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ENVIRONMENTAL PLANNING • LICENSING & PERMITTING • REGULATORY COMPLIANCE

July 26, 2011 *Compliance Chron Log 2011-060*

Mr. Craig Hoffman
Compliance Project Manager
California Energy Commission
1516 Ninth Street MS-2000
Sacramento, CA 95661

Subject: Rice Solar Energy Project (Docket No. 09-AFC-10C)
Condition of Certification PAL-3
Paleontological Resources Monitoring and Mitigation Plan

Dear Craig:

In compliance with the provisions of Condition of Certification PAL-3, attached is the Paleontological Resources Monitoring and Mitigation Plan for the Rice Solar Energy Project.

Should you have any questions or require additional information related to this submittal, please contact me at (916) 780-1171.

Sincerely,

Andrea E. Grenier

Andrea E. Grenier
Permitting and Compliance Manager

Attachment

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PAL-3

Paleontological Resources Monitoring and Mitigation Plan Rice Solar Energy Project

(09-AFC-10)

Submitted to the:

California Energy Commission

Submitted by:

SOLARRESERVE

With Technical Assistance by:

CH2MHILL

Sacramento, California

July 2011

Affidavit of Preparation and Project Owner's Acceptance

I, Dr. Geoffrey Spaulding, the Designated Paleontological Resource Specialist, attest to preparing this Paleontological Resources Monitoring and Mitigation Plan for the Rice Solar Energy Project (09-AFC-10C), under Rice Solar Energy, LLC (RSE).

W. Geoffrey Spaulding

W. Geoffrey Spaulding, Ph.D.

21 July, 2011

Date

I, Jeffrey L Benoit, RSE's Project Director, accept this Paleontological Resources Monitoring and Mitigation Plan for the construction of the Rice Solar Energy Plant (09-AFC-10C).

J. L. Benoit

Signature

25 July, 2011

Date

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Acronyms and Abbreviations

ACC	air-cooled condenser
AFC	Application for Certification
amsl	above mean sea level
Applicant	Rice Solar Energy, LLC
BLM	U.S. Bureau of Land Management
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
COC	Condition of Certification
CPM	Compliance Project Manager
DAR	Daily Activity Report
GPS	global positioning system
kV	kilovolt
LORS	laws, ordinances, regulations, and standards
MCR	Monthly Compliance Report
MW	megawatt
MWh	megawatt hours
NEPA	National Environmental Protection Act of 1969
OPLMA	*Omnibus Public Land Management Act of 2009*
PRM	Paleontological Resources Monitor
PRMMP	Paleontological Resources Monitoring and Mitigation Plan
Project	Rice Solar Energy Project
PRR	Paleontological Resources Report
PRS	Paleontological Resources Specialist
RSE	Rice Solar Energy, LLC
RSEP	Rice Solar Energy Project
SBCM	San Bernardino County Museum
SVP	Society of Vertebrate Paleontology
U.S.C.	United States Code
WEAP	Worker Environmental Awareness Program

SECTION 1

Introduction

1.1 Project Background

Rice Solar Energy, LLC (RSE, Applicant), a wholly owned subsidiary of Solar Reserve, LLC, proposes to construct, own, and operate the Rice Solar Energy Project (RSEP or the project). The RSEP is a concentrating solar power facility to be constructed on a privately owned site located in unincorporated eastern Riverside County, California. The project will have a nominal generating capacity of 150 megawatts (MW), and will be capable of delivering 450,000 megawatt hours (MWh) of renewable energy annually. RSEP's concentrating solar power technology consists of a large field of mirrors or heliostats that concentrate and focus the sun's energy onto a central receiver. The project features thermal energy storage that allows solar energy to be captured throughout the day and retained in a liquid salt heat transfer fluid. When electricity is to be generated, the hot liquid salt is routed to a series of heat exchangers to produce steam. The steam is used to generate electricity in a conventional steam turbine cycle; an air-cooled condenser (ACC) is utilized to minimize water consumption.

The RSEP is being developed to provide sustainable, renewable, cost-effective energy, with energy storage for operating flexibility that contributes to the achievement of the renewable portfolio standards. When constructed, the RSEP will include the following components:

- Heliostat field with up to 17,500 tracking heliostats, each approximately 24 feet tall by 28 feet wide, arranged in a circular array that will reflect and concentrate the sun's energy onto a tower-mounted receiver (The field covers 1,410 acres, which include the 80-acre power block near its center.)
- A concrete central tower approximately 540 feet tall, upon which is mounted a receiver approximately 100 feet tall and topped with a small maintenance crane, for an overall structure height of 653 feet
- A liquid salt storage system featuring insulated "hot" and "cold" salt storage tanks
- A steam turbine generator system rated at 150 MW (net)
- A 20-cell ACC to provide water-free cooling and condensing of the steam turbine exhaust
- A 10-mile, 230-kilovolt (kV) generator tie-line to connect the RSEP with the existing Western Area Power Administration (Western) Parker-Blythe transmission line. The new tie-line is routed along existing dirt roads for approximately 5.4 miles and will require minimal construction of approximately 4.6 miles of single-lane dirt access road for construction and inspection. A new interconnection substation (approximately 3 acres in size) for the tie-in to Western's system will be constructed adjacent to the existing transmission line. The generator tie-line will cross land managed by the U.S. Bureau of Land Management [BLM].)
- Extension of the existing low-voltage power distribution network spanning about 1 mile, including a span of less than 200 feet across BLM land, to supply ancillary facilities

