

5. ENVIRONMENTAL INFORMATION

The following sections, 5.1 through 5.16, provide the environmental information required for this Application for Certification (AFC) Amendment:

- Section 5.1 Air Quality
- Section 5.2 Biological Resources
- Section 5.3 Cultural Resources
- Section 5.4 Land Use and Agriculture
- Section 5.5 Noise
- Section 5.6 Public Health
- Section 5.7 Worker Safety and Health
- Section 5.8 Socioeconomics/Environmental Justice
- Section 5.9 Soils
- Section 5.10 Traffic and Transportation
- Section 5.11 Visual Resources
- Section 5.12 Hazardous Materials Handling
- Section 5.13 Waste Management
- Section 5.14 Water Resources
- Section 5.15 Geological Hazards and Resources
- Section 5.16 Paleontological Resources

This AFC Amendment supersedes previous application materials in their entirety, unless noted otherwise. Documents submitted to date include the AFC submitted on July 31, 2008, and the Revised AFC submitted on May 28, 2009. CEC Staff issued additional requests for information on August 5, 2011. Responses to these requests are incorporated into this AFC Amendment, as summarized in Table 5.0-1.

**Table 5.0-1
Summary of Responses to CEC August 5, 2011 Information Requests**

Data Request	Resource Area	Topic	Comment	Response
1	Air Quality	Revised process description and heat/energy balance for urea manufacturing	Revised process description and heat/energy balance that includes the urea manufacture (needed both for AQ/GHG and visible/thermal plume analysis). This should include revised AQ/GHG emission estimates that include all changes to project assumptions including urea trucking and any other new transportation (ammonia) needs and ammonia/other pollutant emissions from the urea production process.	<p>Description of the heat/energy balance that includes urea manufacture can be found in Chapter 2 and Chapter 5.1 – Sections 5.1.2.3, 5.1.2.4.</p> <p>Description of the visible plume can be found in Section 5.1.2.5 and in Visual Resources Section.</p> <p>For Alternative 1, total Project air emission can be found in Section 5.1.2.3, and total GHG emissions can be found in Section 5.1.2.4.</p> <p>For Alternative 2, emissions of criteria pollutants and GHG for transportation can be found in Section 5.1.3.</p> <p>Emissions for Alternative 1 can be found in Appendices E-3, E-5, and E-6.</p> <p>Emissions for Alternative 2 can be found in Appendix E-12.</p>
2	Air Quality	CO ₂ transport/ use/ sequestration assumptions	Any revised assumptions regarding CO ₂ transport/ use/sequestration.	<p>Discussions of GHG emissions associated with Alternative 1 are found in Section 5.1.2.4 and Appendix E.</p> <p>Discussion of GHG emissions associated with Alternative 2 is provided in Section 5.1.3 and Appendix E-12.</p>
3	Air Quality	Compliance with or exemption from SB 1368 EPS	Explicit description/assumptions regarding compliance with or exemption from SB 1368 EPS (i.e., the project’s annualized capacity factor including the urea facilities and oil field activities).	A description/assumptions regarding compliance with or exemption from SB 1368 EPS can be found in Section 5.1.2.4, Table 5.1-23, and Appendix E-6.
4	Air Quality	Best Available Control Technology (BACT) analysis	Best Available Control Technology (BACT) analysis for Air Quality and for greenhouse gases (GHG).	<p>See AFC Amendment Sections 5.1.2.3, 5.1.2.4, 5.1.5.13, Table 5.1-39, Appendix E-11.</p> <p>The GHG BACT analysis was prepared and submitted to the USEPA with the PSD permit application, a revised GHG BACT analysis will be provided with a revised PSD permit application.</p>

