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PAL-3

APPLICATION FOR CERTIFICATION

PALEONTOLOGICAL RESOURCES MONITORING AND MITIGATION PLAN

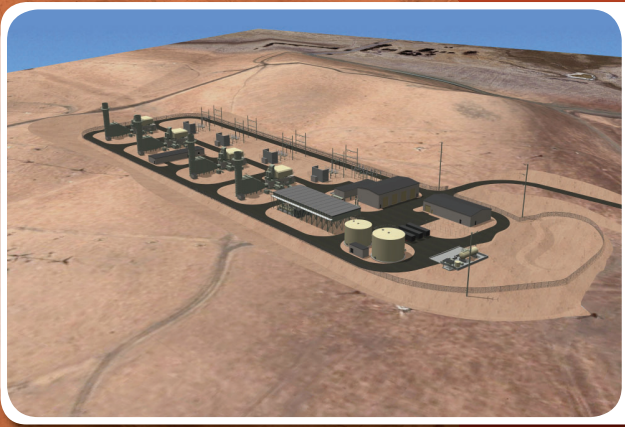
SUBMITTED TO THE

California Energy Commission

FOR THE

Mariposa Energy Project

(09-AFC-03C)



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Paleontological Resources Monitoring and Mitigation Plan for the Mariposa Energy Project (09-AFC-3C)

Prepared for

Mariposa Energy, LLC

February 2011

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Contents

Appendixes

Tables

Figures

Acronyms and Abbreviations

amsl	above mean sea level
BBID	Byron Bethany Irrigation District
bgs	below ground surface
BLM	Bureau of Land Management
CEC	California Energy Commission
CEQA	California Environmental Quality Act
COC	Condition of Certification
CPM	Compliance Project Manager
DAR	Daily Monitoring Activity Report
ECAP	Alameda County East County Area Plan
GE	General Electric Corporation
GPS	global positioning system
kV	kilovolt(s)
LORS	laws, ordinances, regulations, and standards
MA	million years ago
MCR	Monthly Compliance Report
MEP	Mariposa Energy Project
MW	megawatt(s)
PG&E	Pacific Gas and Electric Company
PRM	Paleontological Resources Monitor
PRMMP	Paleontological Resources Monitoring and Mitigation Plan
PRR	Paleontological Resources Report
PRS	Paleontological Resources Specialist
SVP	Society of Vertebrate Paleontology
UCMP	University of California Museum of Paleontology, Berkeley
USGS	United States Geological Survey
WEAP	Worker Environmental Awareness Program

SECTION 1

Introduction

1.1 Project Description

The Mariposa Energy Project (MEP, or the Project) is located in northeastern Alameda County, California, in Township 2S, Range 3E, Section 1 (Mount Diablo Base and Meridian), and its position is mapped within the Clifton Court Forebay 7.5' United States Geological Survey (USGS) quadrangle. The Project consists of three main components: a new generation facility; connections of the facility to fuel gas, water, and electrical transmission interties; and temporary construction facilities. The Project components are shown in Figure 1-1.

MEP, when completed, will be a nominal 200-megawatt (MW) peaking facility consisting of four new General Electric Corporation (GE) LM6000 PC-Sprint natural gas-fired combustion turbine generators and associated equipment. The generation facility site is located on a 10-acre portion of a 158-acre parcel immediately south of the Pacific Gas & Electric Company (PG&E) Byron Compressor Station and the Kelso Substation. The proposed power plant site is in the southern portion of the parcel, between two small hills. The site is currently used for non-irrigated grazing land. Access to the site is via an access road that runs east from Bruns Road to the site within the larger parcel.

MEP will connect to utilities via three new linear utilities (Figure 1-1). The Project will interconnect to the PG&E Kelso Substation via a new 0.7-mile, 230-kilovolt (kV) transmission line that will run north on the property, then across Kelso Road to the existing Kelso Substation. The fuel-gas line interconnection for the proposed power plant entails constructing 580 feet of new 8-inch-diameter pipeline directly northeast from the Project site to the point of interconnection with PG&E's existing high-pressure natural gas pipeline. Service water will be provided from a new connection to the Byron Bethany Irrigation District (BBID) via a new pump station and a 10-inch-diameter, 1.8-mile pipeline placed in or along the east side of Bruns Road, from existing Canal 45 in Contra Costa County south to the plant site in Alameda County (Figure 1-1).

Temporary construction facilities will include a 9.2-acre worker parking and laydown area immediately east of the power plant site and a 1-acre water supply pipeline parking and laydown area at the BBID headquarters facility on Bruns Road.

1.2 Paleontological Resources

Paleontological resources are fossils (the remains of ancient plants and animals) and are protected by federal, state, and county statutes. To preserve these non-renewable resources, the California Energy Commission (CEC) has issued seven conditions of certification (COCs) that must be followed prior to and during the construction of MEP.
This paleontological resource monitoring and mitigation plan (PRMMP) fulfills the requirements of COC PAL-3, and outlines the measures that will be taken to ensure

compliance with the requirements of COCs PAL-4, PAL-5, PAL-6, and PAL-7. These requirements are listed in Appendix A.

Section 2 of this PRMMP provides a review of the laws, ordinances, regulations, and standards (LORS) that are applicable to the protection of paleontological resources in the State of California, as well as a summary of the paleontological sensitivity of the Project area (the power plant site, utility line routes, and temporary construction facilities). Section 3 lists the procedures that are to be followed prior to and during construction activities for paleontological monitoring, and in case of the discovery of fossils during ground-disturbing activities. These include the responsibilities of the paleontological monitor, communications and reporting protocol, circumstances in which construction must be diverted and may be temporarily halted in the vicinity of a discovery, and when construction may resume. Section 4 describes the post-discovery procedures for analysis and curation of any fossils recovered during the course of this project. Section 5 provides the references used in preparing this plan.

LEGEND

- POWER POLE LOCATION
- PUMP STATION/TURNOUT STRUCTURE
- ACCESS ROAD
- NATURAL GAS PIPELINE ROUTE
- TRANSMISSION LINE ROUTE
- WATER SUPPLY PIPELINE ROUTE
- CONSTRUCTION LAYDOWN/PARKING AREA
- WATER SUPPLY PIPELINE LAYDOWN AREA
- PROJECT SITE

This map was compiled from various scale source data and maps and is intended for use as only an approximate representation of actual locations.

N

0 750 1,500
Feet

FIGURE 1.1
PROJECT DESIGN FEATURES
MARIPOSA ENERGY PROJECT
ALAMEDA COUNTY, CALIFORNIA

SECTION 2

Project Background

2.1 Laws, Ordinances, Regulations, and Standards Applicable to Paleontological Resources

Paleontological resources are non-renewable scientific and educational resources that are protected by several federal and state statutes, most notably by the 1906 Federal Antiquities Act and the California Environmental Quality Act (CEQA) (Section 15064.5). Professional standards for assessment and mitigation of adverse impacts on paleontological resources have been established by the Society of Vertebrate Paleontology (SVP 1995, 1996) and the U.S. Department of the Interior Bureau of Land Management (BLM, 2008). Construction and operation of MEP will be conducted in accordance with all LORS applicable to paleontological resources summarized in Table 2-1, and discussed briefly in Sections 2.1.1, 2.1.2, and 2.1.3.

TABLE 2-1
LORS Applicable to Paleontological Resources

LORS	Remarks	Project Applicability
Antiquities Act of 1906	No federal land involved or federal entitlement required	Not applicable
National Environmental Policy Act of 1969	No federal land involved or federal entitlement required	Not applicable
Omnibus Public Land Management Act of 2009	No federal land involved	Not applicable
CEQA, Appendix G	Requires the assessment of project impacts on paleontological resources; fossil remains may be encountered during earth moving activities	Applicable
Public Resources Code, Sections 5097.5/5097.9	Applies to state-owned land	Not applicable
Alameda County East Planning Area General Plan	Paleontological resources are not specifically addressed	Applicable
Contra Costa General Plan	Paleontological resources are not specifically addressed	Applicable

2.1.1 Federal LORS

Several federal regulations have been passed that protect paleontological resources, either explicitly (such as the recent Omnibus Public Land Management Act of 2009) or implicitly (for example by invoking "important historic or scientific resources", as found in the Antiquities Act of 1906 and the National Environmental Policy Act of 1969). These regulations protect only paleontological resources on federal land, or those that might be encountered during the course of a project that requires a federal entitlement. Because no

part of the Project occurs on federally managed land, and no federal permit is required, no federal regulations are applicable to this project.

