards (LORS), as well as the professional standards that protect paleontological resources, are listed in Section 5.8.5. Section 5.8.6 presents the participating agencies and agency contacts. Section 5.8.7 discusses the permits that may be required. Section 5.8.8 contains a list of references cited.

The following evaluation of the potential impacts on paleontological resources was prepared by Dr. Joe Stewart, Ph.D., of URS, a certified paleontologist with over 30 years of experience. It is designed to satisfy the requirements of the California Energy Commission (CEC). It is consistent with the standard measures for mitigating adverse construction-related environmental impacts on significant paleontological resources established by the Society of Vertebrate Paleontology (SVP 1995, 1996). The record search and maps showing known localities of paleontological finds are included as Appendix L, which been submitted separately under rules of confidentiality. With proposed conditions of certification outlined in this section, the project will have no significant negative environmental impacts and will comply with all applicable laws, ordinances, regulations, and standards (LORS).

Project Description

PPEC consists of the project site, linears, and a temporary laydown area (Figure 3.3-1, Facility Plot Plan and Figure 3.3-3, Potential Linears). The project site is located in an unincorporated area of San Diego County known as Otay Mesa. It is comprised of a 9.99 acre parcel located in the southeast quadrant of the Alta Road and Calzada de la Fuente intersection. The proposed project site comprises the entire parcel with Assessor's Parcel Number (APN) 648-040-45, and the laydown area is 6.00 acres of an adjacent parcel to the south (APN 648-040-46) (Figure 3.3-2, Project Location). The existing setting within one-mile of the project site and potential transmission line routes are presented on Figure 3.3-4. The project affects the following areas:

- Plant site – 9.99 acres.

- Temporary laydown and parking area – 6.00 acres, on an adjacent parcel that is contiguous to the project site.
- Natural Gas pipeline – There are two possible routes for the gas supply pipeline. Both routes would connect to an existing SDG&E natural gas pipeline, but at different locations. Route A would extend approximately 8,000 feet south along Alta Road to near the U.S.–Mexico border, at which point it would connect to the existing SDG&E natural gas pipeline. Route B would extend approximately 2,375 feet south along Alta Road, turn west on Otay Mesa Road, and continue approximately 7,920 feet to Harvest Road at which point it would connect to the existing SDG&E natural gas pipeline (Figure 3.3-3, Potential Linears) for a total of approximately 10,300 feet. The pipeline will be constructed, owned, and operated by SDG&E.
- Sewer pipeline – A short connection will be made to an existing 12-inch sewer main along Calzada de la Fuente along the north project site boundary or to an existing 15-inch sewer main along Alta Road, along the west project site boundary.
- Stormwater pipeline – A short connection will be made from a detention pond located at the northwest corner of the project site to an existing 30-inch stormwater pipeline located along Calzada de la Fuente, adjacent to the project site.
- Power line – Two possible routes are provided for a 230kV transmission line that will connect the project into the existing 230kV Otay Mesa switchyard. Route A would begin as an overhead power line along Calzada de la Fuente, extend approximately 1,700 feet east where it would then be routed underground for approximately 400 feet into the Otay Mesa switchyard (total length of Route A would be approximately 2,100 feet). Route B would begin as an overhead power line from the eastern edge of the project site, run south approximately 550 feet, then turn east along the northern border of the parcels with APN 648-040-48 and APN 648-040-43 for 1,400 feet, and finally turn north for approximately 700 feet into the Otay Mesa switchyard (total length of Route B would be approximately 2,650 feet). The power line will be owned and maintained by the Applicant.
- Water supply pipelines – The project will make a short connection to the potable service system, either at an existing 12-inch main along Calzada de la Fuente, or at an existing 24-inch main along Alta Road. Upon the Otay Water District (OWD)'s completion of the planned Otay Mesa area recycled water system, the project will make a connection to an existing 8-inch recycled water main along Calzada de la Fuente or a new recycled water main to be constructed in Alta Road.

These features are illustrated on Figure 3.3-1, Facility Plot Plan and Figure 3.3-3, Potential Linears.

The site topography as of December 2010 is provided on Figure 3.4-1, 2010 Site Topography. The industrial park developer will grade the property in first quarter 2011 as described in the 2009-2010 County of San Diego Grading Permit 2700-1555. This planned soil removal and grading of the property was already planned for prior to the inception of this project and will occur regardless of the submittal of this AFC or its eventual approval. Site elevation for purposes

of this project will be approximately 635 feet above mean sea level (msl). This will establish the baseline conditions that this AFC is founded upon. The baseline site topography is shown on Figure 3.4-2, Baseline Site Topography.

5.8.1 Affected Environment

5.8.1.1 Geographic Location

The proposed project is in an unincorporated area of San Diego County known as Otay Mesa. The main part of the project is in the northwest quarter of the southeast quarter of Section 30, Township 18 South, Range 1 East. The project lies within the Otay Mesa United States Geological Survey (USGS) 7.5-minute quadrangle (shown in Figure 5.8-1). This is at the base of the western border of the San Ysidro Mountains. The proposed project site lies within the Peninsular Ranges physiographic province (Norris and Webb, 1990).

5.8.1.2 Regional Geologic Settings

The geology of the San Diego – El Centro 2 degree sheet was mapped by Strand (1962) at a scale of 1:250,000. Kennedy and Tan (1977) mapped the area at a scale of 1:24,000. Information provided by these geologic maps as well as published and unpublished reports form the basis of the following discussion. Individual maps and publications are incorporated into this report and referenced where appropriate. The distribution, type, and age of sediments immediately underlying the proposed project area and their probability of producing significant fossils during project construction are the main geological concerns of this discussion. The site-specific geology in the vicinity of the proposed project site is discussed separately below.

5.8.1.3 Resource Inventory Methods

Methods used to develop the paleontological resource inventory of the proposed project site and surrounding area are described below. These procedures follow guidelines from the CEC (2007) and Society for Vertebrate Paleontology (SVP) (1995) and included a literature search and field investigation.

