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HECA PSA/DEIS

Workshop Purposes

PSA/DEIS - Workshop Purposes

PSA/DEIS Workshop Purposes:

On June 28, 2013, both the California Energy Commission (Energy Commission) staff and the US Department of Energy (DOE) published a Preliminary Staff Assessment and Draft Environmental Impact Statement (PSA/DEIS).

- Energy Commission staff has completed an independent assessment under the California Environmental Quality Act (CEQA) and has revealed significant, and for the most part, unresolved issues. The Executive Summary identified the technical areas that require additional information, clarification and or resolution prior to completing the FSA/FIES portion of the HECA certification process.
- DOE has completed its assessment pursuant to the National Environmental Policy Act. In accordance with Council on Environmental Quality implementing regulations (40 CFR 1500 thru 1508) and DOE's implementing procedures (10 CFR 1021), DOE has identified and evaluated the potential environmental impacts of the Proposed Action (providing financial assistance for the construction and operation of the applicant's project) and the alternatives. The PSA/DEIS describes the affected environment and the environmental consequences of the alternatives among various resource areas. DOE is also using the PSA/DEIS to fulfill certain responsibilities for documenting wetlands and floodplain impacts (10 CFR 1022), conformity with air quality standards (40 CFR Part 93), and consulting with expert agencies and tribes as required by the National Historic Preservation Act (Section 106), the Endangered Species Act (Section 7), and the Native American Graves Protection and Repatriation Act.

PSA/DEIS – Workshop Purposes

The Energy Commissions purpose for the PSA/DEIS Workshop:

> The purpose of the workshop is to allow Energy Commission and DOE staff, SCS Energy, LLC (applicant), intervenors, interested agencies, and the public to discuss the joint Preliminary Staff Assessment and Draft Environmental Impact Statement (PSA/DEIS), to receive comments from individuals and organizations, to identify and resolve areas of disagreement and to discuss additional informational requirements.

The Department of Energy's purpose for the PSA/DEIS Workshop:

> DOE has completed its draft assessment pursuant to the National Environmental Policy Act (NEPA). For DOE NEPA purposes, the workshop will provide the public the opportunity to make comments for DOE's NEPA review, which started on July 19, 2013 and will end on October 1, 2013. DOE will consider comments submitted after this date to the extent practicable. The workshop will also be used to receive comments from individuals and organizations to identify and resolve areas of disagreement, and to discuss additional informational requirements. Individuals, businesses, government agencies, and other entities may submit comments to DOE regarding the alternatives, impacts and issues DOE should consider in its Final EIS.

HECA Project PSA/DEIS

Project Description

Project Description – PSA/DEIS

PSA/DEIS Project Description:

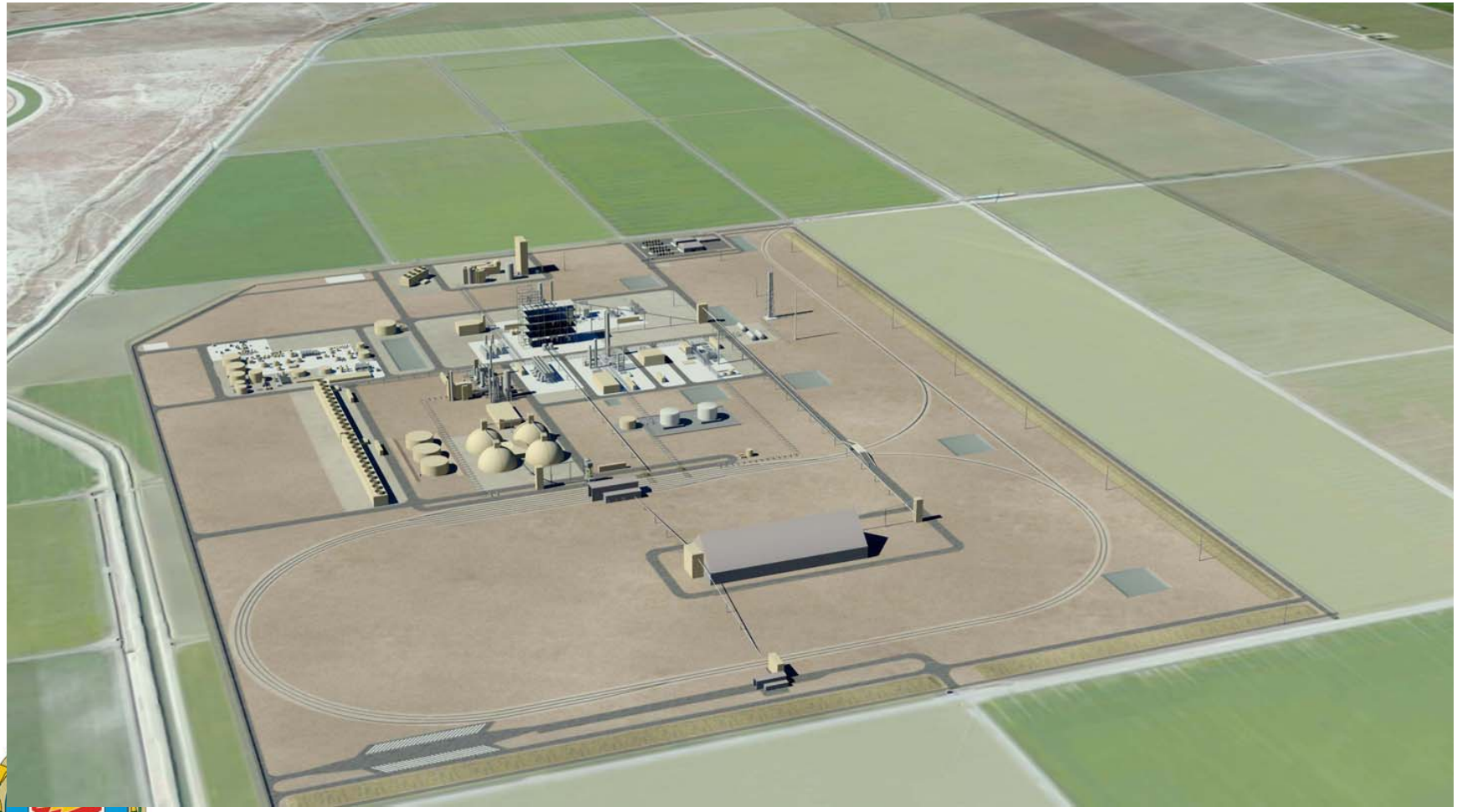
- On May 2, 2012, the applicant submitted an amended Application for Certification (AFC) for HECA.
- The proposed HECA power generating facility would gasify blends of 75 percent western sub-bituminous coal and 25 percent petroleum coke from California refineries to produce hydrogen gas to fuel a combustion turbine operating with a steam turbine in combined cycle mode. Liquid oxygen and nitrogen would be produced in an air separation unit, and supplied to the gasification unit, the combustion turbine, sulfur recovery unit and other process components of HECA. The project incorporates a proposed manufacturing complex that would produce urea in both liquid and pellet form for agricultural uses. The combined cycle power block would generate between 405 and 431 MW gross electrical power and between 151 to 266 MW net after accounting for onsite auxiliary power loads. The lower values apply during the periods of maximum fertilizer production and the higher values apply during periods of maximum electricity production.
- The gasification block would also capture approximately 90 percent of the carbon from the raw syngas (the direct end of the gasification process) at steady-state operation, which would be transported via pipeline to a custody transfer point at the Elk Hills Oil Field for carbon dioxide (CO_2) enhanced oil recovery (EOR) and sequestration.

Project Description – PSA/DEIS

Department of Energy – Clean Coal Power Initiative – Round 3

- **For Round 3, goals and requirements:**
- Carbon capture technologies must operate at 90 percent carbon dioxide capture efficiency.
- At least 300,000 tons per year of CO_2 must be captured and sequestered or put to beneficial use.
- Projects show progress toward capture and sequestration with less than 10 percent increase in electricity costs for gasification systems.
- Projects must use domestic mined coal and/or coal refuse for at least 75 percent of energy input.
- The requirement that projects funded under this solicitation use domestic coal for at least 75% of their energy input was based on national energy policy and is a mandatory condition of HECA's cooperative agreement with DOE. The project may use other fuels such as petroleum coke, imported coal, or biomass for up to 25% of its energy input.
- Coal-based power technologies may produce heat, fuels, chemicals, hydrogen or other useful byproducts in combination with production of electricity.
- Projects must produce electricity as at least 50 percent of the gross energy output.

Project Description – PSA/DEIS



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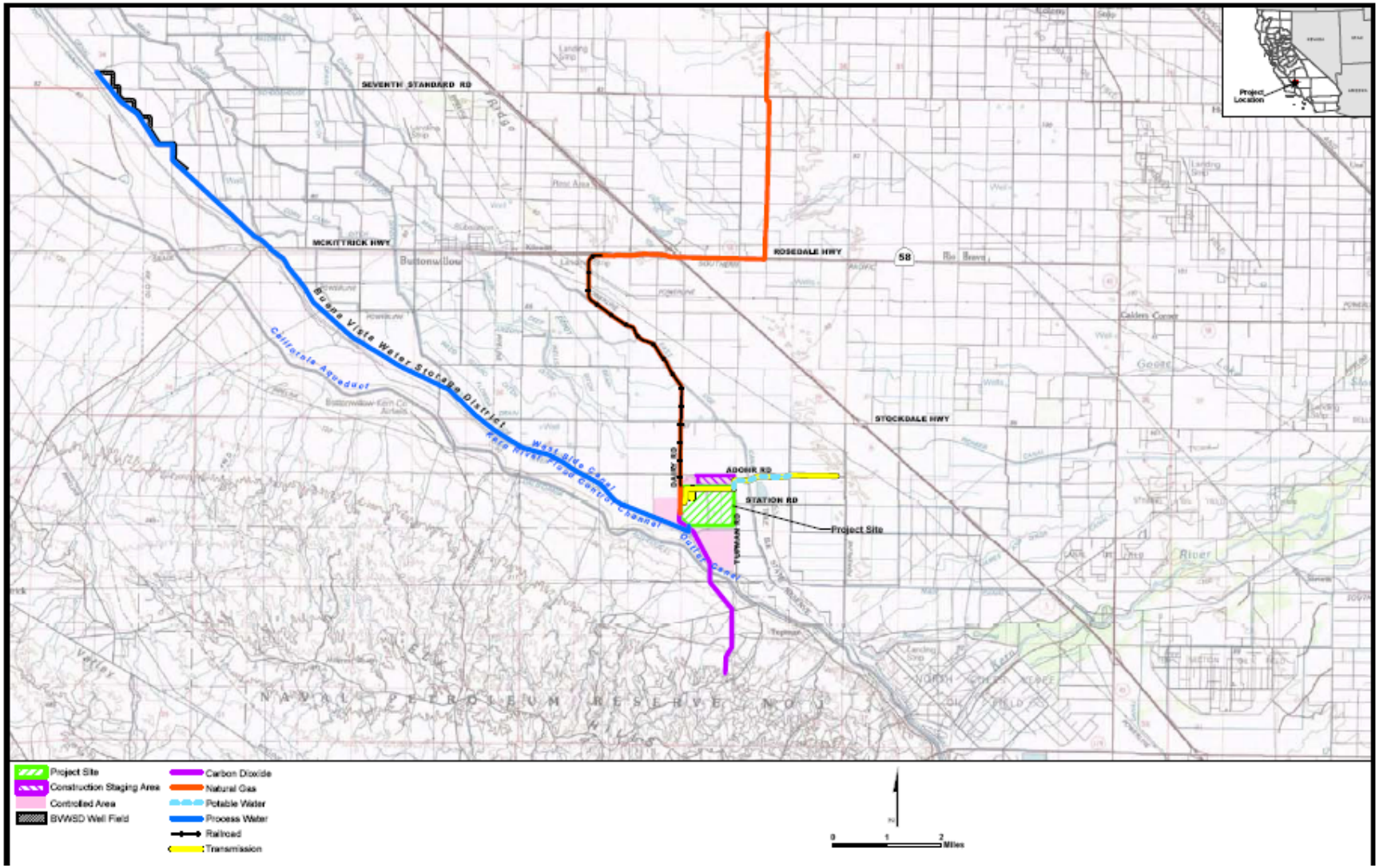