- Two onsite water wells to provide water for heliostat washing, steam cycle makeup and other process uses in an amount not expected to exceed 180 acre-feet per year
- Three lined evaporation ponds of approximately 5 acres each to capture all process wastewater discharge from the project's water treatment system, process blowdown, and stormwater drainage from within equipment areas
- Stormwater drainage features to channelize offsite stormwater flows from upstream of the project site, diverting offsite stormwater around the project site, and rejoining the natural flow channels to the south of the property
- Various buildings for plant control room, administration offices, maintenance and storage, and crew comfort facilities

1.2 Paleontological Resources

The paleontological resources investigations were conducted in support of an Application for Certification (AFC) for submittal to the California Energy Commission (CEC). The AFC process is equivalent to a California Environmental Quality Act (CEQA) process, but requires a more rigorous review of the potential impacts.

This Paleontological Resource Monitoring and Mitigation Plan (PRMMP) and its requirements apply to all portions of the project as described above. With the exception of the paleontological resources module of the Worker Environmental Awareness Program (WEAP), this PRMMP will not be implemented until, in the opinion of the project Paleontological Resources Specialist (PRS), the potential exists for construction to affect paleontologically sensitive sediment, pursuant to Conditions of Certification (COC) PAL-3 and PAL-4 (Appendix A).

Paleontological resources are fossils (the remains of ancient plants and animals) and are non-renewable scientific and educational resources protected by federal and state statutes. In order to preserve these resources and to comply with laws protecting them, the CEC has issued seven COCs that must be followed prior to and during the construction of the RSEP facility. This 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. The COCs are listed in Appendix A, as per the requirements of PAL-3.

Section 2 of this PRMMP provides a brief 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. 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.

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

FIGURE 1-1
LANDFORMS OF THE STUDY AREA
RICE SOLAR ENERGY PROJECT
RIVERSIDE COUNTY, CALIFORNIA

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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, the Omnibus Public Land Management Act, and the 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) (SVP, 1995). Construction and operation of RSEP will be conducted in accordance with all LORS applicable to paleontological resources summarized in Table 2-1, and discussed briefly below.

TABLE 2-1
LORS Applicable to Paleontological Resources

LORS	Remarks	Project Applicability
Antiquities Act of 1906	Protects paleontological resources on federal lands; requires inventory, assessment of effects, and mitigation if appropriate.	Applicable
National Environmental Policy Act of 1969 (NEPA)	Requires an assessment of impacts resulting from the implementation of a federal action, or from a federally licensed or federally funded project.	Applicable
Omnibus Public Land Management Act of 2009	Requires the Department of the Interior and the Department of Agriculture to manage paleontological resources according to scientific principals, and criminalizes the destruction or removal of paleontological resources from public lands.	Applicable
CEQA, Appendix G	Requires the assessment of project impacts to 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
Native American Historic Resource Protection Act	Calls for the protection of “vertebrate paleontological sites, including fossilized footprints…archaeological, paleontological, or historical feature” on state land.	Not Applicable
Riverside County n.d. General Plan Open Space Element	The Resources Conservation and Open Space Element addresses paleontological resources	Applicable

2.1.1 Federal LORS

Paleontological resources are protected by several federal regulations. Several of these apply only to excavations and construction on federal land. RSEP lies on federally owned land; therefore, these federal statutes are applicable to the project.

Paleontological resources were first protected under the Federal Antiquities Act of 1906 (PL 59-209; 16 United States Code [U.S.C.] 431 et seq.; 34 Stat. 225). This statute calls for the protection of historic landmarks, historic and prehistoric structures, and other objects of historic or scientific interest on federal lands.

Further federal protection of paleontological resources is provided by the Federal Land Management and Policy Act (43 U.S.C. 1712[c], 1732[b]); sec. 2, Federal Land Management and Policy Act of 1962 [30 U.S.C. 611]; Subpart 3631.0 et seq.), Federal Register Vol. 47, No. 159, 1982. This regulation charges federal agencies with managing public lands in a manner that protects the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, archaeological, and water resources, and where appropriate, preserve and protect certain public lands in their natural condition (Section 102[a][8][11]); periodically inventory public lands so that the data can be used to make informed land-use decisions (Section 102[a][2]); and regulate the use and development of public lands and resources through easements, licenses, and permits (Section 302[b]). While paleontological resources are not specifically mentioned, significant fossils are understood to be scientific resources.

