

5.18 Worker Safety

This section describes or outlines the systems and procedures that will be implemented to provide occupational safety and health protection for workers at the Ridgecrest Solar Power Project (RSPP or Project) in accordance with all applicable requirements. This section includes descriptions of the health and safety programs that will be used during both construction and operation; it also provides information on the Project's planned fire prevention and protection program and the Project's fuel handling system.

The worker safety discussion presented in the following pages is intended to support compliance by the California Energy Commission with the requirements of the California Environmental Quality Act (CEQA), and by the Bureau of Land Management with the requirements of the National Environmental Policy Act (NEPA). The two agencies are conducting a joint review of the Project and a combined CEQA/NEPA document will be prepared.

Summary

Comprehensive worker health and safety programs will be implemented at the Project. These programs, combined with standard good industrial practices, will ensure that worker safety impacts would be less than significant. Project construction and operations may expose workers to physical and chemical hazards. Worker exposure to such hazards will be minimized by adherence to appropriate engineering design standards and to sound construction, operations, and maintenance practices. During both construction and operations, the Project will implement appropriate safety and administrative procedures, safety training, use of personal protective equipment (PPE), and compliance with applicable health and safety-related regulations. Injury and Illness Prevention Plans (IIPPs) will be central to reducing worker hazards during both construction and operation. Site-specific Fire Protection and Prevention Plans and an Emergency Action Plan also will be implemented during construction and operations.

5.18.1 LORS Compliance

Project construction and operations will be performed in accordance with the applicable laws, ordinances, regulations, and standards (LORS) to ensure a safe workplace. The applicable LORS are summarized in Table 5.18-1 and briefly discussed in the text following the table. Although the Federal Occupational Safety and Health Administration (OSHA) statute and standards (regulations) are listed as LORS, California is a "State Plan" state, as discussed below. Accordingly, California OSHA (Cal/OSHA) standards, not Federal standards, are enforced in California as a result of the "reverse preemption" created by Federal approval of the State Plan.

Table 5.18–1 Worker Safety LORS Summary

LORS	Applicability	Where Discussed in AFC
Federal:		
Occupational Safety and Health Act of 1970: 29 United States Code (USC) Section 651 et seq.	Created OSHA and provides it with the authority to establish and enforce workplace health and safety standards that apply to most employers. Also permits states to adopt their own occupational safety and health plans if they are at least as effective as OSHA Federal standards.	Section 5.18.1
Occupational Safety and Health Standards: Title 29 Code of Federal Regulations (CFR) Part 1910 et seq.	Contains Federal minimum occupational safety and health standards for industrial facilities.	Section 5.18.1
Safety and Health Regulations for Construction: Title 29 CFR Part 1926 et seq.	Contains Federal minimum occupational safety and health standards for the construction industry.	Section 5.18.1
Approved State Plans for Enforcement of State Standards: Title 29 CFR Sections 1952.170 to 1952.175	Provides Federal approval of California's plan for enforcement of its own safety and health requirements, in lieu of most of the Federal requirements found in Title 29 CFR Section 1910.1 to 1910.1500.	Section 5.18.1
State:		
California Occupational Safety and Health Act: California Labor Code 6300 et seq.	Authorized creation of Cal/OSHA and provides it with the authority to enforce workplace health and safety standards that apply to most California employers. Authorized establishment of minimum safety and health standards for construction activities and industrial facilities in California.	Section 5.18.1
Title 8 California Code of Regulations (CCR)	Cal/OSHA regulations that set forth health and safety standards regulating work practices and processes to ensure a safe and hazard-free work environment in California. Categories include General Industrial Safety Orders, General Construction Safety Orders, Electrical Safety Orders, and Pressure Vessel Safety Orders (see Table 5.18-2 for topics covered).	Section 5.18.3
California Building Code: Title 24 CCR Section 3 et seq.	Incorporates the current edition of the International Building Code.	Section 5.18.1
California Health and Safety Code Sections 25500 through 25541	Sets forth requirements for preparation of a Hazardous Material Business Plan and an Emergency Response Plan for a hazardous materials emergency.	Section 5.18.3 and Section 5.6, Hazardous Materials Handling

