

5.5 Hazardous Materials Handling

This section evaluates the potential effects on human health and the environment from the storage and use of hazardous materials in conjunction with the proposed CPV Vaca Station (CPVVS). Section 5.5.1 describes the existing environment that may be affected, and Section 5.5.2 identifies potential impacts on the environment and on human health from site development. Section 5.5.3 addresses potential cumulative effects, Section 5.5.4 presents proposed mitigation measures, and Section 5.5.5 presents the laws, ordinances, regulations, and standards (LORS) applicable to hazardous materials. Section 5.5.6 describes the agencies involved and provides agency contacts. Section 5.5.7 describes permits required and the permit schedule. Section 5.5.8 provides the references used to develop this section. Hazardous waste management, including handling of potentially contaminated soil and groundwater, is addressed in Section 5.14, Waste Management.

5.5.1 Affected Environment

5.5.1.1 Local Land Use

Land use in the area surrounding the project site (discussed in detail in Section 5.6, Land Use) is primarily rural agricultural. Sensitive receptors within a 3-mile radius of the project site include six schools, ten preschool/day care facilities, four hospitals/clinics, twelve churches, eight parks, and two senior care facilities. These receptors are listed in Appendix 5.1D, and shown on Figure 5.1-D2. The nearest of these receptors, also the nearest school to the project site, is the Sierra School of Solano County (private K-12), located at 5416 Holdener Road, approximately 0.7 miles north-northwest of the project site. The nearest hospital/long-term health care facility is Vaca Valley Hospital, which is located approximately 3.28 miles to the northwest.

5.5.1.2 CPVVS Hazardous Materials Use

The CPVVS will use hazardous materials during construction and during project operation. Most of the hazardous materials that will be used for the project are required for facility maintenance, such as lubrication of equipment, or will be contained within transformers and electrical switches. The project will comply with applicable laws and regulations for the storage of these materials to minimize the potential for a release of hazardous materials, and will conduct emergency response planning to address public health concerns regarding hazardous materials storage and use. The following sections describe this use, followed by tables detailing the hazardous materials used, their characteristics, the quantities of use, and use locations.

5.5.1.2.1 Construction Phase

Relatively small quantities of hazardous materials will be onsite during construction and will be limited to gasoline, diesel fuel, motor oil, hydraulic fluid, solvents, cleaners, sealants, welding flux, various lubricants, paint, and paint thinner. There are no feasible alternatives to vehicle fuels and oils for operating construction equipment. The types of paint required are dictated by the types of equipment and structures that must be coated and by the manufacturers' requirements for coating.

No regulated substances, as defined in California's Health and Safety Code, Section 25531, will be used during construction of the project. Therefore, no discussion of regulated substances storage or handling is necessary.

5.5.1.2.2 Operations Phase

Storage locations for the hazardous materials that will be used during operation are described in Table 5.5-1. Table 5.5-2 presents information about these materials, including trade names, chemical names, Chemical Abstract Service (CAS) numbers, maximum quantities onsite, reportable quantities (RQ), California Accidental Release Program (CalARP) threshold planning quantities (TPQs), and status as a Proposition 65 chemical (a chemical known to be carcinogenic or cause reproductive problems in humans). Health hazards and flammability data are summarized for these materials in Table 5.5-3, which also contains information on incompatible chemicals (e.g., sodium hypochlorite and ammonia).

Most of the hazardous substances that will be used by the project are required for facility maintenance and lubrication of equipment, or will be contained within transformers and electrical switches. The only regulated substance that will be used for the project is aqueous ammonia; toxicity characteristics and the exposure level criteria for this regulated substance are included in Table 5.5-4 and discussed in 5.5.2.3.2.

5.5.2 Environmental Analysis

Construction and operation of the project will involve the use of various hazardous materials and one regulated substance. The use of these materials and their potential to cause adverse environmental and human health effects are discussed in this section.

5.5.2.1 Significance Criteria

The project could have a significant effect on the environment in terms of hazardous materials handling if it would do the following (CEQA Guidelines Section 15002[g], Appendix G):

- Create a significant hazard to the public or the environment through the routine transport or use 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 materials, substances, or waste within one-quarter mile of an existing or proposed school.

5.5.2.2 Transportation of Hazardous Materials

Project operation will require regular transportation of hazardous materials to the project site (see also Section 5.12, Traffic and Transportation). Transportation of hazardous materials will comply with all California Department of Transportation (Caltrans), U.S. Environmental Protection Agency (USEPA), California Department of Toxic Substances Control (DTSC), California Highway Patrol (CHP), and California State Fire Marshal regulations. Aqueous ammonia, a regulated substance, will be delivered to the facility and transported in accordance with Vehicle Code Section 32100.5, which regulates the transportation of hazardous materials that pose an inhalation hazard. In addition, ammonia will only be transported along approved transportation routes. The proposed route to the project site would be from Interstate 80 (north or southbound) to the Midway Road exit, Midway Road east to Lewis Road, and Lewis Road south to the project site. Compliance with applicable regulations will ensure that impacts from the transportation of hazardous materials will be less than significant.

TABLE 5.5-1
Use and Location of Hazardous Materials

Chemical	Use	Quantity (gallons/lbs)	Storage Location	State	Type of Storage
Aqueous Ammonia (19% NH ₃ by weight)	Control oxides of nitrogen (NO _x) emissions through selective catalytic reduction	24,000 gals	Two onsite storage tanks.	Liquid	Continuously Onsite
Aqueous Ammonia (19% to 28%)	Condensate / feedwater / boiler water and steam pH control, i.e. cycle pH control	400 gallon tote	With other boiler treatment chemicals	Liquid	Continuously Onsite
Anti-scalant	Prevent scale in reverse osmosis membranes	100 gals	Portable Storage Tote/drum/plastic container – Water Treatment Building (for MDS RO); Near cooling tower blowdown treatment system RO	Liquid	Continuously Onsite
Citric Acid	Cleaning of HRSG interior piping	5,000 gals	Pallet supported chemical storage bags in protected temporary storage location on site.	Solid Powder	Initial Startup and Periodically Onsite
Cleaning chemicals/detergents	Periodic cleaning of combustion turbine	3,000 gals	Chemical storage tote or drums at a protected temporary storage location onsite.	Liquid	Continuously Onsite
Cleaning chemicals / detergents for membrane-based water treatment systems (MF/RO/EDI)	Periodic cleaning of reverse osmosis (RO), microfiltration (MF), and electrodeionization (EDI) systems	25 gals	Adjacent to each water treatment system	Liquid and/or powders	Some continuously onsite; others intermittently onsite
Sanitization chemicals for membrane-based water treatment systems (MF/RO/EDI)	Periodic cleaning of accumulated biofilms on the membranes of the reverse osmosis (RO), microfiltration (MF), and electrodeionization (EDI) systems	25 gals	Near appropriate water treatment systems, i.e., MDS and cooling tower blowdown treatment system	Liquids	Intermittently

TABLE 5.5-1
Use and Location of Hazardous Materials

Chemical	Use	Quantity (gallons/lbs)	Storage Location	State	Type of Storage
Diesel No. 2	Fuel for black start generator/fire pump	400 gals	Permanent onsite storage in above ground storage tank with secondary containment.	Liquid	Continuously Onsite
Hydraulic Oil	High-pressure combustion turbine starting system, turbine control valve actuators	900 gals	Onsite 55 Gallon Drums	Liquid	Continuously Onsite
Laboratory reagents	Water/wastewater laboratory analysis	10 gals	Laboratory chemical storage cabinets (stored in original chemical storage containers/bags)	Liquid and Granular Solid	Continuously Onsite
Lubrication Oil	Lubricate rotating equipment (e.g., gas turbine and steam turbine bearings)	1,500 gals	Lubricating oil reservoirs and 55 gallon drums	Liquid	Continuously Onsite
Mineral Insulating Oil	Transformers/switchyard	4,500 gals	Transformer tanks and 55 gallon drums	Liquid	Continuously Onsite
Oxygen Scavenger (e.g., NALCO ELIMIN-OX)	Oxygen scavenger for condensate / feedwater / boiler water conditioning	400 gallons	Boiler Chemical Feed Building	Liquid	Continuously Onsite
Amine solution	Condensate water / Feedwater / Boiler water / steam pH control	400 gallons	Boiler Chemical Feed Building	Liquid	Continuously Onsite
Bromine-containing solution	Cooling tower biocide	1,600 gallons	Cooling Tower Chemical Feed Building	Liquid	Continuously Onsite

