# Supplemental Responses to CEC Data Requests Set Two: Nos. A151 and A152

## Amended Application for Certification for HYDROGEN ENERGY CALIFORNIA (08-AFC-8A) Kern County, California

Prepared for:
**Hydrogen Energy California LLC**

hydrogen energy california

Submitted to:

**California Energy Commission**

**U.S Department of Energy**



Prepared by:

URS

**February 2013**

**SUPPLEMENTAL RESPONSES TO DATA REQUESTS A151 and A152**
**FROM CALIFORNIA ENERGY COMMISSION (CEC)**

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**FIGURES**



**LIST OF ACRONYMS AND ABBREVIATIONS USED IN RESPONSES**

| | |
|---|---|
| AFC | Application for Certification |
| CEC | California Energy Commission |
| $CO_2$ | carbon dioxide |
| CRHR | California Register of Historical Resources |
| CRMMP | Cultural Resources Monitoring and Mitigation Plan |
| DPR | Department of Parks and Recreation |
| HECA | Hydrogen Energy California |

**Technical Area:** Cultural Resources
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## INTRODUCTION

All responses to these Data Requests containing references to specific archaeological site location or information, or cultural resources of concern to Native Americans, should be submitted under a request for confidentiality.

## BACKGROUND

The detailed geoarchaeological study provided as Data Response 77 convincingly argues that much of the proposed project is to be located in areas with high sensitivity for buried cultural resources. The project footprint, process water pipeline, and transmission line are all planned for Quaternary Alluvium (Qa), which has high cultural resources sensitivity. The $CO_2$ pipeline would cross three soil types (Qb, Qa, and QTt), which have high, medium, and low sensitivity, respectively. The new natural gas pipeline route would also extend across multiple soil types (Qb and Qoa), resulting in one-third of the route crossing areas of high sensitivity and the remainder in areas of low sensitivity (Data Response 77, Table 77-1 and Fig. 77-5). Based on previous archaeological survey and excavation in the HECA project vicinity, it is clear that as-yet- unidentified buried sites are likely to be prehistoric village sites with human remains.

Staff assumes parts of the project site and project linear facilities rights-of-way (ROWs) have been disturbed by agriculture to a depth of three feet, but considerable proposed project ground disturbance would exceed that depth. The ground disturbance resulting from the construction of equipment installations at the plant site would be likely to extend as deep as 10 feet below the surface. The $CO_2$, natural gas, and process water pipelines would be installed at least five feet below grade. The amount of relatively deep ground disturbance proposed in an area sensitive for archaeological resources is considerable.

Because of the high archaeological sensitivity through much of the project site and along project linear facilities rights-of-way (ROWs), staff expects that archaeological monitoring will be required during construction. During the April, 2010 Workshop, staff proposed selected geoarchaeological field sampling within the project area to obtain more project-specific information. Energy Commission staff believes this would help focus the monitoring effort and would result in better protection for the resources (per the State Historic Preservation Office).

The applicant should also be aware that once geoarchaeological field sampling has refined our understanding of the parts of the project area with the highest archaeological sensitivity, a subsurface inventory survey employing backhoe trenches may be required in some of these areas to identify extremely sensitive resources.

The applicant agreed to design a plan and conduct geoarchaeological field sampling “once a development plan has been finalized for the Project Site” (April, 2010 Workshop Response 23). As of the date of this filing, staff has not received this plan. While staff understands that some of the project elements are still being refined, staff considers most of the project elements to be sufficiently developed for a plan to be prepared and field sampling to take place. Staff must establish a factual basis for the assessment of potential effects to buried deposits within the project impact areas and development of monitoring conditions for the project.

## DATA REQUEST

***A151. Please prepare a primary geoarchaeological field study research plan for the project plant site and linear facility corridors. The plan must be prepared by a prehistoric archaeologist who, at a minimum, meets the U.S. Secretary of Interior's Professional Qualifications Standards for prehistoric archaeology, as published in Title 36, Code of Federal Regulations, part 61, and whose résumé includes the completion of graduate-level coursework in geoarchaeology, physical geography, geomorphology, or Quaternary science, or education and experience acceptable to cultural resources staff. A résumé demonstrating the geoarchaeologist's qualifications should be included with the proposed plan. The plan shall include soil profiling within the Project Site where the deepest trenching would occur and along the linear facilities at old stream or water crossings. Submit the research plan for staff approval.***

## SUPPLEMENTAL RESPONSE

As presented in the previous response to Data Request A151 submitted to the California Energy Commission (CEC) on October 10, 2012, and as further explained when discussing Data Request A195 with CEC staff, the Applicant still questions the value of a geoarchaeological investigation given the high archaeological and/or geoarchaeological sensitivity of the entire Project area, and the ultimate necessity of complete archaeological monitoring for the duration of project-related ground-disturbing activities. Nevertheless, to accommodate staff's desire for this information, the Applicant has prepared a plan outlining our proposed approach for conducting the requested geoarchaeological investigation.