Published and unpublished literature concerning area paleontological and geological topics were consulted. Dr. Joe D. Stewart performed the literature search. It is possible to define the surface distribution of the formations involved to estimate their subsurface distribution and gain some estimate of the paleontological productivity of these units from the literature. Another important source for data concerning areal distribution of known paleontological localities and productivity of various rock units is the records of pertinent paleontological collections. An archival database search was executed by the San Diego Natural History Museum (SDNHM) to determine whether any of the stratigraphic units found within the project vicinity had previously yielded significant paleontological resources and whether any known localities lie within or near the project site. Results of the record search are included in Appendix L-1 and have been submitted separately under the rules of confidentiality. The museum staff member who conducted the search is Kesler Randal, Collections Manager for fossil vertebrates. He has worked for the SDNHM for 12 years, and has a B.S. in geo-environmental studies from Shippensburg University, and an M.S. in geology from San Diego State University.

A field survey for any visible fossil remains within a one-mile radius of the proposed project site was conducted on November 12, 2010, by Dr. Joe D. Stewart a paleontologist with over 30 years of experience (URS principal paleontologist) and Dr. Michael Williams (URS paleontologist). A search was performed for exposures of sediment appropriate for producing fossils. During the field survey, attempts were made to detect the presence and nature of subsurface native sediments. An additional site visit with the Applicant was made on November 17, 2010 by Dr. Williams.

As mentioned in the above project description, the site elevation for purposes of this project will be approximately 635 feet above mean sea level (msl). Upon CEC approval of the PPEC project, a survey of the site, temporary laydown and parking area, and all associated project linears, will be conducted prior to ground disturbing activities as outlined in condition of certification PAL-5 in Section 5.8.4 below.

5.8.1.4 Paleontological Resource Assessment Criteria

Vertebrate fossils are considered significant by the SVP (1995) unless otherwise demonstrated. Environmental statutes regard them in a like manner because of the relative rarity of vertebrate fossils. Vertebrate fossils are so uncommon that, in many cases, each recovered specimen will provide additional important information about the morphological variation or the geographic distribution of its species. The SVP (1995) recommendations also state that invertebrate or botanical fossils may also be considered significant paleontological resources.

A rock unit is considered “sensitive” to adverse impacts if there is a high probability that grading, excavation, or other earth-moving will jeopardize significant fossil remains. Using criteria published by the SVP (1995), the paleontological importance or sensitivity (high, low, or undetermined) of each rock unit exposed in a project site or surrounding area is the measure most amenable to classifying the significance of paleontological resources. The paleontological sensitivity of a stratigraphic unit reflects its potential paleontological productivity as well as the scientific significance of the fossils it has produced. This method of paleontological resource assessment is the most appropriate because discrete levels of paleontological importance can be delineated on a topographic or geologic map.

Reasons for considering an individual fossil specimen scientifically important include:

- If it is well preserved.
- If it can be identified.
- If it is more complete than most specimens for that species.
- If it preserves one or more elements not known in most specimens of that species.
- If it is indicative of a particular time period.
- If it has not been recorded from that sedimentary unit.
- If it provides information concerning the environment in which it lived.

- If it could be the basis for description of a new species or comes from a site that produced the type (definitive) specimen of its species.
- If it belongs to a species rarely encountered.

URS considered the following criteria in establishing the importance and paleontological sensitivity of each rock unit exposed in the project site or within the one-mile study area buffer zone:

- Estimation of the potential paleontological productivity of each rock unit on the evidence of fossil localities in or near the proposed project on the basis of published and unpublished sources.
- Consideration of the scientific significance of fossils from each of the rock units exposed within the proposed project area.

Categories of Sensitivity

The SVP (1995) established three categories of sensitivity for paleontological resources in its standard guidelines for assessment and mitigation of adverse impacts to paleontological resources. The three categories are low, high, and undetermined.

Low sensitivity paleontological resources are categorized as rock units that are not sedimentary in origin. Likewise, sedimentary rock units that have been well examined and have not produced paleontological resources are considered to have low sensitivity. Monitoring is not usually recommended or needed during excavation in a rock unit with low sensitivity.

High sensitivity paleontological resources are categorized as rock units older than recent for which vertebrate or significant invertebrate fossils or a significant suite of plant fossils have been recovered. In areas of high sensitivity, full-time monitoring is recommended during any project-related ground disturbance.

Paleontological resources with undetermined sensitivity are categorized as sedimentary rock units for which little information is available. It is often possible for an experienced paleontologist to determine whether such a rock unit should be assigned a high or low sensitivity after he or she has performed a pedestrian survey and has made detailed observations of both natural and artificial exposures of the rock unit.

5.8.1.5 Resource Inventory Results

Stratigraphic Inventory. The general geology of the San Diego – El Centro area was mapped by Strand (1962) at a scale of 1:250,000 and that of the Otay Mesa quadrangle was mapped by Kennedy and Tan (1977) at a scale of 1:24,000.

Project Geology. Four general rock units are present within a one-mile radius of the boundaries of the proposed project area: Santiago Peak Volcanics, the Otay Formation, the Lindavista Formation, and alluvium and slopewash.

Santiago Peak Volcanics. These rocks outcrop along the eastern part of the study area. They are of Jurassic age. Kennedy and Tan (1977) describe the volcanics as ranging from basalt to rhyolite, with dacite and andesite predominating.

Otay Formation. The Otay Formation is of Oligocene age. Walsh and Deméré (1991) divided the formation into three informal members. The lower “conglomerate member” is mapped in a ravine passing to the north and northeast of the project, but this area has been filled in as part of the development of the Otay Mesa Business Park. The “sandstone and gritstone members” overlie the “conglomerate member”. The “sandstone member” has produced numerous vertebrate fossils in parts of the City of Chula Vista (Randall, 2010a). The “gritstone member” has produced only a few fossils (Randall, 2010a). It is unclear at this time whether one or both of these informal members occur at the proposed project site. Within the project area, they consist of expansive clays, silts, sands, and gravels. The expansive clays may be bentonitic. The clays and silts are tan to grey (Figure 5.8-2, Exposure of the Otay Formation Near Project Site). The sands appear much lighter due to the abundance of white feldspar clasts.

Lindavista Formation. The Lindavista Formation is late Pliocene or early Pleistocene in age and is characterized as several meters of iron-red, moderately indurated dirty sand and pebble-conglomerate (Kennedy, 1973). It lies on the Lindavista Terrace, a wave-cut surface extending from Oceanside to northern Baja California. Hertlein and Grant (1939) argued a late Pliocene or early Pleistocene for their Sweitzer Formation (which is an earlier name for the Lindavista Formation).