TABLE 5.5-1
Use and Location of Hazardous Materials

Chemical	Use	Quantity (gallons/lbs)	Storage Location	State	Type of Storage
Sodium Bisulfite (NaHSO ₃)	Reduce oxidizers in reverse osmosis feed to protect the RO membranes (for cooling tower blowdown treatment system RO and MDS RO unit)	200 to 400 gallon tote	Cooling Tower Blowdown Treatment System (outside) and MDS RO system	Liquid	Continuously Onsite
Sodium Carbonate	Chemical feed to softening clarifier system	4000 ft ³ (silo storage)	Cooling Tower Blowdown Treatment System (outside)	Solid	Continuously Onsite
Hydrated Lime	Chemical feed to softening clarifier system	4000 ft ³ (silo storage)	Cooling Tower Blowdown Treatment System (outside)	Solid	Continuously Onsite
Magnesium Chloride (30%)	Chemical feed to softening clarifier system	12,000 gallon tank	Cooling Tower Blowdown Treatment System (outside)	Liquid	Continuously Onsite
Sulfuric Acid (93%)	Chemical feed to softening clarifier system	2,000 gallon tank	Cooling Tower Blowdown Treatment System (outside)	Liquid	Continuously Onsite
Ferric Chloride (30% to 38%)	Chemical feed to softening clarifier system	2-3 400 gallon totes	Cooling Tower Blowdown Treatment System	Liquid	Continuously Onsite
Polymer aid – Acrylate Solution	Chemical feed to softening clarifier system	55 gallon drum	Cooling Tower Blowdown Treatment System	Liquid	Continuously Onsite
Polymer aid	Feed to thickener in softening clarifier dewatering system	55 gallon drum	Cooling Tower Blowdown Treatment System	Liquid	Continuously Onsite
Sodium Hydroxide (NaOH) solution (20% to 50%)	Add alkalinity and raise pH of miscellaneous process streams	200 gallons	Water Treatment Bldg	Liquid	Continuously Onsite

TABLE 5.5-1
Use and Location of Hazardous Materials

Chemical	Use	Quantity (gallons/lbs)	Storage Location	State	Type of Storage
Sodium Hypochlorite (12.5% trade)	Tertiary treatment filter biological control; Filtered Water Storage Tank biological control; Cooling tower biological control; MF system membrane cleaning	8,000 gallons	Cooling Tower Chemical Feed Building; MDS treatment area	Liquid	Continuously Onsite
Hydrochloric acid	MF system membrane cleaning	MF cleaning – 200 gallon tote or smaller container 25 gallons	MDS treatment area	Liquid	Intermittently on-site
Sodium Nitrite	Closed loop cooling anti-corrosion	20 gallons	Cooling Tower Chemical Feed Building	Solid	Initial startup and periodically onsite
Proprietary non-oxidizing biocide	Biocide in cooling tower	400 gallons	Cooling Tower Chemical Feed Building	Liquid	Continuously Onsite
Proprietary corrosion inhibitor / dispersant	Circulating water corrosion and scale control	400 to 1,000 gallons	Cooling Tower Chemical Feed Building	Liquid	Continuously Onsite
Sulfuric Acid (93%)	Circulating water pH control	6,000 gallons	Cooling Tower Chemical Feed Building	Liquid	Continuously Onsite
Trisodium Phosphate (Na ₃ PO ₄) (e.g., NALCO 7208)	Boiler water alkalinity control	400 gallons	Boiler Chemical Feed Building	Liquid	Continuously Onsite
Ferric Chloride (30% - 38%)	Phosphate removal in tertiary treatment system	2,000 gallons	Near tertiary treatment system	Liquid	Continuously Onsite
Alum	Phosphate removal in tertiary treatment system	2,000 gallons	Near tertiary treatment system	Liquid	Continuously Onsite
Anti-foam agent	Control foaming in crystallizer	400 gallons	Near crystallizer	Liquid	Continuously Onsite

TABLE 5.5-1
Use and Location of Hazardous Materials

Chemical	Use	Quantity (gallons/lbs)	Storage Location	State	Type of Storage
Acetylene	Welding Gas	540 ft ³	Maintenance / Warehouse Building	Gas	Continuously Onsite
Hydrogen	Steam turbine generator cooling	50,000 ft ³	Pressurized bottles	Gas	Continuously Onsite
Oxygen	Welding Gas	540 ft ³	Maintenance / Warehouse Building	Gas	Continuously Onsite
Propane	Torch Gas	200 ft ³	Maintenance / Warehouse Building	Gas	Continuously Onsite
EPA Protocol Gases	Calibration Gases	2,500 ft ³	CEMS Enclosure	Gas	Continuously Onsite
Cleaning Chemicals	Cleaning	Varies (less than 25 gallons liquids or 100 lbs solids for each chemical)	Admin / Control Building, Maintenance / Warehouse Building	Liquid or Solid	Continuously Onsite
Paint	Touchup of painted surfaces	Varies (less than 25 gallons liquids or 100 lbs solids for each type)	Maintenance / Warehouse Building	Liquid	Continuously Onsite

TABLE 5.5-2
Chemical Inventory, Description of Hazardous Materials Stored Onsite, and Reportable Quantities

Trade Name	Chemical Name	CAS Number	Maximum Quantity Onsite	CERCLA SARA RQ ^a	RQ of Material as Used Onsite ^b	EHS TPQ ^c	Regulated Substance TQ ^d	Prop 65
Aqueous Ammonia (19% NH3 by weight)	Aqueous Ammonia	7664-41-7	20,400 ^g gals	100 lb	526 lb	500 lb	500 lb	No
Aqueous Ammonia (19%-28% NH3 by weight)	Aqueous Ammonia	7664-41-7	400 gals	100 lb	357 lb	500 lb	500 lb	No
Antiscalant	Antiscalant	Various	2,000 gals	e	e	e	e	No
Citric Acid	Citric Acid	77-92-9	5,000 gals	e	e	e	e	No
Cleaning chemicals/detergents	Various	None	3,000 gals	e	e	e	e	No
Diesel No. 2	Diesel No. 2	68476-34-6	400 gallons	e	e	e	e	No
Hydraulic Oil	Oil	None	900 gals	42 gal ^f	42 gal ^f	e	e	No
Laboratory reagents	Various	Various	10 gals	e	e	e	e	No
Lubrication Oil	Oil	None	1,500 gals	42 gal ^f	42 gal ^f			No
Mineral Insulating Oil	Oil	8012-95-1	4,500 gals	42 gal ^f	42 gal ^f			No
Oxygen Scavenger (e.g., NALCO ELIMIN-OX)	Oxygen Scavenger	None	400 gallons	e	e	e	e	No
Amine Solution	Amine	2008-39-1	400 gallons	e	e	e	e	No
Bromine Containing Solution	Bromine	7726-95-6	1,600 gallons	e	e	500 lb	500 lb	No

TABLE 5.5-2
Chemical Inventory, Description of Hazardous Materials Stored Onsite, and Reportable Quantities

Trade Name	Chemical Name	CAS Number	Maximum Quantity Onsite	CERCLA SARA RQ ^a	RQ of Material as Used Onsite ^b	EHS TPQ ^c	Regulated Substance TQ ^d	Prop 65
Sodium Bisulfite (NaHSO ₃)	Sodium Bisulfite	7631-90-5	1,000 gallons	5000 lb	5000 lb	e	e	No
Sodium Carbonate	Sodium Carbonate	497-19-8	1,600 gallons	e	e	e	e	No
Hydrated Lime	Calcium Hydroxide	1305-62-0	4000 ft ³	e	e	e	e	No
Magnesium Chloride (30%)	Magnesium Chloride	7791-18-6	12,000 gallons	e	e	e	e	No
Sulfuric Acid (93%)	Sulfuric Acid	7664-93-9	6,000 gallons	1000 lb	1,075 lb	1000 lb	1000 lb	Yes
Ferric Chloride (30% to 38%)	Ferric Chloride	7705-08-0	1,000 gallons	1000 lb	2,630 lb	e	e	No
Alum	Aluminum Sulfate	10043-01-3	1,000 gallons	5000 lb	5000 lb	e	e	No
Sodium Hydroxide (NaOH) (20% to 50%)	Sodium Hydroxide	1310-73-2	400 gallons	1000 lb	800 lb	e	e	No
Sodium Hypochlorite (12.5%)	Sodium Hypochlorite	7681-52-9	8,000 gallons	100 lb	800 lb	e	e	No
Hydrochloric Acid	Hydrochloric Acid	7647-01-0	25 gallons	5000 lb	5000 lb	e	15,000 lb	No
Sodium Nitrite	Sodium Nitrite	7632-00-0	20 gallons	100 lb	100 lb	e	e	No
Trisodium Phosphate (Na ₃ PO ₄) (e.g., NALCO 7208)	Trisodium Phosphate	7601-54-9	400 gallons	e	e	e	e	No
Acetylene	Acetylene	47-86-2	540 ft ³	e	e	e	e	No
Hydrogen	Hydrogen	1333-74-0	50,000 ft ³	e	e	e	e	No
Oxygen	Oxygen	7782-44-7	540 ft ³	e	e	e	e	No

TABLE 5.5-2
Chemical Inventory, Description of Hazardous Materials Stored Onsite, and Reportable Quantities

Trade Name	Chemical Name	CAS Number	Maximum Quantity Onsite	CERCLA SARA RQ ^a	RQ of Material as Used Onsite ^b	EHS TPQ ^c	Regulated Substance TQ ^d	Prop 65
Propane	Propane	74-98-6	200 ft ³	e	e	e	e	No
EPA Protocol Gases	Various	Various	2,500 ft ³	e	e	e	e	No
Cleaning Chemicals	Various	Various	Varies (less than 25 gallons liquids or 100 lbs solids for each chemical)	e	e	e	e	No
Paint	Various	Various	Varies (less than 25 gallons liquids or 100 lbs solids for each type)	e	e	e	e	No

^a RQ for a pure chemical, per the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Superfund Amendments and Reauthorization Act (SARA) (Ref. 40 Code of Federal Regulations [CFR] 302, Table 302.4). Release equal to or greater than RQ must be reported. Under California law, any amount that has a realistic potential to adversely affect the environment or human health or safety must be reported.

