Responses to CEC Data Requests Set Two: Nos. A124 through A180

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

October 2012

RESPONSES TO DATA REQUESTS A124 THROUGH A180
FROM CALIFORNIA ENERGY COMMISSION (CEC)

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ATTACHMENTS

LIST OF ACRONYMS AND ABBREVIATIONS USED IN RESPONSES

AFC	Application for Certification
APN	Assessor's Parcel Number
ATN	Assessors Tax Number
BP	British Petroleum
CEC	California Energy Commission
CO_2	carbon dioxide
CPUC	California Public Utilities Commission
CRMMP	Cultural Resources Monitoring and Mitigation Plan
HECA	Hydrogen Energy California
HRSG	heat recovery steam generator
I-5	Interstate 5
I-405	Interstate 405
I-580	Interstate 580
I-680	Interstate 680
I-710	Interstate 710
IGCC	integrated gasification combined cycle
lb/GWh	pounds per gigawatts hour
lb/hr	pounds per hour
lb/MWh	pounds per megawatt hour
MATS	Mercury and Air Toxics Standards
MDAQMD	Mojave Desert Air Quality Management District
OEHI	Occidental of Elk Hills, Inc.
petcoke	petroleum coke
PM_{10}	particulate matter 10 microns in diameter or less
ppm	parts per million
SO_2	sulfur dioxide
SR	State Route
syngas	synthesis gas
U.S. 101	United States Route 101

Technical Area: Air Quality
Authors: William Walters, Nancy Fletcher

BACKGROUND: COAL RAIL TRANSPORTATION EMISSIONS ESTIMATES

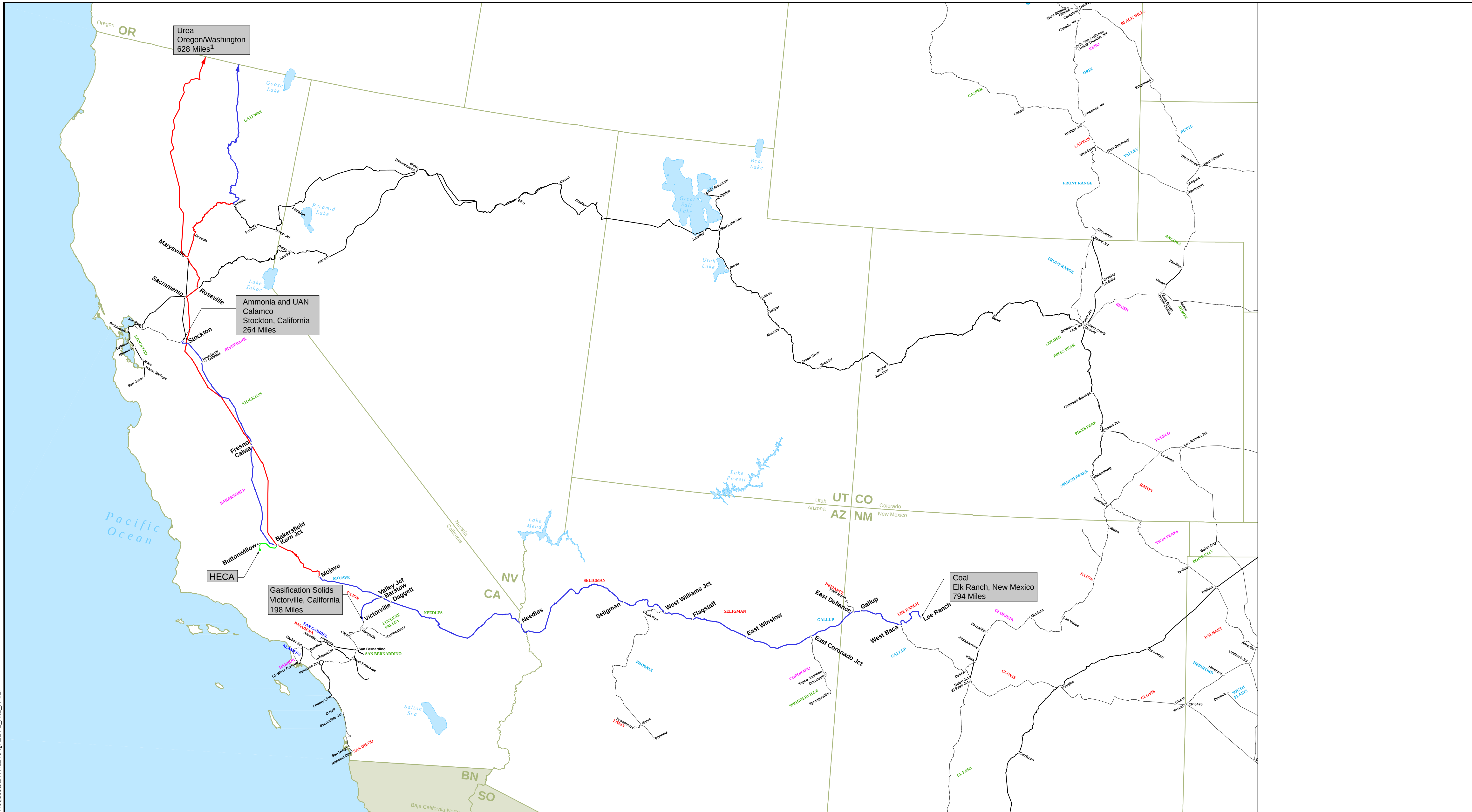
Staff's review of the applicant's coal transportation emissions estimates has found inconsistencies for rail miles by jurisdiction and total rail miles. For example staff's review of the rail route length within the Mojave Desert Air Quality Management District (MDAQMD) jurisdiction indicates a total rail distance of over 200 miles in comparison to the applicant's estimate of 150 miles. Staff's review indicates that route distances through the Arizona and Eastern Kern Air Pollution Control District (EKACPD) jurisdictions may also be underestimated. Also, the route distance differences between the applicant's project alternatives (train vs. trucking) are opposite from what would be expected for total coal train travel distance in the San Joaquin Valley Air Pollution Control District (SJVAPCD) jurisdiction. Specifically, staff's review suggests that the total rail route distance to the site would be longer than the route to the Wasco unloading facility that the applicant uses for the trucking alternative. Additionally, the criteria pollutant emissions presentation provided by the applicant was geared to General Conformity requirements but there was no presentation of the total rail criteria pollutant emissions for all criteria pollutants. Staff needs the applicant to confirm the rail route and distances, and as necessary revise the emissions estimates for all route distances. Additionally, staff needs the applicant to provide a clear summary of the total rail route criteria pollutant emission estimates for all criteria pollutants.

DATA REQUEST

A124. Please provide a route map or a detailed description of the rail routes for coal feedstock delivery and product delivery, for both project alternatives, and describe any corrections to the jurisdiction segment and total rail route lengths.

RESPONSE

Figures A124-1 and A124-2 present the delivery routes for Alternative 1 (rail transportation) and Alternative 2 (truck transportation). The response to Data Request A125 clarifies the jurisdiction segments and rail lengths.



BNSF Delivery Route

UPRR Delivery Route

SJVR Delivery Route

Other/Unused Delivery Route

Note:
1 628 miles is the shortest rail delivery route to Northern California/Oregon/Washington.

ALTERNATIVE 1 (RAIL TRANSPORTATION) DELIVERY ROUTES

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Kern County, California

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FIGURE A124-1

Source: HDR, Inc.; BNSF Railway Company Track Chart Index Map.

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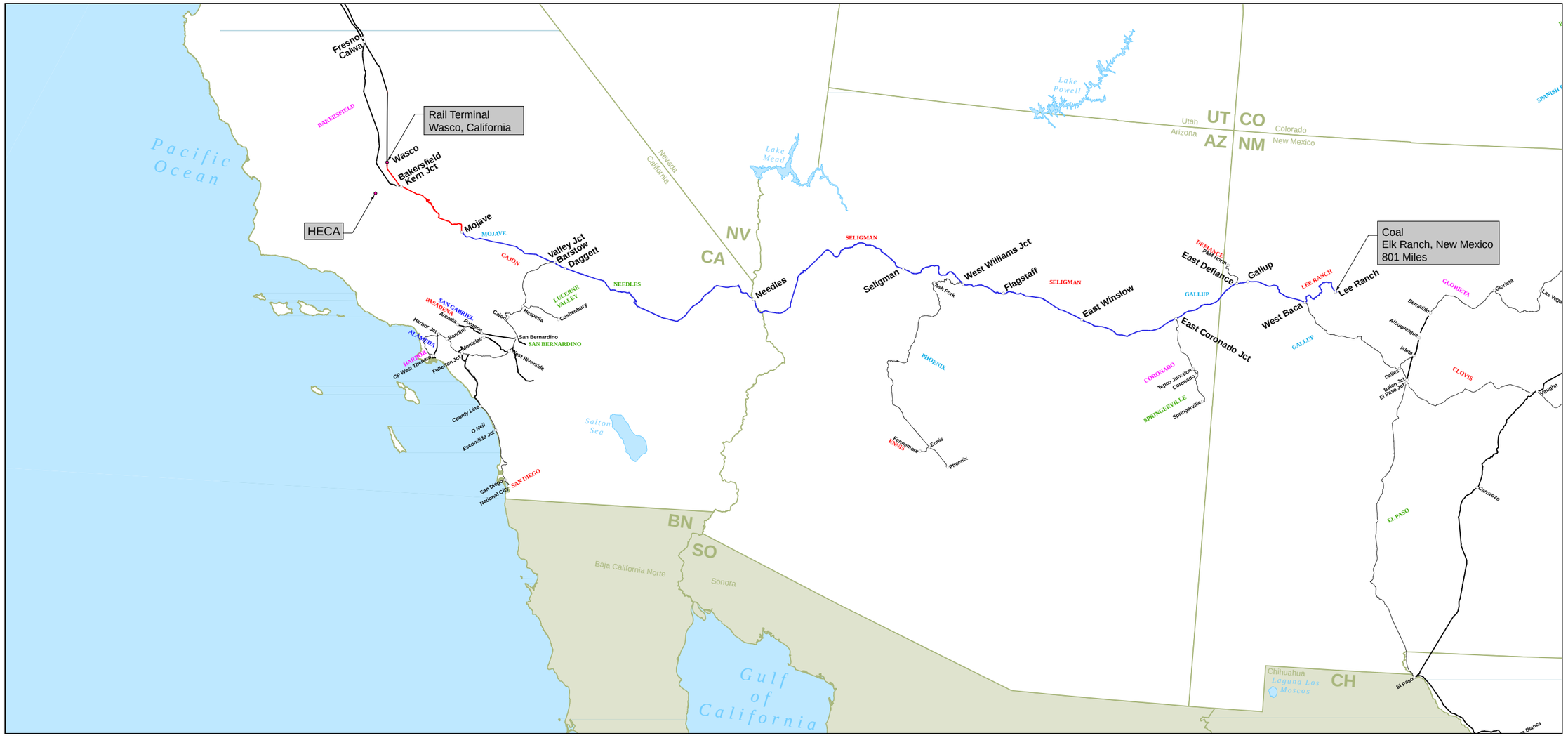

BNSF Delivery Route
UPRR Delivery Route
Other/Unused Delivery Route

ALTERNATIVE 2 (TRUCK TRANSPORTATION)
DELIVERY ROUTES

October 2012
28068052

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE A124-2

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Source: HDR, Inc.; BNSF Railway Company Track Chart Index Map.

DATA REQUEST

A125. Please provide updated emissions for each jurisdiction segment and total train emissions for each alternative using the corrected route lengths.

RESPONSE

Revised train transportation distances were presented in the Applicant's response to California Energy Commission (CEC) Data Request A18. Train route distances were estimated using BNSF rail maps and Google Earth. Emissions associated with Alternatives 1 and 2 were presented in Attachments A18-1 and A18-2, respectively.

As requested by CEC Staff during the September 27, 2012, Data Response Workshop, a summary of the total Project-related transportation emissions is provided below. These emissions do not vary from those presented in the response to CEC Data Request A18; these tables only present a summary of the total emissions across all nonattainment and attainment areas through which Project-related trains and vehicles travel.

Alternative 1 (rail transportation) emissions broken down by nonattainment and attainment areas, as well as total emissions, are presented in Attachment A125-1. Alternative 2 (truck transportation) emissions only differ from Alternative 1 (rail transportation) in the San Joaquin Valley Air Pollution Control District; therefore, only these emissions and the total Project emissions are presented in Attachment A125-2. There are two nonattainment areas in the Mojave Desert Air Quality Management District (MDAQMD), but these areas are not the same size. The ozone nonattainment area is a subarea of the total air district, and the particulate matter 10 microns in diameter or less (PM_{10}) nonattainment area extends across the entire air district. Therefore, the trains travel a distance of 120 miles within the MDAQMD's ozone nonattainment area; and a distance of 204 miles in the entire air district.

Although the breakdown of mileage has been revised since submittal of the Amended Application for Certification (AFC), total mileage for Project-related vehicular travel remains the same. Therefore, the total greenhouse gas emissions presented in the Amended AFC, Tables 5.1-24 (Alternative 1) and 5.1-33 (Alternative 2), remain accurate.

ATTACHMENT A125-1
HECA ALTERNATIVE 1 (RAIL TRANSPORTATION)
SUMMARY OF APPLICABLE OPERATIONAL EMISSIONS

Summary of Applicable Operational Emissions (Alternative 1)

Hydrogen Energy California LLC *8/05/2012 revision*
HECA Project

Federal NAAQS Nonattainment or Maintenance Area General Name and State	Detailed Status in Nonattainment or Maintenance Area	Authority Agency	Basis to Estimate the Offsite Transportation Distance	Emission Sources / Applicable General Conformity Thresholds / Comparisons	Project Operational Annual Emission Rates - for General Conformity (tpy)					
					CO	NOx	PM10	PM2.5	SO2	VOC
San Joaquin Valley, CA	8-Hour Ozone (2008) Nonattainment - Extreme PM2.5 Nonattainment CO Maintenance - Moderate - Fresno, CA (Part of Fresno County), Modesto, CA (Part of Stanislaus County), Stockton, CA (Part of San Joaquin County) PM10 Maintenance	SJVAPCD	Entire SJVAPCD jurisdiction area (one way trip: trains = 63 to 287 miles, trucks = 40 to 80 miles, workers= 20 miles)	Offsite Train	6.17	23.85	0.39	0.37	0.44	0.66
				Offsite Truck	5.29	8.71	2.39	0.72	0.06	0.74
				Offsite Workers Commuting	4.17	0.48	1.05	0.28	0.01	0.13
				Onsite Train	0.85	2.38	0.04	0.04	0.06	0.12
				Onsite Truck	0.63	0.99	0.15	0.05	0.01	0.16
				Total Emissions	**17.11**	**36.40**	**4.01**	**1.46**	**0.57**	**1.80**
				Applicable General Conformity *de minimis* Thresholds	**100**	**10**	**100**	**100**	**100**	**10**
				Less Than Thresholds?	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**
Los Angeles-South Coast Air Basin, CA	8-Hour Ozone (2008) Nonattainment - Extreme PM10 Nonattainment - Serious PM2.5 Nonattainment NO2 Maintenance CO Maintenance - Serious	SCAQMD	Entire SCAQMD jurisdiction area (one way trip: trucks = 88 to 90 miles)	Offsite Train	0.00	0.00	0.00	0.00	0.00	0.00
				Offsite Truck	4.14	6.82	1.87	0.56	0.05	0.58
				Total Emissions	**4.14**	**6.82**	**1.87**	**0.56**	**0.05**	**0.58**
				Applicable General Conformity *de minimis* Thresholds	**100**	**10**	**70**	**100**	**100**	**10**
				Less Than Thresholds?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Kern County (East Kern), CA	8-Hour Ozone (2008) Nonattainment - Marginal PM10 Nonattainment - Serious	EKAPCD	Entire EKAPCD jurisdiction area (one way trip: trains = 62 to 83 miles)	Offsite Train	3.62	13.98	0.23	0.22	0.26	0.39
				Offsite Truck	0.00	0.00	0.00	0.00	0.00	0.00
				Total Emissions	**3.62**	**13.98**	**0.23**	**0.22**	**0.26**	**0.39**
				Applicable General Conformity *de minimis* Thresholds	**N/A**	**100**	**70**	**N/A**	**N/A**	**100**
				Less Than Thresholds?	**N/A**	**Yes**	**Yes**	**N/A**	**N/A**	**Yes**
Los Angeles-San Bernardino Counties (West Mojave Desert), CA	8-Hour Ozone (2008) Nonattainment - Severe 15 (Part of San Bernardino and Los Angeles Counties)	MDAQMD	Los Angeles-San Bernardino Counties (West Mojave Desert) - 8-hr Ozone (2008) NAA (one way trip: trains = 120 miles)	Offsite Train		23.11				0.64
				Offsite Truck		0.00				0.00
				Total Emissions		**23.11**				**0.64**
				Applicable General Conformity *de minimis* Thresholds		**25**				**25**
				Less Than Thresholds?		**Yes**				**Yes**
San Bernardino County, CA (Mojave Desert)		MDAQMD	NOx and VOC emissions in the remainder of MDAQMD outside the Nonattainment area (one way trip: trains = 84 miles)	Offsite Train		17.36				0.48
				Offsite Truck		0.00				0.00
				Total Emissions		17.36				0.48
				Applicable General Conformity *de minimis* Thresholds		**N/A**				**N/A**
				Less Than Thresholds?		**N/A**				**N/A**
San Bernardino County, CA (Mojave Desert)	PM10 Nonattainment - Moderate	MDAQMD	Entire MDAQMD jurisdiction area (one way trip: trains = 204 miles)	Offsite Train	10.47		0.65	0.63	0.74	
				Offsite Truck	0.00		0.00	0.00	0.00	
				Total Emissions	10.47		**0.65**	0.63	0.74	
				Applicable General Conformity *de minimis* Thresholds	**N/A**		**100**	**N/A**	**N/A**	
				Less Than Thresholds?	**N/A**		**Yes**	**N/A**	**N/A**	
Sacramento Metro, CA	8-Hour Ozone (2008) Nonattainment - Severe 15 PM10 Nonattainment - Moderate (Sacramento County) PM2.5 Nonattainment CO Maintenance - Moderate - Sacramento, CA (Part of Placer, Sacramento and Yolo Counties)	SMAQMD	Entire SMAQMD jurisdiction area (one way trip: trains = 80 miles)	Offsite Train	0.33	1.27	0.02	0.02	0.02	0.04
				Offsite Truck	0.00	0.00	0.00	0.00	0.00	0.00
				Total Emissions	**0.33**	**1.27**	**0.02**	**0.02**	**0.02**	**0.04**
				Applicable General Conformity *de minimis* Thresholds	**100**	**25**	**100**	**100**	**100**	**25**
				Less Than Thresholds?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Yuba City-Marysville, CA	PM2.5 Nonattainment (Sutter and Part of Yuba Counties)	FRAQMD	Yuba City-Marysville, CA - PM2.5 NAA (one way trip: trains = 50 miles)	Offsite Train	0.21	0.80	0.01	0.01	0.01	0.02
				Offsite Truck	0.00	0.00	0.00	0.00	0.00	0.00
				Total Emissions	**0.21**	**0.80**	**0.01**	**0.01**	**0.01**	**0.02**
				Applicable General Conformity *de minimis* Thresholds	**N/A**	**100**	**N/A**	**100**	**100**	**100**
				Less Than Thresholds?	**N/A**	**Yes**	**N/A**	**Yes**	**Yes**	**Yes**
Chico, CA	8-Hour Ozone (2008) Nonattainment - Marginal (Butte County) PM2.5 Nonattainment (Part of Butte County) CO Maintenance - Moderate (Part of Butte County)	BCAQMD	Chico, CA - 8-Hour Ozone (2008) NAA - Entire Butte County (one way trip: trains = 50 miles)	Offsite Train	0.21	0.80	0.01	0.01	0.01	0.02
				Offsite Truck	0.00	0.00	0.00	0.00	0.00	0.00
				Total Emissions	**0.21**	**0.80**	**0.01**	**0.01**	**0.01**	**0.02**
				Applicable General Conformity *de minimis* Thresholds	**100**	**100**	**N/A**	**100**	**100**	**100**
				Less Than Thresholds?	**Yes**	**Yes**	**N/A**	**Yes**	**Yes**	**Yes**
Northern California	(N/A)	NSAQMD TCAPCD LCAPCD Shasta AQMD MCAPCD SCAPCD	Mileage north of Chico = 161 miles	Offsite Train	0.66	2.56	0.04	0.04	0.05	0.07
				Offsite Truck	0.00	0.00	0.00	0.00	0.00	0.00
				Total Emissions	**0.66**	**2.56**	**0.04**	**0.04**	**0.05**	**0.07**
				Applicable General Conformity *de minimis* Thresholds	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**
				Less Than Thresholds?	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**