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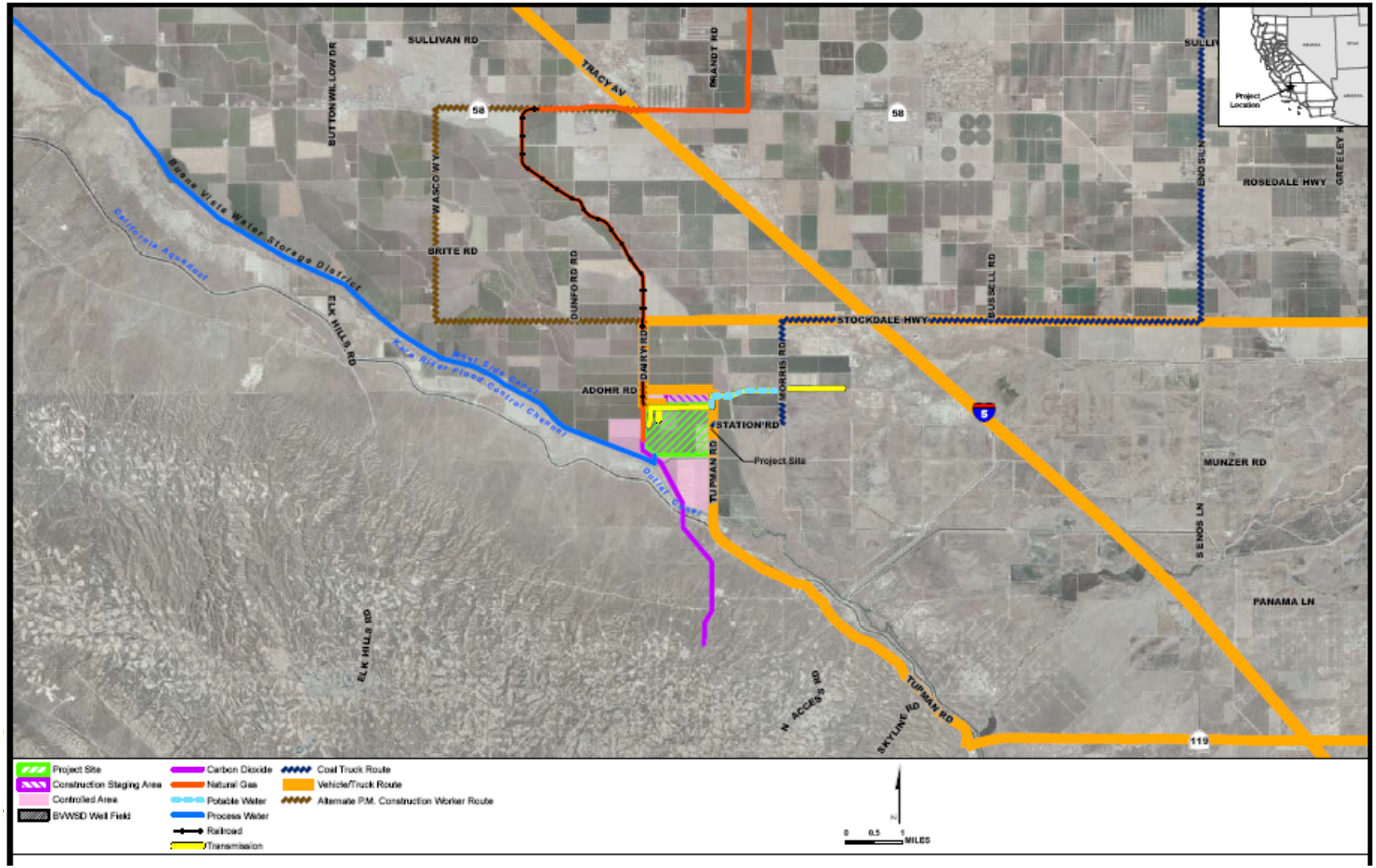

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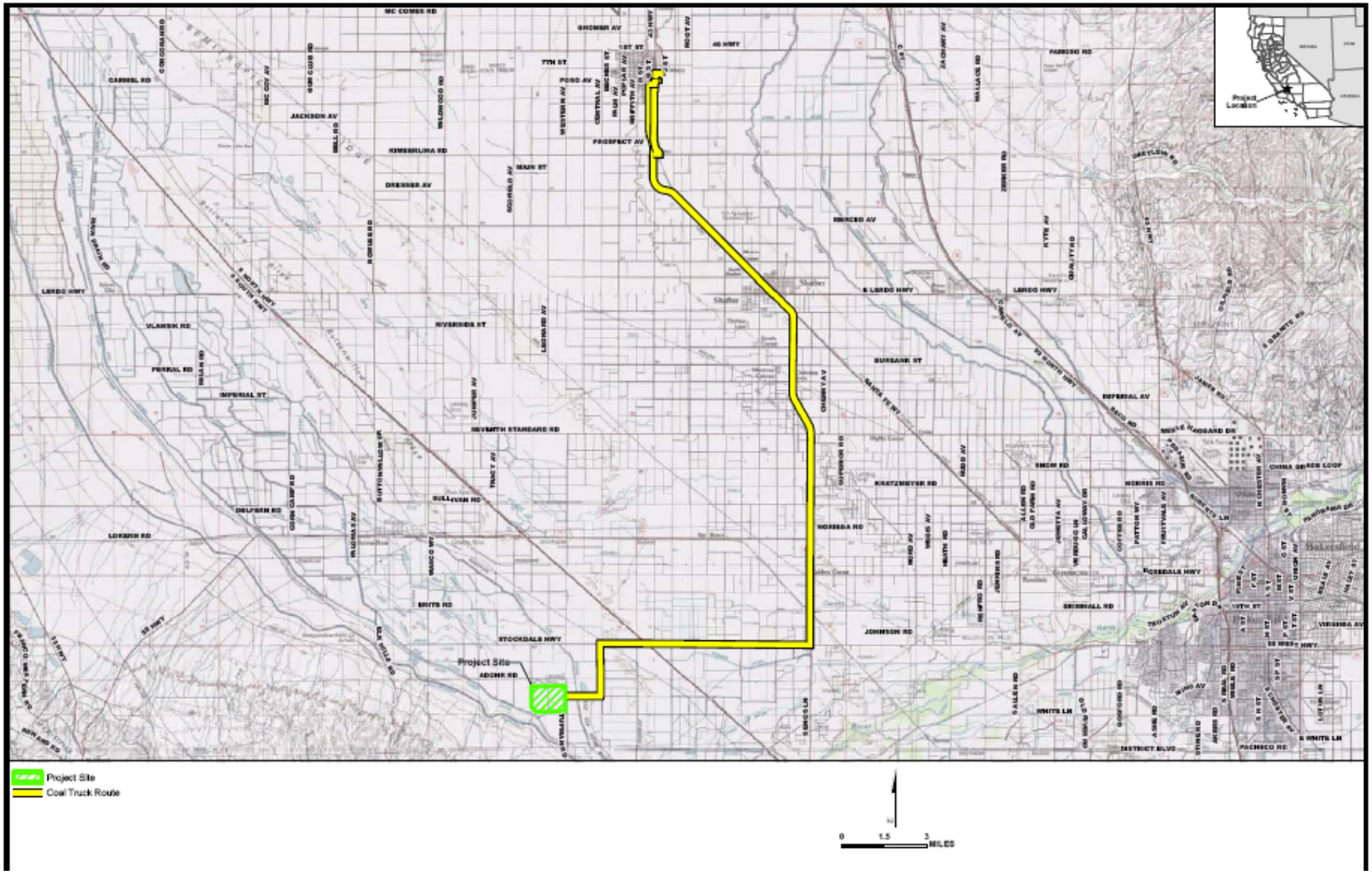

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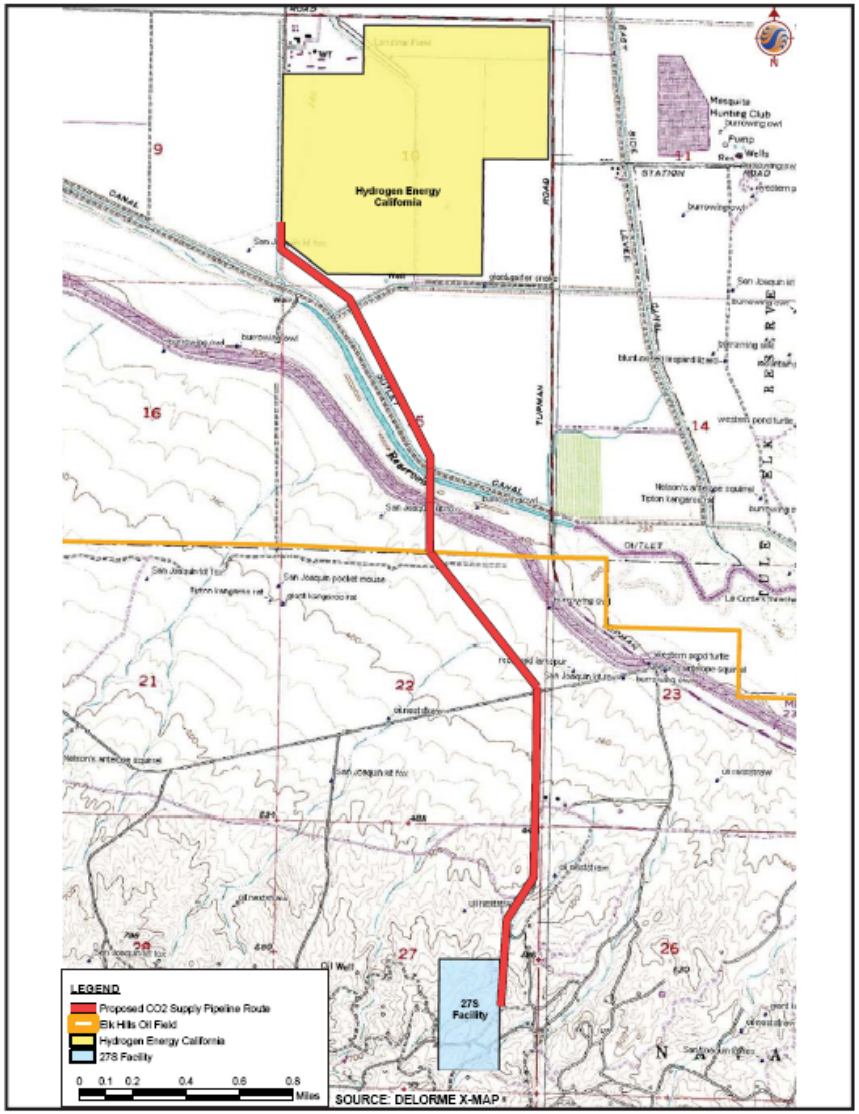

HECA Project PSA/DEIS

Air Quality

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Air Quality – PSA/DEIS

PSA/DEIS Air Quality Section's Purpose:

- Describe environmental and regulatory setting
- Detail air pollutant emissions
  - Project description
  - Notable project components and emissions sources
- Analyze project's air pollutant impacts
  - Air pollutant dispersion modeling/direct impacts
  - Secondary and cumulative impacts
- Identify air pollutant mitigation/conditions of certification
  - Emissions offsets
  - Emissions limits
  - Operating limits and monitoring requirements

Air Quality – PSA/DEIS

Preliminary Impact Analysis Findings:

- Project would comply with LORS, including general conformity and NSR offset mitigation requirements.
- Mitigated construction impacts would be less than significant.
- Operation emissions would be offset to a minimum 1:1 ratio for all nonattainment pollutants/precursors.
- Mitigated operation impacts would be less than significant.
- Staff/Air District Conditions of Certification ensure LORS compliance and less than significant impacts.