^b RQ for materials as used onsite. Since some of the hazardous materials are mixtures that contain only a percentage of an RQ, the RQ of the mixture can be different than for a pure chemical. For example, if a material only contains 10% of a reportable chemical and the RQ is 100 lb., the RQ for that material would be (100 lb.)/(10%) = 1,000 lb.

^c Extremely Hazardous Substance (EHS) TPQ (Ref. 40 CFR Part 355, Appendix A). If quantities of extremely hazardous materials equal to or greater than the TPQ are handled or stored, they must be registered with the local Administering Agency.

^d TQ is from 19 California Code of Regulations (CCR) 2770.5 (state) or 40 CFR 68.130 (federal)

^e No reporting requirement. Chemical has no listed threshold under this requirement.

^f State RQ for oil spills that will reach California state waters [Ref. CA Water Code Section 13272(f)]

^g Each Ammonia tank capacity is 12,000 gallons; however, each tank is only filled to 85% of it's capacity, or 10,200 gallons (20,400 gallons total).

TABLE 5.5-3
Toxicity, Reactivity, and Flammability of Hazardous Substances Stored Onsite

Hazardous Materials	Physical Description	Health Hazard	Reactive & Incompatibles	Flammability*
Aqueous Ammonia	Colorless liquid with pungent odor	Corrosive. Irritation to permanent damage from inhalation, ingestion, and skin contact	Acids, halogens (e.g., chlorine), strong oxidizers, salts of silver and zinc	Liquid is incombustible; vapor is combustible, but difficult to burn
Anti-scalant	Amber liquid	May cause slight irritation to the skin and moderate irritation to the eyes	None	Non flammable
Citric Acid	Odorless, white granules	Causes irritation to the skin, gastrointestinal tract, and respiratory tract	Metal nitrates (potentially explosive reaction), alkali carbonates and bicarbonates, potassium tartrate. Will corrode copper, zinc, aluminum and their alloys.	Slightly flammable
Cleaning chemicals/detergents	Liquid	Refer to individual chemical labels	Refer to individual chemical labels	Refer to individual chemical labels
Diesel No. 2	Oily, light liquid	May be carcinogenic	Sodium hypochlorite	Flammable
Hydraulic Oil	Oily, dark liquid	Hazardous if ingested	Sodium hypochlorite. Oxidizers	Combustible
Laboratory reagents	Liquid and solid	Refer to individual chemical labels	Refer to individual chemical labels	Refer to individual chemical labels
Lubrication Oil	Oily, dark liquid	Hazardous if ingested	Sodium hypochlorite. Oxidizers	Flammable
Mineral Insulating Oil	Oily, clear liquid	Minor health hazard	Sodium hypochlorite. Oxidizers	Can be combustible, depending on manufacturer
Oxygen Scavenger	Light yellow liquid with sulfurous odor	May cause asthma like attack if ingested. Can cause mild irritation. Causes asthmatic signs and symptoms in hyper-reactive individuals.	None	Not flammable
Alum	Clear, light green or amber liquid	May irritate the eyes and skin	Alkalis and water reactive materials such as oleum: cause exothermic reactions	Non-flammable
Amine	Clear, pale yellow liquid with phenolic-amine odor	Harmful if swallowed. Causes irreversible eye damage.	Hazardous polymerization will not occur	Not flammable

TABLE 5.5-3
Toxicity, Reactivity, and Flammability of Hazardous Substances Stored Onsite

Hazardous Materials	Physical Description	Health Hazard	Reactive & Incompatibles	Flammability*
Bromine	Dark red-brown	Causes eye and skin burns. May cause severe respiratory tract irritation with possible burns. May cause severe digestive tract irritation with possible burns. Lachrymator (substance which increases the flow of tears). May cause central nervous system effects. May cause cardiac disturbances. May cause liver and kidney damage.	Strong oxidizer	Contact with other material may cause fire
Ferric Chloride (30% - 38%)	Yellow-Brown Liquid	May cause irritation to the upper respiratory tract, skin, and eyes. Repeated or prolonged exposure may cause conjunctivitis. Material is toxic by ingestion.	Most common metals, aluminum strong bases, strong oxidizing agents, potassium	N/A
Hydrated Lime	White as a dry powder, wet slurry or paste	Prolonged contact may irritate or burn skin – especially in the presence of moisture. Inhalation of dust may irritate mucous membranes or respiratory passages. Direct eye contact may cause permanent damage.	Avoid Acids, Inter-halogens, Phosphorus (V) Oxide	N/A
Hydrochloric Acid	Colorless to light-yellow liquid	Very hazardous in case of skin contact, of eye contact and of ingestion. Slight hazard in case of inhalation. Skin contact may produce burns. Inhalation may produce severe irritation of respiratory tract. Severe over-exposure can result in death.	Highly reactive with metals. Reactive with oxidizing agents, organic materials, alkalis, and water	Non-flammable
Magnesium Chloride	Deliquescent crystals solid	Slightly hazardous in case of skin contact (irritant, permeator), of eye contact (irritant), of ingestion, of inhalation.	Reactive with oxidizing agents. Non-reactive with moisture.	Non-flammable
Sodium Bisulfite	Yellow liquid	Corrosive: Irritation to eyes, skin, and lungs; may be harmful if digested	Strong acids and strong oxidizing agents	Non flammable

TABLE 5.5-3
Toxicity, Reactivity, and Flammability of Hazardous Substances Stored Onsite

Hazardous Materials	Physical Description	Health Hazard	Reactive & Incompatibles	Flammability*
Sodium Carbonate	White solid (solid powder) and odorless	Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation (lung irritant)	Reactive with acids. Slightly reactive to reactive with moisture	Not flammable
Sodium Hydroxide	Solid, white, and odorless	Causes eye and skin burns. Hygroscopic. May cause severe respiratory tract irritation with possible burns. May cause severe digestive tract irritation with possible burns.	Incompatible with acids, water, flammable liquids, organic halogens, metals, aluminum, zinc, tin, leather, wool, and nitromethane.	Not flammable
Sodium Hypochlorite	Colorless liquid with strong odor	Harmful by ingestion, inhalation and through skin contact	Incompatible with strong acids, amines, ammonia, ammonium salts, reducing agents, metals, aziridine, methanol, formic acid, phenylacetonitrile.	Not flammable
Sodium Nitrite	White to slightly yellowish. Solid (powdered solid), odorless	Very hazardous in case of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (irritant). Slightly hazardous in case of skin contact (permeator). Prolonged exposure may result in skin burns and ulcerations. Over-exposure by inhalation may cause respiratory irritation. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching.	Highly reactive with combustible materials, organic materials. Reactive with reducing agents, metals, acids. Slightly reactive to reactive with moisture.	Not flammable
Stabilized Bromine (e.g., Stabrex ST70)	Clear, light yellow liquid	Corrosive: Irritant to eyes and skin. Harmful if ingested or inhaled	Strong acids, organic materials, sodium hypochlorite	Non flammable

TABLE 5.5-3
Toxicity, Reactivity, and Flammability of Hazardous Substances Stored Onsite