Summary of Applicable Operational Emissions (Alternative 1)

Hydrogen Energy California LLC *8/05/2012 revision*
HECA Project

NAAs in State of Arizona	8-Hour Ozone (2008) Nonattainment - Marginal - Phoenix-Mesa, AZ (Part of Maricopa and Pinal County) PM10 Nonattainment (Moderate, Serious, or Maintenance) (12 Counties) PM2.5 Nonattainment - Nogales, AZ (Part of Santa Cruz County), West Central Pinal, AZ (West Pinal County) SO2 Nonattainment - Hayden (Pinal County), AZ (Part of Pinal County), Maintenance - San Manual (Pinal County), AZ, Ajo (Pima County), AZ, Douglas (Cochise County), AZ, Miami (Gila County), AZ CO Maintenance - Serious - Phoenix, AZ. (Part of Maricopa)	ADEQ	Entire ADEQ jurisdiction area (one way trip: trains = 364 miles)	Offsite Train	18.13	70.10	1.13	1.10	1.28	1.94
				Offsite Truck	0.00	0.00	0.00	0.00	0.00	0.00
				Total Emissions	**18.13**	**70.10**	**1.13**	**1.10**	**1.28**	**1.94**
				Applicable General Conformity *de minimis* Thresholds	**100**	**100**	**70**	**100**	**100**	**100**
				Less Than Thresholds?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
NAAs in State of New Mexico	PM10 Nonattainment - Moderate - Anthony, NM (Dona Ana County) CO Maintenance (Bernalillo County) SO2 Maintenance - Grant Co, NM	NMED-AQB	Entire NMED-AQB jurisdiction area (one way trip: trains = 102 miles to coal mine site)	Offsite Train	5.05	19.55	0.32	0.31	0.36	0.54
				Offsite Truck	0.00	0.00	0.00	0.00	0.00	0.00
				Total Emissions	**5.05**	**19.55**	**0.32**	**0.31**	**0.36**	**0.54**
				Applicable General Conformity *de minimis* Thresholds	**100**	**N/A**	**100**	**N/A**	**100**	**N/A**
				Less Than Thresholds?	**Yes**	**N/A**	**Yes**	**N/A**	**Yes**	**N/A**
				TOTAL Project Emissions (tpy)	**59.91**	**192.75**	**8.30**	**4.37**	**3.35**	**6.51**

Notes:

1. The associated emissions from the onsite worker travel are negligible
2. To simplify the analysis, the biggest area among all detailed NAA areas was conservativly used to estimate the emissions in each main NAA category area.
   For State of Arizona and New Mexico the total distances accross each state along the train routes were conservativly used to estimate the emissions in NAA.
3. The distance for trains and trucks are varied depending on the type to materials transporting and their destinations.
4. In MDAQMD, it is important to note that the size of the ozone NAA and PM10 NAA area are different and the ozone NAA is smaller than PM10 NAA. Therefore, the train route (distance) within MDAQMD in ozone nonattainment area is smaller than the distance in PM10 nonattainment area.
5. ACRONYMS AND ABBREVIATIONS
   MDAQMD = Mojave Desert Air Quality Management District
   SCAQMD = South Coast Air Quality Management District
   EKAPCD = East Kern County Air Pollution Control District
   SMAQMD = Sacramento Metro Air Quality Management District
   BCAQMD = Butte County Air Quality Management District
   FRAQMD = Feather River Air Quality Management District
   ADEQ = Arizona Department of Environmental Quality
   NMED-AQB = New Mexico Environment Department - Air Quality Bureau
   NSAQMD = Northern Sierra Air Quality Management District
   TCAPCD = Tehama County Air Pollution Control District
   LCAPCD = Lassen County Air Pollution Control District
   Shasta AQMD = Shasta County Air Quality Management District
   MDAPCD = Modoc County Air Pollution Control District
   SCAPCD = Siskiyou County Air Pollution Control District

ATTACHMENT A125-2
HECA ALTERNATIVE 2 (TRUCK TRANSPORTATION)
SUMMARY OF APPLICABLE OPERATIONAL EMISSIONS

Summary of Applicable Operational Emissions (Alternative 2)

Hydrogen Energy California LLC *8/05/2012 revision*
HECA Project

Federal NAAQS Nonattainment or Maintenance Area General Name and State	Detailed Status in Nonattainment or Maintenance Area	Authority Agency	Basis to Estimate the Offsite Transportation Distance	Emission Sources / Applicable General Conformity Thresholds / Comparisons	Project Operational Annual Emission Rates - for General Conformity (tpy)					
					CO	NOx	PM10	PM2.5	SO2	VOC
San Joaquin Valley, CA	8-Hour Ozone (2008) Nonattainment - Extreme PM2.5 Nonattainment CO Maintenance - Moderate - Fresno, CA (Part of Fresno County), Modesto, CA (Part of PM10 Maintenance	SJVAPCD	Entire SJVAPCD jurisdiction area (one way trip: trains = 70 miles, trucks = 26.5 to 80 miles, workers= 20 miles)	Offsite Train	3.49	13.48	0.22	0.21	0.25	0.37
				Offsite Truck	14.22	23.42	6.43	1.94	0.17	1.98
				Offsite Workers Commuting	4.17	0.48	1.05	0.28	0.01	0.13
				Onsite Train	0.00	0.00	0.00	0.00	0.00	0.00
				Onsite Truck	1.42	2.76	0.28	0.09	0.01	0.41
				Total Emission	**23.29**	**40.14**	**7.98**	**2.52**	**0.44**	**2.90**
				Conformity De minimis (ton/yr)	**100**	**10**	**100**	**100**	**100**	**10**
				Less than De minimis?	**Yes**	**No**	**Yes**	**Yes**	**Yes**	**Yes**
				TOTAL Project Emissions (tpy)	**66.09**	**196.49**	**12.27**	**5.43**	**3.22**	**7.61**

BACKGROUND: PETROLEUM COKE TRANSPORTATION ASSUMPTIONS

Staff's review of the applicant's petroleum coke transportation emissions estimates has found that this amendment has significantly revised the assumption for the source of the petroleum coke. The former AFC assumed petroleum coke to be transported from a number of refinery locations, while the Amended AFC only shows petroleum coke being delivered from Los Angeles area refineries. Staff needs the applicant to confirm this major delivery route assumption change.

DATA REQUEST

A126. Please confirm that the only source of petroleum coke will be Los Angeles Area refineries; or provide a detailed list of potential petroleum coke sources, their distance from the site, the route that trucks would take from each, and the amount of truck trips that could occur from each petroleum coke source.

RESPONSE

To minimize future costs associated with the petroleum coke (petcoke) feedstock, the Applicant intends to buy petcoke via short-term contracts. Table A126-1 includes the potential petcoke sources for the Hydrogen Energy California (HECA) Project, and their distance and route to the Project Site.

Table A126-1
Potential Petroleum Coke Sources

Producer	City	Distance (miles)	Route
BP	Carson	~ 140	I-710 to I-405 to I-5 to Stockdale Highway
Phillips 66	Carson	~ 140	I-710 to I-405 to I-5 to Stockdale Highway
Tesoro	Wilmington	~ 140	I-710 to I-405 to I-5 to Stockdale Highway
Valero	Wilmington	~ 140	I-710 to I-405 to I-5 to Stockdale Highway
Chevron	El Segundo	~ 130	I-405 to I-5 to Stockdale Highway
ExxonMobil	Torrance	~ 135	I-405 to I-5 to Stockdale Highway
Phillips 66	Santa Maria	~ 150	U.S. 101 to SR 46 to I-5 to Stockdale Highway
Phillips 66	Rodeo	~ 270	I-680 to I-580 to I-5 to Stockdale Highway
Shell	Martinez	~ 265	I-680 to I-580 to I-5 to Stockdale Highway
Tesoro	Martinez	~ 265	I-680 to I-580 to I-5 to Stockdale Highway

Notes:

BP = British Petroleum
I-5 = Interstate 5
I-405 = Interstate 405
I-580 = Interstate 580
I-680 = Interstate 680
I-710 = Interstate 710
SR = State Route
U.S. 101 = United States Route 101

The Applicant anticipates purchasing petcoke from Southern California refineries (including Santa Maria) because it is generally less expensive. Therefore, the expected average travel distance for petcoke trucks is approximately 140 miles.

BACKGROUND: PRODUCT RAIL/TRUCKING TRANSPORTATION EMISSIONS ESTIMATES

Staff's review of the assumptions used for product rail and trucking indicate that the applicant appears to have used inconsistent assumptions regarding product destinations. For example, the trucking distance for Urea and UAN is only 40 miles one-way, while when shipped by train these products go 628 miles and 264 miles one-way, respectively. Staff needs the applicant to supply additional information regarding the rationale for the selection of the travel distances and destinations for all of the shipped products, and if necessary correct emissions estimates so that the assumptions are both reasonable and logically consistent. Specifically, staff is concerned that the trucking alternative, where trucking should be less efficient than rail, isn't showing higher emissions for all pollutants directly related to fuel use.

DATA REQUEST

A127. Please describe the shipping destinations for products when being shipped by rail transportation and shipped by truck. This description needs to identify why the final destinations are not the same, or correct the destinations based on logically consistent final destinations.

RESPONSE

Product shipping information is detailed in Attachments 127-1 and 127-2. Product shipping distances vary between Alternative 1 (rail transportation) and Alternative 2 (truck transportation) due to the presence or absence of the rail spur. Under Alternative 2 (truck transportation), product truck routes leave the Project Site and travel a maximum of 40 miles to regional distribution/transloading centers. Product transport distances from the distribution/transloading centers to end-users are unknown at this time, and will not be dictated by HECA. Under Alternative 1 (rail transportation), product will be shipped by rail and truck. Product being transported shorter distances will be trucked a maximum of 40 miles to regional distribution/ transloading centers. Product being transported longer distances will be shipped via rail.

See the response to Data Request A126 for rail route maps for coal and product delivery for Alternative 1 (rail transportation) and Alternative 2 (truck transportation).

ATTACHMENT A127-1
HECA ALTERNATIVE 1 (RAIL TRANSPORTATION)
SUMMARY OF TRANSPORTATION VEHICLES AND ROUTES

HECA Alternative 1 (Rail Transportation) - Summary of Transportation Vehicles and Routes

Commodity Handled	Petcoke	Coal	Liquid Sulfur	Gasification	Ammonia	Urea	UAN	Equipment	Miscellaneous
Expected plant operation									
Expected plant operation is 8000 hours / year									
The plant will operate 24 hours / day	24 hours / day	24 hours / day	24 hours / day	24 hours / day	24 hours / day	24 hours / day	24 hours / day	24 hours / day	24 hours / day
The plant will operate 333 days / year	333 days / yr	333 days / yr	333 days / yr	333 days / yr	333 days / yr	333 days / yr	333 days / yr	333 days / yr	333 days / yr
Shipment by trucks	100 %	0 %	75 %	25 %	75 %	25 %	50 %	100 %	100 %
Shipment by train	0 %	100 %	25 %	75 %	25 %	75 %	50 %	0 %	0 %
Production rate									
Required Normal Flow / day	1,140 tons / day	4,580 tons / day	100 tons / day	839 tons / day	500 tons / day	833 tons / day	1,392 tons / day		
Required Normal Flow / year	380,000 tons / yr	1,525,000 tons / yr	33,000 tons / yr	280,000 tons / yr	167,000 tons / yr	280,000 tons / yr	464,000 tons / yr		
Required Maximum Flow day	1,368 tons / day (3)	6,107 tons / day (4)	200 tons / day (5)	1,678 tons / day (6)	1,000 tons / day (6)	1,666 tons / day (6)	2,784 tons / day (6)		
Truck Shipments									
Truck Capacity	25 tons / truck		25 tons / truck	25 tons / truck	25 tons / truck	25 tons / truck	25 tons / truck	25 tons / truck	25 tons / truck
Required trucks loads for normal operation / day	46 trucks / day		4 trucks / day	8 trucks / day	15 trucks / day	8 trucks / day	28 trucks / day	2 trucks / day	3 trucks / day
Required trucks loads for normal operation / yr	15,200 truck / yr		990 truck / yr	2,800 truck / yr	5,010 truck / yr	2,800 truck / yr	9,280 truck / yr		
Required trucks loads for maximum operation /day	55 trucks / day		8 trucks / day	17 trucks / day	30 trucks / day	17 trucks / day	56 trucks / day		
Train Shipments									
Railcar Capacity		117 tons / car	100 tons / car	100 tons / car	117 tons / car	117 tons / car	117 tons / car		
Assume a train has 13,000 ton capacity									
Required railcars for normal operation / day		39 cars / day	0.25 cars / day	6 cars / day	1 cars / day	5 cars / day	6 cars / day		
Required railcar loads for normal operation / yr		13,034 cars / yr	83 cars / yr	2,800 cars / yr	357 cars / yr	1,795 cars / yr	1,983 cars / yr		
Required railcars for maximum operation / day		200 cars / day	1 cars / day	16 cars / day	2 cars / day	11 cars / day	12 cars / day		
Basis	- 91% availability - 25% petcoke (heat input) - 25 ton/truck - 7 days/week receiving - 25% excess truck	- 91% availability - 75% coal (heat input) per - 117 tons/car - 100% coal for maximum - Rack sized to handle two	- 91% availability - High sulfur case - 100 - 25 ton/truck - Weekdays only - Can only move up to 25% of	- 91% availability - 75% coal max annual - 100% capable by rail - 25% capable by truck - Maximun is double the daily	- 91% availability - 500 t/d NH3 sales - 75% by truck - Ability to ship 7500 tons ove	- 91% availability - 75% by rail -empty 45 day storage in 10	- 91% availability - 75% by rail -empty 45 day storage in 10		
Traffic route	Truck Route	Truck Route	Truck Route	Truck Route	Truck Route	Truck Route	Truck Route	Truck Route	Truck Route
Destination/Origin	Carson Refinery	None	California Sulfur	Various	Various	Various	Various	Various	Various
Address	1801 E Sepulveda, Carson		2509 E Grant Street, Wilmington						
Distance	140 Miles		142 Miles	80 Mile radius	40 mile radius	40 mile radius	40 mile ratius	40 mile ratius	40 mile ratius
Route	Alameda 405 Fwy 5 Fwy Stockdale hwy Morris Road Station Road Station Road		Grant Henry Ford Alameda 405 Fwy 5 Fwy Stockdale hwy Morris Road Station Road	40 mile radius Station Road Morris Road Stockdale Hywy 5 Fwy	Station Road Morris Road Stockdale Hywy 5 Fwy	Station Road Morris Road Stockdale Hywy 5 Fwy	Station Road Morris Road Stockdale Hywy 5 Fwy	5 fwy Stockdale Hwy Dairy Road	5 fwy Stockdale Hwy Dairy Road
	Rail Route	Rail Route	Rail Route	Rail Route	Rail Route	Rail Route	Rail Route	Rail Route	Rail Route
Destination/Origin	None	Elk Ranch New Mexico	In SJVAPCD	CEMEX, Victorville	Calamco	Oregon/Washington	Calamco	None	None
Address					Port Rd G15, Stockton, CA		Port Rd G15, Stockton, CA		
Distance		794 miles		198 miles	264 miles	628 Miles	264 miles		
Route		Kern County: 132.2 miles (County Line near Boron, CA to north pro Mine to Boron, CA: 662 miles Total Distance: 794.2 miles		SJVR/BNSF	SJVR/UPRR	SJVR/UPRR			

Notes

1) Equipment Maintenance Trucks are considered to be 2% of the total trucks per day for the feed and product operation.
2) Miscellaneous trucks are considered to be 3% of the total trucks per day for the feed and product operation.
3) The maximum flow rate of coke is ratioed up from the normal flow rate at 25% to 30% of feed
4) The maximum flow rate of coal is ratioed up from the normal flow rate at 75% to 100% of feed
5) The maximum flow rate of sulfur is 2 times the normal production
6) The maximum flow rate of these commodities is 2 times the normal production
7) The sources of flow data used in the Production Rate calculation were based on the flow rates provided in "Conference Note: Rail and Truck Traffic - Planning Session" and the "FertilizerProductMovement Update", 01-25-12.