2.1.2 State LORS

The CEC environmental review process under the Warren-Alquist Act is considered functionally equivalent to that of CEQA (Public Resources Code Sections 21000 et seq.). Furthermore, the Alameda County requirements for approval of projects include a review for CEQA compliance. CEQA requires that public agencies and private interests identify the environmental consequences of their proposed projects on any object or site of significance to the scientific annals of California (Division I, California Public Resources Code: 5020.1 [b]). Guidelines for the implementation of CEQA (Public Resources Code Sections 15000 et seq.) define procedures, types of activities, persons, and public agencies required to comply with CEQA. Appendix G in Section 15023 provides an Environmental Checklist of questions that a lead agency should normally address if relevant to a project's environmental impacts. One of the questions to be answered in the Environmental Checklist (Section 15023, Appendix G, Section V, part c) is "Would the project directly or indirectly destroy a unique paleontological resource or site?"

Although CEQA does not define what is "a unique paleontological resource or site," Section 21083.2 defines "unique archaeological resources" as "any archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

1. Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
2. Has a special and particular quality such as being the oldest of its type or the best available example of its type.
3. Is directly associated with a scientifically recognized important prehistoric or historic event or person."

With only slight modification, this definition is equally applicable to recognizing "a unique paleontological resource or site." Additional guidance is provided in CEQA Section 15064.5 (a)(3)(D), which indicates "generally, a resource shall be considered historically significant if it has yielded, or may be likely to yield, information important in prehistory or history."

Section XVII, part a, of the CEQA Environmental Checklist asks a second question equally applicable to paleontological resources: "Does the project have the potential to…eliminate important examples of the major periods of California history or prehistory?" To be in compliance with CEQA, environmental impact assessments, statements, and reports must answer both these questions in the Environmental Checklist. If the answer to either question is *yes* or *possibly*, a mitigation and monitoring plan must be designed and implemented to protect significant paleontological resources.

The CEQA lead agency having jurisdiction over a project is responsible for ensuring that paleontological resources are protected in compliance with CEQA and other applicable statutes. The lead agency with the responsibility to ensure that fossils are protected during construction of MEP is the CEC. California Public Resources Code Section 21081.6, Mitigation Monitoring Compliance and Reporting, requires that the CEQA lead agency demonstrate project compliance with mitigation measures developed during the environmental impact review process.

Other state requirements for paleontological resource management, such as are found in California Public Resources Code Chapter 1.7, Section 5097.5 (Stats. 1965, c. 1136, p. 2792), would only be applicable only if any construction or other related project impacts occur on state-owned or state-managed lands, utilized land controlled by the state, or if the state or a state agency were to obtain ownership of project lands during the term of the project license. Because the MEP site is private land, and these statutes are not referenced by the county statutes, these state statutes do not apply.

2.1.3 County LORS

The Alameda County East County Area Plan (ECAP) (Alameda County, 2000) places emphasis on the preservation of historic and cultural resources, including heritage resources, but does not address paleontological resources per se. Nevertheless, county approval of projects includes review for CEQA compliance, and the CEQA Environmental Checklist employed does include the Appendix G, Section V, part c question regarding paleontological resources (see Section 2.1.2, above).

The Contra Costa County General Plan does not include statutes specifically for the preservation of paleontological resources. The county does, however, call for the preservation of archeological and historic resources (Contra Costa County, 2005).

2.1.4 Professional Standards

The SVP, an international scientific organization of professional paleontologists, has established guidelines that outline acceptable professional practices in the conduct of paleontological resource assessments, monitoring, data recovery, specimen preparation, analysis, and curation (SVP, 1995). Most practicing professional paleontologists adhere to the SVP guidelines, with appropriate accommodations for the last 16 years of advancement. More recently, paleontological resources guidelines were promulgated by the *BLM Instructional Memorandum No. 2008-009* (BLM, 2008), and these incorporate advancements that are being followed by many professional paleontologists conducting paleontological studies on federal lands and elsewhere. A combined approach was taken for this analysis, and is discussed further in Table 2-2.

TABLE 2-2
Paleontological Sensitivity Ratings Employed

Rating	Definition
High	Assigned to geological formations known to contain paleontological resources that include rare, well-preserved, and/or fossil materials important to ongoing paleoclimatic, paleobiological, and/or evolutionary studies. They have the potential to produce, or have produced, vertebrate remains that are in particular research focus of many paleontologists, and also can represent important educational resources.
Moderate	Stratigraphic units that have yielded fossils that are but moderately well preserved, are common elsewhere, and/or that are stratigraphically long ranging would be assigned a moderate rating. This evaluation also can be applied to strata that have an unproven but strong potential to yield fossil remains based on stratigraphy and/or geomorphological setting.
Low	Sediment that is relatively recent, or that represents a high-energy subaerial depositional environment where fossils are unlikely to be preserved. A low abundance of invertebrate fossil remains, or reworked marine shell from other units, can occur, but the paleontological sensitivity would remain low because of their lack of potential to serve as significant scientific or educational purposes.
Marginal and Zero	Stratigraphic units with marginal potential include pyroclastic flows and soils that might preserve traces or casts of plants or animals. Most igneous rocks, however, have zero paleontological potential. Other stratigraphic units deposited subaerially in a high-energy environment (such as alluvium) also may be assigned a marginal or zero sensitivity rating. Manmade fill is also considered to possess zero paleontological potential.

2.2 Project Resource-specific Considerations

2.2.1 Significance of Paleontological Resources

Sensitivity Criteria

The paleontological importance or sensitivity of a stratigraphic unit reflects: (1) the scientific significance of the fossils it has produced; and (2) its potential paleontological productivity. Thus, the potential paleontological productivity of a stratigraphic unit exposed in the Project site is based on the abundance of fossil specimens and/or previously recorded fossil sites in exposures of the unit in the vicinity of the Project site. The underlying assumption of this assessment method is that exposures of a stratigraphic unit are most likely to yield fossil remains in a quantity and of a quality similar to those previously recorded from that unit elsewhere in the area.

In its standard guidelines for assessment and mitigation of adverse impacts to paleontological resources, the SVP (1995) established three categories of paleontological sensitivity for geologic units: high, low, and undetermined. To these categories is added that of "moderate," following common usage in CEQA reviews of paleontological sensitivity of sediments for sites in coastal California, as well as BLM guidelines (BLM, 2008). The paleontological sensitivity of a geologic unit reflects its potential paleontological productivity and the scientific significance of the fossils it has produced. The potential paleontological productivity of a geologic unit exposed in the Project site is inferred from the abundance of fossil specimens and/or previously recorded fossil sites in exposures of the unit, or of similar units in similar geological settings. The underlying assumption of this

assessment method is that a geologic unit is most likely to yield fossil remains in a quantity and of a quality similar to those previously recorded from the unit elsewhere in the area. It should be noted that while all four classes of paleontological sensitivity listed in Table 2-2 were used during the evaluation of the geologic units, not all classes were applicable because of the nature of the geologic units in and near MEP.

During field monitoring, an individual fossil specimen can be considered scientifically important and significant if it is: (1) identifiable, (2) complete, (3) well preserved, (4) age diagnostic, (5) useful in paleoenvironmental reconstruction, (6) a member of a rare species, or (7) a skeletal element different from, or a specimen more complete than, those now available for that species (SVP, 1995). For example, vertebrate fossils are considered scientifically important because of their potential use in providing age determinations and paleoenvironmental reconstructions for the sediments in which they occur. Moreover, vertebrate remains are comparatively rare in the fossil record. Fossil plants also are important because they can be helpful in age-determination of Late Pleistocene sediments, and they are actually more sensitive indicators of their environment. In contrast, while invertebrate assemblages may be scientifically important the individual fossils in the assemblage are typically common in other geologic units as well, and the individual fossils therefore have limited scientific value.

