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Project Title:	Gem Energy Storage Center
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Document Title:	Section 5_16_Worker Health and Safety_Gem Energy Storage Center
Description:	This subsection summarizes the worker health and safety issues that may be encountered during the construction and operation of the proposed Gem Energy Storage Center (GESC or Gem). Because of the subject matter, this subsection follows a slightly different format than other subsections in Section 5. Instead of a standard discussion of affected environment followed by the project's environmental consequences and proposed mitigation measures for significant impacts, this subsection contains worker safety information, including the laws, ordinances, regulations, and standards (LORS) that apply to the GESC. Section 5.16.1 contains a brief description of the work environment and setting. Section 5.16.2 describes the health and safety programs in terms of analyses conducted to identify hazards and also the safety compliance and training programs that will be established onsite. Section 5.16.3 discusses the applicable LORS. Section 5.16.4 lists the regulatory agencies involved and key agency contacts. Section 5.16.
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5.16 Worker Health and Safety

This subsection summarizes the worker health and safety issues that may be encountered during the construction and operation of the proposed Gem Energy Storage Center (GESC or Gem). Because of the subject matter, this subsection follows a slightly different format than other subsections in Section 5. Instead of a standard discussion of affected environment followed by the project's environmental consequences and proposed mitigation measures for significant impacts, this subsection contains worker safety information, including the laws, ordinances, regulations, and standards (LORS) that apply to the GESC. Section 5.16.1 contains a brief description of the work environment and setting. Section 5.16.2 describes the health and safety programs in terms of analyses conducted to identify hazards and also the safety compliance and training programs that will be established onsite. Section 5.16.3 discusses the applicable LORS. Section 5.16.4 lists the regulatory agencies involved and key agency contacts. Section 5.16.5 provides information regarding required permits and permitting schedules.

5.16.1 Setting

The GESC project is a 500-megawatt (MW) energy storage facility that is designed to deliver up to 6,000 MW hours (MWh) over an 8-hour period when discharging. The approximately 71-acre Gem Energy Storage Center will be located just over one mile north of Willow Springs, CA. The GESC will provide electricity to the existing Southern California Edison (SCE) Whirlwind Substation via an estimated 10.9-mile interconnection transmission line from the 500-megawatt (MW) A-CAES system.

The Advanced Compressed Air Energy Storage (A-CAES) technology will compress air using electricity from the grid, capture heat in the thermal system and store compressed air in purpose-built underground storage caverns. Stored compressed air will then be converted to electricity using hydrostatic pressure to force air to the surface where it is recombined with the stored heat and expanded through a turbine to generate electricity on demand.

5.16.2 Health and Safety Program

5.16.2.1 Environmental Checklist

Impacts would generally be evaluated with respect to the California Environmental Quality Act checklist, which does not have specific questions for worker health and safety. Related questions are addressed in Section 5.5, Hazardous Materials Management, and Section 5.7, Noise.

5.16.2.2 Hazard Analysis

Workers will be exposed to plant construction, operation conditions, and activities that pose potential safety hazards. A hazard analysis is included to evaluate the hazards and assess control measures. The analysis identifies the hazards anticipated during construction and operation and indicate which safety programs should be developed and implemented to avoid, mitigate, and appropriately manage those hazards. The hazard analysis for construction activities is presented in Table 5.16-1; the hazard analysis prepared for plant operation is presented in Table 5.16-2. The types of hazards anticipated during plant construction and operation are similar, thus there is duplication between the tables. Programs are overall plans that set forth the method or methods that will be followed to achieve particular health and safety objectives. For example, the Fire Protection and Prevention Program will describe what is necessary to protect against and prevent fires. This will include the equipment required, such as alarm systems and firefighting equipment, and procedures to follow to protect against fires. The Emergency Action Program/Plan will describe evacuation procedures, muster points, rescue and medical protocols, alarm and communication systems, operational upsets, and response procedures for every hazardous

material spills . The programs or plans will be in written and electronic formats that will be kept at specific locations in the facility and readily available to staff and first responders.

Each program or plan will contain job specific training requirements that are translated into detailed training courses. These courses are taught to plant construction and operating personnel as needed. For example, all plant operating personnel will receive training in evacuation procedures under the Emergency Action Program/Plan, but only those personnel working with flammables will receive training under the Fire Protection and Prevention Program.

Tables 5.16-1 and 5.16-2 list construction and operation activities and associated hazards, respectively, and the tables show the program designed to reduce the occurrence of each hazard (in the Control column).

Table 5.16-1: Construction Hazard Analysis for the Gem Energy Storage Facility

Activity	Hazard[a,b]	Control
Motor vehicle and heavy equipment use	▪ Employee injury and property damage from collisions between people and equipment	▪ Motor Vehicle and Heavy Equipment Safety Program
Forklift operation	▪ Same as heavy equipment	▪ Forklift Operation Program
Trench and excavation	▪ Employee injury and property damage from the collapse of trenches and excavations or exposure to fumes or vapors that have collected in the trench/excavation	▪ Excavation/Trenching Program ▪ Confined Space Training
Working at elevated locations	▪ Falls from the same level and elevated areas	▪ Fall Prevention Program ▪ Scaffolding/Ladder Safety Program ▪ Articulating Boom Platforms Program ▪ Working at Heights
Using cranes and derricks	▪ Property damage from falling loads ▪ Employee injuries from falling loads ▪ Injuries and property damage from contact with crane or derrick ▪ Inclement weather	▪ Crane and Material Handling Program ▪ Critical Lift Studies as necessary ▪ Crane Operator Certification
Working with flammable and combustible liquids	▪ Fire/spills	▪ Fire Protection and Prevention Program ▪ Housekeeping and Material Handling and Storage Program
Hot work (including cutting and welding)	▪ Employee injury and property damage from fire ▪ Exposure to fumes during cutting and welding ▪ Ocular exposure to ultraviolet and infrared radiation during cutting and welding	▪ Hot Work Safety Program ▪ Respiratory Protection Program ▪ Employee Exposure Monitoring Program ▪ PPE Program ▪ Fire Protection and Prevention Program