Air Quality – PSA/DEIS

Recommended Conditions of Certification:

- Energy Commission staff-proposed conditions (14 staff conditions in PSA)
  - Construction equipment/fugitive dust mitigation
  - Operations fugitive dust mitigation
  - Mobile source/dedicated equipment emissions mitigation
  - Transportation load fugitive dust (coal dust) mitigation
- District-proposed DOC conditions
  - Over 1,000 PDOC conditions for the stationary sources
  - FDOC completed after PSA, additional revisions requested

Air Quality – PSA/DEIS

Outstanding Information and Remaining Issues:

- Outstanding information
  - PSA list of information required/applicant response follow-up
    - Revised emissions estimate
    - Updated operating cycle assumption data/deferred to GHG Discussion
    - FDOC – Provided by SJVAPCD on July 8th.
- Remaining issues
  - Finalize staff conditions
  - Revise FDOC conditions/permit unit descriptions with SJVAPCD approval
  - Augment Savage Coal Services (Wasco) and ASU evaluations
  - Resolve PSA comment responses (especially U.S.EPA comments)

HECA Project PSA/DEIS

Carbon Sequestration and Greenhouse Gas Emissions

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Carbon Capture and Sequestration and Greenhouse Gas Emissions

Combined PSA/DEIS Section's Purpose:

- Carbon capture and sequestration analysis
  - Carbon capture and sequestration technical feasibility
  - Geologic issues analysis
  - Regulatory compliance and impact analysis (including how to define project scope).
- Greenhouse gas emissions (GHG) analysis
  - GHG emissions estimates
  - Electricity system GHG impact analysis
  - Regulatory compliance and impact analysis

GHG Emissions – PSA/DEIS

Preliminary GHG Impact Analysis Findings:

- Project would comply with GHG emissions LORS including SB 1368 EPS.
- Project's mitigated GHG emissions impacts would be less than significant.
- Would HECA reduce the carbon intensity of the electricity California uses?
- Staff recommended conditions ensure LORS compliance and less than significant impacts.

GHG Emissions – PSA/DEIS

Outstanding Information Needs:

- PSA list of information required
  - Contract between HECA and OEHI for CO_2 sales that details carbon sequestration responsibilities and rights
  - Complete energy balance
  - Final emissions estimates (GHG and Air Pollutant)
  - The SJVAPCD FDOC
  - Information on OEHI CO_2 geologic formation leak abatement
  - Additional information on venting hour compliance
  - Carbon balance

GHG Emissions – PSA/DEIS

Outstanding Information Needs (cont'd):

- PSA list of information required (cont'd)
  - Additional supporting information on SB 1368 calculations
  - Gross and net MWh supporting data
  - Fertilizer plant steam/power generation description
  - Emissions and generation allocation (power/fertilizer) supporting calculations and rationale for SB 1368 compliance
  - ASU power consumption data per operating case
  - Power consumption requirements for initial CO_2 compression versus carbon sequestration compression requirements.

GHG Emissions – PSA/DEIS

Outstanding Information Needs (cont'd):

- PSA list of information required (cont'd)
  - Description of fertilizer production swings/storage capacity
  - SB 1368 compliance monitoring/recordkeeping information
  - Planned and unplanned outage basis confirmation
- Savage Coal Services (Wasco) operation information
- ASU operation information including oxygen and nitrogen balances.
- Hydrogen balance discrepancy resolution, including coal dryer exhaust conditions.

GHG Emissions – PSA/DEIS

Remaining Issues:

- Obtaining responses to all PSA information requests and follow-up on certain responses received.
- Significant disagreement between staff and applicant on how GHG emissions are assigned to project components for SB 1368 compliance.
- Determining that contract between HECA and Occidental Petroleum provides adequate measures to ensure carbon sequestration.
- Finalize staff-proposed conditions, including sequestration monitoring and emissions reporting conditions.

Carbon Sequestration – PSA/DEIS

Abdel-Karim Abulaban, Ph.D., P.E., Tad Patzek, Ph.D.

Geologic Carbon Sequestration

- The process of capture and long-term storage of carbon dioxide (CO_2), where carbon dioxide is removed from flue gases, such as on power stations, and stored in underground reservoirs

HECA/Elk Hills Geologic Setting

- CO_2 to be injected in Water-Alternating-Gas process to enhance Elk Hills oil production – some sequestration occurs in each pass
- CO_2 injection zones 5,000+ ft. below ground surface
- Several confining formations are present between porous storage formation and ground surface, including thick and continuous shale layers, offering a tight lid to prevent CO_2 from leaking to the surface

Carbon Sequestration – PSA/DEIS

Abdel-Karim Abulaban, Ph.D., P.E., Tad Patzek, Ph.D.

Carbon Sequestration Feasibility

- The significant size (area and vertical thickness) of the Reef Ridge Shale (RRS) and the storage capacity of the Stevens Reservoir are primary factors in evaluating their effectiveness to store and contain injected CO_2
  - Area and thickness of RRS: many times larger than the planned areal extent of the CO_2 EOR component, and is also very thick (750 - 1,400 ft)
  - Volume of injected CO_2 would occupy less than five percent of Stevens Reservoir capacity
- Significant injection and recovery infrastructure already in place at Elk Hills
  - But this means numerous pathways exist that injected carbon can leak through
  - An extensive and effective monitoring and reporting network is required
  - Leaks reduce the net amounts of sequestered CO_2

Carbon Sequestration – PSA/DEIS

Preliminary Sequestration Analysis Findings

- Carbon sequestration by EOR at OEHI is feasible
  - RRS can be effective barrier
  - Oxy has well field monitoring infrastructure in place that could address CO_2
- Staff conditions are necessary to ensure carbon sequestration and LORS compliance
  - Class II vs. Class VI
- Project's geologic impacts would be less than significant
  - Low or insignificant induced seismicity

Carbon Sequestration – PSA/DEIS

Outstanding Information and Remaining Issues

- Outstanding information
  - Contract between HECA and OEHI for CO_2 handling, credits for sequestration, and liability for leakage.
- Remaining issues
  - Retrofitting of active and inactive (plugged and shut-in) wells to prevent leaks and make casings resistant to corrosion by carbonic acid.
  - Details of monitoring plan demonstrating how OEHI would detect and quantify potential leakage through well boreholes, old and new.

Public Health

Alvin Greenberg, Ph.D.

- Conditions of certification are recommended for adoption such that the project's direct and cumulative air quality impacts would be reduced to less than significant
- Staff does not expect any significant risk of cancer or any short-term or long-term health effects to any members of the public from project toxic emissions, including the following:
  - Low income and minority populations
  - Sensitive individuals (such as a developing fetus, newborns, infants, the elderly)
  - Specific age or ethnic groups

Public Health

To be discussed in the FSA/FEIS:

1. Coal Dust Impacts

Health Risk Assessment

- Identify types and amounts of hazardous substances that could be emitted to the environment
- Estimate worst-case concentrations of project emissions using dispersion modeling
- Estimate level of public exposure
- Compare exposure level to safe standards for known health effects, for long- and short-term exposure
  - Acute (short-term) health effects from 1-hour exposure
  - Chronic (long-term) health effects from long term exposure
  - Cancer risk (long-term)

Noncancer Health Significance Criteria

- Acute and Chronic Noncancer Health Effects
  - Significance is assessed by calculating a Hazard Index (HI) which is a ratio comparing exposure from facility emissions to the reference (safe) exposure level (REL) established by Cal-EPA OEHHA
  - HI < 1.0 signifies exposure from facility emissions is below the safe level
  - When HI < 1.0, health protection from the project is likely to be achieved, even for sensitive members of population
  - When HI <1.0, no significant noncancer project-related public impacts exist due to facility emissions

Cancer Health Significance Criteria

- Cancer Risk (chronic)
  - Expressed as chances per million (ex: 1 in a million means 1 case of cancer per million people)
  - Dependent on maximum expected pollutant concentration, the probability that a particular pollutant will cause cancer, and the length of exposure
  - Cancer risk from each carcinogen is added to give total risk
  - State regulations and SJVAPCD use 10 in a million as the level of "significant risk" (for lifetime exposure)
  - Risk below 10 in a million represents no significant

Construction Impacts & Mitigation

- Potential public health risks from exposure to toxic substances in contaminated soil due to site preparation work
  - Potential on-site contamination due to underground storage tanks and past fertilizer manufacturing (evaluated in Waste Management section)
  - Heavy equipment diesel exhaust during construction
    - Exposure to diesel may cause short- and long-term health effects (ranging from labored breathing to lung cancer)
    - Results of applicant's analysis at PMI:
      - Cancer risk – 5.5 in a million

Operation Impacts & Mitigation

- The applicant prepared a risk assessment that appears to be complete, transparent and verifiable by staff's analysis
- Staff conducted independent air dispersion modeling and a limited focused risk assessment (a "spot check")
  - Air Quality staff used AERMOD air dispersion model
  - Health risk assessment used the most recent exposure methodology developed by Cal-EPA OEHHA (Office of Environmental Health Hazard Assessment), August 2012
  - HRA assumes 100% of soils ingested and available for dermal contact impacted by particulates emitted

Staff's Limited Focused Health Risk Assessment

- 8 Stationary sources evaluated: HRSG, Coal Dryer, CO_2 vent, fugitives from: Gasification, Shift area, AGR, SRU, SWS
- 6 Receptor locations evaluated:
  - Point of Maximum Impact (PMI) for:
    - Cancer risk (located SE corner of project at Tupman Rd)
    - Chronic noncancer hazard (located close to cancer PMI)
    - Acute noncancer hazard (located NW of project)
  - Maximally Exposed Individual Receptor (MEIR) for:
    - Cancer risk and chronic noncancer hazard (located at a residence along SE side of property on Tupman Rd)
    - Acute noncancer hazard (located at residence on Tule Park Rd near Station Rd)
    - Elk Hills School (nearest sensitive receptor)

PUBLIC HEALTH Table 12 Compares Staff and Applicant HRA Results

	Staff's Analysis (8 sources only)			Applicant's Analysis (all sources)		
	Cancer Risk (per million)	Chronic HI	Acute HI	Cancer Risk (per million)	Chronic HI	Acute HI
PMI-cancer risk	3.1	0.84	0.85	8.97	-	-
PMI-chronic HI	3.6	0.97	0.95	-	0.42	-
PMI-acute HI	3.0	0.11	0.96	-	-	0.88
MEIR-chronic	2.5	0.66	0.54	4.29	0.29	-
MEIR-acute	0.87	0.23	0.69	-	-	0.33
Nearest school	0.61	0.16	0.24	0.96	0.07	0.11