The National Historic Preservation Act of 1966 also applies to the Project, and provides for the survey, recovery, and preservation of significant paleontological data when such data may be destroyed or lost due to a federal, federally licensed, or federally funded project. (Pub. L. 89 665; 80 Stat. 915, 16 U.S.C. 470 et seq.)

Visitor services, including the collection of paleontological resources, on BLM lands are regulated by 43 Code of Federal Regulations (CFR) 8360. Specifically, 43 CFR 8365.1-5 prohibits the collection of scientific resources, including vertebrate fossils, without a permit, as well as prohibiting the use of fossils found on federal land for commercial purposes.

The National Environmental Protection Act of 1969 (NEPA) requires federal agencies, and companies using federal land, to consider the environmental impacts of their proposed action and reasonable alternatives to those actions. Section 101(b)(4) directs federal agencies to use all feasible means to "preserve important historic, cultural, and natural aspects of our national heritage" that would be affected by a proposed project. Regulations for implementing the procedural provisions of NEPA are provided in 40 CFR 1500–1508. Fossils found on federal lands or on project sites where the project receives federal funding are normally included in NEPA reviews.

The *Omnibus Public Land Management Act of 2009* (OPLMA)(H.R. 146) Title 6, Subtitle D, *Paleontological Resources Preservation*, requires the secretaries of the Department of the Interior (exclusive of Indian trust lands) and the Department of Agriculture (insofar as U.S. Forest Service lands are concerned) to "…manage and protect paleontological resources on Federal land using scientific principals and expertise… (and) develop appropriate plans for inventory, monitoring, and the scientific and educational use of paleontological resources…" The OPLMA further excludes casual collection from restrictions under the law, and then describes the requirements for permitting collection on Federal lands, stipulations

regarding the use of paleontological resources in education, continued Federal ownership of recovered paleontological resources, and standards for acceptable repositories of collected specimens and associated data (OPLMA, Secs. 6303-6305). The OPLMA also provides for criminal and civil penalties for unauthorized removal of paleontological resources from Federal land, and rewards for reporting the theft of fossils (Secs. 6306-6309).

In addition to these measures, the BLM has issued BLM Manual 8270 and BLM Handbook H-8270-1, which outline the requirements for collecting paleontological resources on BLM land. These include the requirement of a paleontological resource use permit for excavation work performed on BLM lands.

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.). 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 the following: "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. It 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.

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 pre-history?" 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 to ensure 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 RSEP is the CEC. California Public Resources Code Section 21081.6, entitled "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 are in California Public Resources Code Chapter 1.7, Section 5097.5 (Stats. 1965, c. 1136, p. 2792), entitled "Archaeological, Paleontological, and Historical Sites." This statute defines as a misdemeanor any unauthorized disturbance or removal of a fossil site or remains on public land and specifies that state agencies may undertake surveys, excavations, or other operations as necessary on state lands to preserve or record paleontological resources. This statute would apply to the RSEP project only if any construction or other related project impacts occur on state-owned or -managed lands or if the state or a state agency were to obtain ownership of project lands during the term of the project license.

2.1.3 County LORS

The Multipurpose Open-Space Element of the *Riverside County General Plan* (Riverside County, n.d.) includes the following policies:

> **OS 19.8** Whenever existing information indicates that a site proposed for development may contain biological, paleontological, or other scientific resources, a report shall be filed stating the extent and potential significance of the resources that may exist within the proposed development and appropriate measures through which the impacts of development may be mitigated.
>
> **OS 19.9** This policy requires that when existing information indicates that a site proposed for development may contain paleontological resources, a paleontologist shall monitor site grading activities, with the authority to halt grading to collect uncovered paleontological resources, curate any resources collected with an appropriate repository, and file a report with the Planning Department documenting any paleontological resources that are found during the course of site grading.
>
> OS 19.10 Transmit significant development applications subject to CEQA to the San Bernardino County Museum (SBCM) for review, comment, and/or preparation of recommended conditions of approval with regard to paleontological resources.

The project's *Application for Certification* included a thorough assessment of the paleontological potential of the area and satisfies OS 19.8. Implementation of this PRMMP (see Section 3.1) would continue compliance activities consistent with these policies.

However, because no paleontological resources are located within the vicinity of the proposed project, it is unlikely that the activities stipulated in OS 19.9 will be undertaken. Consistent with OS 19.10, project plans were provided to the SBCM as part of a request for a paleontological site records review, and the SBCM responded with recommendations for paleontological resources monitoring and mitigation.

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; n.d.). Most practicing professional paleontologists adhere to the SVP guidelines which, with appropriate accommodations for the nature of the fossils, also apply to paleobotanical and invertebrate faunal remains. In addition, Federal guidelines provided in the recently revised BLM *Instructional Memorandum 2008-009* (BLM, 2008) are also an important source of guidelines, particularly in the western states.