Activity	Hazard[a,b]	Control
Inspection and maintenance of temporary systems used during construction activities	▪ Employee injury and property damage from contact with hazardous energy sources ▪ (e.g., electrical, thermal, and mechanical)	▪ Electrical Safety Program ▪ LO/TO Program
Working on electrical equipment and systems	▪ Employee contact with live electricity and energized equipment	▪ Electrical Safety Program ▪ PPE Program
Exposure to hazardous waste	▪ Personnel who are working with or have the potential to be exposed to contaminated soil, groundwater, or debris during construction	▪ Hazardous Waste Program
Confined space entry	▪ Employee injury from physical and chemical hazards	▪ Permit-required, Confined-space Entry Program
General construction activity	▪ Employee injury from hand and portable power tools	▪ Hand and Portable Power Tool Safety Program ▪ PPE Program ▪ Powder-actuated Tools Program
	▪ Employee injury/property damage from inadequate walking and work surfaces	▪ Housekeeping and Material Handling and Storage Program
	▪ Employee exposure to occupational noise	▪ Hearing Conservation Program ▪ PPE Program
	▪ Employee injury from improper lifting and carrying materials and equipment	▪ Back Injury Prevention Program
	▪ Employee injury to head, eye/face, hand, body, foot, and skin	▪ PPE Program
	▪ Employee exposure to hazardous gases, vapors, dusts, and fumes	▪ Hazard Communication Program ▪ Respiratory Protection Program ▪ PPE Program ▪ Air Monitoring Program
	▪ Employee exposure to various hazards ▪ Reporting of hazardous conditions during construction	▪ Injury and Illness Prevention Program
	▪ Heat and cold stress	▪ Heat and Cold Stress Monitoring and Control Program

Activity	Hazard[a,b]	Control
Construction and testing of high-pressure steam and air systems	▪ Employee injury and property damage attributable to failure of pressurized system components or unexpected release of pressure	▪ Pressure Vessel and Pipeline Safety Program ▪ Electrical Safety Program ▪ LO/TO Program
Use of explosives	▪ Employee injury and property damage from contact with explosive energy sources ▪ Regulatory non-compliance ▪ Post blast air quality – reentering excavation before blast gases have cleared. ▪ Unexploded blasting caps or initiators fire off during mucking operation. ▪ Damage to life and property due to improper storage and transport of explosives. ▪ Secure storage and inventory of explosives to prevent theft.	▪ Explosive Control Plan ▪ Housekeeping and Material Handling and Storage Program ▪ Post Blast Ventilation Protocol ▪ Post Blast Muck Pile Inspection ▪ ATF Regulations – Storage and Transport of Explosives ▪ ATF Regulations – Storage and Transport of Explosives
Underground mining activities	▪ Employee injury from inadequate ground control ▪ Employee injury from underground fire ▪ Employee injury from slips, trips, and falls. ▪ Employee injury and property damage from loose wall rock falls. ▪ Employee injury due to poor atmospheric conditions related to equipment exhaust. ▪ Employee injury due to equipment striking employee. ▪ Employee injury due to employees entering sump areas. ▪ Employee injury while working in shaft areas. ▪ Employee injury due to inhalation of silica.	▪ Underground Ground Control Plan ▪ Inspection and monitoring plan for reporting of ground conditions ▪ Hazard Communication Plan ▪ Housekeeping Plan ▪ Inspection and Scaling Plan ▪ Ventilation Plan ▪ Pedestrian Travel Plan ▪ Confined Space Entry Plan ▪ Fall Protection Plan ▪ Dust Control Plan
Shaft Drilling	▪ Employee injury due to rotating equipment. ▪ Explosive gas mixture encountered while drilling. ▪ Employee injury due to equipment failure during heavy lift operations.	▪ Physical Barriers ▪ Atmospheric Monitoring Plan ▪ Critical Lift Plan

Activity	Hazard[a,b]	Control
Working Near Water	▪ Employee injury when working near reservoir (slips trips fall),	▪ Fall Protection Plan ▪ Working near water hazards ▪ Life Safety Vest (PPE) training
Working Outdoors/Remote	▪ Employee working alone outdoors could suffer an injury ▪ Lightning Strike during a storm	▪ Working alone/Man Down plan ▪ Lightening Procedure

[a] The hazards and hazard controls provided are generic to construction activities. During various phases of construction, additional hazard analysis will be performed to evaluate the relevant hazards more specifically and to develop appropriate controls.

[b] Because neither construction, nor operation of the Gem facility will involve contact with groundwater, there will be no contact with contaminated groundwater.

LO/TO = lock-out/tag-out; PPE = personal protective equipment

Table 5.16-2: Operation Hazard Analysis for the Gem Energy Storage Facility

Activity	Hazard[a]	Control
Motor vehicle and heavy equipment use	▪ Employee injury and property damage from collisions between people and equipment	▪ Motor Vehicle and Heavy Equipment Safety Program
Forklift operation	▪ Same as heavy equipment	▪ Forklift Operation Program
Trench and excavation	▪ Employee injury and property damage from the collapse of trenches and excavations	▪ Excavation/Trenching Program ▪ Confined Space Training
Working at elevated locations	▪ Falls from the same level and elevated areas	▪ Fall Prevention Program ▪ Scaffolding/Ladder Safety Program ▪ Working at Heights
Using cranes and derricks	▪ Property damage from falling loads ▪ Employee injuries from falling loads ▪ Injuries and property damage from contact with crane or derrick	▪ Crane and Material Handling Program| ▪ Critical Lift Studies as necessary ▪ Crane Operator Certification
Working with flammable and combustible liquids	▪ Fire/spills	▪ Fire Protection and Prevention Program
Working with hazardous materials	▪ Employee injury (chemical burns, inhalation, digestion, absorption)	▪ Safe Use Handling Procedures ▪ Job Specific Training ▪ PPE Program ▪ Spill Response Procedures ▪ Emergency Response Program