ATTACHMENT A127-2
HECA ALTERNATIVE 2 (TRUCK TRANSPORTATION)
SUMMARY OF TRANSPORTATION VEHICLES AND ROUTES

HECA Alternative 2 (Truck Transportation) - Summary of Transportation Vehicles and Routes

Commodity Handled	Petcoke	Coal	Liquid Sulfur	Gasification	Ammonia	Urea	UAN	Equipment	Miscellaneous
Expected plant operation									
Expected plant operation is 8000 hours / year									
The plant will operate 24 hours / day	24 hours / day	24 hours / day	24 hours / day	24 hours / day	24 hours / day	24 hours / day	24 hours / day	24 hours / day	24 hours / day
The plant will operate 333 days / year	333 days / yr	333 days / yr	333 days / yr	333 days / yr	333 days / yr	333 days / yr	333 days / yr	333 days / yr	333 days / yr
Shipment by trucks	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %	100 %
Shipment by train	0 %	100 %	0 %	0 %	0 %	0 %	0 %	0 %	0 %
Production rate									
Required Normal Flow / day	1,140 tons / day	4,580 tons / day	100 tons / day	839 tons / day	500 tons / day	833 tons / day	1,392 tons / day		
Required Normal Flow / year	380,000 tons / yr	1,525,000 tons / yr	33,000 tons / yr	280,000 tons / yr	167,000 tons / yr	280,000 tons / yr	464,000 tons / yr		
Required Maximum Flow day	1,368 tons / day (3)	6,107 tons / day (4)	200 tons / day (5)	1,678 tons / day (6)	1,000 tons / day (6)	1,666 tons / day (6)	2,784 tons / day (6)		
Truck Shipments									
Truck Capacity	25 tons / truck	25 tons / truck	25 tons / truck	25 tons / truck	25 tons / truck	25 tons / truck	25 tons / truck	25 tons / truck	25 tons / truck
Required trucks loads for normal operation / day	46 trucks / day	183 trucks / day	4 trucks / day	34 trucks / day	20 trucks / day	33 trucks / day	56 trucks / day	2 trucks / day	3 trucks / day
Required trucks loads for normal operation / yr	15,200 truck / yr	61,000 truck / yr	1,320 truck / yr	11,200 truck / yr	6,680 truck / yr	11,200 truck / yr	18,560 truck / yr		
Required trucks loads for maximum operation /day	55 trucks / day	244 trucks / day	8 trucks / day	67 trucks / day	40 trucks / day	67 trucks / day	111 trucks / day		
Train Shipments									
Railcar Capacity		117 tons / car	100 tons / car	100 tons / car	117 tons / car	117 tons / car	117 tons / car		
Assume a train has 13,000 ton capacity									
Required railcars for normal operation / day		39 cars / day	0 cars / day	0 cars / day	0 cars / day	0 cars / day	0 cars / day		
Required railcar loads for normal operation / yr		13,034 cars / yr	0 cars / yr	0 cars / yr	0 cars / yr	0 cars / yr	0 cars / yr		
Required railcars for maximum operation / day		200 cars / day	0 cars / day	0 cars / day	0 cars / day	0 cars / day	0 cars / day		
Basis	- 91% availability - 25% petcoke (heat input) - 25 ton/truck - 7 days/week receiving - 25% excess truck	- 91% availability - 75% coal (heat input) per year - 117 tons/car - 100% coal for maximum - Rack sized to handle two trains/day	- 91% availability - High sulfur case - 100 - 25 ton/truck - Weekdays only	- 91% availability - 75% coal max annual - Maximum is double the daily average rate	- 91% availability - 500 t/d NH3 sales - Ability to ship 7500 tons over 10 days (75% of tank plus some production)	- 91% availability -empty 45 day storage in 10 days	- 91% availability -empty 45 day storage in 10 days	'	
Traffic route	Truck Route	Truck Route	Truck Route	Truck Route	Truck Route	Truck Route	Truck Route	Truck Route	Truck Route
Destination/Origin	Carson Refinery	Wasco rail terminal to site	California Sulfur 2509 E Grant Street, Wilmington	Various	Various	Various	Various	Various	Various
Address	1801 E Sepulveda, Carson								
Distance	140 miles	26.5 miles	142 miles	80 mile radius	40 mile radius	40 mile radius	40 mile radius	40 mile ratius	40 mile ratius
Route	Alameda 405 Fwy 5 Fwy Stockdale hwy Morris Road Station Road		Grant Henry Ford Alameda 405 Fwy 5 Fwy Stockdale hwy Morris Road Station Road	40 mile radius Station Road Morris Road Stockdale Hywy 5 Fwy	Station Road Morris Road Stockdale Hywy 5 Fwy	Station Road Morris Road Stockdale Hywy 5 Fwy	Station Road Morris Road Stockdale Hywy 5 Fwy	5 fwy Stockdale Hwy Dairy Road	5 fwy Stockdale Hwy Dairy Road
	Rail Route	Rail Route	Rail Route	Rail Route	Rail Route	Rail Route	Rail Route	Rail Route	Rail Route
Destination/Origin	None	Elk Ranch New Mexico	None	None	None	None	None	None	None
Address									
Distance		801 miles							
Route		Kern County: 139.2 miles (County Line near Boron, CA to north property line of plant) Mine to Boron, CA: 662 miles Total Distance: 801.2 miles							

Notes

1) Equipment Maintenance Trucks are considered to be 2% of the total trucks per day for the feed and product operation.
2) Miscellaneous trucks are considered to be 3% of the total trucks per day for the feed and product operation.
3) The maximum flow rate of coke is ratioed up from the normal flow rate at 25% to 30% of feed
4) The maximum flow rate of coal is ratioed up from the normal flow rate at 75% to 100% of feed
5) The maximum flow rate of sulfur is 2 times the normal production
6) The maximum flow rate of these commodities is 2 times the normal production
7) The sources of flow data used in the Production Rate calculation were based on the flow rates provided in "Conference Note: Rail and Truck Traffic - Planning Session" and the "FertilizerProductMovement Update", 01-25-12.

DATA REQUEST

A128. Please provide updated product rail and trucking emissions for each of the applicant's alternatives, if necessary based on the answer to the preceding data request.

RESPONSE

Based on the responses to Data Requests A126 and A127, rail and trucking emissions do not need to be updated for either Alternative 1 (rail transportation) or Alternative 2 (truck transportation).

BACKGROUND: RAIL TRANSPORTATION SO2 EMISSIONS ESTIMATES

It is staff's understanding that locomotives would have to meet a 15 ppm sulfur diesel fuel requirement and/or that all refiners would have to meet a 15 ppm sulfur diesel fuel requirement by 2014 (http://www.epa.gov/otaq/standards/fuels/diesel-sulfur.htm), so that higher sulfur diesel fuel would not be available for use by locomotives at the time the project starts rail transportation of coal and products. Staff's review indicates that sulfur dioxide (SO_2) emissions from rail transportation have been based on a sulfur fuel content assumption of approximately 300 ppm rather than 15 ppm.

DATA REQUEST

A129. Please provide corrections to the total rail transportation emissions of SO_2 based on 15 ppm sulfur diesel fuel.

RESPONSE

To correct the sulfur dioxide (SO_2) emissions to account for fuel sulfur of only 15 parts per million (ppm) instead of 300 ppm, total rail SO_2 emissions can be multiplied by 5 percent. Therefore, the train emissions presented were extremely conservative.

BACKGROUND: COAL TRANSPORTATION – FUGITIVE DUST EMISSIONS

The applicant has not estimated fugitive dust emissions from coal transport or provided any information regarding potential control of this emissions source. Staff needs the applicant to provide information that addresses this issue.

DATA REQUEST

A130. Please indicate whether the applicant will stipulate to using covered coal hopper cars, or stipulate to another measure to control fugitive dust emissions from open coal hopper cars.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A124-A180*, docketed on September 26, 2012, the Applicant is requesting additional time to address this Data Request.

DATA REQUEST

A131. If open coal hopper cars are proposed please estimate the fugitive coal dust emissions that occur during transport.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A124-A180,* docketed on September 26, 2012, the Applicant is requesting additional time to address this Data Request.

BACKGROUND: ONSITE ROADS – PAVED ROADS

Staff's review of the project description and construction/operation emissions estimates found that the applicant was proposing to pave all of the onsite roads regularly used during operation, but staff was unable to determine when during construction the applicant is proposing to pave these onsite roads. The applicant should be aware that staff will be recommending the use of soil binders on all onsite unpaved roads, including gravel roads, and onsite inactive disturbed areas. To complete our review of the fugitive dust emissions estimate staff needs additional information regarding the applicant's assumption regarding when the onsite roads will be paved.

DATA REQUEST

A132. Please identify the earliest date during construction that the applicant would be willing to pave the onsite roads.

RESPONSE

The Applicant plans to pave all temporary construction access roads within 6 months after site mobilization, including the Dairy Road extension south from Adohr Road along the western boundary of the Project Site. Within 6 months after site mobilization, the Applicant also plans to pave the temporary construction access road that extends from Adohr Road through the northern construction laydown area to the northern Project Site boundary. Offsite temporary paving shall consist of asphalt concrete construction. Onsite temporary paving shall be constructed with geofabric overlain by a minimum of 8 inches of crushed rock or Class II Aggregate Base, because of the presence of clays that can become softened when wet. The permanent plant onsite roads will be paved with asphalt concrete during the second quarter of construction (months 11 through 21). All temporary roads will be wetted with water trucks as needed for dust control.

BACKGROUND: CONSTRUCTION FUGITIVE DUST CONTROL

Staff's continued review of the construction emissions estimates has determined that emissions control for the fugitive dust emissions estimate for grading is being double counted by assuming both a high, or mitigated, soil moisture content and assuming additional control by watering. The emission factor equation for grading includes the soil moisture content, so additional emissions control should not be applied. Additionally, the emissions control for reduced speed should only be applied to unpaved roads, not to other fugitive dust causing activities, so please revise the fugitive dust control

efficiencies to only include watering, where the current SCAQMD factor for watering three times daily is 61 percent control. (http://aqmd.gov/ceqa/handbook/mitigation/fugitive/MM_fugitive.html – Table XI-A).

DATA REQUEST

A133. Please correct the grading emissions estimate by removing the added emission control efficiency that double counts the effect of grading watered/moist soil.

RESPONSE

The Applicant requires an additional 30 days to respond to this Data Request.

DATA REQUEST

A134. Please correct the fugitive dust emissions control efficiency to only include watering efficiencies, using an agency referenced source for the control efficiency, for the fugitive dust causing activities that are not unpaved road travel.

RESPONSE

The Applicant requires an additional 30 days to respond to this Data Request.

BACKGROUND: MERCURY AND AIR TOXICS STANDARDS COMPLIANCE

The Amended AFC notes that the project will comply with USEPA Mercury and Air Toxics Standards (MATS) regulation, which has several emissions standards, including mercury emission limits. However, the Amended AFC provides no substantive comparison between the project's emissions and these standards. While the effectiveness of the new source emissions standards of this regulation have been stayed for three months while USEPA is reconsidering parts of the regulation, that stay is not based on the mercury emissions standards which USEPA does not intend to change (http://epa.gov/airquality/powerplanttoxics/pdfs/20120727staynotice.pdf).

Specifically, the notice of the stays indicates it is based on…

> *"…reconsideration on certain new source issues related to the emission standards issued under Clean Air Act section 112, including measurement issues related to mercury and the data set to which the variability calculation was applied when establishing the new source standards for particulate matter and hydrochloric acid."*

Therefore, while USEPA is re-evaluating the particulate matter and hydrochloric acid emissions standards, they are only evaluating measurement issues related to mercury. Staff's review of the project's emissions and the MATS emissions standards indicates that the current estimate of all pollutants other than mercury emissions would comply with this regulation. Staff needs additional information from the applicant indicating how they will comply with the mercury emissions limit required by this regulation.

DATA REQUEST

A135. Please identify additional or augmented mitigation for the control of mercury emissions, provide a revised mercury emissions estimate, and compare the project's proposed emissions with all of the MATS emissions limits.

RESPONSE

Mercury emissions from the HECA Project will be controlled using a suitable adsorbent, such as activated carbon or alumina. Two separate treatment systems will be employed. As described in the Amended AFC, a fixed-bed adsorber will be used to remove mercury from sour synthesis gas (syngas), just upstream of the acid gas removal system. A second mercury removal system will be provided by the gasification technology supplier to remove volatilized mercury compounds from the feedstock dryer exhaust gas in the gasifier feed preparation area. This system will use either adsorbent injection into the dryer exhaust stream or a fixed-bed adsorbent system, through which the exhaust gas would flow prior to discharge. In the case of the injection-type adsorbents, the injected material with the adsorbed mercury will be removed with other particulates in the exhaust gas baghouse and added to the gasifier feedstock for syngas production. The adsorbed mercury compounds will be recaptured in the syngas mercury removal system. Based on the latest information obtained from suppliers, we expect to achieve at least 98 percent mercury removal from syngas and 75 percent from the feedstock dryer exhaust, which will be adequate to comply with the Mercury and Air Toxics Standards (MATS). These control efficiencies are slightly different than those presented in the Amended AFC, so updated mercury emission calculations are presented below.

The applicable MATS emission requirements for HECA are given in 40 Code of Federal Regulations Part 63, Subpart UUUUU, in Table 1 for new integrated gasification combined

cycles (IGCC). These emission limits for mercury and the other emission surrogates selected by HECA are shown below. HECA intends to measure filterable particulate matter as a surrogate for metal toxics, and hydrogen chloride or sulfur dioxide as a surrogate for all toxic acid gases. Amended AFC Appendix E-3, page 6, presents the estimated IGCC emissions for the Project (PM_{10} and SO_2 from the heat recovery steam generator [HRSG] and gasification feedstock dryer); and Appendix M presents the emissions of hydrogen chloride. The maximum combined HRSG and feedstock dryer emissions for the MATS constituents are shown below, as well as the ratio of emissions to power generated, using the maximum gross power production of 405 megawatts.

Table A135-1
HECA Emissions for MATS Compliance

Pollutant	HECA Expected Emissions (HRSG plus Feedstock Dryer)		MATS Limit
Filterable Particulate Matter	14.3 lb/hr	0.035 lb/MWh	0.07 lb/MWh
Hydrogen chloride	0.0372 lb/hr	9.2×10^{-5} lb/MWh	2.0×10^{-3} lb/MWh
Sulfur dioxide	5.0 lb/hr	0.012 lb/MWh	0.4 lb/MWh
Mercury	0.00101 lb/hr	0.0025 lb/GWh	0.003 lb/GWh

Notes:

HECA = Hydrogen Energy California
HRSG = heat recovery steam generator
lb/GWh = pounds per gigawatts hour
lb/hr = pounds per hour
lb/MWh = pounds per megawatt hour
MATS = Mercury and Air Toxics Standards

Mercury Emission Calculation

Gasifier coal feed (dry basis) = 3,900 short tons per day
Coal mercury concentration (dry basis) = 0.09 parts per million, weight
Mercury in gasifier feed = 0.0293 pounds per hour (lb/hr)

Uncontrolled mercury in feedstock dryer exhaust (Mitsubishi Heavy Industries estimate) = 0.002 lb/hr
Feedstock dryer mercury removal = 75 percent
Feedstock dryer mercury emission = 0.0005 lb/hr

Inlet mercury to syngas adsorber bed = 0.0293 – 0.0005 = 0.0288 lb/hr
Adsorber removal = 98 percent
Estimated HRSG mercury emission = 0.000576 lb/hr

Eighty-five percent of the HRSG mercury emissions will be exhausted through the HRSG stack and the remainder through the feedstock dryer stack. It is assumed that the mercury in HRSG gas sent to the dryer will be reduced by the dryer mercury removal system, thus:

Feedstock dryer mercury emission = 0.0005 + (0.000576 * 0.15 * 0.25) lb/hr
HRSG mercury emission = 0.000576 * 0.85 lb/hr

Summary

Feedstock dryer emission = 0.000522 lb/hr

HRSG emission = 0.000489
Total plant = 0.00101 lb/hr

Technical Area: Air Quality/Enhanced Oil Recovery and Carbon Capture and Sequestration
Authors: William Walters, Nancy Fletcher

THE ENHANCED OIL RECOVERY (EOR) AND CARBON CAPTURE AND SEQUESTRATION (CCS)

BACKGROUND: BOILER/HEATER EMISSION FACTOR ASSUMPTIONS

Staff's review of SJVAPCD regulations (Rules 4307 and 4320) indicate that the emissions factor assumptions in Appendix A of the AFC will not meet rule requirements for nitrogen oxides (NO_X) emissions at the time three of the proposed process heaters would be permitted. Staff needs clarification of whether there are any applicable exemptions assumed or if emissions should be re-evaluated based on Rule limits.

DATA REQUEST

A136. Please identify if there are any rule exemptions assumed for three heaters rated above 1 million Btu per hour heat input so that the Rule 4307 or 4320 requirements for NO_X limits would not apply. If there are no applicable rule exemptions, then please update the emissions estimates for these three heaters based on compliance with the NO_X emissions limits provided in District Rules 4307 and 4320.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A124-A180,* docketed on September 26, 2012, the Applicant is requesting additional time to address this Data Request.

BACKGROUND: PIPING SYSTEM FUGITIVE VOC EMISSION FACTORS

Staff has not been able to match all of the applicant's VOC fugitive emissions factor calculations, which were noted to come from Table 5-7 of the USEPA Protocol for Equipment Leak Emissions Estimates. Staff needs additional information to understand the rationale for the differences in the calculated emission factors or a corrected emissions estimate to be provided.

DATA REQUEST

A137. Please review and as necessary correct the emission factor calculations/values and VOC emissions calculations for the following piping systems and component types provided in the Operational Phase Criteria Pollutant Emissions appendix to AFC Appendix A:

- ***a. Reinjection Compression Facility (RCF)***
  - ***i. Gas/Light Liquid Valves***
- ***b. Carbon Dioxide Recovery Plant (CRP)***
  - ***i. Gas/Light Liquid Valves***
  - ***ii. Heavy Crude Oil Valves***
  - ***iii. Light Crude Oil Connectors***
- ***c. Central Tank Battery***
  - ***i. Gas/Light Liquid Valves***
  - ***ii. Heavy Crude Oil Valves***
  - ***iii. Light Crude Oil Connectors***
- ***d. Production Satellite Settings***
  - ***i. Gas/Light Liquid Valves***
  - ***ii. Light Crude Oil Connectors***
  - ***iii. Light Oil Open-Ended Lines***
- ***e. Crude Oil and Natural Gas Production Wells***
  - ***i. Gas/Light Liquid Valves***
  - ***ii. Light Crude Oil Connectors***
  - ***iii. Light Oil Open-Ended Lines***
- ***f. CO_2 Injection Wells***
  - ***i. Gas/Light Liquid Valves***
  - ***ii. Light Crude Oil Connectors***
  - ***iii. Light Oil Open-Ended Lines***

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A124-A180,* docketed on September 26, 2012, the Applicant is requesting additional time to address this Data Request.

DATA REQUEST

A138. Please confirm that there are no piping components and/or zero VOC composition, or provide completed emissions calculations, for the following two piping component systems shown in the emissions calculations: Gathering System for Crude Oil and Natural Gas Production (p. 23 of 29); and CO_2 Intake and CO_2 Distribution System for Injection (p. 24 of 29). Please note that if fugitive VOC emission calculations are necessary for either of these piping systems the emissions factors need to address the issues identified above in data request 14.d through 14.f.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A124-A180,* docketed on September 26, 2012, the Applicant is requesting additional time to address this Data Request.

Technical Area: Cultural Resources
Authors: Melissa Mourkas, Elizabeth A., Bagwell, Thomas Gates, Gabriel Roark

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 Energy Commission's siting regulations require applicants to survey project sites, substations, and staging areas plus an area not less than 200 feet surrounding these features for the presence of cultural resources. Additionally, the siting regulations state that cultural resource surveys extend not less than 50 feet beyond the planned limits of proposed linear facilities. (20 California Code of Regulations [CCR], App. B[g][2][C].) Three portions of the applicant's archaeological resources study area have not been surveyed to these specifications because of access issues (Amended AFC, App. G-3, Figure 1, Sheets 4–5). These areas are:

Areas surrounding the Project Site and Controlled Area, consisting of:

- A 200-foot-wide area west of Dairy Road and the Project Site and south of Adohr Road.
- A 200-foot-wide area north of Adohr Road and the Controlled Area, between Dairy Road and Tupman Road.
- A 200-foot-wide area at the northeast corner of the Controlled Area.

East of the proposed natural gas and railroad spur corridor, consisting of:

- A 50-foot-wide swath extending north from the northeast corner of the Stockdale Highway–Dairy Road intersection to the East Side Canal.

The proposed natural gas pipeline corridor along State Route (SR) 58, vicinity of Bowerbank, consisting of:

- The natural gas pipeline corridor and a 50-foot-wide buffer to each side between the end point of the proposed railroad spur and Interstate 5 (I-5).

Staff needs descriptions of archaeological survey methods and survey results for these areas to adequately assess the proposed project's impacts on historical and unique archaeological resources.

DATA REQUEST

A139. Please conduct pedestrian archaeological survey for unsurveyed portions of the proposed HECA project site, linear alignments, and associated buffer areas. In addition, if areas identified are still inaccessible, please provide a justification for continued access issues and an estimate of when requested surveys can be completed and survey results will be submitted.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A124-A180,* docketed on September 26, 2012, the Applicant is requesting additional time to address this Data Request.

DATA REQUEST

A140. Please provide the following information in the survey reports for the requested pedestrian archaeological surveys:

a. The methods used to identify cultural resources in the project linear alignments.

b. The results of the records search and pedestrian survey.

c. Descriptions of newly recorded cultural resources in the proposed project linear alignments.

d. An assessment of impacts to cultural resources in the project linear alignments.

e. Proposed mitigation measures for identified impacts.

f. Department of Parks and Recreation (DPR) 523 forms for all cultural resources identified during the survey as being 45 years or older or of exceptional importance.

g. Figures depicting survey coverage. The figures should also depict ground surface visibility in the survey areas, expressed as a percentage. Figures shall be on a 1:24,000-scale U.S. Geological Survey topographic quadrangle map. Previously and newly recorded cultural resources shall be mapped on the figures.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A124-A180,* docketed on September 26, 2012, the Applicant is requesting additional time to address this Data Request.