Significance Criteria

Applicable statutes and professional standards agree that the damage or destruction of a unique paleontological resource or site is a significant and adverse impact on paleontological resources (CEQA Section 3.1.2; SVP, 1995; BLM, 2008). This is most typically thought of as occurring as a result of heavy-equipment damage to fossils, but may also occur when fossils are looted, improperly removed from the surrounding sediment, or otherwise lost to the scientific world. Because fossils are a non-renewable resource (SVP, 1995), all impacts on paleontological resources are considered adverse and potentially significant unless they result in recovery of the scientific and educational values of the resource.

Generally, the probability of adverse impacts during excavations within a geologic unit is proportionate to the paleontological sensitivity of the unit in question. While it is theoretically possible to adversely affect paleontological resources in low-sensitivity geologic units, the probability is low because the sediments are not known to contain scientifically significant fossils. The highest probability of significant adverse effects to paleontological resources results from disturbance of stratigraphic units with high paleontological sensitivity, which have produced scientifically significant fossils, and recorded fossil localities are sufficiently frequent to anticipate encountering more (SVP, 1995). Significant impacts are possible from excavation in moderate-sensitivity units; however, they are less likely than in high-sensitivity units, as fossil sites in these units tend to be widely scattered (BLM, 2008).

Paleontological resources that remain undisturbed in the sediment are considered to be unaffected by MEP and are considered adequately protected. Because fossils are likely to be exposed only during the excavation phase of construction, activities that do not result in subsurface disturbance, including operation of MEP, have no potential to impact paleontological resources.

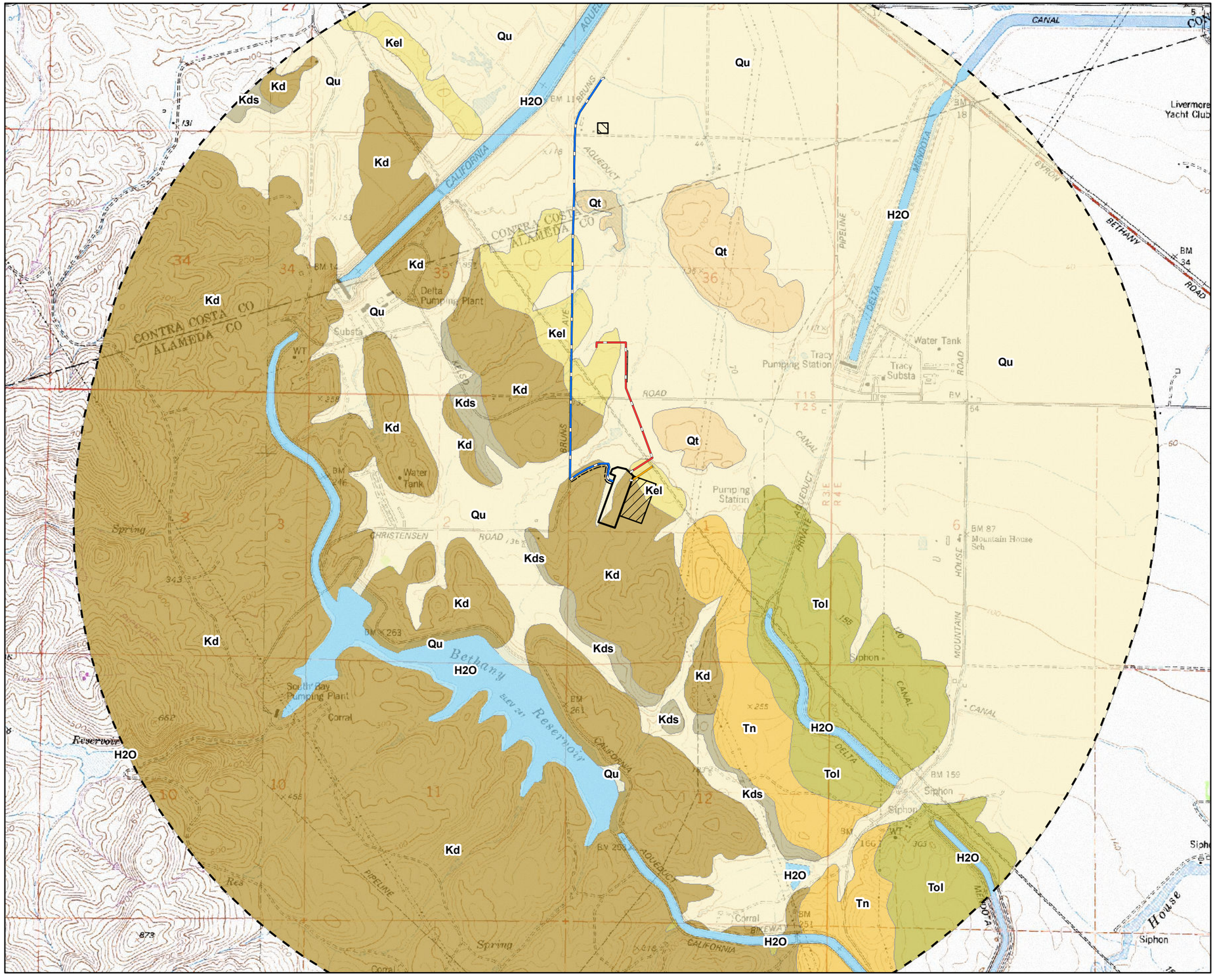
2.2.2 Geological and Paleontological Context of the Project Area

Physiographic Setting

MEP is located in the northern and lowest portion of the San Joaquin Valley of California, along the boundary between the Diablo Range to the west and south, and the Great Valley (Central Valley) to the east and north. This region is known as the Coast Ranges-Sierran Block boundary zone and is delineated by a series of low hills and complex thrust/reverse faults. The Great Valley and the adjacent Sierra Nevada form a relatively stable crustal block (Sierran block) composed of Mesozoic crystalline basement that dips to the west. The western edge of the Sierra Nevada block is buried beneath the sediments of the Great Valley, and its terminus at great depth is generally thought to be coincident with the western margin of the Great Valley (Wahrhaftig and Birman, 1965).

The Great Valley physiographic province, comprised of two elongated northwest- to southeast-trending basins (the northwestern Sacramento basin and the southeastern San Joaquin basin), separates the Coast Ranges to the west from the Sierra Nevada to the east (Fenneman, 1931). The present-day basin evolved from a late Jurassic to middle Tertiary (40 to 150 million years ago [MA]) marine fore-arc basin. During the Jurassic and Cretaceous, much of the area was a deep abyssal plain, in the range of 10,000 feet below sea level (e.g., Dickinson and Rich, 1972). Sediments of the resultant Great Valley Sequence, as these Mesozoic sediments are called, usually lack megafossils (Dickinson and Rich, 1972; Haggart and Ward, 1984), and are typically differentiated based on their lithological characteristics. In the mid-Tertiary (25 to 30 MA), a change in the relative motion between the Pacific and North American plates resulted in the gradual uplift of the Coast Ranges and the eventual isolation of the Central Valley from the ocean. More recent Miocene through Pleistocene sediments were derived from the bounding Coast Ranges and the Sierra Nevada. By the Pliocene (2 to 3 MA), subaerial depositional conditions prevailed and Sierra Nevada-derived sediments dominated basin deposition (Wahrhaftig and Birman, 1965).

The Coast Ranges are a north-northwest- to northwest-trending series of mountains and intervening valleys extending for 597 miles (960 kilometers) from northern Oregon south to the Santa Ynez River near Santa Barbara. Physiographically, the Coast Ranges can be divided into the northern and southern subprovinces, separated by the San Francisco Bay and the Sacramento River Delta. The portion of the Coast Ranges to the west of the Project is named the Diablo Range, and is composed of Cretaceous marine rocks of the Great Valley Sequence (Graymer et al., 1996) with Tertiary sediments stratigraphically above those. The youngest deformed sediments are older Quaternary deposits that are often correlated with the Tulare Formation of the San Joaquin Valley. MEP lies among the easternmost outcrops of Cretaceous bedrock, which form the low hills to the north and south of the proposed plant site. MEP linears extend farther east onto the gently sloping alluvial fan to the west of the San Joaquin River. As shown in Figure 2-1, isolated low ridges composed of older Quaternary sediments occur throughout this area.