Alluvium and Slopewash. Kennedy and Tan (1977) describe the alluvium of poorly consolidated stream deposits of silt, sand, and cobble-sized particles derived from bedrock sources in or near the area. The slopewash is composed of decomposed bedrock and locally formed soil. It commonly mantles the lower valley slopes.

Paleontological Resource Inventory. The literature review and the SDNHM archival search conducted for this inventory documented six previously recorded fossil sites within a one-mile radius of the proposed project site (Confidential Appendix L-1). A one-mile radius of the project area is the standard buffer zone prescribed by the California Energy Commission. The final report for the paleontological resource monitoring and mitigation efforts at the construction of the adjacent Otay Mesa Generating Project (OMGP) (Fisk, 2009) documented vertebrate, pollen and dinoflagellate fossils. No Pleistocene vertebrate localities near the project site were mentioned by Jefferson (1991a, b). All pertinent paleontological localities are provided in Appendix L-2, which has been submitted separately under the rules of confidentiality.

Santiago Peak Volcanics. These rocks outcrop along the eastern part of the project study area. They are of Jurassic age. The guidelines published by SVP (1995) rate most volcanic rocks as having a low sensitivity for paleontological resources. That rating is appropriate for the San Diego Peak Volcanics.

Otay Formation. No significant paleontological resources have been found within the “conglomerate member” of the Otay Formation. Randall (2010a) assigned the “conglomerate member” a low paleontological sensitivity. The “sandstone member” has produced numerous vertebrate fossils in parts of the City of Chula Vista (Randall, 2010a). The “gritstone member”

has produced only a few fossils (Randall, 2010a). It is unclear at this time whether one or both of these informal members occur at the proposed project site (Randall, pers. com., 2010). Of the six localities reported by Randall (2010b) to be near the project, two produced only snail fossils. The other four produced vertebrates including lizards, and opossum, and many rodents. Fisk (2009) reported finding vertebrate fossils, including camels and oreodonts, from the Otay Formation at the site of the adjacent OMGP. Therefore, the “sandstone and gritstone members” of the Otay Formation are assigned a high paleontological sensitivity.

Lindavista Formation. The Lindavista Formation typically does not produce fossils, but Kennedy (1971) reported fossils from one locality. These fossils could be interpreted as late Pliocene or early Pleistocene age. This formation has, however, produced a considerable fauna of marine invertebrates as well as occasional specimens of ray, teleost, whale, and horse. Randall (2010a, b) does not mention the Linda Vista Formation. The City of San Diego (2008) considers this formation to have a high sensitivity for paleontological resources. Therefore, the Lindavista Formation is assigned a high paleontological sensitivity. Although this formation occurs within the project area, it is not expected to be impacted by project construction.

Alluvium and Slopewash. These deposits are presumably of Holocene age. The City of San Diego (2008) assigned these sediments a low paleontological resource sensitivity because of their young age. Therefore, this Application assigns them a low sensitivity rating for paleontological resources.

Summary. It is probable that identifiable fossil remains will be salvaged from the “sandstone and gritstone members” of the Otay Formation during project construction. They potentially would be scientifically important and significant. Recovered remains could represent new taxa or new fossil records for the area, or for the particular stratigraphic unit in which they occur. They could also represent geographic or temporal range extensions. Moreover, discovered fossil remains could make it possible to more accurately determine the age, paleoclimate, and depositional environment of the sediments from which they are salvaged. Finally, fossil remains salvaged during project construction could provide a more comprehensive documentation of the diversity of animal and plant life that once existed in the Otay Mesa area.

5.8.2 Environmental Consequences

Potential Impacts of Proposed Project Construction. Potential direct impacts on paleontological resources resulting from construction of the proposed project primarily involve vegetation clearing, grading, and excavations for structure foundations, and trenching for pipelines or utilities. Paleontological resources that could be adversely affected by ground disturbance and earth moving are not restricted to fossil remains. They include associated specimen data and corresponding geologic and geographic site data, and the fossil-bearing strata. Direct impacts described above could disturb previously undisturbed fossiliferous sediments, making those sediments and their paleontological resources unavailable for future scientific investigation. In general, project-related ground disturbance could have adverse impacts on significant paleontological resources. A properly designed and implemented mitigation program, however, would reduce these impacts to less than significant.

If paleontological finds are encountered during construction of the proposed project, the potential cumulative impacts would be low, as long as mitigation measures and conditions of certification are implemented to salvage the resources. Section 5.8.4 provides mitigation measures and conditions of certification that would effectively preserve the value of any significant fossils uncovered during project-related excavations.

Potential Impacts from Proposed Project Operation. It is anticipated that continuing operation of the proposed project and its related facilities will have no impacts on paleontological resources.

5.8.3 Cumulative Impacts

The purpose of this section is to identify past, present, and reasonably foreseeable actions in the PPEC project area that could affect the same resources as those of the project and provide the following analysis:

- Determine if the impacts of PPEC and the other actions would overlap in time or geographic extent.
- Determine if the impacts of the proposed project would interact with, or intensify, the impacts of the other actions.
- Identify any potentially significant cumulative impacts.

Section 5.18 presents a list of potential projects that could result in cumulative impacts with the proposed project. The volume of native sediments impacted, as well as the identities of the formations impacted are not known for most of these potential projects. Because this project will have less than significant impacts to paleontological resources and because the other projects that could occur in the area are largely either unlikely to have significant impacts to resources and/or will be required to adequately mitigate their impacts, this project is not expected to contribute to cumulatively significant impacts to paleontological resources. If paleontological resources are not encountered during construction of the PPEC, there will be no impact at all, let alone any cumulatively significant impact issues. If significant paleontological resources are encountered during the course of construction and the proposed mitigation measures and conditions of certification are implemented, the potential cumulative impacts would be low. The mitigation measures and conditions of certification proposed in Section 5.8.4 would effectively preserve the value of any significant fossils uncovered during proposed project-related excavations.