Interpretation of Staff's HRA Results

- All cancer risk results are below significance level
- All HI levels are below significance level with exception of chronic and acute HI at PMI which approach 1.0
  (While this usually warrants further analysis, it is staff's opinion that addition of remaining emitted substances to this analysis would not result in significant incremental increase in HI)
- Contribution of exposure routes to total cancer risk at PMI:
  - Inhalation – 43%
  - Soil ingestion – 54%
  - Dermal absorption – 3.5%
- Contribution of emitted substances to total cancer risk at PMI:
  - Arsenic – 62%

Transportation Analysis

- Applicant assessed risk posed to off-site public due to emissions of diesel particulate matter (DPM) along transportation routes
- Applicant conducted an expanded HRA that included all stationary and mobile emissions at a location on Station Road estimated to represent the point of greatest DPM emissions and at 3 schools along the truck route
  - Transportation risk results at Station Road:
    - Transportation alternative 1: cancer risk is 4.2 in a million
    - Transportation alternative 2: cancer risk is 7.2 in a million
    - Hazard index is less than 1.0 for both alternatives
  - Transportation risk results at 3 schools: 0.09 in a million

Enhanced Oil Recovery Facility

- Located about 4 miles south of the project site
- CO_2 from HECA is proposed to be compressed and delivered by pipeline to EOR where it will be injected into wells to help in recovery of trapped oil and sequestration of CO_2
- Cumulative risk between HECA and EOR not expected due to distance between them

Existing Public Health Concerns

- Kern County is ranked one of the lowest counties in California for overall health outcomes
- Asthma death rate in Kern County is higher than in California
- Cancer death rate in Kern County is higher than in California
- In Kern County, hospitalization of African American asthmatics is 2.3 and 3.6 times higher than hospitalization of white and Hispanic asthmatics, respectively
- Valley Fever appears to be on the rise in Kern County
- Bakersfield is the most polluted city in the US for particulates
- Bakersfield is the 3rd most polluted city in the US for

Proposed Condition of Certification PUBLIC HEALTH-1

- Project owner shall prepare protocols for sampling and quantitative analysis of Toxic Air Contaminants emitted (source tests)
- Project owner shall prepare protocol for preparation of a HRA
  - Not less than sixty (60) days prior to the start of commissioning
  - Protocols shall be submitted to SJVAPCD for review and comment and to the CPM for review and approval
  - Source testing and HRA shall include the following TACs from all sources at the project site:

Arsenic	Mercury
Cadmium	Carbon disulfide
Hexavalent chromium	Hydrogen

Proposed Condition of Certification PUBLIC HEALTH-2

- Project owner shall conduct source tests as described by protocol prepared as per PH-1
  - Not later than sixty (60) days after the start of commissioning
- Project owner shall prepare and submit results of source test and HRA to SJVAPCD for review and comment and the CPM for review and approval
  - Not later than thirty (30) days after the source test
- Project owner shall conduct another source test and prepare a new HRA and submit results to SJVAPCD and CPM
  - Not later than sixty (60) days after start of commercial operations
    - CPM review and approval thirty (30) days after source test completed

Proposed Condition of Certification PUBLIC HEALTH-2 (continued)

- Project owner shall repeat source test and HRA after 3 years of commencing commercial operations

- Project owner shall repeat source test and HRA every 5 years thereafter

Proposed Condition of Certification PUBLIC HEALTH-3

- Project owner shall submit plans to address results of any source test and any HRA prepared using those source test results that shows Risks greater than 10 in one million or a Hazard Index greater than 1.0
  - Submit protocol for a more refined HRA or
  - Reduction in emissions of certain TACs
- Plans will be submitted to SJVAPCD for review and comment and to the CPM for review and approval
  - Not later than sixty (60) days after the submittal to the CPM of source test results and HRA prepared using those results
    - Project owner shall repeat this after every source test and HRA preparation

Traffic and Transportation

John Hope, Environmental Planner II

Conclusions of PSA

- Degrade existing peak hour LOS at SR 43/Stockdale Highway, SR 119/Tupman Road, Dairy Road/Adohr Road, and Dairy Road/Stockdale Highway. Conditions of Certification TRANS-1 and TRANS-2 proposed.
- Increase traffic on certain roadway segments resulting in potential degradation of roadway surfaces. Conditions of Certification TRANS-3 and TRANS-4 proposed.
- High velocity thermal plumes could present a potentially significant hazard to aircraft flying directly overhead. Conditions of Certification TRANS-7 through TRANS-10 proposed.
- Concerns with potential to substantially increase traffic levels on farming roads not currently intended for heavy truck traffic and heavy load capacities. Potential to impact traffic associated with existing farming activities thereby potentially resulting in safety issues and increased accidents to the public.

Traffic and Transportation

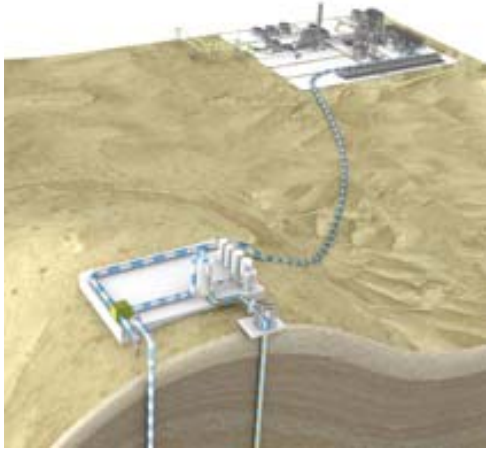
John Hope, Environmental Planner II

Issues to Be Resolved in FSA

- Application to Public Utilities Commission (CPUC) for rail crossings
- Farm equipment traffic along Dairy Road
- School bus traffic (Elk Hills, Buttonwillow, Rio Bravo-Greeley)
- Tule fog
- Analysis of operations at SR 43 / Los Angeles Avenue (City of Shafter)
- Potential expansion of Wasco coal facility

National Environmental Policy Act (NEPA)

- **U.S. Federal Law - effective January 1, 1970**
- **Applies to all Federal agencies**
- **NEPA elevated the role of environmental considerations in proposed Federal Agency actions**
- **Promotes environmental considerations in decision-making**



NEPA Mandate

- **Environmental information must be available to public officials and citizens before Federal decisions are made and before Federal actions are taken.**
- **Goals of the EIS:**
  - **High quality information**
  - **Accurate scientific analyses**
  - **Expert agency comments**
  - **Open, accountable, and responsible decision making**
  - **Public involvement**

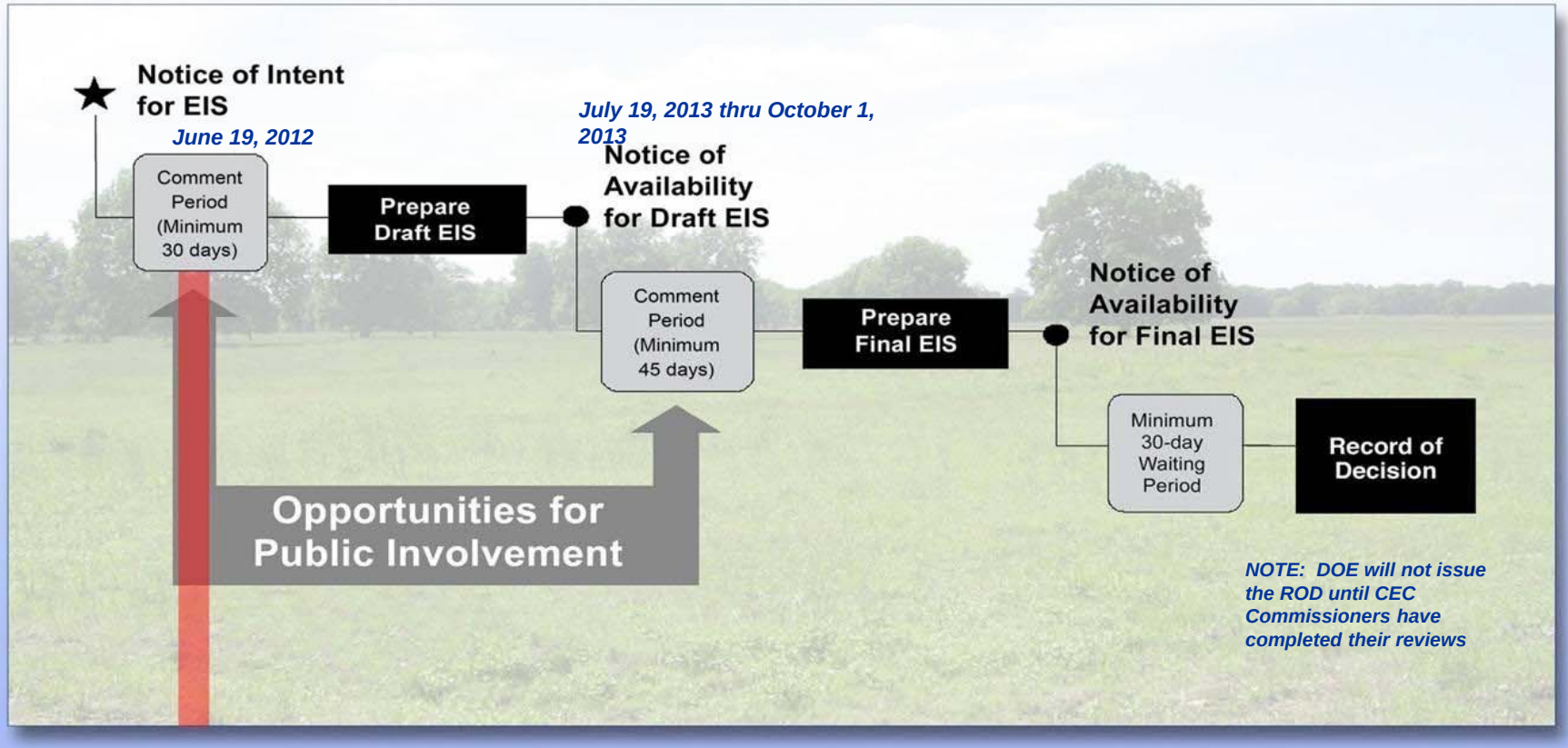
Content of a Typical Environmental Impact Statement (EIS)

- **Purpose and Need for Agency Action (*why here? why now?*)**
- **Proposed Agency Action & Reasonable Alternatives**
- **Proposed Project & Project Alternatives**
- **Description of the Affected Environment**
- **Analysis of Potential Environmental Consequences**
- **List of Agencies, Organizations, and Persons Contacted**
- **Public Participation and Responses to Public Input**

PSA/DEIS for HECA

- **Basics: New polygen plant that produces electricity, fertilizer and CO_2 using integrated gasification combined cycle technology.**
- **Fuel: 75% coal, 25% petcoke.**
- **CO_2 Sequestration: Through use for enhanced oil recovery (EOR) at Oxy Elk Hills Oil Field.**
- **DOE Funding: $408 M.**
- **History: Ownership of Applicant (HECA LLC) changed from BP/Rio Tinto to SCS Energy. SCS proposed some changes to the project.**
- **PSA/DEIS: DOE and CEC integrated NEPA and CEQA processes in order to facilitate public involvement.**

NEPA PROCESS AND EIS MILESTONES



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Hazardous Materials Management

Alvin Greenberg, Ph.D.

PSA/DEIS Findings:

Use, Handling, Storage, and Transport (to and from the site) can be accomplished with a less-than-significant risk to the public if mitigation measures consisting of engineering controls, administrative controls, and emergency response measure are implemented.

