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5.12 HAZARDOUS MATERIALS HANDLING

Hydrogen Energy International LLC (HEI or Applicant) is jointly owned by BP Alternative Energy North America Inc. and Rio Tinto Hydrogen Energy LLC. HEI is proposing to build an Integrated Gasification Combined Cycle power generating facility called Hydrogen Energy California (HECA or Project) in Kern County, California. The Project will produce low-carbon baseload electricity by capturing carbon dioxide (CO_2) and transporting it for CO_2 enhanced oil recovery (EOR) and sequestration (storage)[1].

The 473-acre Project Site is located approximately 7 miles west of the outermost edge of the city of Bakersfield and 1.5 miles northwest of the unincorporated community of Tupman in western Kern County, California, as shown in Figure 2-1, Project Vicinity. HEI is also acquiring an additional 628 acres of land adjacent to the Project Site, herein referred to as "Controlled Area" (see Figure 2-4, Site Plan). HEI will own this property and have control over public access and future land use. For the purposes of this analysis, "Property" referred to in this section includes both the Project Site and the Controlled Area.

The Project Site is near a hydrocarbon-producing area known as the Elk Hills Field. The Project Site is currently used primarily for agricultural purposes. Existing surface elevations vary from about 282 feet to 291 feet above mean sea level.

The Project will gasify petroleum coke (petcoke) (or blends of petcoke and coal, as needed) to produce hydrogen to fuel a combustion turbine operating in combined cycle mode. The Gasification Block feeds a 390-gross-megawatt (MW) combined cycle plant. The net electrical generation output from the Project will provide California with approximately 250 MW of low-carbon baseload power to the grid. The Gasification Block will also capture approximately 90 percent of the carbon from the raw syngas at steady-state operation, which will be transported to the Elk Hills Field for CO_2 EOR and Sequestration. In addition, approximately 100 MW of natural gas generated peaking power will be available from the Project.

The Project Site and linear facilities comprise the affected study area and are entirely located in Kern County, California. These Project components are described below.

Major on-site Project components will include, as shown on Figure 2-5, Preliminary Plot Plan:

- Solids Handling, Gasification, and Gas Treatment
  - Feedstock delivery, handling and storage
  - Gasification
  - Sour shift/gas cooling
  - Mercury removal
  - Acid gas removal

[1] This carbon dioxide will be compressed and transported via pipeline to the custody transfer point at the adjacent Elk Hills Field, where it will be injected. The CO_2 EOR process involves the injection and reinjection of carbon dioxide to reduce the viscosity and enhance other properties of the trapped oil, thus allowing it to flow through the reservoir and improve extraction. During the process, the injected carbon dioxide becomes sequestered in a secure geologic formation. This process is referred to herein as CO_2 EOR and Sequestration.

- Power Generation
  - Combined-cycle power generation
  - Auxiliary combustion turbine generator
  - Electrical switching facilities

- Supporting Process Systems
  - Natural gas fuel systems
  - Air separation unit (ASU)
  - Sulfur recovery unit/Tail Gas Treating Unit
  - Zero liquid discharge (ZLD) units for process and plant waste water streams
  - Carbon dioxide compression
  - Raw water treatment plant
  - Other plant systems

The Project also includes the following offsite facilities, as shown on Figure 2-6, Project Location Map:

- **Electrical Transmission Line –** An electrical transmission line will interconnect the Project to Pacific Gas & Electric's (PG&E) Midway Substation. Two alternative transmission line routes are proposed; each alternative is approximately 8 miles in length.

- **Natural Gas Supply –** A natural gas interconnection will be made with PG&E or SoCalGas natural gas pipelines, each of which are located southeast of the Project Site. The natural gas pipeline will be approximately 8 miles in length.

- **Water Supply Pipelines –** The Project will utilize brackish groundwater supplied from the Buena Vista Water Storage District (BVWSD) located to the northwest. The raw water supply pipeline will be approximately 15 miles in length. Potable water for drinking and sanitary use will be supplied by West Kern Water District to the southeast. The potable water supply pipeline will be approximately 7 miles in length.

- **Carbon Dioxide Pipeline –** The carbon dioxide pipeline will transfer the carbon dioxide captured during gasification from the Project Site southwest to the custody transfer point. Two alternative carbon dioxide pipeline routes are proposed; each alternative will be approximately 4 miles in length.

The Project components described above are shown on Figure 2-8, Project Location Details, which depicts the region, the vicinity, the Project Site and its immediate surroundings.

All temporary construction equipment laydown and parking, including construction parking, offices, and construction laydown areas, will be located on the Project Site.

This section presents a discussion of the potential impacts from storage and use of hazardous materials during construction and operational phases of the Project. Design features have been incorporated into the Project regarding the use of hazardous materials, specifically storage procedures, in order to keep maximum potential impacts below defined thresholds of significance. Hazardous waste generation and waste management practices for the Project are further discussed in Section 5.13, Waste Management.

The discussion below includes the existing conditions; the environmental consequences associated with hazardous materials usage during construction and operation of the Project; cumulative impacts; mitigation measures; and applicable laws, ordinances, regulations, and standards (LORS). Appendix L, Hazardous Materials Technical Analysis, provides additional data supporting this analysis. Additionally, Appendix E, Carbon Dioxide Technical Report, provides data relating to the evaluation for carbon dioxide performed for the Project.

5.12.1 Affected Environment

The Project Site is currently used for farming purposes, including cultivation of cotton, alfalfa, and onions. As discussed in Section 5.4 (Land Use), the Project Site is located in an area zoned Exclusive Agriculture (A). Land within the Controlled Area to the northwest of the Project Site is currently used for residential purposes, grain storage, and organic fertilizer production. The remaining portions of the Controlled Area are currently used for farming purposes.

Adjacent land uses consist of Adohr Road and agricultural uses to the north; Tupman Road and agricultural uses to the east; agricultural uses and an irrigation canal to the south; and a residence, structures (used for grain storage and organic fertilizer production), agricultural uses, and Dairy Road right-of-way to the west. The land adjacent to the northwestern corner of the Project Site contains the Port Organics Products, LTD natural fertilizer manufacturing plant, farming operations, and a residence.

The West Side Canal, Kern River Flood Control Channel, and California Aqueduct are located approximately 500 feet, 700 feet, and 1,900 feet, respectively, to the south of the Project Site. The land southwest of the California Aqueduct is used for mineral and petroleum purposes. The Elk Hills Field is located approximately 1 mile south of the Project Site.

Sensitive receptors (e.g., schools, hospitals, playgrounds, daycare centers, residences, etc., as defined by California Accidental Release Prevention (CalARP) 19 Code of California Regulations (CCR) §2735.3, were not identified within the Project Site. Two residences were found in the immediate vicinity of the Project Site boundary (one residence located approximately 375 feet to the north of the Project Site, and one residence located approximately 1,400 feet east of the Project Site along Station Road). See Section 5.6, Public Health, for additional information on sensitive receptors. For a detailed description of the Project features, see Section 2.0, Project Description.

5.12.2 Environmental Consequences

The criteria used at the Project were evaluated based on the Environmental Checklist Form of the California Environmental Quality Act (CEQA) guidelines and on standards and thresholds adopted by the relevant agencies involved with this Application for Certification (AFC). Accordingly, the Project may result in a significant impact if it will:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.

- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.

- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within 0.25 mile of an existing or proposed school.

- Be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code §65962.5, and as a result, create a significant hazard to the public or environment.

- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.

5.12.2.1 Construction Phase

Hazardous materials to be used during construction include gasoline, diesel fuel, oil, and lubricants, as well as minimal amounts of cleaners, solvents, adhesives, and paint materials. No Acutely Hazardous Materials (AHMs) will be used or stored on site during construction, and no storage of hazardous materials will occur outside of the Project Site. A summary of hazardous materials to be used and stored for construction is provided in Tables 5.12-1, Hazardous Materials Usage and Storage During Construction Based on Title 22 Hazardous Characterization, and 5.12-2, Hazardous Materials Usage and Storage During Construction Based on Material Properties. These tables identify hazardous materials that will be used during constructions based on Title 22 characteristic criteria, and based on the properties of the substance itself.

A Hazardous Materials Business Plan (HMBP) will be prepared prior to construction activities, and will outline hazardous materials handling, storage spill response, and reporting procedures. In accordance with the HMBP, construction contractors will be responsible for demonstrating that the use, storage, and handling of these materials are in compliance with applicable LORS, including licensing, personnel training, accumulation limits, reporting requirements, and recordkeeping. Each construction contractor will also be responsible for maintaining a set of Material Safety Data Sheets (MSDSs) for each on-site chemical they use, and construction workers will be made aware of their location and contents.

The following site services will be provided either by separate contract or incorporated into individual construction subcontracts for the Project:

- Environmental health and safety training;
- Site security;
- Site first aid;
- Construction testing (e.g., soil, concrete);
- Furnishing and servicing of sanitary facilities;
- Trash collection and disposal; and
- Disposal of hazardous materials and waste in accordance with applicable LORS.

Table 5.12-1
Hazardous Materials Usage and Storage During Construction
Based on Title 22 Hazardous Characterization[1]

Material	Hazardous Characteristics[2]	Purpose	Storage Location	Maximum Stored	Storage Type
Diesel Fuel	Ignitability, Toxicity	Refueling construction vehicles and equipment	Laydown Area	2,000 gallons	Tank
Acetylene, Oxygen, Other Welding Gases	Ignitability	Maintenance Welding	Temporary Gas Cylinder Storage Area	2,000 standard cubic feet	Cylinders of various volumes
Lead/Acid and Alkaline Batteries	Corrosivity, Toxicity	Power for Equipment	Warehouse/ Shop Area	<50 units	Unit
Paints, Solvents, Adhesives, Resins, Cleaning Acids, etc.	Toxicity, Ignitability, Corrosivity	Painting and Paint Removal, general construction activities	Temporary Chemical Storage Area	200 gallons/ week	Drum
Gasoline	Ignitability, Toxicity	Refueling Construction Vehicles and Equipment	Warehouse/ Shop Area	2,000 gallons/ week	Tank

Source: HECA Project.

Notes:
[1] All numbers are approximate
[2] Hazardous characteristics identified per California Code of Regulations Title 22 §§66261.20 et seq., for hazardous wastes

Table 5.12-2
Hazardous Materials Usage and Storage During Construction
Based on Material Properties[1]

Material	Potential Hazardous Characteristics[2]	Purpose	Storage Location	Maximum Stored	Storage Type
Lubricating Oil	Mildly Toxic	Lubricating Equipment Parts	Laydown area	200 gallons	Tanks
Cleaning Chemicals/ Detergents	Toxic, Irritant	Periodic Cleaning	Contained in storage tanks on equipment skids	1,000 pounds	Tanks and containers or equipment

Source: HECA Project.

Notes:
[1] All numbers are approximate
[2] Potential hazardous characteristics based on material properties and potential health hazards associated with those properties

Contractors will be expected to implement best management practices (BMP) consistent with hazardous materials storage, handling, emergency spill response, and reporting specified in the HMBP. These BMPs will include provisions for spill protection for non-hazardous materials (such as lube oils), which will also be handled and stored on site during construction. The most probable accidents involving hazardous materials during construction might occur from small-scale spills during cleaning, or use of other materials in the storage areas, or during refueling of equipment. Such materials generally have a low relative risk to human health and the environment. Such spills will be immediately cleaned up, and materials containing hazardous substances will be properly disposed in accordance with the HMBP and BMPs.