**Table 5.0-1
Summary of Responses to CEC August 5, 2011 Information Requests (Continued)**

Data Request	Resource Area	Topic	Comment	Response
5	Biological Resources	Lake or Streambed Alteration Agreement application (Section 1600) and Incidental Take Permit (Section 2081)	California Department of Fish and Game permit applications – staff requires the applicant prepare and submit a Lake or Streambed Alteration Agreement application per California Fish and Game Code Section 1600. In addition, staff requires the applicant prepare and submit to Energy Commission staff a 2081 Incidental Take Permit application inclusive of a compensatory habitat mitigation proposal and identification of mitigation lands. Staff cannot prepare the biological resources section of the Final Staff Assessment without these permit applications. Staff will use the provided information to prepare conditions of certifications for compensatory mitigation and project impact avoidance and minimization measures for state-listed species and state jurisdictional waters based on the Project's impacts to these habitats.	See AFC Amendment—Tables 5.2-9 and 5.2-11 note the need and dates to obtain these permits. AFC Amendment Sections 5.2.1.3, 5.2.2.1, and 5.2.2.2 discuss the survey conducted for the proposed Project and impacts to jurisdictional waters. The section also discusses compliance with the USACE wetland delineation requirements and relevant USACE and RWQCB permits. Section 5.2.2.3 notes the California Fish and Game 2081 permit. AFC Amendment Table 5.2.13 notes the sections (5.2.1.3, 5.2.2.1, and 5.2.2.2) relevant to the California Fish and Game Code Section 1600.
6	Biological Resources	Compensatory habitat mitigation proposal	Compensatory habitat mitigation proposal – staff requires the applicant submit habitat impact acreages for San Joaquin kit fox, blunt-nosed leopard lizard, Swainson's hawk, western burrowing owl, Tipton kangaroo rat, giant kangaroo rat, and San Joaquin antelope squirrel for the power plant site and linear facilities. The applicant must also provide additional information on whether the 223 acres in the 473-acre project site will be permanently fenced off for use by wildlife such as San Joaquin kit fox or not fenced and useable by wildlife by maintaining the 223 acres in agriculture or revegetating as grassland. Intersection improvements have been identified for	<u>Habitat impact acreage</u> : Table 5.2-9. <u>Blunt-nosed leopard lizard</u> : No acreage is provided. Text notes that a survey will be conducted in 2012, and the Project would minimize impacts, and interactions would be less likely due to the limited amount of suitable habitat. <u>Swainson's hawk</u> : Text notes the potential occurrence along the offsite Project linear facilities, and the Project Site. No impact acreage is provided. <u>Western borrowing owl</u> : Text notes the potential direct impacts to burrowing owl but not impact acreage is provided. <u>Tipton kangaroo rat</u> : Text notes the potential presence of

**Table 5.0-1
Summary of Responses to CEC August 5, 2011 Information Requests (Continued)**

Data Request	Resource Area	Topic	Comment	Response
			<p>two locations where an additional 12 feet would be required within the 60-foot road right-of-way, the intersection of Dairy Road and Stockdale Highway and the intersection of Dairy Road and Adohr Road. The applicant must also include these habitat acreages into the species' habitat impact calculations. Based on the habitat impact acreages, staff requires that the applicant submit a compensatory habitat mitigation proposal for each species listed above to indicate how the project's impacts to habitat loss would be mitigated.</p>	<p>Tipton rats within the project area. However, no impact acreage is provided.</p> <p><u>Giant kangaroo rat</u>: Text notes that no giant kangaroo are expected to be present north of the California Aqueduct. The species is assumed to be present south of the aqueduct.</p> <p><u>San Joaquin antelope squirrel</u>: The text discusses the Nelson antelope squirrel and notes that this species is not present north of the Aqueduct. It does not say anything about the area south of the Aqueduct.</p> <p><u>Movement of the San Joaquin kit fox</u>: The text indicates that offsite mitigation habitat would be provided to compensate for potential impact of land used for movement and migration habitat.</p> <p><u>Compensatory habitat mitigation</u>: Section 5.2.4.3 summarizes the compensatory habitat mitigation proposal for the affected species.</p> <p>The habitat impacts of the proposed intersection improvements will be provided in a separate compensatory habitat mitigation proposal.</p>
7	Biological Resources	Draft impact avoidance and minimization plans	<p>Draft impact avoidance and minimization plans – as specified in staff's proposed conditions of certification, staff requires the applicant submit draft impact avoidance plans for San Joaquin kit fox, blunt-nosed leopard lizard, western burrowing owl, a Small Mammal Relocation Plan, special-status plant species, and a Revegetation Plan in order to ensure a timely receipt of final agency-approved impact avoidance plans. Due to large traffic volumes projected throughout operation of the project, the San Joaquin Kit Fox Impact Avoidance and Minimization Plan should incorporate long-term monitoring for kit fox</p>	<p>See AFC Amendment <u>Section 5.2.4, which describes the proposed avoidance and minimization plans for the affected species</u>:</p> <ul style="list-style-type: none"> - San Joaquin kit fox: BIO-16 - Blunt-nosed leopard lizard: BIO-6 - Western burrowing owl: BIO-15 - Small Mammal Relocation Plan: BIO-17 - Special-status plant species: BIO-1, BIO-2, and BIO-3 - Revegetation plan: BIO-3 <p><u>Long-term monitoring for kit fox mortality from vehicle strikes</u>: Further discussion with the CEC is necessary to</p>