Activity	Hazard[a]	Control
Hot work (including cutting and welding)	▪ Employee injury and property damage from fire ▪ Exposure to fumes during cutting and welding ▪ Ocular exposure to ultraviolet and infrared radiation during cutting and welding	▪ Hot Work Safety Program ▪ Respiratory Protection Program ▪ Employee Exposure Monitoring Program ▪ PPE Program ▪ Fire Protection and Prevention Program ▪ Hexavalent Chromium Program
Troubleshooting and maintenance of plant systems and general operational activities	▪ Employee injury and property damage from contact with hazardous energy sources (e.g., electrical, thermal, and mechanical)	▪ Electrical Safety Program ▪ LO/TO Program
Working on electrical equipment and systems	▪ Employee contact with live electricity	▪ Electrical Safety Program ▪ PPE Program
Confined space entry	▪ Employee injury from physical and chemical hazards	▪ Confined-space Program
General plant operation activities	▪ Employee injury from hand and portable power tools	▪ Hand and Portable Power Tool Safety Program ▪ PPE Program
	▪ Employee injury and property damage from inadequate walking and work surfaces	▪ Housekeeping and Material Handling and Storage Program
	▪ Employee overexposure to occupational noise	▪ Hearing Conservation Program ▪ PPE Program
	▪ Employee injury from improper lifting and carrying materials and equipment	▪ Back Injury Prevention Program
	▪ Employee injury and property damage from unsafe driving	▪ Safe Driving Program
	▪ Employee overexposure to hazardous gases, vapors, dusts, and fumes	▪ Hazard Communication Program ▪ Respiratory Protection Program ▪ PPE Program ▪ Employee Exposure Monitoring Program
	▪ Reporting and repairing hazardous conditions	▪ Injury and Illness Prevention Program
	▪ Heat and cold stress	▪ Heat and Cold Stress Monitoring and Control Program
	▪ Ergonomic injuries	▪ Ergonomic Awareness Program

Activity	Hazard[a]	Control
Maintaining and repairing high-pressure systems	▪ Employee injury and property damage due to failure of pressurized system components or unexpected release of pressure	▪ Pressure Vessel and Pipeline Safety Program ▪ Electrical Safety Program ▪ LO/TO Program
Housekeeping (General)	▪ Electrostatic charge from use of Vacuum Trucks ▪ Dust and Airborne risk - Filter Change out on filter houses	▪ Respirator training ▪ Grounding procedures
Working near Water	▪ Employee injury when working near reservoir (slips trips fall),	▪ Fall Protection Plan ▪ Working near water hazards ▪ Life Safety Vest (PPE) training ▪ Life Saving Stations at regular intervals
Working Outdoors	▪ Employee working alone outdoors could suffer an injury ▪ Lightning Strike during a storm	▪ Working alone / Man Down plan ▪ Lightning Procedure ▪ Heat Stress Training & Management
Biological Hazards	▪ Wildlife Hazards ▪ ▪ Flora ▪ ▪ COVID-19 Impacts	▪ Emergency Response Plan ▪ Working Alone / Man Down Plan ▪ Pest Management Protocol ▪ Vector Management Program ▪ Poison Species Awareness Program for Employees ▪ Hygiene Program

[a] The hazards and hazard controls provided are generic to operations. During various phases of operation additional hazard analysis will be performed to evaluate the relevant hazards more specifically and to develop appropriate controls.

5.16.2.3 Training and Safety Programs

To protect the safety and health of workers during the construction and operation of the GESC, health and safety programs designed to mitigate hazards and comply with applicable regulations will be implemented. Periodic audits will be performed by qualified individuals to determine whether proper work practices are being used to mitigate hazardous conditions and to evaluate regulatory compliance.

The following subsections contain information on the anticipated content of the health and safety programs.

5.16.2.3.1 Construction Health and Safety Program

The following construction safety programs will be developed and implemented during construction of the GESC as outlined:

- **Injury and Illness Prevention Program**
  - Philosophy and safety commitment
  - Safety leadership and responsibilities

- Accountability
- Specific core safety processes (see Construction Safety Programs in this subsection)
- Employee communication
- Planning “job hazard analysis and pre-task”
- Compliance with work rules and safe work practices
- Measurement of compliance and effectiveness of prevention methods, and inspections/audits
- Communication of performance and implementation of necessary improvements
- Training and other communication requirements

- **Fire Protection and Prevention Program**
  - General requirements
  - Housekeeping and proper material storage
  - Employee alarm/communication system
  - Portable fire extinguishers
  - Fixed firefighting equipment
  - Fire control and containment
  - Flammable and combustible liquid storage
  - Dispensing and disposal of flammable liquids
  - Service and refueling areas
  - Training
- **PPE Program**
  - Personal protective devices
  - Hazard analysis
  - Training
  - Head protection
  - Eye/face protection
  - Body protection
  - Hand protection
  - Foot protection

- Skin protection
- Fall protection
- Electrical arc flash protection
- Respiratory protection
- Hearing protection

- **First Aid, CPR, and Automated External Defibrillator**
  - General requirements
  - Written program
  - Training
  - Maintenance

- **Emergency Action Program/Plan**
  - Emergency procedures for the protection of personnel, equipment, the environment, and materials:
    - Fire and emergency reporting procedures
    - Response actions for accidents involving personnel and/or property
    - Bomb threat response procedures
    - Site assembly and emergency evacuation route procedures
    - Natural disaster response
  - Reporting and notification procedures for emergencies and contacts, including offsite and local authorities:
    - Alarm and communication systems
    - Spill response, prevention, and control action plan
    - Emergency response equipment
    - Emergency personnel (response team) responsibilities and notification roster
    - Training requirements

- **Construction Safety Programs**
  - **Motor Vehicle and Heavy Equipment Safety Program**
    - Operation and maintenance of vehicles
    - Inspection

  - PPE
  - Training
- **Forklift Operation Program**
  - Trained and certified operators
  - Fueling operations
  - Safe operating parameters
  - Training
- **Excavation/Trenching Program**
  - Shoring, sloping, and benching requirements
  - California Division of Occupational Safety and Health (Cal/OSHA) permit requirements
  - Inspection
  - Air monitoring
  - Access and egress
- **Fall Protection Program**
  - Evaluation of fall hazards
  - Protection devices
  - Training
- **Scaffolding/Ladder Safety Program**
  - Construction and inspection of equipment
  - Proper use
  - Training
- **Articulating Boom Platforms Program**
  - Inspection of equipment
  - Load ratings
  - Safe operating parameters
  - Operator training