LEGEND

- ACCESS ROAD
- NATURAL GAS PIPELINE ROUTE
- TRANSMISSION LINE ROUTE
- WATER SUPPLY PIPELINE ROUTE
- TWO MILE BUFFER
- CONSTRUCTION LAYDOWN/PARKING AREA
- TRANSMISSION LINE LAYDOWN AREA
- WATER SUPPLY PIPELINE LAYDOWN AREA
- PROJECT SITE

GEOLOGY TYPES

- H2O, WATER
- Kd, UNIT D SANDSTONE
- Kds, UNIT D SHALE MEMBER
- Kel, LOWER UNIT D SILTSTONE
- Qt, TERRACE DEPOSTIS
- Qu, UNDIFFERENTIATED
- Tn, NEROLY FM. BLUE SANDSTONE
- Tol, ORO LOMA FORMATION - REDDISH SILT, SAND AND GRAVEL

Notes:

1. Source: USGS OFR 94-622. Preliminary Geologic Map Emphasizing Bedrock Formations in Contra Costa County, California: A Digital Database, 1994. USGS OFR 96-252 Preliminary Geologic Map Emphasizing Bedrock Formations in Alameda County, California: A Digital Database, 1996.

This map was compiled from various scale source data and maps and is intended for use as only an approximate representation of actual locations.

N

0 1,000 2,000
Feet

FIGURE 2.1
SURFICIAL GEOLOGY WITHIN TWO MILES OF PROJECT SITE
MARIPOSA ENERGY PROJECT
ALAMEDA COUNTY, CALIFORNIA

Geologic Units

Geologic units, within and near MEP, range from Cretaceous to Quaternary. Pre-Quaternary units have been extensively deformed, while unconsolidated Quaternary sediment fills the valleys in this region. Most of the Project site, including the utility line routes, is overlain by a thin veneer of disturbed sediment. The geologic formations within two miles of MEP include the Mesozoic Great Valley Sequence, the Late Miocene Neroly Formation, the Pliocene Oro Loma Formation, Quaternary alluvium, and modern disturbed sediments.

The stratigraphy of the Great Valley Sequence has been subject to much revision (see Bartow and Nilsen, 1990 for a more detailed discussion). This has important implications for MEP, as some formations attributed to the Great Valley Sequence have produced numerous fossil sites, while others have yielded few if any fossils (University of California Museum of Paleontology [UCMP], n.d.; Bartow and Nilsen, 1990). The units of the Great Valley Sequence generally have limited geographic extents, and correlation between the various units of the Great Valley Sequence is difficult (Bartow and Nilsen, 1990). Two fossiliferous geologic units—the Moreno Shale and the Panoche Formation—have in the past been said to underlie the Project site (for example, California Division of Mines and Geology, 1966); however, more recent stratigraphic analysis has shown that these units do not extend to the northern San Joaquin Valley (Bartow and Nilsen, 1990). For MEP, the nomenclature used by Graymer and others (1996) is adopted, and Cretaceous rocks at and near the Project site and utility line routes are listed as Units C and D of the Great Valley Sequence. These geologic units represent abyssal marine sediments laid down many thousands of feet below the surface of an ocean that extended west from a volcanic island chain that occupied the area of the current Sierra Nevada. In part because of the abyssal depth of their origin, megafossils are rare throughout the Great Valley Sequence (e.g., Dickinson and Rich, 1972); the 40 Cretaceous megafossil localities for Alameda County include only one vertebrate locality and four plant fossil localities.

Both the Neroly Sandstone and Oro Loma Formation outcrop within 2 miles of the MEP site. However, they do not extend into the Project area and no Project components will impact these formations. Therefore they are not discussed in detail in this report.

Poor stratigraphic controls for Quaternary units in this region complicate the analysis of the Quaternary units underlying the power plant site, laydown yards, and utility line routes. There are two hills, or terrace remnants, northeast of the MEP site that were mapped by Graymer and others (1996) as older Quaternary sediment (Qt; Figure 2-1). These sediments were also mapped as Pleistocene alluvial fan deposits (Qpaf) by Helley and Graymer (1997); however, these authors did not differentiate between younger and older Quaternary sediments. Correlation of these sediments with those of the Tulare Formation (Wahrhaftig and Birman, 1965) was not attempted by Graymer and others (1996). For the sake of paleontological analysis of the MEP site, the older Quaternary sediments were lumped with the younger undifferentiated Quaternary sediments (Qu).

Disturbed sediments form a thin veneer (approximately 3 feet thick) over much of the Project site. There was prior wind turbine development at the site, and debris from that development still can be found in the Project site.

2.2.3 Site Assessment and Potential Impacts

Investigations to Date

The MEP paleontological resources specialist (PRS) performed a paleontological inventory of the Project site and off-site linears, using published and unpublished geological and paleontological literature, as well as appropriate online paleontological databases. Other sources of important information included geological maps, satellite and aerial photography, and technical and scientific reports.

An updated paleontological resources records review was conducted for the Project using the on-line database maintained by the UCMP. In addition to vertebrate and paleobotanical studies and samples, the UCMP database includes records of several microfossil studies (e.g., pollen, radiolarian, diatoms, foraminifera) conducted in the area. However, many sediments that yield microfossils or isolated invertebrate remains are largely devoid of plant or vertebrate megafossils. When microfossil and invertebrate localities, which are generally of low scientific significance, are excluded, the resultant number of plant megafossil and vertebrate fossil sites is smaller and more reflective of the paleontological potential of the sedimentary unit. The results of this survey are summarized in Table 2-3.

TABLE 2-3
Geological Units within 1 Mile of MEP, Including Offsite Laterals

Formation[a]	Fossil Localities[b]	Age	Sensitivity	Notes
Previously disturbed sediments	0	Modern	Low	Includes sediments disturbed by modern activities, including farming and previous construction
Undifferentiated Alluvium (Qu)	68	Late Quaternary-Holocene	High	Includes the unconsolidated sediment underlying the plant site itself
Older Alluvium (Qt)		Quaternary		Comprising the topographic highs extending farthest east; includes the Tulare Formation identified by some authors.
Oro Loma (Tol)	0	Pliocene	---	Not in the Project area
Neroly (Tn)	10	Late Miocene	---	Not in the Project area
Great Valley Sequence (Kd/c)	5	Cretaceous	Low	Includes Unit D Sandtone and Shale members (Kd and Kds, respectively), and Upper Unit C Shale (Kcu)

[a] Source: Graymer et al. (1996); there is no formal name given to Quaternary-age sediments.

[b] Source: UCMP Database, Alameda County Records. Only sites which have produced plant megafossil or vertebrate fossils were included.

In addition to conducting the record search and literature review, the PRS carried out a resource survey of the project area and linears on January 14, 2009. A mantle of disturbed agricultural soil and colluvium, vegetation, and fill over much of the Project site prevented

inspection of the underlying sediments. Therefore, the field survey was judgmental and focused on the road cuts, back dirt piles, and ditches in the Project vicinity that might provide some exposure of paleontologically sensitive sediment. In particular, cuts on the east side of Bruns Road allowed inspection of the Cretaceous strata that underlie the Project site (Figure 2-1). No fossil material was found during the survey.

Paleontological Sensitivity

The potential paleontological productivity of a stratigraphic unit exposed in the MEP area is based on the abundance of fossil specimens and on previously recorded plant and vertebrate fossil sites in exposures of the unit near the Project site, as determined by the UCMP database review, literature review, and site survey. The underlying assumption of this assessment method is that a stratigraphic unit is most likely to yield fossil remains in a quantity and of a quality similar to those previously recorded from the unit elsewhere in the region. The geologic units that may be encountered during the construction of MEP and its associated facilities, along with their paleontological sensitivity, are listed below, and in Table 2-3.