If there is a large spill, the spill area will be bermed or controlled as quickly as practical to minimize the footprint of the spill in accordance with the HMBP and BMPs. Contaminated soil materials produced during cleanup of a spill will be stored, transported, and disposed of in accordance with applicable LORS. If a spill or leak into the environment involves hazardous materials equal to or greater than the specific reportable quantity, federal, state, and local reporting requirements will be adhered to. In particular, the County of Kern Environmental Health Services Department (EHSD) will be notified. The Kern County Fire Department (KCFD) will also be notified in the event of a fire or injury.

Impacts associated with the use of hazardous materials during construction would be less than significant as a result of the Applicant implementing the above procedures and Mitigation Measures HAZMAT-1 through HAZMAT-4, as discussed in Section 5.12.4, Mitigation Measures.

5.12.2.2 Operations Phase

A summary of hazardous materials to be used and stored on site for operation of the Project is provided in Tables 5.12-3, Hazardous Materials Usage and Storage During Operations Based on Title 22 Hazardous Characterization, and 5.12-4, Hazardous Materials Usage and Storage During Operations Based on Material Properties. These tables present materials that will be used during regular plant operations that may be characterized as hazardous based on Title 22 criteria or on the materials' properties.

Fire and Explosion Risks

Natural Gas

Natural gas, which will be used as a startup and backup fuel for the Project, poses a fire and/or explosion risk as a result of its flammability. U.S. Department of Transportation (DOT) rules govern gas pipeline operations to reduce the fire and explosion risk.

For the Project, natural gas will be used to start up and load the combustion turbine to the point where hydrogen-rich fuel can be used. Natural gas will also serve as a backup fuel to allow electric power generation to continue when hydrogen-rich fuel is not available. Natural gas is to be used for flare pilots, startup of the sulfur recovery unit (SRU), pilot gas, auxiliary boiler, auxiliary combustion-turbine generator (CTG), and support fuel for the SRU tail gas thermal oxidizer. Natural gas will also be used to preheat the gasifier refractory. The natural gas supply tie-in will be located on the southeast of the Project Site.

Two large natural-gas pipeline systems appear to be potentially suited to supply natural gas to the power plant site. They are Southern California Gas Company and Pacific Gas and Electric Company (PG&E). The distance between the main pipeline system headers and the Project Site is approximately 8 miles. Natural gas will not be stored on site.

Table 5.12-3
Hazardous Materials Usage and Storage During Operations
Based on Title 22 Hazardous Characterization[1]

Material	Hazardous Characteristics[2]	Purpose	Storage Location	Maximum Stored	Storage Type
Sodium Hydroxide	Corrosivity	Plant Wastewater ZLD, Sour Water Treatment, Gasification, Caustic Scrubber	Outdoor	60,000 gallons (5 to 50 wt% NaOH)	Carbon steel AST with secondary containment
Molten Sulfur	Ignitability, Reactivity	By-product for sale	Outdoor	150,000 gallons	Two sulfur pits constructed of compatible material
Methanol	Ignitability	Gasifier startup-fuel AGR solvent make-up	Outdoor	550,000 gallons	1 × 300,000 gal AST with secondary containment + 250,000 gal contained in process vessels of AGR
Compressed Gases (Ar, He, H_2)	Ignitability	Lab	Indoor	Minimal	Cylinders of various volumes
Chemical Reagents (acids/bases/ standards)	Corrosivity, Reactivity	Lab	Indoor chemical storage	<5 gallons	Small original containers
Flammable/ Hazardous Gases (H_2, CO, H_2S), Syngas and Hydrogen-Rich Gas	Ignitability, Toxicity	Primary power generation fuel	Process piping/ vessels	In process quantities only, no storage on site	None
Miscellaneous Industrial Gases – Acetylene, Oxygen, Other Welding Gases, Analyzer Calibration Gases	Ignitability, Toxicity	Maintenance Welding/ Instrumentation Calibration	Gas cylinder Storage in Shop/ instrument shelters	Minimal	Cylinders of various volumes
Natural Gas	Ignitability	Startup/Backup / Auxiliary Fuel	Supply piping only	Utility supply on demand via pipeline	None
Diesel Fuel	Ignitability	Emergency generator/fire water pump fuel	Outdoor	2,000 gallons	ASTs with secondary containment
Aqueous ammonia	Reactivity, Toxicity	Emissions control (SCR), Gasifier pH control	Outdoor	20,000 gallons (19 wt%)	Pressurized horizontal AST within a secondary containment berm, filled with HDPE poly balls (floating cover)

Table 5.12-3
Hazardous Materials Usage and Storage During Operations
Based on Title 22 Hazardous Characterization[1] (Continued)

Material	Hazardous Characteristics[2]	Purpose	Storage Location	Maximum Stored	Storage Type
Sulfuric Acid	Corrosivity, Reactivity, Toxicity	Plant Wastewater ZLD	Outdoor	2,000 gallons	AST with secondary containment
Sulfuric Acid	Corrosivity, Reactivity, Toxicity	Cooling water, BFW pH control	Outdoor	12,000 gallons	AST with secondary containment
Paint, Thinners Solvents, Adhesives, etc.	Ignitability, Toxicity	Shop / Warehouse	Indoor chemical storage area	<20 gallons	Small original containers
Boiler Feedwater Chemicals (e.g., Carbonic Dihydrazide, Morpholine, Cyclohexamine, Sodium Sulfite)	Corrosivity	Boiler feedwater pH/corrosion / dissolved oxygen/biocide control	Outdoor chemical storage area	<500 gallons	Small original containers
Hydrogen	Ignitability	STG & CTG generator cooling	Outdoor	29,000 standard cubic feet	Pressurized multi-tube trailer
CTG and HRSG Cleaning Chemicals (e.g., HCl, Citric Acid, EDTA Chelant, Sodium Nitrate)	Toxic, Reactive	HRSG Chemical Cleaning	Stored off site or temporarily on site	Intermittent cleaning requirement/temp storage only	Small original containers

Source: HECA Project.

Notes:

1 All numbers are approximate.
2 Hazardous characteristics identified per California Code of Regulations Title 22 §§66261.20 *et seq*., for hazardous wastes.

% = percent
< = less than
AGR = acid gas removal
Ar = argon
AST = aboveground storage tank
BFW = boiler feed water
CO = carbon monoxide
CTG = combustion turbine generator
EDTA = ethylene diamine tetra-acetic acid
H_2 = hydrogen
H_2S = hydrogen sulfide
HCl = hydrochloric acid
He = helium
HRSG = heat recovery steam generator
HDPE = high-density polyethylene
SCR = selective catalytic reduction
NaOH = sodium hydroxide
NO_x = nitrogen oxide
STG = steam turbine generator
wt% = percent by weight
ZLD = zero liquid discharge

Table 5.12-4
Hazardous Materials Usage and Storage During Operations
Based on Material Properties[1]

Material	Potential Hazardous Characteristics[2]	Purpose	Storage Location	Maximum Stored	Storage Type
Methyldiethanol amine	Mild Irritant, Mildly Toxic	Solvent for sulfur removal	TGTU – in process inventory plus outdoor storage	220,000 pounds (40 wt % solution)	Contained in process vessels of TGTU, AST
Sodium Hypochlorite	Corrosivity, Reactivity	Raw Water Treatment and Cooling Tower biological control	Outdoor	7,000 gallons	Polyethylene ASTs with secondary containment
Ammonium Lignosulfonate	Mild Irritant	Slurry Prep Bldg for maintaining % solids in slurry	Indoor	63,000 gallons	ASTs with secondary containment
Combustion Turbine Wash Chemicals (specialty detergents and surfactants)	Toxic, Irritants	Combustion Turbine Cleaning	Chemicals are contractor provided and are either not stored on site or are stored only temporarily in a chemical storage area.	Intermittent use/cleaning by contractor	Small original containers
Water Treatment Chemicals	Irritant, Mildly Toxic	Raw water, demineralized water, and cooling water treatment	Indoor chemical storage area	<500 gallons	Drums or ASTs
Oxygen (95%), liquid	Oxidizer	Gasification, SRU	Outdoor	1,200 tons	AST within the ASU
Nitrogen[3]	Asphyxiant	Syngas fuel diluent for NO_x control, inert gas	Outdoor	50 tons	AST within the ASU
Cooling Water Chemical Additives (e.g., Magnesium Nitrate, Magnesium Chloride)	Mild Irritant, Mildly Toxic	Corrosion Inhibitor/ Biocides	Outdoor chemical storage area near each cooling tower	<500 gallons	Small quantities in original containers
Diethylene glycol monobutyl ether (industrial cleaner)	Basic Compound, Toxic, Mild Irritant	Routine cleaning, degreasing, oxygen pipeline cleaning	Indoor	None	Temporary storage as needed provided by contractor

Table 5.12-4
Hazardous Materials Usage and Storage During Operations
Based on Material Properties[1] (Continued)

Material	Potential Hazardous Characteristics[2]	Purpose	Storage Location	Maximum Stored	Storage Type
Compressed Carbon Dioxide Gas[3]	Asphyxiant	Generator purging and fire protection	Outdoor	50,000 standard cubic feet for purging	Carbon dioxide, for fire suppression, stored in pressurized cylinders or tank
Propylene Glycol	Mild Irritant	Heat Transfer Fluid	Closed-Loop Cooling System	<300 gallons (100 vol. % solution)	4 × ~55 gallon drum or ASTs
Propylene Glycol	Mild Irritant	Heat Transfer Fluid	Closed Loop Cooling System -In process inventory	25,000 gallons (45 vol. % solution)	Contained in process equipment
Sodium Bisulfite	Irritant, Mildly Toxic	Raw Water Treatment	Indoor chemical storage area	<500 gallons	Drums or ASTs
Sodium Phosphate	Irritant, Mildly Toxic	Raw Water Treatment, Gasification, Plant Wastewater ZLD	Indoor chemical storage area	1,500 gallons	AST with secondary containment

Notes:
[1] All numbers are approximate
[2] Potential hazardous characteristics based on material properties and potential health hazards associated with those properties
[3] Nitrogen and carbon dioxide are not hazardous materials but may be asphyxiants under some circumstances

% = percent
< = less than
AGR = acid gas removal
Ar = argon
AST = aboveground storage tank
BFW = boiler feed water
CO = carbon monoxide
CTG = combustion turbine generator
CCW = closed cooling water system
EDTA = ethylene diamine tetra-acetic acid
H_2 = hydrogen
H_2S = hydrogen sulfide
HCl = hydrochloric acid
He = helium
HRSG = heat recovery steam generator
HDPE = high density polyethylene
SCR = selective catalytic reduction
NaOH = sodium hydroxide
NO_x = nitrogen oxide
SO_2 = sulfur dioxide
SRU = sulfur recovery unit
STG = steam turbine generator
TGTU = tail gas treating unit
wt% = percent by weight
ZLD = zero liquid discharge

The risk of a fire and/or explosion will be minimized through adherence to applicable codes and design features, including isolation valves and the continued implementation of effective safety management practices. With the implementation of standard operating procedures (SOP) and BMPs, based on Occupational Safety and Health Administration (OSHA) and DOT regulatory requirements, the potential impacts from the use of natural gas would be less than significant.

Syngas and Hydrogen

The Project will generate (but not store) syngas consisting mainly of water, carbon monoxide, carbon dioxide, hydrogen, hydrogen sulfide, nitrogen, and argon. The Project will use a hydrogen-cooled generator and store 29,000 standard cubic feet (scf) of compressed hydrogen gas in a pressurized multi-tube trailer.