- **Crane and Material Handling Program**
  - Certified and licensed operators
  - Inspection of equipment
  - Load ratings
  - Safe operating parameters
  - Training
- **Hazardous Waste Program (KCEHD 2021)**
  - Evaluation of hazard
  - Training
  - Air monitoring
  - Medical surveillance
  - Health and Safety Plan preparation
- **Hot Work Safety Program**
  - Welding and cutting procedures
  - Acetylene and fuel gas safety procedures
  - Fire watch
  - Hot work permit
  - PPE
  - Training
- **Employee Exposure Monitoring Program**
  - Exposure evaluation
  - Monitoring requirements
  - Reporting of results
  - Medical surveillance
  - Training

- **Electrical Safety Program**
  - Grounding procedure
  - Overhead and underground utilities
  - Utility clearance
  - Assured Grounding Program/Ground Fault Circuit Interrupters
  - Training
- **LO/TO Program**
  - Allocation of devices (e.g., locks, tags, and adaptors)
  - LO/TO sequencing
  - Types/magnitudes of energy
  - Types/locations of machines
  - Verification
  - Training
- **Permit-required Confined-space Entry Program**
  - Air monitoring and ventilation requirements
  - Rescue procedures
  - LO/TO and blocking, blinding, and blanking requirements
  - Permit completion
  - Training
- **Hand and Portable Power Tool Safety Program**
  - Guarding and proper operation
  - Training
- **Powder-actuated Tool Safety Program**
  - Operator qualification
  - Inspection requirements
  - Repair requirements
  - Storage requirements
  - Training

- **Housekeeping and Material Handling and Storage Program**
  - Storage requirements
  - Walkways and work surfaces
  - Equipment handling requirements
  - Training
- **Hearing Conservation Program**
  - Identifying high-noise environments
  - Exposure monitoring
  - Medical surveillance requirements
  - Hearing-protective devices
  - Training
- **Back Injury Prevention Program**
  - Proper lifting and material handling procedures
  - Training
- **Hazard Communication Program (KCEHD 2021)**
  - Labeling requirements
  - Storage and handling
  - Safety data sheets
  - Chemical inventory
  - Training
- **Respiratory Protection Program**
  - Selection and use
  - Storage
  - Fit testing
  - Medical requirements
  - Inspection and repair
  - Training

- **Heat and Cold Stress Monitoring and Control Program**
  - Monitoring requirements
  - Prevention and control
- **Pressure Vessel and Pipeline Safety Program**
  - Line-breaking program
  - Equipment inspection and maintenance
  - Blocking, bleeding, and blanking
  - Training
- **Underground Safety Programs**
  - Pre & Post Blast Inspection Programs
  - Storage, Handling, Training and Transportation of Explosives
  - Evacuation Plan
  - Underground Fire Plan
  - Underground Water Management Plan
  - Access Management
  - PPE Training
  - Housekeeping Plan
  - Inspection and Scaling Plan
  - Ventilation Plan
  - Refueling Plan
  - Pedestrian Travel Plan
  - Spill Response Plan
  - Confined Space Entry Plan
  - Fall Protection Plan
  - Air Monitoring Plan
  - Dust Control Plan
  - Mobile Equipment Inspection Program

5.16.2.3.2 Operation Health and Safety Program

Upon completion of construction and commencement of operations at the GESC, the construction Health and Safety Plan will transition into an operation-oriented program reflecting the hazards and controls necessary during operation. The following outline sets forth the topics that will be included in the Operations Health and Safety Program:

- **Injury and Illness Prevention Program**
  - Personnel with the responsibility and authority for implementing the plan
  - Safety and health policy
  - Work rules and safe work practices
  - System for ensuring that employees comply with safe work practices
  - Employee communications
  - Identification and evaluation of workplace hazards
  - Methods and/or procedures for correcting unsafe or unhealthy conditions, work practices, and work procedures in a timely manner based on the severity of the hazards
  - Specific safety procedures (see Plant Operation Safety Program)
  - Training and instruction
- **First Aid, CPR, and Automated External Defibrillator**
  - General requirements
  - Written program
  - Training
  - Maintenance
- **Fire Protection and Prevention Program**
  - General requirements
  - Fire hazard inventory, including ignition sources and mitigation
  - Housekeeping and proper materials storage
  - Employee alarm/communication system
  - Portable fire extinguishers
  - Fixed firefighting equipment
  - Fire control
  - Flammable and combustible liquid storage

- Use of flammable and combustible liquids
- Dispensing and disposal of liquids
- Training
- Personnel to contact for information on plan contents

- **Emergency Action Program/Plan. This program/plan is part of the Risk Management Plan and Process Safety Management Program.**
  - Emergency escape procedures and emergency escape route assignments
  - Procedures to be followed by employees who remain to operate critical plant operations before they evacuate
  - Procedures to account for all employees after emergency evacuation has been completed
  - Rescue and medical duties for those employees performing them
  - Fire and emergency reporting procedures
  - Alarm and communication system
  - Personnel to contact for information on plan contents
  - Training requirements
- **PPE Program**
  - Hazard analysis and prescription of PPE
  - Personal protective devices
  - Head protection
  - Eye and face protection
  - Body protection
  - Hand protection
  - Foot protection
  - Skin protection
  - Sanitation
  - Safety belts and lifelines for fall protection
  - Protection for electric shock
  - Medical services and first aid/blood-borne pathogens

- Respiratory protective equipment
- Hearing protection
- Life Safety
- Training

- **Plant Operation Safety Program**
  - Motor Vehicle and Heavy Equipment Safety Program
    - Operation and maintenance of vehicles
    - Inspection
    - PPE
    - Training
  - **Forklift Operation Program**
    - Trained and certified operators
    - Fueling operations
    - Safe operating parameters
    - Training
  - **Excavation/Trenching Program**
    - Shoring, sloping, and benching requirements
    - Cal/OSHA permit requirements
    - Inspection
    - Air monitoring
    - Access and egress
  - **Fall Protection Program**
    - Evaluation of fall hazards
    - Protection devices
    - Training

- **Scaffolding/Ladder Safety Program**
  - Construction and inspection of equipment
  - Proper use
  - Training
- **Articulating Boom Platforms Program**
  - Inspection of equipment
  - Load ratings
  - Safe operating parameters
  - Operator training
- **Crane and Material Handling Program**
  - Certified and licensed operators
  - Inspection of equipment
  - Load ratings
  - Safe operating parameters
  - Training
- **Hot Work Safety Program**
  - Welding and cutting procedures
  - Acetylene and fuel gas safety
  - Fire watch
  - Hot work permit
  - PPE
  - Training
- **Workplace Ergonomics Program**
  - Identification of personnel at risk
  - Evaluation of personnel
  - Workplace and job activity modifications
  - Training