Table 5.18–1 Worker Safety LORS Summary

LORS	Applicability	Where Discussed in AFC
Local:		
Health and Safety: Kern County Municipal Code, Title 8 Sections 16, 20, 28, 36, 44, 46, and 48	Includes specific codes to regulate permits, activities (e.g., solid waste management), and administrative penalties. Specific sections included are as follows: Section 16, Dangerous Excavations; Section 20, Alarm Systems; Section 28, Solid Waste Sanitation; Section 36, Noise; Section 44, Public Nuisances; Section 46, Weeds; and Section 48, Underground Storage of Hazardous Substances.	Section 5.18.1
Building and Construction: Kern County Municipal Code, Title 17 Sections 8, 12, 20, 24, 28, 32, and 56	Includes specific codes for various building codes, such as the fire code. Specific sections included are as follows: Section 8, Building Code; Section 12, Mechanical Code; Section 20, Plumbing Code; Section 24, Electrical Code; Section 28, Grading Code; Section 32, Fire Code; and Section 56, Energy Code.	Section 5.18.1
Industry Codes and Standards:		
Uniform Fire Code, Article 80	Addresses prevention, control and mitigation of dangerous conditions related to storage, dispensing, uses, and handling of various hazardous materials. Also identifies information needed by emergency response personnel.	Section 5.18.3 and Section 5.6.2, Hazardous Materials Handling
National Fire Protection Association (NFPA) Standards	Standards needed to establish reasonable level of safety and property protection from hazards created by fire and explosion (see Table 5.18-3 for list of standards).	Section 5.18.3 and Section 5.6.2, Hazardous Materials Handling
American National Standards Institute (ANSI) and American Society of Mechanical Engineers (ASME) Standards	Provides specifications and other requirements for pressure vessels.	Appendix C, Engineering Design Criteria
ANSI/NFPA Z223.1	Provides specifications and requirements for fuel gas piping systems.	Appendix C, Engineering Design Criteria

5.18.1.1 Federal LORS

The Occupational Safety and Health Act of 1970 created OSHA and provided it with the authority to establish and enforce workplace health and safety standards that apply to most employers. These standards are set forth in Federal regulations and are administered by OSHA, which cover equipment and employee safety practices during construction and operation of industrial facilities.

Construction

Construction health and safety regulations are found in Title 29 CFR Part 1926. Part 1926 addresses several types of construction activities, such as general safety and health provisions (Subpart C); occupational health and environmental controls (Subpart D); personal protective and life saving

equipment (Subpart E); fire protection and prevention (Subpart F); material handling, storage, use, and disposal (Subpart H); welding and cutting activities (Subpart J); electrical work (Subpart K); scaffolding (Subpart L) and fall protection (Subpart M); cranes, derricks, hoists, elevators, and conveyors (Subpart N); motor vehicles and mechanized equipment (Subpart O); excavations (Subpart P); concrete and masonry construction activities (Subpart Q); steel erection activities (Subpart R); underground construction, caissons, cofferdams, and compressed air (Subpart S); demolition (Subpart T); power transmission and distribution (Subpart V); rollover protection structures and overhead protection (Subpart W); stairways and ladders (Subpart X); and toxic and hazardous substances (Subpart Z). Federal safety and health regulations for construction also are provided in 40 USC Sections 327 et seq. These Federal requirements are addressed by State regulations in Title 8 CCR Chapter 4, Subchapter 4, Construction Safety Orders.