BACKGROUND

Five cultural resource inventories have been conducted along or overlapping the portion of the proposed CO_2 pipeline corridor that extends south of the California Aqueduct (Farmer 2008; Hamusek-McGann et al., 1997; Jackson et al., 1998; Peak & Associates 1991; Stantec 2011). Six archaeological resources have been identified in or less than 200 feet from the proposed pipeline within Section 22: P-15-6776 (CA-KER-5041), HECA-6, HECA-7, HECA-8, HECA-12, and Isolated Artifact 1. Archaeological sites HECA-7 and HECA-12 have been recommended as California Register-eligible resources (Farmer 2008:5-8, 5-10). P-15-6776 has been found ineligible for listing on the National Register of Historic Places, but recent work indicates that the significance of the site needs to be reconsidered (Jackson et al., 1998: Table 8.2; Stantec 2011:8). No archaeological resources have been found in the proposed pipeline alignment south of Section 22.

The findings of these previous inventories raise three issues. First, there is a disparity between the results of survey work in Section 22 and south of Section 22. Second, the boundaries of P-15-6776 and other archaeological sites in or adjacent to the proposed pipeline corridor are incompletely defined. Third, the proposed pipeline would intersect at least one previously identified archaeological resource, necessitating test excavation to determine resource significance and possibly mitigation measures.

Concerning the different survey results in Section 22 and south of it, the methods employed by archaeologists to identify archaeological resources appear unsuited to the visibility of archaeological materials south of Section 22. Consequently, archaeological resources are incompletely defined along this portion of the proposed CO_2 pipeline. If not corrected, significant impacts to cultural resources will likely result and could include discoveries of archaeological materials during construction.

The purpose of archaeological survey varies with the goals of the survey. The context of the Energy Commission's environmental review focuses on the discovery of archaeological objects, sites, places, and areas (14 California Code of Regulations 15064.5[a][3]). The typical unit of archaeological discovery is the individual feature (for instance, a house pit depression or mining tailings) or artifact (such as an arrow point or bottle). Artifacts or features that are found close to one another are grouped into archaeological sites for the purposes of future study and management. Archaeological sites in turn may be grouped into larger units (places or areas)—usually termed archaeological districts or landscapes—if the sites show functional, chronological, or other connections (Office of Historic Preservation 1995:1–3).

In planning and conducting an archaeological survey, important considerations include the visibility and obtrusiveness of archaeological resources in the study area. Visibility refers to the ease with which archaeological materials can be seen. During the typical pedestrian archaeological survey, factors affecting archaeological visibility include lighting, weather, the attentiveness and experience of surveyors, the pace of survey, the presence of flood deposits or other soil cover atop archaeological resources, and the density and type of vegetation in the study area. Obtrusiveness of archaeological materials refers to the ease with which the archaeologist can recognize materials as archaeological. For instance, a large and dense scatter of stone-tool debris is easier to encounter and recognize during a survey than one that is small, sparse, or both. Standing structures or their ruins are easier to recognize as archaeological or cultural materials than are house pit depressions. Without exception, as the visibility and obtrusiveness of archaeological materials decreases, the archaeologist must increase the intensity of survey in order to identify archaeological materials. Greater intensity—and probability for finding and accurately describing the range of archaeological materials—can

be achieved in several ways. Most commonly, the spacing between surveyors (transect interval) is reduced or set no wider than the minimal dimension of archaeological resources in the study area. For example, in an area where the average diameter of archaeological sites is 60 feet, transect intervals in a survey should be no wider than 60 feet. Another reasonable way of increasing survey intensity in areas with dense vegetation is to clear vegetation at regular intervals. (Feder 1997:46–49, 54–55.)

Energy Commission staff find that the survey methods employed in the proposed CO_2 pipeline corridor do not conform to the standards described above and are probably responsible for the lack of archaeological resources found south of Section 22. A review of previous surveys in the immediate vicinity will make the situation plain.

In 1991, Peak & Associates surveyed the eastern half of Section 22 in 60-foot transect intervals. Where the ground surface was not clearly visible, Peak & Associates cleared the ground surface at 60-foot intervals. The survey report does not state how obscured the ground surface was before the decision was made to scrape away vegetation, nor how large the surface scrapes were. Survey of this area identified a scatter of freshwater mussel shells, a gray chert chopper,[1] two flakes, and a single bowl mortar.[2] (Peak & Associates 1991:45, 64, 88, 112, Figure 6.) This site was later designated P 15-6776 (CA-KER-5041).

Jackson and colleagues revisited the area in 1997, surveying after a wildfire had burned the area. The wildfire produced excellent ground surface visibility since most of the vegetation succumbed to the fire. Say Jackson et al. (1998:72), "The excellent ground surface visibility resulting from the wildfire revealed constituents [artifacts] that otherwise would lie obscured beneath continuous vegetation." These materials were identified near Peak & Associates' recordation of P-15-6776.

In 2008, URS archaeologists surveyed the northern half of Section 22, overlapping with Peak & Associates (1991) and Jackson et al.'s (1998) survey coverage (Farmer 2008). The survey was conducted by 2–6 persons walking transects spaced 50 feet apart. Ground surface visibility ranged from 50–100 percent, with the "vast majority" of the survey area being free of vegetation. Once an archaeological site was located, the survey crew walked 15-foot transects over the site to determine its boundaries. URS identified four archaeological resources and one historic structure (road) in or within 200 feet of the current proposed CO_2 pipeline: HECA-6, HECA-7, HECA-11, HECA-12, and KRM-010H (Farmer 2008:4-1).

At archaeological site P-15-6776, URS found that the site contained far more surface artifacts than were recorded by previous investigators and that the site extended further south and west. Two potential house-pit depressions were also observed on the site surface. URS attributed their additional finds to surveying after recent field disking and 10 years of erosion since the site was last recorded (Farmer 2008:5-21, 6-1).

In February 2011, Stantec archaeologists surveyed the current proposed CO_2 pipeline by walking parallel transects spaced 50 feet between surveyors. Ground surface visibility was poor throughout the proposed pipeline corridor (10–20 percent) and Stantec does not describe attempts to improve the ground surface visibility by clearing vegetation. Stantec reports that archaeological site P-15-6776 extends west (into the proposed pipeline corridor) and north of the previously identified site boundaries. Given the clear track record shown in previous

[1] A large pebble, cobble, or core tool that is flaked to form an axe-like cutting edge; it is used for chopping and cleaving work.

[2] A stone or wooden bowl-like artifact in which seeds, berries, meat, pigment, and other substances are pulverized or ground with a pestle.

investigations of the pipeline vicinity, the amount of ground cover—and whether one clears obscuring vegetation—strongly conditions the reliability of archaeological survey results. In the context of 10–20 percent visibility and no vegetation clearing, the results of survey south of Section 22 appear unreliable.

The second issue with the archaeological survey for the proposed pipeline corridor is that archaeological site boundaries within and adjacent to the pipeline corridor are incompletely defined. This is particularly true of P-15-6776, which Stantec (2011: Figure 2) maps as extending into areas mapped as archaeological sites HECA-8, HECA BUF 1, HECA-7, HECA-ISO-1, and HECA-ISO-2 (Farmer 2008). The Stantec (2011) report contains no reference to these archaeological sites or to URS's survey (Farmer 2008), indicating that Stantec was unaware that these five resources were recorded near one another and to P-15-6776. Stantec (2011:8) states that "further survey, and possibly additional testing [should] be conducted in the area of site number PS-15-006776 [sic] when the exact pipeline corridor is established and ground visibility has improved."

Third, the proposed pipeline corridor would probably affect at least one archaeological resource, P-15-6776. Although Jackson et al. (1998) recommended P-15-6776 as ineligible for listing on the National Register, they did not evaluate the site for California Register eligibility and subsequent researchers found additional surface artifacts and features at the site in sufficient numbers to warrant reconsideration of its boundaries and significance (Farmer 2008:5-20, 5-21, Table 5-2; Stantec 2011:8). For Energy Commission staff to determine whether the proposed project would result in a substantial adverse change to historical or unique archaeological resources, staff needs to know whether archaeological site P-15-6776 qualifies as a historical or unique archaeological resource. This matter is solvable by conducting a test excavation program at the site.

DATA REQUEST

A141. Please conduct an archaeological survey in the proposed CO_2 pipeline corridor south of Section 22, incorporating the following practices.

a. Fifty-foot-wide or narrower transect intervals.

b. Where the ground surface visibility is 50 percent or less in the proposed pipeline corridor due to vegetation, clear vegetation in 3-feet- by-3-feet patches at 50-foot intervals to inspect the ground surface.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A124-A180,* docketed on September 26, 2012, the Applicant is requesting additional time to address this Data Request.

DATA REQUEST

A142. Please prepare and submit an addendum to Amended AFC Appendices A-1 and A-2, Attachment B, that describes or contains:

a. The methods used to identify cultural resources in the proposed pipeline corridor.

b. The identity and qualifications of the personnel conducting the survey and report preparation.

c. The results of the archaeological survey.

d. Descriptions of newly recorded cultural resources in the proposed pipeline corridor.

e. An assessment of impacts to cultural resources in the proposed pipeline corridor.

f. Proposed mitigation measures for identified impacts.

g. Department of Parks and Recreation (DPR) 523 forms for all cultural resources identified during the survey as being 45 years or older or of exceptional importance.

h. Figures depicting survey coverage. The figures should also depict ground surface visibility in the survey areas, expressed as a percentage. Figures shall be on a 1:24,000-scale U.S. Geological Survey topographic quadrangle map. Previously and newly recorded cultural resources shall be mapped on the figures.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A124-A180,* docketed on September 26, 2012, the Applicant is requesting additional time to address this Data Request.

DATA REQUEST

A143. Please provide a recommended avoidance plan describing and graphically demonstrating how impacts on specific archaeological resources in the proposed CO_2 pipeline corridor will be avoided. The plan should include:

a. Descriptions of the resource(s), with particular attention to the depth or thickness of archaeological materials and the resource boundaries.

b. Maps depicting the site boundaries and locations of any previous test excavation units for each resource. Maps shall meet the requirements laid out for DPR 523 Sketch Maps, but do not need to be generated on the site form template (see Office of Historic Preservation 1995:15).

c. Overlay the proposed pipeline corridor and all associated work areas and access roads onto the aforementioned sketch map.

d. Similar exhibits showing, plan and profile, the proposed methods for avoiding identified archaeological resources.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A124-A180,* docketed on September 26, 2012, the Applicant is requesting additional time to address this Data Request.

DATA REQUEST

A144. If archaeological sites along the proposed CO_2 pipeline corridor cannot be avoided per data request 143, please provide, for staff review and approval, an archaeological testing plan that conforms to the standards described in Office of Historic Preservation (1991). The purpose of the testing plan is to determine whether archaeological resources in the proposed pipeline corridor meet CEQA's definition of a historical or unique archaeological resource. The research design shall be prepared by an archaeologist that meets the Secretary of the Interior's professional standards for archaeologists (see Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines, 36 Code of Federal Regulations 61). The research design must include the following:

a. A statement of the problem and research goals.

b. A statement of methods to achieve the research goal.

c. A statement regarding how the results will be reported.

d. Maps depicting the site boundaries and locations of any previous test excavation units for each resource. Maps shall meet the requirements laid out for DPR 523 Sketch Maps, but do not need to be generated on the site form template (see Office of Historic Preservation 1995:15).

e. Overlay the proposed pipeline corridor and all associated work areas and access roads onto the aforementioned sketch map.

f. A schedule for implementation of the research design.

g. The preparer's résumé and the résumés of other key staff that are expected to implement the research design.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A124-A180,* docketed on September 26, 2012, the Applicant is requesting additional time to address this Data Request.

DATA REQUEST

A145. Upon staff's approval of the research design described in data request 144 immediately above, please implement the archaeological investigation consistent with the approved research design.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A124-A180,* docketed on September 26, 2012, the Applicant is requesting additional time to address this Data Request.

DATA REQUEST

A146. Following completion of the archaeological investigation specified in data request 145 above, please provide, for staff's review and approval, an archaeological evaluation report that identifies the methods employed and results of the investigation. The report shall contain the following:

a. A description of the research design and the methods employed during the study.

b. A description of the study results.

c. Recommendations as to eligibility for consideration as a historical or unique archaeological resource for each resource investigated.

d. A location map on a U.S. Geological Survey, 7.5-minute topographic quadrangle.

e. For archaeological resources that appear to meet the criteria of historical or unique archaeological resource, describe whether the proposed pipeline would result in impacts to them. Supplement the impact discussion with exhibits and quantify the estimated quantity of archaeological materials that would be damaged or removed.

f. Proposed mitigation measures for impacted archaeological resources. Supplement the mitigation discussion with exhibits as needed.

g. A Sketch map (see data request 143 above) that depicts the sampling locations and the location of any newly identified archaeological features.

h. Revised DPR 523 forms.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A124-A180,* docketed on September 26, 2012, the Applicant is requesting additional time to address this Data Request.

BACKGROUND

The proposed process water pipeline would extend through the vicinity of recorded sites P-15-89 (CA-KER-89/H), P-15-171 (CA-KER-171), P-15-179 (CA-KER-179), P-15-2485 (CA-KER-2485), P-15-6725, P-15-7176, P-15-13717, HECA-2008-1 (JM-BVWD-1), HECA-2009-09, HECA-2009-10, BS-BVWD-1, BS-IF-001, BS-IF-002, BS-IF-003, BS-IF-005, JM-IF-001, JM-IF-004, KRM-IF-002, KRM-IF-003, KRM-IF-004, KRM-IF-005, KRM-IF-006, and KRM-IF-007. The Amended AFC states that the process water pipeline would be placed in fill sediments and that impacts on cultural resources would be negligible (Amended AFC Section 5.3, pp. 27–29). The Amended AFC, however, does not state its source of information regarding the depth of fill in the vicinity of these resources.

DATA REQUEST

A147. Provide more detailed engineering drawings, showing where exactly the process water pipes will be placed in cross-section of levee. Provide proof, such as historic documents or test results, demonstrating the depth of fill used to build the levee, thereby proving that the sites along the pipeline will be successfully avoided.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A124-A180,* docketed on September 26, 2012, the Applicant is requesting additional time to address this Data Request.

BACKGROUND

Information on cultural resources in the project vicinity is distributed among about 12 reports, including six cultural resource reports prepared specifically for HECA and connected actions (Farmer 2008; Hale and Laurie 2009; Hale et al., 2012; JRP Historical Consulting 2009, 2012; Stantec 2011). None of these reports document or graphically display the location of the entire proposed project with previous studies and recorded cultural resources. Energy Commission staff's efforts to assess the potential environmental impacts of the project are hindered by the lack of comprehensive mapping of the project, cultural resource studies, and recorded cultural resources.

DATA REQUEST

A148. Please provide a revised map showing the entire project and connected actions. On the same map, depict the locations of previous studies labeled with their California Historical Resources Information System study numbers. Also include the limits of URS's 2008, 2009, and 2012 archaeological survey coverage. The revised map must include the locations of all previously and newly recorded cultural resources. Prepare the map as a single oversize sheet, not as a series of smaller sheets.

RESPONSE

Figure A148-1 presents, on a single oversize sheet, the current Project elements; relevant URS archaeological survey coverage; and all previously and newly recorded cultural resources. This figure has been submitted separately to the CEC under rules of confidentiality.

Figure A148-1 Record Search Data and URS Survey Results (Submitted under Separate Confidential Cover)

BACKGROUND

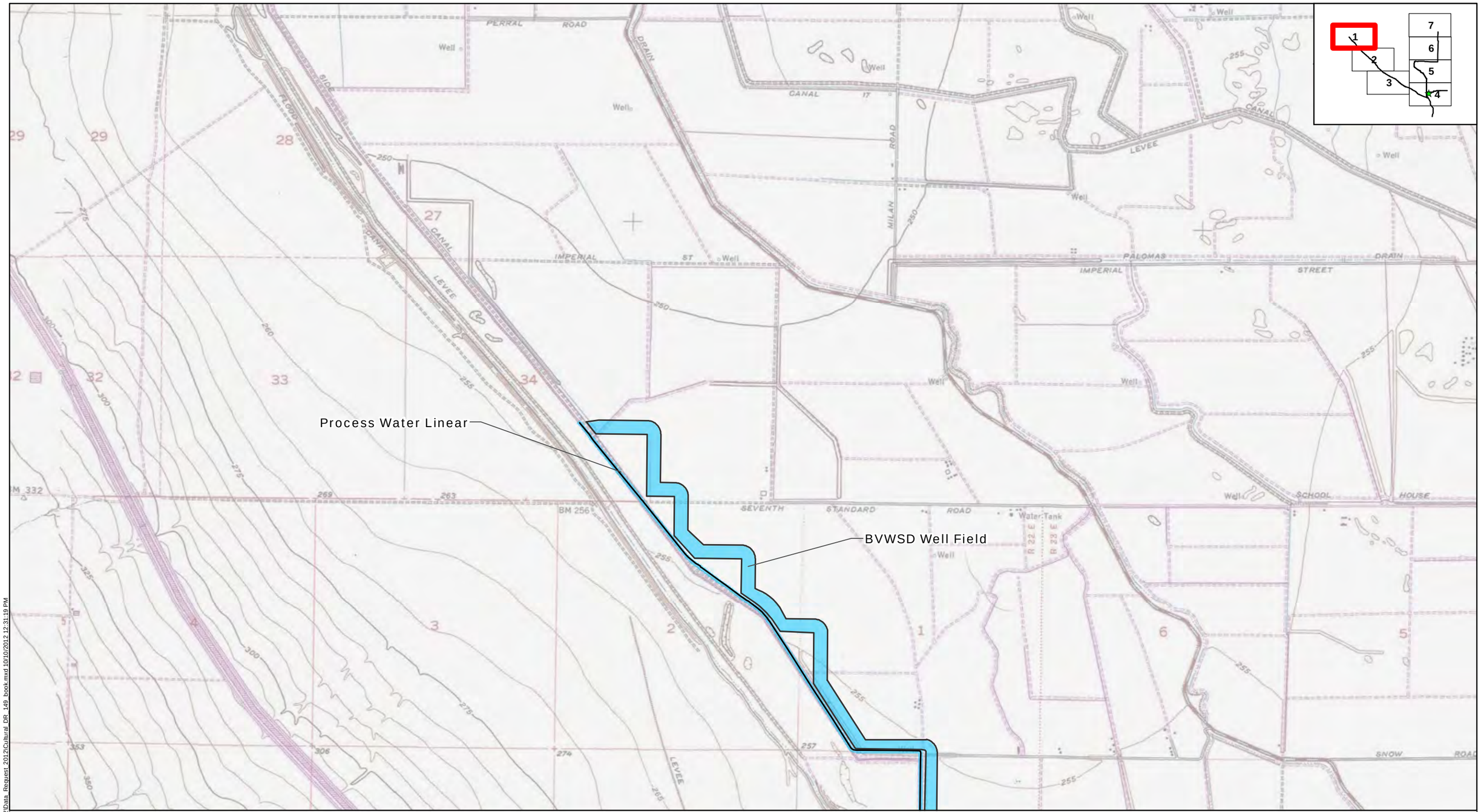
It is unclear whether the applicant's archaeological consultants surveyed a 200-foot buffer surrounding the Controlled Area, future electrical transmission switchyard, proposed railroad laydown yard, the proposed meter/natural gas valve station, and horizontal directional drilling (HDD) entry and exit pits, as required by Appendix B(g)(2)(C) of the Energy Commission's Siting Regulations. The archaeological consultant's archaeological resources study area (ARSA) is described both narratively and graphically (Amended AFC Section 5.3, p. 3, Figure 5.3-1; Amended AFC App. A-2, Attachment B, p. 1, Figure 1; Confidential App., Railroad and Natural Gas Linears, p. 5.3-1, Figure 5.3-1). Figures depicting the ARSA do not identify the locations of the proposed railroad laydown yard, future electrical transmission switchyard, or the HDD entry and exit pits. The narrative descriptions of the ARSA and survey coverage do not indicate whether a 200-foot buffer was surveyed surrounding the Controlled Area, meter/natural gas valve station, or HDD entry and exit pits (Amended AFC App. G-3, pp. 33, 37–38).