**Table 5.0-1
Summary of Responses to CEC August 5, 2011 Information Requests (Continued)**

Data Request	Resource Area	Topic	Comment	Response
			mortality from vehicle strikes attributable to the project during commercial operation. Submittal of these draft plans also requires the applicant consider maintenance plans for all linear facilities. If routine maintenance of the linear facilities would require consistent vehicle traffic along the facility roads for operation and maintenance, staff, CDFG, and the Service may consider this a permanent impact and permanent loss of habitat rather than temporary.	define the scope and objectives of long-term vehicle mortality monitoring. The applicant has not identified a suitable monitoring method that would differentiate vehicle strikes due to the HECA Project from mortality associated with other future projects in the region. <u>Maintenance plans:</u> BIO-10
8	Biological Resources	Clean Water Act Section 404 jurisdiction	Clean Water Act Section 404 jurisdiction – staff requires the applicant perform a formal wetland delineation, submit a Waters of the U.S. map to the U.S. Army Corps of Engineers (Corps) for verification, and request a jurisdictional determination from the Corps on the occurrence of jurisdictional waters of the U.S. including wetlands in the project area.	See AFC Amendment Table 5.2-1. Sections 5.2.1.3, 5.2.2.1 (Text indicates that jurisdictional delineation will be submitted to USACE in spring 2012).
9	Biological Resources	Alternative carbon dioxide pipeline alignment	Revised carbon dioxide pipeline alignment – staff requires that the applicant provide an alternative for the carbon dioxide pipeline alignment that would avoid land use conflicts with conservation lands. The current proposal for the carbon dioxide pipeline route would go through lands either under an existing conservation easement or proposed for conservation under the draft Occidental of Elk Hills Habitat Conservation Plan and CDFG is not able to grant a right-of-way permit for a pipeline proposed through conservation lands (Biological Resources Figure 1).	The CO ₂ pipeline route proposed by OEHI in Appendix A has been modified to avoid conflicts with existing conservation lands managed by CDFG (Refer to Figure 5.2-1). This route also would not conflict with lands proposed for conservation in the Elk Hills Habitat Conservation Plan.

**Table 5.0-1
Summary of Responses to CEC August 5, 2011 Information Requests (Continued)**

Data Request	Resource Area	Topic	Comment	Response
10	Biological Resources	Golden eagle nest data	Golden eagle nest data – due to changes in the Service’s survey protocols and management of golden eagle nests (Pagel et al 2010) and observation of golden eagles in the project area, staff needs additional information on the occurrence of golden eagle nests within the project area. Staff needs the applicant to provide the results of a literature review, museum records search, and database search for golden eagle nests and territories to determine the project’s effects, if any, to golden eagle nesting territories following the Service’s 2010 survey protocol guidance for this species.	See AFC Amendment Section 5.2.1.4.
11	Biological Resources	San Joaquin kit fox vehicle strike and road mortality analysis	San Joaquin kit fox vehicle strike and road mortality analysis – staff requests that the applicant implement the Probabilistic Measure of Road Lethality paper by Waller et al (2005) using the Poisson model and project hourly traffic volumes or other agency approved method to identify the impacts that project construction and operation traffic may have on San Joaquin kit fox in the project area. This analysis should include an assessment of nighttime traffic and the potential for increased impacts to nocturnal wildlife, in order to appropriately determine the mitigation to offset project impacts of vehicle strikes to San Joaquin kit fox. This data will generate the project’s San Joaquin kit fox incidental take estimate which will be used to calculate the acreage of mitigation lands needed for acquisition to offset the loss of carrying capacity from the project.	See AFC Amendment Section 5.2.2.3, Table 8. Analysis of the traffic impact is provided. The impact model used by URS uses a conservative approach that does not differentiate between daytime and nighttime traffic. Most of the project-related traffic would occur during the daytime hours, which is less sensitive for San Joaquin kit fox. However, the model used in the AFC assumes that traffic-related mortality would increase proportionate to the increase in traffic, and does not address the potential that traffic increases would be concentrated during daytime hours. Therefore, our approach provides a more conservative (higher) estimate of potential vehicle strike mortality for San Joaquin kit fox.

**Table 5.0-1
Summary of Responses to CEC August 5, 2011 Information Requests (Continued)**

Data Request	Resource Area	Topic	Comment	Response
12	Biological Resources	Additional survey data	Additional survey data – given recent realignment of the natural gas pipeline, the applicant proposed to conduct protocol-level blunt-nosed leopard lizard surveys, special-status plant surveys, a formal field wetland delineation, and focused Swainson’s hawk nest surveys during the appropriate survey windows during 2011(URS 2010). Staff agrees that the relocated natural gas pipeline alignment must be surveyed during the appropriate survey window for San Joaquin kit fox dens, blunt-nosed leopard lizard, special-status plant species, burrowing owl, Swainson’s hawk, giant kangaroo rat, San Joaquin antelope squirrel, Tipton kangaroo rat, as well as potentially jurisdictional state and federal waters. Staff also requires that the applicant perform focused botanical surveys within all suitable habitat along linear facilities for special-status plant species and GPS all occurrences. This data would then be used in the preparation of the draft Special-status Plant Impact Avoidance and Minimization Plan and impact analysis to determine if the project’s impacts to rare plants would be considered significant.	See AFC Amendment Table 5.2-1. <u>Blunt-nosed leopard lizard</u> : Conducted in 2010. Text indicates that protocol surveys will be conducted in 2012 and provided to CEC. <u>Rare plant surveys</u> : Conducted in 2011 and 2012. <u>Wetland delineation</u> : 2012. <u>Swainson’s hawk</u> : 2012. <u>San Joaquin kit fox</u> : 2011. Mitigation Measures to conduct surveys: BIO-4, BIO-12, BIO-13, BIO-15, BIO-16.
13	Biological Resources	Oxy’s historical wildlife data from long-term monitoring of NPR-1 and NPR-2	Applicant to provide Oxy’s historical wildlife data from long-term monitoring of NPR-1 and NPR-2 (several decades of data was collected during Naval Petroleum Reserve monitoring). Resource agencies have a good handle on which wildlife are present on Elk Hills. San Joaquin kit fox, San Joaquin antelope ground squirrel, giant kangaroo rat, blunt-nose leopard lizard are all threatened and endangered species and assumed present.	AFC Amendment Appendix A-2, Section 4.4 of the SEI includes a discussion of existing biological resources and impact analysis for the CO ₂ EOR Project. OEHI will provide the Annual Reports from 1995 to 2011 under separate cover. These reports contain historic long-term monitoring data for NPR-1 (EHOF).