Hydrogen, carbon monoxide, and hydrogen sulfide may pose a fire and/or explosion risk as a result of flammability. Section 5.12.2.3, Off-site Consequence Analysis (OCA), provides a worst-case release scenario analysis for the hazardous components of syngas. As discussed in Section 5.12.2.3 and Appendix L, Hazardous Materials Technical Analysis, the potential off-site impacts related to accidental worst-case hydrogen and syngas release would be less than significant. Furthermore, the risk of a fire and/or explosion will be minimized through adherence to applicable LORS and codes, design features, and safety management practices specified in the HMBP.

Oxygen

The gasification process requires high-pressure, high-purity oxygen (95 percent by volume). The oxygen is supplied from the ASU, which separates and purifies oxygen from the ambient air. The ambient air is filtered, compressed, dried, cooled to cryogenic temperatures, and separated into nitrogen and oxygen products. The oxygen is sent to the gasifier and the SRU as one of the feeds. The potential impacts presented by the use of oxygen will be less than significant through the adherence to applicable LORS and codes, design features, and safety management practices specified in the HMBP.

Methanol

The Project will use methanol in the process unit, which will be stored in a single 300,000-gallon AST with secondary containment. An additional 250,000 gallons of methanol will also be contained within process vessels, equipment, and piping of the of AGR unit. This process inventory is geographically remote from the 300,000-gallon AST, and a pump and isolation valve are placed on the piping between the storage tank and the AGR unit, isolating the AST and AGR unit. Methanol is considered to be a hazardous substance due to its flammable and moderately toxic chemical properties. Methanol is listed in the following federal regulations:

- 29 CFR 1910.1200 (OSHA)
- 40 CFR 116 and 40 CFR 117 (USEPA)
- 40 CFR 355, Appendices A and B (USEPA)
- 40 CFR 372 (Superfund Amendments and Reauthorization Act [SARA] Title III)

- 40 CFR 302 (Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA])

Although it is a listed substance, neither federal nor state regulations require an OCA for the use of methanol. However, because of the flammable and explosive characteristic of the substance, the Project performed an OCA for the worst-case release scenario to assess the potential consequences of such an event, and to assess the need for appropriate controls and mitigation measures for the Project. Because methanol is a flammable substance, the most severe hazardous consequence that could be derived from an accidental release would consist of a vapor cloud explosion. The analysis is included in Section 5.12.2.3, Off-site Consequence Analysis, and Appendix L, Hazardous Materials Technical Analysis.

Based upon the foregoing, and as further described in Section 5.12.2.3, the potential impact from the use and storage of methanol by the Project would be less than significant.

Molten Sulfur

The Project Site will store 150,000 gallons of degassed molten sulfur within two below-grade sulfur storage pits, as further described in Section 2.0, Project Description. Both storage pits will be constructed of compatible material and will be structurally sound (free of any cracks or fissures). Sulfur storage pits will be equipped with pressure monitoring equipment and ventilation lines. In addition, sulfur-loading equipment will have a vapor recovery system to control fugitive emissions by returning displaced vapors to the SRU. Therefore, the potential impact from the use and storage of molten sulfur onsite by the Project is expected to be less than significant.

Other Gases

Other gases expected to be stored and used at the site include gases typically used for maintenance activities such as shop welding and emissions monitoring. These gases include small amounts of acetylene, carbon monoxide, and oxygen. The potential impacts presented by the use of these gases are not considered to be significant, based on the following:

- A limited quantity of each gas will be stored at the facility.
- The gases will be stored in DOT-approved safety cylinders, secured to prevent upset and physical damage.
- Incompatible gases (e.g., flammable gases and oxidizers) will be stored separately.
- The gases will be stored in multiple, standard-sized portable cylinders, in contrast to larger cylinders, generally limiting the quantity that may be released from an individual cylinder failure.

For these reasons, the potential impact from use of these gases would be less than significant.

Risk Analysis of Hazardous Materials

In September 1996, Senate Bill (SB) 1889 was enacted to change the California Health and Safety Code (CHSC) §25531 et seq., replacing the Risk Management and Prevention Program requirements with the Risk Management Plan (RMP) requirements established pursuant to Section 112(r) of the federal Clean Air Act (CAA) (42 United States Code [USC] Section 7412). Pursuant to SB 1889, the California Office of Emergency Services (OES) is required to adopt implementing regulations, initially as emergency regulations, and to seek and maintain delegation of the federal program. The CalARP program merges federal and state programs for the prevention of accidental releases of regulated toxic and flammable substances. The goal was to eliminate the need for two separate and distinct chemical risk management programs. The CalARP Phase I Final Regulations were approved on 16 November 1998.

The CalARP program final regulations (CCR Title 19, Division 2, Chapter 4.5) provide two sets of lists of Regulated Substances: (1) Federal Regulated Substances; and (2) State Regulated Substances.

- Section 2770.5 – Tables 1 and 2 of §2770.5 list Federal Regulated Substances and threshold quantities for accidental release prevention, including flammable substances. Ammonia, sulfuric acid, and flammable/hazardous compressed gases (such as hydrogen) are on the list. However, the quantities of these chemicals proposed for use by the Project from construction through operation do not exceed the threshold quantity limits. Therefore, these chemicals as used by the Project are not regulated under the federal program.

- Section 2770.5 – Table 3 of §2770.5 lists State Regulated Substances and threshold quantities for accidental release prevention. Aqueous ammonia, sulfuric acid, and flammable/hazardous compressed gases (such as hydrogen) are on the list. However, the quantities of these chemicals proposed for use by the Project from construction through operation do not exceed the threshold quantity limits, with the exception of aqueous ammonia. Therefore, these chemicals as used by the Project are not regulated under the state program, except for aqueous ammonia.

Aqueous Ammonia

Tables 1 and 3 of CalARP §2770.5 identify the threshold quantities for aqueous ammonia to be 20,000 pounds and 500 pounds, respectively. Aqueous ammonia is only regulated by federal requirements if it is being stored at concentrations greater than 20 percent, while state regulatory requirements are enforced over any volume of aqueous ammonia exceeding the threshold amount, regardless of concentration. The federal requirements are not triggered for the Project because the Project will be using a concentration of 19 percent aqueous ammonia. However, CalARP regulatory requirements (which do not depend on concentration) apply because the Project will store approximately 20,000 gallons of 19 percent aqueous ammonia (28,348 pounds). The Project will comply with CalARP regulatory requirements to develop an RMP, which will be submitted to the County of Kern EHSD.

An OCA was conducted for the Project to determine the extent of impact that may be caused from a worst-case release of ammonia, and to determine the appropriate program classification for the power plant under CalARP (19 CCR §2735.4). See Section 5.12.2.3, Off-Site Consequence Analysis, for the specific modeling parameters, results, and program determination of the OCA.

Based upon the foregoing, and as further described in Section 5.12.2.3, the potential impact from the use and storage of aqueous ammonia by the Project would be less than significant.

Sulfuric Acid

Table 3 of CalARP §2770.5 provides a threshold quantity requirement of 1,000 pounds for sulfuric acid. Even though sulfuric acid exceeds the threshold quantity pursuant to §25532(g)(2) of the HSC, it does not satisfy the other criteria required under the regulations to be considered a CalARP-regulated chemical, because it is not concentrated with greater than 100 pounds of sulfur trioxide to meet the definition of oleum, and/or it is not in a container with flammable hydrocarbons (flash point <730 degrees Fahrenheit [°F]). In summary, the Project will store 12,000 gallons of sulfuric acid within an AST, at ambient temperature, but will not be subject to CalARP requirements because it will not meet the definition of oleum, and will not be stored in a container with flammable hydrocarbons.

While not mandated by the applicable regulations, the hazardous nature of sulfuric acid was evaluated when developing safety measures and procedures for the Project. Sulfuric acid is highly corrosive and will produce toxic gas emissions when in contact with water. The sulfuric acid AST will be made of compatible material, which will not corrode, and the groundcover surrounding the location of the tank will be coated to prevent deterioration of the ground surface in the event of a spill. To prevent any possible spill from entering a wastewater or stormwater drainage system, this area will not contain any drains or drainage. All combustible material will be removed from the location of the tank to prevent any potential combustion. Safety measures will also be implemented at the site to prevent the accumulation of water in areas that may encounter a sulfuric acid spill pool. Additionally, the Project has implemented measures and monitoring equipment to prevent water from entering the secondary containment area for the sulfuric acid.

Based upon the foregoing, the potential impact from the use and storage of sulfuric acid by the Project would be less than significant.

Hydrogen

Table 2 of CalARP §2770.5 identifies the threshold quantity for hydrogen to be 10,000 pounds. The Project will store 29,000 standard cubic feet (scf) of hydrogen (about 150.8 pounds) on site in a pressurized multi-tube trailer. Because the amount of hydrogen stored on site is below the regulatory threshold, there is no requirement to satisfy CalARP or CAA RMP regulatory requirements. However, even though the storage amount of hydrogen at the Project Site is far below the federal or state regulatory threshold, an OCA evaluation was performed in order to assess the potential consequences of a worst-case release scenario, and the need to design appropriate controls and mitigation measures to operate in a safe environment. In accordance with California Energy Commission (CEC) requirements, the U.S. Environmental Protection Agency (USEPA) RMP OCA Guidance (April 1999) document was applied to generate the OCA for hydrogen. The analysis is included in Section 5.12.2.3, Off-site Consequence Analysis, and Appendix L, Hazardous Materials Technical Analysis.

Based upon the foregoing, and as further described in Section 5.12.2.3, the potential impact from the use and storage of hydrogen by the Project would be less than significant.

Acid Gas

Acid gas is composed of about 45 percent hydrogen sulfide and about 55 percent carbon dioxide. Hydrogen sulfide is a regulated material. It is produced by the gasification process, separated from the syngas by the AGR unit, and converted to elemental sulfur in the SRU. The regulatory threshold for hydrogen sulfide is 10,000 pounds under CAA RMP, and 500 pounds under CalARP. The toxicity concentration level set by CAA RMP/CalARP for hydrogen sulfide is 32.3 parts per million (ppm) (0.042 milligrams per liter [mg/L]). However, the on-site quantities of hydrogen sulfide to be generated by the Project are below regulatory thresholds, and do not trigger application of CalARP or CAA RMP requirements. However, because of its characteristic of explosivity and toxicity, the Project performed an OCA to assess the potential consequences of a worst-case release scenario, and the need for appropriate controls and mitigation measure to operate in a safe environment. The analysis is included in Section 5.12.2.3, Off-site Consequence Analysis, and Appendix L, Hazardous Materials Technical Analysis.

Based upon the foregoing, and as further described in Section 5.12.2.3, the potential impact from the use of hydrogen sulfide by the Project would be less than significant.

Syngas

The feedstock will be gasified to produce a syngas. The syngas will be processed and purified to produce a hydrogen-rich gas, which will be used to fuel the combustion turbine for low-carbon baseload power generation. Syngas consists primarily of water vapors, carbon monoxide, carbon dioxide, hydrogen, nitrogen, and hydrogen sulfide, with trace amounts of argon, ammonia, and methane. Of these substances, only hydrogen, carbon monoxide, hydrogen sulfide, ammonia and methane are regulated chemicals under applicable federal and state regulations. Hydrogen and methane are regulated as flammable substances, while hydrogen sulfide and ammonia are regulated as a toxic substance (see 40 CFR 68.130 and 19 CCR 2770.5). However, the quantities of these constituents in the syngas do not trigger regulatory requirements under CalARP or CAA RMP; however, because of its characteristic of flammability and toxicity, the Project performed an OCA for the worst-case release scenario to assess the potential consequences of a worst-case release scenario, and the need for appropriate controls and mitigation to operate in a safe environment. The analysis is included in Section 5.12.2.3, Off-site Consequence Analysis, and Appendix L, Hazardous Materials Technical Analysis.