Operation

Occupational health and safety standards for industrial facilities are provided in Title 29 CFR Section 1910 et seq. Part 1910 addresses several types of operational activities, such as walking and working surfaces (Subpart D); means of egress (Subpart E); powered platforms, manlifts, and vehicle-mounted work platforms (Subpart F); occupational health and environmental controls (Subpart G); hazardous materials (Subpart H); PPE (Subpart I); medical and first aid (Subpart K); fire protection (Subpart L); compressed gas and compressed air equipment (Subpart M); material handling and storage (Subpart N); machinery and machine guarding (Subpart O); hand and portable powered tools and other hand-held equipment (Subpart P); welding, cutting, and brazing (Subpart Q); special industries (Subpart 4), including electric power generation, transmission, and distribution (Section 1910.269); and electrical (Subpart S).

OSHA has the authority under 29 USC Section 667 to delegate its jurisdiction to occupational and health agencies created by individual states. Enforcement authority is transferred to the state agency by an "operational status agreement" negotiated between OSHA and each state seeking to implement its own enforcement program through a "State Plan". A State Plan cannot be approved unless, among other things, the State's standards are "at least as effective" as Federal standards (29 USC Section 667[c][2]). Once the State Plan is approved, the State standards that have been approved, and not the Federal standards, are then enforced. An October 5, 1989 "Operational Status Agreement," signed by the State of California and Federal OSHA, sets forth the scope of the exercise of Federal Authority under Section 18(e) of the Occupational Health and Safety Act of 1970 (29 USC Section 667) in the State of California with respect to occupational safety and health standards. The State Plan has been consistently amended to cover new and modified standards. As a result, the State of California enforces most Cal/OSHA standards, and the Federal standards and statute (e.g. the General Duty Clause contained in 29 USC Section 654) do not apply in California, although Federal OSHA has retained concurrent enforcement jurisdiction for certain Federal standards (e.g., those related to hazardous waste).

5.18.1.2 State LORS

Cal/OSHA is responsible for enforcing State and Federal workplace health and safety standards, including those addressing health and safety issues during industrial facility construction and operation. These regulations deal with a variety of issues such as equipment design, personnel training, operational procedures, and safety devices, and are found primarily in Title 8 CCR. Table 5.18-2 identifies specific topical areas covered in applicable portions of Title 8 CCR.

Table 5.18–2 Potentially Applicable Topics Addressed in Title 8 CCR

Standard	Description
General Construction Safety Orders: Title 8 CCR Sections 1500-1938	Construction Accident Prevention Plan Weekly Toolbox Meeting Traffic Accidents and Earth Moving Hoist Equipment Reinforcing Concrete Fall Protection and Scaffolding Electrical Installation Evacuation Plan and Procedures Fire Safety Airborne Contaminants Emergency Medical Procedures PPE Hand and power Tool Use Crane and Hoist Operations Illumination Housekeeping Excavations
General Industrial Safety Orders: Title 8 CCR Sections 3200-6184	Employee/Employer Communications IIPP Emergency Action Plan Fire Prevention Plan Hazardous Materials Control of Hazardous Substances Hazard Communications Emergency Medical Procedures PPE Airborne Contaminants Signs, Tags, and Barriers Noise Levels Ventilation Flammable/Combustible Materials Handling and Storage Fire Protection Systems Machine Guarding Crane and Hoist Operation Heavy Equipment and Machinery Operation Rigging Sanitary Facilities Traffic Safety Interface with Other Contractors Miscellaneous Hazards (including hot pipes, compressed air systems, relief valves, pipelines, loading docks)
Electrical Safety Orders: Title 8 CCR Sections 2299-2989.1	High Voltage Installation, Operation, and Maintenance Low and High Voltage Hazards
Unfired Pressure Vessel Safety Orders: Title 8 CCR Sections 450-560 Boiler and Fired Pressure Vessel Safety Orders: Title 8 CCR Sections 750-797	Design and Construction Air Tanks Pressure Vessels other than Air Tanks LP Gas Systems Aqueous Ammonia Safe Practices Design and Construction Installation, Inspection, Operation, Repairs

Construction

Construction safety orders are published at Title 8 CCR Sections 1502 et seq. These requirements are promulgated by Cal/OSHA and apply to the construction phase of the Project. The construction safety and health program will include the following:

- Construction IIPP (Title 8 CCR Section 1509);
- Construction Fire Protection and Prevention Plan (Title 8 CCR Section 1920);
- PPE Program (Title 8 CCR Section 1514 - 1522); and
- Emergency Action Program and Plan (Title 8 CCR Section 3220).

