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SECTION ACRONYMS/ABBREVIATIONS

Acronym/ Abbreviation	Definition
DPLU	County of San Diego Department of Planning and Land Use
CEC	California Energy Commission
CEQA	California Environmental Quality Act
LORS	Laws, Ordinances, Regulations and Standards
PRIMMP	Paleontological Resource Impact Monitoring and Mitigation Program
SR	State Route
SVP	Society of Vertebrate Paleontology

6.8 PALEONTOLOGIC RESOURCES

Paleontological resources are the fossilized remains of prehistoric plant and animal organisms, as well as the mineralized impressions (trace fossils) left as indirect evidence of the form and activity of such organisms. Paleontological resources include the localities where the fossils were collected and the rock formations from which they were obtained.

This section describes the existing known paleontological conditions in the vicinity of the Site, as well as Project design measures to assure there is no adverse impact to significant paleontological resources. Based on record and literature research and a field survey of the Site and the surrounding area, there is no evidence that significant paleontological resources occur in the Site vicinity, including the Project linear corridors. The Project design includes excavation monitoring during Project construction, so if unknown significant paleontological resources are found, they can be collected, studied, and preserved.

6.8.1 Existing Conditions

A paleontological analysis was conducted by Hugh M. Wagner, Ph.D., to determine the sensitivity of the Project area with regard to paleontological resources and the potential for important resources to occur.

Based on literature and field studies performed for the Project, there are no known paleontological resources within 1.0 mile of the Site and related linear facilities. Therefore, there are no specific resource locations to report to the California Energy Commission (CEC) under request of confidentiality.

6.8.1.1 Project Area

The Project is located in the Peninsular Ranges Geomorphic Province (Figure 6.3-1), east of Interstate 15 in northern San Diego County. The Site and associated linear facilities are located on the north side of the San Luis Rey River. The region is rural. The Site is not in use and was formerly an orchard that has not been maintained for at least 5 years. The linear facilities will be located primarily along existing paved and unpaved roads, within former dairy farms, and along the shoulder of State Route (SR) 76. Approximately 800 feet of the gas pipeline will traverse undisturbed natural terrain.

6.8.1.2 Geologic Setting and Stratigraphy

The geology of the area is described in Section 6.3, Geologic Hazards and Resources, and shown in 1:24,000 scale maps accompanying that section. The Site is located on the surface of a very old alluvial fan on the north side of the San Luis Rey River. The only geologic unit exposed at the Site is a “Very Old” alluvium of early Pleistocene age. Geologic units that will be disturbed by the Project include the Very Old alluvium, Holocene alluvium, and plutonic igneous rocks of the Peninsular Range Batholith.

6.8.1.3 Paleontologic Sensitivity

Paleontological sensitivity is the potential for a geologic unit to produce scientifically significant fossils, as determined by rock type, past history of the rock unit in producing fossil materials, and fossil sites that are recorded in the unit. A paleontological sensitivity rating is derived from fossil data from the entire geologic unit, not just from a specific survey area.

The County of San Diego, Department of Planning and Land Use (DPLU) publishes guidance for paleontological resources in San Diego County (DPLU, 2007). Five classifications of sensitivity are utilized, including, in decreasing order of sensitivity: High, Moderate, Low, Marginal, and None. DPLU mapping shows the sensitivity at the Project Site to be “None.” DPLU guidance shows the gas pipeline route to run through areas with paleontological sensitivity classifications of “None” where the pipeline is close to the Site and crossing the mountainous terrain north of SR 76, and “Low” where the pipeline is south of SR 76 and adjacent to SR 76 at the west end.

While DPLU guidance shows the Site not to have important paleontological resources, an additional Project-specific evaluation was performed for this application, using a sensitivity evaluation system recommended by the Society of Vertebrate Paleontology (SVP), as follows:

- High Sensitivity - Indicates fossils are currently observed onsite, localities are recorded within the study area, and/or the unit has a history of producing numerous significant fossil remains.
- Low Sensitivity - Indicates significant fossils are not likely to be found because of random fossil distribution pattern, extreme youth of the rock unit and/or the method of rock formation, such as alteration by heat and pressure.
- Unknown Sensitivity - Unknown or undetermined status indicates that the rock unit either has not been sufficiently studied or lacks good exposures to warrant a definitive rating.
- No Sensitivity - Igneous and metamorphic rocks that due to the igneous nature of origin, or alteration during exposure to high temperature and pressures, have obliterated any fossils that may have been present.