2.2 Project Resource-specific Considerations

2.2.1 Significance Criteria for Paleontological Resources

The paleontological importance or sensitivity of a stratigraphic unit reflects: (1) its potential paleontological productivity; and (2) the scientific significance of the fossils it has produced. Thus, the potential paleontological productivity of a stratigraphic unit exposed in the project area 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 sensitivity for paleontological resources: high, low, and undetermined. Other guidelines, such as the BLM *Instructional Memorandum 2008-009*, accommodate more detailed paleontological sensitivity criteria (BLM, 2008). Guidelines do agree that sediments of undetermined or unknown sensitivity should be subject to monitoring protocol, as well as those of high and moderate paleontological sensitivity. For this analysis, both the BLM guidelines and the SVP guidelines (with the addition of a "moderate" category) were utilized.

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 type or topotypic specimen, (7) a member of a rare species, (8) a skeletal element different from, or a specimen more complete than, those now available for that species (SVP, 1995). For example, identifiable 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, such as those found in packrat middens, are also important because they can be

helpful in age-determination of Late Pleistocene sediments, and they are highly sensitive indicators of their environment. The value or importance of different fossil groups varies depending on their ubiquity or scarcity, their age, and the depositional environment of the stratigraphic unit that contains the fossils.

2.2.2 Geological and Paleontological Context of the Project Area

2.2.2.1 Physiographic Setting

The solar array and plant site, and the first several miles of the transmission interconnect are located on the southern bajada[1] of the Turtle Mountains. The last approximately 5 miles of the transmission line are located in very similar habitat near the toe of the bajada extending west from the West Riverside Mountains (Figure 5.8-1). The entire project area is on the northern and northeastern portion of Rice Valley, an intermountain basin in the arid Colorado Desert of eastern Riverside County, California. The Rice Valley is bounded by the Turtle Mountains to the north, the West Riverside Mountains to the east, the Big Maria and Little Maria Mountains to the southeast and southwest, respectively, and the low Arica Mountains to the west (Figure 1-1). The valley axis is oriented generally WNW to ESE with relatively low alluvial sills separating it from the Danby Dry Lake basin to the northwest, and the Colorado River Valley to the southeast (Figure 5.8-1). Elevations vary from about 950 feet above mean sea level (amsl) on the Turtle and West Riverside Mountains bajadas, to about 720 feet amsl near the valley axis.

The area lies in the Basin and Range physiographic province of the interior West (Fenneman, 1931), eponymously typified by large basins separated by intervening mountain ranges. In most portions of the west these mountains and valleys are oriented generally north-south, but this is not necessarily the case in the present area due to differences in the direction of crustal deformation here than elsewhere in the Basin and Range. The zone of anomalous deformation through this region is called the Maria Fold and Thrust Belt (Glazner et al., 1994). The extension and then rotation of crustal blocks in this area, partly a consequence of proximity to the San Andreas Fault Zone, resulted in many mountain ranges that have an east-west rather than north-south orientation. The physiography of this area is therefore, best characterized as being one dominated by many smaller mountain ranges surrounding large valleys.

2.2.2.2 Geologic Setting

The Turtle Mountains represent the only bedrock outcrops within the vicinity of the project, and their closest outcrops lie about 1.2 miles to the north. They are composed of Precambrian metamorphic and igneous rocks (Bishop, 1963), and possess no paleontological sensitivity. Along with eolian sand and silt, clasts of these Precambrian rocks form the alluvial substrate of the project site. Field reconnaissance revealed that the closest outcrops of fossiliferous sediments in settings similar to the project area are about 13 miles to the northeast, where outcrops of the Mio-Pliocene Bouse Formation outcrop intermittently on the western edge of the Colorado River Valley.

Late Quaternary lacustrine and paleospring sediments are among the most common fossiliferous sediments in this desert region (Quade et al., 1995; Jefferson, 2003), but neither

[1] A bajada is the ramp of alluvium that extends from the axes of southwest desert valleys to the piedmonts of surrounding mountain ranges, and is composed of coalescing alluvial fans.

one occurs near the project site or the transmission line. Evidence of a pluvial lake is abundant in the Danby Dry Lake Basin, about 13 miles to the west-northwest, but there is none readily apparent in the Rice Valley. Previously unrecorded paleospring deposits were found along the Rice-Blythe road, about 5.5 miles south-southwest of the project area, but none have been located closer than that.

The county's paleontological sensitivity map (Riverside County, 2009b) shows that Rice Valley is surrounded with uplands possessing "Low" paleontological sensitivity, with the lower slopes of the valley where the project site is located possessing "Undetermined" paleontological sensitivity. A small area along the valley axis, and more than a mile distant from the project including the transmission line right-of-way, is mapped as possessing "High" paleontological sensitivity.

2.2.2.3 Sediments Present or Within 1 Mile of the Project Site

The geological units within 1 mile of the project site and the transmission intertie are Quaternary alluvium, and eolian sand sheets and dunes. In addition, locally derived fill and previously disturbed sediment mantles the project area to varying depths.