Based upon the foregoing, and as further described in Section 5.12.2.3, the potential impact from the use of syngas by the Project would be less than significant.

Methanol

The Project will use methanol in the process unit, which will be stored in a single 300,000-gallon AST with secondary containment. An additional 250,000 gallons of methanol will also be contained within process vessels, equipment and piping of the of AGR unit. This process inventory is geographically remote from the 300,000-gallon AST, and a pump and isolation valve are placed on the piping between the storage tank and the AGR unit isolating the AST and AGR unit. Methanol is considered to be a hazardous substance due to its flammable and moderately toxic chemical properties. Methanol is listed in the following federal regulations:

- 29 CFR 1910.1200 (OSHA)
- 40 CFR 116 and 40 CFR 117 (USEPA)
- 40 CFR 355, Appendices A and B (USEPA)
- 40 CFR 372 (SARA Title III)
- 40 CFR 302 (CERCLA)

Although it is a listed substance, federal regulations do not require an OCA for the use of methanol. Additionally, methanol is not regulated under applicable state regulations. However, because of its characteristic of flammability and explosivity, the Project performed an OCA for the worst-case release scenario to assess the potential consequences of a worst-case release scenario, and the need for appropriate controls and mitigation to operate in a safe environment. Because methanol is a flammable substance, the most severe hazardous consequence that could be derived from an accidental release would consist of a vapor cloud explosion and a pool fire. The analysis is included in Section 5.12.2.3, Off-site Consequence Analysis, and Appendix L, Hazardous Materials Technical Analysis.

Based upon the foregoing, and as further described in Section 5.12.2.3, the potential impact from the use and storage of methanol by the Project would be less than significant.

Other Hazardous Materials

No adverse environmental impacts related to other hazardous materials used at the Project Site are anticipated. Only minimal quantities of paints, oils, solvents, pesticides, and cleaners, typical of those packaged for retail consumer use, are or will be present during operation of the power plant. Small volumes of petroleum products associated with construction equipment will be on site during construction. As described in Section 5.12.2.2, Operations Phase, and Section 5.12.3, Cumulative Impact Analyses, long-term or cumulative impacts will be avoided by cleaning up any accidental leaks or spills of these materials in accordance with applicable LORS. As a result, no adverse environmental impacts related to other hazardous materials used at the Project Site are anticipated.

Carbon Dioxide

Carbon dioxide does not manifest hazardous properties (i.e., toxicity, reactivity, flammability, or explosivity) that would result in regulatory classification as a hazardous material. However, the current DOT requirement for pipelines transporting carbon dioxide (49 CFR 195) directs the operator to perform a risk assessment. Pursuant to this DOT requirement and industry practice, the Project conducted a risk analysis for the carbon dioxide pipeline. Section 5.12.2.4 below and Appendix E of this Revised AFC set forth the Risk Evaluation conducted for an accidental worst-case release scenario from the carbon dioxide pipeline.

Carbon dioxide captured in the gasification processes at the Project will be compressed and transported to the custody transfer point for injection into deep underground hydrocarbon reservoirs for CO_2 EOR and Sequestration. A compressor will pressurize (up to 2,800 pounds per square inch gauge [psig]) the carbon dioxide for offsite delivery. The carbon dioxide pipeline will transfer the carbon dioxide from the Project Site southwest to the custody transfer point.

Based upon the foregoing, and as further described in Section 5.12.2.4, the potential impact from the use and storage of carbon dioxide by the Project would be less than significant.

Hazardous Materials Business Plan

The Project will maintain and implement an HMBP. The Project will also implement BMPs consistent with the hazardous materials handling, emergency spill response, and reporting as specified in the HMBP.

If there is a spill or release of hazardous materials during operations, the spill area will be bermed or otherwise controlled as quickly as practical to minimize the footprint of the spill in accordance with the HMBP and BMPs. Specifically, the following procedures will be followed:

- Contaminated soil materials produced during cleanup of a spill will be stored, transported, and disposed of in accordance with local, state, and federal regulations

- If a spill or leak into the environment involves hazardous materials equal to or greater than the specific reportable quantity, federal, state, and local reporting requirements will be adhered to. In particular, the County of Kern EHSD will be notified. The Emergency Management System will also be notified by calling 911 in the event of a fire or serious injury.

With the implementation of the HMBPs and BMPs, long-term or cumulative impacts associated with spills or releases of hazardous materials will be avoided. Impacts would be less than significant.

Fire Prevention and Protection

Several combustible materials will be stored and used on the Project Site during the construction and operation phases. A listing of these materials is found within Table 5.12-1, Hazardous Materials Usage and Storage During Construction Based on Title 22 Hazardous Characterization; Table 5.12-2, Hazardous Materials Usage and Storage During Construction Based on Material Properties; Table 5.12-3, Hazardous Materials Usage and Storage During Operations Based on Title 22 Hazardous Characterization; and Table 5.12-4, Hazardous Materials Usage and Storage During Operations Based on Material Properties. Potential hazards, brought onto the site from the storage and use of these materials, consist of fires and explosions.

The Applicant will implement a variety of prevention and mitigation measures to prevent and control potential fires and/or explosions.

The Fire Prevention and Protection Program includes both fire prevention and protection measures. Employment of conservative equipment layouts, segregation of critical components, and the remote location of non-essential resources are some of the important components of the fire mitigation/suppression measures employed.

Conservative equipment spacing and segregation of potentially hazardous activities from the balance of plant (BOP) facilities are the guiding principals employed to protect personnel and property. The extensive use of temperature detectors in the gasification area provides the capability to monitor the equipment and annunciate early warnings of abnormal excursions. Flammable gas (i.e., carbon monoxide and natural gas) and toxic fumes (i.e., ammonia and hydrogen sulfide) monitors will be strategically located in the process areas to detect and alarm at high concentration levels. Oil containment sumps and fire walls will be erected to isolate large transformers from adjacent facilities. Hydrogen distribution lines are routed to avoid hazardous locations and areas containing critical equipment. Structural steel will be protected with fire-proofing materials in strategic areas. Process liquid drains will be configured to contain liquid spills within the unit of origin. Grading and paving plans will be prepared to complement this objective. An extensive power plant grounding system will be installed to dissipate static electrical charges. Emergency lighting is provided to illuminate egress lanes. The administration building, general warehousing, and other components not essential to support daily operations will be located away from the main process facilities.

Fire suppression will be provided by various means. A dedicated fire-water storage and site-wide loop distribution system, including automatic fire suppression (deluge/mist), and manual fire-water fighting equipment (monitors and hydrants) will be provided. Inert gas suppression systems will be installed in areas where water systems would otherwise cause damage to site equipment. Carbon dioxide fire suppression systems will be provided in the combustion turbine enclosures. Provisions for the deployment of aqueous film-forming foam (AFFF) will be included with the methanol storage tanks. Steam is used to smother fires originating in hot equipment, which may otherwise be further damaged by the application of relatively “cold” fire water.

The Project Site “Fire Areas” consist of the following:

- Material handling
- Gasification
- Acid gas removal
- Sulfur recovery unit/tail gas treating unit
- Syngas blending and distribution
- Natural gas distribution
- Air separation unit
- Cooling towers
- Power generation and high voltage transmission.

The Fire Protection System design is based on the single risk area concept. This considers that only one fire will occur in any one of the identified “Fire Areas” at any given time. The major hazard identified in the material handling area is dust from the petcoke conveying, storage, and sizing operations. The primary hazards in the gasification area are the hydrogen syngas product and molten slag. Multiple hazards are present in the power block, including natural gas and hydrogen-fuel gas, hydrogen generator coolant, ammonia for emissions control, and the hydrocarbons contained in the lube/seal oil systems. The methanol system and storage represents the primary risk in the AGR area. Toxic and potentially flammable sulfur compounds are present in the AGR and the SRU. The largest physical area of the power plant was identified as that requiring the greatest degree of protection, and was considered to be the “greatest” single fire risk. The capacity of the Fire Water storage, supply, and distribution system was sized based on the demand of the largest Fire Risk area.

An evaluation of the potential areas that may be impacted from the worst-case scenario combustion of ignitable hazardous materials can be found within Appendix L, Hazardous Materials Technical Analysis. The analyses performed show that the potential impact derived from these worst-case scenarios will not be significant. The application of the aforementioned prevention and mitigation measures will further reduce the predicted area of impact established through the OCA analyses, as described in Appendix L.

5.12.2.3 Off-site Consequence Analysis

An OCA was conducted for ammonia, hydrogen, and other chemicals that will be used or produced at the Project Site. The following section and Appendix L, Hazardous Materials Technical Analysis, present the parameters and results of the OCA conducted for chemicals at the Project Site.

Aqueous Ammonia

The Project will store approximately 20,000 gallons of aqueous ammonia of 19 percent concentration by weight (approximately 28,000 pounds of pure ammonia) in a pressurized horizontal AST with secondary containment. Following the regulatory guidance for OCAs, an OCA was conducted for an accidental worst-case release scenario under worst-case atmospheric conditions for the Project Site, where the entire contents from the aqueous ammonia tank are released instantaneously. Under the scenario, all 20,000 gallons of aqueous ammonia are assumed to flow instantaneously into the secondary containment. In addition, the secondary containment is designed to be covered by high-density polyethylene (HDPE) floating balls, which reduce the available surface area for vaporization. The exposed ammonia is then vaporized over a 10-minute period, as per regulatory guidelines. The model examines the results of the subsequent dispersion over a 1-hour period. It should be noted that based upon the physical properties of aqueous ammonia, this scenario is very unlikely to occur.

The OCA considered the spill during worst-case conditions. In the worst case, the atmospheric or environmental conditions are assumed that would significantly enhance the vaporization of the ammonia, and at the same time prevent the quick dissipation of a vapor cloud generated from such an assumed release.

Aqueous Ammonia Modeling Results are presented in Appendix L, Hazardous Materials Technical Analysis. In summary, the concentration levels examined do not extend outside of the Project Site boundary. CalARP regulatory threshold concentrations of 0.14 mg/L (200 ppm) only reached a distance of 189 feet (0.035 mile); the 300 ppm concentration reached a distance of 162 feet (0.03 mile); and the 2,000 ppm concentration reached a distance of 60 feet (0.01 mile), even with worst-case assumptions and conditions. No off-site impact is expected to occur from a worst-case release scenario. Consequently, the potential impacts would be less than significant.

Hydrogen

The unique properties of hydrogen – low density, high specific heat, and thermal conductivity – make it an ideal coolant for electricity generators and it is now being widely used as a coolant for power plants. The Project will use a hydrogen-cooled generator and store 29,000 scf compressed hydrogen gas in a pressurized multi-tube trailer as make-up for the loss within the generator. To determine the behavior of hydrogen under a worst-case release scenario, we have examined its properties, along with the historical data, to evaluate the potential impacts in this section. The worst-case release scenario assumed that the contents of the whole hydrogen tube trailer (29,000 scf) are instantaneously released into the atmosphere.

The OCA analysis result shows that even for the worst-case hydrogen explosion scenario, the impact of the incident will be restricted within an area of a 317-foot-radius (0.06 mile) from the center of the storage tube trailer, and it does not extend outside the Project Site boundary. Any explosion or combustion of a hydrogen-gas release at the Project Site will not have any negative impacts onto the surrounding area or public and will be contained within the Project Site boundaries. Consequently, the potential impacts would be less than significant.