**Table 5.0-1
Summary of Responses to CEC August 5, 2011 Information Requests (Continued)**

Data Request	Resource Area	Topic	Comment	Response
14	Biological Resources	Giant kangaroo rat precincts map	Applicant to map giant kangaroo rat precincts (individual territories) on direct impact areas of Elk Hills. Giant kangaroo rat are assumed present by resource agencies, but a current mapping would be useful. The resource agencies asked for current giant kangaroo rat precinct data for the carbon dioxide pipeline so the same request would likely be made here.	Giant kangaroo rats are only expected to occur south of the California Aqueduct in the OEHI Project area. No giant kangaroo rats or precincts were observed in the BRSA during the 2008, 2009, 2010, or 2011 surveys. Results of the Surveys of the BRSA documented in the AFC Amendment Section 5.2 and in Appendix A. AFC Amendment Appendix A-2, Section 4.4 (SEI) includes a discussion of existing biological resources and impact analysis for the CO ₂ EOR Project. However, the OEHI document does not identify the locations.
15	Biological Resources	Swainson's hawk nests focused survey	Applicant to perform focused surveys for Swainson's hawk nests. General survey timing: March – August.	See AFC Amendment Section 5.2.1.4. HECA is currently conducting 2012 nesting season surveys for Swainson's hawks. Additional pre-construction surveys are proposed in the mitigation measure BIO-19. AFC Amendment Appendix A-2, Section 4.4.1 (SEI): As required by the EHOFF HCP, biological pre-activity surveys are conducted by qualified biologist's prior to ground disturbance activities. Biological data associated with Swainson's hawk and nests are provided in the EHOFF HCP semi-annual and annual reports provided to the wildlife agencies. [NOTE: URS received NPR-1/ EHOFF 1995-2011 endangered species annual reports on April 24, 2012. We assume that OEHI will provide this information to CEC under separate cover].
16	Biological Resources	Golden eagle nest data	Applicant to provide golden eagle nest data for Elk Hills and surrounding areas. Provide the results of a literature review, museum records search, database search, and check with local raptor groups for golden eagle nests and territories. Depending on this data, USFWS's Migratory Bird Office may request more detailed field surveys and/or helicopter surveys.	See AFC Amendment Section 5.2.1.4. Text indicates that no golden eagles have been observed during the wildlife or botanical surveys, and there are no documented nest sites within 40 miles of the Project Site. AFC Amendment Appendix A-2, Section 4.4.1 (SEI): Biological pre-activity surveys are conducted by qualified biologists prior to ground-disturbance activities. Biological data associated with golden eagle and nests are

**Table 5.0-1
Summary of Responses to CEC August 5, 2011 Information Requests (Continued)**

Data Request	Resource Area	Topic	Comment	Response
				provided, if observed in the annual reports provided to the wildlife agencies; and included herewith. [NOTE: NPR-1/EHOF 1995-2011 endangered species annual reports will be provided under separate cover].
17	Biological Resources	Burrowing owl surveys	Applicant to conduct focused burrowing owl surveys (Phase I habitat assessment, Phase II burrow surveys, Phase III owl survey) on Oxy's direct impact areas. Timing: Phase I and II can be conducted any time of year, Phase III peak nesting season April 15 to July 15.	See AFC Amendment Section 5.2.1.4. HECA is currently conducting 2012 nesting season surveys for burrowing owls. Additional pre-construction surveys are proposed in the mitigation measure BIO-12. AFC Amendment Appendix A-2, Section 4.4.1 (SEI) states that biological pre-activity surveys would be conducted by qualified biologists prior to ground-disturbance activities. Biological data associated with burrowing owl and nests will be provided, if observed in the annual reports provided to the wildlife agencies. No specific surveys are conducted by OEHI to index burrowing owl population on Elk Hills. Abundance information is collected incidentally during pre-activity surveys and annual monitoring activities including San Joaquin kit fox spotlighting, blunt-nosed leopard lizard surveys, and giant kangaroo rat transect surveys.
18	Biological Resources	Elk Hills focused botanical surveys	Applicant to conduct focused botanical surveys following CDFG 2009 survey guidelines over the direct impact area of Elk Hills. Staff is not sure how current the plant survey data is for Elk Hills although rare plants have been long-studied here. Survey timing is species-specific in the southern San Joaquin Valley, but generally, surveys should be spaced out between February through March/April for annuals. Perennials can be surveyed for later in the season. Consult with DFG on species specific survey timing.	AFC Amendment Appendix A-1: Plant species are listed in the Data Gap Analysis Biological Assessment (February 2011). Hoover's woolly star is the only special status plant species monitored annually by OEHI. OEHI is not currently conducting additional focused surveys for special status plant species in the OEHI Project area.