- **Artificial Fill, Agricultural Soils, and Disturbed Sediment –** While re-worked and disturbed fossil material may be present in previously disturbed sediment, the lack of stratigraphic context and likely mechanical damage would compromise all scientific value. Disturbed sediment (including artificial fill and agricultural soils), which forms a thin veneer (approximately 3 feet deep) over much of the MEP site, has a low sensitivity.
- **Quaternary Alluvium –** For the purpose of this analysis, Quaternary Alluvium includes both older Pleistocene alluvial deposits and younger Quaternary deposits. These deposits have yielded numerous vertebrate and microfossil sites, and six vertebrate sites lie within 1 mile of the MEP site. While microfossils are not individually scientifically significant, the presence of multiple vertebrate sites near the Project area gives these sediments high paleontological sensitivity.
- **Mio-Pliocene Sediments –** These sediments range from low sensitivity (the Pliocene Oro Loma Formation) to high sensitivity (the Late Miocene Neroly Formation).
- **Cretaceous Great Valley Sequence –**While some rocks from the Cretaceous of the Great Valley Sequence have produced numerous fossil sites (UCMP, n.d.) those units do not extend north into the Project site. Geologic units of Cretaceous age in the Project site generally have produced very limited numbers of scientifically significant fossils, typically in numbers low enough to preclude accurate biostratigraphic analysis (Bartow and Nilsen, 1990). Therefore, these geologic units are considered to be of low paleontological sensitivity. That said, megafossil deposits in these units, particularly age-diagnostic vertebrate and ammonite fossils, have the potential to be scientifically significant primarily because of that scarcity (Bartow and Nilsen, 1990).

Potential Project Impacts

Potentially significant impacts on paleontological resources are expected when excavations disturb sediments with high paleontological sensitivity. Within the MEP site, those sediments are limited to the Quaternary Alluvium. Most of the site is covered by a layer of disturbed sediment approximately 3 feet deep. Therefore, disturbances that do not extend

below this depth, even in areas underlain by high sensitivity sediments, will not impact those high-sensitivity sediments. Excavations into Quaternary alluvium are expected in three areas:

- The westernmost portion of the MEP power plant site
- The water supply line, both where the line turns north away from the MEP site and near the California Aqueduct
- The transmission line route, between the MEP site and the end of the line, where it turns westward

Significant impacts are not expected from construction excavations at most of the MEP facility because the site is on fill and Cretaceous Great Valley Sequence rocks, both of which have low paleontological sensitivity. No impacts are anticipated on the Miocene- to Pliocene-aged sediment near the Project area, as no construction activities will impact those sediments. With the implementation of the mitigation measures below, the impacts even in geologic units of high paleontological sensitivity will be reduced to less than significant.

SECTION 3

Monitoring and Mitigation Procedures

Paleontological monitoring and mitigation measures are restricted to those construction-related activities that will result in the disturbance of paleontologically sensitive sediments. It is the responsibility of the paleontological resource specialist (PRS) and the paleontological resources monitors (PRMs) to determine when and where this may occur, based on this PRMMP and in consultation with the owner's construction engineers and managers.

3.1 Standing Project Protocol

3.1.1 Project Standards

This PRMMP shall function as the formal guide for all monitoring and mitigation activities related to paleontological resources for this project. The PRMMP shall be used as the basis in the event that any onsite decisions or changes in activities related to or affecting paleontological monitoring or sampling are proposed. Copies of the PRMMP will reside with the PRS, with each PRM, with Mariposa Energy, LLC's Environmental Compliance Manager, in the project files at the MEP site, and with the CEC Compliance Project Manager (CPM).

3.1.2 Reporting

A daily activity report (DAR) will be completed by the PRM concurrent with each day monitored, and will describe relevant construction excavations, geological units affected, and attendant monitoring activities. The monthly compliance report (MCR) will be provided by the PRS to Mariposa Energy, LLC's Environmental Compliance Manager for inclusion in the monthly project report that goes to the CPM. The MCR will summarize monitoring activities, geological units and project areas monitored, discoveries, incidents (if any), and the administration of the paleontological resources module of the Worker Environmental Awareness Program (WEAP) training, as per PAL-4. In compliance with PAL-7, a final paleontological resources report (PRR) will be prepared and submitted to the CPM within 90 days after the cessation of all project-related excavations.

3.1.3 Non-Compliance and Other Incidents

Should the PRM identify any incidence of non-compliance with the CEC COCs, with the procedures in this PRMMP, or with the guidelines provided in the paleontological resources module of the WEAP, the onsite construction manager and Mariposa Energy, LLC's Environmental Compliance Manager will be immediately notified, followed by notification of the PRS. If the PRM reports that the noncompliance activity is ongoing, the PRS shall, in turn, contact the appropriate project superintendent or construction project manager. If the issue remains unresolved, the PRS will then notify the CEC. Reportable incidents include any instance of noncooperation, the result of which substantively interferes with the PRM's

discharge of duties, or harassment. Experience with numerous projects suggests that most noncompliance incidents are either:

- The PRM or PRS not being notified in advance of excavations previously identified as requiring monitoring or, similarly,
- Persistent failures in schedule communication to the PRM, or
- A new subcontractor's failure to adhere to project-specific paleontological resources mitigation requirements.

Along with application of the WEAP training modules (see Section 3.1.4), active onsite coordination between the PRM and the construction supervisor(s), and participation in scheduling meetings for ground-disturbing activities potentially requiring monitoring, are the most effective means of minimizing these types of incidents.

3.1.4 Worker Environmental Awareness Program Training

Prior to the initiation of ground-disturbing activities and for the duration of those construction activities (but not for the duration of activities related to facility construction that will result in no additional ground disturbance), the Project owner and the PRS shall prepare and ensure that worker environmental awareness training (the paleontological resources module of the WEAP) is conducted onsite, as per PAL-4 (Appendix B). All management, supervisory personnel, and construction workers will be required to take this course prior to beginning work on the Project, and the MCR will include a list of all workers who have taken the course each month. All construction workers also will be provided with a printed pamphlet that summarizes the training program and provides names and telephone numbers of persons to contact in case paleontological resources are found during construction. The paleontological resource module of the WEAP will include a description of fossils that may be encountered, what to do in case they are encountered, and the roles and responsibilities of the individual operators, as well as the roles of the PRM and PRS.

3.1.5 Changes

Changes to the measures and procedures stipulated in this PRMMP can be made by the PRS, or with the endorsement of the PRS, and with notification to the CPM. Changes to the construction schedule that have the potential to affect the scheduled activities of the PRM within the same week shall be communicated immediately to the PRM and to the PRS.

3.1.6 Notifications

Requests and/or notifications from any party that would affect the monitoring schedule or scope will be provided to the PRS and PRM at least 48 hours prior to the event. E-mail confirmation will be sent within 24 hours of the request to the PRS and PRM. Confirmations and other appropriate Project activity documents will be included as attachments in the monthly paleontological resources compliance report.

Procedures for notification in the case of an unanticipated fossil discovery are found in Sections 3.4.1 and 3.4.5. In the case of the discovery of a fossil resource, *construction activities in the area of the discovery will cease immediately* and the PRM will be notified with no delay. Construction activities may continue uninterrupted elsewhere, provided that appropriate monitoring continues.

3.1.7 Coordination

The PRM will consult with the project superintendent or appropriate construction manager at appropriate intervals to confirm the schedule of ground-disturbing activities. This coordination will be ongoing during ground-disturbance activities sufficiently deep to affect sediments below the veneer of disturbed sediment that covers most of the site.

When, in the opinion of the PRM or PRS, bulk sampling is necessary, the PRM will coordinate with the project superintendent or appropriate construction manager to obtain the temporary service of a front-end loader, or similar equipment, to take bulk samples. The PRM will also consult with the project superintendent or appropriate construction manager to locate an area where sampled sediment may be temporarily stockpiled for subsequent transport to a locality for screening and extraction of microfossils. Similarly, in the event that a fossil resource is discovered during the course of excavation, the PRM or PRS will coordinate with the project superintendent or appropriate construction manager and heavy equipment operator(s) identified by the construction manager, to have a front-end loader or similar equipment remove overburden to facilitate recovery of the discovered resource.

3.1.8 Monitoring Log and Recording Procedures

Each PRM shall maintain a daily project log consisting of the DARs for the Project. Entries in DARs will include the date and time intervals monitored, the construction activity and location being monitored, the depth of excavations and nature of the sediment disturbed, and the location and nature of sampling localities and of any discoveries. Substantive communications with construction personnel regarding the location and scheduling of ground-disturbing activities will be recorded by the PRM in the log.