Hazardous Materials	Physical Description	Health Hazard	Reactive & Incompatibles	Flammability*
Sulfuric Acid	Oily, colorless to slightly yellow, clear to turbid liquid. Odorless.	Causes severe skin burns. Causes severe eye burns. Causes burns of the mouth, throat, and stomach.	Nitro compounds, carbides, dienes, alcohols (when heated): causes explosions. Oxidizing agents, such as chlorates and permanganates: causes fires and possible explosions. Allyl compounds and aldehydes: undergoes polymerization, possibly violent. Alkalies, amines, water, hydrated salts, carboxylic acid anhydrides, nitriles, olefinic organics, glycols, aqueous acids: causes strong exothermic reactions.	Not flammable
Trisodium Phosphate	White crystal	Severe irritant. Causes pain and redness. Prolonged or repeated contact may cause mild burn.	Strong acids	Not flammable
Acetylene	Colorless gas	Asphyxiant gas	Oxygen and other oxidizers including all halogens and halogen compounds. Forms explosive acetylide compounds with copper, mercury, silver, brasses containing >66 percent copper and brazing materials containing silver or copper.	Flammable
Hydrogen	Colorless, odorless, flammable gas or a colorless, odorless, cryogenic liquid.	Asphyxiation, by displacement of oxygen.	Strong oxidizers (e.g., chlorine, bromine, oxygen, oxygen difluoride, and nitrogen trifluoride). Oxygen/Hydrogen mixtures can explode on contact with a catalyst such as platinum.	Flammable
Oxygen	Colorless, odorless, tasteless gas	Therapeutic overdoses can cause convulsions. Liquid oxygen is an irritant to skin.	Hydrocarbons, organic materials	Oxidizing agent; actively supports combustion

TABLE 5.5-3
Toxicity, Reactivity, and Flammability of Hazardous Substances Stored Onsite

Hazardous Materials	Physical Description	Health Hazard	Reactive & Incompatibles	Flammability*
Propane	Propane gas (odorant added to provide odor)	Asphyxiant gas. Causes frostbite to area of contact.	Strong oxidizing agents and high heat	Flammable
EPA Protocol Gases	Gas	Refer to individual chemical labels	Refer to individual chemical labels	Refer to individual chemical labels
Cleaning Chemicals	Liquid	Refer to individual chemical labels	Refer to individual chemical labels	Refer to individual chemical labels
Paint	Various colored liquid	Refer to individual container labels	Refer to individual container labels	Refer to individual container labels

Data were obtained from Material Safety Data Sheets (MSDSs) and Lewis, 1991.

Per Department of Transportation regulations, under 49 CFR 173: "Flammable" liquids have a flash point less than or equal to 141 degrees Fahrenheit; "Combustible" liquids have a flash point greater than 141° F.

TABLE 5.5-4
Toxic Effects and Exposure Levels of Regulated Substance

Name	Toxic Effects	Exposure Levels-Pure NH ₃
Aqueous Ammonia (19-percent solution)	Contact with pure liquid or vapor causes eye, nose, and throat irritation, skin burns, and vesiculation. Ingestion or inhalation causes burning pain in mouth, throat, stomach, and thorax, constriction of thorax, and coughing followed by vomiting blood, breathing difficulties, convulsions, and shock. Other symptoms include dyspnea, bronchospasms, pulmonary edema, and pink frothy sputum. Contact or inhalation overexposure can cause burns of the skin and mucous membranes, headache, salivation, nausea, and vomiting. Other symptoms include labored breathing, bloody mucous discharge, bronchitis, laryngitis, hemmoptysis, and pneumonitis. Damage to eyes may be permanent, including ulceration of conjunctiva and cornea and corneal and lenticular opacities.	Occupational Exposures: PEL = 35 mg/m ³ OSHA TLV = 18 mg/m ³ ACGIH TWA = 25 mg/m ³ NIOSH STEL = 35 mg/m ³ Hazardous Concentrations: IDLH = 500 ppm LD ₅₀ = 350 mg/kg – oral, rat ingestion of 3 to 4 ml may be fatal Sensitive Receptors: ERPG-1 = 25 ppm ERPG-2 = 200 ppm ERPG-3 = 1,000 ppm
ERPG	Emergency Response Planning Guideline	
ERPG-1	Maximum airborne concentration below which nearly all individuals could be exposed for up to 1 hour without experiencing other than mild transient adverse health effects	
ERPG-2	Maximum airborne concentration below which nearly all individuals could be exposed for up to 1 hour without developing irreversible or serious health effects	
ERPG-3	Maximum airborne concentration below which nearly all individuals could be exposed for up to 1 hour without experiencing life-threatening health effects	
IDLH	Immediately dangerous to life and health	
LD50	Dose lethal to 50 percent of those tested	
mg/kg	milligrams per kilogram	
mg/m ³	milligrams per cubic meter	
PEL	OSHA-permissible exposure limit for 8-hour workday	
ppm	parts per million	
STEL	Short-term exposure limit, 15-minute exposure	
TLV	ACGIH threshold limit value for 8-hour workday	
TWA	NIOSH time-weighted average for 8-hour workday	

5.5.2.3 Hazardous Materials Use

5.5.2.3.1 Construction Phase

Construction will involve the transport of limited quantities of hazardous materials to the project site and will pose minor hazards associated with their use. Small oil spills may occur during onsite refueling. Equipment refueling will be performed away from water bodies to prevent contamination of water in the event of a fuel spill. Therefore, the potential environmental effects from fueling operations are expected to be limited to small areas of contaminated soil. If a fuel spill occurs on soil, the contaminated soil will be placed into barrels or trucks for offsite disposal as a hazardous waste. The worst-case scenario for a chemical release from fueling operations would be a vehicle accident involving a service or refueling truck.

The quantities of hazardous materials that will be handled during construction are relatively small. Best Management Practices (BMPs) described in Section 5.5.4.1 will be implemented by contractor personnel. Therefore, the potential for environmental effects will be less than significant.

5.5.2.3.2 Project Operation

As stated previously, most of the hazardous substances that will be used by the project are required for NO_x emission controls (i.e., ammonia), treatment and laboratory analysis of cooling water, facility maintenance, and lubrication of equipment, or will be contained within transformers and electrical switches. Their storage will be carefully contained within designated hazardous materials storage areas and their use will be carefully prescribed in terms of hazardous materials handling plans, facility Health and Safety Plans, and the Hazardous Materials Business Plan (HMBP). For the non-CalARP regulated materials, therefore, the risk of public exposure and serious hazard is low and would not be significant. The only regulated substance that will be used for the project is aqueous ammonia, described in Table 5.4-4 and as follows.

Aqueous Ammonia

The CPVVS facility will store the 19-percent aqueous ammonia solution in two aboveground storage tank (AST). The capacity of each tank is approximately 12,000 gallons. The tanks will be surrounded by individual secondary containment structures capable of holding the full contents of each tank and accumulated precipitation.

Aqueous ammonia will be used in a selective catalytic reduction (SCR) process to control NO_x emissions created in the combustion chambers of the combustion turbines. The SCR system will include catalyst modules, an ammonia storage system, and an ammonia injection system. The aqueous ammonia will be injected into the turbine exhaust housing upstream of the catalyst modules. The rate of injection will be controlled by a monitoring system that uses sensors to determine the correct quantity of ammonia to feed to the injection system.

Approximately two to three times per month (for a maximum of 36 deliveries per year), one 6,500-gallon tanker truck will deliver aqueous ammonia to the site. The ammonia will be stored in two ASTs with a combined capacity of 24,000-gallons, contained within a secondary containment system, as required by the Uniform Fire Code. This containment system includes a bermed containment area surrounding each tank. The aqueous ammonia storage tanks will be equipped with continuous tank level monitors, automated leak detection system, temperature and pressure monitors and alarms, and excess flow and emergency block valves.

Because of its hazardous properties, ammonia is classified as a regulated substance, and an accidental release of the 19 percent aqueous ammonia solution could present a human health hazard. Pure ammonia (NH₃) is a volatile substance that is very soluble in water. Aqueous ammonia consists of a solution of ammonia and water. If the aqueous ammonia solution were to leak or be released without proper controls, the ammonia in solution could escape or evaporate as a gas into the atmosphere.

Ammonia gas can be toxic to humans at sufficient concentrations. Potential toxic effects of ammonia and acceptable exposure levels are summarized in Table 5.5-4. The odor threshold of ammonia is about 5 ppm, and minor irritation of the nose and throat will occur at 30 to 50 ppm. Ammonia concentrations greater than 140 ppm will cause detectable effects on lung function even for short-term exposures (0.5 to 2 hours). At higher concentrations of 700 to 1,700 ppm, ammonia gas will cause severe effects; death occurs at concentrations of 2,500 to 6,000 ppm (Smyth, 1956).

Storage and use of ammonia would be subject to the requirements of the California Fire Code, Article 80, as well as CalARP. Article 80 of the California Fire Code contains specific requirements for control of liquid and gaseous releases of hazardous materials. Secondary containment in the form of an underground spill containment vault will be provided for the ammonia storage tank and loading area. In addition, the facility will be required to prepare a Risk Management Plan (RMP) in accordance with CalARP, further specifying safe handling procedures for the ammonia as well as emergency response procedures in the event of an accidental release. The RMP, which is discussed in more detail in Section 5.5.4.2.2, will be prepared for the site using updated modeling guidance prior to operation of CPVVS.