Additional programs required under General Industry Safety Orders (Title 8 CCR Sections 3200 to 6184), Electrical Safety Orders (Title 8 CCR Sections 2299 to 2974) and Unfired Pressure Vessel Safety Orders (Title 8 CCR Sections 450 to 544) will include: an electrical safety program; a motor vehicle and heavy equipment safety program; a forklift operation program; an excavation/trenching program; a fall protection program; a scaffolding/ladder safety program; an articulating boom platforms program; a crane and material handling program; a housekeeping and material handling and storage program; a respiratory protection program; an employee exposure monitoring program; a hand and portable power tool safety program; a hearing conservation program; a back injury prevention program; a hazard communication program; a heat and cold stress monitoring and control program; a pressure vessel and pipeline safety program; a hazardous waste program; a hot work safety program; a permit-required confined space entry program; and a demolition procedure (if applicable).

Title 24 CCR, also known as the California Building Standards Code, is a compilation of three types of building standards from three different origins: building standards that have been adopted by State agencies without change from building standards contained in national codes; building standards that have been adopted and adapted from the national model code standards to meet California conditions; and building standards, authorized by the California Legislature, that constitute extensive additions not covered by the model codes that have been adopted to address particular California concerns. Within Title 24 CCR, there are several parts potentially applicable to the Project. These include Part 2 - California Building Code; Part 3 - California Electrical Code; Part 4 - California Mechanical Code; Part 5 - California Plumbing Code; Part 6 - California Energy Code; Part 9 - California Fire Code; and Part 10 - California Code for Building Conservation.

Operation

An operations and maintenance safety and health program will be prepared prior to operation of the Project. This program will include the following components:

- IIPP (Title 8 CCR Section 3203);
- Fire Protection and Prevention Program (Title 8 CCR Section 3221);
- PPE Program (Title 8 CCR Sections 3401 to 3411); and
- Emergency Action Plan (Title 8 CCR Section 3220).

In addition, certain requirements set forth in the General Industry Safety Orders (Title 8 CCR Sections 3200 to 6184), Electrical Safety Orders (Title 8 CCR Sections 2299 to 2974) and Unfired Pressure Vessel Safety Orders (Title 8 CCR Sections 450 to 560) will apply to this Project. Written (operations) safety programs for the Project will ensure compliance with those requirements. Table 5.18-2 identifies specific topical areas covered in applicable portions of Title 8 CCR.

5.18.1.3 Local LORS

Kern County ordinances include requirements to protect the health and safety of workers and the public during construction and operation. Specific ordinances applicable to the Project include Title 8, Health and Safety, and Title 17, Building and Construction.

Title 8 of the Kern County Ordinances, Health and Safety, includes the following relevant County ordinances: dangerous excavations (Section 16); alarm systems (Section 8.20); solid waste/sanitation (Section 8.28); noise (Section 8.36); public nuisances (Section 8.44); weeds (Section 8.46); and underground storage of hazardous substances (Section 8.48). The County ordinance presents criteria, fees, and other relevant information for a facility to be in compliance.

Kern County Ordinance Title 17, Building and Construction, includes the following: building code (Chapter 17.08); mechanical code (Chapter 17.12); plumbing code (Chapter 17.20); electrical code (Chapter 17.24); grading code (Chapter 17.28); fire code (Chapter 17.32); and energy code (Chapter 17.56). The fire code (Chapter 17.32) includes the specific requirements of the County fire code including identification of zoning designations where storage of certain types of hazardous substances are prohibited or limited.