5.8.4 Mitigation Measures and Conditions of Certification

Randall (2010b, Confidential Appendix L-1), speaking for the San Diego Natural History Museum, concluded that any fossil discoveries from exposures of Otay Formation during project development are likely to be significant. Therefore, he recommended the implementation of a complete paleontological resource mitigation program. The following mitigation measures are designed to minimize the impact of construction activities of the proposed project to paleontological resources and effectively preserve the value of any significant fossils uncovered during proposed project-related excavations. These measures conform to the standard guidelines

developed by the SVP for the purpose of mitigating the impact of such construction activity to significant paleontological resources (SVP 1995, 1996). With implementation of the following mitigation measures and conditions of certification, impacts to paleontological resources would be less than significant:

PAL-1: The project owner will provide the Compliance Project Manager (CPM) with the resume and qualifications of its Paleontological Resource Specialist (PRS) for review and approval. If the approved PRS is replaced prior to completion of project mitigation and submittal of the Paleontological Resources Report, the project owner will obtain CPM approval of the replacement PRS. The project owner will keep resumes on file for qualified Paleontological Resource Monitors (PRMs). If a PRM is replaced, the resume of the replacement PRM will also be provided to the CPM.

The PRS resume will include the names and phone numbers of references. The resume will also demonstrate to the satisfaction of the CPM the appropriate education and experience to accomplish the required paleontological resource tasks.

As determined by the CPM, the PRS will meet the minimum qualifications for a vertebrate paleontologist as described in the SVP guidelines of 1995. The experience of the PRS will include the following:

- Institutional affiliations, appropriate credentials, and college degree.
- Ability to recognize and collect fossils in the field.
- Local geological and biostratigraphic expertise.
- Proficiency in identifying vertebrate and invertebrate fossils.
- At least three years of paleontological resource mitigation and field experience in California and at least one year of experience leading paleontological resource mitigation and field activities.

The project owner will verify that the PRS obtains qualified PRMs to monitor as he or she deems necessary on the project. PRMs will have the equivalent of the following qualifications:

- Bachelor of Science (B.S.) or Bachelor of Arts (B.A.) degree in geology or paleontology and one year of experience monitoring in California; or
- Associate of Science (A.S.) or Associate of Arts (A.A.) degree in geology, paleontology, or biology and four years of experience monitoring in California; or
- Enrollment in upper division classes pursuing a degree in the fields of geology or paleontology.

Verification: At least 60 days prior to the start of ground disturbance, the project owner shall submit a resume and statement of availability of its designated PRS for onsite work. Prior to the

termination or release of a PRS, the project owner shall submit the resume of the proposed new PRS to the CPM for review and approval.

PAL-2: The project owner will provide to the PRS and the CPM, maps and drawings showing the footprint of the PPEC power plant, construction laydown areas, and all related facilities. Maps will identify all areas of the project where ground disturbance is anticipated. If the PRS requests enlargements or strip maps for linear facility routes, the project owner will provide copies to the PRS and CPM. The site grading plan and plan and profile drawings for the utility lines would be acceptable for this purpose. The plan drawings should show the location, depth, and extent of all ground disturbances and be at a scale of 1 inch = 40 feet to 1 inch = 100 feet range. If the project's footprint or its linear facilities change, the project owner will provide maps and drawings reflecting those changes to the PRS and CPM.

If construction of the project proceeds in phases, maps and drawings may be submitted prior to the start of each phase. A letter identifying the proposed schedule of each project phase would be provided to the PRS and CPM. Before work commences on affected phases, the project owner will notify the PRS and CPM of any construction phase scheduling changes.

At a minimum, the project owner will verify that the PRS or PRM consults weekly with the project superintendent or construction field manager to confirm area(s) to be worked the following week and until ground disturbance is completed.

Verification: At least 30 days prior to the start of ground disturbance, the project owner shall provide the maps and drawings to the PRS and CPM. If there are changes to the footprint of the project, revised maps and drawings shall be provided to the PRS and CPM at least 15 days prior to the start of ground disturbance. If there are changes to the scheduling of the construction phases, the project owner shall submit a letter to the CPM within five days of identifying the changes.

PAL-3: The project owner will verify that the PRS prepares, and the project owner submits to the CPM for review and approval, a Paleontological Resources Monitoring and Mitigation Plan (PRMMP) to identify general and specific measures to minimize potential impacts to significant paleontological resources. Approval of the PRMMP by the CPM will occur prior to any ground disturbance. The PRMMP will function as the formal guide for monitoring, collecting, and sampling activities and may be modified with CPM approval. This document will be used as the basis of discussion when onsite decisions or changes to mitigation or monitoring procedures are proposed. Copies of the PRMMP will reside with the PRS, each monitor, the project owner's onsite manager, and the CPM.

The PRMMP will be developed in accordance with the guidelines of the SVP (SVP, 1995) and will include, but not be limited to, the following:

- Assurance that the performance and sequence of project-related tasks, such as any literature searches, preconstruction surveys, worker environmental training, fieldwork, flagging or staking, construction monitoring, mapping and data recovery, fossil preparation and collection, identification and inventory, preparation of final reports, and transmittal of materials for curation will be performed according to PRMMP procedures.

- Identification of the person(s) expected to assist with each of the tasks identified within the PRMMP and the names and qualifications of PRMs.
- A thorough discussion of the anticipated geologic units expected to be encountered, the location and depth of the units relative to the project when known, and the known sensitivity of those units based on the occurrence of fossils either in that unit or in correlative units.
- An explanation of why, how, and how much sampling is expected to take place, and in what units. Include descriptions of different sampling procedures that will be used for fine-grained and coarse-grained units.
- A discussion of the locations of where the monitoring of project construction activities is deemed necessary, and a proposed plan for monitoring and sampling.
- A discussion of procedures to be followed in the event of a significant fossil discovery, halting construction, resuming construction, and how notifications will be performed.
- A list of equipment and supplies necessary for collection of fossil materials and any specialized equipment needed to prepare, remove, load, transport, and analyze large-sized fossils or extensive fossil deposits.
- Procedures for inventory, preparation, and delivery for curation into a retrievable storage collection in a public repository or museum that meets the SVP's standards and requirements for the curation of paleontological resources.
- Identification of the institution that will be approached to receive data and fossil materials collected, requirements or specifications for materials delivered for curation, and how they will be met, and the name and phone number of the contact person at the institution.
- A copy of the paleontological Conditions of Certification.