The project log also will contain information regarding sampling and discovery localities. Each sampling locality, or discovery, shall have at a minimum the following information:

- Date and general description of entry subject (for example, “6,000 pound sample from gray-brown silt stratum” or “large mammal bone in fluvial gravel”)
- A unique designator number that is the initials of the PRM followed by the two digit designation for the month, then the year, then a unique sequential number; at the beginning of the next month, the unique sequential number will restart at “01”
- Depth from the ground surface of upper and lower limits of the sedimentary horizon being sampled, or fossil remains, below original ground surface (if known), and below present ground surface
- Depth of upper and lower limits of the sample taken, if different from above
- Observable lateral extent (for example, east-west and north-south) of unit being sampled or of the discovery
- Basic description of the sediments of interest, including clast size, degree of sorting, and color
- Exposure numbers of photographs taken
- Disposition (for example, “200-pound sample removed, screened, nothing found”) and further action taken, if any

At the discretion of the PRS, at times when monitoring of excavations is not required, the PRM may be engaged in screen-washing previously collected sediment samples for microvertebrate and other fossils.

3.2 Construction Impact Evaluation, Planning, and Coordination

No less than 30 days prior to ground disturbance, the Project owner shall provide to the PRS maps and drawings showing the footprint of the power plant, construction laydown areas, pipelines, transmission lines, and all other facilities related to construction of MEP. Plans can be provided separately for separate components of the Project (such as the power plant site and electric transmission lines). Maps shall identify areas where ground disturbance is anticipated. The site grading plan and profile drawings are normally acceptable for this purpose. The plans must show the anticipated depth below ground surface of all excavations. Requests for enlargements or additional plans may be made during the Project.

A need for additional Project-related information may be identified from time to time during the Project by the PRS or PRM. This additional information may be required to determine the location and depth of ground-disturbing activities, scheduling of monitoring activities, or to assist in logistics and coordination.

If the footprint of MEP or its lateral changes, or if new ground-disturbing activities are identified, the Project owner shall notify the PRS promptly, and supply the PRM with plan and profile drawings of these changes or additions at least 7 days prior to construction of these changes.

3.3 Construction Monitoring

The PRM, as well as any other personnel engaged in site-specific paleontological monitoring and mitigation activities, shall comply with all applicable California Occupational Safety and Health Administration regulations and with Project-specific safety procedures and requirements. At all times they will remain aware of, and take appropriate steps to avoid, heavy construction machinery.

Monitoring will focus on exposed cuts and side walls where possible, and the back-dirt exhumed from excavations. The PRM will not interfere with heavy equipment operation, and compliance with all safety procedures will be maintained at all times.

The PRS has sole direction authority over the PRMs, with the exception of issues regarding site safety or security.

3.3.1 Where Monitoring Will Take Place

Paleontological resources monitoring will take place where, in the opinion of the PRS, excavations are likely to affect potentially paleontologically sensitive strata. These are expected to be primarily those areas identified in Section 2.2.3. These include full-time monitoring of excavations that impact the Quaternary alluvium at depths exceeding 3 feet below ground surface (bgs). This will include the western portion of the power plant site, sections of the water supply line, and sections of the transmission line (Figure 2-1).

While significant fossils are not expected within the Great Valley Sequence, it is a sedimentary unit that on rare occasion has yielded significant fossils. Therefore, spot-monitoring of excavations that impact these sediments is planned.

No monitoring will be necessary in previously disturbed sediment, or hillside colluviums, that have no potential to yield significant fossils. Site grading operations that will not affect sediment more than 3 feet deep will typically not need to be monitored. The exception to this is the laydown yard immediately east of the power plant site, which lies on a topographic high and therefore will require more extensive grading, likely extending well below the layer of disturbed sediment; site grading operations in this laydown yard will likely encounter sediments of the Great Valley Sequence, and therefore will need to be spot-monitored.

3.3.2 When Monitoring Will Take Place

Paleontological resource monitoring will take place whenever, in the judgment of the PRS or PRM in coordination with the PRS, there is a reasonable probability of excavations impacting paleontologically sensitive sediments. In particular, all excavations in the high-sensitivity Quaternary alluvium will be monitored. Spot-checks of the low-sensitivity Great Valley Sequence will be at the discretion of the PRS or the PRM in coordination with the PRS.

3.3.3 Sampling—When and How Much

As noted in Section 2.2, scientifically significant paleontological resources include not only the remains of large vertebrates, but also the remains of smaller vertebrates and paleobotanical materials. These smaller remains, most likely to be encountered in fine-grained sedimentary facies, can easily elude detection if special sampling procedures are not used. Therefore, the PRM will employ a sampling protocol for micropaleontological remains when, in the judgment of the PRM and with the concurrence of the PRS, a potentially paleontologically productive soil horizon or sedimentary unit is encountered. This sampling will consist of test screening sediment to determine whether small vertebrate fossils are present in the soil.

When in-field test screening by the PRM yields fossil remains, or when fossil material is otherwise noted in excavated sediments, in coordination with the heavy-equipment operator(s), the PRM will arrange to have removed for sampling not less than 200 pounds of sediments from the appropriate stratigraphic horizon. The PRM shall then field test this material by passing it through the appropriate field screen listed in Table 3-1. In most cases, screening should be accomplished by wet-sieving to ensure that microfossils are not obscured by aggregated sediment.

Should the initial screening reveal neither microfossils nor paleobotanical remains, sampling will be considered to be complete for that locality and that depth. However, should initial screening reveal the presence of small vertebrate and/or paleobotanical remains, then the PRM will arrange for a heavy equipment operator to remove up to a 6,000-pound sample from the same stratigraphic horizon, and to transport that sediment to the stockpile area. The stockpile area will be marked off with lathe and tape, and staked with a stake labeled with the sample number and date in clearly visible, waterproof ink. A 6,000-pound sample is equivalent to the full front bucket of a front-end loader.

TABLE 3-1
Paleontological Monitoring Equipment

Item	Number	Notes
Field vehicle	1	Pickup truck preferable to carry equipment
Camera	1	Digital required for fast turnaround of images in the case of a discovery
Camera bag	1	
Field log book	1	May be a 3-ring binder to facilitate handling of DAR forms
PRMMP	2	One permanent record copy and at least one additional copy to provide to supervisory personnel if requested.
Pens and pencils	2 each	Minimum number
Construction plans	1	
First aid kit	1	
Hard hat	1	To be worn at all times in the construction zone
Safety vest	1	To be worn at all times in the construction zone
Water bottle	2	Minimum number
Steel-toed boots	1 pair	
Flashlight	1	
Clipboard	1	
Grid paper	1 pad	
Cellular telephone	1	
List of Project-specific telephone numbers	2	One for log book, one to remain in vehicle
4-foot lathe	1 dozen	
Large felt tip pens	2	Suitable for marking lathe as well as labeling plastic bags
Construction tape	2 rolls	For cultural and paleontological resources avoidance
5-gallon plastic bucket	3	Minimum number
Shovel and pick	1 each	
Field screens	1 set	Nested set of frames (2 per set) with one coarse and one fine screen
Trowel	1	
Hoe	1	For cleaning vertical exposures that are typically “smeared” by heavy equipment blades
Water can	2	5 gallon
Metal tape	1	Professional grade recommended
Chaining pins	4	
One-gallon plastic bags	20	Minimum number
Large (12 p) nails	20	
12-dram vials or film cans	1 dozen	For small specimens
Toilet paper	1 roll	For cushioning small specimens

The equipment that will be available to the monitor is listed in Table 3-1.

3.4 Discovery of Fossils

Fossils may be discovered by either construction personnel, by the PRM, or by the archaeological monitor. Regardless of the person making the discovery, prompt notification of the individuals noted below is crucial.

3.4.1 Notification

Regardless of the individual making a paleontological discovery, the first thing that must occur is that ***construction activity in the immediate vicinity of the discovery must cease***. Construction activity may continue elsewhere provided that it continues to be monitored as appropriate. If the discovery is made by someone other than the PRM, the PRM must immediately be notified. The PRM will then confirm that the appropriate construction manager(s) also have been notified, and ensure that the PRS is notified. After discussing an initial assessment of the find with the PRM, the PRS will ensure that appropriate supervisory and agency personnel are notified. Appropriate notification must be completed no later than the following morning, or on Monday morning, should the discovery occur on a weekend.