Hazardous Materials Management

To be discussed in the FSA/FEIS:

1. Revised HAZ-12

2. Risk of CO_2 pipeline and well blow-outs

LORS

- **RMPs: CAA 42 USC §112(r) and CalARP H&SC 25531**
  Requires a Risk Management Plan (RMP) that includes air dispersion modeling of an accidental release off-site consequences.
- **HMBP: H&SC 25500 and Kern County EHSD**
  Requires the submittal of a chemical inventory, planning and reporting for management of hazardous materials.
- **Process Safety Management: 8 CCR 5189**
  Requires facility owners to develop and implement effective process safety management plans when toxic, reactive, flammable, or explosive chemicals are maintained on site in quantities that exceed regulatory thresholds.
- **Security: 6 CFR Part 27, 49 CFR 172.800**
  Chemical Facility Anti-Terrorism Standard (CFATS) and U.S. DOT requirements to implement security plans.

Engineering Controls

- Engineering controls help to prevent accidents and releases (spills) from moving off site and affecting communities by incorporating engineering safety design criteria in the design of the project. The engineered safety features proposed by the applicant and/or proposed by staff include:

Engineering Controls (con't.)

- Storage of containerized hazardous materials in their original containers which are designed to prevent releases.
- Construction of secondary containment areas surrounding each of the hazardous materials storage areas designed to contain accidental releases that might happen during storage or delivery.
- Physical separation of stored chemicals in isolated containment areas in order to prevent accidental mixing of incompatible materials, which could result in the evolution and release of toxic gases or fumes.
- Installation of local level gauges and alarms to prevent overfilling of bulk chemical storage tanks.

Engineering Controls (con't.)

- Containment area surrounding the anhydrous ammonia tanks, sodium hydroxide tanks, sulfuric acid tank, sodium hypochlorite tank, diesel fuel tank, and lubricating oil tank capable of holding the entire contents of each tank plus rainfall.
- The placement of a subsurface vault into which spilled anhydrous ammonia would flow thus reducing the surface area of a spill.
- Process protective systems including continuous tank level monitors, automated leak detectors, ammonia and hydrogen sulfide detectors, temperature and pressure monitors, alarms, and isolation valves.
- Hydrogen stored within a multi-tube trailer and monitored & controlled by flow meters and pressure monitors and equipped with pressure relief valves and automatic shutdown.

Engineering Controls (con't.)

- Molten sulfur stored on site in storage pits made of compatible material, structurally sound, and equipped with pressure-monitors and ventilation. In addition,
- Sulfur-loading equipment will have vapor recovery system.
- Methanol stored in one AST with secondary containment. Methanol contained within process vessels and piping will be kept geographically remote from the AST. Isolation valve placed on the piping between the storage tank and the process unit.
- Tanks equipped with leak detectors to identify the presence of any liquid accumulation below the tank bottom or in the containment area. The
- Methanol delivery system equipped with a flow meter and automatic shutdown capabilities. The methanol transfer pump and piping to have secondary containment.

Engineering Controls (con't.)

- An extensive buffer-zone around the actual gasification facility and production processes. The perimeter of the buffer zone will also contain an earthen berm on the north and east sides of the entire site fence line.

- Ensuring that all redundant command and control systems that are "hard-wired" are placed in separate wiring tracks.

Administrative Controls

- Administrative controls also help prevent accidents and releases from occurring or moving off site and affecting neighboring communities by establishing worker training programs, process safety management programs, and complying with all applicable health and safety LORS.

Administrative Controls (con't.)

- Hazardous Materials Business Plan (HMBP)
- Spill Prevention, Control, and Countermeasure Plan (SPCC Plan)
- Risk Management Plan (RMP) specifically for the use and storage of anhydrous ammonia, methanol, and liquid oxygen/nitrogen

Administrative Controls (con't.)

- **Safety Management Plan** for the on-site production of or delivery to the site of any liquid, gaseous, or cryogenic hazardous materials.
- The plan shall include procedures, protective equipment requirements, training, and a checklist.
- It shall also include a section describing all measures to be implemented to prevent mixing of incompatible hazardous materials including provisions to maintain lockout control by a power plant employee not involved in any delivery or transfer operation.
- It shall also describe the type, number, locations, and detection limits of hazardous gas monitors for ammonia, carbon monoxide, hydrogen sulfide, and sulfur dioxide.

Administrative Controls (con't.)

- **Process Safety Management Plans** that include hazard analyses specifically for the production, use, and storage of:
  - anhydrous ammonia
  - syngas
  - methanol
  - molten or liquid sulfur
  - liquid oxygen/nitrogen
  - nitric acid
  - UAN solution

- PSM Plans shall contain a hazard analysis using at least two different methodologies. One shall be a Hazard and Operability Study (HAZOP) and the other shall be chosen from the list in 8 CCR 5189 (e) (1)

Administrative Controls (con't.)

- Independent peer review and approval of the process hazard analyses and the PSM plans before they are submitted to the CPM.
- Develop and implement a pipeline integrity management plan that is consistent with the U.S. DOT Pipeline and Hazardous Materials Safety Administration (PHMSA) Liquid Pipeline Integrity Management in High Consequence Areas for Hazardous Liquid Operators (49 CFR Parts 195.450 and .452) rule, the recommendations of the U.S. Chemical Safety and Hazard Investigation Board in its report on the August 2, 2012 Chevron Richmond Refinery Fire, and the recommendations of the independent professionals.

Administrative Controls (con't.)

- No rail tank car or tanker truck leaving the site with molten or liquid sulfur contains hydrogen sulfide (H2S) at a concentration greater than 2.0 ppm in the truck or tanker airspace above the sulfur.

Worker Safety and Fire Protection

Alvin Greenberg, Ph.D.

PSA/DEIS Findings:

- Comply with applicable safety LORS
- Protect workers during the construction and operation of the facility.
- Protect against fire.
- Provide adequate emergency response procedures.

Worker Safety and Fire Protection

To be discussed in the FSA/FEIS:

1. Further clarification on WS-7, Valley Fever, and linears

2. Mitigation to the KCFD

Worker Safety

WORKER SAFETY-1 and -2

Safety and Health Program

- Personal Protective Equipment Program;
- Exposure Monitoring Program;
- Injury and Illness Prevention Program;
- Emergency Action Plan; and
- Fire Prevention Plan.

Worker Safety

- **WORKER SAFETY-3** Construction Safety Supervisor (CSS)
- **WORKER SAFETY-4** Construction Safety Monitor
- **WORKER SAFETY-5** Portable automatic external defibrillator (AED)
- **WORKER SAFETY-6** Three secure access points for emergency personnel to enter the site.

Worker Safety

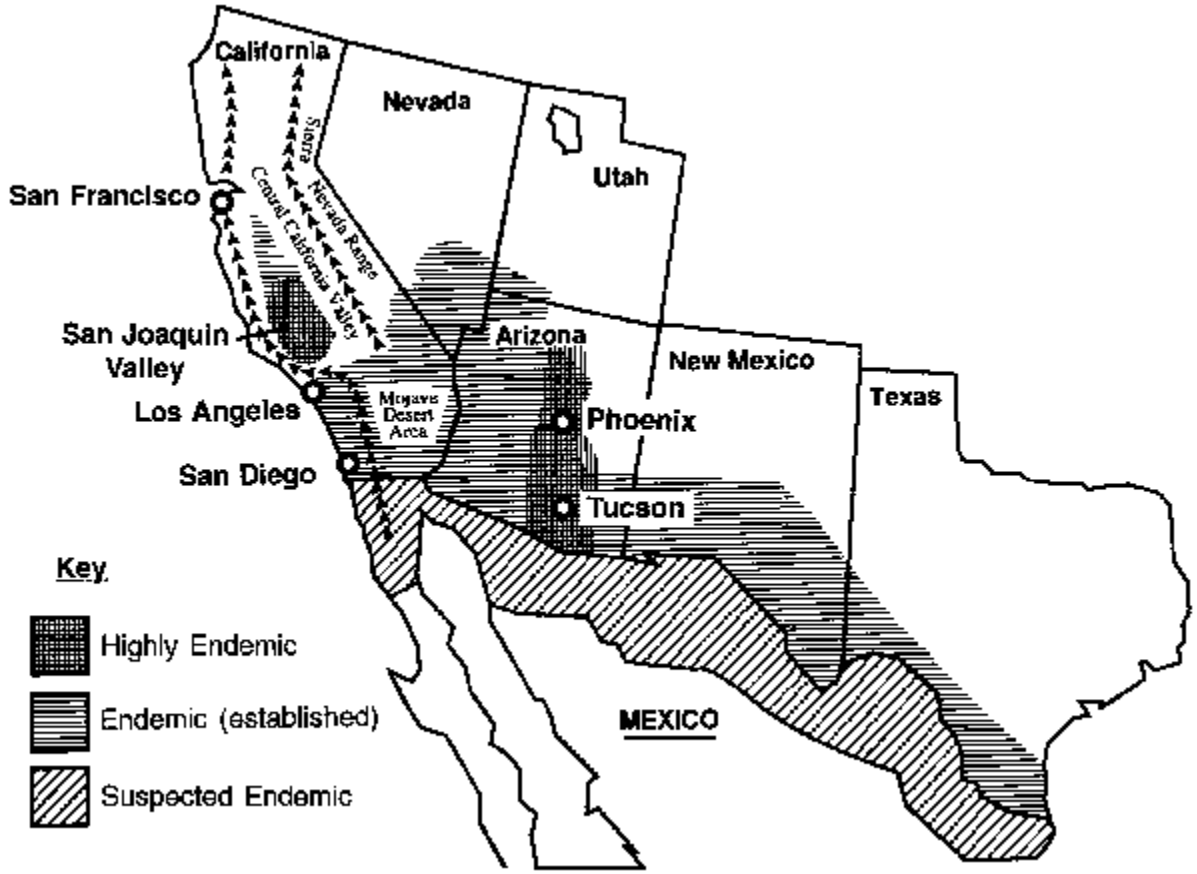
Valley Fever (Coccidioidomycosis)

- "Valley Fever" (VF) is primarily encountered in southwestern states, particularly in Arizona and California.
- It is caused by inhaling the spores of the fungus Coccidioides immitis, which are released from the soil during soil disturbance (e.g., during construction activities) or wind erosion.
- The disease usually affects the lungs and can have potentially severe consequences, especially in at-risk individuals such as the elderly, pregnant women, and people with compromised immune systems.
- Trenching, excavation, and construction workers are often the most exposed population.
- Highest VF rates are recorded in Kern, Kings, and Tulare Counties, followed by Fresno County, San Luis Obispo County, LA County, San Diego County, San Bernardino County, and Riverside County.

Valley Fever (con't.)

- A February 2013 outbreak of VF affecting at least 28 workers at a photovoltaic solar plant in eastern San Luis Obispo County, along with an increase in inmates at two San Joaquin Valley prisons coming down with the disease, has sparked renewed interest and concern.
- The California Department of Public Health, Cal-OSHA, and San Luis Obispo County are investigating these outbreaks.

Valley Fever (con't.)



Valley Fever (con't.)

Worker Safety

WORKER SAFETY-10

During commissioning and operations, at least one person would be on the site at all times (24 hours/day, 7 days/week) who was knowledgeable of and dedicated to safety, security, and fire protection.