Using the SVP evaluation system, the Very Old alluvium that underlies the Site and portions of linear facilities adjacent to the Site is judged to have unknown sensitivity. No fossils have been reported from these deposits. However, the proximity of the Pala conglomerate to the Site, and a published record of Pleistocene age fossils in the Pala conglomerate, indicates that there may be potential for fossils to occur in Very Old alluvial fan deposits in this region. Differences between the Pala conglomerate and the Very Old alluvial fan deposits are described in Section 6.8.1.5.2 that may make the likelihood of fossils in the Very Old alluvial fan deposits lower than in the Pala conglomerate. However, no records were found of adequate study of the Very Old alluvial fan deposits to make a definitive conclusion, so this unit is judged to have an unknown sensitivity, and excavation monitoring is included in the Project design.

Using the SVP evaluation system, the Holocene alluvium that will be disturbed by gas pipeline construction south of and adjacent to SR 76 is judged to be of low sensitivity, because this unit is too young to yield significant fossils.

The igneous rocks of the Peninsular Range Batholith that is prevalent throughout most of the Project area, including the locations of the fresh water and reclaim water pickup stations, have no sensitivity.

6.8.1.4 Research Methods

6.8.1.4.1 *Records and Literature Search*

Geologic and paleontologic literature including publications, reports, papers and maps that cover the Project area were reviewed to ascertain what lithologic unit or units underlie the Project facilities. It was then determined whether these units had produced fossils in the past. This was followed by a record and archive search of the collections of the Department of Paleontology, San Diego Natural History Museum on March 20, 2007.

6.8.1.4.2 *Field Survey*

The field survey of the Site and surrounding area was conducted on April 6, 2007 by Dr. Wagner. The Site is underlain by Very Old alluvial fan deposits. These deposits were exposed in road cuts and shallow excavations on and adjacent to the Site. They were observed to be coarse-grained angular fanglomerates and sandstones within 5 feet of the ground surface. The surface has a weathered soil horizon at least 5 feet thick in places.

The proposed gas pipeline route generally parallels SR 76. The pipeline will be constructed across mountainous terrain at its eastern end, and across former dairy farms and along the SR 76 road shoulder at its western end. Through the dairy farms and along the SR 76 road shoulder, the gas pipeline route occurs along the northern margin of the flood plain of the San Luis Rey River through this region west of Pauma Valley. The gas pipeline will cross Holocene age alluvium consisting of river gravels and sands in the riverbed of the San Luis Rey River, and basement igneous rocks of the Peninsular Batholith. In addition, close to the Site the gas pipeline will disturb the same Very Old alluvial unit that underlies the Site. The gas pipeline route was modified after the April 2007 field inspections. The modified route was subsequently inspected a California Professional Geologist and it was confirmed that the geologic units affected by the revised pipeline route are the same as the geologic units inspected and evaluated for paleontologic sensitivity by Dr. Wagner.

6.8.1.5 Findings

6.8.1.5.1 *Records and Literature Search*

Kennedy (2000) mapped the deposits underlying the Site as Very Old alluvial fan deposits (Qvof) of early Pleistocene age. There is no known record of any fossils being recovered in the area from the Very Old alluvial fan geologic unit.

There is one published account of fossils being recovered from younger alluvial fan deposits east of the community of Pala. The younger geologic unit from which the fossils were recovered is a late Pleistocene deposit referred to as the Pala conglomerate of the Aqua Tibia fan (Jahns, 1954). According to Jahns (1954, p. 35) the deposits of the Pala conglomerate east of Pala contain scattered vertebrate remains of late Pleistocene age. There is no physical record of these specimens in the collections of the San Diego Natural History Museum or any paleontological collections in the state of California (Demere, 2007). On several occasions museum personnel have examined the exposures of the Pala conglomerate exposed along SR 76 for fossils and no subsequent fossil material has been observed or recovered from these rocks.