The plan set forth below provides details regarding field study and reporting activities and is accompanied by Figure A151-2[1], which shows the proposed trenching locations. This figure shows the locations of cultural resources in the Project area, and therefore, this figure has been submitted under confidential cover. The Applicant is currently approaching landowners along the Project linears to obtain approval for conducting subsurface activities at 23 proposed trenching locations along the Project linears. Because subsurface work and access to the Project linears has not been granted, Figure A151-2 currently only depicts 10 proposed trenching locations within the Project Site and Controlled Area. If approval is obtained from the landowners along the Project linears, the Applicant will submit a revised figure showing additional trenching locations. The activities described below are intended to apply to all trenching locations, including the 10 locations within the Project Site and Controlled Area, and the 23 locations along the Project linears (where and when access is granted).

Per CEC staff request, the following geoarchaeological field study has been designed to meet staff's needs to better understand subsurface conditions, and the process geomorphology that comprises the Project area.

### Geoarchaeological Field Study

The purpose of the investigation is primarily to provide key information necessary to the understanding of two related aspects of the historic character of Project area landforms: (1) the potential for each landform to harbor intact buried archaeological deposits, greater than 1 meter in depth (i.e., geoarchaeological sensitivity); and (2) the potential for surface archaeological

[1] Figure A151-1 was titled *Quaternary Landforms and their Geoarchaeological Sensitivity within the HECA Project Vicinity*, and was docketed on October 10, 2012 with the previous response.

sites, identified through pedestrian surveys, to have an associated shallowly buried component, based on the near-surface developmental characteristics of the landform on which each site is situated. In each of these cases, the level of effort and methodology should be commensurate with the degree of potential Project-related impacts to archaeological resources. Subsurface field investigations will be targeted to assess those areas with the highest potential for containing buried archaeological deposits and/or stratigraphic units of appropriate age to better refine our understanding of the post-terminal Pleistocene geomorphic evolution of the Project area. Archaeological sites in California are very often associated with ecotones—ecological areas at the intersection of two or more biotic communities—which are themselves generally associated with variability in the underlying soils and geomorphology (Moratto, 1984:589). As such, a larger number of proposed units will be placed at the intersection of the mapped geomorphic units. In addition, the number of proposed subsurface investigation units will be generally proportional to the level of potential Project impacts (i.e., more excavation units in the Project Site, versus the linear alignments).

The primary proposed mode of subsurface investigation is backhoe trenching. Depending on cohesiveness of sediments and other subsurface conditions, a backhoe can generally expose sediments up to 15 feet below surface. This depth has been demonstrated to be sufficient for exposing the majority of Holocene landforms within the San Joaquin Valley (Meyer, Rosenthal, and Young, 2010:143). Backhoe trenching is also an expedient means of exposing observable soil profiles and sufficient sediment to identify any archaeological materials that may be present in the vicinity of the excavation.

A maximum of eight backhoe trenches will be excavated across the Project Site and an additional two within the Controlled Area (Figure A151-2). Within the Project Site, the placement of trenches is based on the proposed layout of the facility with the areas of deepest soil disturbance being the focus. The Applicant is currently seeking approval to conduct trenching in 23 additional locations along the Project linear footprints. Given the scale of the attached figure, the plotted trench locations on Figure A151-2 are approximate and may be slightly adjusted to accommodate landowner requirements while still addressing the requirements of the geoarchaeological analyses. The figure is intended for use by the CEC staff as a means to assess the Applicant's proposed plan.

Each trench will be excavated to a maximum depth of approximately 4.5 meters (15 feet) below surface and will be approximately 15 feet long, using a 3-foot bucket. These smaller trenches are the most expedient means of creating subsurface profiles useful in documenting stratigraphic units and depositional setting. In accordance with Occupational Safety and Health Administration standards, unshored trenches will not be entered after they have reached 5 feet in depth. In cases where it becomes necessary to more closely inspect subsurface stratigraphy, possible archaeological features, or unclear stratigraphic contacts that cannot be discerned from the surface, the trench will be shored using hydraulic shoring so that the Project Geoarchaeologist[2] can enter the trench, document stratigraphy and pedogenic indicators in detail, and/or collect soil and dating samples.