Because sodium hypochlorite and aqueous ammonia are incompatible chemicals, the sodium hypochlorite will be stored in a bermed area for secondary containment (an area capable of capturing any spills) that will be designed such that it is separated ammonia, to eliminate potential interactions/reactions in the event that the chemicals are accidentally released.

With the implementation of these measures, impacts related to the storage and handling of aqueous ammonia will be less than significant.

5.5.2.4 Accidental Release Hazards

If a chemical release were to occur without proper engineering controls in place, the public could be exposed to harmful vapors, and incompatible chemicals could mix, causing vapors that could also potentially have harmful effects. In addition, an uncontrolled release of liquid chemicals could run off and drain into the stormwater system and potentially degrade water quality. However, the California Fire Code, Articles 79 and 80, includes specific requirements for the safe storage and handling of hazardous materials that would reduce the potential for a release of hazardous materials, and mixing of incompatible materials. The design of the project will incorporate state-of-the-art chemical storage and handling facilities in compliance with the current California Fire Code and other applicable federal, state, and local regulations. With the implementation of these measures, the impacts related to the accidental release of hazardous materials, including ammonia, will be less than significant.

5.5.2.4.1 Offsite Consequences Analysis

Because there is human activity in the vicinity of the proposed CPVVS site, an Offsite Consequences Analysis (OCA) will be performed during the Application for Certification (AFC) process. The analysis will assess the risk to humans at various distances from the site if a spill or rupture of a aqueous ammonia storage tank were to occur or if a spill from the supply truck were to occur while refilling the storage tanks, and will assess the project in relation to the CEC's significance threshold of 75 ppm. The modeling protocol for the OCA for ammonia is presented in Appendix 5.5A.

5.5.2.5 Fire and Explosion Hazards

Table 5.5-3 describes the flammability for the hazardous materials that will be onsite. Article 80 of the California Fire Code requires all hazardous materials storage areas to be equipped with a fire extinguishing system and also requires ventilation for all enclosed hazardous material storage areas.

Aqueous ammonia, which constitutes the largest quantity of hazardous materials stored onsite, is incombustible in its liquid state. Under normal storage conditions, ammonia would not evaporate to the atmosphere because it is contained in a sealed tank that maintains the ammonia in a state that precludes evaporation. In the unlikely event that a release were to occur, ammonia could evaporate directly to the atmosphere. Ammonia vapor is combustible only within a narrow range of concentrations in air. The evaporation rate of aqueous ammonia is similar to water, which is sufficiently low that the lower explosive limit of 15 percent (or 15,000 ppm) will not be reached.

The plant machinery lubrication oil is flammable. In accordance with Article 80 of the California Fire Code, the storage area for the lubrication oil would be equipped with a fire extinguishing system and the lubrication oil would be handled in accordance with an HMBP approved by the Solano County Fire Department; Solano County Department of Resource Management, Hazardous Resources Division; and the CEC. With proper storage and handling of flammable materials in accordance with the California Fire Code and the site-specific HMBP, the risk of fire and explosion at the generating facility would be minimal.

The natural gas fuel the facility will use is flammable and could leak from the pipeline that brings the gas from the main Pacific Gas and Electric Company (PG&E) distribution pipeline. Natural gas is composed mostly of methane, but also may contain ethane, propane, nitrogen, butane, isobutene, and isopentane. It is colorless, odorless, tasteless, and is lighter than air. Methane is flammable when mixed in air at concentrations of 5 to 14 percent, which is also the detonation range. Natural gas, therefore, poses a risk of fire and explosion if an accidental release were to occur. However, the risk of a fire and/or explosion would be reduced through compliance with applicable codes, regulations, and industry design/construction standards.

The federal safety and operating requirements for natural gas pipelines are contained in Title 49 of the CFR, Parts 190 through 192. These requirements vary according to population density and land use; the pipeline classes are defined as follows:

- Class 1 includes pipelines in locations with 10 or fewer buildings intended for human occupancy.
- Class 2 includes pipelines in locations with more than 10, but fewer than 46 buildings intended for human occupancy.
- Class 3 includes pipelines in locations with more than 46 buildings intended for human occupancy, or where the pipeline is within 100 yards of any building or small well-defined outside area occupied by 20 or more people on at least 5 days per week for 10 weeks in any 12-month period.
- Class 4 includes pipelines in locations where buildings with 4 or more stories aboveground are prevalent.

The project's pipeline will be designed to meet Class 1 service and will meet California Public Utilities Commission (CPUC) General Order 112-D and 58-A standards, in addition to the federal requirements for gas pipeline construction and safety.

The closest fire station to CPVVS is Station No. 72 at 2001 Ulatis Drive, Vacaville. The station is approximately 3.5 miles away and would provide the first response to a fire at the project site. If hazardous materials were involved in the incident, Station No. 72 would be the first on site, requesting additional resources from the Fairfield Station of the Solano County Fire Department. The Fairfield Station, with trained hazmat teams and the county's hazmat equipment, is approximately 14.6 miles from the project site (1633 Union Avenue, Fairfield).

5.5.2.6 Schools

The nearest school to the CPVVS is the Sierra School of Solano County (private K-12), located at approximately 0.7 mile north-northwest from the CPVVS at 5416 Holdener Road. The proposed transportation route for delivery of regulated materials such as aqueous ammonia (and for all other hazardous materials used at the CPVVS) will not pass in the vicinity of the school. This route travels along Fry Road to the project site from I-80.

5.5.3 Cumulative Effects

A cumulative effect refers to a proposed project's incremental effect together with other closely related past, present, and reasonably foreseeable future projects whose impacts may compound or increase the incremental effect of the proposed project (Pub. Resources Code § 21083; CCR tit. 14, §§ 15064(h), 15065(c), 15130, and 15355).

Existing laws and regulations address the handling hazardous materials and the transportation and use of aqueous ammonia, an acutely hazardous material, and will ensure that hazardous materials at the CPVVS are safely managed. There are no properties adjacent to the CPVVS that use aqueous ammonia, so that a simultaneous release of this chemical from two or more sources would not cause a hazardous cumulative concentration of this chemical. Existing laws and regulations will thus ensure that the proposed project's incremental effect is not cumulatively considerable.

5.5.4 Mitigation Measures

The following sections present measures included in the project to mitigate potential public health and environmental effects of handling hazardous materials and regulated substances during construction and operation.

5.5.4.1 Construction Phase

The hazardous materials that would be used during construction present a relatively low public health risk, but could contaminate surface water or groundwater if a release occurred. Use of BMPs would reduce the potential for the release of construction-related fuels and other hazardous materials to stormwater and receiving waters as discussed in Section 5.15, Water Resources. BMPs prevent sediment and stormwater contamination from spills or leaks, control the amount of runoff from the site, and require proper disposal or recycling of hazardous materials.

Construction service personnel will follow general industry health, safety, and environmental BMPs for filling and servicing construction equipment and vehicles. The BMPs are designed to reduce the potential for incidents involving the hazardous materials. They include the following:

- Refueling and maintenance of vehicles and equipment will occur only in designated areas that are either bermed or covered with concrete, asphalt, or other impervious surfaces to control potential spills. Employees will be present during refueling activities.
- Vehicle and equipment service and maintenance will be conducted only by authorized personnel.
- Refueling will be conducted only with approved pumps, hoses, and nozzles.
- Catch-pans will be placed under equipment to catch potential spills during servicing.
- All disconnected hoses will be placed in containers to collect residual fuel from the hoses.
- Vehicle engines will be shut down during refueling.
- No smoking, open flames, or welding will be allowed in refueling or service areas.
- Refueling will be performed away from bodies of water to prevent contamination of water in the event of a leak or spill.
- When refueling is completed, the service truck will leave the project site.
- Service trucks will be provided with fire extinguishers and spill containment equipment, such as absorbents.
- Should a spill contaminate soil, the soil will be put in containers and disposed of as appropriate. All containers used to store hazardous materials will be inspected at least once per week for signs of leaking or failure. All maintenance and refueling areas will be inspected monthly. Results of inspections will be recorded in a logbook that will be maintained onsite.

In the unlikely event of a spill, the spill may need to be reported to the appropriate regulatory agencies and cleanup of contaminated soil could be required. Small spills will be contained and cleaned up immediately by trained, onsite personnel. Larger spills will be reported via emergency phone numbers to obtain help from offsite containment and cleanup crews. All personnel working on the project during the construction phase will be trained in handling hazardous materials and the dangers associated with hazardous materials. An onsite health and safety person will be designated to implement health and safety guidelines and to contact emergency response personnel and the local hospital, if necessary.