- **Employee Exposure Monitoring Program**
  - Exposure evaluation
  - Monitoring requirements
  - Reporting of results
  - Medical surveillance
  - Training
- **Electrical Safety Program**
  - Grounding procedure
  - Overhead and underground utilities
  - Utility clearance
  - Training
  - High Voltage Switching
- **LO/TO Program**
  - Allocation of LO/TO devices (e.g., locks, tags, and adaptors)
  - Machine-specific LO/TO procedures
  - Steps for verification of isolation
  - Training (Affected and Authorized and Interaction with Energized Electrics)
  - Annual program review
- **Permit-required Confined-space Entry Program**
  - Air monitoring and ventilation requirements
  - Rescue procedures
  - LO/TO and blocking, blinding, and blanking requirements
  - Permit completion
  - Training
- **Hand and Portable Power Tool Safety Program**
  - Guarding and proper operation
  - Training

- **Housekeeping and Material Handling and Storage Program**
  - Storage requirements
  - Walkways and work surfaces
  - Equipment handling requirements
  - Training
- **Hearing Conservation Program**
  - Identifying high-noise environments
  - Exposure monitoring
  - Medical surveillance requirements
  - Hearing-protective devices
  - Training
- **Back Injury Prevention Program**
  - Proper lifting and material-handling procedures
  - Training
- **Hazard Communication Program (KCEHD 2021)**
  - Labeling requirements
  - Storage and handling
  - Safety data sheets
  - Chemical inventory
  - Training
- **Respiratory Protection Program**
  - Selection and use
  - Storage
  - Fit testing
  - Medical requirements
  - Inspection and repair
  - Training

- **Heat and Cold Stress Monitoring and Control Program**
  - Monitoring requirements
  - Prevention and control
- **Pressure Vessel and Pipeline Safety Program**
  - Line-breaking policy
  - Equipment inspection and maintenance
  - Blocking, bleeding, and blanking
  - Communication
  - Training
- **Safe Driving Program**
  - Inspection and maintenance
  - Training
- **Wellhead Safety Program**
  - Inspection and Maintenance
  - Job Specific Training
  - Preventative Maintenance Procedures
  - Restricted Access
- **Reservoir Safety Program**
  - Life Safety Training
  - Utilization of Work Permits
  - Life Saving Stations
  - Emergency Response Procedures

5.16.2.3.3 Safety Training

To ensure that employees recognize and understand how to protect themselves from potential hazards during this project, comprehensive training programs for construction and operation will be implemented as indicated in Tables 5.16-3 and 5.16-4. Each of the safety procedures developed to control and mitigate potential site hazards will require some form of training. Training will be delivered in a variety of ways depending on the requirements of Cal/OSHA standards, the complexity of the topic, the characteristics of the workforce, and the degree of risk associated with each of the identified hazards.

Tables 5.16-3 and 5.16-4 summarize the safety training programs that will be provided to construction and operations personnel, respectively.

Table 5.16-3: Construction Training Program

Training Course	Target Employees
Injury and Illness Prevention Training	All
Emergency Action Program/Plan	All
PPE Training	All
Motor Vehicle and Heavy Equipment Safety Training	Employees working on, near, or with heavy equipment or vehicles
Forklift Operation Training	Employees operating forklifts
Excavation/Trenching Safety Training	Employees involved with trenching or excavation
Fall Protection Training	Employees working at heights greater than 6 feet required to use fall protection
Scaffolding/Ladder Safety Training	Employees required to erect or use scaffolding
Crane Safety Training	Employees supervising or performing crane operations
Fire Protection and Prevention Training	Employees responsible for the handling and storage of flammable or combustible liquids or gases
Hazard Communication Training	Employees handling or working with hazardous materials
Hazardous Waste	Employees handling or excavating hazardous waste
Hot Work Safety Training	Employees performing hot work
Electrical Safety Training	Employees performing LO/TO or working on systems that require LO/TO activities
	Employees required to work on electrical systems and equipment, or use electrical equipment and cords
Permit-required Confined-space Entry Training	Employees required to supervise or perform confined-space entry activities
Hand and Portable Power Tool Safety Training	Employees who will be operating hand and portable power tools
Powder-actuated Tool Safety Training	Employees who will be operating powder-actuated tools

Training Course	Target Employees
Heat Stress and Cold Stress Safety Training	Employees who are exposed to temperature extremes
Hearing Conservation Training	All
Back Injury Prevention Training	All
Safe Driving Training	Employees supervising or driving motor vehicles
Pressure Vessel and Pipeline Safety Training	Employees supervising or working on pressurized systems or Equipment
Respiratory Protection Training	All employees required to wear respiratory protection
Fire Protection and Prevention Training	All
First Aid, CPR, and Automated External Defibrillator	All
Underground Training	All employees entering underground facilities
Underground Emergency Response	All employees entering underground facilities.
Explosive	All employees handling explosives
Underground Mobile Equipment	In accordance with MSHA regulation
Worker Exposure Awareness Training	All
Worker Environmental Awareness Training	All

Table 5.16-4: Operations Training Program

Training Course	Target Employees
Injury and Illness Prevention Training	All
Emergency Action Plan	All
PPE Training	All
Excavation/Trenching Safety Training	Employees involved with trenching or excavation
Scaffolding/Ladder Safety Training	Employees required to erect or use scaffolding
Fall Protection Training	Employees required to use fall protection
Forklift Operator Training	Employees operating forklifts
Crane Safety Training	Employees supervising or performing crane operations

Training Course	Target Employees
Workplace Ergonomics	Employees performing repetitive activities
Fire Protection and Prevention Training	Employees responsible for the handling and storage of batteries or flammable or combustible liquids or gasses
Hot Work Safety Training	Employees performing hot work
Electrical Safety Training	Employees performing LO/TO or required to work on electrical systems and equipment
Permit-required Confined-space Entry	Employees required to supervise or perform confined-space entry
Hand and Portable Power Tool Safety Training	Employees operating hand and portable power tools
Heat Stress and Cold Stress Safety Training	Employees exposed to temperature extremes
Hearing Conservation Training	All
Back Injury Prevention Training	All
Safe Driving Training	Employees supervising or driving motor vehicles
Hazard Communication Training	Employees handling or working around hazardous materials
Pressure Vessel and Pipeline Safety Training	Employees supervising or working on pressurized systems or equipment
Respiratory Protection Program	All employees required to wear respiratory protection
Fire Protection and Prevention Training	All
First Aid, CPR, and Automated External Defibrillator	All
Worker Exposure Awareness Training	All
Worker Environmental Awareness Training	All

5.16.2.4 Fire Protection

Fire suppression at the site will incorporate facilities designed in compliance with current California Fire Code.