**Table 5.0-1
Summary of Responses to CEC August 5, 2011 Information Requests (Continued)**

Data Request	Resource Area	Topic	Comment	Response
19	Biological Resources	Elk Hills state jurisdictional waters	Applicant to provide mapping of potentially state jurisdictional waters following Section 1600 Fish and Game Codes on Elk Hills direct impact area.	OEHI holds a 12-year site-wide streambed alteration maintenance permit as required by 14 CCR Sections 1601 and 1603 of the Fish and Game Code. The current permit for OEHI expires in the year 2020. If it is determined that the activity may substantially adversely affect fish and wildlife resources within state jurisdictional waters, a Lake or Streambed Alteration Agreement will be prepared.
20	Biological Resources	Elk Hills Section 404 Waters of the U.S. study	Applicant to add Elk Hills direct impact area to Section 404 Waters of the U.S. study area map and re-submit to Corps for verification.	EHOE contains no U.S. Army Corps of Engineers jurisdictional waters.
21	Biological Resources	CDFG conservation lands under the draft Occidental of Elk Hills HCP	Applicant to assess whether Elk Hills direct impact area overlaps with any existing or proposed conservation lands owned by CDFG per the draft Occidental of Elk Hills Habitat Conservation Plan (HCP).	The Elk Hills direct impact area does not overlap with any existing or proposed conservation lands owned by CDFG.
22	Cultural Resources	Native American consultation and site tours	Determine the nature of impacts to ethnographic resources through with local Native American groups. Staff has found that letters and emails to be ineffective in determining ethnographic impacts. Therefore, face to face consultation and site tours are strongly recommended.	In addition to sending letters on several occasions, URS has also completed follow-up phone calls with members and groups of the Native American community identified by the Native American Heritage Commission. Members of the Native American community will be invited and encouraged to attend Project scoping meetings and public workshops.
23	Cultural Resources	Formal government-to-government Section 106 consultation (DOE)	Provide copies of formal government-to-government Section 106 consultation letters written by the DOE to local Native American groups.	DOE is in the process of sending letters to the federally recognized tribes, per Section 106 of the NHPA. Copies of these letters will be provided under separate cover.

**Table 5.0-1
Summary of Responses to CEC August 5, 2011 Information Requests (Continued)**

Data Request	Resource Area	Topic	Comment	Response
24	Cultural Resources	CA-Ker-5392	Revisit site CA-Ker-5392, identify and map its full extent, and submit either a detailed site specific avoidance plan or data recovery plan to address impacts of the proposed CO ₂ line.	Because the route of the CO ₂ line has been revised since the submittal of the previous HECA AFC, the site is no longer within the study area of the current HECA Project. Because the project is longer to be constructed in the vicinity of CA-KER-5392, no impacts to the site will occur; therefore, the site is no longer addressed in the HECA analyses.
25	Cultural Resources	Historic archaeological sites P-15-9738 and HECA 2010-2	Revisit historic archaeological sites P-15-9738 and HECA 2010-2, update the site maps and site forms to include all of the structures and features shown on aerial photographs or described in previous site forms. Conduct archival research equivalent to that conducted for the built-environment resources by JRP.	The route of the transmission line has been changed since the submittal of the previous revised HECA AFC. The site is no longer in the study area of the current HECA Project. Because the project is longer within the vicinity of P-15-9738, no impacts to the site will occur; therefore, the site is no longer addressed in the current HECA Project analyses. Archival information for HECA 2010-2 has been conducted per CEC request. Since the time of original recordation, construction activities unrelated to the HECA Project have eliminated the site.
26	Cultural Resources	Linear pedestrian surveys	Complete the pedestrian survey for all of the HECA linear alignments.	All accessible areas of the ARSA were subjected to intensive archaeological pedestrian survey. The methods used and results are documented in Appendix G3 of the AFC Amendment. Areas where access had been denied at the time of the filing will be subjected to identical methods, and the results presented in amendment(s) to the report as access is secured. A pedestrian survey was conducted for the OEHI preferred CO ₂ supply line alignment (Refer to Appendix A).