For each excavated trench, the Project Geoarchaeologist will produce a measured representative profile drawing, using a metric scale. Observed stratigraphic units will be described based on physical characteristics such as composition (grain size, parent material), color, superposition, textural transitions, and pedogenic properties (i.e., relative soil development). Each profile, including all observable textural and soil transitions, will be logged

[2] Project Geoarchaeologist shall meet the qualification standards of Condition of Certification **CUL-1** in the April 2009 preliminary staff assessment for the subject proposed project.

on standard soil recordation forms, and photographed. These will include a detailed description of each lithostratigraphic and pedostratigraphic unit, and will be used to correlate units identified in other trenches. In trenches where archaeological features are observed in profile, or where cross-cutting or interfingered strata of different depositional units are present, a detailed profile drawing will be completed for one entire wall of the trench, to document the context of any unique features.

The information collected in the soil recordation forms will be used to produce detailed written descriptions, appropriate to the character of each lithostratigraphic and pedostratigraphic unit. Each trench will be photographed with a metric scale and north arrow.

A maximum of 11 radiocarbon samples will be submitted for analysis, to determine the depositional rates and approximate ages of the major landforms present, and to constrain the dates of any paleosols or archaeological deposits that are found. Discrete, in-place charcoal samples will be used for dating. In the absence of such deposits, bulk humate samples will be submitted for Accelerator Mass Spectrometry analysis.

At least one additional archaeologist will be on site to assist in monitoring and sorting spoils excavated from the geoarchaeological trenches. Rakes and other hand tools will be used to actively sort through material as it is excavated from each trench. The Project Geoarchaeologist will assist in identifying paleosols as they are excavated, and these will be targeted for monitoring. Additionally, a small amount of material (three 5-gallon buckets) from each found lithostratigraphic unit or major process-related lithostratigraphic sequence in each of the profiles subject to measured drawing, and from the A Horizon of each found pedostratigraphic unit, will be removed from the profile wall and screened through 1/4-inch hardware mesh. Where lithostratigraphic units or major process-related lithostratigraphic sequences are demonstrably high-energy deposits of large gravel that range in size from pebbles to boulders, no screening will occur, because such deposits have virtually no potential to preserve primary artifact and ecofact associations. Where such lithostratigraphic units or sequences—or pedostratigraphic units—are not apparent, the same amount of material will be screened through the same size mesh from 50-centimeter (cm)-thick arbitrary levels down the wall of each profile.

The Project Geoarchaeologist shall mechanically excavate through any buried archaeological deposits encountered, unless such deposits contain human remains, using arbitrary levels no greater than 20-cm thick; screen the arbitrary levels through 1/4-inch hardware mesh; and provenience all artifacts, ecofacts, and other material culture finds to those arbitrary levels. Archaeological deposits found during the trenching activities will be recorded on Department of Parks and Recreation (DPR) 523 forms. Formal evaluation of site eligibility and/or data recovery is beyond the current scope. The geoarchaeological study is not designed to assess eligibility of an archaeological site. Additional scoping and consultation with the CEC will be necessary to complete resource evaluations (i.e., National Register of Historic Places and/or California Register of Historical Resources [CRHR] eligibility) of any identified archaeological deposits.

**Reporting**

A report describing the results of the geoarchaeological field study set out herein (dependent on landowner access), and of the implications of these results on the assumptions made during the initial geoarchaeological assessment, will be produced. This report will include: revised mapping of the surface geomorphology of the Project area (map scale of ≥1:12,000) where trenches have been excavated; maps and descriptions of all excavated trench locations; graphic

and written descriptions of the stratigraphic profiles of the Project area, including an analysis of the depth and extent of any potentially sensitive paleosols; a graphic showing the correlation of stratigraphic units across the Project area; a processual geologic interpretation and the approximate age of subdivisions of the master column that reflect shifts in local depositional regimes or depositional history, and that reflect time ranges that correspond to the prehistory and history of the region, as currently understood; DPR 523 forms; and descriptions and preliminary interpretations of any encountered archaeological deposits. Formal reporting of radiocarbon analysis results will be included as an appendix. The report will also provide an interpretation of the character of the prehistoric or historic land use that each encountered archaeological deposit represents; an interpretation, with reference to the information gathered and developed above, of the likelihood that buried archaeological deposits are present in each of the identified landforms or portions thereof; a summary, on the basis of the current understanding of the prehistory and history of the region, of what site types are most likely to be found; and recommendations, based on the present geoarchaeological study, for the locations and extent (horizontal and vertical) of potential mitigation measures that would be most consistent with California Environmental Quality Act requirements for mitigation of impacts through avoidance, when possible, and with the historic preservation goal of recovering valid scientific data from CRHR-eligible archaeological deposits whose destruction cannot be avoided.