For the GESC, there will be sprinkler systems in specific locations in the turbomachinery hall such as office areas, lunchrooms and meeting places within the buildings, and other areas within the facility. The fire sprinkler system will also service sprinklers on specific pieces of equipment within the turbomachinery hall such as the bearing boxes on the compressors, turbines and on the generators. The fire protection system will have electro-motor driven pumps connected to a power supply to the electrical grid system with backup to the emergency generators.

Given the site use and classification, relevant to the GESC, a minimum fire flow of 1,500 gallons per minute (gpm) and minimum operational duration of 4 hours should be used as a basis for the fire water pump flow and the required volume of water in a reservoir. In a review of list of NFPA codes, it was found that, NFPA 14 has useful information pertaining to flow at the points of use (standpipes), pressure and other design guidelines about fire water piping network that can be related to the design fire water system for the GESC. A review of site plot plans based on NFPA 14 principles was also completed to determine the flow rates required for various areas of the facility with probability of class A and B fire events. The results of the review are summarized in Table 5.16-5.

Table 5.16-5: Estimation of Demand for Fire Area

Location	Flowrate (GPM)	Quantity
GIS Building	250	1
Chemical Treatment Area	250	1
Visitor Building	250	1
Utility Area (i.e., pumps)	250	1
Operations Building	250	1
		Total Flowrate = 1,250 GPM

As an approximation, flowrate requirements for each identified user area have been evaluated to determine to the total required flowrate. Since the calculated flowrate is lower than the industrial minimum required, the flowrate used for calculations is the fire flow minimum of 1,500 gpm. Based on the fire code requirements of a 4-hour duration and a 1,500-gpm flowrate, a minimum of 360,000 gallons of water is required to use the reservoir as the source of fire water that must be available all year round. Values presented in Table 5.16-6 show that the reservoir can be used as a water source because of the small volume percent required for the fire water. The reservoir will always be maintained with a minimum volume to facilitate this.

Table 5.16-6: Estimation of Available Water for Fire Demand

Source	Working Volume	Fire Water Requirement (% of reservoir volume)
Reservoir	146,351,317 gallons	0.25

The closets fire station is Kern County Fire Station No. 15 located at 3219 35th St W in Rosamond, CA. The Fire Station is 8.1 miles southwest of site and will provide first response to fire at the Gem site. Unless specified by local agencies, the Kern County Fire Station No.15 will be contacted in the event of a fire or emergency spill. If feasibly possible, water within the reservoir will adhere to volume requirements set by the Kern County Fire Department for emergency fire suppression associated with the GESC Site.

5.16.3 Laws, Ordinances, Regulations, and Standards

The construction and operation of the GESC will be conducted in accordance with all applicable LORS. Table 5.16-7 summarizes the federal, state, and local (Kern County) LORS relating to worker health and safety. Table 5.16-7 also provides a summary of the applicable national consensus standards.

Table 5.16-7: Laws, Ordinances, Regulations, and Standards for Worker Health and Safety

LORS	Requirements/Applicability	Administering Agency
Federal		
Title 29 Code of Federal Regulations Part 1910	Contains the minimum occupational safety and health standards for general industry in the United States	OSHA
Title 29 Code of Federal Regulations Part 1926	Contains the minimum occupational safety and health standards for the construction industry in the United States	OSHA
Title 30 Code of Federal Regulations, Mineral Resources, Part 1 - 199	Contains rules under the Mine Safety and Health Administration, Department of Labor	MSHA
Commerce of Explosives (27 CFR Part 555)	This regulation explains requirements for manufacturing, importing, buying, selling, transporting, and storing explosive materials.	Federal Bureau of Alcohol, Tobacco, Fires and Explosives (ATF)
State		
California Occupational Safety and Health Act, 1970	Establishes minimum safety and health standards for construction and general industry operations in California	Cal/OSHA
Surface Mining and Reclamation Act (SMARA), Public Resources Code, Sections 2710 - 2796	SMARA provides mining and reclamation policies for surface mining operations	State Mining and Geology Board
8 CCR 339	Requires list of hazardous chemicals relating to the Hazardous Substance Information and Training Act	Cal/OSHA
8 CCR 450	Addresses hazards associated with pressurized vessels	Cal/OSHA
8 CCR 750	Addresses hazards associated with high-pressure steam	Cal/OSHA
8 CCR 1509	Addresses requirements for construction, accident, and prevention plans	Cal/OSHA
8 CCR 1509, et seq., and 1684, et seq.	Addresses construction hazards, including head, hand, and foot injuries and noise and electrical shock	Cal/OSHA
8 CCR 1528, et seq., and 3380, et seq.	Requirements for PPE	Cal/OSHA
8 CCR 1532, and 5206	Addresses Chromium IV (Hexavalent Chromium)	Cal/OSHA