Pleistocene Alluvium

The alluvial fans that extend south from the Turtle Mountains carry primarily fine-grained clasts (coarse gravel and finer clastic sediment) by the time it reaches the project area. Older and coarser-grained boulder trains can be seen to the west of the project area, but at the plant and solar array site the alluvium is uniformly fine-grained. This is also the case for the distal portion of the bajada that extends southwest from the West Riverside Mountains that is crossed by the electrical transmission line.

The stratigraphy of the geotechnical trenches revealed a pattern of soil formation typical of Pleistocene sediments in this area. Holocene eolian sands and silts comprise the top 5 to 10 cm followed by flat-lying, coarsely bedded coarse gravelly sand with gravel stringers overlying a distinctly reddened argillic horizon at 35 to 60 centimeters (cm) depth. The argillic horizon itself overlies a silty, sandy gravel possessing a Stage II+ carbonate morphology at depths exceeding 60 cm. Both the nature of the sediment and the soil development, typical of alluvial fan surfaces in the xeric western deserts (McFadden et al., 1991), indicate low to no paleontological sensitivity. This is due not only to the subaerial deposition of the alluvium, but also to the intense chemical weathering associated with this type of soil development.

Eolian Sand Sheets and Dunes

The Rice Valley possesses spectacular sand ramps that practically cover the flanks of the Big Maria and West Riverside Mountains to the southeast of the project area, and the valley axis possesses an extensive sand sheet with limited barchanoid and coppice sand dune systems. Most are largely inactive at present, and the upper strata of the sand ramps include extensive Pleistocene and early Holocene deposits. Fossil finds in dune sands are limited to ancient dune sands of the Mesozoic; Quaternary eolian deposits are not known to contain scientifically important fossils.

Holocene Alluvium

Holocene sediments are younger than about 11,000 years ago, and therefore, are typified by weakly developed soils that frequently display an incipient caliche carbonate horizon. Otherwise, these sediments can be very similar to older Pleistocene alluvium. They are typified

by moderately to poorly bedded sands, silts, and gravels deposited in alluvial fan and valley fill or basin environments. Frequently, it is not possible to determine in a stratigraphic section the exact location of the Pleistocene-Holocene boundary and, as a consequence, it should be assumed that some Holocene sediments may contain facies of late Pleistocene age. In this arid setting, Holocene alluvium is considered to have low paleontological potential

Artificial Fill and Previously Disturbed Sediment

Construction on nearby roads and airfield facilities within and near the boundaries of the RSEP, have left varying depths of fill and disturbed soil in the area. Artificial fill and previously disturbed sediment would not have fossils in stratigraphic context. Therefore, this sediment has no paleontological potential and is not considered further in this assessment.

2.2.2.4 Paleontological Sensitivity of the Project Site

Paleontological sensitivity is a qualitative assessment made by a professional paleontologist taking into account the paleontological potential of the stratigraphic units present, the local geology and geomorphology, and any other local factors that may be germane. Paleontological potential is the probability that a given rock unit will yield scientifically significant fossils based on its geologic history and physical properties, as well as the available fossil record from that unit. According to SVP (1995; n.d.) standard guidelines, paleontological sensitivity consists of (1) the potential for yielding abundant or significant vertebrate fossils or for yielding a few significant fossils, large or small, vertebrate, invertebrate, or botanical, and (2) the importance of recovered evidence for new and significant taxonomic, phylogenetic, ecological, or stratigraphic data. The paleontological sensitivity ratings employed (Table 2-2):

TABLE 2-2
Paleontological Sensitivity Ratings Employed in this Assessment

Sensitivity	Definition
High	Assigned to geological formations known to contain paleontological resources that include rare, well-preserved, and/or fossil materials important to on-going paleoclimatic, paleobiological and/or evolutionary studies. They have the potential to produce, or have produced vertebrate remains that are the particular research focus of many paleontologists, and can represent important educational resources as well.
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 can also be applied to strata that have an unproven but strong potential to yield fossil remains based on its stratigraphy and/or geomorphologic 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 due to 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) may also be assigned a marginal or zero sensitivity rating. Manmade fill is also considered to possess zero (no) paleontological potential.

Source: Adapted from SVP, n.d.

2.2.2.5 Investigations to Date

A paleontological records search for the RSEP was conducted by the San Bernardino County Museum (SBCM). In addition, the online utility offered by the University of California Museum of Paleontology at Berkeley (UCMP) was searched using keywords that included geographically relevant designators. In addition, internet searches using Google™ were used to identify relevant paleontological and geological literature, and remote imagery of the area was examined using Google Earth™. Finally, Riverside County's (2009b) paleontological sensitivity map was consulted.

A reconnaissance-level paleontological survey was conducted of the area including a field review of the RSEP and the eastern Rice Valley. This was followed by a detailed study of the surface geomorphology of the project area. In addition, two trenches were excavated to a depth of 10 feet for geotechnical investigations at the project site, and the exposed strata were examined and diagrammed. The ground surface throughout the RSEP and along the transmission line corridor consists of alluvium and eolian sand of low to no paleontological sensitivity.