Verification: Not more than five days after notice from the PRS that paleontologically sensitive sediments are, or are likely to be impacted, the project owner shall provide a copy of the PRMMP to the CPM. The PRMMP shall include an affidavit of authorship by the PRS and acceptance of the PRMMP by the project owner evidenced by a signature.

PAL-4: If after review of the plans provided pursuant to **PAL-2**, the PRS determines that materials with moderate or high paleontological sensitivity could be impacted then, prior to ground disturbance and for the duration of construction activities involving ground disturbance, the project owner and the PRS will prepare and conduct weekly CPM-approved training for the following workers: project managers, construction supervisors, foremen, and general workers involved with or who operate ground-disturbing equipment or tools. Workers will not excavate in sensitive units prior to receiving CPM-approved worker training. Worker training will consist of an initial in-person PRS training during the project kick-off. Initial training may be in the form of a CPM-approved video or in-person presentation. The training program may be combined with other training programs prepared for cultural and biological resources, hazardous materials, or other areas of interest or concern. No ground disturbance will occur prior to CPM approval of

the Worker Environmental Awareness Program (WEAP), unless specifically approved by the CPM.

The WEAP will address the possibility of encountering paleontological resources in the field, the sensitivity and importance of these resources, and legal obligations to preserve and protect these resources.

The training will include:

- A discussion of applicable laws and penalties under the law.
- Good quality photographs of physical examples of vertebrate fossils for project sites containing units of high paleontologic sensitivity.
- Information that the PRS or PRM has the authority to halt or redirect construction in the event of a discovery or unanticipated impact to a paleontological resource.
- Instruction that employees are to halt or redirect work in the vicinity of a find and to contact their supervisor and the PRS or PRM.
- An informational brochure that identifies reporting procedures in the event of a discovery.
- A WEAP certification of completion form signed by each worker indicating that he/she has received the training.
- A sticker that will be placed on hard hats indicating that the environmental training has been completed.

Verification: Not more than five days after implementation of a PRMMP, the project owner shall submit the proposed WEAP, including the brochure, with the set of reporting procedures for workers to follow.

Not more than 20 days after implementation of a PRMMP, the project owner shall submit the script and final video to the CPM for approval if the project owner is planning to use a video for interim training. If the owner requests an alternate paleontological trainer, the resume and qualifications of the trainer shall be submitted to the CPM for review and approval prior to installation of an alternate trainer. Alternate trainers shall not conduct training prior to CPM authorization.

In the monthly compliance report (MCR), the project owner shall provide copies of the WEAP certification of completion forms with the names of those trained and the trainer or type of training (in-person or video) offered that month. The MCR shall also include a running total of all persons who have completed the training to date.

PAL-5: Subject to **PAL-3**, the project owner will verify that the PRS and PRM(s) monitor, consistent with the PRMMP, all construction-related grading, excavation, trenching, and augering in areas where potential fossil-bearing materials have been identified, both at the project site and along any constructed linear facilities associated with the project. In the event

that the PRS determines full-time monitoring is unnecessary in locations that were identified as potentially fossil-bearing in the PRMMP, the project owner will notify and seek the concurrence of the CPM.

Upon the implementation of a PRMMP (see **PAL-3**), the project owner will verify that the PRS and PRM(s) have the authority to halt or redirect construction if paleontological resources are encountered. The project owner will verify that there is no interference with monitoring activities unless directed by the PRS. Monitoring activities will be conducted as follows:

- Any change of monitoring from the accepted schedule in the PRMMP will be proposed in a letter or email from the PRS and the project owner to the CPM prior to the change in monitoring and will be included in the monthly compliance report. The letter or email will include the justification for the change in monitoring and be submitted to the CPM for review and approval.
- The project owner will verify that the PRM(s) keeps a daily monitoring log of paleontological resource activities. The PRS may informally discuss paleontological resource monitoring and mitigation activities with the CPM at any time.
- The project owner will verify that the PRS notifies the CPM within 24 hours of the occurrence of any incidents of noncompliance with any paleontological resources Conditions of Certification. The PRS will recommend corrective action to resolve the issues or achieve compliance with the Conditions of Certification.
- For any significant paleontological resources encountered, either the project owner or the PRS will notify the CPM within 24 hours, or Monday morning in the case of a weekend event where construction has been halted because of a paleontological find.

Upon implementation of a PRMMP, the project owner will verify that the PRS prepares a summary of monitoring and other paleontological activities placed in the monthly compliance reports. The summary will include the name(s) of PRS or PRM(s) active during the month; general descriptions of training and monitored construction activities; and general locations of excavations, grading, and other activities. A section of the report will include the geologic units or subunits encountered, descriptions of samplings within each unit, and a list of identified fossils. A final section of the report will address any issues or concerns about the project relating to paleontological monitoring, including any incidents of noncompliance or any changes to the monitoring plan that have been approved by the CPM. If no monitoring took place during the month, the report will include an explanation in the summary as to why monitoring was not conducted.

Verification: After implementation of a PRMMP, the project owner shall ensure that the PRS submits the summary of monitoring and paleontological activities in the MCR. When feasible, the CPM shall be notified ten days in advance of any proposed changes in monitoring different from the plan identified in the PRMMP. If there is any unforeseen change in monitoring, the notice shall be given as soon as possible prior to implementation of the change.

PAL-6: The project owner, through the designated PRS, will verify that all components of the PRMMP are adequately performed, including collection of fossil materials, preparation of fossil materials for analysis, analysis of fossils, identification and inventory of fossils, the preparation of fossils for curation, and the delivery for curation of all significant paleontological resource materials encountered and collected during project construction.

Verification: The project owner shall maintain in his/her compliance file copies of signed contracts or agreements with the designated PRS and other qualified research specialists. The project owner shall maintain these files for a period of three years after project completion and approval of the CPM-approved paleontological resource report (see **PAL-7**). The project owner shall be responsible for paying any curation fees charged by the museum for fossils collected and curated as a result of paleontological mitigation. A copy of the letter of transmittal submitting the fossils to the curating institution shall be provided to the CPM.

PAL-7: The project owner will verify preparation of a Paleontological Resources Report (PRR) by the designated PRS. The PRR will be prepared following completion of the ground-disturbing activities. The PRR will include an analysis of the collected fossil materials and related information and submit it to the CPM for review and approval.