LORS	Requirements/Applicability	Administering Agency
8 CCR 1597, et seq., and 1590, et seq.	Requirements addressing the hazards associated with traffic accidents and earthmoving	Cal/OSHA
8 CCR 1604, et seq.	Requirements for construction hoist equipment	Cal/OSHA
8 CCR 1620, et seq., and 1723, et seq.	Addresses miscellaneous hazards	Cal/OSHA
8 CCR 1709, et seq.	Requirements for steel reinforcing, concrete pouring, and structural steel erection operations	Cal/OSHA
8 CCR 1920, et seq.	Requirements for fire protection systems	Cal/OSHA
8 CCR 2300, et seq., and 2320, et seq.	Requirements for addressing low-voltage electrical hazards	Cal/OSHA
8 CCR 2395, et seq.	Addresses electrical installation requirements	Cal/OSHA
8 CCR 2700, et seq.	Addresses high-voltage electrical hazards	Cal/OSHA
8 CCR 3200, et seq., and 5139, et seq.	Requirements for control of hazardous substances	Cal/OSHA
8 CCR 3203, et seq.	Requirements for operational accident prevention programs	Cal/OSHA
8 CCR 3270, et seq., and 3209, et seq.	Requirements for evacuation plans and procedures	Cal/OSHA
8 CCR 3301, et seq.	Requirements for addressing miscellaneous hazards, including hot pipes, hot surfaces, compressed air systems, relief valves, enclosed areas containing flammable or hazardous materials, rotation equipment, pipelines, and vehicle-loading dock operations	Cal/OSHA
8 CCR 3360, et seq.	Addresses requirements for sanitary conditions	Cal/OSHA
8 CCR 3511, et seq., and 3555, et seq.	Requirements for addressing hazards associated with stationary engines and compressors, as well as portable, pneumatic, and electrically powered tools	Cal/OSHA
8 CCR 3649, et seq., and 3700, et seq.	Requirements for addressing hazards associated with field vehicles	Cal/OSHA
8 CCR 3940, et seq.	Requirements for addressing hazards associated with power transmission, compressed air, and gas equipment	Cal/OSHA
8 CCR 5109, et seq.	Requirements for addressing construction accident and prevention programs	Cal/OSHA

LORS	Requirements/Applicability	Administering Agency
8 CCR 5110, et seq.	Requirements for the implementation of an ergonomics program	Cal/OSHA
8 CCR 5139, et seq.	Requirements for addressing hazards associated with welding, sandblasting, grinding, and spray-coating	Cal/OSHA
8 CCR 5150, et seq.	Requirements for confined space entry	Cal/OSHA
8 CCR 5155, et seq.	Requirements for use of respirators and for controlling employee exposure to airborne contaminants	Cal/OSHA
8 CCR 5160, et seq.	Requirements for addressing hot, flammable, poisonous, corrosive, and irritant substances	Cal/OSHA
8 CCR 5184 and 5185.	Requirements for storage battery systems and changing the charging storage batteries	Cal/OSHA
8 CCR 5192, et seq.	Requirements for conducting emergency response operations	Cal/OSHA
8 CCR 5193, et seq.	Requirements for controlling employee exposure to bloodborne pathogens associated with exposure to raw sewage water and body fluids associated with first aid/CPR duties	Cal/OSHA
8 CCR 5194, et seq.	Requirements for employee exposure to dusts, fumes, mists, vapors, and gases	Cal/OSHA
8 CCR 5405, et seq.; 5426, et seq.; 5465, et seq.; 5500, et seq.; 5521, et seq.; 5545, et seq.; 5554, et seq.; 5565, et seq.; 5583, et seq.; 5606, et seq.	Requirements for flammable liquids, gases, and vapors	Cal/OSHA
8 CCR 5583, et seq.	Requirements for design, construction, and installation of venting, diking, valving, and supports	Cal/OSHA
8 CCR 6150, et seq.; 6151, et seq.; 6165, et seq.; 6170, et seq.;6175, et seq.	Requirements for fire protection	Cal/OSHA
Title 24, Part 3, California Electrical Code	Requirements for electrical safety, which include the Uniform Electrical Code, Title 24, Part 3	Cal/OSHA
Title 24, Part 9, Chapter 6, Section 608	California Fire Code requirements for stationary storage battery systems	Cal/OSHA

LORS	Requirements/Applicability	Administering Agency
8 CCR, Part 6	Requirements for health and safety for working with tanks and boilers	Cal/OSHA
Health and Safety Code Sections 25500 through 25541	Requirements for the preparation of a Hazardous Material Business Plan that details emergency response plans for a hazardous materials emergency at the facility	Cal/OSHA
Local		
Specific hazardous material handling requirements	Hazardous materials used or stored shall conform to the Uniform Fire Code.	Kern County Fire Prevention Office
Emergency Response Plan	Kern County Environmental Health Services Division is the designated CUPA and is responsible for administering the Hazardous Materials Business Plans filed by businesses located in the county.	Kern County Public Health Services Department, Environmental Health Services Division
Business Plan	Kern County Environmental Health Services Division is the designated CUPA and is responsible for administering the Hazardous Materials Business Plans filed by businesses located in the county.	Kern County Public Health Services Department, Environmental Health Services Division
National Standards		
NIOSH- National Institute for Occupational Safety and Health	Conducts research and makes recommendations for prevention of work-related injury and illness.	CDC
NFPA 10, Standard for Portable Fire Extinguishers	Requirements for selection, placement, inspection, maintenance, and employee training for portable fire extinguishers	NFPA
NFPA 11, Standard for Low-Expansion Foam and Combined Agent Systems	Requirements for installation and use of low-expansion foam and combined-agent systems	NFPA
NFPA 11A, Standard for Medium- and High-Expansion Foam Systems	Requirements for installation and use of medium- and high-expansion foam systems	NFPA
NFPA 12, Standard on Carbon Dioxide Extinguishing Systems	Requirements for installation and use of carbon dioxide extinguishing systems	NFPA

LORS	Requirements/Applicability	Administering Agency
NFPA 13, Standard for Installation of Sprinkler Systems	Guidelines for selection and installation of fire sprinkler systems	NFPA
NFPA 13A, Recommended Practice for the Inspection, Testing, and Maintenance of Sprinkler Systems	Guidance for inspection, testing, and maintenance of sprinkler systems	NFPA
NFPA 14, Standard for the Installation of Standpipe and Hose Systems	Guidelines for selection and installation of standpipe and hose systems	NFPA
NFPA 15, Standard for Water Spray Fixed Systems	Guidelines for selection and installation of water spray fixed systems	NFPA
NFPA 17, Standard for Dry Chemical Extinguishing Systems	Guidance for selection and use of dry chemical extinguishing systems	NFPA
NFPA 20, Standard for the Installation of Centrifugal Fire Pumps	Guidance for selection and installation of centrifugal fire pumps	NFPA
NFPA 22, Standard for Water Tanks for Private Fire Protection	Requirements for water tanks for private fire protection	NFPA
NFPA 24, Standard for the Installation of Private Fire Service Mains and Their Appurtenances	Requirements for private fire service mains and their appurtenances	NFPA
NFPA 26, Recommended Practice for the Supervision of Valves Controlling Water Supplies	Supervision guidance for valves controlling water supplies	NFPA
NFPA 30, Flammable and Combustible Liquid Code	Requirements for storage and use of flammable and combustible liquids	NFPA
NFPA 37, Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines	Fire protection requirements for installation and use of combustion engines and gas turbines	NFPA