3.4.2 Avoidance and Continued Construction Activities

In consultation with the PRS, the PRM will determine the probable lateral extent of the fossil find and ensure that area is cordoned off using lathe and distinctly colored cultural/paleontological resources avoidance tape, or red plastic mesh construction fencing and steel T-posts. While the limits of the discovery are being cordoned off, construction management has the option of redirecting excavation activities to another portion of the site, *provided that there is a PRM present to monitor that activity.* Should the sole onsite PRM be engaged in the assessment and recovery of the discovered paleontological resource, then all ground-disturbing activity elsewhere in paleontologically sensitive sediments must cease until an additional monitor is available onsite.

3.4.3 Determining Significance

Initial assessment of the significance of the find by the PRM will take place in consultation with the archaeological monitor, if present, to confirm that the discovery is not a cultural resources discovery, as well as with the PRS. Final determination of the significance of the find is at the sole discretion of the PRS in consultation with the PRM. If the discovery is determined to be significant, or potentially significant, the PRS will designate an individual to be in charge of the excavation, and treatment and recovery of the find will then proceed.

3.4.4 Recovery of Discovered Paleontological Resources

No Loitering

The appropriate construction manager or project superintendent will ensure that construction personnel neither enter the area of the paleontological find that has been cordoned off, nor loiter in the vicinity in such a manner as to interfere with the recovery of the discovered resource, as to create a safety hazard, or as to distract the paleontologists

excavating the find. Neither the paleontologists working to remove the find nor the PRS will be responsible for other personnel congregating in the vicinity of the find.

Excavation Logistics

The PRM will coordinate with the appropriate construction manager or project superintendent to locate an area near the excavation where back-dirt can be placed. The individual in charge of excavation will be responsible for ensuring that back-dirt pile(s) are positioned such that they do not hinder further excavations.

The overburden above the find may be removed by heavy equipment down to a depth no closer than 1 foot above the discovered resource. The person in charge of recovery will determine the actual depth depending on site-specific conditions and instruct the heavy equipment operator accordingly. Should it appear that a paleontological site (a stratum with multiple fossils) has been discovered, use of heavy equipment will be limited to reaching the top of that stratum. If the fossil resource is discovered in the wall of a trench or other excavation, then the wall may be pulled back a distance of up to 6 feet from its original position, or to a distance to completely expose the discovery. Because the intent of recovery and treatment is to salvage fossil remains and related scientific data that would be destroyed, exposure of fossils that would otherwise be undisturbed is not warranted.

After removal of the overburden, exposure of the fossil remains will proceed using hand tools. Shovels, picks, and similar heavy-duty hand tools are permissible if, in the judgment of the person in charge of recovery, the probability of striking a bone is low to nil. Small hand tools (geological hammers, trowels, brushes, dental picks) will be used to expose the fossil remains when larger tools might damage them. In the case of a fossil site where multiple bones are exposed in one stratigraphic horizon, a grid system will be established and the bones will be mapped on the grid prior to removal. If station numbers are available from the Project engineering plans, the location of the discovered resource(s), and the map grid, will be related to the appropriate project grid. A global positioning system (GPS) will be used to establish the coordinates of the excavation and the fossil remains if a project grid is not available. Photographs will also be taken to supplement the mapping and document stratigraphic context, and a log of the photographs will be kept listing exposure number, date, subject, and ancillary notes.

Standard paleontological procedures will be employed to stabilize bones prior to removal. Plaster of Paris and burlap soaked in plaster will be used to stabilize all materials that, in the judgment of the individual in charge of recovery, could be damaged during removal or transport. In coordination with the project site manager or construction superintendent, heavy equipment can be used to lift larger specimens from the excavation and carry them to a truck for transport to the laboratory.

Additional sampling of sediments for microfossils or paleobotanical materials may also be conducted if, in the judgment of the person in charge of recovery or the PRS, significant scientific data can be reasonably gained as a result.

All fossil specimens and samples recovered from the excavation will be associated with excavation notes establishing where they were recovered, their depth, their relationship to one another and their stratigraphic context. All specimens will be provided a unique

number in the field and in a corresponding entry in the excavation logbook maintained by the individual in charge of excavation.

The equipment required to recover fossil specimens is listed in Table 3-2.

TABLE 3-2
Paleontological Specimen Recovery Equipment

Item	Minimum Number	Remarks
Vehicles	1	Pickup truck or SUV-style for crew and equipment
Camera	1	Digital required for efficient image dissemination
Camera bag	1	
Field log book	1	Separate from the monitoring log book
Pens and pencils	2 each	Minimum number
Construction plans	1	
First aid kit	1	Per vehicle
Flashlight	1	Per vehicle
Clipboards	2	
Grid paper	2 pads	11 × 17 size
Cellular telephone	1	Per vehicle
GPS unit	1	For establishing the coordinates of, at a minimum, the corners of the excavation and the fossil find itself
Line levels	2	Laser or string-and-bubble
Mason line	>60 feet	
Linear scale	1	For profile photos
List of Project-specific telephone numbers	2	One for log book, one to remain in vehicle
4-foot lathe	1 dozen	
Large felt tip pens	2	Suitable for marking lathe as well as labeling plastic bags
Bag of plaster of Paris	2	50-pound bags
Burlap sacks	1 dozen	With plaster, for stabilization of fossils
5-gallon plastic bucket	4	Minimum number
“Dig kit”	1 per excavation	For smaller equipment listed herein
Round-nose shovels	2	
Pick	1	
Pick-mattock	1	
Square-nose shovel	1	
Full-size straw broom	1	
Whisk brooms	2	
Paint brushes – 2 inch	2	

TABLE 3-2
Paleontological Specimen Recovery Equipment

Item	Minimum Number	Remarks
Paint brushes – 1/2 inch	2	
Dental picks	4	Assorted shapes
Ice pick	1	
Trowel	1	
Water can	4	5 gallon, for plaster
Metal tape	2	Professional-grade recommended
Chaining pins	6	
1-gallon plastic zip-closure bags	20	Minimum number
12 dram vials or film cans	1 dozen	For small specimens
Cotton or toilet paper	1 roll	For cushioning small specimens

Note: The above list is for one crew of two to four persons. It does not include personal protective equipment such as hard hats, steel-toe boots, etc. Additional special equipment would be needed for specimens weighing more than 75 pounds; additional supplies would be needed for recovery in special circumstances (for example, nonmineralized organic material). Additional material would be required to recover large finds.

During the conduct of recovery activities, it is the responsibility of the PRS to keep the CPM and the project site manager or construction superintendent advised regularly regarding progress, and to provide estimates of when the recovery will be completed. Persons conducting the recovery effort are responsible for the scientific excavations alone.

3.4.5 Resumption of Construction-related Activities

At the conclusion of recovery of the discovered fossil remains, the person in charge of excavation will consult with the PRS to ensure that all reasonable measures have been taken to recover the subject fossil resource(s). At that time, construction supervisory and agency personnel will be notified that recovery has been completed and that the resumption of construction activities in the area is recommended. Upon concurrence of the CEC, the excavation will be back-filled, the staking or fencing around the site will be removed, and the project site manager or construction superintendent will notified that recovery has been completed and that construction activities may resume in the area.

SECTION 4

Treatment of Recovered Paleontological Resources

Recovered fossils will be inventoried, cleaned to the point where identification is feasible, provided tentative identification, and prepared for curation. Identification will be dependent on whether the fossil material has sufficient diagnostic features, the availability of adequate comparative material, and the availability of personnel with appropriate expertise. Additional sediment samples and paleobotanical materials, if recovered, also will be processed, identified, and prepared for curation. A draft paleontological project completion report on the excavation and the recovered materials will be prepared by or under the direction of the PRS for review and comment. The report will include initial interpretations of the geological, chronological, and paleoecological contexts of the recovered material. Upon receipt of comments by Mariposa Energy, LLC prior to transmission to the CEC, a final report on the material will be prepared and will be included in the project final report.