6.8.1.5.2 Field Survey Results

Exposures are limited to road cuts along SR 76 and shallow excavations on the western portion of the Site. Also, at the pre-existing substation, there are good exposures of the Very Old alluvial fan deposits in the excavated back wall and access road north of the substation. These deposits were examined to determine their composition and potential for containing fossils. The deposits underlying the Site are composed of very well lithified, poorly sorted, sandy cobble to boulder conglomerate. The rocks are dominated by angular clasts of granite and gabbro clasts in a dark reddish-brown, medium to coarse-grained sandstone. The upper 3 feet or more of these deposits was observed to have a darker brown color and contained more finer-grained material with silts and clays with lesser cobble-sized clasts. This upper layer appears to be a weathered horizon that has developed on the surface of these Very Old fan deposits over an extended period of time. The dark color of the sandstones is attributed to the source rock being derived primarily from the basement rock that in this area is mapped as both granitic and gabbroic in composition. The thickest stratigraphic section was observed in the cuts north of the existing substation west of the Site where approximately 18 feet of section was exposed. Here the rocks were observed to not be well-bedded and consisted of coarse angular clasts resembling a fanglomerates in a coarse sandstone matrix. Some areas were sandier than others, but the section was very coarse-grained except near the surface where a dark loamy soil was well developed. No paleosols (fossil soils) were observed in the deposits on the Site.

A comparison of the alluvial fan deposits underlying the Site to those of the Pala conglomerate that are exposed along SR 76 4 miles to the east in the Aqua Tibia fan indicated that the rocks beneath the Site are somewhat different compared to the Pala conglomerate where fossils have been found. The alluvial deposits beneath the Site are more lithified (harder) and contain clasts dominated by gabbroic intrusive rocks and a darker reddish-brown color. The younger alluvial materials of the Pala conglomerate have better developed bedding, and clasts that are more granitic in composition. The higher energy depositional environment suggested by the lithology of the Very Old alluvial fan deposits indicates this unit may be less likely to yield significant fossils than the Pala conglomerate, but there is not adequate exposure of the Very Old alluvium to definitively conclude that fossils are not likely to be present.

The route of the proposed gas pipeline generally parallels SR 76. Geologic units traversed by this route include Very Old alluvium, younger alluvium of Holocene age, and plutonic igneous rocks of the Peninsular Range Batholith.

6.8.2 Impacts

6.8.2.1 Significance Criteria

Significance criteria were determined based on California Environmental Quality Act (CEQA) Guidelines (Guidelines for the Implementation of the California Environmental Quality Act, as amended May 10, 1980, 14 Cal. Admin. Code: 15000 et seq.), Appendix G, Environmental Checklist Form, and on performance standards or thresholds adopted by responsible agencies. An impact may be considered significant if the Project:

- Directly or indirectly destroys an intact fossil bed or removal of portions of it in a manner inconsistent with the guidelines of the SVP.
- Directly or indirectly destroys a significant vertebrate fossil.
- Directly or indirectly destroys a unique paleontological resource or site.

6.8.2.2 Construction Impacts

Project construction will include excavations in the Site area with foundation depths typically 4 to 6 feet deep or less. The gas pipeline and the electric transmission line interconnection will be located underground, with construction involving excavations to approximately 9 feet deep.

Three rock units will be disturbed by Project construction. The following section will discuss each unit from oldest to youngest.

Mesozoic intrusive rocks of the Peninsular Range Batholith (Kgb, Kcc, Kgt, Kt) - Intrusive igneous rocks of granitic and gabbroic composition underlie the mountainous terrain along the eastern portion of the gas pipeline route, and the fresh water and reclaim water pickup stations. These are igneous rocks that formed beneath the ground surface and therefore have no potential for containing fossil remains. Therefore, these rocks have no paleontological sensitivity and Project disturbance of these rocks will not impact paleontological resources.