Acid Gas

The Rectisol process will remove acid gas to significantly reduce sulfur dioxide emissions to the atmosphere. Acid gas is removed from shifted syngas to produce low-sulfur hydrogen-rich fuel for low-carbon baseload electrical generation. The acid gas will consist of an approximate 45 percent hydrogen sulfide and 55 percent carbon dioxide mixture. The worst-case release scenario for the acid gas consists of a total release of the piping volume equivalent to 50 pounds of hydrogen sulfide.

As shown by the modeling that is summarized in Appendix L, Hazardous Materials Technical Analysis, potential impacts from a worst-case scenario vapor cloud explosion will be limited to less than 0.1 mile. The potential impact from a worst-case explosion will be limited to inside the Project Site boundaries. Results from the toxicity modeling presented a distance to toxic endpoint of 1,974 feet (0.37 mile). The potential impact generated from the worst-case release scenario would not extend outside of the Project Site boundary. Consequently, the potential impacts would be less than significant.

Syngas

The feedstock will be gasified to produce a synthesis gas (syngas) that will be processed and purified to produce a hydrogen-rich gas. This hydrogen-rich gas will be used to fuel the combustion turbine for low-carbon baseload power generation. Syngas consists primarily of hydrogen, carbon monoxide, water vapor, carbon dioxide, nitrogen, argon, and hydrogen sulfide. The purpose of the modeling was to estimate the consequences from a hypothetical worst-case release of syngas at the Project Site. The scenario analyzed consisted of a worst-case release of approximately 15,000 pounds of wet-syngas from equipment and process piping at the facility.

The modeling of the worst-case release scenario demonstrates that such a release of syngas contained with the process equipment and piping may produce a vapor cloud explosion that may reach a distance of 491 feet (0.09 mile) from the point of release. Consequently, the potential impact of an explosion will not extend outside of the Project Site boundary. Therefore, the potential impact from the use of syngas at the Project Site would be less than significant.

One of the primary components of syngas is carbon monoxide. Carbon monoxide is a hazardous material with toxic and ignitable characteristics. Due to its toxic characteristics, a worst-case scenario release was modeled for carbon monoxide. The modeling scenario consisted of a worst-case release of syngas containing approximately 4,000 pounds carbon monoxide. The modeling considered a height of 70 feet for the release (the lowest connection point in the process vessel). Due to the height of the release, calculations from the ALOHA modeling program indicated that concentrations of concern (i.e., immediately dangerous to life and health [IDLH] or OSHA short-term exposure limit [STEL)] were not detected at ground level. The worst-case scenario release would dilute with the air in such a manner that only a concentration of carbon monoxide less than the concentration of concern would potentially impact ground level receptors.

Similarly, worst-case scenario release modeling was conducted for the hydrogen sulfide component of the syngas. An approximate amount of 180 pounds of hydrogen sulfide was modeled to be release from a height of 70 feet. Once more, the concentration of concern (0.042 milligrams per liter [mg/L]) did not reach ground level elevations.

Lastly, modeling was performed for the ammonia portion of the syngas. A total of 15 pounds of ammonia was modeled to be released from the gasifier/scrubber and adjoining piping. The release was also considered to take place at an elevation of 70 feet. The regulated 0.14 mg/L concentration was never reached at ground level.

Based on the results of the modeling for syngas and its components discussed above, the potential impacts from the use of syngas at the Project Site would be less than significant.

Methanol

The Project will use methanol in the process unit, which will be stored in a single 300,000-gallon AST with secondary containment. An additional 250,000 gallons of methanol will also be contained within process vessels, equipment, and piping of the of AGR unit. This process inventory will be geographically remote from the 300,000-gallon AST. Additionally, a pump and isolation valve will be placed on the piping between the storage tank and the AGR unit to isolate the AST and AGR unit. The worst-case scenario releases modeled for methanol were potential impacts of a vapor cloud explosion and a pool fire.

The worst-case scenario modeled for the vapor cloud assumed a methanol release where the entire contents of the methanol AST (300,000 gallons) are released into the atmosphere instantaneously.

The modeling of the worst-case 1 pound per square inch (psi) pressure wave scenario showed that the potential impact distance from a worst-case methanol vapor cloud explosion after the complete release of a single tank may reach a distance of 4,224 feet (0.8 mile) from the location of the tank. The impact distance of explosion may extend past the Controlled Area. The immediate vicinity surrounding the Controlled Area is rural and there are no residences within the pressure-wave impact distance. Therefore, even such an unlikely event will not impact sensitive receptors. The off-site impact from the use and storage of methanol at the Project Site would be less than significant.

The second worst-case scenario analyzed was a methanol pool fire in accordance with the appropriate regulatory guidance, and assumed the entire contents of one methanol AST (300,000 gallons) is released, forming a pool of fire. The modeling results showed that for a potential methanol pool fire, the potential impact distance may reach a distance of 1,215 feet (0.23 mile) from the center of the methanol pool and will not extend outside of the Controlled Area. The implementation of appropriate safety measures will significantly reduce the likelihood of an accidental methanol release. The potential impact from the use and storage of methanol at the Project Site will be less than significant.

5.12.2.4 Carbon Dioxide Pipeline Risk Evaluation

Carbon dioxide captured from the syngas will be compressed and transported by pipeline from the Project Site southwest to the custody transfer point in the Elk Hills Field for CO_2 EOR and Sequestration. Carbon dioxide does not manifest hazardous properties (i.e., toxicity, reactivity, flammability, or explosivity) that would result in regulatory classification as a hazardous material. However, as further discussed in Appendix E of this Revised AFC, the current DOT requirement for pipelines transporting carbon dioxide (49 CFR 195) directs the operator to perform a risk assessment. Pursuant to this DOT requirement and industry practice, the Project conducted a risk analysis for the carbon dioxide pipeline.

For the purpose of this study, risk was defined as a combination of the probability of occurrence of a scenario versus the severity of its consequences. The following methodology was used to define the magnitude of risk for this study:

- Identify scenarios or events that may occur and have adverse consequences;
- Estimate potential consequences from the release;
- Estimate the likelihood of this event occurring; and
- Evaluate the risk.

For this study, a semi-quantitative analysis based on historical data was used to develop a risk matrix that determines the risk to the surrounding community from the proposed carbon dioxide pipeline in accordance with established risk methodology.

In order to estimate the historical failure rate of carbon dioxide pipelines, two sets of information (databases) were reviewed: (1) accident/spill records of carbon dioxide pipelines in the United.States.; and (2) corresponding carbon dioxide pipelines currently in operation. At present (2009), there are more than 3,500 miles of carbon dioxide pipelines operating in the United.States (see Figure 5-1 and Appendix E of this Revised AFC). These pipelines are mainly used to carry carbon dioxide to oil fields for use in CO_2 EOR and Sequestration operations, and operate at conditions similar to those proposed for the Project carbon dioxide pipeline.

Based on an analysis of the historical data for carbon dioxide pipelines, the probability of an accidental release from the Project pipeline will not present a significant likelihood of occurrence. Based on these data, the upper bound of the projected failure rate for the approximately 4 miles of carbon dioxide pipeline at the Project is 0.0007 failure per year. As noted by the DOT, pipeline transportation is the safest mode for the distribution of gases and liquids.

As concluded by the risk analysis presented in Appendix E, the potential risk is acceptable and demonstrates that the carbon dioxide pipeline will pose a less-than-significant risk. Results from this evaluation showed that the potential impact of any release occurring from the Project's carbon dioxide pipeline would be less than significant.

5.12.2.5 Abandonment/Closure

Premature closure or unexpected cessation of operations will be outlined in the Project closure plan. The plan will outline steps to secure hazardous and non-hazardous materials and wastes. Such steps will be consistent with BMPs and the HMBP and according to applicable LORS. The plan will include monitoring of vessels and receptacles of hazardous material and wastes, safe cessation of processes using hazardous materials or hazardous wastes, and inspection of secondary containment structures.

Planned permanent closure impacts will be incorporated into the Project closure plan and evaluated at the end of the economic operation of the power plant. The Project closure plan will document non-hazardous and hazardous waste management practices, including inventory, management, and disposal of hazardous materials and wastes; and permanent closure of permitted hazardous materials and waste storage units in accordance with applicable LORS.

5.12.3 Hazardous Materials Delivery Route

There are four hazardous materials that will be regularly transported to the project site during the operation phase of the Project. These substances include: ammonium lignosulfonate, methanol, ammonia, and caustic (sodium hydroxide). A summary of the estimated quantities and number of trips of each material is presented in Table 5.12-5.

Table 5.12-5
Summary of Anticipated Routes of Project-related Hazardous Chemicals

	Ammonium Lignosulfonate (Aqueous, 50 wt%)	Methanol	Ammonia (Aqueous, 19 wt%)	Caustic (Aqueous, 50 wt%)
Maximum daily rate (ton/day)	16	-	-	-
Average daily rate (ton/day)	16	-	-	-
Average daily operating rate (ton/day)	16	-	-	-
Maximum Annual rate (gal/yr)	-	2,500,000	1,100,000	1,700,000
Average Annual rate (gal/yr)	-	2,260,000	750,000	1,640,000
Average truck capacity (ton/truck)	25			
Average container capacity (gal/truck)	-	6,700	6,700	6,700
Average number of trucks or containers				
1-hour	0.03	0.04	0.01	0.03
24-hour	1	0.9	0.3	0.7
Maximum number of trucks/containers				
1-hour	2	2	2	2
24-hour	4	20	2	1
Annual average number of trucks or loads	200	340	120	250

Note:
wt% = percent by weight

The major suppliers of project-related hazardous materials are located in the City of Bakersfield, east of the Project Site. Thus, the primary transport route is planned to take Stockdale Highway and Dairy Road and then enter into the gate on Adohr Road (shown as a red line with arrows on Figure 5-2). The alternative routes will only be used if hazardous materials are transported from non-major suppliers located at the north or south of the Project Site (shown as blue lines with arrows on Figure 5-2). As a pro-active measure, the Project proponent does not plan to use State Route 119 as the primary access route during construction and operations activities, thereby minimizing Project-added traffic and environment impacts on the community of Tupman.

5.12.4 Cumulative Impact Analyses

According to CEQA Guidelines Section 15355:

> *Cumulative impacts* refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts.
>
> (a) The individual effects may be changes resulting from a single project or a number of separate projects.

(b) The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable future projects. Cumulative impacts can result from individual minor but collectively significant projects taking place over a period of time.

Land immediately adjacent to the Project Site consists of agricultural land. Surrounding the Project Site, the land is currently used for farming practice. Aqueous ammonia tanks are frequently used by the agriculture industry as a fertilizer component, which is applied throughout agricultural fields. Since ammonia is applied throughout agricultural fields, mobile ammonia tanks can be potentially found in various locations of an agricultural field.

No cumulative impacts are anticipated from an aqueous ammonia release at the Project Site. OCA modeling results for the aqueous ammonia identified the extent of impact from a worst-case scenario release of aqueous ammonia did not extend outside of the Project Site boundary. No other hazardous materials stored at the Project Site are anticipated to produce cumulative impacts with hazards derived from adjacent lands.

Consequently, it is anticipated that the potential cumulative impacts from the operation of the Project will be minimal and less than significant.

5.12.5 Mitigation Measures

Implementation of the following mitigation and compliance conditions will ensure that the Project uses hazardous materials in compliance with all applicable LORS and in a manner than ensures no significant environmental impacts will result related to hazardous materials.

5.12.5.1 Construction Phase

During construction, hazardous materials stored on site will be limited to fuel such as gasoline and diesel, lubricating oils, paint, coatings, adhesives, welding gases, and other cleaners. These materials will be stored in a locked utility shed or in a secured, fenced area with secondary containment. It is anticipated that fuels, lubricants, and other various fluids needed for operation of construction equipment will be transported to the construction site on an as-needed basis by equipment service trucks. During Project construction, workers will be trained in handling hazardous materials, and will be alerted to dangers associated with these materials. An on-site safety officer will be designated to implement health and safety guidelines and to contact emergency response personnel and the local hospital, if necessary.