DATA REQUEST

A149. Please provide survey coverage figures on a 7.5-minute topographic quadrangle base (set at 7.5-minute scale). The figures must include all project elements and boundaries of the areas actually surveyed.

RESPONSE

A map set depicting all survey coverage on 7.5-minute topographic quadrangles has been prepared, and is presented on Figure A149-1.



HECA Project Component
Survey Area
No Survey Access

N

0 1,000 2,000 4,000 FEET

ARCHAEOLOGICAL SURVEY COVERAGE

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE A149-1 - SHEET 1

Source: ESRI, USGS seamless 1:24K topo maps. Updated by ESRI, 2009

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BVWSD Well Field

Process Water Linear

HECA Project Component
Survey Area
No Survey Access

N

0 1,000 2,000 4,000 FEET

Source: ESRI, USGS seamless 1:24K topo maps. Updated by ESRI, 2009

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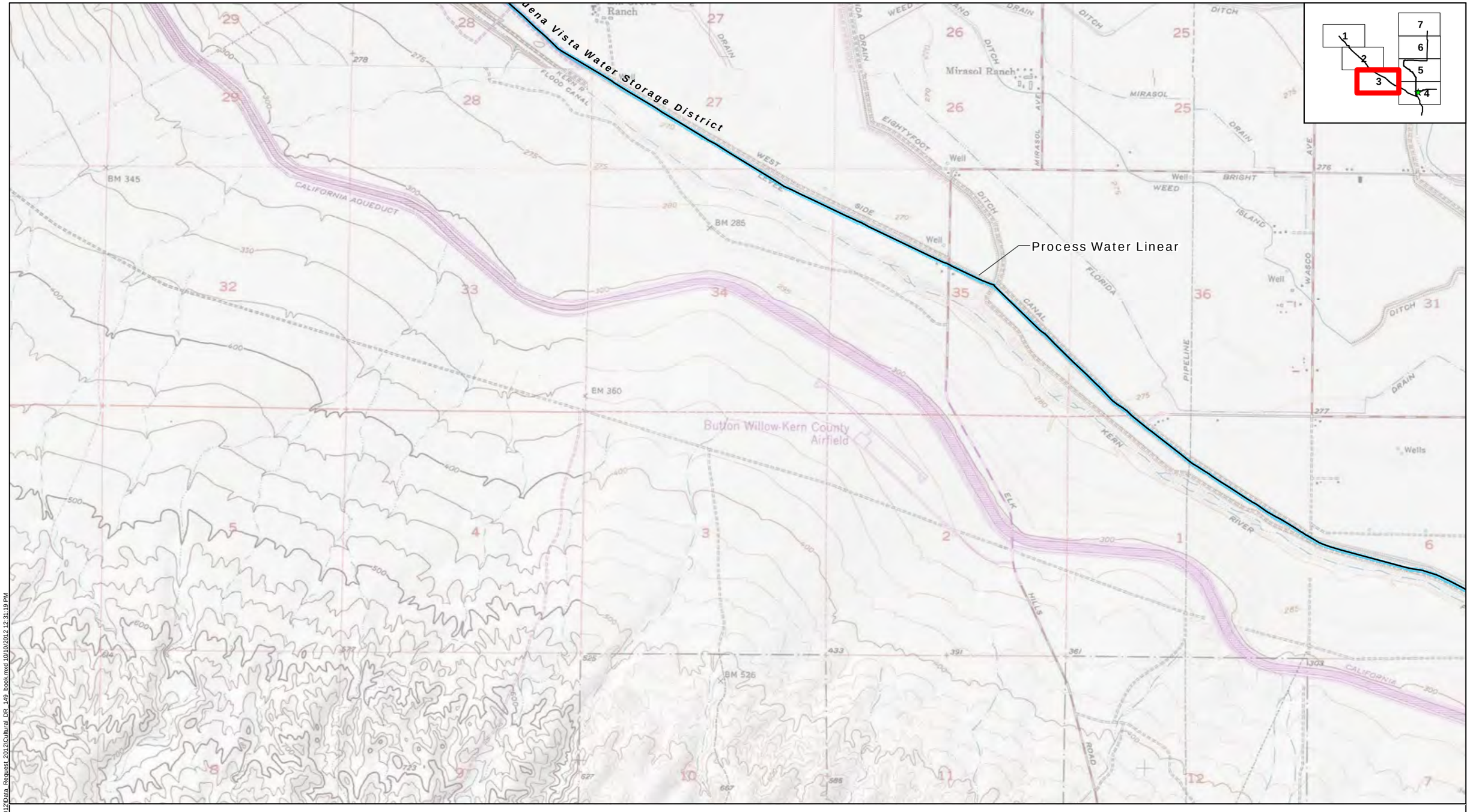
ARCHAEOLOGICAL SURVEY COVERAGE

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE A149-1 - SHEET 2



HECA Project Component
Survey Area
No Survey Access

N

0 1,000 2,000 4,000 FEET

ARCHAEOLOGICAL SURVEY COVERAGE

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE A149-1 - SHEET 3

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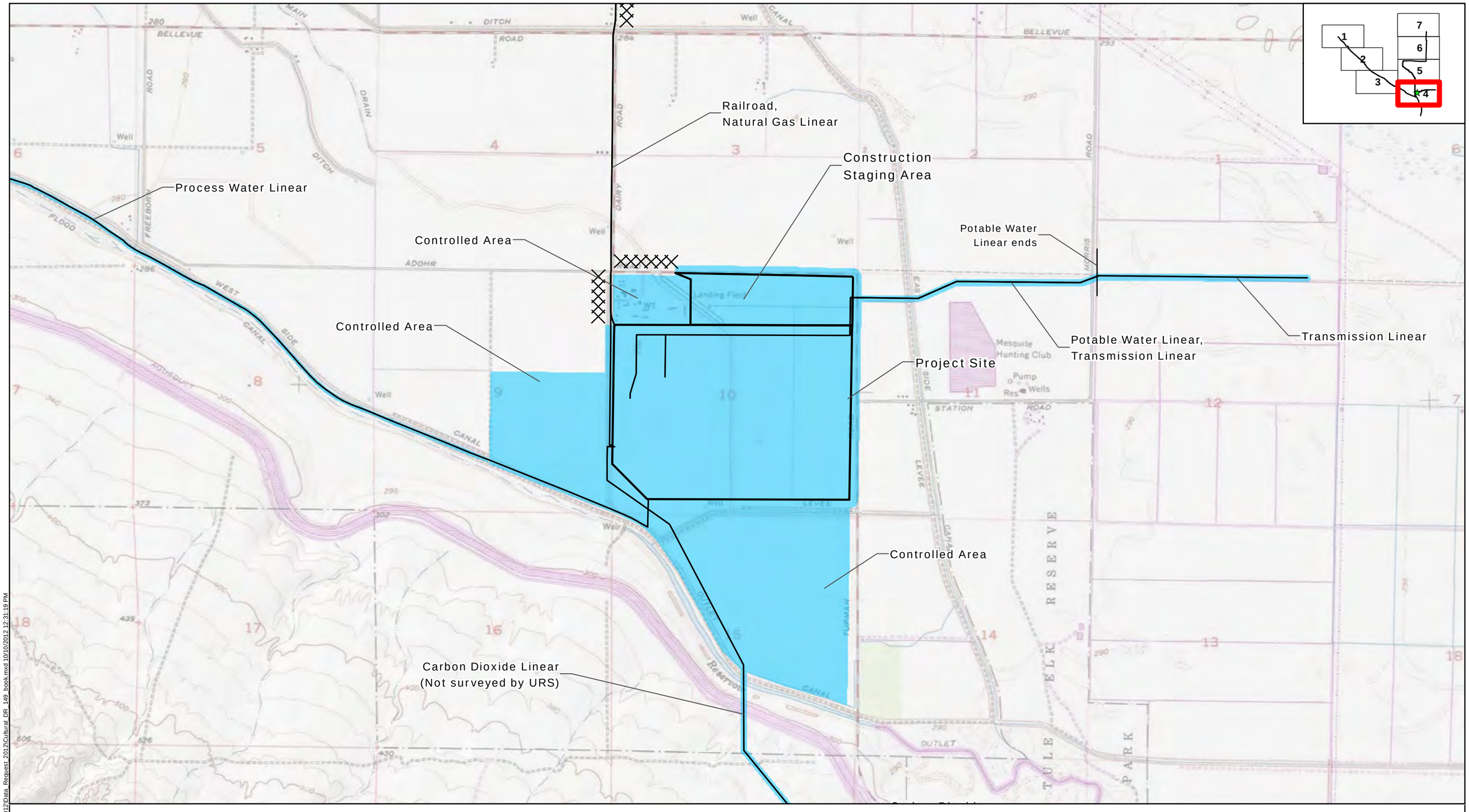
Source: ESRI, USGS seamless 1:24K topo maps. Updated by ESRI, 2009



ARCHAEOLOGICAL SURVEY COVERAGE

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE A149-1 - SHEET 4

Source: ESRI, USGS seamless 1:24K topo maps. Updated by ESRI, 2009

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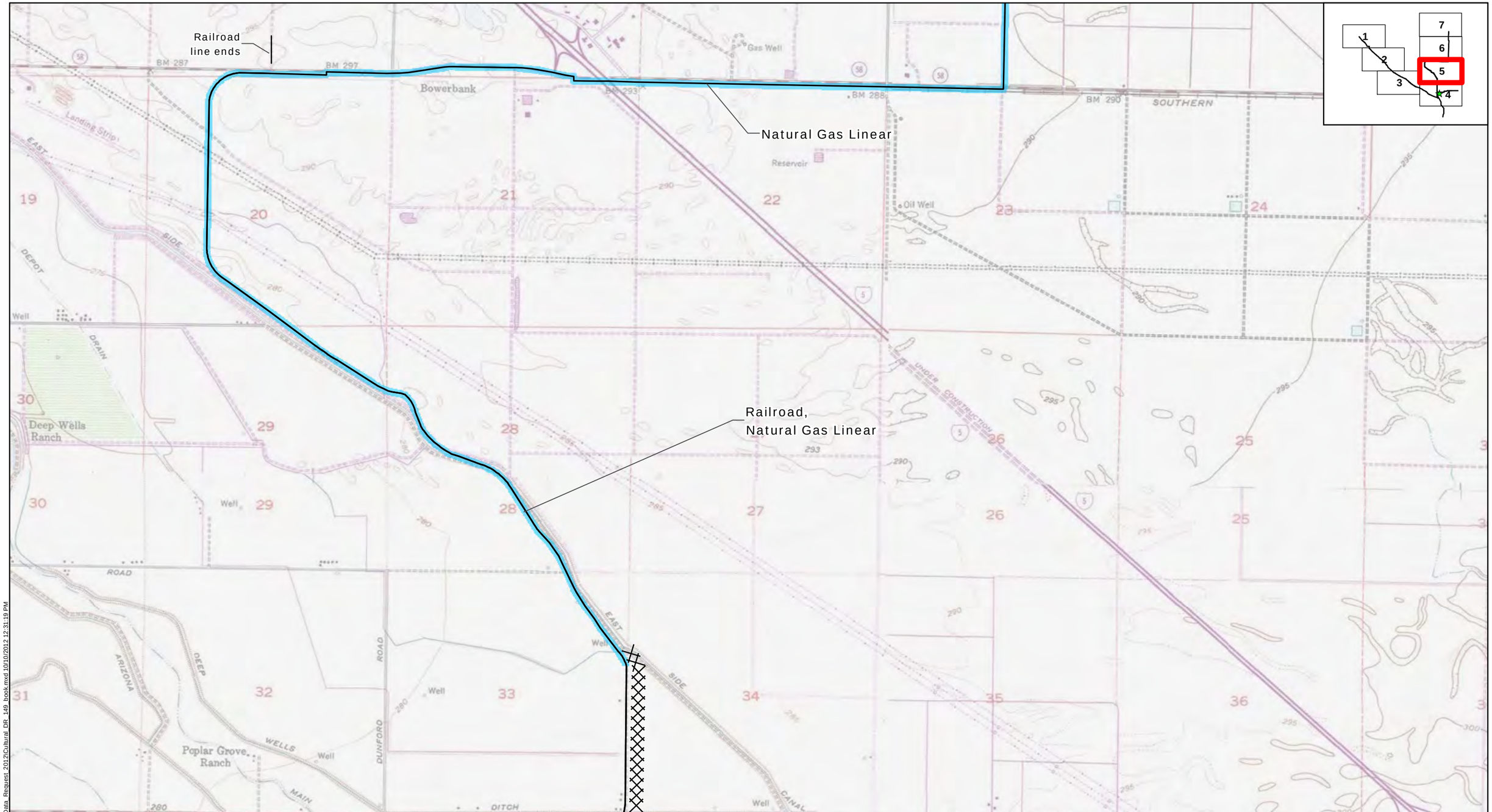

HECA Project Component
Survey Area
No Survey Access

N

0 1,000 2,000 4,000 FEET

ARCHAEOLOGICAL SURVEY COVERAGE

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE A149-1 - SHEET 5

Source: ESRI, USGS seamless 1:24K topo maps. Updated by ESRI, 2009

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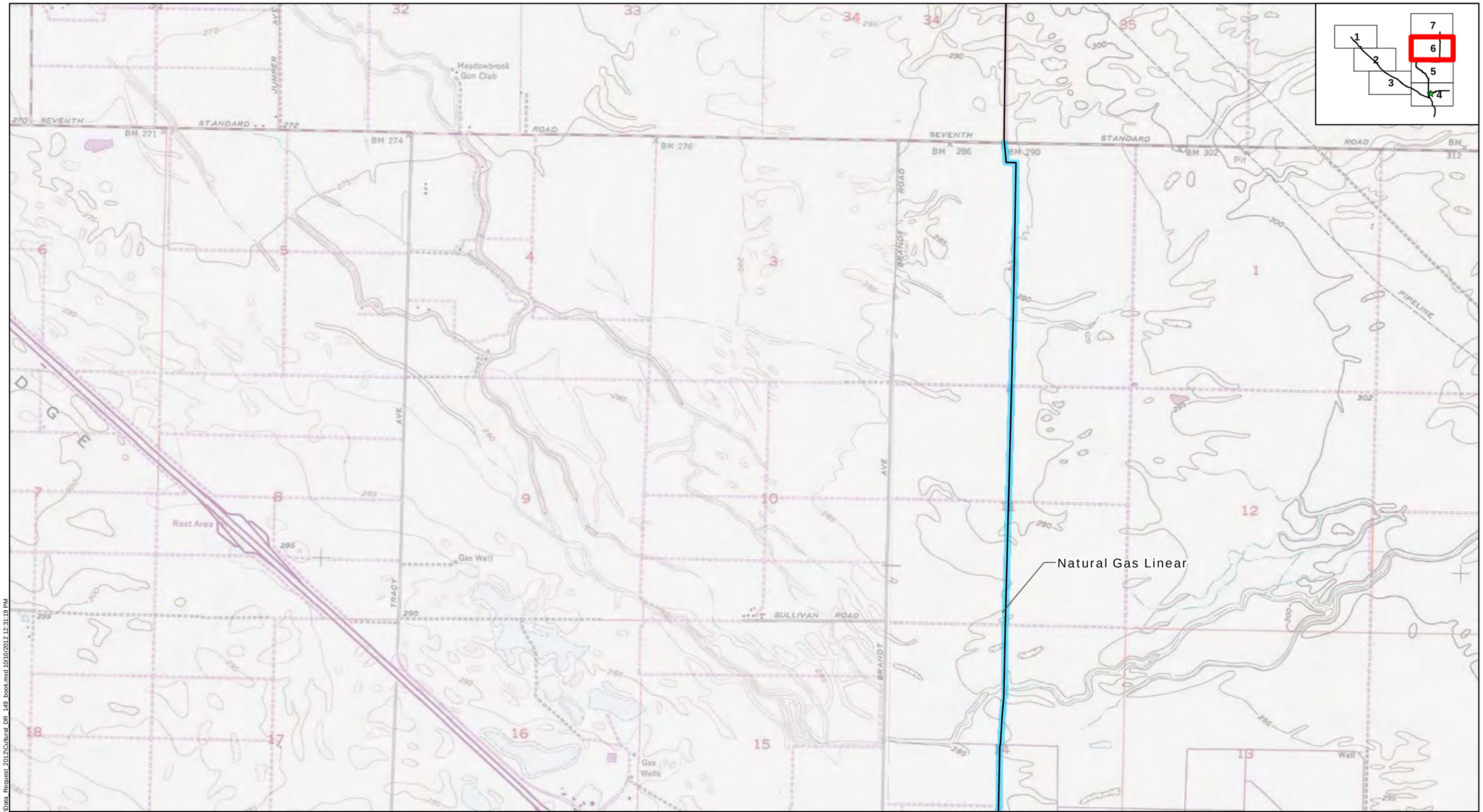

HECA Project Component
Survey Area
No Survey Access

N

0 1,000 2,000 4,000 FEET

ARCHAEOLOGICAL SURVEY COVERAGE

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE A149-1 - SHEET 6

Source: ESRI, USGS seamless 1:24K topo maps. Updated by ESRI, 2009

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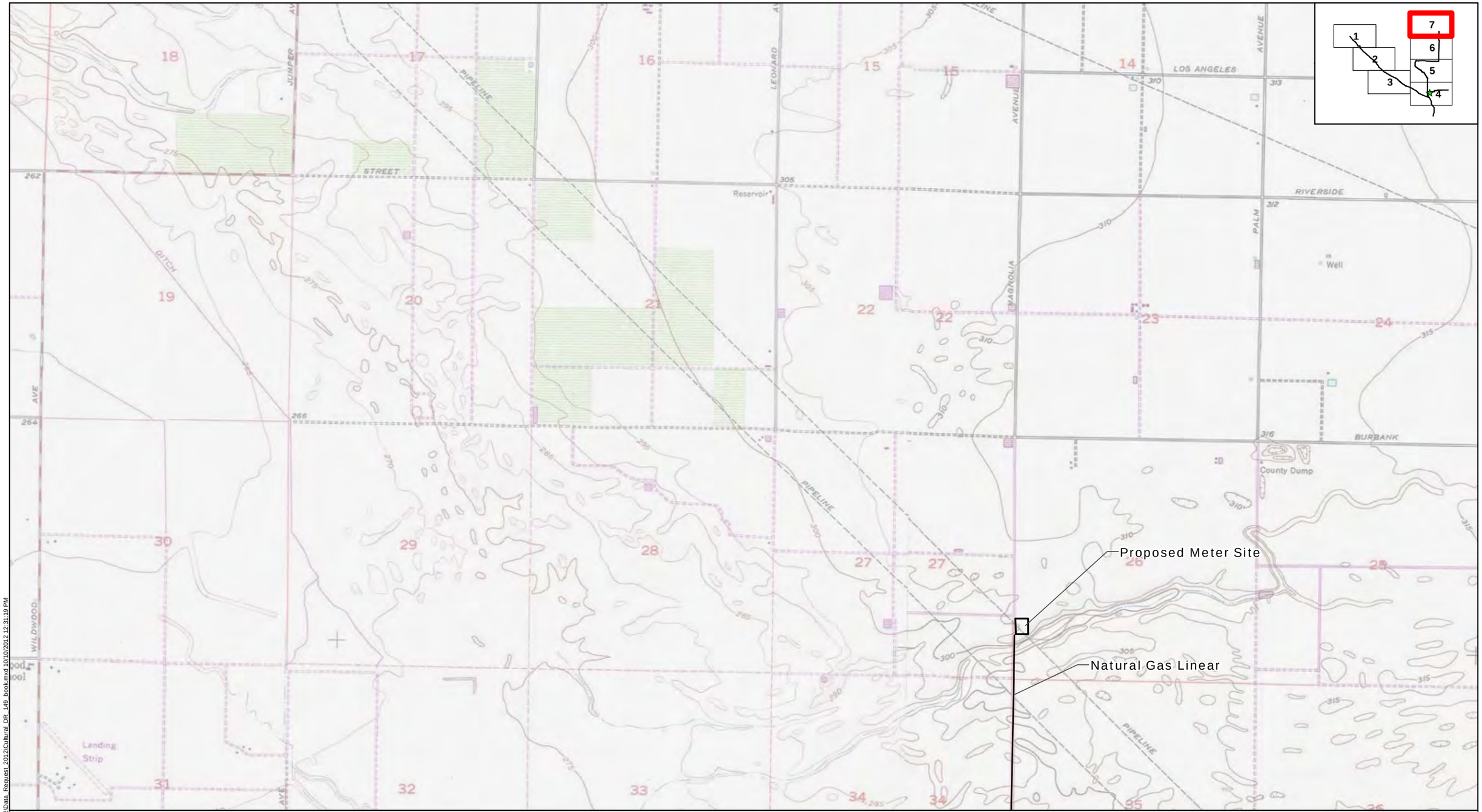

HECA Project Component
Survey Area
No Survey Access

N

0 1,000 2,000 4,000 FEET

ARCHAEOLOGICAL SURVEY COVERAGE

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE A149-1 - SHEET 7

Source: ESRI, USGS seamless 1:24K topo maps. Updated by ESRI, 2009

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BACKGROUND

The Amended AFC does not state the depth of excavation for several ground-disturbing activities. This information is necessary to assess the proposed project's potential impacts on cultural resources.