**Table 5.0-1
Summary of Responses to CEC August 5, 2011 Information Requests (Continued)**

Data Request	Resource Area	Topic	Comment	Response
27	Cultural Resources	Archaeological test excavations and evaluations of CRHR eligibility	Conduct test excavations and evaluations of CRHR eligibility for all archaeological sites which staff has identified as having the potential to be directly impacted by HECA.	All archaeological resource areas within the direct impact area except two would be avoided. The site areas (i.e., the previously delineated site boundaries) of P-15-3108 and HECA-2010-2 cannot be avoided by Project construction. These sites, although in the Archaeological Resources Study Area, will not be impacted because there currently are no identifiable resources (e.g., historic or prehistoric features and/or artifacts) in these locations. Prehistoric archaeological site P-3108 has never been positively re-located subsequent to original recordation, and historic archaeological site HECA-2010-2 has been graded away by non-HECA-related construction activities (Section 5.3.3.6). OEHI will evaluate the sites within the CO ₂ supply pipeline ROW alignment.
28	Cultural Resources	Geoarchaeological field sampling	Conduct geoarchaeological field sampling as requested in Data Requests 78-79, 143, and 172-173 (CEC 2009o, CEC 2010b, 2010w). Staff requests that the sampling be conducted prior to the completion of the FSA, otherwise staff may not be able to complete their analysis.	A geoarchaeological discussion is included in AFC Amendment Section 5.3 and the Archaeological Technical Report (Appendix G-3). HECA has agreed to conduct the geoarchaeological sampling as a condition of certification. HECA currently does not have full access to the linear alignments; thus, ground-disturbing activities related to geoarchaeological field sampling are not possible.
29	Cultural Resources	Site conditions, impacts and monitoring plans	Provide a discussion of the existing site conditions, the expected direct, indirect and cumulative impacts due to the construction, operation and maintenance of the project, the measures proposed to mitigate adverse environmental impacts of the project, the effectiveness of the proposed measures, and any monitoring plans proposed to verify the effectiveness of the mitigation.	See AFC Amendment, Appendix A-2 (SEI), Section 4.5 (Cultural Resources) and Appendix A-1 Data Gap Analysis, Section 2.3.

**Table 5.0-1
Summary of Responses to CEC August 5, 2011 Information Requests (Continued)**

Data Request	Resource Area	Topic	Comment	Response
30	Cultural Resources	Regional ethnology, prehistory, and history	A summary of the ethnology, prehistory, and history of the region with emphasis on the area within no more than a 5-mile radius of the project location.	See AFC Amendment Sections 5.3.1.3, 5.3.1.2, and 5.3.1.4 See AFC Amendment, Appendix A-2 (SEI), Section 4.5 (Cultural Resources) and Appendix A-1 Data Gap Analysis, Section 2.3.
31	Cultural Resources	Literature search	The results of a literature search to identify cultural resources within an area not less than a 1-mile radius around the project site and not less than one-quarter (0.25) mile on each side of the linear facilities.	See AFC Amendment Section 5.3.1.5. See AFC Amendment, Appendix A-2 (SEI), Section 4.5 (Cultural Resources) and Appendix A-1 Data Gap Analysis, Section 2.3.
32	Cultural Resources	Pedestrian surveys of the CO2 linear route	Conduct all required pedestrian surveys of the CO2 linear route and any proposed facilities, staging areas or injection points and provide the results in a technical report.	See AFC Amendment Section 5.3.1.5 (except for the Southern Controlled Area). See AFC Amendment, Appendix A-2 (SEI), Section 4.5 (Cultural Resources) and Appendix A-1 Data Gap Analysis, Section 2.3.
33	Cultural Resources	Technical reports	Copies of all technical reports whose survey coverage is wholly or partly within .25 mile of the area surveyed for the project.	See AFC Amendment, Appendix A-2 (SEI), Section 4.5 (Cultural Resources) and Appendix A-1 Data Gap Analysis, Section 2.3.
34	Cultural Resources	California DPR 523 forms	Copies of California Department of Parks and Recreation (DPR) 523 forms for all cultural resources identified in the literature search as being 45 years or older or of exceptional importance.	Refer to Appendix G-1.
35	Cultural Resources	Literature search area and past surveys	A copy of the USGS 7.5' quadrangle map of the literature search area delineating the areas of all past surveys.	See AFC Amendment Table 5.3-1. See AFC Amendment, Appendix A-2 (SEI), Section 4.5 (Cultural Resources), and Appendix A-1 Data Gap Analysis, Section 2.3.