Alternatives

Negar Vahidi and Scott Debauche, Senior Planners

Alternatives Evaluated in Detail Within the PSA/DEIS

- No Action Alternative (NEPA)
  - DOE would not fund the Project
- No Project Alternative (CEQA)
  - Project would not be constructed
- No Fertilizer Manufacturing Complex (Reduced Project) Alternative (CEQA) / Action Alternative (NEPA)
  - Project as proposed absent fertilizer manufacturing

Alternatives

Negar Vahidi and Scott Debauche, Senior Planners

Alternatives Eliminated from Further Consideration within the PSA/DEIS

- Alternative Sites (Proximate to HECA Site)
  - Site within Elk Hills Oilfield, Alternative Sites 1-4
- Alternative Linear Utility Routes
- Reduced Project (Reduced Footprint) Alternative
- Dry Scrubbing Alternative
- Renewable Energy Project Alternatives
- Natural Gas Project Alternative
- Enclosed Ground Flare and Flare Recovery System Alternative
- Reduced Coal/Increased Petcoke Upon Conclusion of Five-Year Section 48A Program Requirement Period Alternative

Alternatives

Negar Vahidi and Scott Debauche, Senior Planners

Alternatives Still Under Consideration by Staff (to be considered in detail or eliminated from further consideration within the FSA/FEIS)

- Dry Cooling or Wet-Dry Hybrid Cooling Alternative
  - To be completed by Water Staff
- Natural Gas Combined Cycle with Carbon Capture and Storage
  - Engineering Staff to determine feasibility
- Biomass Boiler Alternative
  - Engineering Staff to determine feasibility
- Alternative Sites with Expansive CO_2 Pipeline
  - Alternatives Staff to determine locational extent and feasibility
- Coal Transfer Route Alternatives
  - Traffic Staff to determine need/feasibility

Biological Resources
CEC Staff Carol Watson

Topics of Discussion:

1. HECA Impacts
2. OEHI Impacts
3. Discussion of HECA Data Response, Set 2

Biological Resources
CEC Staff Carol Watson

1. **HECA Topics**:

A. Required Analysis: Vegetation and Special Status Plant Species:

1. Impact acres for potentially impacted Great Valley Mesquite Shrub, alkali sinks/valley sink scrub, Valley saltbush scrub, riparian, vernal pool, and other special status plant species) (PSA Table 3)

2. Additional data needs – botanical surveys along CO2 pipeline route, noxious or invasive weeds data availability, nitrogen deposition model

Biological Resources
CEC Staff Carol Watson

B. Special Status Wildlife Species (PSA Table 4):
Impact assessment (acres, populations, individuals affected, etc.) for vernal pool fairy shrimp, and tadpole shrimp, CRLF, GGS, peregrine falcon, longhorn fairy shrimp, golden eagle, etc.

C. Extent of U.S. Army Corps of Engineers Section 404 jurisdiction and Fish and Game Code Section 1600 jurisdiction, agency comments on draft HDD plan

D. Water supply analysis and the effects of groundwater pumping to sensitive vegetation communities and raptor nesting habitat

Biological Resources
CEC Staff Carol Watson

E. Mitigation strategy for project impacts to San Joaquin kit fox, giant kangaroo rat, Tipton kangaroo rat, San Joaquin antelope squirrel, blunt-nosed leopard lizard, Swainson's hawk, burrowing owl and cumulative effects

Biological Resources
CEC Staff Carol Watson

2. OEHI Questions:

A. Discussion between Oxy, HECA, and agencies on permit coverage and mitigation strategy for species impacts and habitat loss for EOR project impacts

B. Status of biological baseline studies (clarify sections involved and survey plan)

C. Staff's PSA recommended conserving 40 acre minimum blocks of *Hoover's eriastrum*, a CNPS List 1B2 species. Does the project owner have feedback on feasibility of this approach?

Biological Resources
CEC Staff Carol Watson

3. HECA Data Response Set 2 Topics:

A. San Joaquin kit fox vehicle-strike and road mortality analysis
B. Spadefoot toad habitat assessment
C. New CDFW (=CDFG) burrowing owl staff guidance 2012
D. Impacts and mitigation for 5 threatened or endangered plant species: Bakersfield cactus, Bakersfield smallscale, California jewelflower, Kern Mallow, and San Joaquin woollythreads.
E. Impacts and mitigation for other special status plant species, Coulter's goldfields, Oil nest straw, etc.)

HECA Project PSA/DEIS

Water Supply

Authors:
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Steve Deverel, P.G.

Water Supply PSA/DEIS

Combined PSA/DEIS's Purpose:

- Would project substantially deplete groundwater supplies?
- Would project increase local pumping costs?
- Would project degrade local groundwater supplies?
- Would project contribute to subsidence?
- Does project utilize the least amount of worst water available?

Water Supply PSA/DEIS

Preliminary Water Supply Impact Analysis Findings:

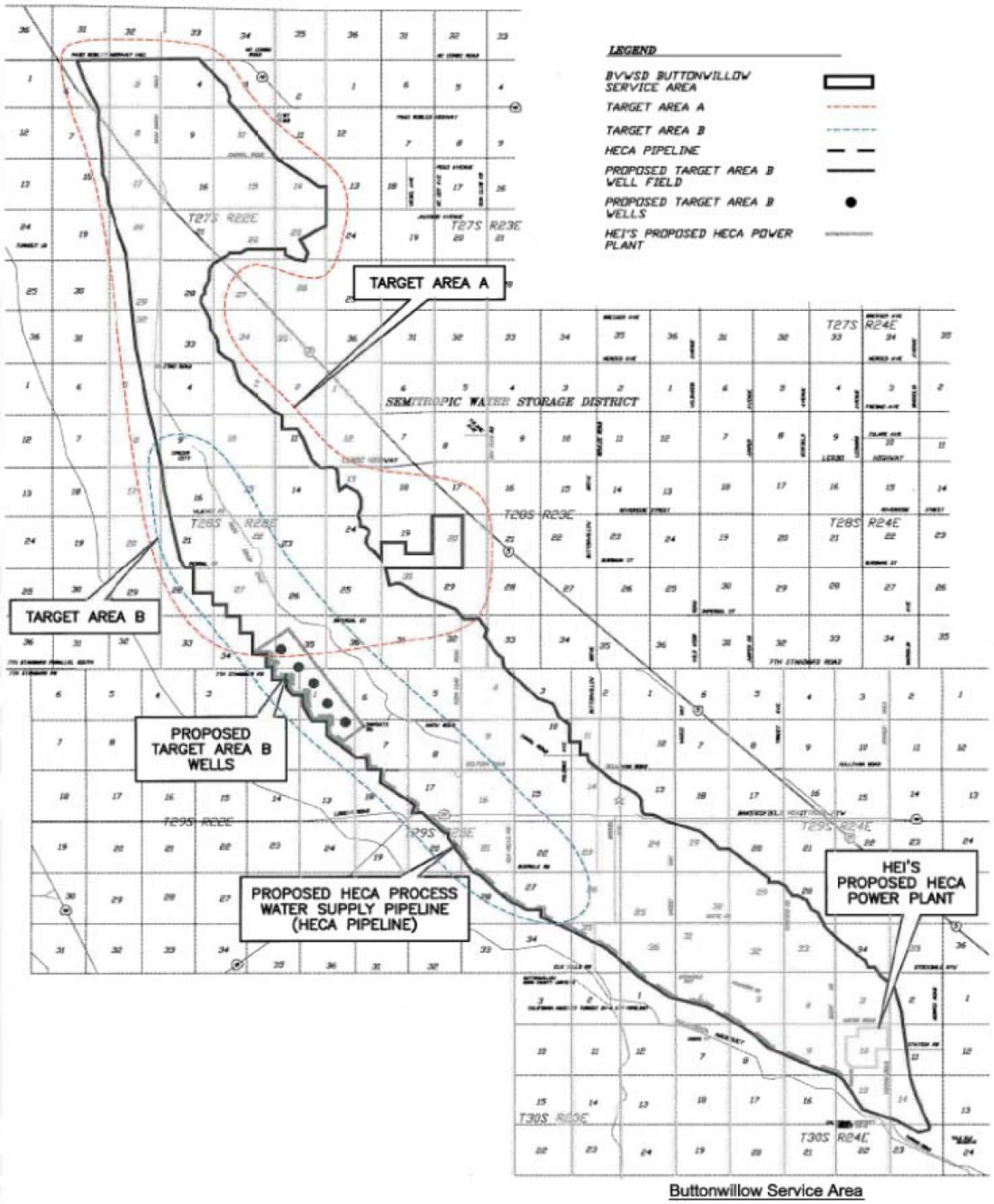
- Project could lower water levels locally
- Project does not have obvious water quality benefit
- Project would exacerbate overdraft in Kern County
- Project may not be consistent with state water policy

Water Supply PSA/DEIS

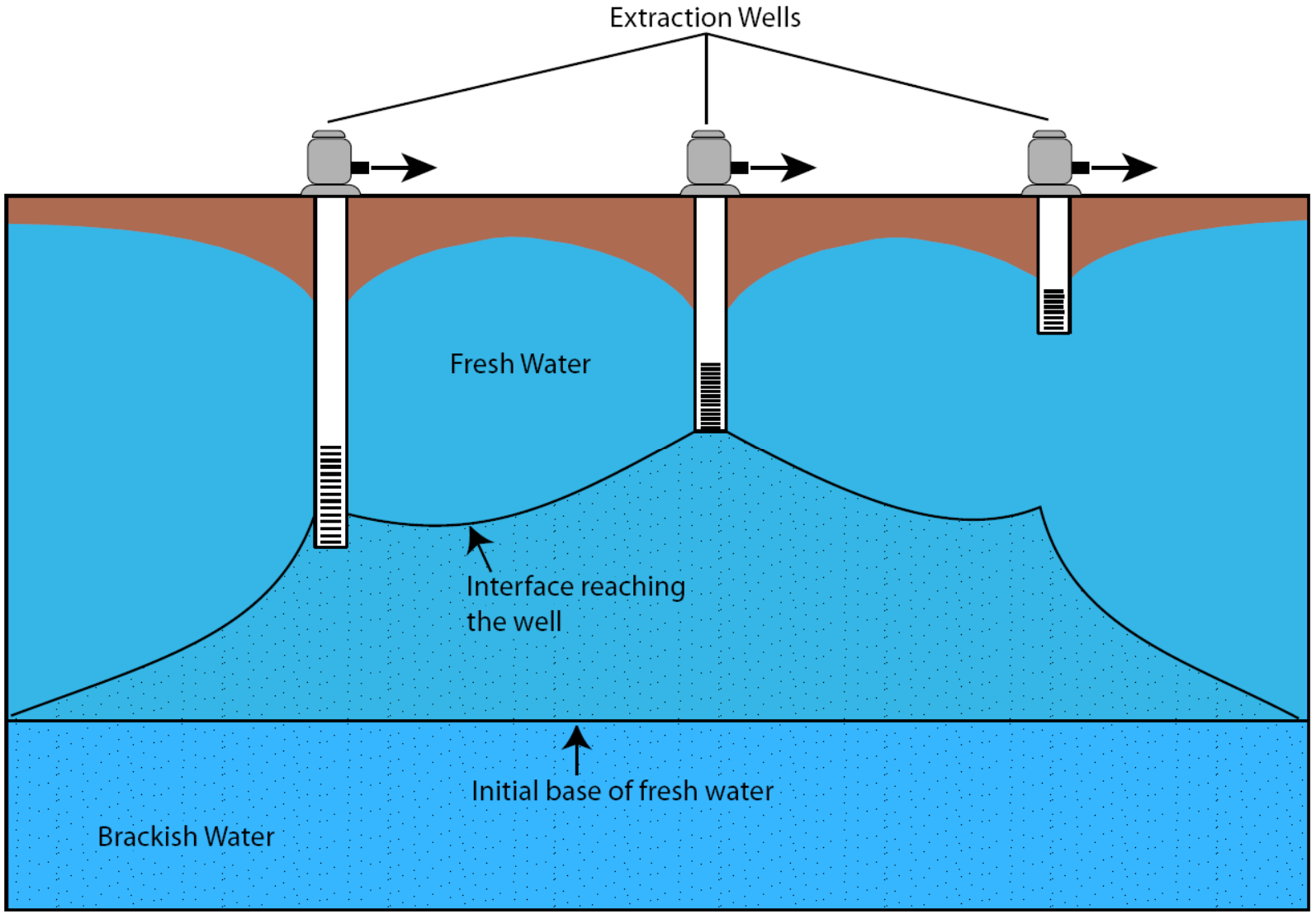
Remaining Issues:

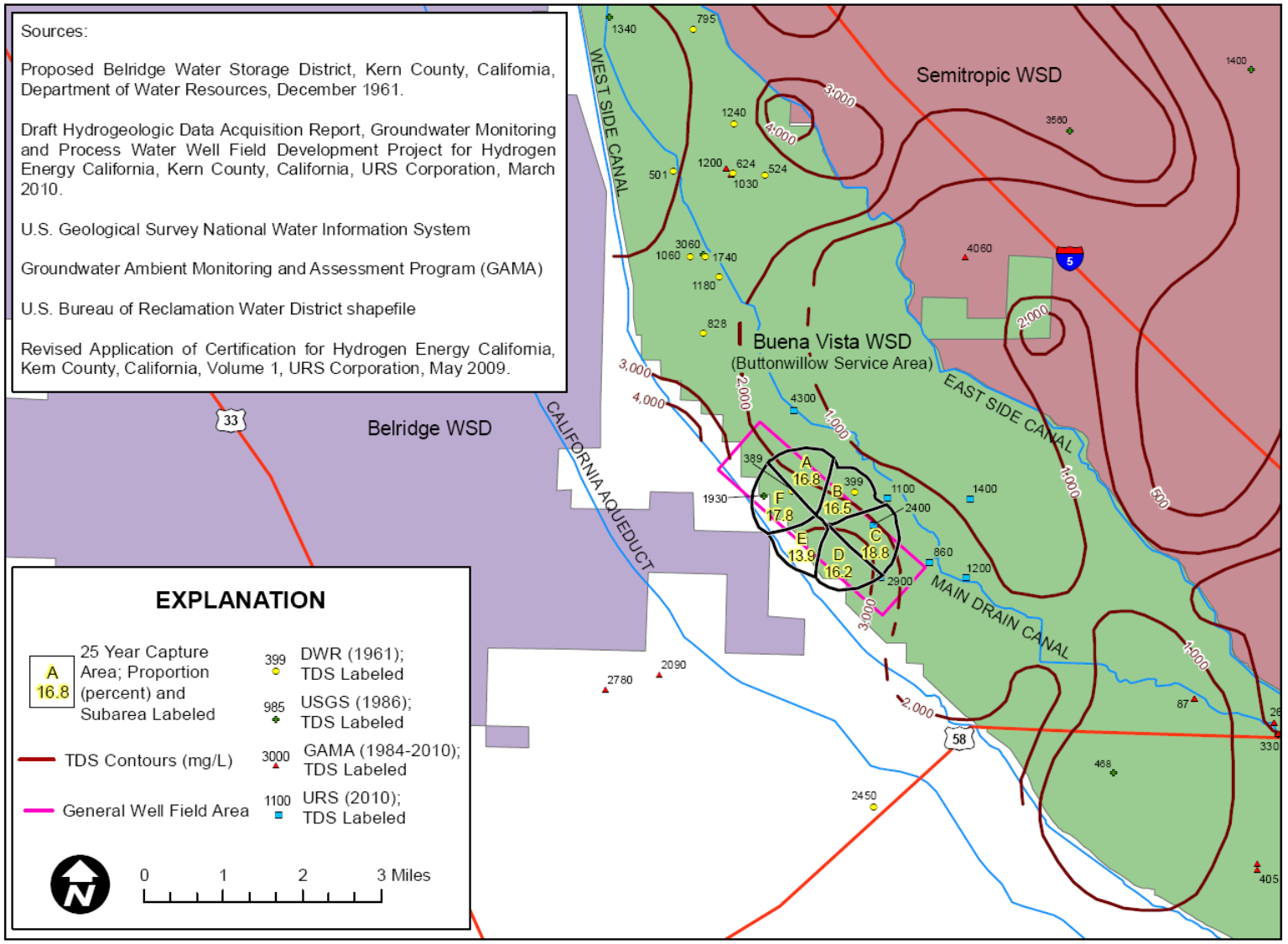
- How can project ensure use of poor water?
- Can project minimize water use?
- What mitigation is available for overdraft?
- Can any alternative water supplies be considered?

WATER Figure 2: Brackish Groundwater Remediation Project



Buttonwillow Service Area


Extraction Wells
Fresh Water
Interface reaching
the well
Initial base of fresh water
Brackish Water



Water Figure 18. Composite 1970-2007 TDS concentration contours and 25-year Zone of Influence (ZOI) simulated by the applicant model.

Land Use

Jonathan Fong, Land Use Specialist

Preliminary Staff Assessment (PSA) Conclusions

- **HECA**
- The project would permanently convert approximately 492 acres of prime farmland and farmland of statewide importance. Staff is recommending conditions of certification mitigate this impact.

- Electrical generating facilities and chemical manufacturing for "agricultural use only" are conditionally permitted land uses within the Exclusive Agricultural Zone.

- **OEHI Component**
- The OEHI EOR component would be consistent with LORS and would not result in significant direct, indirect, or cumulative adverse land use impacts.

Land Use

Jonathan Fong, Land Use Specialist

- **PSA Outstanding Issues**

To determine project compliance with county LORS and to determine land use compatibility:

- The project applicant is also required to submit to Kern County an application for cancellation of Williamson Act contracts for the rail spur lands.
- Staff will need to determine land use compatibility findings for conditionally permitted uses can be made for HECA:

A. The proposed use is consistent with the goals and policies of the applicable General or Specific Plan.

B. The proposed use is consistent with the purpose of the applicable district or districts.

C. The proposed use is listed as a use subject to a conditional use permit in the applicable zoning district or districts or a use determined to be similar to a listed conditional use in accordance with the procedures set out in Sections 19.08.030 through 19.08.080 of this title.

D. The proposed use meets the minimum requirements of this title applicable to the use.

E. The proposed use will not be materially detrimental to the health, safety, and welfare of the public or to property and residents in the vicinity.

Cultural Resources

Gabriel Roark, MA and Elizabeth A. Bagwell, PhD, RPA

Analysis conducted and discussed in PSA/DEIS for **HECA**:

- Prehistoric – 18 resources, impacts unknown
- Multi-component – 2 resources, impacts unknown
- Ethnographic – no resources identified
- Historic Archaeology – 1 resource, impacts unknown
- Historic Built-Environment – 23 resources, 2 eligible, impacts less-than-significant

Analysis conducted and discussed in PSA/DEIS for **OEHI**:

- Prehistoric – More than 5 resources, impacts unknown
- Ethnographic – no resources identified
- Historic Archaeology – # of resources unknown, impacts unknown
- Historic Built-Environment – # of resources unknown but includes a historic landscape, a road, WII era sites, and water control structures, impacts unknown

Cultural Resources

Gabriel Roark, MA and Elizabeth A. Bagwell, PhD, RPA

Discussion points and information required to complete staff analysis in FSA/FEIS:

- Geoarchaeological Results
- Presence/Absence or XPI Test Excavation
- Potential effects of proposed mitigation measures/conditions
- Identification Efforts in the EOR component
  - Complete records search map and results not provided per DR A85-86
  - Pedestrian survey appears incomplete and maps are missing information
  - The report does not adequately describe or evaluate identified cultural resources
  - Additional supporting information is missing from the report

Cultural Resources

Gabriel Roark, MA and Elizabeth A. Bagwell, PhD, RPA

Discussion points and information required to complete staff analysis in FSA/FEIS (continued):

- DRs A85–88 and A141–144—Adequacy of the Technical Report (continued)
  - Stantec's finding that archaeological site P-15-6776 does not extend into the project area (contrary to Stantec's 2011 reporting) is inadequately supported because it relies on surface evidence alone
  - The report does not substantiate statements that archaeological site Stantec-1 and Wells #113-27S and #59-27S can be avoided during construction of the proposed project
  - Figure 4 shows archaeological site HECA-11 to be in or adjacent to the proposed CO2 pipeline corridor; this resource is not discussed in the report.
  - Critically, the centerline of the proposed CO2 pipeline corridor is located 250 feet east of the alignment depicted in the Department of Energy and Energy Commission's defined project area, as well as previous mapping by URS
  - The report does not discuss indirect or cumulative impacts

Socioeconomics

Lisa Worrall, Socioeconomics Specialist

Preliminary Staff Assessment (PSA) Conclusions for Socioeconomics

- The HECA and OEHI EOR component would not result in significant direct, indirect, or cumulative adverse socioeconomic impacts on project area housing, schools, law enforcement services, and parks.
- The project would not induce substantial population growth, displacement of population, or demand for housing and public services.
- The project would result in substantial economic benefits, including employment opportunities and revenue to local governments.

Socioeconomics

Lisa Worrall, Socioeconomics Specialist

Project Area Demographics:

Demographics show there is an environmental justice population in the project buffer; therefore, staff in the following 13 technical areas consider project impacts to this population:

Air Quality, Hazardous Materials Management, Land Use, Noise and Vibration, Public Health, Socioeconomics, Soils and Surface Water Resources, Water Supply, Traffic and Transportation, Transmission Line Safety and Nuisance, Visual Resources, Cultural Resources, and Waste Management.

HECA and OEHI Project Buffer-

- Minority population accounts for 51 percent (1,850) of the total population (3,663) in the project buffer.
- Approximately 21 percent of the 1,390 people in the combined census tracts intersecting the project buffer area for whom poverty status is determined, lived below the federal poverty threshold* between 2007 and 2011.

*According to the 2011 Poverty Thresholds published by the US Census Bureau, the poverty threshold for a single person household who is under 65 years of age is $11,702. The threshold for a family of four with two dependent children was $22,811.

Socioeconomics

Lisa Worrall, Socioeconomics Specialist

Demographics for Wasco, California-

- Minority population accounts for 86 percent (21,856) of the total population (25,544) in the city of Wasco.
- Approximately 27 percent of the 19,153 people in the city of Wasco for whom poverty status is determined, lived below the federal poverty threshold between 2007 and 2011.