The report will include, but is not limited to, a description and inventory of recovered fossil materials; a map showing the location of paleontological resources encountered; determinations of sensitivity and significance; and a statement by the PRS that project impacts to paleontological resources have been mitigated below the level of significance.

Implementation of these mitigation measures will reduce the potentially significant adverse environmental impact of proposed project-related ground disturbance and earth moving on paleontological resources to an insignificant level by allowing for the salvage of fossil remains and associated specimen data. Corresponding geologic and geographic site data that otherwise might be lost to earth moving and to unauthorized fossil collecting will be retained.

Possible beneficial impacts on paleontological resources as a result of executing the paleontological resource monitoring and mitigation plan may include the discovery of fossil remains that would not have been exposed without proposed project construction and, therefore, would not have been available for study. These fossils may help answer important questions regarding the geographic distribution, stratigraphic position, and age of fossiliferous sediments in the project area.

Verification: Within 90 days after completion of ground-disturbing activities, including landscaping, the project owner shall submit the PRR under confidential cover to the CPM.

5.8.5 Compliance with Laws, Ordinances, Regulations, and Standards

Paleontological resources are included among nonrenewable scientific resources by governmental agencies. Protection of such resources is provided by federal and state legislation and by some local ordinances. As mentioned in Section 5.8.1.4, the SVP has developed guidelines and professional standards for assessing the impact of projects on paleontological resources and for mitigation of adverse impacts (SVP 1995, 1996). The Applicant intends that construction and operation of the proposed project will take place in a manner consistent with all

LORS relevant to paleontological resources. Table 5.8-1 summarizes these LORS, and specific agency contacts are listed in Tables 5.8-2 and 5.8-3.

**TABLE 5.8-1
APPLICABLE PALEONTOLOGICAL RESOURCES LAWS, ORDINANCES,
REGULATIONS, AND STANDARDS**

LORS	Applicability	Agency	Section
Federal			
Antiquities Act of 1906, Public Law 59-209; 16 United States Code 431 <i>et seq</i> ; 34 Stat. 225	Protects paleontological resources on federal lands; therefore, not applicable.	DOI	5.8.5.1
National Environmental Policy Act, 1969, Sec. 101	Protects paleontological resources on federal lands; therefore, not applicable	USEPA	5.8.5.1
Federal Land Policy Management Act	Requires management of public lands inconsistent with preservation of their scientific value . Not applicable.	DOI	5.8.5.1
Paleontological Resource Preservation Act, 2009	Protects paleontological resources on federal lands. Provides for permitting scientific collecting by qualified persons. Establishes penalties for illegal collecting. Not applicable.	DOI	5.8.5.1
State			
California Environmental Quality Act Title 14, Chapter 3, California Code of Regulations: 15000 <i>et seq</i> .	Regulates industrial/residential development projects. Project direct or indirect impacts on unique paleontological resources or site – resource assessment, monitoring, and mitigation required (superseded by CEC process).	CEC	5.8.5.2
Public Resources Code Sections 5097.5/5097.9	Protects paleontological resources on state-owned or managed lands, and therefore not applicable.	CEC	5.8.5.2
Local			
San Diego County Grading, Clearing, and Watercourses Ordinance, Sec. 87.101 <i>et seq</i>	States that County Officials may require that a qualified paleontologist be present during grading operations to monitor for resources	San Diego County Department of Planning and Land Use	5.8.5.3
San Diego County Draft General Plan, Conservation and Open Spaces elements, Goal COS-9 and Policy COS-0.1	Promotes conservation of paleontological resources within the county for educational and scientific purposes and requires salvage of paleontological resources in county-permitted projects.	San Diego County Department of Planning and Land Use	5.8.5.3
Professional Standards			
Society of Vertebrate Paleontologists	Paleontological Resources – Nationwide. Recommended set of procedures and standards for assessing and mitigating impacts to vertebrate paleontological resources.	n/a	n/a

BLM = Bureau of Land Management

CEC = California Energy Commission

USEPA = U.S. Environmental Protection Agency

5.8.5.1 Federal

The Antiquities Act of 1906 is used as the basis for federal protection of paleontological resources on federal lands. The act authorizes the government to regulate the disturbance of objects of antiquity on federal lands through the responsible managing agency and to prosecute unauthorized damage or removal. The National Environmental Policy Act (NEPA) requires that important natural aspects of the United States' national heritage be considered in assessing the environmental consequences of any proposed project. The Federal Land Policy Management Act (FLPMA) of 1976 (P.L. 94-579; 90 Stat. 2743, United States Code 1701-1782) requires that public lands be managed in a manner that protects the quality of their scientific values. Paleontological resources are also afforded federal protection under 40 Code of Federal Regulations 1508.27 as a subset of scientific resources. The most explicit federal protection for paleontological resources was enacted in 2009. The Paleontological Resources Preservation Act of 2009 regulates who may collect fossils on public lands and where such fossils must be curated. It also provides for prosecution of violators.

5.8.5.2 State

CEQA can require that state agencies evaluate potential environmental impacts that could be caused by projects that fall under the statutes jurisdiction. The act's Cultural Section does not specifically address paleontological resources, but the Guidelines for the Implementation of the CEQA, as amended in 2004, include a standard checklist that requires proponents and regulators to determine whether the proposed project will directly or indirectly destroy a unique paleontological resource or site. A paleontological mitigation plan is mandated if the answer is "yes" or "possibly." The environmental review process of the CEC treats paleontological resources in a manner similar to CEQA.

Other state requirements for paleontological resources management are in Public Resources Code Chapter 1.7. Section 5097.5 (Stats. 1965, c. 1136, p. 2792), entitled Archaeological, Paleontological, and Historical Sites. This statute defines any unauthorized disturbance or removal of a fossil site or fossil remains on public land as a misdemeanor and specifies that state agencies may undertake surveys, excavations, or other operations a necessary on state lands to preserve or record paleontological resources. This statute would apply to the proposed project if the project were to be built on city-owned or state-managed lands.