If there is a large spill from a service or refueling truck, contaminated soil will be placed into barrels or trucks by service personnel for offsite disposal at an appropriate facility in accordance with law. If a spill involves hazardous materials quantities equal to or greater than the specific RQ (42 gallons for petroleum products), all federal, state, and local reporting requirements will be followed. In the event of a fire or injury, the local fire department will be called (Fire Station No. 72).

5.5.4.2 Operation Phase

During facility operation, various hazardous materials and one regulated substance will be stored onsite as shown in Table 5.5-1. Table 5.5-2 presents information about these materials,

including trade names, chemical names, CAS numbers, maximum quantities onsite, RQs, CalARP TPQs, and status as a Proposition 65 chemical (a chemical known to be carcinogenic or cause reproductive problems in humans). Health hazards and flammability data are summarized for these materials in Table 5.5-3, which also contains information on incompatible chemicals (e.g., sodium hypochlorite and ammonia). Table 5.5-4 describes the toxicity of the regulated substance and hazardous materials. Listed below are mitigation measures for minimizing the public health risks associated with hazardous material and regulated substance handling during facility operation.

5.5.4.2.1 Hazardous Materials

All hazardous materials will be handled and stored in accordance with applicable codes and regulations specified in Section 5.5.6. Specific requirements of the California Fire Code that reduce the risk of fire or the potential for a release of hazardous materials that could affect public health or the environment include:

- Provision of an automatic sprinkler system for indoor hazardous material storage areas.
- Provision of an exhaust system for indoor hazardous material storage areas.
- Separation of incompatible materials by isolating them from each other with a noncombustible partition.
- Spill control in all storage, handling, and dispensing areas.
- Separate secondary containment for each chemical storage system. The secondary containment is required to hold the entire contents of the tank plus the volume of water for the fire suppression system that could be used for fire protection for a period of 20 minutes in the event of a catastrophic spill.

In addition, a Business Emergency/Contingency Plan (i.e., HMBP) is required by CCR Title 19 and the Health and Safety Code (Section 25504). In accordance with these regulations, the HMBP will include an inventory and location map of hazardous materials onsite and an emergency response plan for hazardous materials incidents. Specific topics currently addressed in the plan include:

- Facility identification
- Emergency contacts
- Chemical inventory information (for every hazardous material)
- Site map
- Emergency notification data
- Procedures to control actual or threatened releases
- Emergency response procedures
- Training procedures
- Certification

The revised HMBP will be filed with the Solano County Department of Resource Management, the designated Certified Unified Program Agency (CUPA) for the project site, and will be updated annually in accordance with applicable regulations.

In accordance with emergency response procedures specified in the HMBP, designated personnel will be trained as members of a plant hazardous material response team, and

team members will receive the first responder and hazardous material technical training to be developed in the HMBP, including training in appropriate methods to mitigate and control accidental spills. In the event of a chemical emergency, plant personnel will defer to the Solano County Department of Resource Management. Vacaville Fire Station No. 72 would be the first onsite. Teams from the Solano County Fire Department, Fairfield Station, located at 1633 Union Avenue, Fairfield (approximately 14.6 miles from the project site), which is also the CUPA Hazardous Emergency Response Headquarters, will be dispatched to the site simultaneously, if warranted.

5.5.4.2.2 Aqueous Ammonia

Ammonia is a regulated substance under the federal Clean Air Act (CAA) pursuant to 40 CFR 68 (Subpart G) and the CalARP pursuant to Health and Safety Code Sections 25331 through 25543.3. The California program is similar to the federal program but is more stringent in some areas.

In accordance with CalARP regulations, an RMP will be prepared for the ammonia tanks. The RMP includes a hazard assessment to evaluate the potential effects of an accidental release, a program for preventing an accidental release, and a program for responding to an accidental release. The specific components of the RMP include:

- Description of the facility
- Accident history of the facility
- History of equipment used at the facility
- Design and operation of the facility
- Site map(s) of the facility
- Piping and instrument diagrams of the facility
- Seismic analysis
- Hazard and operability study
- Prevention program
- Consequence analysis
- Offsite consequence analysis
- Emergency response
- Auditing and inspection
- Record keeping
- Training
- Certification

The RMP will be filed with the Solano County Department of Resource Management, the designated CUPA for the project site. The RMP includes a hazard assessment to evaluate the potential effects of accidental releases; a program for preventing accidental releases; and a program for responding to accidental releases to protect human health and the environment.

A Process Safety Management (PSM) plan will not be required under OSHA, because the OSHA regulations apply only to aqueous ammonia solutions above 44 percent (29 CFR Part 199).

5.5.4.2.3 Petroleum Products

Federal and California regulations require a Spill Prevention Control and Countermeasure (SPCC) plan if petroleum products above certain quantities are stored. Both federal and

state laws apply only to petroleum products that might be discharged to navigable waters. If stored quantities are equal to or greater than 660 gallons for a single container, or equal to or greater than 1,320 gallons total (including ASTs, oil-filled equipment, and drums), an SPCC plan must be prepared. Because the facility will store more than 1,320 gallons of petroleum products, an SPCC plan will be prepared.

5.5.4.2.4 Transportation/Delivery of Hazardous Materials and Regulated Substances

Hazardous materials and one regulated substance will be delivered periodically to the facility. As discussed in Section 5.12, Traffic and Transportation, transportation of hazardous materials will comply with all Caltrans, USEPA, DTSC, CHP, and California State Fire Marshal regulations. Under the California Vehicle Code, the CHP has the authority to adopt regulations for transporting hazardous materials in California. Aqueous ammonia, a regulated substance, will be delivered to the facility, and transported in accordance with Vehicle Code Section 32100.5, which regulates the transportation of hazardous materials that pose an inhalation hazard. In addition, ammonia will only be transported along approved transportation routes. The approved route to the project site would be from Interstate 80 (I-80). From I-80, northbound, trucks will exit east on Alamo Drive and head east on Fry Road. From I-80, southbound, trucks will exit east on Leisure Town Road and turn east on Fry Road.

5.5.4.2.5 Security Plan

In addition to standard industrial business security measures, the Applicant will be preparing a security plan that will include the following elements:

- Descriptions of the site fencing and security gate
- Evacuation procedures
- A protocol for contacting law enforcement in the event of conduct endangering the facility, its employees, its contractors, or the public
- A fire alarm monitoring system
- Measures to conduct site personnel background checks, including employee and routine onsite contractors consistent with state and federal law regarding security and privacy
- A site access protocol for vendors
- A protocol for hazardous materials vendors to prepare and implement security plans as per 49 CFR 172.800 and to ensure that all hazardous materials drivers are in compliance with personnel background security checks as per 49 CFR Part 172, Subpart I

The plan will also include a demonstration that the perimeter security measures will be adequate. The demonstration may include one or more of the following:

- Security guards
- Security alarm for critical structures
- Perimeter breach detectors and onsite motion detectors
- Video or still camera monitoring system

5.5.4.3 Monitoring

In accordance with applicable federal, state, and local regulations, site personnel would regularly inspect all hazardous materials handling facilities for compliance with applicable regulations and would ensure that any deficiencies were promptly repaired. In addition, the facility would be subject to regular inspections by the Vacaville Fire Department, which would ensure compliance with appropriate regulatory requirements for hazardous materials and regulated substances handling.

5.5.5 Laws, Ordinances, Regulations, and Standards

The storage and use of hazardous materials and regulated substances at the facility are governed by federal, state, and local laws. Applicable laws and regulations address the use and storage of hazardous materials to protect the environment from contamination and to protect facility workers and the surrounding community from exposure to hazardous and regulated substances. The applicable LORS are summarized in Table 5.5-5 and described below.

TABLE 5.5-5
Laws, Ordinances, Regulations, and Standards for Hazardous Materials Handling

LORS	Requirements/Applicability	Administering Agency	AFC Section Explaining Conformance
Federal			
Section 302, EPCRA (Pub. L. 99-499, 42 USC 11022) Hazardous Chemical Reporting: Community Right-To-Know (40 CFR 370)	Requires one-time notification if extremely hazardous substances are stored in excess of TPQs.	Solano County Department of Resource Management	A revised HMBP will be prepared for submittal to Solano County Department of Resource Management (Section 5.5.4.2.1).
Section 304, EPCRA (Pub. L. 99-499, 42 USC 11002) Emergency Planning and Notification (40 CFR 355)	Requires notification when there is a release of hazardous material in excess of its RQ.	Solano County Department of Resource Management	An HMBP will be prepared to describe notification and reporting procedures (Section 5.5.4.2.1).
Section 311, EPCRA (Pub. L. 99-499, 42 USC 11021) Hazardous Chemical Reporting: Community Right-To-Know (40 CFR 370)	Requires that MSDSs for all hazardous materials or a list of all hazardous materials be submitted to the SERC, LEPC, and Solano County Department of Resource Management	Solano County Department of Resource Management	The HMBP to be prepared will include a list of hazardous materials for submission to agencies (Section 5.5.4.2.1)
Section 313, EPCRA (Pub. L. 99-499, 42 USC 11023) Toxic Chemical Release Reporting: Community Right-To-Know (40 CFR 372)	Requires annual reporting of releases of hazardous materials.	Solano County Department of Resource Management	The HMBP to be prepared will describe reporting procedures (Section 5.5.4.2.1).

