

APPENDIX 5.8A

Paleontological Records Search and Literature Review



SAN BERNARDINO COUNTY MUSEUM

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COUNTY OF SAN BERNARDINO
PUBLIC AND SUPPORT
SERVICES GROUP

ROBERT L. McKERNAN
Director

21 December 2006

CH2M HILL
JAN - 2 2007

CH2MHill
attn: Michelle Harris, Geologist
2285 Corporate Circle, Suite #200
Henderson, NV 89074

re: **PALEONTOLOGY LITERATURE AND RECORDS REVIEW, IVANPAH SOLAR
POWER GENERATING STATION, IVANPAH LAKE REGION, SAN
BERNARDINO COUNTY, CALIFORNIA**

Dear Ms. Harris,

The Division of Geological Sciences of the San Bernardino County Museum (SBCM) has completed a literature review and records search for the above-referenced property in the Ivanpah Valley region of San Bernardino County, California. The property is located in portions of sections 26, 27, 33 and 34, Township 17 North, Range 14 East, San Bernardino Base and Meridian, as seen on the Ivanpah Lake, California 7.5' United States Geological Survey topographic quadrangle map (1985 provisional edition).

Previous geologic mapping (Jennings, 1961) indicates that the proposed study area is located on Holocene alluvium that likely overlies subsurface Quaternary lake sediments. Depending upon the age at which this subsurface lacustrine alluvium was laid down, which cannot be determined with any precision *a priori*, this lithologic unit may have high paleontologic sensitivity. Similar sediments elsewhere in the near vicinity of the project area have yielded fossil resources. Near the northern end of Ivanpah Lake, for example, large mammal bone fragments were recovered from Quaternary lacustrine sediments.

For this review, I conducted a search of the Regional Paleontologic Locality Inventory (RPLI) at the SBCM. The results of this search indicate that no previously known paleontologic resource localities are recorded by the SBCM from the study area, nor from within one mile in any direction. The nearest paleontologic resource localities are recorded between one and two miles to the southeast, near the western border of Ivanpah Lake. These localities have produced fossil remains of tortoise (*Gopherus* sp.), kangaroo rat (*Dipodomys* sp.), wood rat (*Neotoma* sp.), and other small vertebrates, as well as a partial hackberry seed (*Celtis* sp.) and clasts of tufa from the high stand of Ivanpah Lake. Fossil hackberry seeds are abundant in nearby cave deposits which contain Pleistocene vertebrate faunas (Reynolds and others, 1991). Tufa is common at the top of the sedimentary section at several Pleistocene lakes in San Bernardino County, including Valley Wells, Piute Valley, and Cadiz.

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However, it is important to note that none of the localities near Ivanpah Lake has yielded temporally diagnostic fossil remains. For this reason, a Pleistocene age for these faunas can be suggested, but not demonstrated.

Recommendations

The results of the literature review and the check of the RPLI at the SBCM demonstrate that excavation into undisturbed subsurface sediments of Ivanpah Lake has high potential to impact paleontologic resources, depending upon the age at which these sediments were deposited. Shallow excavation is not expected to impact paleontologic resources, and so no plan to mitigate such impacts is required for these activities. However, excavation at depths in excess of ~5' below the existing ground surface are estimated to have potential to impact these lacustrine sediments, and so will require a qualified vertebrate paleontologist to develop a program to mitigate impacts to significant nonrenewable paleontologic resources. Such a mitigation program must be consistent with the provisions of the California Environmental Quality Act (Scott and Springer, 2003), as well as with regulations currently implemented by the County of San Bernardino and the proposed guidelines of the Society of Vertebrate Paleontology. This mitigation program should include, but not be limited to:

1. Monitoring of excavation in areas identified as likely to contain paleontologic resources by a qualified paleontologic monitor. Based upon the results of this review, areas requiring monitoring include all previously undisturbed Quaternary lake sediments of Pleistocene age present at depths of ~5' and more below the existing ground surface. Where necessary, paleontologic monitors should be equipped to salvage fossils as they are unearthed, to avoid construction delays, and to remove samples of sediments that are likely to contain the remains of small fossil invertebrates and vertebrates. Monitors must be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens. Monitoring may be reduced if the potentially-fossiliferous units described herein are not present in the subsurface, or if present are determined upon exposure and examination by qualified paleontologic personnel to have low potential to contain fossil resources.
 2. Preparation of all recovered specimens to a point of identification and permanent preservation, including washing of sediments to recover small invertebrates and vertebrates. Preparation and stabilization of all recovered fossils are essential in order to fully mitigate adverse impacts to the resources (Scott and others, 2004).
 3. Identification and curation of specimens into an established, accredited museum repository with permanent retrievable paleontologic storage (e.g., SBCM). These procedures are also essential steps in effective paleontologic mitigation (Scott and others, 2004) and CEQA compliance (Scott and Springer, 2003). The paleontologist must have a written repository agreement in hand prior to the initiation of mitigation activities. Mitigation of adverse impacts to significant paleontologic resources is not considered complete until such curation into an established museum repository has been fully completed and documented.
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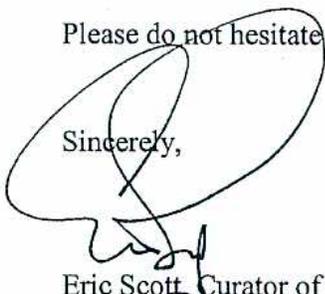
4. Preparation of a report of findings with an appended itemized inventory of specimens. The report and inventory, when submitted to the appropriate Lead Agency along with confirmation of the curation of recovered specimens into an established, accredited museum repository, will signify completion of the program to mitigate impacts to paleontologic resources.

References

- Jennings, C.W., 1961. Geologic map of California, Kingman sheet, 1:250,000. Division of Mines and Geology.
- Reynolds, R.E., R.L. Reynolds, C.J. Bell, N.J. Czaplewski, H.T. Goodwin, J.I. Mead and B. Roth, 1991. The Kokoweef Cave faunal assemblage. *In* J. Reynolds (ed.), *Crossing the borders: Quaternary studies in eastern California and southwestern Nevada*. Redlands: SBCM Association Special Publication MDQRC 1991, p. 97-103.
- Scott, E. and K. Springer, 2003. CEQA and fossil preservation in southern California. *The Environmental Monitor*, Fall 2003, p. 4-10, 17.
- Scott, E., K. Springer and J.C. Sagebiel, 2004. Vertebrate paleontology in the Mojave Desert: the continuing importance of "follow-through" in preserving paleontologic resources. *In* M.W. Allen and J. Reed (eds.) *The human journey and ancient life in California's deserts: Proceedings from the 2001 Millennium Conference*. Ridgecrest: Maturango Museum Publication No. 15, p. 65-70.

Please do not hesitate to contact us if you have any further questions.

Sincerely,



Eric Scott, Curator of Paleontology
Division of Geological Sciences
San Bernardino County Museum

Locality SBCM 1.2.3 is located in the NW $\frac{1}{4}$ of the NE $\frac{1}{4}$ of the SW $\frac{1}{4}$ of the same section.

Locality SBCM 1.2.4 is situated in the SE $\frac{1}{4}$ of the SE $\frac{1}{4}$ of the NE $\frac{1}{4}$ of section 35, T 17N, R 14E, SBB&M.