5.18.1.4 Other Regulations and Standards

A variety of private and industrial organizations have established internal standards regarding the design and operation of industrial facilities and equipment. These include NFPA, ANSI, and ASME, as well as the American Welding Society, Heat Exchanger Institute, and Instrument Society of America, among others. Many of these organizations' standards have been incorporated into Federal and State regulations and into building codes. Of particular relevance to worker safety are the fire and explosion hazards-related standards of the NFPA, which are identified in Table 5.18-3.

Table 5.18–3 NFPA Fire and Explosion Hazards Standards

Standard	Description
NFPA 1	Fire Prevention Code
NFPA 10	Portable Fire Extinguishers
NFPA 12	Carbon Dioxide Fire Extinguishers
NFPA 13	Sprinkler Systems
NFPA 14	Installation of Standpipe and Hose Systems
NFPA 15	Water Spray Fixed Systems
NFPA 17	Dry Chemical Fire Extinguishing Systems
NFPA 20	Centrifugal Fire Pumps
NFPA 22	Water Tanks for Private Fire Protection
NFPA 24	Private Fire Service Mains and Appurtenances
NFPA 26	Valves Controlling Water-Supplied Fire Suppression Systems
NFPA 30	Flammable and Combustible Liquids Code
NFPA 37	Combustion Engines and Gas Turbines
NFPA 50A	Gaseous Hydrogen at Consumer Sites
NFPA 54	Protection of Fuel Gas Systems
NFPA 68	Explosion Venting
NFPA 69	Explosion Preventing
NFPA 70	National Electric Code
NFPA 71	Installation, Maintenance, and Use of Central Station Signaling Systems
NFPA 72	National Fire Alarm Code
NFPA 78	Lighting Protection Systems
NFPA 80	Fire Doors and Windows

Table 5.18–3 NFPA Fire and Explosion Hazards Standards

Standard	Description
NFPA 90A	Air Conditioning and Ventilating Systems
NFPA 101	Design Requirements for Means of Exiting Facilities
NFPA 291	Testing and Marking Hydrants
NFPA 496	Purged and Pressurized Enclosures for Electrical Equipment
NFPA 497	Flammable and Combustible Liquids Classification
NFPA 850	Fire Protection Requirements for Fossil Fuel Steam Electric Generating Facilities
NFPA 1961	Fire Hose
NFPA 1962	Care, Use, and Service of Fire Hose including Couplings and Nozzles
NFPA 1963	Screw, Threads, and Gaskets for Fire Hose Connections
NFPA 2001	Clean Agent Fire Extinguishing Systems
NFPA 8501	Standard for Single Boiler Operation

5.18.1.5 Involved Agencies and Required Permits

The agencies and person(s) to contact for workplace health and safety issues for the Project are shown in Table 5.18-4.

Table 5.18–4 Agencies and Agency Contacts

Agency Contact	Phone/E-mail	Permit/Issue
Duty Officer San Bernardino District Office Cal/OSHA 464 West 4th Street, Room 339 San Bernardino, CA 92408	Consultation Services (909) 383-4567 Compliance Division (909) 383-4321	See Permits in Table 5.18-5
Kern County Fire Department (KCFD) 5642 Victor Street Bakersfield, CA 93308	Fire Prevention (661) 391-7000	Fire Code compliance and NFPA conformity

Table 5.18-5 lists applicable worker safety permits that will be required for the Project. Additionally, this table provides the activities covered for each permit as well as the application requirements to obtain the permit. The permit notification or application requirement is generally 24 hours prior to commencement of work. A specific permitting schedule is not provided because the permits may be required at several points during construction or operation of the Project.