Construction contractors for the Project will be required to develop SOPs for servicing and fueling construction equipment. These procedures will, at a minimum, include the following mitigation measures.

HAZMAT-1

The following measures will be implemented related to fueling and maintenance of vehicles and equipment:

- No smoking, open flames, or welding will be allowed in the fueling/services areas.
- Servicing and fueling of vehicles and equipment will occur only in designated areas.
- Fuel storage tanks will have secondary containment.
- Fueling service and maintenance will be conducted only by authorized personnel.
- Refueling will be conducted only with approved pumps, hoses, and nozzles.
- All disconnected hoses will be handled in a manner to prevent residual fuel and fluids from being released into the environment.
- Catchpans will be placed under equipment/hose connections to catch potential spills during fueling and servicing.
- Service trucks will be provided with fire extinguishers and spill containment equipment, such as absorbents, shovels, and containers.
- Service trucks will not remain on the job site after fueling and service are complete.

HAZMAT-2

Spills that occur during vehicle maintenance will be cleaned up immediately. Contaminated soil will be containerized and sent for subsequent evaluation and off-site disposal in accordance with applicable LORS. A log of all spills and cleanup actions will be maintained.

HAZMAT-3

Emergency telephone numbers will be available on site for the fire department, police, local hospitals, ambulance service(s), and environmental regulatory agencies.

HAZMAT-4

Containers used to store hazardous materials will be properly labeled and kept in good condition.

It is anticipated that these SOPs will minimize the potential for incidents involving hazardous materials during construction. Consequently, potential impacts from use or storage of hazardous materials during construction would be less than significant.

5.12.5.2 Operational Phase

A listing of anticipated hazardous materials to be used on-site can be found in Table 5.12-3, Hazardous Materials Usage and Storage During Operations Based on Title 22 Hazardous Characterization; and Table 5.12-4, Hazardous Materials Usage and Storage During Operations Based on Material Properties. General mitigation measures are detailed below for containerized and bulk hazardous materials.

5.12.5.3 General Mitigation Measures

HAZMAT-5: Containerized Materials

Containerized materials will typically consist of returnable tanks (approximately 100-gallon capacity), 55-gallon drums, or 5-gallon pails of lubricants and oils, and smaller containers of paints and solvents. These materials will be managed as described below to mitigate potential releases.

- Hazardous materials will be stored in accordance with applicable LORS (i.e., the Uniform Fire Code [UFC]).
- Trucks delivering hazardous materials will be parked adjacent to the usage area or storage area where the chemicals are to be stored to minimize potential unloading and transportation accidents.
- Incompatible materials will be stored separately.
- Containerized hazardous materials will be stored in original containers appropriately designed for the individual characteristics of the contained material. Containers will be labeled with contents and identification of fire hazards as required by National Fire Protection Association (NFPA) 704.
- Containers of flammable materials will be stored in inflammable storage cabinet(s) when not in use.
- Hazardous materials will be stored within secondary containment structures, typically constructed of sealed concrete. These structures will have capacity for the largest container plus an allowance for rainwater equivalent to a 24-hour, 25-year storm event, if the area is outdoors. Alternatively, containerized hazardous materials may also be stored in commercially available hazardous materials storage sheds with built-in secondary containment.
- Commercially available secondary containment pallets may also be used for containers stored in warehouse facilities to augment other spill control measures.
- Empty containers, especially portable tanks and drums, will be emptied, drained, and returned to the supplier for reuse to the maximum extent possible, or recycled off site.
- Pollution prevention efforts such as replacement of hazardous materials with less hazardous materials, reduction of hazardous waste generation volumes, and recycling will be employed at the facility, as practical.

HAZMAT-6: Bulk Hazardous Materials

Hazardous materials will be managed as described below to mitigate the potential for releases to the environment.

Bulk chemical storage tanks will be equipped with a local level gauge and automated level instrumentation. To prevent overfilling, a high level alarm will sound at the local common alarm panel if the storage tank reached an abnormally high-level, and be interlocked to shut down the metering pump.

Associated skid-mounted equipment includes the feed pumps, valves, interconnecting piping, controls, etc. Controls, instrumentation, and interlocks are provided for safe operation of the equipment during all modes of operation. The metering pumps will also be located within the secondary containment and will be elevated to prevent flooding during rainstorms.

Out-of-doors secondary containment will employ a valve to empty the containment of rainwater, after inspection to evaluate potential for contamination. The valve will be equipped with a lock and will remain locked shut unless rainwater is being actively emptied from the secondary containment. Contaminated water will run through the oil/water separator or will be disposed of off site, as appropriate.

Tank trucks will be unloaded in a tank truck unloading area. This unloading area will be paved with concrete, and will have sufficient secondary containment to hold the contents of the worst-case release scenario.

Seismic loads for hazardous materials storage and containment areas will be determined by the static lateral force procedures of the Uniform Building Code (UBC), and site-specific design features will be incorporated into these storage facilities. These structures will be designed and constructed in accordance with applicable codes, regulations, and standards.

Underground piping and piping runs outside of secondary containment structures will be constructed with single-wall (secondary containment) piping to minimize the potential for releases and enable staff to detect leaks; when and if they should occur.

Aqueous Ammonia

Aqueous ammonia (19 percent concentration by weight) will be stored in a 20,000-gallon AST with secondary containment. The secondary containment will be covered with floating balls. The secondary containment berm will be able to sustain 110 percent of the aqueous ammonia tank volume (100 percent of aqueous ammonia tank and floating balls plus an allowance for rainwater for a 24-hour, 25-year storm event). The aqueous ammonia will be delivered to the Project Site in tank trucks.

The ammonia truck unloading pad will be equipped with an underground containment vault. This vault will be specifically designed for minimization of ammonia evaporation in case of aqueous ammonia spills during truck unloading operations.

Sodium Hydroxide

Sodium hydroxide will be stored on site within one large, carbon-steel AST and one waste tank (60,000 gallons total). Both tanks will be equipped with secondary containment, capable of holding 110 percent of the tank volume (100 percent of sodium hydroxide tank plus an allowance for rainwater for a 24-hour, 25-year storm event). Associated transfer pumps and piping will have secondary containment to collect any potential spills. Piping secondary containment will also be equipped with liquid detectors to identify leaks.

Sulfuric Acid and Sodium Hypochlorite

Sulfuric acid and sodium hypochlorite will be stored at the Project Site in quantities of 14,000 gallons and 7,000 gallons, respectively. Both substances will be stored in ASTs of compatible material. The storage tanks will be equipped with secondary containment, capable of storing the entire volume of the tank. The tanks will also be equipped with liquid detectors to identify the presence of any liquid substance within the secondary annular space. Additionally, the area surrounding the tanks will be constructed and coated to prevent its corrosion or deformation from an accidental chemical spill.

The sulfuric acid and sodium hypochlorite delivery systems will be equipped with flow meters and automatic shutdown capabilities. Transfer pumps and piping will have secondary containment to collect any potential spills.

Diesel Fuel

The Project Site will store a 2,000-gallon diesel AST throughout its operation. The storage tank will be equipped with a secondary containment capable of holding 110 percent of the tank volume (100 percent of diesel tank plus an allowance for rainwater for a 24-hour, 25-year storm event). A Spill Prevention, Control, and Countermeasures (SPCC) Plan will be prepared and implemented that includes requirements for oil spill prevention, preparedness, and response to prevent oil discharges to navigable waters and adjoining shorelines.

Lubricating Oil

The Project Site will store 200 gallons of lubricating oil. The lubricating oil will be stored in a large AST. The storage tank will be equipped with a secondary containment capable of holding 100 percent of the tank volume. Liquid detection equipment will be installed to detect any potential leaks generated and collected in the secondary containment annular space. An SPCC Plan will be prepared and implemented that includes requirements for oil spill prevention, preparedness, and response to prevent oil discharges to navigable waters and adjoining shorelines.

Hydrogen

Hydrogen will be stored on site (29,000 scf) within a multi-tube trailer. The multi-tube trailer will feed into the power plant process. Hydrogen will be monitored and controlled through the use of flow meters and pressure monitors. The hydrogen system will also be equipped with pressure relief valves and automatic shutdown.

Carbon Dioxide

Carbon dioxide for fire suppression and purging (50,000 scf) will be stored on site within large pressurized cylinders and/or tank, which will be equipped with pressure sensors and automatic shutdown controls, and pressure relief valves.

Oxygen

The Project will generate oxygen on site that will be stored in a large aboveground vessel. A maximum of 1,100-tons of liquid oxygen will be stored on site. Pressure relief valves and automatic shutdown equipment will be provided for the oxygen delivery system.

Molten Sulfur

The Project Site will store 150,000 gallons of degassed molten sulfur within two sulfur storage pits, as further described in Section 2.0, Project Description. Both sulfur storage pits will be constructed of compatible material and will be structurally sound (free of any cracks or fissures). Sulfur storage pits will be equipped with pressure-monitoring equipment and ventilation lines. In addition, sulfur-loading equipment will have a vapor recovery system to control fugitive emissions by returning displaced vapors to the SRU.

Methanol

The Project will use methanol in the process unit, which will be stored in a single 300,000-gallon AST with secondary containment. An additional 250,000 gallons of methanol will also be contained within process vessels, equipment, and piping of the of AGR unit. This process inventory is geographically remote from the 300,000-gallon AST, and a pump and isolation valve are placed on the piping between the storage tank and the AGR unit isolating the AST and AGR unit. The tanks will also be 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 will be equipped with a flow meter and automatic shutdown capabilities. The methanol transfer pump and piping will have secondary containment to collect any potential spills.

Methyldiethanol Amine

Methyldiethanol Amine (MDEA) will be used at the site with the TGTU. Approximately 220,000 pounds of a 40 percent aqueous MDEA solution will be stored on site. The MDEA solution will be stored within process vessels of the TGTU and ASTs, which will be composed of compatible material for the MDEA solution.

Sodium Phosphate

Sodium phosphate will be used for raw water treatment, gasification, and plant wastewater ZLD. A maximum 1,500 gallons of sodium phosphate contained in ASTs will be stored at the indoor chemical storage area. The sodium phosphate ASTs will be equipped with secondary containment and leak detectors to detect the presence of a rupture.

Propylene Glycol

A maximum 25,000 gallons of propylene glycol will be used in this Project as a heat-transfer fluid circulating in the closed-loop cooling system of the process equipment. Leak detection equipment will be installed on the system to control any accidental releases.

HAZMAT-7: Materials Safety Data Sheets

MSDSs for the hazardous materials will be kept on site as required by 29 CFR §1910 OSHA Hazard Communication rules and regulations.

HAZMAT-8: Worker Training and Equipment

Personnel working with chemicals will be trained in proper handling and emergency response to chemical spills or accidental releases. Additionally, designated personnel will be trained as plant hazardous materials First Responder(s).

Safety equipment will be provided for use as required during chemical containment and cleanup activities, and will include safety showers and eyewash stations. Service water hose connections will be provided near chemical usage and storage areas to allow flushing of chemical spills, if needed.

HAZMAT-9: Hazardous Materials Management – Plans and Procedures

Several programs will address hazardous materials storage locations: emergency response procedures, employee training requirements, hazard recognition fire safety, first-aid/emergency medical procedures, hazardous materials release containment/control procedures, hazard communication training, personal protective equipment (PPE) training, and release reporting requirements. These programs will include the HMBP, workers' safety program, fire response program, power plant safety program, and facility standard operating procedures. The HMBP will include procedures on hazardous materials handling, use, and storage; emergency response; spill prevention and control; training; record keeping; and reporting.