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Summary of Responses to CEC August 5, 2011 Information Requests (Continued)**

Data Request	Resource Area	Topic	Comment	Response
36	Cultural Resources	Map of previously known and newly identified cultural resources	A map at a scale of 1:24,000 U.S. Geological Survey quadrangle depicting the locations of all previously known and newly identified cultural resources compiled through the research required by Appendix B.	See AFC Amendment, Appendix A-2 (SEI), Section 4.5 (Cultural Resources), and Appendix A-1 Data Gap Analysis, Section 2.3.
37	Land Use	Zoning and general plan designations	Please provide the existing zoning and general plan designations(s) for any new project parcels resulting from the HECA project modification, including linears and injection wells.	See AFC Amendment Section 5.4.1.3, Tables 5.4-7 and 5.4-8.
38	Land Use	Existing surrounding land uses	Please describe how the HECA project modification would be consistent with existing surrounding land uses.	See AFC Amendment Section 5.4.2.2.
39	Land Use	Williamson Act contracted lands	Please state whether the project would contain new Williamson Act contracted lands a result of the HECA project modification.	See AFC Amendment Sections 5.4.1.3 and 5.4.2.4.
40	Land Use	Zone change for urea production facility	Please work with the Kern County, Planning and Community Development Department regarding the modified HECA project, including the proposed urea production facility. The addition of this facility may require a zone change. Please discuss this modification with Kern County and let us know if the county would require a zone change and/or general plan change for the urea production facility.	See AFC Amendment Section 5.4.2.5 and 5.4.2.6.
41	Project Description	Project description of urea facilities and EOR/CCS components	Staff will have to perform a complete CEQA review and impact analysis associated with long-term maintenance and operation of both the urea facilities and EOR/Carbon Capture and Sequestration activities. Staff understands that the EOR/Carbon Capture and Sequestration (CCS)	A description of the urea unit is provided in Section 2.4.3. A description of the urea pastillation unit is provided in Section 2.4.4. A description of the urea ammonium nitrate complex is provided in Section 2.4.5. A description and time line of impacted areas can be found in the Modified CO ₂ Supply Line Alignment Data

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Summary of Responses to CEC August 5, 2011 Information Requests (Continued)**

Data Request	Resource Area	Topic	Comment	Response
			activities (e.g. the capture and compression, coupled with injection and recovery) will be operated to maximize enhanced oil recovery in the oilfield. Staff has not received a detailed description of these facilities over time or the acreage and locations on which the EOR/CCS facilities will be located throughout the life of EOR/CCS activities. Please provide a description of the urea production and EOR/CCS activities. Additionally, please provide a map and time line of the impacted areas for the life of the HECA and EOR/CCS projects.	Gap Analysis (Appendix A) Section 1.3 and Figures 1 and 2.
42	Soil and Water	Overdraft in the Kern County subbasin	The project's pumping could exacerbate overdraft in the Kern County subbasin.	See AFC Amendment Sections 5.14.1.5, 5.14.1.6, 5.14.2.1, and 5.14.3.
43	Soil and Water	Local water level increases and subsidence of the California Aqueduct	The project's pumping could also reverse local water level increases and increase the threat to the California Aqueduct from subsidence.	See AFC Amendment Section 5.14.2.2.
44	Soil and Water	Degraded water migration into the local water-supply aquifer	The project's pumping could potentially induce significant degraded water migration into the local water-supply aquifer, further degrading local water supplies.	See AFC Amendment Sections 5.14.1.4, 5.14.1.6, 5.14.2.3, 5.14.3, and 5.14.4.1.

**Table 5.0-1
Summary of Responses to CEC August 5, 2011 Information Requests (Continued)**

Data Request	Resource Area	Topic	Comment	Response
45	Soil and Water	Contaminated runoff	Specify how potentially contaminated runoff would not commingle with non-contact runoff, including potential contaminants that would most likely be found in each lined basin and sump, the type of lining proposed and reason(s) why, the method(s) of conveyance to the basin, and maintenance performed during the operational life of the proposed project.	See AFC Amendment Sections 5.14.1.8, 5.14.2.3, 5.14.2.4, and 5.14.3.
46	Soil and Water	Storage pile storm runoff	Address how storm runoff in contact with the storage pile would be collected and conveyed and how this area would not contaminate the surrounding soil.	See AFC Amendment Sections 5.14.1.8, 5.14.2.4, and 5.14.3.
47	Soil and Water	Containing water runoff	Demonstrate that no water runoff, during construction or post-construction, would leave the proposed HECA site.	See AFC Amendment Sections 5.14.1.8 and 5.14.2.4.
48	Soil and Water	Diversion of offsite storm runoff or offsite irrigation runoff	Show how offsite storm runoff or offsite irrigation runoff would be diverted around the proposed site, to ensure that onsite drainage facilities, sized to completely contain only onsite runoff, would not become overwhelmed with offsite flows.	See AFC Amendment Section 5.14.1.8.
49	Soil and Water	Installing pipeline across existing water courses	Address potential construction-related impacts of installing pipeline across existing water courses. The draft DESCP lists several Best Management Practices (BMPs) to implement during construction of the proposed linear facilities, but no information was provided to address pipeline installation across waterways such as irrigation ditches.	See AFC Amendment Sections 5.14.1.6 and 5.14.2.4.