DATA REQUEST

A150. Please provide the depth of excavation involved in constructing the following project elements:

a. CO_2 transfer facility.

b. Natural gas pipeline (also state the diameter of this pipe).

c. Railroad spur.

d. Electrical transmission line towers.

e. Electrical transmission switchyard.

f. Natural gas meter/valve station.

g. Potable water line.

h. Process water line.

i. Confirm whether excavation within the Project Site will be confined to 5-10 feet below current grade.

j. Confirm whether pile foundations would be used and whether such piles would extend 40-60 feet below ground surface.

RESPONSE

a. The Applicant understands that CEC's Data Request relates to the Occidental of Elk Hills, Inc. (OEHI), carbon dioxide (CO_2) processing facility, rather than to a CO_2 transfer facility. Up to 50 feet of excavation may be required in some areas for grading associated with the CO_2 processing facility. The maximum depth of excavation for CO_2 processing facility equipment foundations is expected to be approximately 6 feet below grade.

b. The excavation for the 12-inch-diameter natural gas pipeline is expected to be approximately 7 feet.

c. The Applicant understands that CEC's Data Request relates to the OEHI CO_2 processing facility, rather than to a CO_2 transfer facility. Up to 50 feet of excavation may be required in some areas for grading associated with the CO_2 processing facility. The maximum depth of excavation for CO_2 processing facility equipment foundations is expected to be approximately 6 feet below grade.

d. The excavation for the railroad spur bed will be between 6 inches and 3 feet, with an average depth of less than 2 feet.

e. The foundations of on tangent towers (straight line towers) will be approximately 28 feet in depth. The foundations of turning towers will be approximately 35 feet in depth.

f. The Project switchyard will be over excavated to approximately 9 feet, and then backfilled to grade. The electric transmission switching station, which will be designed and constructed by Pacific Gas and Electric Company, is expected to be overexcavated to the same approximate depth.

g. The natural gas meter/valve station will be excavated to approximately 6 feet.

h. The excavation for the potable water line is expected to be approximately 6 feet.

i. The process water line will be buried 3 feet to the top of the pipe, and will be buried in the levee road adjacent to the West Side Canal. The total depth of the trench for the process water line is expected to be approximately 5 feet.

j. The majority of excavations (approximately 90 percent) are expected to be in the range of 5 to 10 feet below existing grade. Excavations in areas such as the gasification structure, the cooling tower pump basin, and the feedstock unloading bunker will be in the range of 15 to 50 feet below existing grade. These deeper excavations will involve sloping back the sides of the excavation or using a shoring system (sheet piles or soldier piles).

k. Shallow soil-bearing foundations will be used for the majority, if not all, of the foundations. Pile foundations may be used in selected high load applications, with piles extending approximately 40 feet below existing ground elevations.

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.

RESPONSE

Although the CEC background section is complimentary of the geoarchaeological study completed for the 2008 Revised AFC, it should be noted that an updated geoarchaeological analysis was included in the confidential archaeological reconnaissance report (see Amended AFC Appendix G-3). The updated analysis also determined that the new project configuration (which included a minor change to location of the facility within the Controlled Area, the movement of some Project linears, and the introduction of a railroad corridor) is situated in an area that is predominantly of high geoarchaeological sensitivity. The updated geoarchaeological analysis also indicates that these soils of increased archaeological sensitivity extend to depths of nearly 35 feet.

At the time of the submittal of the response to Data Request 77 referenced in the CEC background section, the Applicant maintained that the study contained sufficient pertinent information gathered from extant Quaternary science and geoarchaeological literature, and from geomorphological technical studies within the Project vicinity, to reconstruct the historical geomorphology of the Project area. For that reason, the Applicant maintained that a Project-specific geoarchaeological study comprising a research plan and field studies was unnecessary.

Discussions between the Applicant and CEC staff concerning the necessity of geoarchaeological field sampling ensued during CEC's April 2010 Data Response and Issue Resolution Workshop, concluding in the Applicant's acquiescence and agreement to develop the following, as stated in the Workshop responses:

- For the Project Site: "Once a development plan has been finalized for the Project Site, an exploration plan for the combined geotechnical/geoarchaeological investigations will be developed, focusing on those areas with the deepest project impacts."

- For Project linears: "Once engineering and design (including the proposed depths of the linear components under consideration) have been finalized, an exploration plan for the geoarchaeological investigation will be developed…"

However, design changes have been made since the April 2010 workshop, and neither the development plan nor the engineering and design of the linear components of the revised Project have been finalized.

Upon further consideration, the current Applicant questions the need for further geoarchaeological analysis (i.e., plan and field investigation) beyond what has been submitted. As stated in the CEC background section, the information to be gained from the requested geoarchaeological investigation would "help focus the monitoring effort and would result in better protection for the resources." As discussed with CEC staff during the September 27, 2012 Data Response Workshop, the Applicant understands that the entire Project is situated in an area of high *archaeological* sensitivity (as distinct from geoarchaeological sensitivity); therefore, the CEC will likely require archaeological monitoring of all ground-disturbing activities associated with the Project. It is the Applicant's opinion that monitoring of all ground-disturbing activities will provide sufficient protection of buried cultural resources, and that the completion of an additional geoarchaeological analysis is unnecessary and could result in a lengthy Project delay.

Furthermore, as detailed below, the Applicant notes that a comprehensive monitoring program will likely be required even in areas of low geoarchaeological sensitivity. Therefore, focusing monitoring efforts is not necessary.

As presented on Figure A151-1 (submitted under separate Confidential cover), portions of the Project bisect areas of low geoarchaeological sensitivity, meaning that it is unlikely that these particular soils include deeply buried (i.e., not visible on the ground surface) archaeological resources. However, archaeological resources could still occur in these areas. Figure A151-1 shows that there are numerous prehistoric archaeological sites situated on (i.e., visible on the surface) soils of low geoarchaeological sensitivity. The following are examples of these areas:

- Within one half mile of this section of the natural gas line along State Route 58 near Interstate 5, there are eight previously recorded prehistoric archaeological sites. Historic maps reviewed during archival research reveal that the former course of the Kern River Slough once occurred within this area. The presence of the slough, a natural draw to the prehistoric inhabitants of the area, elevates the archaeological sensitivity of the area. The apparent absence of additional prehistoric archaeological sites in this immediate vicinity is likely due to the general lack of archaeological survey coverage outside the existing transportation corridors.

- The CO_2 line that extends into the Elk Hills Oil Field will be constructed in soils of varying geoarchaeological sensitivity. As depicted on Figure A151-1, some soils of decreased geoarchaeological sensitivity along the CO_2 line also contain a high density of previously recorded archaeological sites. This particular location along the lower elevations of the Elk Hills Oil Field once fronted the shore of Buena Vista Slough, another attractant to the prehistoric population of the area. It is the presence of the sloughs, not the depositional history of the local soils, that determines the archaeological sensitivity of these areas. In both these cases, the number of identified archaeological sites confirms the elevated archaeological sensitivity of these areas.

The determination that the Project is located entirely within an area of high archaeological sensitivity is not based solely on the results of the geoarchaeological analysis, but also relies on the results of the pedestrian surveys, archival research, and record searches completed for the Project. Taken alone, the geoarchaeological data indicate that there is indeed variability in the sensitivity of the Project area and associated linear alignments. As cited by the CEC in the background section, the geoarchaeological data supplied by the Applicant determined that:

> *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.*

Discussions between CEC staff and the Applicant at the Data Response Workshop held September 27, 2012, again addressed the necessity of further geoarchaeological analysis given the preponderance of evidence that the Project is situated entirely in areas of high

archaeological sensitivity. The Applicant confirmed its understanding that monitoring would be required throughout the Project area.

Given that the Applicant has acknowledged that a Project-wide comprehensive archaeological monitoring program will be required as a Condition of Certification, the need for site-specific geoarchaeological data to "focus monitoring efforts" is unnecessary. In addition, due to the fact that the majority of the overall Project is situated within areas of high geoarchaeological sensitivity, the subsequent implementation of geoarchaeological trenching as a means of identifying specific buried resources would only suffice to determine the presence or absence of buried archaeological resources within the individual trenches themselves. Such trenching could not be considered an exhaustive inventory effort of the subsurface deposits within the Project area, and monitoring would therefore still be necessary.

For the reasons outlined above, the Applicant proposes that a Cultural Resources Monitoring and Mitigation Plan (CRMMP) be required by the CEC as a Condition of Certification in lieu of additional geoarchaeological analyses. The purpose of the CRMMP would be to outline a detailed program of mitigation for direct and indirect impacts to cultural resources during all ground-disturbing phases of the Project (including but not limited to preconstruction site mobilization; construction ground disturbance, including construction grading, boring, and trenching; and construction maintenance), by providing for the identification, evaluation, treatment, and protection of any cultural resources that are affected by or may be discovered during the construction of the Project. CRMMPs have historically been a Condition of Certification for projects approved by the Commission, and such a document will provide for the protection of both known and unknown archaeological resources within the HECA Project area.

Figure A151-1 (Revised Figure 7) Quaternary Landforms and their Geoarchaeological Sensitivity within the HECA Project Vicinity (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.

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RESPONSE

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

Technical Area: Traffic and Transportation
Author: John Hope

BACKGROUND

As identified in the amended AFC, the proposed project could operate under one of two alternatives for transporting coal to the project site, either by truck or train. Appendix E-3 of the revised AFC provides a summary of transportation vehicles and routes that would be used during operations. However, Appendix E-3 does not provide information for truck shipments or truck routes related to coal.

DATA REQUEST

A153. In Appendix E-3, please provide the missing data under the column "Coal" and the row "Truck Shipments."

RESPONSE

Appendix E-3 contains only data relevant to Alternative 1 (rail transportation), in which all coal is transported to the Project Site by train. For Alternative 2 (truck transportation), the requested information is provided in the Amended AFC, in Appendix E-12, Operational Transportation Emissions for Alternative 2.

DATA REQUEST

A154. In Appendix E-3, please identify the truck route(s) for coal.

RESPONSE

Appendix E-3 contains only data relevant to Alternative 1 (rail transportation), in which all coal is transported to the Project Site by train. For Alternative 2 (truck transportation), the requested information is provided in the Amended AFC, in Appendix E-12, Operational Transportation Emissions for Alternative 2.

BACKGROUND

As identified in Table 5.10-12 of the revised AFC, the California Public Utilities Commission (CPUC) administers numerous requirements for design and operation of a railroad. Table 5.10-12 also lists number "9" as the agency contact for these CPUC requirements and refers the reader to Table 5.10-13 which does not list a number "9" or the CPUC as an agency contact. It is noted that the footnote at the end of Table 5.10-12 incorrectly refers the reader to Table 5.10-11.

DATA REQUEST

A155. Please provide the name(s) of the individuals contacted at the CPUC.

RESPONSE

The Applicant believes that any required California Public Utilities Commission (CPUC) approvals related to the railroad spur crossings of public roads would be subsumed within the CEC's exclusive jurisdiction over the HECA Project and related facilities. The Applicant will work with the CPUC to identify any requirements that the CPUC would otherwise impose on such crossings, and will provide conversation records to the CEC.

DATA REQUEST

A156. Please provide a record of conversation(s) with staff of the CPUC.

RESPONSE

Please see the Applicant's response to Data Request A155.

DATA REQUEST

A157. Please provide a record of conversation(s) with staff of the Kern County Roads Department.

RESPONSE

The Applicant most recently met with Kern County Roads Department on September 6, 2012, to discuss traffic and transportation matters related to the construction and operation of the HECA Project. A summary of this meeting is presented in Attachment A157-1.

ATTACHMENT A157-1
KERN COUNTY TRAFFIC MEETING SUMMARY

RECORD OF CONVERSATION

Date: September 6, 2012 Time: 1:30 - 3:30pm Job No.: 28068052

Recorded By: Noel Casil Owner/Client: HECA

Attendees:
Kern County Roads Dept: Warren Maxwell – (Engineering Mgr.), Brian Blaylock, Steven Young, Bruce Gray
HECA: Tom Daniels, George Landman. URS: Dale Shileikis, Noel Casil

Nature of Call: Incoming ☐ Outgoing ☐ Visit ☐ Meeting ☒ Phone #:

Route To: Information Action

Main Subject: Traffic and Transportation - Construction and Operation of the Proposed HECA Project

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Purpose: Met with representatives of the Kern County Roads Department to discuss the traffic and transportation analysis in the HECA Amended AFC.

Items Discussed:

- Staff from County Roads Department reviewed the Amended AFC including proposed mitigation. No new traffic mitigation measures were suggested beyond those presented in the Amended AFC.
- County staff requested new intersection counts at two locations:
  - SR 43 /Stockdale Highway; and
  - Tupman Road/SR119
- This is to determine traffic volume trends within the Project study area. Based on the traffic counts (February 2012) presented in the AFC for the Project study area there is a trend of lower traffic compared to the traffic counts recently collected in September 2012 in response to the meeting request referenced above.
- County staff wants input from Caltrans regarding the proposed mitigation at facilities under Caltrans' full or shared jurisdiction with the County. The resulting Caltrans' input will be incorporated in the County's assessments.
- County staff provided input on the Project construction and operational routes. Based on this input new ADT traffic counts (September 2012) were collected specifically for the purpose of calculating the Traffic Index (TI) of the Project routes within County's jurisdiction. The result of the TI calculations prepared by the County will be used in the future design of the roadway improvements.
- County staff indicated that by constructing the roadway and circulation improvements within their jurisdiction according to their specifications that no further roadway mitigation or maintenance capital outlay will likely be needed on future operational years of the HECA Project.

URS

BACKGROUND

As identified on page 5.10-6 of the amended AFC, "… the Project does not plan to use SR 119 as the primary access route during construction and operation activities … [to] minimize Project-added traffic …"

DATA REQUEST

A158. Please identify how the project would determine whether or not to use SR 119 as the primary access route.

RESPONSE

As stated in Amended AFC Section 5.10.1.2, Highways and Roadways, page 5.10-5, State Route (SR) 119 is not intended to be used as the primary access route. The primary access route to the Project Site from points east and from the Interstate 5 interchange will be: westbound via Stockdale Highway; left and southbound on Morris Road; and right and westbound on Station Road towards the Project Site. Additionally, the Project Site can be accessed from Stockdale Highway via left turn and southbound travel on Dairy Road, but this will be limited to light worker, visitor, and operations and maintenance trips.

BACKGROUND

The amended AFC on pages 5.10-5 through 5.10-8 provides information related to regional and local roadway facilities (e.g., Interstate 5, Stockdale Highway). As part of this information, the revised AFC identifies the annual average daily traffic (AADT) for regional roadway facility segments in the study area. However, the information does not identify the AADT for local roadway facilities.

DATA REQUEST

A159. Please provide the AADT volumes for all local roadway facilities that would experience project-related traffic during construction and operation activities (Alternatives 1 and 2).

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A124-A180,* docketed on September 26, 2012, the Applicant is requesting additional time to address this Data Request.

BACKGROUND

The amended AFC provides an analysis of peak-hour intersection levels of service (LOS) for the "no project" and with the project construction and operation conditions (Alternatives 1 and 2). The amended AFC concludes that two intersections (SR 43/Stockdale Highway, SR 119/ Tupman Road) would be significantly affected by construction and operation activities.

As identified in the amended AFC in Tables 5.10-3 and 5.10-5, construction and operation of the proposed project would result in a peak of 3,720 and 2,906 passenger- car-equivalent (PCE) vehicle trips per day, respectively. In addition, footnote number 4 in Table 5.10-5 of the amended AFC identifies a break in coal trucking activities would occur during the evening peak hour to minimize roadway conflicts with heavy vehicles and identifies coal trucking activities would resume immediately after the peak evening traffic has dissipated.

DATA REQUEST

A160. Please provide a LOS analysis based on AADT for all roadway segments located in Kern County affected by project construction and operation activities.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A124-A180,* docketed on September 26, 2012, the Applicant is requesting additional time to address this Data Request.

DATA REQUEST

A161. Please identify how the project would determine when the peak hour begins and when the peak evening traffic has dissipated.

RESPONSE

The Applicant will identify the beginning and end of the peak hour based on 24-hour average daily traffic roadway traffic counts.

Technical Area: Land Use and Agricultural
Author: Jonathan Fong

BACKGROUND

Land Use and Agriculture Tables

All page numbers, figures, and tables cited in this document refer to the 2012 HECA Amended Application for Certification (08-AFC-8A) (AFC), unless otherwise stated. In the definition of terms in Section 5.4 of the AFC, the "Project Site" is defined as the 453 acre parcel of land on which the HECA facility will be located.

Table 5.4-2 of "Existing Land Uses in the Study Area" provides an inventory of the land uses on the Project Site and in the Project Vicinity. Table 5.4-2 identifies the Project Site as 446.4 acres. This deviates from the 453 acre Project Site as defined in Section 5.4 and throughout the AFC.

Table 5.4-3 "Crop Types in the Study Area" provides an inventory of the crop types on the Project Site and in the Project Vicinity. Table 5.4-3 identifies the Project Site as 430.7 acres. This deviates from the 453 acre Project Site as defined in Section 5.4 and throughout the AFC.

DATA REQUEST

A162. Please revise Tables 5.4-2 and Table 5.4-3 to be consistent with the AFC project site acreage of 453 acres or provide clarification of the discrepancy.

RESPONSE

Amended AFC Tables 5.4-2, 5.4-3, 5.4-5, 5.4-7, and 5.4-8 have been updated and are consistent with the Project Site acreage of 453 acres (see Tables A162-1 through A162-6).