2.2.2.6 Paleontological Sensitivity of Units At or Near the Project Site

No paleontological records are known for Rice Valley, and no paleontologically sensitive sediments occur in or within 1 mile of the project area.

The Pleistocene alluvium in the project area possesses low paleontological sensitivity, while Holocene alluvial facies possess no paleontological sensitivity. Eolian sands in the project area also possess low paleontological sensitivity. Geomorphological investigations and the stratigraphy exposed by the geotechnical trenches suggest that the Holocene alluvium across the site does not exceed a foot in depth. Below this is the reddened soil of the upper stratum of Pleistocene alluvium

2.2.2.7 Potential Project Impacts

No direct or indirect impacts to non-renewable paleontological resources would occur from construction or operation of the RSEP or its linears.

Because no paleontological records are known, and no paleontologically sensitive sediments occur within the project area, impacts to paleontological resources would not occur from subsurface excavations associated with construction of the RSEP and its offsite lateral. No impacts to paleontological resources are expected from the operation of the RSEP.

SECTION 3

Monitoring and Mitigation Procedures

Because the project site is underlain entirely by low-sensitivity sediment, paleontological monitoring and mitigation measures are restricted to those construction-related activities that unearth paleontological resources. It is the responsibility of the PRS and the paleontological resources monitors (PRM) 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

> **The project area possesses low paleontological sensitivity. Therefore, this PRMMP will not be implemented unless and until the PRS determines that potentially fossiliferous sediments may be, or have been, encountered by construction equipment, pursuant to COC PAL-5.**

The exception to the above is the administration of the paleontological resources awareness module of the Worker Environmental Awareness Program training (WEAP) (see immediately below), which will be provided at their indoctrination to all supervisory personnel and workers involved in construction-related excavations at the project site.

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 on site, as per PAL-4. All management and supervisory personnel, and construction workers involved with ground-disturbing activities, will be required to take this course prior to beginning work on the project, and the monthly compliance report (MCR) will include a list of all workers who have taken the course each month. All construction workers will also 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 of the PRM and PRS. Appendix B provides the text of the paleontological resources module of the WEAP.

Project Standards: Upon implementation, 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 the project owner's onsite manager(s), and with the compliance project manager (CPM).

Reporting: ***Should this PRMMP be implemented*** (see the introduction to Section 3.1, above), 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.

No monthly compliance report (MCR) is necessary for paleontological resources until and unless the PRMMP is implemented (see the introduction to Section 3.1, above). Should monthly reporting for paleontological resources begin, the MCRs will be provided by the PRS to the Applicant'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 WEAP training, as per PAL-4.

Subsequent to implementation of this PRMMP, 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 project-related excavations. This 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.

If the PRMMP is not implemented, then no PRR will be necessary.

Non-Compliance and Other Incidents: Should the PRS or PRM identify any incidence of non-compliance with the CEC COCs, with the procedures in this PRMMP once implemented, or with the guidelines provided in the paleontological resources module of the WEAP, the onsite construction manager will be immediately notified, followed by notification of the PRS should the PRM be the reporting individual. If the PRM reports that the non-compliance 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 non-cooperation, the result of which substantively interferes with the PRM's discharge of duties, or harassment.

Experience with numerous projects suggests that most non-compliance incidents are consequences of one of these conditions:

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

Application of the WEAP training modules and active coordination between the PRS and construction supervisor(s) will be the most effective means of minimizing these types of incidents.

Changes: As per PAL-5, once implemented, 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 MCR. The letter or email shall include the justification for the change in monitoring and be submitted to the and the CPM for review and approval. 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.

Notifications: Requests or notifications from any party that would either implement monitoring, or affect an implemented monitoring schedule or scope, will be provided by the PRS to the CPM, at least 48 hours prior to the event. E-mail confirmation will be sent within 24 hours of any request to the PRS and PRM. Confirmations and other appropriate project activity documents will be included as attachments in the monthly PRR.

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 PRS or PRM (if monitoring has been implemented) will be notified with no delay. Construction activities with no potential to affect the discovered resource may continue uninterrupted elsewhere, provided appropriate monitoring continues.

Coordination: If monitoring is implemented, the PRM will consult with the project superintendent or appropriate construction manager at least once a week (as per PAL-2) to confirm the schedule of ground-disturbing activities. This coordination will be ongoing during ground-disturbance activities sufficiently deep to affect paleontologically sensitive sediments.

The PRM will coordinate with the project superintendent or appropriate construction manager to have a front-end loader or similar heavy construction equipment take bulk samples, if bulk sampling is needed. 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 in recovery of the discovered resource.

Monitoring Log and Recording Procedures: If monitoring is implemented, each PRM shall maintain a daily project log consisting of the DARs for that 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 will also 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")
- Unique designator number. This will be 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

The MCR shall consist of a copy of a summary of the monitoring and other paleontological activities. The summary will include the names of the PRS and the PRM(s) active during the month, general descriptions of training and monitored 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 paleontological resource monitoring, including any incidents of non-compliance or any changes to the monitoring plan that have been approved by the CPM. If no paleontological monitoring takes place in that month, the MCR shall explain in the summary why monitoring was not conducted, as per PAL-5.