Older Alluvial fan deposits (Qvof) - Deposits mapped as Very Old alluvial fan deposits underlie the Site, the route of the transmission line interconnection, and the portion of the gas pipeline where these linear facilities are proximal to the Site. These rocks are comprised primarily of very coarse and angular material. The coarse nature of these deposits observed during the field survey indicated that they are not especially conducive to the preservation of fossils. However, if finer grained layers occur in this unit, such as beds of sandstone or claystone, they have the potential to be more conducive to the preservation of fossils. If fossils are present in this unit, they may be capable of yielding information of interest to the scientific community and the public, such as information about environmental and climatic conditions in this region of San Diego County during the early Pleistocene. This unit is considered to have unknown sensitivity. The unit has not been studied enough to rule out the potential for occurrence of important fossils. Consequently, a qualified Paleontologist will monitor 50 percent of the excavation work associated with Project construction where excavation occurs in the area mapped as Very Old alluvial fan deposits. In addition, the construction program will include sensitizing appropriate

personnel to the importance of potential fossils and to watch for potential fossils when excavating in the alluvial unit when the Paleontologist is not present. If fossil materials are encountered, work will be halted in the immediate area, the Paleontologist will be called to investigate the find, evaluate the fossil materials and, if necessary, implement the Paleontological Resource Impact Monitoring and Mitigation Program (PRIMMP) to collect significant scientific values from the finding. Qualifications of the paleontologist, and collection and reporting of paleontological resources, if found, will be in accordance with requirements specified in DPLU's paleontology impact assessment guidance (DPLU, 2007).

Quaternary alluvium (Qa) - Deposits mapped as Holocene alluvium will be encountered during trenching for portions of the proposed gas pipeline. This geologic unit is too young to yield important fossils so no impact to paleontological resources is expected in this geologic unit.

6.8.2.3 Operations Impacts

Project operations are not expected to impact paleontological resources because operations will not result in new disturbances to geologic units that have paleontological sensitivity.

6.8.2.4 Cumulative Impacts

The list of activities with potential for cumulative impacts is provided in Section 6.1.3. Since the Project is not expected to have impacts to paleontological resources, no cumulative impact is expected. Moreover, the Project includes safeguards described in Section 6.8.2.2 to notify the Project Paleontologist in the event that fossils are encountered when the paleontological monitor is not present. Other projects also will be required under existing laws and regulations to mitigate significant fossils, if found. Based on these considerations, potential cumulative impacts, if any, will be less than significant.

6.8.2.5 Project Design Features to Avoid or Minimize Impacts

Since construction activities associated with the Project will include excavation in the Very Old alluvium unit that has an undetermined potential to produce important fossils, the following measures will be incorporated into Project construction procedures to avoid the potential for significant impact to important paleontological resources:

- A qualified Paleontologist will observe a minimum of 50 percent of the excavation occurring in the undisturbed deposits of the Very Old alluvium that underlie the Site.
- The construction program will include an educational program to enhance awareness of construction personnel to paleontological resources. The educational program will include verbal instruction and written material to sensitize construction personnel. Appropriate personnel will be instructed to watch for potential fossils in excavation areas.
- If fossil materials are encountered, work will be halted in the immediate area, and the Project Paleontologist will be called to investigate the find, evaluate the fossil materials and, if necessary, implement the PRIMMP to collect significant scientific

values from the finding in accordance with DPLU written guidance on paleontological resource salvage, data collection, fossil cleaning and preparation, curation and reporting. These requirements will be implemented as performance criteria for the Project, if paleontologic resources are encountered.

These measures are consistent with CEQA guidelines in 14 California Code of Regulations 15064.5 and 15126.4(b).

6.8.3 Mitigation Measures

Based on the above analysis of impacts and measures incorporated during Project construction activities, no additional mitigation is required. Significant impacts are not expected.

6.8.4 Significant Unavoidable Adverse Impacts

No significant unavoidable adverse impacts are expected to occur to paleontological resources considering measures built into the Project design.

6.8.5 Laws, Ordinances, Regulations and Standards

Applicable Laws, Ordinances, Regulations and Standards (LORS) related to paleontological resources are summarized in Table 6.8-1. The paleontological field surveys of the Site and surrounding area and the related analysis of potential impacts were conducted by a qualified paleontologist, consistent with procedures for compliance described in the LORS. The design and construction features incorporated in the Project and included in this section will assure that the Project is in compliance with the LORS identified in Table 6.8-1 for paleontological resources. There are no permits or approvals required for the Project related to paleontology.