Table 5.18–5 Permits and Approvals

Permit/ Approval	Issuing Agency	Law/Application Requirements	Permit Schedule
<p>Construction Activity Permit</p> <p>Trenching, Excavation, and Erection or Demolition Permit</p>	Cal/OSHA	<p>Title 8 CCR Chapter 4, Subchapter 4</p> <p>Project permits and/or annual permits are required for the following operations:</p> <p>Construction of trenches or excavations, which are five or more feet below ground surface where personnel are required to enter.</p> <p>Construction of any building, structure, scaffolding, or falsework more than three stories high (or equivalent of 36 feet).</p> <p>Demolition of any building or structure, or dismantling of scaffolding or false work more than three stories high (or equivalent of 36 feet).</p> <p>Erection or dismantling of vertical shoring systems more than three stories high (or equivalent of 36 feet).</p>	<p>Submit completed permit application to San Bernardino Office and receive a permit within 24 hours. Annual permit applications are submitted to any Cal/OSHA district or field office prior to commencing construction. Permits are issued within 24 hours.</p>
<p>Tower Cranes Permit</p> <p>Erection of a Fixed Tower Crane Permit</p>	Cal/OSHA	<p>Title 8 CCR Chapter 4, Subchapter 4</p> <p>Permits are required for the following operations: Erecting, climbing, and dismantling of fixed tower cranes.</p> <p>Additionally, notifications to Cal/OSHA must be made at least 24 hours prior to the initiation of the following activities:</p> <p>Initial erection at the site;</p> <p>Completion of erection and commencement of operation;</p> <p>Climbing of the tower crane; and</p> <p>Dismantling of the tower crane.</p>	<p>Submit completed permit application to San Bernardino Office and receive a permit within 24 hours. Annual permit applications are submitted to any Cal/OSHA district or field office prior to commencing construction. Permits are issued within 24 hours.</p>
Pressure Vessel Permit	Division of Occupational Safety and Health (DOSH)	<p>Title 8 CCR Chapter 4 Subchapter 1 and 2</p> <p>Permits are required for air tanks, propane storage tanks over 125 gallons, and high pressure boilers over 15 pounds per square inch gauge steam.</p>	<p>Permits are issued by Cal/OSHA Pressure Vessel Unit. Inspections may be done by certified insurance inspector or DOSH unit (Cal/OSHA). DOSH performs onsite inspection, follow-up, and issue renewal permits.</p>
Fire Protection Systems Permit	KCFD	<p>Kern County Code, Title 17 Chapter 32</p> <p>Addresses information regulating the safeguarding of life, property and public welfare. Per the Kern County fire code, issuance of construction and operational permits are required. Permits are required for installation, alteration, modification, or removal of any fire alarm, fire protection system, fire pumps, and flammable or combustible liquid tanks.</p>	<p>Permits are issued by the KCFD (fire prevention office) and require approval by the Fire Chief.</p>

5.18.2 Affected Environment

Because the Project facilities have not yet been constructed and because there are no industrial activities currently on the Project site, there are no relevant baseline conditions to describe as there are in other environmental topical areas such as biological resources, air quality, etc. However, as described in Section 2.0, Project Description, the Project will involve a new transmission line from the turbine generator to a new nearby switchyard that will connect with an existing Southern California Edison transmission system.

During World War II (1942-1945) and for two weeks in 1964, large areas of the Mojave Desert were utilized for large scale military training exercises. Small caliber ammunition and “practice ordnance” were used during these maneuvers. Tanks and planes were also involved in these exercises. Shells that contained spotting or marking charges were fired and dropped over a large area during these activities. A small percentage of this ordnance did not explode and some unexploded ordnances (UXO) has been discovered on the Project site during routine resource surveys. When detonated by the Kern County Sheriff's department, the UXO were found to be inert practice ordnance.

The prior history of the site and the discovery of UXO indicate that additional precautions should be taken by construction crews while on the Project site. It is recommended that a geophysical survey be undertaken by qualified UXO personnel to clear sites prior to ground disturbance. Site personnel will also be trained to identify potential UXO and how to respond/who to contact if potential UXO is discovered.