TABLE 5.5-5
Laws, Ordinances, Regulations, and Standards for Hazardous Materials Handling

LORS	Requirements/Applicability	Administering Agency	AFC Section Explaining Conformance
Section 112, CAA Amendments (Pub. L. 101-549, 42 USC 7412) Chemical Accident Prevention Provisions (40 CFR 68)	Requires facilities that store a listed hazardous material at a quantity greater than the TQ to develop an RMP.	Solano County Department of Resource Management	A revised RMP will be prepared and submitted to the Solano County Department of Resource Management (Section 5.5.4.2.2)
Section 311, CWA (Pub. L. 92-500, 33 USC 1251 et seq.) Oil Pollution Prevention (40 CFR 112)	Requires preparation of an SPCC plan if oil is stored in a single AST with a capacity greater than 660 gallons or if the total petroleum storage (including ASTs, oil-filled equipment, and drums) is greater than 1,320 gallons. The facility will have petroleum in excess of the aggregate volume of 1,320 gallons.	RWQCB	An SPCC will be prepared (Section 5.5.4.2.3)
Pipeline Safety Laws (49 USC 60101 et seq.) Hazardous Materials Transportation Laws (49 USC 5101 et seq.) Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards (49 CFR 192)	Specifies natural gas pipeline construction, safety, and transportation requirements.	U.S. Department of Transportation	The natural gas pipeline will be constructed in accordance with 49 CFR requirements (Section 5.5.2.5)
State			
Health and Safety Code, Section 25500, et seq. (HMBP)	Requires preparation of an HMBP if hazardous materials are handled or stored in excess of threshold quantities.	Cal/OSHA	An revised HMBP will be prepared for submittal to the Solano County Department of Resource Management (Section 5.5.4.2.1)
Health and Safety Code, Section 25531 through 25543.4 (CalARP)	Requires registration with local CUPA or lead agency and preparation of an RMP if regulated substances are handled or stored in excess of TPQs.	Solano County Department of Resource Management	A revised RMP will be prepared and submitted to the Solano County Department of Resource Management (Section 5.5.4.2.1)
Health and Safety Code, Section 25270 through 25270.13 (Aboveground Petroleum Storage Act)	Requires preparation of an SPCC plan if oil is stored in a single AST with a capacity greater than 660 gallons or if the total petroleum storage (including ASTs, oil-filled equipment, and drums) is greater than 1,320 gallons. The facility will have petroleum in excess of the aggregate volume of 1,320 gallons.	RWQCB	An SPCC plan will be prepared (Section 5.5.4.2.3)

TABLE 5.5-5
Laws, Ordinances, Regulations, and Standards for Hazardous Materials Handling

LORS	Requirements/Applicability	Administering Agency	AFC Section Explaining Conformance
Health and Safety Code, Section 25249.5 through 25249.13 (Safe Drinking Water and Toxics Enforcement Act) (Proposition 65)	Requires warning to persons exposed to a list of carcinogenic and reproductive toxins and protection of drinking water from same toxins.	OEHHA	The site will be appropriately labeled for chemicals on the Proposition 65 list. (Section 5.5.5.2.4)
Vehicle Code Section 32100.5.	Establishes the procedures for the State to determine transportation corridors for materials that may pose an inhalation hazard.	Caltrans, CHP	Transportation of aqueous ammonia will follow designated routes (Section 5.5.4.2.4)
CPUC General Order Nos. 112-E and 58-A	Specify standards for gas service and construction of gas gathering, transmission, and distribution piping systems.	CPUC	Construction of the natural gas pipeline will comply with the standards specified in these General Orders (Section 5.5.5.2.5)
Local			
City of Vacaville General Plan, 9.4 Hazardous Materials, 9.4-G2	Cooperate with Solano County on implementation of the Hazardous Waste Management Plan and review proposals for hazardous waste facilities for consistency with the Plan.	Solano County Department of Resource Management	Section 5.5.5.3
City of Vacaville General Plan, 9.4 Hazardous Materials, 9.4-I2	Ensure that development proposals involving hazardous waste facilities are consistent with the Solano County Hazardous Waste Management Plan.	Solano County Department of Resource Management	Section 5.5.5.3
City of Vacaville General Plan, 9.4 Hazardous Materials, 9.4-I3	Continue to implement a hazardous materials disclosure program.	Solano County Department of Resource Management	Section 5.5.5.3
AST	aboveground storage tank		
CAA	Clean Air Act		
CalARP	California Accidental Release Program		
Cal/OSHA	California Division of Occupational Safety and Health		
CPUC	California Public Utilities Commission		
CWA	Clean Water Act		
EPCRA	Emergency Planning and Community Right-to-Know Act of 1986		
LEPC	local emergency planning committee		
MSDS	Material Safety Data Sheet		
OEHHA	Office of Environmental Health Hazard Assessment		
Pub. L.	Public Law		
RMP	Risk Management Plan		
RQ	Reportable Quantities		
SERC	State Emergency Response Commission		
SPCC	Spill Prevention Control and Countermeasures		
TPQs	Threshold Planning Quantities		
USC	United States Code		

5.5.5.1 Federal LORS

Hazardous materials are governed under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the CAA, and the Clean Water Act (CWA).

5.5.5.1.1 29 CFR 1910 et seq. and 1926 et seq.

These sections contain requirements for equipment used to store and handle hazardous materials for the purpose of protecting worker health and safety. This regulation also addresses requirements for equipment necessary to protect workers in emergencies. It is designed primarily to protect worker health, but also contains requirements that affect general facility safety. The California regulations contained in Title 8 (California equivalent of 29 CFR) are generally more stringent than those contained in Title 29. The administering agency for the above authority is OSHA and the California Division of Occupational Safety and Health (Cal/OSHA).

5.5.5.1.2 49 CFR Parts 172, 173, and 179

These regulations provide standards for labels, placards, and markings on hazardous materials shipments by truck (Part 172), standards for packaging hazardous materials (Parts 173), and for transporting hazardous materials in tank cars (179). The administering agencies for the above authority are the CHP and U.S. Department of Transportation.

5.5.5.1.3 CERCLA

The SARA amends CERCLA and governs hazardous substances. The applicable part of SARA for the proposed project is Title III, otherwise known as EPCRA, which requires states to establish a process for developing local chemical emergency preparedness programs and to receive and disseminate information on hazardous substances present at facilities in local communities. The law provides primarily for planning, reporting, and notification concerning hazardous substances. Key sections of the law follow:

- Section 302 – Requires one-time notification when EHSs are present in excess of their TPQs. EHSs and their TPQs are found in Appendices A and B to 40 CFR Part 355.
- Section 304 – Requires immediate notification to the LEPC and the SERC when a hazardous material is released in excess of its RQ. If a CERCLA-listed hazardous substance RQ is released, notification must also be given to the National Response Center in Washington, D.C. (RQs are listed in 40 CFR Part 302, Table 302.4). These notifications are in addition to notifications given to the local emergency response team or fire personnel.
- Section 311 – Requires that either MSDSs for all hazardous materials or a list of all hazardous materials be submitted to the SERC, LEPC, and local fire department.
- Section 313 – Requires annual reporting of hazardous materials released into the environment either routinely or as a result of an accident.

The administering agencies for the above authority are the USEPA Region IX, the National Response Center, and the Solano County Department of Resource Management. The Solano County Department of Resource Management is a CUPA.

5.5.5.1.4 Clean Air Act

Regulations (40 CFR 68) under the CAA are designed to prevent accidental releases of hazardous materials. The regulations require facilities storing a TQ or greater of listed regulated substances to develop an RMP, including hazard assessments and response programs to prevent accidental releases of listed chemicals. Section 112(r)(5) of the CAA discusses the regulated substances. These substances are listed in 40 CFR 68.130. Aqueous ammonia is a listed substance, and its TQ for solutions of 20 percent and greater is 20,000 pounds of solution.

5.5.5.1.5 Clean Water Act

The Spill Prevention Control and Countermeasures (SPCC) rule under the CWA is designed to prevent or contain the discharge or threat of discharge of oil into navigable waters or adjoining shorelines. Regulations (40 CFR 112) under the CWA require facilities to prepare a written SPCC Plan if they store oil and its release would pose a threat to navigable waters. The SPCC rule is applicable if a facility has a single oil AST with a capacity greater than 660 gallons, total petroleum storage (including ASTs, oil-filled equipment, and drums) greater than 1,320 gallons, or underground storage capacity greater than 42,000 gallons. The SPCC rule is administered by the local CUPA, which is the Solano County Department of Resource Management.