Upon completion of preparation and identification, recovered paleontological specimens will be transported to the UCMP, for permanent accessioning and curation.[1] The UCMP is the regional repository for paleontological records and specimens. Curation will be under the direction of the staff of the UCMP and compliance with all curatorial conditions of the UCMP will be maintained. This includes, at a minimum, providing a detailed, cross-checked inventory with the transported fossils and a copy of the final report. If large specimens in plaster jackets are involved, the jacket will be removed in such a fashion that the "bottom" of the jacket remains to support the specimen, and the "top" is removed to display appropriately diagnostic characteristics. All bone will be stabilized by impregnation with a soluble resin such as Glyptal™ or an equivalent acceptable to the UCMP.

Each specimen will bear a unique identifying number keyed into the detailed inventory. The inventory will, in turn, reference the project completion report. Should the specimen be small, then the specimen will be enclosed in a plastic vial labeled with a unique inventory number referencing the fossil within.

The mode of transportation to the UCMP will depend on the size and number of specimens to be accessioned at that institution. In any case, care will be taken in packing and handling to ensure that the chances of damage are minimized.

[1] Note: Curation of specimens at the UCMP is subject to completion of negotiations and execution of an appropriate curatorial agreement with that institution. The UCMP has been identified as the regional institution most capable of meeting the curatorial conditions of the SVP for a retrievable repository suitable for further scientific investigations of recovered materials, and records maintenance.

SECTION 5

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Appendix A
Paleontological Resources Conditions of Certification

APPENDIX A

Paleontological Resources Conditions of Certification

PAL-1 The project owner shall provide the CPM with the resume and qualifications of its 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 shall obtain CPM approval of the replacement PRS. The project owner shall keep resumes on file for qualified Paleontological Resource Monitors (PRMs). If a PRM is replaced, the resume of the replacement PRM shall also be provided to the CPM.

The PRS resume shall include the names and phone numbers of references. The resume shall 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 shall meet the minimum qualifications for a vertebrate paleontologist as described in the SVP guidelines of 1995. The experience of the PRS shall include the following:

1. Institutional affiliations, appropriate credentials, and college degree;
2. Ability to recognize and collect fossils in the field;
3. Local geological and biostratigraphic expertise;
4. Proficiency in identifying vertebrate and invertebrate fossils; and
5. 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 shall ensure that the PRS obtains qualified PRMs to monitor as he or she deems necessary on the project. Paleontologic Resource Monitors shall have the equivalent of the following qualifications:

- BS or BA degree in geology or paleontology and one year of experience monitoring in California; or
- AS or AA in geology, paleontology, or biology and four years' experience monitoring in California; or
- Enrollment in upper division classes pursuing a degree in the fields of geology or paleontology and two years of monitoring experience in California.

Verification:

(1) 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 on-site work.

(2) At least 20 days prior to ground disturbance, the PRS or project owner shall provide a letter with resumes naming anticipated monitors for the project, stating that the identified monitors meet the minimum qualifications for paleontological resource monitoring required by the condition. If additional monitors are obtained during the project, the PRS shall provide additional letters and resumes to the CPM. The letter shall be provided to the CPM no later than one week prior to the monitor's beginning on-site duties.

(3) 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 shall provide to the PRS and the CPM, for approval, maps and drawings showing the footprint of the power plant, construction lay down areas, and all related facilities. Maps shall 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 shall 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 between 1 inch = 40 feet and 1 inch = 100 feet range. If the footprint of the project or its linear facilities change, the project owner shall 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 shall be provided to the PRS and CPM. Before work commences on affected phases, the project owner shall notify the PRS and CPM of any construction phase scheduling changes.

At a minimum, the project owner shall ensure 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:

(1) 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.

(2) 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.

(3) If there are changes to the scheduling of the construction phases, the project owner shall submit a letter to the CPM within 5 days of identifying the changes.

PAL-3 The project owner shall ensure 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 shall occur prior to any ground disturbance. The PRMMP shall function as the formal guide for monitoring, collecting, and sampling activities, and may be modified with CPM approval. This document shall be used as the basis of discussion when on-site decisions or changes are proposed. Copies of the PRMMP shall reside with the PRS, each monitor, the project owner's on-site manager, and the CPM.

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

1. Assurance that the performance and sequence of project-related tasks, such as any literature searches, pre-construction 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;

2. Identification of the person(s) expected to assist with each of the tasks identified within the PRMMP and the conditions of certification;

3. 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;

4. 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 shall be used for fine-grained and coarse-grained units;

5. A discussion of the locations of where the monitoring of project construction activities is deemed necessary, and a proposed plan for monitoring and sampling;

6. 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;

7. A discussion 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;

8. Procedures for inventory, preparation, and delivery for curation into a retrievable storage collection in a public repository or museum, which meet the Society of Vertebrate Paleontology's standards and requirements for the curation of paleontological resources;

9. Identification of the institution that has agreed 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; and

10. A copy of the paleontological conditions of certification.

Verification: At least 30 days prior to ground disturbance, 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 Prior to ground disturbance and for the duration of construction activities involving ground disturbance, the project owner and the PRS shall 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 shall not excavate in sensitive units prior to receiving CPM-approved worker training. Worker training shall consist of an initial PRS training, or may utilize a CPM-approved video or other presentation format, during the project kick off for those mentioned above. Following initial training, a CPM-approved video or other approved training presentation/materials, or in-person training may be used for new employees. 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 shall occur prior to CPM approval of the Worker Environmental Awareness Program (WEAP), unless specifically approved by the CPM.

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

The training shall include:

1. A discussion of applicable laws and penalties under the law;

2. Good quality photographs or physical examples of vertebrate fossils for project sites containing units of high paleontologic sensitivity;

3. 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;

4. 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;

5. An informational brochure that identifies reporting procedures in the event of a discovery;

6. A WEAP certification of completion form signed by each worker indicating that he/she has received the training; and

7. A sticker that shall be placed on hard hats indicating that environmental training has been completed.

Verification:

(1) At least 30 days prior to ground disturbance, the project owner shall submit the proposed WEAP, including the brochure, with the set of reporting procedures for workers to follow.

(2) At least 30 days prior to ground disturbance, the project owner shall submit the training program presentation/materials to the CPM for approval if the project owner is planning to use a presentation format other than an in-person trainer for training.

(3) 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.

(4) 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 other approved presentation format) offered that month. The MCR shall also include a running total of all persons who have completed the training to date.

PAL-5 The project owner shall ensure 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 site and along any constructed linear facilities associated with the project. In the event that the PRS determines full-time monitoring is not necessary in locations that were identified as potentially fossil-bearing in the PRMMP, the project owner shall notify and seek the concurrence of the CPM.

The project owner shall ensure that the PRS and PRM(s) have the authority to halt or redirect construction if paleontological resources are encountered. The project owner shall ensure that there is no interference with monitoring activities unless directed by the PRS. Monitoring activities shall be conducted as follows:

1. Any change of monitoring from the accepted schedule in the PRMMP shall 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 shall include the justification for the change in monitoring and be submitted to the CPM for review and approval.

2. The project owner shall ensure that the PRM(s) keep 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.

3. The project owner shall ensure that the PRS notifies the CPM within 24 hours of the occurrence of any incidents of non-compliance with any paleontological resources conditions of certification. The PRS shall recommend corrective action to resolve the issues or achieve compliance with the conditions of certification.

4. For any significant paleontological resources encountered, either the project owner or the PRS shall 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.

The project owner shall ensure 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 shall 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 paleontologic monitoring, including any incidents of non-compliance or any changes to the monitoring plan that have been approved by the CPM. If no monitoring took place during the month, the report shall include an explanation in the summary as to why monitoring was not conducted.

Verification: 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 10 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, shall ensure 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 shall ensure preparation of a Paleontological Resources Report (PRR) by the designated PRS. The PRR shall be prepared following completion of the ground-disturbing activities. The PRR shall include an analysis of the collected fossil materials and related information, and submit it to the CPM for review and approval.

The report shall 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.

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.

Appendix B
Paleontological Resources Module
Worker Environmental Awareness Program

APPENDIX B

Paleontological Resources Module Worker Environmental Awareness Program

WEAP in progress—to be inserted upon completion.