As discussed below, an RMP for aqueous ammonia will also be prepared.

HAZMAT-10: Spill Response Procedures

The following describes the general spill response procedures for the Project. The Project will maintain one or more spill response kits on the Project Site. These kits will contain absorbents appropriate for the hazardous materials kept on site, and each kit will be clearly designated for the type of spilled material it should be used for. Typically, these kits contain a barrel, shovel, and absorbents. In addition, the Project will maintain a supply of gloves and protective clothing for use during spill response events.

Personnel discovering a spill will report to the on-shift Control Room Operator. The Control Room Operator will notify the Operations Superintendent or the Plant Manager. The Superintendent or Manager will function as the On-Site Coordinator and will be in charge of activities related to spill containment, control, and cleanup, and regulatory agency reporting, if needed.

The On-site Coordinator will assess the situation, contain the leak or spill, begin cleanup operations with on-site staff or off-site contractors, as needed, and collect information for reporting, if needed. The following information will be needed for reporting:

- Type of chemical released;
- Amount of release or spill, i.e., volume and description, liquid, vapor, etc.;
- Direction of release and distance traveled if the release is outside the secondary containment;
- Cause of spill or release;
- Potential hazard to off-site personnel and local water bodies, including groundwater; and
- Actions undertaken to mitigate the spill or release.

The appropriate governmental authorities will be contacted if required by laws and regulations, or as deemed necessary by the On-Site Coordinator.

In the case of a small spill involving 55 gallons (or less) of liquid hazardous materials, the spill will typically be retained by a secondary containment structure. This type of spill will be confined to as small a space as possible using absorbent pigs or pillows, and be cleaned up with properly trained employees using absorbents available on site. Similarly, small spills outside of secondary containment structures could be cleaned up by trained employees with on-site spill kit equipment.

Larger spills will normally be contained within secondary containment and will be cleaned up by outside contractors using trained spill response personnel, if on-site employees could not handle the spill using available on-site spill response equipment.

Waste generated from spill cleanup will be placed in closed, labeled containers, typically 55-gallon drums or roll-off containers. Labeling will include the name of the facility (HECA), date of start of accumulation, name of the spilled material, Hazardous Waste identification language from CCR 22 66262.32, and the established DOT shipping name, as needed.

Collected waste will be properly disposed of off site at an approved recycling, landfill, or other appropriate disposal facility in accordance with applicable LORS. Off-site transportation of spill wastes will be contracted with a licensed, hazardous materials and/or waste transportation company, as applicable.

HAZMAT-11: Gas Release Response Procedures

The following describes the general procedures that will be applied at the Project during a gas release. Personnel will be trained in appropriate response and system shutdown procedures.

Personnel discovering a gas leak or release will report to the on-shift Control Room Operator. The Control Room Operator will notify the Operations Superintendent or the Plant Manager. The Superintendent or Manager will function as the On-Site Coordinator, and will be in charge of activities related to spill containment, control, and cleanup, and regulatory agency reporting, if needed.

The On-Site Coordinator will assess the situation and determine the appropriate course of action. In the event of a gas release, the On-Site Coordinator will institute some of the appropriate following measures:

- Immediate cessation of all work that may produce any type of ignition source;
- Evacuation of the affected area;
- Restricted access to affected area;
- Shutdown of affected portion of system for repairs; and
- Shutdown of entire facility for repairs.

The appropriate governmental authorities will be contacted if required by laws and regulations, or as deemed necessary by the On-Site Coordinator.

5.12.6 Laws, Ordinances, Regulations, and Standards

Construction and operation of the Project will be in accordance with all applicable LORS pertaining to hazardous materials. Applicable laws and regulations address the use and storage of hazardous materials to protect the environment from contamination, and to also protect Project workers and the surrounding community from exposure to hazardous and acutely hazardous materials.

5.12.6.1 Federal

SARA of 1968 Title III, also known as Emergency Planning and Community Right-to-know Act (EPCRA) §§302, 304, 311, and 313, and regulations pursuant to the Clean Air Act (CAA) of 1990 (40 CFR 68) established a nation-wide emergency planning and response program, and imposed reporting requirements for businesses that store, handle, or produce significant quantities of extremely hazardous materials. The Acts require the states to implement a comprehensive system to inform local agencies and the public when a significant quantity of such materials are stored or handled at a facility (see 40 CFR, §68.95). The requirements of these Acts are reflected in the CHSC, Section 25531 *et seq*. The Project will comply with these requirements as discussed below in Section 5.12.5.2, State.

Title 49, CFR, Parts 171-177, govern the transportation of hazardous materials, the types of materials defined as hazardous, and the marking of the transportation vehicles.

5.12.6.2 State

The CHSC, §25500, requires companies that handle hazardous materials in sufficient quantities to develop an HMBP. The HMBP includes basic information on the location, type, quantity, and health risks of hazardous materials handled, stored, used, or disposed of that could be accidentally released into the environment. It also includes a plan for training new personnel, and for annual training of all personnel in safety procedures, to follow in the event of a release of hazardous materials. It also includes an emergency response plan and identifies the business representative able to assist emergency personnel in the event of a release.

An HMBP will be developed prior to construction and operation of the power plant.

The CFC, §2701.5.1 and 2701.5.2, states that local fire agencies can require information in addition to the state requirements for HMBPs be included in HMBP submittal. In the case when the quantities of hazardous material present do not exceed the state HMBP thresholds but the

CFC permit thresholds, some of which are lower than the state levels, the local fire agencies can require the submission of HMBP.

The CHSC, §25534, directs facility owners storing or handling acutely hazardous materials in reportable quantities to develop an RMP and submit it to appropriate local authorities, USEPA, and the designated local Administering Agency for review and approval. The RMP includes an evaluation of the potential impacts associated with an accidental release, the likelihood of an accidental release occurring, the magnitude of potential human exposure, any pre-existing evaluations or studies of the material, the likelihood of the substance being handled in the manner indicated, and the accident history of the material. This recently developed program supersedes the California Risk Management and Prevention Plan, and is known as CalARP. The Project will prepare an RMP for the use and storage of aqueous ammonia.

The CCR, Title 8, §5189, requires facility owners to develop and implement effective Safety Management Plans to ensure that large quantities of hazardous materials are handled safely. While such requirements primarily provide for the protection of workers, they also indirectly improve public safety and are coordinated with the RMP process.

California Government Code, §65850.2, states that a city or county shall not issue a final certificate of occupancy unless there is verification that the applicant has met the applicable requirements of CHSC, §25531 and 25505, for a permit from the air pollution control district.

The California UBC contains requirements regarding the storage and handling of hazardous materials. The Chief Building Official must inspect and verify compliance with these requirements prior to issuance of an occupancy permit.

5.12.6.3 Local

The designated, certified, unified program agency (CUPA) for the Project is the County of Kern EHSD, and is responsible for (1) the implementation of the HMBP and emergency response plan; and (2) the storage of hazardous materials in underground storage tanks (USTs) and cleanup of petroleum releases.

The EHSD will be contacted in the event of a release of hazardous wastes or materials to the environment.

The Kern County Fire Code, §2701.7, directs that when required by the fire code official, business owners are to submit a Facility Correction Plan to Fire Prevention. The Facility Correction Plan shall demonstrate that hazardous materials stored, dispensed, handled, or used in the facility shall be transported, disposed of or handled in a manner that eliminates the need for further maintenance, that any threat to public health and safety will be eliminated, and that all federal, state, and local requirements will be met to ensure the safe closure or correction of the facility.

5.12.6.4 Industry Standards

The UFC contains provisions regarding the storage and handling of hazardous materials. These provisions are contained in Articles 79 and 80. Article 80 was extensively revised in the latest edition (1994). These articles contain requirements that are generally similar to those contained in the CHSC §25531 *et seq*. The UFC does, however, contain unique requirements for secondary containment, monitoring, and treatment of toxic gases emitted through emergency venting. These unique requirements are generally restricted to extremely hazardous materials, which are not being used by this Project.

The applicable LORS related to hazardous materials handling are summarized in Table 5.12-6, Summary of LORS – Hazardous Materials Handling.

5.12.7 Involved Agencies and Agency Contacts

There are a number of federal and state agencies that regulate hazardous materials, including USEPA at the federal level, and the Cal-EPA at the state level. However, local agencies are the primary enforcers of hazardous materials laws. For the Project Site, the local agency is the County of Kern EHSD, shown in Table 5.12-7, Agency Contact List for LORS.

5.12.8 Permits Required and Permit Schedule

The Project will develop an HMBP prior to construction activities. See Table 5.12-8, Applicable Permits, for a list of potential permit requirements.

Table 5.12-6
Summary of LORS – Hazardous Materials Handling

LORS	Requirements	Conformance Section (Section 5.12.5.1/2/3/4)	Administering Agency	Agency Contact
Federal Jurisdiction				
SARA Title III, EPCRA	Imposes reporting requirements of hazardous materials to state and local agencies	Section 5.12.5.1	USEPA	Region IX (800) 231-3075
U.S. DOT Regulations, 49 CFR 171-177	Governs the transportation of hazardous materials, including the marking of the transportation vehicles.	Section 5.12.5.1	DOT FMCSA	Amy Hope, California Division (916) 930-2760
State Jurisdiction				
Health and Safety Code Section 25500 *et seq.* (Waters Bill), CCR Art. 1, Ch 6.95	Requires preparation of an HMBP if hazardous materials are handled or stored in excess of TQ.	Section 5.12.5.2	County of Kern EHSD	Matthew Constantine, Director (661) 862-8700
Health and Safety Code Section 25531 *et seq*. (La Follette Bill)	Requires registration of the facility with local authorities and preparation of an RMP if hazardous materials stored or handled in excess of TQ.	Section 5.12.5.2	County of Kern EHSD	Matthew Constantine, Director (661) 862-8700
CCR, Title 8, Section 5189	Facility owners are required to implement safety management plans to ensure safe handling of hazardous materials.	Section 5.12.5.2	County of Kern EHSD	Matthew Constantine, Director (661) 862-8700
California UBC	Requirements regarding the storage and handling of hazardous materials.	Section 5.12.5.2	Kern County Planning and Building Department	Ted James, Director (661) 862-8600
California Government Code Section 65850.2	Restricts issuance of COD until the facility has submitted an RMP.	Section 5.12.5.2	County of Kern EHSD	Matthew Constantine, Director (661) 862-8700
Local Jurisdiction				
CUPA County of Kern EHSD	Requires new/modified businesses to complete an HMBP prior to final plan/permit approval.	Section 5.12.5.3	County of Kern EHSD	Matthew Constantine, Director (661) 862-8700
Industry Standards Jurisdiction				
UFC (Articles 79 and 80)	Requirements for secondary containment, monitoring, etc., for extremely hazardous materials.	Section 5.12.5.4	Kern County Fire Department	Dennis Thompson Fire Chief (661) 391-7000

Source: DTSC, 2008; Cal-EPA, Central Valley RWQCB, 2008; County of Kern, Planning Department, 2008; County of Kern, Building Department, 2008; Kern County Environmental Health Services Department, 2008; and Kern County Fire Department, 2008.