5.8.5.3 Local***County of San Diego***

Finding 1 of the County of San Diego General Plan, Conservation Element (County of San Diego, 1975) states that it is the state's policy to "conduct a study of the state's total effort to preserve and salvage the archaeological, paleontological, and historical resources of the state." Unless the General Plan tacitly regards paleontological resources as a subset of cultural resources, then the General Plan has no provisions for paleontological resources. The County is updating its General Plan. The Conservation and Open Space element of the Draft General Plan lists Goal COS-9 as "Educational and Scientific Uses. Paleontological resources and unique geologic features conserved for educational and/or scientific purposes." Policy COS-0.1 is

“Preservation. Require the salvage and preservation of unique paleontological resources when exposed to the elements during excavation or grading activities or other development processes.”

The San Diego County Grading, Clearing, and Watercourses Ordinance (County Code Title 8, Division 7, Chapter 1, Sec. 87.101 *et seq*) states that County Officials may require that a qualified paleontologist be present during grading operations to monitor for resources.

The East Otay Mesa Business Park Specific Plan does not mention paleontological resources.

5.8.5.4 Professional Standards

The SVP is an international scientific organization of professional and avocational vertebrate paleontologists. In the late 1990s, the society perceived a growing need to address standards for the mitigation of impacts to paleontological resources as a result of construction activities. Standard guidelines were developed, considered, and adopted (SVP 1995, 1996). These guidelines delineate standards for assessment of paleontological resources including paleontological surveys, monitoring and mitigation, and the type of data to be recorded. Guidelines for sampling vertebrate microfossils as well as the preparation, identification, analysis, and curation of specimens recovered were also developed. Many federal and California state regulatory agencies have used these guidelines; although the U.S. Department of the Interior is developing a more complicated system for rating sensitivity of paleontological resources. These guidelines recommend an archival review in a museum having collections pertinent to the project paleontology. If the probability of the project impacting significant paleontological resources is high or unknown, the guidelines recommend development of a mitigation and monitoring plan as well as the salvage of paleontological resources encountered. Preparation, identification, and curation of salvaged resources are also discussed. The compilation of a final report describing all these activities and the significance of the resources recovered should also be completed.

5.8.6 Agencies and Agency Contacts

Table 5.8-2 lists involved agencies and agency contacts for the project.

**TABLE 5.8-2
INVOLVED AGENCIES AND AGENCY CONTACTS**

Agency	Contact	Address	Telephone
Department of Planning and Land Use San Diego County	Carl Stiehl Department of Planning and Land Use	5201 Ruffin Road, Suite 3B San Diego, CA 92123	(858) 694-2216
San Diego Natural History Museum	Kesler Randall	PO Box 121390 San Diego, CA 92112	(619) 232-3821

5.8.7 Permits Required and Permit Schedule

Neither state nor county agencies requires a paleontological collecting permit to allow for the salvage of fossil remains discovered as a result of construction-related earth moving on state or

private land in a project site. As a result, no permits are required pertaining to paleontological resources.

5.8.8 References

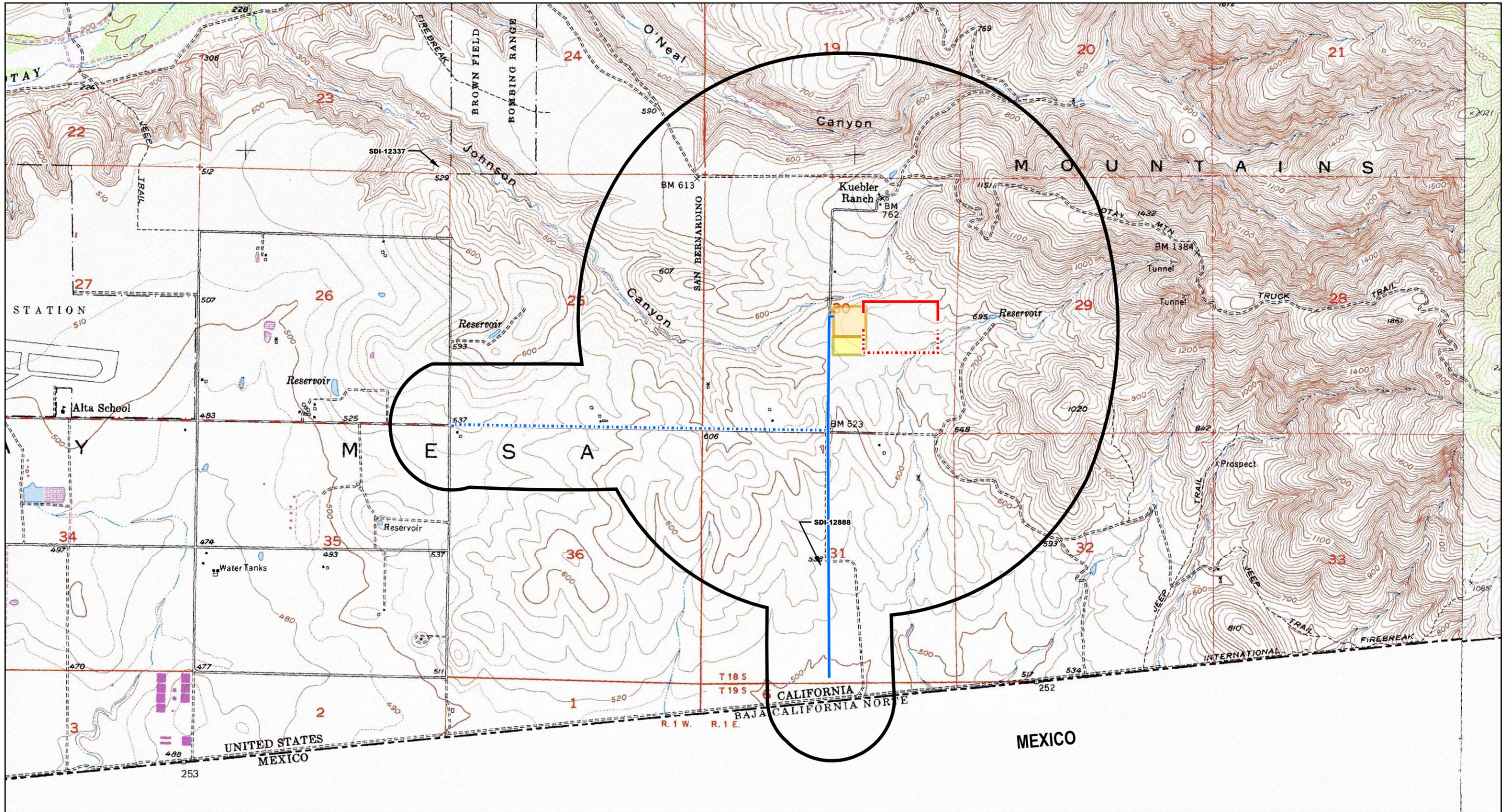
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- Deméré, T.A. and S.L. Walsh. 1993. Paleontological Resources, County of San Diego, Prepared for the Department of Public Works, San Diego County. 68 p.
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- Jefferson, G.T. 1991a. A Catalogue of Late Quaternary Vertebrates from California: Part One, Nonmarine Lower Vertebrate and Avian Taxa. Natural History Museum of Los Angeles County Technical Reports no. 5.
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Strand, R.G. 1962. San Diego – El Centro Sheet. California Division of Mines and Geology, Scale 1:250,000.