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 the RSEP. Plans can be provided separately for separate components of the project (the project site and its linears). Maps shall identify areas where ground disturbance is anticipated. The

plan and profile drawings and site-grading plan 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 the RSEP or its linears 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

Construction monitoring will not be implemented unless, in the opinion of the PRS, the potential to impact sediments of moderate, high, or unknown paleontological sensitivity exists, pursuant to the conditions of PAL-5 and PAL-6 (Appendix A). Should a monitoring program be implemented, the following shall apply:

3.3.1 Safety

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.

3.3.2 Where Monitoring Will Take Place

If implemented, paleontological resources monitoring will take place where excavations are likely to affect potentially paleontologically sensitive strata, in the opinion of the PRS and in concurrence of the CPM. Monitoring will focus on exposed cuts and side walls, 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.

3.3.3 When Monitoring Will Take Place

Upon implementation, paleontological resource monitoring will taken place whenever, in the judgment of the PRS or PRM, there is a reasonable probability of excavations impacting paleontologically sensitive sediments.

3.3.4 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 microfossils 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 a sieve with a minimum screen size of 30 mesh. In most cases, screening should be accomplished by wet-sieving to ensure that microfossils are not obscured by aggregated sediment.

If the initial screening reveals 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.

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

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
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	
Field Safety Instructions	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	

TABLE 3-1
Paleontological Monitoring Equipment

Item	Number	Notes
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 each
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

3.4 Discovery of Fossils

Fossils may be discovered by construction personnel, the PRM, or the archaeological monitors. Regardless of the person making the discovery, prompt notification of the individuals noted is critical.

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 a PRM, the PRM must immediately be notified if there is one on duty. Otherwise the PRS must be notified. The PRM or PRS will then confirm that avoidance of the find is taking place and that the appropriate construction manager(s) have also been notified. After an initial assessment of

the find, the PRS will ensure that CPM is notified. The CPM must be notified within 24 hours, or on Monday if the discovery occurs on a weekend.

3.4.2 Avoidance and Continued Construction Activities

The PRS 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 the PRS affirms that appropriate monitoring is taking place in light of any find, or other information germane to a reassessment of paleontological resource sensitivity*.

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, and 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

3.4.4.1 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.

3.4.4.2 Excavation Logistics

The PRM will coordinate with the appropriate construction manager or project superintendent to locate an area proximal to 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 log book maintained by the individual in charge of excavation.

The equipment to be available 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	11x17 size

TABLE 3-2
Paleontological Specimen Recovery Equipment

Item	Minimum Number	Remarks
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 level	1	
Mason line	60 feet	
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	
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	
One-gallon plastic zip-lock 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 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, non-mineralized 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 CPM, 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, will also 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 the Owner 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 SBCM, for permanent accessioning and curation.[2] The SBCM is the regional repository for paleontological records and specimens. Curation will be under the direction of the staff of the SBCM and compliance with all curatorial conditions of the SBCM 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 SBCM.

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 SBCM 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.

[2] Note: Curation of specimens at the SBCM is subject to completion of negotiations and execution of an appropriate curatorial agreement with that institution. The SBCM 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

Conditions of Certification

PAL-1 The project owner shall provide the CPM with the resume and qualifications of its Paleontological Resources Specialist (PRS) for review and approval. If the approved PRS is replaced prior to completion of project mitigation and submittal of the Paleontological Resources Report, the project owner 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.
5. At least three years of paleontological resource mitigation and field experience in California and at least 1 year of experience leading paleontological resource mitigation and field activities. The project owner shall ensure that the PRS obtains qualified paleontological resource monitors 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 1 year of experience monitoring in California; or
    - AS or AA in geology, paleontology, or biology and 4 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 and 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(s) shall be provided to the CPM no later than 1 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 the CPM. The site grading plan and plan and profile drawings for the utility lines are acceptable for this purpose. The plan drawings shall 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. If the footprint of the project or its linear facilities changes, the project owner shall provide maps and drawings reflecting those changes to the PRS and the 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 the 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 the CPM. (2) If there are changes to the footprint of the project, revised maps and drawings shall be provided to the PRS and the 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 Resource 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 coarsegrained 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 meets 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 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 in-person PRS training during the project kick-off for those mentioned above. Following initial training, a CPM-approved video 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 these 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 script and final video to the CPM for approval if the project owner is planning to use a video for interim 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 video) 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 must 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 noncompliance 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 and that the summary is included in the monthly compliance reports. The summary shall 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 shall 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 Condition of Certification **PAL-7**). The project owner shall be responsible for paying any curation fees charged by the institution 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

My name is Geof Spaulding and I'm the designated Paleontologist for the Rice Solar Energy Project. Along with our Monitors, my role on the project team is to look out for and help you protect *fossils* that may be encountered during project excavations.