**References**

Meyer, Jack, D. Craig Young, and Jeffrey S. Rosenthal, 2010. Cultural Resources Inventory of Caltrans District 6 and 9 Rural Conventional Highways, Volume 1: A Geoarchaeological Overview and Assessment of Caltrans Districts 6 and 9. Far Western Anthropological Research Group, Inc. Report on File at the California Department of Transportation, District 6. Fresno.

Moratto, Michael J., 1984. California Archaeology. New York: Academic Press.

Figure A151-2 Quaternary Landforms and Geoarchaeological Trench Locations (Submitted under separate confidential cover)

## DATA REQUEST

***A152. Once staff has approved the plan, please have the qualified geoarchaeologist conduct the field study and prepare a report of the results. The primary study and resulting report should, at a minimum, include the following elements:***

***a. A map of the present landforms in the project area at a scale of not less than 1:24,000; the data sources for the map may be any combination of published maps, satellite or aerial imagery that has been subject to field verification, and the result of field mapping efforts;***

***b. A sampling strategy to document the stratigraphy of the portions of the landforms in the project impact areas where the construction of the proposed project will involve disturbance at depths greater than 3 feet;***

***c. Data collection necessary for determinations of the physical character, the ages, and the depositional rates of the various sedimentary deposits and paleosols that may be beneath the surface of the project impact areas to the proposed maximum depth of ground disturbance. Each landform must be sampled. Data collection at each sampling locale should include a measured profile drawing and a profile photograph with a metric scale, and the screening of a small sample (three 5-gallon buckets) of sediment from the major sedimentary deposits in each profile through 0.25-inch hardware cloth. Data collection should also include the collection and assaying of enough soil humate samples to reliably radiocarbon-date a master stratigraphic column for each sampled landform; and***

***d. An analysis of the collected field data and an assessment, based on those data, of the likelihood of the presence of buried archaeological deposits in the project impact areas, and, to the extent possible, the likely age and character of such deposits.***

## REFERENCES CITED

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**Hale, Mark R., and Leroy T. Laurie. 2009. *Confidential Archaeological Reconnaissance, Hydrogen Energy California Study Area, Kern County, California.* May. URS Corporation. Prepared for Hydrogen Energy International LLC, Long Beach, CA. Submitted to California Energy Commission, Sacramento, CA. Docket No. 08-AFC-8.**

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**Jackson, Thomas L., Lisa A. Shapiro, and Jerome H. King. 1998. *Prehistoric Archaeological Resources Inventory and Evaluation at Naval Petroleum Reserve No. 1 (Elk Hills), Kern County, California.* Draft. November. Pacific Legacy, Inc., Aptos, CA. Submitted to ICF Kaiser Engineers, Inc., Oakland, CA. On file, Southern San Joaquin Valley Information Center, California Historical Resources Information System, Bakersfield. Study KE-02268.**

**JRP Historical Consulting. 2009. *Historic Architecture Technical Report: Inventory and Evaluation, Hydrogen Energy California Project.* April. Davis, CA. Prepared for URS Corporation, San Francisco, CA. Submitted to California Energy Commission, Sacramento, CA. Docket No. 08-AFC-8.**

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**SUPPLEMENTAL RESPONSE**

Please see the Applicant's supplemental response to Data Request A151.

**BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT**
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***AMENDED APPLICATION FOR CERTIFICATION FOR THE HYDROGEN ENERGY CALIFORNIA PROJECT***

**Docket No. 08-AFC-08A**
***PROOF OF SERVICE***
**(Revised 12/24/12)**

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## DECLARATION OF SERVICE

I, Dale Shileikis, declare that on February 1, 2013, I served and filed copies of the attached Revised Responses to CEC Data Requests Set Two: Nos. A151 and A152, dated February, 2013. This document is accompanied by the most recent Proof of Service list, which I copied from the web page for this project at: http://www.energy.ca.gov/sitingcases/hydrogen_energy/index.html.

The document has been sent to the other parties in this proceeding (as shown on the Proof of Service list) and to the Commission's Docket Unit, as appropriate, in the following manner:

(*Check one*)

For service to all other parties and filing with the Docket Unit at the Energy Commission:

_X_ I e-mailed the document to all e-mail addresses on the Service List above and personally delivered it or deposited it in the US mail with first class postage to those parties noted above as "hard copy required"; OR

____ Instead of e-mailing the document, I personally delivered it or deposited it in the US mail with first class postage to all of the persons on the Service List for whom a mailing address is given.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct, and that I am over the age of 18 years.

Dated: 2/1/13