LORS	Requirements/Applicability	Administering Agency
NFPA 50A, Standard for Gaseous Hydrogen Systems at Consumer Sites	Fire protection requirements for hydrogen systems	NFPA
NFPA 54, National Fuel Gas Code	Fire protection requirements for use of fuel gases	NFPA
NFPA 59A, Standard for the Storage and Handling of Liquefied Petroleum Gases	Requirements for storage and handling of liquefied petroleum gases	NFPA
NFPA 68, Guide for Explosion Venting	Guidance in design of facilities for explosion venting	NFPA
NFPA 70, National Electric Code	Guidance on safe selection and design, installation, maintenance, and construction of electrical systems	NFPA
NFPA 70, Article 480, National Electric Code (Storage Batteries)	Requirements for safe installation and wiring for battery electrical systems	NFPA
NFPA 70B, Recommended Practice for Electrical Equipment Maintenance	Guidance on electrical equipment maintenance	NFPA
NFPA 70E, Standard for Electrical Safety Requirements for Employee Workplaces	Employee safety requirements for working with electrical equipment	NFPA
NFPA 71, Standard for the Installation, Maintenance, and Use of Central Station Signaling Systems	Requirements for installation, maintenance, and use of central station signaling systems	NFPA
NFPA 72A, Standard for the Installation, Maintenance, and Use of Local Protective Signaling Systems for Guard's Tour, Fire Alarm, and Supervisory Service	Requirements for installation, maintenance, and use of local protective signaling systems	NFPA
NFPA 72E, Standard on Automatic Fire Detection	Requirements for automatic fire detection	NFPA

LORS	Requirements/Applicability	Administering Agency
NFPA 72F, Standard for the Installation, Maintenance, and Use of Emergency Voice/Alarm of Communication Systems	Requirements for installation, maintenance, and use of emergency and alarm communications systems	NFPA
NFPA 72H, Guide for Testing Procedures for Local, Auxiliary, Remote Station, and Proprietary Protective Signaling Systems	Testing procedures for types of signaling systems anticipated for facility	NFPA
NFPA 75, Standard for the Protection of Electronic Computer/Data Processing Equipment	Requirements for fire protection systems used to protect computer systems	NFPA
NFPA 78, Lightning Protection Code	Lightning protection requirements	NFPA
NFPA 80, Standard for Fire Doors and Windows	Requirements for fire doors and windows	NFPA
NFPA 90A, Standard for the Installation of Air Conditioning and Ventilating Systems	Requirements for installation of air conditioning and ventilating systems	NFPA
NFPA 101, Code for Safety to Life from Fire in Buildings and Structures	Requirements for design of means of exiting the facility	NFPA
NFPA 291, Recommended Practice for Fire Flow Testing and Marking of Hydrants	Guidelines for testing and marking of fire hydrants	NFPA
NFPA 850, Recommended Practice for Fire Protection for Fossil Fuel Steam Electric Generating Plants	Requirements for fire protection in fossil-fuel steam electric generating plants	NFPA
NFPA 1961, Standard for Fire Hose	Specifications for fire hoses	NFPA

LORS	Requirements/Applicability	Administering Agency
NFPA 1962, Standard for the Care, Maintenance, and Use of Fire Hose Including Connections and Nozzles	Requirements for care, maintenance, and use of fire hoses	NFPA
NFPA 1963, Standard for Screw Threads and Gaskets for Fire Hose Connections	Specifications for fire hose connections	NFPA
American National Standards Institute / American Society of Mechanical Engineers, Boiler and Pressure Vessel Code	Specifications and requirements for pressure vessels	American National Standards Institute / American Society of Mechanical Engineers
American National Standards Institute, B31.2, Fuel Gas Piping	Specifications and requirements for fuel gas piping	American National Standards Institute

CCR = California Code of Regulations; N/A = not applicable; NFPA = National Fire Protection Association; CUPA = Certified Unified Program Agency; OSHA = Occupational Safety and Health Administration

5.16.4 Agencies and Agency Contacts

Several agencies are involved to ensure the protection of worker health and safety. Agency contacts relative to worker health and safety and fire are shown in Table 5.16-8.

Table 5.16-8: Agency Contacts for Worker Health and Safety

Issue	Agency	Contact
Worker Health and Safety	Cal/OSHA, Region 4, Bakersfield District Office	Efren Gomez District Manager (661)-558-6400
CUPA for Hazardous Materials Business Plan (HMPB)	Kern County Public Health Services Department - Hazardous Materials Program	Cilal Korin 661-862-8730
Hazardous Materials Response for Spills or Fires	Kern County Public Health Services Department Emergency Response Hotline	661-549-9927*

Notes: * Kern County Public Health Services Department Hotline does not have a specified personnel contact.

5.16.5 Permits and Permit Schedule

Table 5.16-9 lists possible applicable permits related to the protection of worker health and safety. Third party subcontractors will be responsible in obtaining permits for assigned project tasks. No permitting schedule is provided, however notification requirements for each agency will be followed.

Table 5.16-9: Applicable Permits for Worker Health and Safety

Permit	Agency Contact	Schedule
Trenching and Excavation Permit	Any Cal/OSHA district or field office	Submit completed permit application to any Cal/OSHA district or field office before commencing construction.
HMBP	Kern County Public Health Services Department Hazardous Materials Program 2700 M Street, Suite 300 Bakersfield CA 93301 (661)-862-8740	Submittal prior to operation. Permits are available on the Kern County Public Health Services Department main website.
RMP	Kern County Public Health Services Department Hazardous Materials Program 2700 M Street, Suite 300 Bakersfield CA 93301 (661)-862-8740	Submittal prior to operation. Permits are available on the Kern County Public Health Services Department main website.

5.16.6 References

Kern County Public Health Services, Environmental Health Division – Hazardous Waste Program (KCEHD). 2021. Hazardous Materials Business Plan/California Environmental Reporting System (CERS). Available at: https://kernpublichealth.com/hazardous-materials-business-plan-california-environmental-reporting-system-cers/. Accessed July 5, 2021.