Other related federal laws that address hazardous materials but do not specifically address their handling, include the Resource Conservation and Recovery Act, which is discussed in Section 5.14, Waste Management, and the Occupational Safety and Health Act, which is discussed in Section 5.16, Worker Health and Safety.

5.5.5.1.6 Natural Gas Pipeline Construction and Safety

Title 40 of the CFR, parts 190 through 192, specifies safety and construction requirements for natural gas pipelines. Part 190 outlines pipeline safety procedures, Part 191 requires a written report for any reportable incident, and Part 192 specifies minimum safety requirements for pipelines.

5.5.5.2 State LORS

California laws and regulations relevant to hazardous materials handling at the facility include Health and Safety Code Section 25500 (hazardous materials), Health and Safety Code 25531 (regulated substances), and the Aboveground Petroleum Storage Act (petroleum in aboveground tanks).

5.5.5.2.1 Title 8, California Code of Regulations, Section 339; Section 3200 et seq., Section 5139 et seq. and Section 5160 et seq.

Section 339 of Title 8 of the CCR lists hazardous chemicals relating to the Hazardous Substance Information and Training Act; 8 CCR Section 3200 et seq. and 5139 et seq. address control of hazardous substances; 8 CCR Section 5160 et seq. addresses hot, flammable, poisonous, corrosive, and irritant substances.

5.5.5.2.2 Health and Safety Code Section 25500

California Health and Safety Code, Section 25500, et seq., and the related regulations in 19 CCR 2620, et seq., require local governments to regulate local business storage of hazardous materials in excess of certain quantities. The law also requires that entities storing hazardous materials be prepared to respond to releases. Those using and storing hazardous

materials are required to submit an HMBP to their local CUPA and to report releases to their CUPA and the State Office of Emergency Services. The TQs for hazardous materials are 55 gallons for liquids, 500 pounds for solids, and 200 cubic feet for compressed gases measured at standard temperature and pressure.

5.5.5.2.3 Health and Safety Code Section 25531 (California Accidental Release Program)

California Health and Safety Code, Section 25531, et seq., and the CalARP regulate the registration and handling of regulated substances. Regulated substances are any chemicals designated as an extremely hazardous substance by the USEPA as part of its implementation of SARA Title III. Health and Safety Code Section 25531 overlaps or duplicates some of the requirements of SARA and the CAA. Facilities handling or storing regulated substances at or above TPQs must register with their local CUPA and prepare an RMP, formerly known as a Risk Management and Prevention Program. The CalARP is found in Title 19, CCR, Chapter 4.5. The TPQ for ammonia is 500 pounds. Portions of the aqueous ammonia process that can be demonstrated to have a partial pressure of the regulated substance in the mixture (solution) under the handling or storage conditions (less than 10 millimeters of mercury) do not count toward the threshold.

5.5.5.2.4 Aboveground Petroleum Storage Act

The California Health and Safety Code Sections 25270 to 25270.13 ensure compliance with the federal CWA. The law applies to facilities that operate a petroleum AST with a capacity greater than 660 gallons or combined ASTs capacity greater than 1,320 gallons, or oil-filled equipment where there is a reasonable possibility that the tank(s) or equipment may discharge oil in "harmful quantities" into navigable waters or adjoining shore lands. If a facility falls under these criteria, it must prepare an SPCC plan.

5.5.5.2.5 Safe Drinking Water and Toxics Enforcement Act (Proposition 65)

This California law requires the state to identify chemicals that cause cancer and reproductive toxicity, contains requirements for informing the public of the presence of these chemicals, and prohibits discharge of the chemicals into sources of drinking water. Lists of the chemicals of concern are published and updated periodically by California's Office of Environmental Health Hazard Assessment. Some of the chemicals to be used at the facility are on the cancer-causing and reproductive-toxicity lists of the Act.

5.5.5.2.6 Natural Gas Pipeline Construction and Safety

The CPUC enforces General Order No. 58-A, which specifies standards for natural gas service in the State of California, and General Order No. 112-E, which specifies rules governing the design, construction, testing, operation, and maintenance of natural gas gathering, transmission, and distribution piping systems. The proposed project will connect to an existing PG&E high-pressure natural gas pipeline through a new pipeline located in agricultural fields north of Fry Road.

5.5.5.2.7 California Vehicle Code Section 32100.5

California Vehicle Code Section 32100.5 regulates the transportation of hazardous materials that pose an inhalation hazard. Aqueous ammonia, a regulated substance, will be delivered to the facility and transported in accordance with this section by following the designated access routes, as described previously in Section 5.5.4.2.4.

5.5.5.3 Local LORS

The Solano County Department of Resource Management is the designated CUPA and is responsible for administering HMBPs, Hazardous Materials Management Plans, SPCC Plans, and RMPs filed by businesses located in the county. The Solano County Department of Resource Management is also responsible under the CUPA program for underground storage tank compliance. In addition, the Solano County Department of Resource Management is responsible for ensuring that businesses and industry store and use hazardous materials safely and in conformance with various regulatory codes. The Solano County Department of Resource Management performs inspections at established facilities to verify that hazardous materials are properly stored and handled and that the types and quantities of materials reported in a firm's HMBP are accurate.

5.5.5.4 Codes

The design, engineering, construction, and operation of hazardous materials storage and dispensing systems will be in accordance with all applicable codes and standards, including the following:

- California Vehicle Code, 13 CCR 1160, et seq. – Provides the CHP with authority to adopt regulations for the transportation of hazardous materials in California. The CHP can issue permits and specify the route for hazardous material delivery.
- The California Fire Code, Articles 79 and 80 – The hazardous materials sections of the Fire Code. Local fire agencies or departments enforce this code and can require that an HMBP and a Hazardous Materials Inventory Statement be prepared. The California Fire Code is based on the Federal Fire Code.
- State Building Standard Code, Health and Safety Code Sections 18901 to 18949 – Incorporates the Uniform Building Code, Uniform Fire Code, and Uniform Plumbing Code.
- The American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section VIII
- City of Vacaville Municipal Code

5.5.6 Agencies and Agency Contacts

Several agencies regulate hazardous materials, and they will be involved in regulating the hazardous materials stored and used at CPVVS. At the federal level, the USEPA will be involved; at the state level, the California EPA will be involved. However, local agencies primarily enforce hazardous materials laws. For CPVVS, the primary local agencies with jurisdiction will be the Solano County Department of Resource Management and the Vacaville Fire Department. The persons to contact are shown in Table 5.5-6.

TABLE 5.5-6
Agency Contacts for Hazardous Materials Handling

Issue	Agency	Contact
CUPA for Hazardous Materials Inventory and Emergency Business Plan and Risk Management Plan	Solano County Department of Resource Management, Hazardous Materials Section 675 Texas Street, Suite 5500 Fairfield, CA 94533	Albert G. Netto Senior Hazardous Materials Specialist (707) 784-6765 anetto@solanocounty.com
Fire Department Permits	Vacaville Fire Department 650 Merchant Street Vacaville, CA 95688	Joel Brick Fire Marshall, Division Chief (707) 449-5463 jbrick@cityofvacaville.com
Hazardous Materials Response	Solano County Department of Resource Management, Hazardous Materials Section 675 Texas Street, Suite 5500 Fairfield, CA 94533	Albert G. Netto Senior Hazardous Materials Specialist (707) 784-6765 anetto@solanocounty.com

5.5.7 Permits and Permit Schedule

The Solano County Department of Resource Management and the City of Vacaville require that project developers obtain the permits listed in Table 5.5-7 before storing hazardous materials on site.

TABLE 5.5-7
Permits and Permit Schedule for Hazardous Materials Handling

Permit	Agency Contact	Schedule
Hazardous Materials Business Plan	Solano County Department of Resource Management, Hazardous Materials Section Albert G. Netto Senior Hazardous Materials Specialist 675 Texas Street, Suite 5500 Fairfield, CA 94533 (707) 784-6765	Approximately 60 days before any regulated substance comes on site
Risk Management Plan	Solano County Department of Resource Management, Hazardous Materials Section Colby LaPlace 675 Texas Street, Suite 5500 Fairfield, CA 94533 (707) 784-6765	Approximately 60 days before any regulated substance comes on site

5.5.8 References

Lewis, Richard J., Sr. 1991. *Hazardous Chemical Desk Reference*, 2nd Edition.

Smyth H. F., Jr. 1956. "Improved Communication: Hygienic Standards for Daily Inhalation." *Am. Ind. Hyg. Assoc.* Q 17(2):129-185.