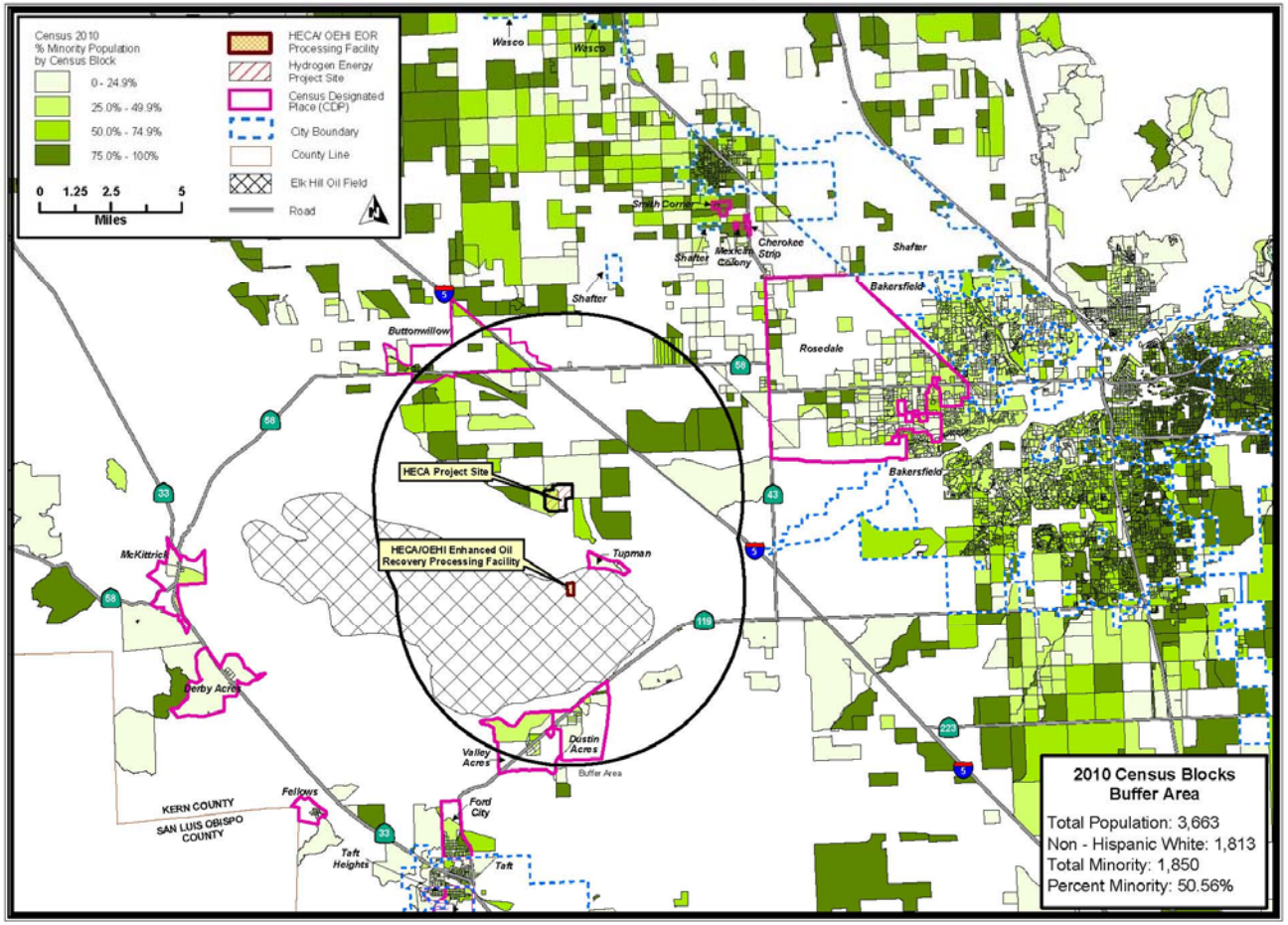
The demographics for Wasco show there is an environmental justice population, so staff from the 13 technical areas will consider impacts to this environmental justice population in the FSA.

Socioeconomics

Lisa Worrall, Socioeconomics Specialist

SOCIOECONOMICS - FIGURE 1

Hydrogen Energy California - Census 2010 Minority Population by Census Block



CALIFORNIA ENERGY COMMISSION, ENERGY FACILITIES SITING DIVISION

SOURCE: California Energy Commission, URS - Census 2010 PL 94-171 Data

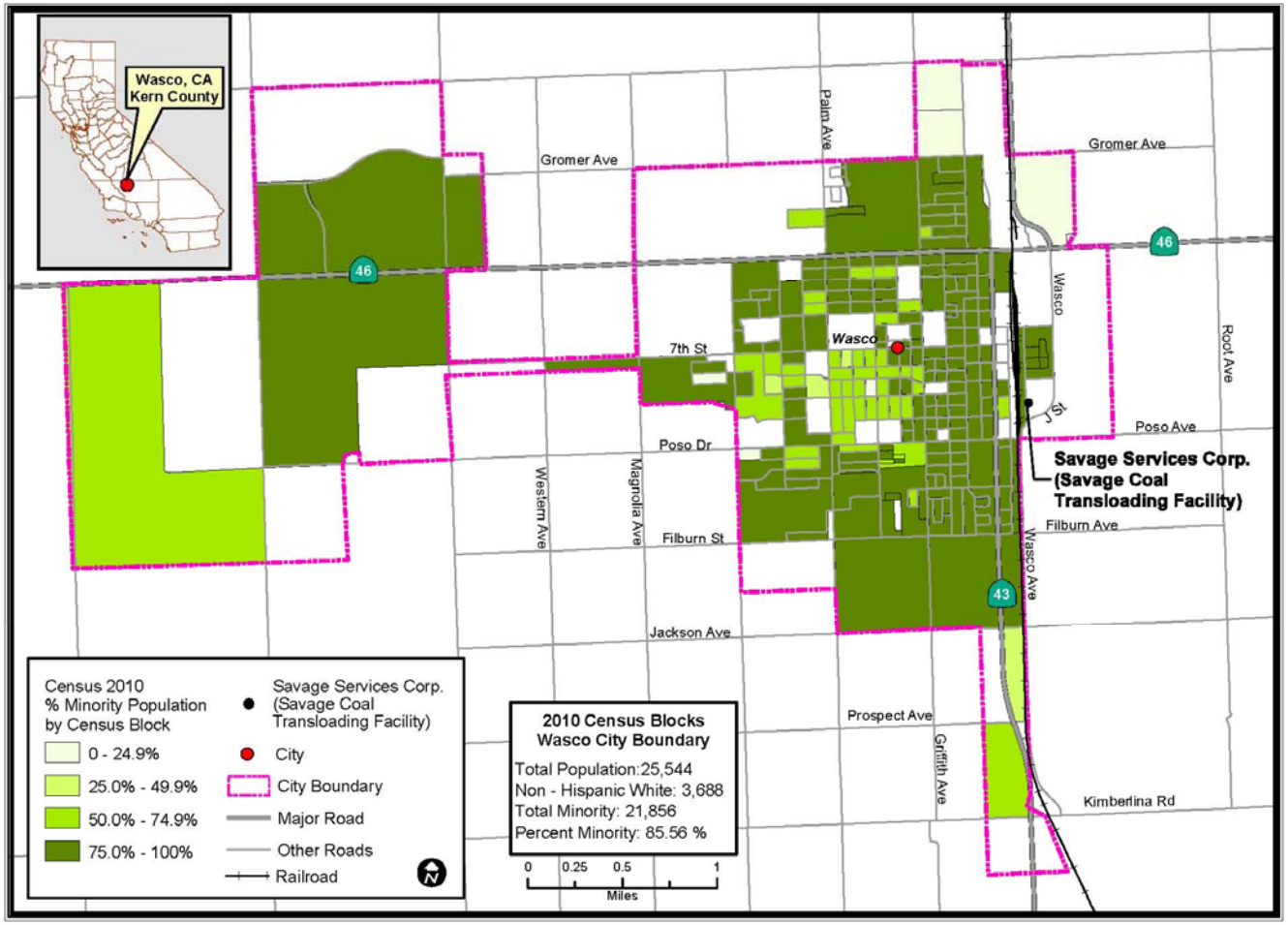
SOCIOECONOMICS

Socioeconomics

Lisa Worrall, Socioeconomics Specialist

SOCIOECONOMICS - FIGURE 2

Hydrogen Energy California - Census 2010 Minority Population by Census Block - City of Wasco



CALIFORNIA ENERGY COMMISSION, ENERGY FACILITIES SITING DIVISION

SOURCE: California Energy Commission, URS - Census 2010 PL 94-171 Data

SOCIOECONOMICS

Socioeconomics

Lisa Worrall, Socioeconomics Specialist

Project Construction for HECA:

- 49-month construction period
- Peak workforce of 2,461 workers
- Average workforce of 1,160 workers during 49-month construction period

Project Operations for HECA:

- Annual average of 200 full-time permanent employees

Project Construction for OEHI:

- 20-year construction period
- Peak workforce of 385 workers
- OEHI currently employs approx. 345 workers and 2,650 contract personnel in the Elk Hills Oil Field.
- EOR component could require up to 240 new workers

Project Operations for OEHI:

- 25 operations jobs

Socioeconomics

Lisa Worrall, Socioeconomics Specialist

HECA and OEHI Construction Estimated Fiscal Benefits

- $3.15 billion- total construction costs
- $1.37 billion- labor costs
- $1.78 billion- non-labor expenditures
- Sales and use tax based on construction spending on materials, equipment, and fixtures accrued to the community designated as the "point of sale" or "point of first use" for each transaction.

Condition of Certification SOCIO-1 is proposed to require a good faith effort to ensure the receipt of sales and use tax revenue in the unincorporated area of the Kern County

HECA and OEHI Operation Estimated Fiscal Benefits

- $30 million in direct labor income
- 30 percent of all materials and supply purchases would occur within Kern County
- Sales and use tax based on operations spending on materials, equipment, and fixtures
- $28.7 million in annual property tax revenue for HECA without the rail spur
- $28.9 million in annual property tax revenue for HECA with the rail spur
- Cannot estimate property tax revenue for the OEHI EOR component

Visual Resources

Elliott Lum, Visual Resources Specialist

Preliminary Staff Assessment (PSA) Conclusions

- **HECA**
  - Staff has determined that project impacts at KOP 2, KOP 3, KOP 4, KOP 5, and KOP 6 would not cause substantial degradation of the existing visual character of the site and its surroundings at these five KOPs. However, as the project would cause substantial degradation of the existing visual character of the site and its surroundings at KOP 1, a significant impact to visual resources is identified at KOP 1 (located on Station Road, approximately 2,600 feet east of the middle of the HECA project site).

- **OEHI Component**
  - Staff determined that the impacts at KOP 1, KOP 2, KOP 3, KOP 4, KOP 5, and KOP 6 did not meet or exceed the criterion set forth in the discussion above. Therefore, the project would not cause substantial degradation of the existing visual character of the site and its surroundings at these six KOPs.

Visual Resources

Elliott Lum, Visual Resources Specialist

- **Other Project-related Impacts**
  - Less Than Significant Impact (with implementation of Conditions of Certification VIS-1, VIS-2, VIS-3, VIS-4, VIS-5, and VIS-6)
    - Construction
    - Railroad Spurs
    - Electrical Transmission Lines
    - Visible Water Vapor Plumes
    - Light/Glare/Flare

- **Cumulative Impacts**
  - Although a significant visual impact has been identified at KOP 1 (HECA), there are no other probable future projects within the VSOI that, in conjunction with the significant impact at KOP 1, would cause a cumulatively considerable impact to visual resources.

- **LORS**
  - Project is compliant with all relevant LORS except for Kern County General Plan, Land Use, Open Space, and Conservation Element, 1.8 Industrial, Policy 7 (i.e. screening for industrial uses).

Visual Resources

Elliott Lum, Visual Resources Specialist

Outstanding Issue(s)/Request(s)

- Staff requests the following information from the applicant to perform a comprehensive visual analysis for the Final Staff Assessment:
  - Proposed, off-site visual mitigation plan at the properties located at KOP 1 (the intersection of Station Road and Tule Park Road). Please see PSA, HECA KOP 1, Visual Impact Determination, Paragraph three for more information.