**Table 5.0-1
Summary of Responses to CEC August 5, 2011 Information Requests (Continued)**

Data Request	Resource Area	Topic	Comment	Response
50	Soil and Water	Erosion control BMPs	Specify the type, location, timing, and maintenance plan/schedule of all erosion control BMPs, to show proper installation after construction is complete and proper maintenance during operation of the proposed project.	See AFC Amendment Sections Section 5.14.1 and 5.14.2.4.
51	Sequestration/ Enhanced Oil Recovery	Storage rate or trapping ratio for CO ₂ per pass	A storage rate or trapping ratio for CO ₂ per pass is needed to evaluate the amounts of CO ₂ stored with time. The original application assumed a ratio of 1:3, which seems to be unrealistic given that there is no basis from field data, especially when compared with many other documented injection projects that report an average recirculation rate of 100 percent of purchased CO ₂ and thus a trapping ratio of zero. Staff is aware of the results of the study conducted at the University of Wyoming that indicates a trapping ratio on the order of 1:3 per pass, but cannot verify this ratio from pilot studies or reports.	To be provided under separate cover.
52	Sequestration/ Enhanced Oil Recovery	CO ₂ injection and storage formation data	Data needed to characterize the formation where the CO ₂ will be injected and stored are still lacking. Of particular importance are data pertaining to the following: a- pore space characteristics and oil distribution, which are necessary to judge the availability and ease of pumping the carbon dioxide (CO ₂); b- information needed to characterize the rock formations that will help determine the response of the rocks to available and additional stresses; c- pore pressure, which is needed to assess the pressure required for the injection of the CO ₂ into the formation; and	To be provided under separate cover.

**Table 5.0-1
Summary of Responses to CEC August 5, 2011 Information Requests (Continued)**

Data Request	Resource Area	Topic	Comment	Response
			d- formation stresses, which are needed to assess the behavior of any faults that may be present.	
53	Sequestration/ Enhanced Oil Recovery	Rock-mechanics data and reservoir data	Rock-mechanics data and reservoir data are needed to demonstrate the feasibility of the EOR and CCS project. Also, in-situ stress measurements at multiple locations as a function of depth are needed. In addition, estimates of the bulk rock moduli, Poisson's ratios, and/or Young's moduli for the Stevens sandstone and the confining Reef Ridge shale are needed in order to characterize the rock formation in terms of maximum stressed that can be sustained and the induced deformations.	To be provided under separate cover.
54	Sequestration/ Enhanced Oil Recovery	Integrity of wells penetrating Reef Ridge (RR) shale	There are hundreds of wells that penetrate the Reef Ridge (RR) shale, but no information is available as to their integrity and keeping their casing and cement components from being corroded/eroded away by the combination of CO2 and carbonic acid. This information will be necessary for staff's analysis.	To be provided under separate cover.
55	Sequestration/ Enhanced Oil Recovery	Faulting and folding of Oxy Hills field	The Oxy Hills field is characterized as a plunging anticline that forms a natural geologic trap for petroleum hydrocarbons. This anticline has formed as a result of faulting and folding of sedimentary rock in an active tectonic region of California. Staff is concerned that the faulting and folding remain active and that there is potential for future rupture of existing or new faults in or along the plunging anticline which would allow for leakage and failure of the short- and long-term CCS component of the project. There is a lack of information about the location of active and potentially active faults and time and magnitude of rupture along faults in the vicinity of the project	To be provided under separate cover.

**Table 5.0-1
Summary of Responses to CEC August 5, 2011 Information Requests (Continued)**

Data Request	Resource Area	Topic	Comment	Response
			site. Also, information is needed to analyze the potential for reactivating existing ruptures or creating new ones.	
56	Visual Resources	Revised conceptual landscape plan and visual simulations from KOP 1	Please prepare and submit a revised conceptual landscape plan and visual simulations depicting the view of the landscape plantings, fencing or other structures along the site periphery, and modified plant structures and layout from KOP 1. Submittal of the revised conceptual landscape plan cannot occur until a decision is made to retain the existing viewpoint and direction for KOP 1. Include any visible off-site structures in the simulated view (e.g., proposed transmission line).	See Figure 5.11-16.
57	Visual Resources	Landscaped buffers along Tupman Road	Sheets 1 and 2 of the January 2011 conceptual landscape plan show landscaped buffers along Tupman Road on the east side of the project site. The drawings show a relatively narrow buffer south of Station Road compared to the buffer north of the road. Please note that the view simulations in the plan for KOP 1 show no difference in the density of plant material in the site perimeter buffers north and south of Station Road. Assuming that the configuration of landscaped areas does not change under the modified project, please revise the visual simulation to reflect the difference between the densities of the two buffer areas as they would be viewed from KOP 1.	See Figure 5.11-16.

**Table 5.0-1
Summary of Responses to CEC August 5, 2011 Information Requests (Continued)**

Data Request	Resource Area	Topic	Comment	Response
58	Worker Safety	Staffing of local Kern County Fire Department	It is unknown if the local Kern County Fire Department is adequately staffed and equipped to support the HECA facility, including the proposed urea facilities. Previously, the project was in discussions with the county and the fire department. What is the status of those negotiations?	Discussions between the Applicant and Kern County are ongoing.