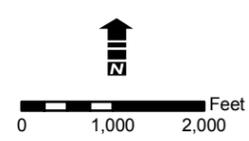
Society of Vertebrate Paleontology (SVP). 1995. Assessment and Mitigation of Adverse Impacts to Nonrenewable Paleontological Resources: Standard Guidelines: Society of Vertebrate Paleontology New Bulletin, No. 163. pp. 22 27.

Society of Vertebrate Paleontology (SVP). 1996. Conditions of Receivership for Paleontological Salvage Collections: Society of Vertebrate Paleontology News Bulletin, No. 166, pp. 31 32.

Walsh, S.L., and T.A. Deméré. 1991. Age and Stratigraphy of the Sweetwater and Otay Formations, San Diego County, California. In: P.L. Abbott and J.A. May (eds.), Eocene Geologic History, San Diego Region. Society of Economic Mineralogists and Paleontologists, Pacific Section 68:131-14.



- Legend**
- Project Site
 - Laydown Area
 - Study Area (1 mile buffer, linear 1/4 mile buffer)
 - Route A 230 kV Transmission Line
 - Route B 230 kV Transmission Line
 - Route A Natural Gas Line
 - Route B Natural Gas Line



**FIGURE 5.8-1
SITE VICINITY**

**PIO PICO
ENERGY CENTER**

PROJECT NO.: 29874835
DATE: DECEMBER 2010



Source: USGS 24K Digital Raster Graphic Mosaics (Cal-Atlas 2003).



FIGURE 5.8-2
EXPOSURE OF THE OTAY FORMATION
NEAR PROJECT SITE

**PIO PICO
ENERGY CENTER**

PROJECT NO.: 29874835
DATE: DECEMBER 2010



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

Technical Area: **PALEONTOLOGY** Project: Pio Pico Energy Center Technical Staff: _____
 Project Manager: _____ Docket: _____ Technical Senior: _____

Appendix B (g) (1)	...provide a discussion of the existing site conditions, the expected direct, indirect and cumulative impacts due to the construction, operation and maintenance of the project, the measures proposed to mitigate adverse environmental impacts of the project, the effectiveness of the proposed measures, and any monitoring plans proposed to verify the effectiveness of the mitigation.	Sections 5.8.1, 5.8.2, 5.8.3 and 5.8.4		
Appendix B (g) (16) (A)	Identification of the physiographic province and a brief summary of the geologic setting, formations, and stratigraphy of the project area. The size of the paleontological study area may vary depending on the depositional history of the region.	Sections 5.8.1		
Appendix B (g) (16) (B)	A discussion of the sensitivity of the project area described in subsection (g)(16)(A) and the presence and significance of any known paleontologic localities or other paleontologic resources within or adjacent to the project. Include a discussion of sensitivity for each geologic unit identified on the most recent geologic map at a scale of 1:24,000. Provide rationale as to why the sensitivity was assigned.	Section 5.8.1.4 and 5.8.1.5 Confidential Appendix L		
Appendix B (g) (16) (C)	A summary of all local museums, literature searches and field surveys used to provide information about paleontologic resources in the project area described in subsection (g)(16)(A). Identify the dates of the surveys, methods used in completing the surveys, and the names and qualifications of the individuals conducting the surveys.	Section 5.8.1.3		
Appendix B (g) (16) (D)	Information on the specific location of known paleontologic resources, survey reports, locality records, and maps at a scale of 1:24,000, showing occurrences of fossil, finds if known, within a one-mile radius of the project and related facilities shall be included in a separate appendix to the Application and submitted to the Commission under a request for confidentiality, pursuant to Title 20, California Code of Regulations, s 2501 et seq.	Confidential Appendix L		

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

Technical Area: **PALEONTOLOGY** Project: Pio Pico Energy Center Technical Staff: _____

Project Manager: _____ Docket: _____ Technical Senior: _____

Appendix B (g) (16) (E)	A discussion of any educational programs proposed to enhance awareness of potential impacts to paleontological resources by employees, measures proposed for mitigation of impacts to known paleontologic resources, and a set of contingency measures for mitigation of potential impacts to currently unknown paleontologic resources.	Section 5.8.4		
Appendix B (i) (1) (A)	Tables which identify laws, regulations, ordinances, standards, adopted local, regional, state, and federal land use plans, leases, and permits applicable to the proposed project, and a discussion of the applicability of, and conformance with each. The table or matrix shall explicitly reference pages in the application wherein conformance, with each law or standard during both construction and operation of the facility is discussed; and	Section 5.8.5 Table 5.8-1		
v (i) (1) (B)	Tables which identify each agency with jurisdiction to issue applicable permits, leases, and approvals or to enforce identified laws, regulations, standards, and adopted local, regional, state and federal land use plans, and agencies which would have permit approval or enforcement authority, but for the exclusive authority of the commission to certify sites and related facilities.	Section 5.8.5 and 5.8.6 Tables 5.8-1 and 5.8-2		
Appendix B (i) (2)	The name, title, phone number, address (required), and email address (if known), of an official who was contacted within each agency, and also provide the name of the official who will serve as a contact person for Commission staff.	Section 5.8.6 Tables 5.8-2		
Appendix B (i) (3)	A schedule indicating when permits outside the authority of the commission will be obtained and the steps the applicant has taken or plans to take to obtain such permits.	Section 5.8.7		