Note that the acreages presented in Tables A162-1 through A162-6 reflect the sum of all of features within the applicable study areas. Acreages of individual study areas are presented in Table A162-7. The Process Water linear study area (0.25-mile radius) is 4,942.9 acres, whereas the total area of crop data for this study area is 5,932.9 acres. A greater number of acres of crop data exist because multiple crops may be grown within one year on the same area of land. Conversely, although the area of the Project Site is 453 acres, only 435.4 acres of total crop data exist for this area because crops are not grown over the entire Project Site. Both of these circumstances are evident on Amended AFC Figure 5.4-2.

Table A162-1 (Revised Table 5.4-2)
Existing Land Uses in the Study Area

Existing Land Use	Area (acres)	Percent
Project Site	**453**	**100.0**
Farming	452	99.8
Industrial	1.0	0.2
Vicinity of Project Site (1-Mile Radius)	**4,384.3**	**100.0**
Canal	36.5	0.8
Farming	2,727.6	62.2
Industrial	31.6	0.7
Orchards	506.0	11.5
Parks/Open Space/Recreation	379.0	8.6
Public/Quasi-Public	29.7	0.7
Residential	0.6	0.0
Residential/Urban	5.6	0.1
Undeveloped	667.6	15.2
CO_2 Linear (0.25-Mile Radius)	**1,120.8**	**100.0**
Canal	5.6	0.5
Farming	319.4	28.5
Public/Quasi-Public	6.6	0.6
Resource Extraction	286.2	25.5
Undeveloped	503.0	44.9
Natural Gas/Railroad Linears (0.25-Mile Radius)	**4,145.1**	**100.0**
Canal	26.5	0.6
Commercial	29.7	0.7
Farming	2,820.2	68.0
Industrial	94.3	2.3
Orchards	782.7	18.9
Public/Quasi-Public	32.0	0.8
Residential	5.2	0.1
Undeveloped	354.5	8.6
Transmission/Potable Water Linears (0.25-Mile Radius)	**771.0**	**100.0**
Canal	8.6	1.1
Farming	698.0	90.5
Orchards	50.7	6.6
Public/Quasi-Public	13.6	1.8
Process Water Linears (0.25-Mile Radius)	**4,873.2**	**100.0**
Canal	65.8	1.3
Farming	2,907.6	59.7
Orchards	564.9	11.6
Public/Quasi-Public	8.4	0.2
Residential	12.8	0.2
Undeveloped	1,313.7	27.0

Source: Site reconnaissance surveys; U.S. Geological Survey (USGS) 7.5-minute topographic quadrangle maps; aerial photography; and Kern County Assessor's land use codes.

Note:

CO_2 = carbon dioxide

Table A162-2 (Revised Table 5.4-3)
Crop Types in the Study Area

Crop Type	Area (acres)	Percent
Project Site	**435.4**	**100.0**
Alfalfa	118.0	27.1
Cotton	249.7	57.4
Onion	67.6	15.5
Vicinity of Project Site (1-Mile Radius)	**2,912.3**	**100.0**
Alfalfa	616.1	21.2
Corn	200.8	6.9
Cotton	1,454.2	49.9
Onion	177.3	6.1
Pistachio	376.4	12.9
Wheat	11.3	0.4
Other	76.2	2.6
CO_2 Linear (0.25-Mile Radius)	**301.5**	**100.0**
Alfalfa	102.7	34.1
Cotton	124.9	41.4
Onion	73.9	24.5
Natural Gas/Railroad Linears (0.25-Mile Radius)	**4,047.6**	**100.0**
Alfalfa	1,205.9	29.8
Almond	137.6	3.4
Carrot	60.7	1.5
Corn	421.9	10.4
Cotton	948.0	23.4
Pistachio	434.4	10.7
Uncultivated Ag	100.5	2.5
Wheat	610.6	15.1
Other	128.0	3.2
Potable Water/Transmission Linears (0.25-Mile Radius)	**343.9**	**100.0**
Alfalfa	225.5	65.6
Corn	17.3	5.0
Cotton	64.8	18.9
Pistachio	35.2	10.2
Wheat	1.2	0.3
Process Water Linear (0.25-Mile Radius)	**5,932.9**	**100.0**
Alfalfa	981.5	16.5
Almond	42.7	0.7
Carrot	73.8	1.2
Corn	73.8	1.2
Cotton	1,186.2	20.0
Onion	206.8	3.5
Pistachio	453.7	7.6
Uncultivated Ag	91.5	1.5
Wheat	203.7	3.4
Other	2,619.2	44.1

Source: Kern County, 2011.
Note:
CO_2 = carbon dioxide

Table A162-3 (Revised Table 5.4-4)
Important Farmland in the Study Area

Important Farmlands	Area (acres)	Percent
Project Site	**453.0**	**100.0**
Prime Farmland	453.0	100.0
Vicinity of Project Site (1-Mile Radius)	**4,602.9**	**100.0**
Grazing Land	750.0	16.3
Nonagricultural or Natural Vegetation	401.9	8.7
Prime Farmland	3,295.9	71.6
Semi-Agricultural and Rural Commercial Land	39.7	0.9
Unique Farmland	37.6	0.8
Vacant or Disturbed Land	77.9	1.7
CO_2 Linear (0.25-Mile Radius)	**1,196.2**	**100.0**
Grazing Land	574.2	48.0
Nonagricultural or Natural Vegetation	199.8	16.7
Prime Farmland	343.6	28.7
Semi-Agricultural and Rural Commercial Land	9.9	0.8
Vacant or Disturbed Land	68.6	5.7
Natural Gas/Railroad Linears (0.25-Mile Radius)	**4,275.7**	**100.0**
Confined Animal Agriculture	80.0	1.9
Farmland of Statewide Importance	895.7	20.9
Nonagricultural or Natural Vegetation	443.7	10.4
Prime Farmland	2,626.1	61.4
Semi-Agricultural and Rural Commercial Land	31.9	0.7
Unique Farmland	0.6	0.0
Urban and Built-up Land	91.8	2.1
Vacant or Disturbed Land	105.9	2.5
Potable Water/Transmission Linears (0.25-Mile Radius)	**781.9**	**100.0**
Grazing Land	182.0	23.3
Prime Farmland	585.0	74.8
Unique Farmland	14.9	1.9
Process Water Linear (0.25-Mile Radius)	**4,942.9**	**100.0**
Farmland of Statewide Importance	162.2	3.3
Grazing Land	1,681.4	34.0
Nonagricultural or Natural Vegetation	24.9	0.5
Prime Farmland	2,872.9	58.1
Unique Farmland	201.2	4.1
Vacant or Disturbed Land	0.2	0.0

Source: Kern County, 2007.
Note:
CO_2 = carbon dioxide

Table A162-4 (Revised Table 5.4-5)
Williamson Act Contracts in the Study Area

Important Farmlands	Area (acres)	Percent
Project Site	**453**	**100.0**
Williamson Act Contract	453	100.0
Vicinity of Project Site (1-mile Buffer)	**4,602.9**	**100.0**
Williamson Act Contract	2,826.9	61.4
CO_2 Linear (0.25-Mile Buffer)	**1,196.2**	**100.0**
Williamson Act Contract	488.3	40.8
Natural Gas/Railroad Linears (0.25 Mile Buffer)	**4,275.7**	**100.0**
Williamson Act Contract	2,652.8	62.0
Potable Water/Transmission Linears (0.25-Mile Buffer)	**782.0**	**100.0**
Williamson Act Contract	341.3	43.6
Process Water Linear (0.25-Mile Buffer)	**4,942.9**	**100.0**
Williamson Act Contract	2,398.2	48.5

Source: Kern County, 2007.
Note:
CO_2 = carbon dioxide

Table A162-5 (Revised Table 5.4-7)
General and Specific Plan Land Use Designations in the Study Area

Designation (Map Code)	Intent	Area (Acres)	Percent
Project Site		**453**	**100.0**
Intensive Agriculture (8.1)	Areas devoted to the production of irrigated crops or having a potential for such use. Other agriculture uses, while not directly dependent on irrigation for production, may also be consistent with the intensive agriculture designation. Minimum parcel size is 20 acres gross. Uses shall include, but are not limited to, the following: Irrigated cropland; orchards; vineyards; horse ranches; raising of nursery stock, ornamental flowers, and Christmas trees; fish farms, bee keeping, ranch and farm facilities, and related uses; one single-family dwelling unit; cattle feed yards; dairies; dry land farming; livestock grazing; water storage; groundwater recharge acres; mineral, aggregate, and petroleum exploration and extraction; hunting clubs; wildlife preserves; farm labor housing; public utility uses; agricultural industries pursuant to provisions of the Kern County Zoning Ordinance; and land in development areas subject to significant physical constraints.	453	100.0
Vicinity of Project Site (1-Mile Radius)		**4,602.9**	**100.0**
Extensive Agriculture (8.3)	Agricultural uses involving large amounts of land with relatively low value-per-acre yields, such as livestock grazing, dry land farming, and woodlands. Minimum parcel size is 20 acres gross, except lands subject to a Williamson Act Contract/ Farmland Security Zone Contract, in which case the minimum parcel size shall be 80 acres gross.	711.7	15.5
Intensive Agriculture (8.1)	See intent under Project Site, above.	3,493.2	76.3
State or Federal Land (1.1)	Applied to all property under the ownership and control of the various state and federal agencies operating in Kern County (such as military, United States Forest Service, Bureau of Land Management, and Department of Energy)	381.9	8.3
CO_2 Linear (0.25-Mile Radius)		**1196.2**	**100.0**
Extensive Agriculture (8.3)	See intent under Vicinity of Project Site, above.	207.6	17.4
Intensive Agriculture (8.1)	See intent under Project Site, above.	334.8	28.0
Mineral and Petroleum (8.4)	Areas that contain producing or potentially productive petroleum fields, natural gas, and geothermal resources, and mineral deposits of regional and statewide significance. Uses are limited to activities directly associated with the resource extraction. Minimum parcel size is 5 acres gross.	653.8	54.7

Table A162-5 (Revised Table 5.4-7)
General and Specific Plan Land Use Designations in the Study Area (Continued)

Designation (Map Code)	Intent	Area (Acres)	Percent
Natural Gas/Railroad Linears (0.25-Mile Radius)		**4,275.7**	**100.0**
Extensive Agriculture (8.3)	See intent under Vicinity of Project Site, above.	161.2	3.8
General Commercial (6.2) [1]	Retail and service facilities of less intensity than regional centers providing a broad range of goods and services which serve the day-to-day needs of nearby residents. Permitted uses shall include, but are not limited to, the following: neighborhood shopping centers, convenience markets, restaurants, offices, and wholesale business facilities.	11.4	0.3
Highway Commercial (6.3) [1]	Uses which provide services, amenities, and accommodations at key locations along major roadways to visitors and through traffic. Maximum building height not to exceed 50 feet. Permitted uses shall include, but are not limited to, the following: hotels, motels, restaurants, garages, service stations, and recreation vehicle facilities.	139.9	3.3
Intensive Agriculture (8.1)	See intent under Project Site, above.	3,316.8	77.6
Light Industrial (7.1) [1]	Unobtrusive industrial activities that can locate in close proximity to commercial uses with a minimum of environmental conflicts. These industries are characterized as non-labor intensive and nonpolluting and do not produce fumes, odors, noise, or vibrations detrimental to nearby properties. Permitted uses shall include, but are not limited to, the following: wholesale businesses, storage buildings and yards, warehouses, manufacturing and assembling, truck parking and servicing, all commercial uses, public facilities, and resource land use.	100.5	2.4
Residential Maximum 10 Units/Net Acre (5.3) [1]	This category is designed to accommodate single-family development on mobile home lots in conformance with § 17.3 of the Kern County Zoning Ordinance and State of California Title 25 ordinance standards.	17.9	0.4
Mineral and Petroleum (8.4)	See intent under CO_2, above.	244.0	5.7

Table A162-5 (Revised Table 5.4-7)
General and Specific Plan Land Use Designations in the Study Area (Continued)

Designation (Map Code)	Intent	Area (Acres)	Percent
Resource Management (8.5)	Primarily open space lands containing important resource values, such as wildlife habitat, scenic values, or watershed recharge areas. These areas may be characterized by physical constraints, or may constitute an important watershed recharge area or wildlife habitat or may have value as a buffer between resource areas and urban areas. Other lands with this resource attribute are undeveloped, non-urban areas that do not warrant additional planning within the foreseeable future because of current population (or anticipated increase), marginal physical development, or no subdivision activity. Minimum parcel size is 20 acres gross, except lands subject to a Williamson Act Contract/ Farmland Security Zone Contract, in which case the minimum parcel size shall be 80 acres gross. Uses shall include, but are not limited to, the following: Recreational activities; livestock grazing; dry land farming; ranching facilities; wildlife and botanical preserves; and timber harvesting; one single-family dwelling unit; irrigated croplands; water storage or groundwater recharge areas; mineral; aggregate; petroleum exploration and extraction; open space and recreational uses; one single-family dwelling on legal residentially zoned lots on effective date of this General Plan; land within development areas subject to significant physical constraints; State and federal lands which have been converted to private ownership.	273.9	6.4
State Land (1.1) [1]	Applied to property owned or controlled by the State of California.	4.7	0.1
Potable Water/Transmission Linears (0.25-Mile Radius)		**782.0**	**100.0**
Intensive Agriculture (8.1)	See intent under Project Site, above.	782.0	100.0
Process Water Linear (0.25-Mile Radius)		**4,942.9**	**100.0**
Extensive Agriculture (8.3)	See intent under Vicinity of Project Site, above.	1,104.3	22.3
Intensive Agriculture (8.1)	See intent under Project Site, above.	3,838.6	77.7

Sources: Kern County, 1985, 1986, 2009.

Notes:

[1] Designations under the Oglesby Specific Plan (Kern County, 1985) or Interstate 5 at Highway 58 Rural Community Specific Plan (Kern County, 1986)

CO_2 = carbon dioxide

Table A162-6 (Revised Table 5.4-8)
Zoning Districts in the Study Area

Designation	Purpose/Development Standards	Area (Acres)	Percent
Project Site		**453**	**100.0**
Exclusive Agriculture (A)	The purpose of the Exclusive Agriculture (A) District is to designate areas suitable for agricultural uses and to prevent the encroachment of incompatible uses onto agricultural lands and the premature conversion of such lands to nonagricultural uses. Uses in the A District are limited primarily to agricultural uses and other activities compatible with agricultural uses. Minimum lot size is 20 gross acres. A minimum lot size of 80 gross acres applies to lots under Williamson Act Contract and designated 8.2, 8.3, or 8.5 by the County General Plan or equivalent designation of any other adopted General or Specific Plan. The minimum front yard setback is 55 feet from the legal centerline of any existing or proposed private local street or access easements. The minimum side yard setback is 5 feet, except a minimum of 10 feet is required on the street side or corner lots. The minimum rear yard setback is 5 feet. There are no height limits for non-residential structures.	453	100.0
Vicinity of Project Site (1 mile Buffer)		**4,463.5**	**100.0**
Exclusive Agriculture (A)	See intent under Project Site, above.	4,072.0	91.2
Limited Agriculture (A-1)	The purpose of the Limited Agriculture (A-1) District is to designate areas suitable for a combination of estate-type residential development, agricultural uses, and other compatible uses. Final map residential subdivisions are not allowed in the A-1 District.	391.5	8.8
CO_2 Linear (0.25 Mile Buffer)		**1135.3**	**100.0**
Exclusive Agriculture (A)	See intent under Project Site, above.	438.8	38.7
Limited Agriculture (A-1)	See intent under Vicinity of Project Site, above.	696.5	61.4

Table A162-6 (Revised Table 5.4-8)
Zoning Districts in the Study Area (Continued)

Designation	Purpose/Development Standards	Area (Acres)	Percent
Natural Gas/Railroad Linears (0.25 Mile Buffer)		**4,182.0**	**100.0**
Exclusive Agriculture (A)	See intent under Project Site, above.	3,954.0	94.5
General Commercial (C-2), Precise Development Combining (PD)	The purpose of the General Commercial (C-2) District is to designate areas for the widest range of retail commercial activities, including regional shopping centers and heavy commercial uses. The C-2 District should be located on major highways. The purpose of the Precise Development (PD) Combining District is to designate areas with unique site characteristics or environmental conditions or areas surrounded by sensitive land uses to ensure that development in such areas is compatible with such constraints.	81.3	1.9
Limited Agriculture (A-1)	See intent under Vicinity of Project Site, above.	110.8	2.6
Medium Industrial (M-2), Precise Development Combining (PD)	The purpose of the Medium Industrial (M-2) District is to designate areas for general manufacturing, processing, and assembly activities. Uses may not produce fumes, odor, dust, smoke, gas, or vibrations extending beyond zoning district boundaries. See intent above.	16.6	0.4
Mobilehome Park (MH)	The purpose of the Mobilehome (MH) Combining District is to provide for the installation of mobile homes with or without foundations in agricultural, resource-related, and residential zoned areas.	19.3	0.5
Potable Water/Transmission Linears (0.25 Mile Buffer)		**782.0**	**100.0**
Exclusive Agriculture (A)	See intent under Project Site, above.	782.0	100.0
Process Water Linear (0.25 Mile Buffer)		**4,906.7**	**100.0**
Exclusive Agriculture (A)	See intent under Project Site, above.	3,815.2	77.8

Table A162-6 (Revised Table 5.4-8)
Zoning Districts in the Study Area (Continued)

Designation	Purpose/Development Standards	Area (Acres)	Percent
Exclusive Agriculture (A), Airport Approach Height Combining (H)	The purpose of the Airport Approach Height (H) Combining District is to minimize aviation hazards by regulating land uses, restricting the height of buildings and vegetation, and specifying design criteria necessary to promote aviation safety and to implement the requirements of the adopted Airport Land Use Compatibility Plan. The H District may be applied to areas within the vicinity of any public or general-use airport as provided for in the adopted Airport Land Use Compatibility Plan. The standards established by the H District are in addition to the regulations of the base district with which the H District is combined.	37.9	0.8
Limited Agriculture (A-1)	See intent under Vicinity of Project Site, above.	606.7	12.4
Limited Agriculture (A-1), Airport Approach Height Combining (H)	See intent above.	446.9	9.1

Source: Kern County, 2011a.

Note:

The identified zoning districts have been summarized and only those districts in the affected environment of the Project study area are discussed.

Table A162-7
Total Acreages of Study Areas

Project Element	Area (acres)[1]
Project Site	453.0
Vicinity of Project Site (1-Mile Radius)	4,602.9
CO_2 Linear (0.25-Mile Radius)	1,196.2
Natural Gas/Railroad Linears (0.25-Mile Radius)	4,275.7
Potable Water/Transmission Linears (0.25-Mile Radius)	782.0
Process Water Linear (0.25-Mile Radius)	4,942.9

Notes:

[1] The areas presented are for the individual study areas of project elements. These study areas overlap; for example, the vicinity of the Project Site and each of the linear study areas.

CO_2 = carbon dioxide

Technical Area: Socioeconomics
Authors: Candace M. Hill, Aaron J. Nousaine

BACKGROUND: DIRECT, INDIRECT, AND INDUCED ECONOMIC IMPACTS

The amended Application for Certification (AFC) presents the estimated direct, indirect, and induced economic impacts of the Hydrogen Energy California (HECA) project derived from an application of the IMPLAN economic modeling software using economic data specific to Kern County for 2009. The amended AFC does not provide a clear explanation of the assumptions and input values used in the IMPLAN economic model. To undertake an independent assessment of the economic impacts of the proposed project, California Energy Commission staff requires a complete project budget that identifies major expenditures for construction and operation of all major project components. This should include all aspects of both the HECA and the Occidental of Elk Hills, Inc. (OEHI) projects. It should also identify the value and percentage of total spending within each expense category that will be spent locally within Kern County.