Notes:
CCR = California Code of Regulations
CFR = Code of Federal Regulations
COD = Commercial Operating Date
DOT = Department of Transportation
EHSD = Environmental Health Services Department
FMCSA = Federal Motor Carrier Safety Administration
HMBP = Hazardous Materials Business Plan
LORS = laws, ordinances, regulations, and standards
RMP = Risk Management Plan
SARA = Superfund Amendments and Reauthorization Act
TQ = Threshold Quantity
UBC = Uniform Building Code
U.S. = United States
UFC = Uniform Fire Code

Table 5.12-7
Agency Contact List for LORS

	Agency	Contact	Address	Telephone
1	County of Kern, Environmental Health Services Department (EHSD)	Matthew Constantine, Director	2700 M Street, Suite 300 Bakersfield, CA 93301	(661) 862-8700
2	Kern County Fire Department	Dennis Thompson Fire Chief	5642 Victor Avenue Bakersfield, CA 93308	(661) 391-7000
3	Department of Toxic Substances Control (DTSC)	Noel Laverty DTSC Duty Officer Clovis Field Office	1515 Tollhouse Road Clovis, CA 93611	(916) 255-3618 (559) 297-3901

Source: California DTSC, 2008; Kern County Environmental Health Services Department, 2008; and Kern County Fire Department, 2008.

Note:
LORS = laws, ordinances, regulations, and standards

Table 5.12-8
Applicable Permits

Responsible Agency	Permit/Approval	Schedule
Federal	RMP	30 days prior to ammonia delivery
State	RMP	30 days prior to ammonia delivery
Local	HMBP	30 days prior to storage of hazardous materials on-site

Source: Kern County Environmental Health Services Department, 2008.

Notes:
HMBP = Hazardous Materials Business Plan
RMP = Risk Management Plan

5.12.9 References

Cal-EPA (California Environmental Protection Agency), Central Valley Regional Water Quality Control Board (RWQCB), 2008. Information downloaded from: http://www.waterboards.ca.gov/centralvalley. March 2008.

California Health and Safety Code Section 25531. Hazardous Materials Handling.

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USEPA (U.S. Environmental Protection Agency), 1993. Guidance on the Application of Refined Dispersion Models to Hazardous/Toxic Air Pollutant Releases. EPA-454/R-93-002. 30 April 1993.

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USEPA (U.S. Environmental Protection Agency), 1999. Risk Management Program Off-site Consequence Analysis Guidance. EPA RMP OCA, Exhibit C-1. Heat of Combustion of Hydrogen.

USEPA (U.S. Environmental Protection Agency), 1999. Risk Management Program Off-site Consequence Analysis Guidance. EPA RMP OCA, App C-1. Equation C-2. Vapor Cloud Explosion Equation.

Wray, Thomas, K., 1991. "HazMat Chemist: Ammonia." *HazMat World*. p. 86. November.

Source: Stromberg, 2009

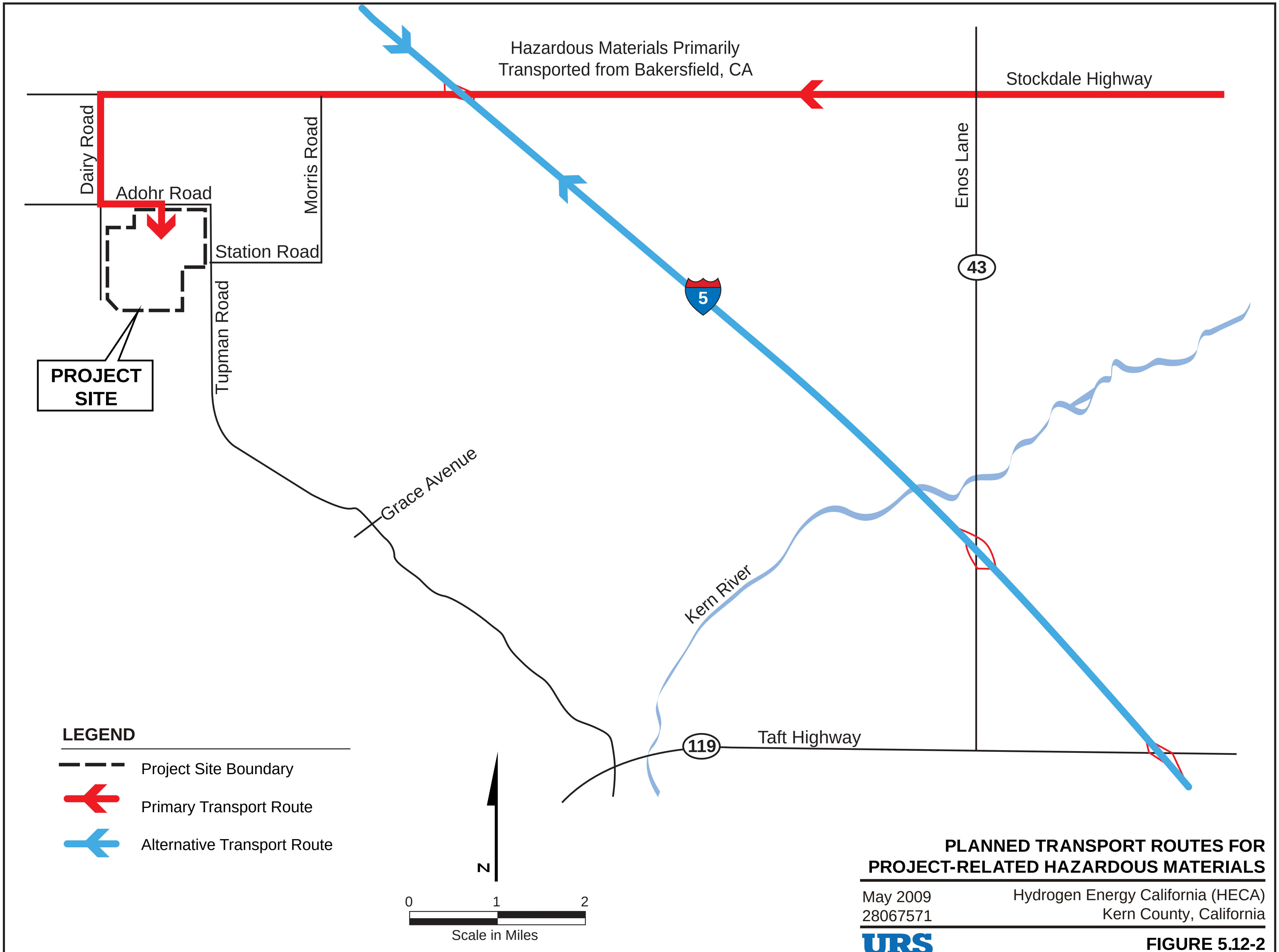
CARBON DIOXIDE PIPELINES IN THE U.S.

May 2009
28067571

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE 5.12-1



PLANNED TRANSPORT ROUTES FOR PROJECT-RELATED HAZARDOUS MATERIALS

May 2009
28067571

Hydrogen Energy California (HECA)
Kern County, California

URS

FIGURE 5.12-2

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Adequacy Issue:	Adequate ____	Inadequate ____	DATA ADEQUACY WORKSHEET	Revision No. 0	Date
Technical Area:	**Hazardous Materials Handling**		Project:	Technical Staff:	
Project Manager:			Docket:	Technical Senior:	

Siting Regulations	Information	AFC Page Number And Section Number	Adequate Yes Or No	Information Required To Make AFC Conform With Regulations
Appendix B (e) (1)	A discussion of how facility closure will be accomplished in the event of premature or unexpected cessation of operations.	Section 5.12.2.5, p. 5.12-24 Section 3		
Appendix B (g) (1)	...provide a discussion of the existing site conditions, the expected direct, indirect and cumulative impacts due to the construction, operation and maintenance of the project, the measures proposed to mitigate adverse environmental impacts of the project, the effectiveness of the proposed measures, and any monitoring plans proposed to verify the effectiveness of the mitigation.	Section 5.12.1, p. 5.12-3 Section 5.12.2, p. 5.12-3 Section 5.12.4, p. 5.12-26 Section 5.12.5, p. 5.12-26		
Appendix B (g) (10) (A)	A list of all materials used or stored on-site which are hazardous or acutely hazardous, as defined in Title 22, California Code of Regulations, §66261.20 *et seq.*, and a discussion of the toxicity of each material.	Table 15.12-1, p. 5.12-4 Table 15.12-3, p. 5.12-6		
Appendix B (g) (10) (B)	A map at a scale of 1:24,000 depicting the location of schools, hospitals, day-care facilities, emergency response facilities and long-term health care facilities, within the area potentially affected by any release of hazardous materials.	Appendix L, Figure L-1		
Appendix B (g) (10) (C)	A discussion of the storage and handling system for each hazardous material used or stored at the site.	Table 15.12-1, p. 5.12-4 Table 15.12-2, p. 5.12-5 Table 15.12-3, p. 5.12-6 Table 15.12-4, p. 5.12-9		

Adequacy Issue:	Adequate ____	Inadequate ____	DATA ADEQUACY WORKSHEET	Revision No. 0	Date ____
Technical Area:	**Hazardous Materials Handling**		Project: ____	Technical Staff:	____
Project Manager:	____		Docket: ____	Technical Senior:	____

Siting Regulations	Information	AFC Page Number And Section Number	Adequate Yes Or No	Information Required To Make AFC Conform With Regulations
Appendix B (g) (10) (D)	The protocol that will be used in modeling potential consequences of accidental releases that could result in off site impacts. Identify the model(s) to be used, a description of all input assumptions, including meteorological conditions. The results of the modeling analysis can be submitted after the AFC is complete.	Appendix L, Hazardous Materials Technical Analysis		
Appendix B (g) (10) (E)	A discussion of whether a risk management plan (Health and Safety Code §25531 *et seq.*) will be required, and if so, the requirements that will likely be incorporated into the plan.	Section 5.12.2.2, p. 5.12-6		
Appendix B (g) (10) (F)	A discussion of measures proposed to reduce the risk of any release of hazardous materials.	Section 5.12.5, p. 5.12-26		
Appendix B (g) (10) (G)	A discussion of the fire and explosion risks associated with the project.	Section 5.12.2.2, p. 5.12-6		
Appendix B (i) (1) (A)	Tables which identify laws, regulations, ordinances, standards, adopted local, regional, state, and federal land use plans, leases, and permits applicable to the proposed project, and a discussion of the applicability of, and conformance with each. The table or matrix shall explicitly reference pages in the application wherein conformance, with each law or standard during both construction and operation of the facility is discussed; and	Section 5.12.6, p. 5.12-34 Table 15.12-6, p. 5.12-36		

Adequacy Issue:	Adequate ____	Inadequate ____	DATA ADEQUACY WORKSHEET	Revision No. 0	Date ____
Technical Area:	**Hazardous Materials Handling**		Project: ____	Technical Staff: ____	
Project Manager:	____		Docket: ____	Technical Senior: ____	

Siting Regulations	Information	AFC Page Number And Section Number	Adequate Yes Or No	Information Required To Make AFC Conform With Regulations
Appendix B (i) (1) (B)	Tables which identify each agency with jurisdiction to issue applicable permits, leases, and approvals or to enforce identified laws, regulations, standards, and adopted local, regional, state and federal land use plans, and agencies which would have permit approval or enforcement authority, but for the exclusive authority of the commission to certify sites and related facilities.	Section 5.12.7, p. 5.12-37 Table 5.12-7, p. 5.12-37		
Appendix B (i) (2)	The name, title, phone number, address (required), and email address (if known), of an official who was contacted within each agency, and also provide the name of the official who will serve as a contact person for Commission staff.	Table 5.12-7, p. 5.12-37		
Appendix B (i) (3)	A schedule indicating when permits outside the authority of the commission will be obtained and the steps the applicant has taken or plans to take to obtain such permits.	Table 5.12-8, p. 5.12-38		