Y'all know fossils—they're the remains of prehistoric plants and animals, *and* they are protected by State and Federal Laws. Fossils include animal bones and teeth, and plant remains such as logs and even prehistoric seeds. Fossils also include such things as ancient burrows and tracks, and even really small remains like bird bones or rodent teeth of rodents.

(show Specimen 1) Here we see the track of an extinct trilobite preserved in mica-rich shale with the fossil of a trilobite of about the same size. These animals went extinct some 250 million years ago. And here we have two ammonites ***(show Specimen 2),*** which were essentially squids living in shells a lot like the modern nautilus of the South Pacific (***show Figure 1-*** chambered nautilus). However, these lived in the sea that covered most of California up to about 65 million years ago, when they too went extinct.

Fossils are non-renewable resources because they represent life and environments that no longer exist. If they're destroyed or taken without proper, scientifically controlled collection, the detailed evidence of that past life is lost forever. It doesn't help if the fossil is in somebody's private collection because scientists won't know that, and they won't have access to it. However, when properly collected fossils provide evidence not only of the types of animals or plants that grew here in the distant past, but also valuable data on past environments and even on climate change.

As important scientific and educational resources, fossils are protected by State and Federal law. It's those laws that require all of us to specifically watch for and take steps to protect fossils during excavations for the Rice Solar Energy Project. The laws protecting fossils are specific: NO individual can disturb fossils except in the course of their scientific investigation and controlled recovery. So we need to take care during excavations to identify and protect any fossils that may be uncovered until they are examined and removed by a qualified paleontologist.

Fossils that have been found in the region include the remains of Ice Age animals and plants. Mammoth, at least two species of extinct horse, and the extinct North American camel roamed the deserts of California during the last Ice Age when the climate was colder and wetter. Here we have a mammoth tooth similar to those found along the Colorado River not far to the east ***(show Specimen 3),*** and here we have a horse tooth from one of the ancient springs that dried up at the end of the last Ice Age (***(show Specimen 4).*** You may encounter their fossils either at depth at the plant site, or along the transmission line.

However, the alluvial fans in the area are not known to contain fossils, so you're unlikely to see a paleontological monitor around unless a fossil is discovered.

From studies of the geology of the site we know that sediment here is unlikely to yield fossils. But we cannot be absolutely sure. That's why the California Energy Commission requires this paleontological awareness training.

What you should be looking for is anything that looks strange or different- a bone or other remain that just looks out of place or is shaped strangely. These need to be brought to the attention of either the paleontological or the archaeological monitor, or to your construction supervisor. What you find may be a fossil that will need to be recovered properly to avoid violating laws protecting it.

If it doesn't look like a rock, it may not be a rock, and it might be a fossil. When they're covered with dirt, fossils are never as obvious as this cleaned and reconstructed specimen ***(show Specimen 5)*** Here we have a shoulder blade of the extinct North American camel, an animal that was once common in this region.

Keep in mind that we're looking for shells as well as bone. Snail shells such as this one ***(show Specimen 6)*** indicate the former presence of water, and wherever there was water animals congregated, and fossils could be preserved. The sediments from ancient springs in this area are important not only for their fossils, but also for what they can tell us of past environmental change.

Now remember, if you've discovered something, the first thing to do is stake off the area of the find for heavy-equipment avoidance, as well as for the safety of the crew investigating the find. We'll then determine whether you've actually encountered something scientifically significant.

If a paleontological find is made, excavations can continue elsewhere while the find is assessed and removed. Depending on the nature of the sediment, steps might also be taken to remove and save a sample of the dirt for later screening for small bones and teeth. After scientific recovery is completed, you or your supervisor will be informed that you may resume work there. The delay while recovery takes place will be kept as short as possible to scientifically recover the fossil find.

So if you think you've found a fossil, leave it where it is, contact the monitor or your supervisor, and divert construction activities away from the find. If a monitor is not immediately available, stake and flag it yourself in such a way that others will know not to enter that area. Use construction avoidance fencing, or lathe and tape, to create an exclusion zone where the fossil find can be protected until removed, and where the paleontologists can work to clear the find without having to worry about heavy equipment.

If you have any questions at all about your role in protecting fossils that could be discovered here at the Rice project site, ask your supervisor or the paleontological monitor and they can explain the procedures that I've outlined here. We're here to help *you* comply with the laws, and to help in making this resource available for future generations to learn from and enjoy.

So we're asking for your help. If you can be another pair of eyes, if you can call to our attention any fossils that you think you've found, and if you can help in protecting them by following these procedures, we would really appreciate it.

List of Illustrations (in order of presentation)

Specimen 1- Trilobite track in biotite rich Bright Angel Shale (Grand Canyon), with attendant trilobite of the same appropriate size (Brazil)

Specimen 2- Two Ammonites from the Cretaceous Austin Chalk of Texas

Figure 1 Chambered nautilus

Specimen 3 Mammoth tooth

Specimen 4 Molar- Pleistocene horse

Specimen 5- Scapula of WEC camel no. 2

Specimen 6- Planorbid snail shell.