Because the impact estimates reported in the AFC include the impacts of both the HECA and OEHI projects combined, it is not possible to evaluate the independent economic impacts of each project. The economic impact estimates in the AFC also report indirect and induced construction and operations impacts as combined figures. For example, the AFC states on page 5.8-12 that the two projects combined will produce approximately $1.67 billion in labor income, of which approximately $294 million would represent the indirect and induced effects of construction related activities. To fully understand the economic impacts of the two projects it is necessary that the economic impact estimates be reported separately. The direct, indirect, and induced economic impacts also need to be reported independently because each represents a different type of economic effect.

The AFC also does not report the estimated fiscal impacts of purchases associated with project operations and maintenance. According to the data provided on page 5.8-23 of the AFC, the HECA project is expected to generate approximately $77.4 million in taxable sales (7.25 percent sales tax on $1.06 billion worth of locally purchased materials) during project construction. However, no data is provided on the estimated amount of state and local sales taxes that are likely to be generated by project operations.

DATA REQUEST

A163. Provide a detailed list of assumptions and input values used in the IMPLAN economic impact model to derive the economic impact estimates reported in the AFC. This should include the activity type (e.g., industry change, commodity change, labor income change, etc.), the IMPLAN sector, and the event input value used to model each impact event. Any modifications that were made to the IMPLAN data should also be clearly noted.

RESPONSE

Tables A163-1 and A163-2 list the assumptions and inputs used for the IMPLAN analysis of HECA construction and operation impacts, respectively. The activity type used in the IMPLAN analysis was an industry change in employment.

Table A163-1
Assumptions/Inputs Used for IMPLAN Analysis of Construction Impacts

IMPLAN Sector Code	IMPLAN Sector	Year	Industry Change – Direct Employment			
			HECA Jobs	OEHI Jobs	Rail Jobs	Total Jobs
35	Construction of new nonresidential manufacturing structures	2013	119	0	0	119
35	Construction of new nonresidential manufacturing structures	2014	767	0	0	767
35	Construction of new nonresidential manufacturing structures	2015	1,983	385	0	2,368
35	Construction of new nonresidential manufacturing structures	2016	1,688	385	25	2,098
35	Construction of new nonresidential manufacturing structures	2017	454	385	25	864

Notes:
HECA = Hydrogen Energy California
OEHI = Occidental of Elk Hills, Inc.

Table A163-2
Assumptions/Inputs Used for IMPLAN Analysis of Operation Impacts

IMPLAN Sector Code	IMPLAN Sector	Industry Change – Direct Employment
31	Electric power generation, transmission, and distribution	134
130	Fertilizer manufacturing	37
20	Extraction of oil and natural gas	25
333	Transport by rail	4
	Total	**200**

The following modifications were made to IMPLAN data:

- The average employee compensation during Project construction will be $85 per hour.
- Construction workers will average a 50-hour workweek.
- Because HECA construction compensation is significantly higher than the IMPLAN default compensation value, the model was modified to reflect employee compensation of $221,000 per worker.

DATA REQUEST

A164. Provide staff with a complete project budget for construction, operations, and maintenance for both the HECA and OEHI projects. This should include details by expense category and estimated timelines for construction, operations and maintenance of each project component.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A124-A180,* docketed on September 26, 2012, the Applicant objects to this Data Request.

DATA REQUEST

A165. Report economic impact estimates for the HECA and EOHI projects separately. This should include individual estimates of the estimated direct, indirect, and induced economic impacts on jobs, labor income, output, and value added for each phase of project construction and operation. For each type of impact, please indicate the number of years over which the impact is likely to occur.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A124-A180,* docketed on September 26, 2012, the Applicant objects to this Data Request.

Nonetheless, after discussion with CEC Staff at the September 27, 2012, Data Response Workshop, the Applicant better understands this Data Request and is providing the following response.

The Applicant has chosen not to analyze the economic impacts for the HECA and OEHI projects separately because the economic impact of the HECA Project will indubitably include enhanced oil recovery jobs should the Project move forward. The Applicant has, however, provided the direct job impacts for each Project component (HECA, OEHI, and Rail) by year in the Tables A165-1 and A165-2.

Table A165-1
Direct Construction Job Impact by Year

IMPLAN Sector		Year	Direct Construction Jobs			
			HECA	OEHI	Rail	Total Jobs
35	Construction of new nonresidential manufacturing structures	2013	119	0	0	119
35	Construction of new nonresidential manufacturing structures	2014	767	0	0	767
35	Construction of new nonresidential manufacturing structures	2015	1,983	385	0	2,368
35	Construction of new nonresidential manufacturing structures	2016	1,688	385	25	2,098
35	Construction of new nonresidential manufacturing structures	2017	454	385	25	864

Notes:

HECA = Hydrogen Energy California
OEHI = Occidental of Elk Hills, Inc.

Table A163-2
Permanent Direct Operation Job Impact
(Annual over the Life of the Project)

IMPLAN Sector		Company	Direct Operation Jobs
31	Electric power generation, transmission, and distribution	HECA	134
130	Fertilizer manufacturing	HECA	37
20	Extraction of oil and natural gas	OEHI	25
333	Transport by rail	ND	4
Total			**200**

Notes:

HECA = Hydrogen Energy California
ND = not determined
OEHI = Occidental of Elk Hills, Inc.

DATA REQUEST

A166. For the employment impacts, please indicate the likely average number of jobs generated by the project for each year of construction and operations.

RESPONSE

For construction, the average number of jobs (direct employment) generated each year by the Project is listed in Table A163-1, provided in the response to Data Request A163. The average number of jobs generated during Project construction (indirect and induced employment) is not available on a per-year basis.

For operations, the average number of jobs generated by the Project (direct employment) is listed in Table A163-2, provided in the response to Data Request A163. The average numbers of indirect and induced jobs generated by the Project are 240 and 190, respectively.

DATA REQUEST

A167. Report the estimated state and local sales tax revenues that result based on estimates of annual operations and maintenance expenditures.

RESPONSE

Using the IMPLAN model, state and local sales tax revenue directly related to operation and maintenance is estimated to total approximately $4,879,000. This is estimated revenue, because the IMPLAN model does not use actual tax rates to estimate the tax revenue. Instead, the model uses a historical distribution of collected indirect business taxes for the region, based on data from the Census of Government Finance, to estimate an overall tax rate.

BACKGROUND: PROPERTY TAXES

The net assessed value of the HECA project parcels is reported on page 5.8-15 of the AFC and on page 5.8-22, the property tax rate (1.07 percent) and estimated property tax yield based on the net assessed value of the project parcels is reported and identified as the estimated property tax the project would annually yield. The value of the property would be reassessed as new construction occurs on the project site. The estimated property tax has not been reported for a project operational year. The AFC does not report the property tax assessment process applicable to the project. Also, there is no property tax information provided for the properties where the railroad spur would be constructed under Alternative No. 1 for transportation of goods.

DATA REQUEST

A168. Please report the estimated annual property tax the project would generate during operations. This includes the HECA project site and railroad spur properties (report separately).

RESPONSE

Future annual property tax during operations would be dependent on the reassessment of the properties after construction, and therefore is unknown at this time.

The current property tax rate for the Project Site, Assessors Tax Numbers (ATNs) 159-040-18-00-2 and 159-040-16-00-6, is 1.07 percent. The current assessed value of the Project Site ATNs is $1,705,016. The Project is estimated to annually yield approximately $20,279 in local property tax revenues to the County. This amount represents less than 0.007 percent of the County's projected share of property tax dollars (i.e., $336 million [Kern County Assessor's Office, 2012]) for the 2011–2012 fiscal year.

The value of the property would be reassessed as new construction occurs on the Project Site. According to the allocation of taxes for the Project Site ATNs, the General Local Government (1.0 percent) and Kern County WA ZN 19 Debt (0.024 percent) would be the largest beneficiaries of the property tax revenue, as shown in Table 5.8-10, ATNs 159-040-18-00-2 and 159-040-16-00-6 Property Tax Allocation, Fiscal Year 2011–2012 in the Amended AFC Section 5.8.1.4 (Kern County Recorder and Assessor, 2012).

Annual property tax for the entire parcels on which the railroad spur would be constructed, based on the current tax rate (Tax Year 2012-2013 property taxes) and assessed value, is $32,881.66.

DATA REQUEST

A169. Please report the property tax rate(s) for the properties the railroad spur would be constructed upon.

RESPONSE

Tax Year 2012-2013 property tax rates for the properties on which the railroad spur would be constructed are presented in Table A169-1.

Table A169-1
Railroad Spur Property Tax Rates

APN	Tax Year 2012-2013 Property Tax Rate (Percent)
103-100-28	1.09
103-100-37	N/A- Utility
103-110-02	1.09
103-140-02	1.09
103-140-12	1.09
103-140-15	1.09
103-140-17	1.09
103-190-07	1.09
103-190-10	1.09
103-190-13	1.09
103-190-14	1.09
103-200-23	1.09
103-200-25	1.09
103-200-26	1.09
103-200-28	1.09
103-240-01	1.09
103-240-04	1.06
103-240-06	1.09
103-260-29	1.06
159-040-16	1.07
159-040-17	1.06
159-070-03	1.06
159-070-05	1.06
159-070-07	1.06
159-070-08	1.06
159-130-11	1.06

Note:

APN =Assessor's Parcel Number
N/A = Not Applicable

DATA REQUEST

A170. For both the HECA project and railroad spur alternative, please discuss the property assessment process applicable to the project, including the agency tasked with assessing the project property and the agency tasked with setting the tax rate and collecting the property taxes due.

RESPONSE

The Kern County Assessor locates all taxable property in the county, identifies the owners, and describes the property. Additionally, the Assessor determines a value for all taxable property and applies legal exemptions and exclusions. The Assessor must complete an assessment roll showing the assessed values for all property, and maintain records. The Assessor does not set tax amounts or collect taxes (Kern County, 2012).

The Kern County Auditor is responsible for setting the tax rate. The base rate in Kern County is 1 percent. In addition, the County has different tax rate districts designed to finance various general obligation bond debts, such as water service, repair districts, and high schools. The tax rate districts usually cover a larger geographic area than the special assessment fees, which are calculated per parcel. The Kern County Treasurer, Tax Collector's Office, is charged with collecting property taxes.

Reference

Kern County, 2012. Property Valuations. http://assessor.co.kern.ca.us/assessor/property_valuation.php. Date accessed: October 4, 2012.

Technical Area: Greenhouse Gas Emissions
Authors: Tad W. Patzek, Mike Conway

BACKGROUND

With suitable oil density and reservoir pressure, injected carbon dioxide mixes with the oil it contacts, such that the interfacial tension between these two fluids goes to zero. The CO_2-oil miscibility occurs above the minimum miscibility pressure (MMP). The higher the reservoir temperature is, the higher the MMP. Crude oil composition plays a crucial role. Usually the more intermediate components there are, the lower the MMP. Intermediate content is expressed variously as C5+ molecular weight, C1-C30 content, etc. In effect, for lighter crudes, whose API gravity is more than 220, viscosity less than 3 cp at reservoir conditions, and at reservoir depths above 3,000 ft., the crudes are usually miscible with CO_2 at first contact. If CO_2 is only partially miscible with the crude, as may be the case in Elk Hills, the total composition in the CO_2-crude mixing zone can change to develop miscibility in situ. Regardless of whether the displacement is first-contact miscible or develops later, the CO_2 must immiscibly displace any mobile water present with the oil and gas in the reservoir. Since CO_2 has a higher mobility than water, this immiscible displacement is usually very inefficient, creating viscous fingers of CO_2.

As a result, the injected CO_2 bypasses some water and oil. In addition, CO_2 is the least dense fluid in the reservoir and flows to the top ("overrides"), bypassing again significant quantities of oil and water below. Water slugs are injected in between CO_2 slugs to lower the unfavorable mobility ratio.

Based on the available data from 21 field CO_2–injection projects, it appears that at steady state that will follow CO_2 breakthrough in all wells, for each 1 volume of fresh CO_2 injected, 1 volume of CO_2 will be produced, separated, recompressed and reinjected on average. Therefore, with time, each gas injection well may have to inject two volumes of CO_2 per each volume of fresh CO_2 from the plant. The remainder of the injected CO_2 will fill an expanding zone of trapped CO_2. Oxy's assumed 2/3 volume of CO_2 produced for each volume of CO_2 injected seems low, given the expected high injection pressure and full-interval injection. Staff needs data demonstrating the sequestration of the claimed volume will be sequestered given past experience that shows this may likely not be the case.

DATA REQUEST

A171. Please provide data that demonstrate that each volume of injected CO_2 produces only 2/3 that volume of CO_2 at the production wells.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A124-A180,* docketed on September 26, 2012, the Applicant is requesting additional time to address this Data Request.

BACKGROUND

The minimum miscibility pressure for the Elk Hills conditions is approximately 3,000 psi, and the maximum injection pressure (overburden pressure) is close to 5,000 psi. Given the high and constant injection rate of CO_2, 2,000 psi of incremental pore pressure may be insufficient to put away the required volume of CO_2. This constraint will lead inevitably to the very high injection pressures at or above the overburden pressure, and a distinct possibility of activating faults and breaching the overlaying shale barriers. These increased pressures could fracture the rock and lead to leakage or compromise the formation's ability to store CO_2. Staff needs information on the proposed injection pressures and rates necessary to achieve sequestration.

DATA REQUEST

A172. Please provide current estimates of CO_2 and water injection pressures required during the life of the project.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A124-A180,* docketed on September 26, 2012, the Applicant is requesting additional time to address this Data Request.

DATA REQUEST

A173. Please provide representative downhole well injection rates of CO_2 and water at these injection pressures.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A124-A180,* docketed on September 26, 2012, the Applicant is requesting additional time to address this Data Request.

DATA REQUEST

A174. Please provide geomechanical data/calculations/simulations showing the state of stress of the reservoir rock and overburden just above the reservoir during CO_2 injection.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A124-A180,* docketed on September 26, 2012, the Applicant is requesting additional time to address this Data Request.

DATA REQUEST

A175. Given 4, what are the current predictions of fault activation and reservoir cap rock integrity? Please provide analysis.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A124-A180,* docketed on September 26, 2012, the Applicant is requesting additional time to address this Data Request.

DATA REQUEST

A176. Please provide a thorough description of actual or modeled boundaries of the targeted injection reservoirs (size and type of patterns, number of injectors and producers as a function of time, etc.).

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A124-A180,* docketed on September 26, 2012, the Applicant is requesting additional time to address this Data Request.

BACKGROUND

The CEC may have the need of verifying the emissions of CO_2 from the HECA power plant and from the sequestration activities in the Elk Hills. The CEC requires knowledge of the Elk Hills oil field and sequestration activities. The CEC cannot rely on the applicant's assessment alone to make this determination, nor does the CEC expect the DOGGR Class II permit review process to completely verify proposed sequestration volumes or oil field adequacy.

The submitted MRV plan contains a great deal of information necessary for the CEC to perform a complete analysis, but staff requires the following documents, which were prepared specifically for the HECA project and concern issues of implementation, scheduling, and design.

- Pre-FEED Engineering Study, Process Design Basis, Mustang Engineering, April 15, 2010.
- Preliminary Project Description (Pre-FEED Stage), ManageTech Solutions, April 16, 2010.
- Pre-FEED Engineering Study, Execution Schedule, Mustang Engineering, April 23, 2010.
- Pre-FEED Engineering Study, Overall Design Basis, Mustang Engineering, April 28, 2010.
- Pre-FEED Engineering Study, Project design drawings, Mustang Engineering, misc. dates.

The documents listed above contain "Extensive information" about "the Elk Hills Oil Field, CO_2 EOR Project, and HECA Project."

DATA REQUEST

A177. Please submit all of the documents listed above.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A124-A180,* docketed on September 26, 2012, the Applicant is requesting additional time to address this Data Request.

Technical Area: Visual Resources
Author: Elliott Lum

BACKGROUND

According to the Supplemental Environmental Information (SEI) package for the Occidental of Elk Hills, Inc. (OEHI) CO_2 Enhanced Oil Recovery (EOR) project, OEHI is proposing to utilize carbon dioxide from the HECA project to facilitate oil production in its Elk Hills Unit operations.

As stated in the Aesthetics section of the SEI, the project's Processing Facility will be visible in views from the City of Tupman. Additionally, some small components of the proposed project would be visible from the communities of Dustin Acres, Valley Acres, and motorists on portions of Elk Hills Rd, SR 58, Tupman Road, and SR 119 (see Section 4.1).

Six KOPs were selected to evaluate the visual impacts of the proposed project. Each impact discussion for the above KOPs confirms that components of the proposed project may be visible. The visual impacts to all six of the aforementioned KOPs have been characterized as less than significant (see Section 4.1-17 to 19). However, Energy Commission staff has concluded that additional project information is necessary before a significance conclusion can be reached.

DATA REQUEST

A178. Please provide revised photographic simulations for each of the six KOP viewpoints reflecting the new aboveground elements of the Processing Facility, including the satellites, pipelines, and any other related aboveground structures that may be visible from the six KOPs.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A124-A180,* docketed on September 26, 2012, the Applicant is requesting additional time to address this Data Request.

DATA REQUEST

A179. Please provide electronic and paper copies of 11-inch by 17-inch color photographic simulations at life size scale for each of the six KOP viewpoints.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A124-A180,* docketed on September 26, 2012, the Applicant is requesting additional time to address this Data Request.

DATA REQUEST

A180. Please provide information on the dimensions (i.e., height and width) of all the proposed above ground structures.

RESPONSE

As described in *Applicant's Objections and Requests for Additional Time to Respond to California Energy Commission Staff Data Requests A124-A180,* docketed on September 26, 2012, the Applicant is requesting additional time to address this Data Request.

BEFORE THE ENERGY RESOURCES CONSERVATION AND DEVELOPMENT
COMMISSION OF THE STATE OF CALIFORNIA
1516 NINTH STREET, SACRAMENTO, CA 95814
1-800-822-6228 – WWW.ENERGY.CA.GOV

AMENDED APPLICATION FOR CERTIFICATION FOR THE HYDROGEN ENERGY CALIFORNIA PROJECT

Docket No. 08-AFC-08A
(Revised 10/8/12)

APPLICANT
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DECLARATION OF SERVICE

I, Dale Shileikis, declare that on October 10, 2012, I served and filed a copy of the attached Responses to CEC Data Requests Set Two: Nos. A124 through A180, dated October, 2012. This document is accompanied by the most recent Proof of Service list, located on 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 or Chief Counsel, as appropriate, in the following manner:
(*Check all that Apply*)

For service to all other parties:

__x__ Served electronically to all e-mail addresses on the Proof of Service list;

____ Served by delivering on this date, either personally, or for mailing with the U.S. Postal Service with first-class postage thereon fully prepaid, to the name and address of the person served, for mailing that same day in the ordinary course of business; that the envelope was sealed and placed for collection and mailing on that date to those addresses marked *"hard copy required" or where no e-mail address is provided.

AND

For filing with the Docket Unit at the Energy Commission:

__x__ by sending one electronic copy to the e-mail address below (preferred method); OR

____ by depositing an original and 12 paper copies in the mail with the U.S. Postal Service with first class postage thereon fully prepaid, as follows:

CALIFORNIA ENERGY COMMISSION – DOCKET UNIT
Attn: Docket No. 08-AFC-08A
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512
docket@energy.ca.gov

OR, if filing a Petition for Reconsideration of Decision or Order pursuant to Title 20, § 1720:

____ Served by delivering on this date one electronic copy by e-mail, and an original paper copy to the Chief Counsel at the following address, either personally, or for mailing with the U.S. Postal Service with first class postage thereon fully prepaid:

California Energy Commission
Michael J. Levy, Chief Counsel
1516 Ninth Street MS-14
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I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct, that I am employed in the county where this mailing occurred, and that I am over the age of 18 years and not a party to the proceeding.