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Table 6.8-1 – LORS for Paleontological Resources

JURIS-DICTION	AUTHORITY ¹	AGENCY	REQUIREMENTS	COMPLIANCE	AFC SECTION
Federal	None applicable.	None applicable.	None applicable.	None applicable.	
State	California Environmental Quality Act of 1970 (CEQA, 13 PRC, 21000 et seq)	CEC/County	Requires identification of potential adverse impacts of a project to any object or site of scientific importance (PRC 5020.1(b)).	Potential for impacts to paleontological resources is assessed in this Application.	6.8 Pages 6.8-1 to 6.8-10
	CEQA; PRC §21083.2; 14 CCR §15064.5, 15126.4, 15331, Appendix G.	CEC/County	Requires evaluation by Lead Agency regarding project-related effects to important cultural resources.	This Application provides the basis for evaluations by the CEC.	6.8 Pages 6.8-1 to 6.8-10
	Guidelines for the Implementation of the California Environmental Quality Act, as amended May 10, 1980 (14 Cal. Admin. Code: 15000 et seq).	CEC/County	Requires mitigation of adverse impacts to a paleontological site from development	Monitoring by a qualified paleontologist is proposed as part of Project design to assure that adverse impacts are mitigated if unknown resources are found.	6.8.2.2, 6.8.2.5 Pages 6.8-5 to 6.8-7
	Public Resources Code, Section 5097.5 (State 1965, c. 1136, p. 2792).	CEC/County	Prohibits excavation, removal, destruction or defacing of any paleontological site or any other archaeological, paleontological or historical feature, except with the express permission of the public agency having jurisdiction over such lands. Defines any unauthorized disturbance or removal of archaeological, historical, or paleontological materials or sites located on public lands as a misdemeanor.	No paleontological sites are known based on literature search and field survey. Monitoring by a qualified paleontologist is proposed as part of Project design. If a paleontological site is encountered, appropriate mitigation will be implemented with permission from San Diego County.	6.8.2.2, 6.8.2.5 Pages 6.8-5 to 6.8-7

¹ Pursuant to 20 CCR Chapter 5 Appendix B Section (i)(1)(B): Each agency with jurisdiction to issue applicable permits and approvals or to enforce identified LORS and adopted local, regional and federal land use plans, and agencies which would have permit approval or enforcement authority, but for the exclusive authority of the CEC to certify sites and related facilities.

JURIS-DICTION	AUTHORITY¹	AGENCY	REQUIREMENTS	COMPLIANCE	AFC SECTION
Local	San Diego County Code of Regulatory Ordinances, Title 8, Division 7, Chapter 4, Section 87.430	County	Paleontological monitor can be required at the discretion of the County. In addition, suspension of grading operations is required upon discovery of fossils greater than 12 inches in any dimension. County must be notified of paleontological discovery during grading activities.	Project proposes paleontological monitoring and, if resources are encountered, mitigation and reporting in accordance with County requirements.	6.8.2.2, 6.8.2.5 Pages 6.8-5 to 6.8-7
	General Plan Conservation Element	County	Provides policies for protection of natural resources.	No paleontological sites are known based on literature search and field survey. Monitoring by a qualified paleontologist is proposed as part of Project design. If a paleontological site is encountered, mitigation and reporting will occur in accordance with County requirements.	6.8.2.2, 6.8.2.5 Pages 6.8-5 to 6.8-7
Industry	Society of Vertebrate Paleontology.	None applicable.	Meet SVP guidelines.	No paleontological sites are known based on literature search and field survey. Monitoring by a qualified paleontologist is proposed as part of Project design. If fossils are discovered and mitigation is found to be necessary, it will follow the SVP guidelines.	6.8.2.2, 6.8.2.5 Pages 6.8-5 to 6.8-7

6.8.6 References

- California Division of Mines and Geology, 2001. Geologic Map of the Morro Hill 7.5' Quadrangle, San Diego County, California: a Digital Database, Version 1.0.
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- Department of Planning and Land Use, County of San Diego, March 19, 2007. Guidelines for Determining Significance, Paleontological Resources.
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