5.18.3 Environmental Impacts

Workers on the Project may be exposed to hazards during construction, operation, and maintenance activities. Potential impacts to worker safety are defined as impacts that could adversely affect project personnel, including individuals employed directly by the Project as well as employees of contractors, vendors, or others working on site, during both construction and operations. Impacts to workers can be minimized through the implementation of appropriate engineering and administrative controls and use of PPE. Hazards, impacts, and control measures are similar for the construction and operations of the Project. Therefore, many of the health and safety programs and plans will be developed prior to construction and revised as the Project transitions to operation. Health and safety programs and plans for each phase of the Project are discussed in Section 5.18.3.1, Construction, and Section 5.18.3.2, Operations.

5.18.3.1 Construction

Health and safety programs designed to mitigate hazards and comply with applicable LORS will be developed and implemented to protect worker health and safety during construction. Periodic audits will be performed by qualified individuals to determine whether proper work practices and programs are being used to mitigate hazardous conditions and to evaluate regulatory compliance.

Hazard Analysis

Table 5.18-6 summarizes a hazard analysis of the Project. This table lists work activities and associated hazards, and also shows programs designed to reduce the occurrence of each exposure, work place, or occupational hazard. Because the types of work activities, associated hazards, and hazard control approaches shown are generic and apply to both construction and operations work activities, Table 5.18-6 applies to both construction and operation. As project design, construction, and operations proceed, the analyses of hazards and the specifics of control strategies will be updated as needed to ensure that they are appropriate for Project activities at that time.

Table 5.18–6 Project Hazard Analysis (Construction and Operations Phases)

Activity	Hazard	Control
Motor Vehicle and Heavy Equipment Use	Collisions between equipment, injury to operators and construction workers, and damage to construction and operation equipment.	Establish and implement a Motor Vehicle and Heavy Equipment Safety Program.
Forklift Operation	Similar to motor vehicle and heavy equipment use.	Establish and implement a compliant forklift program, including inspections and training.
Elevated Working Surfaces	Injury to employees from falls from elevated locations.	Establish and implement a Fall Protection Program and Scaffolding Safety Program.
Trenching and Excavation Operations	Injury to employees and property damage from unsafe trenches and excavations.	Establish and implement a Trenching and Excavation Safety Program, and a Confined Space Permit Program.
Use of Cranes or Derricks	Equipment and property damage from falling loads and injuries to workers.	Implement Crane Permits per Cal/OSHA requirements and establish a Hoisting and Rigging Safety Program.
Plant Systems, Maintenance, and General Construction Activities	Injury to employees and property damage from various contacts with hazardous energy sources (e.g., heat sources, electrical, tools, and mechanical equipment).	Establish procedures to control energy sources (e.g., Lock Out/Tag Out Program, Hot Work Permits, and Cold Work Permits).
Working with Flammable and Combustible Liquids	Danger of fire or explosions with damage to property and injury to personnel.	Establish Flammable and Combustible Liquid Storage and a Chemical Handling Program. Establish and implement an Emergency Response Plan. Implement a Fire Prevention and Protection Program. Implement a Housekeeping Policy and Program.
Cutting and Welding (Hot Work)	Injury to employees and property damage from fire. Employee exposure to toxic fumes during cutting and welding operations. Eye injury due to exposure to ultraviolet and infrared radiation during cutting and welding.	Establish a Respiratory Protection Program, Hot Work Program, Industrial Hygiene Monitoring Program, and a Housekeeping Policy.
Working on or with Electrical Equipment and Systems	Injury to employees and equipment from flashovers and contact with electricity.	Implement an Electrical Safety Program, PPE Program, Hazardous Energy Control (Lock Out/Tag Out) Program, etc.
Construction Assembly, Repair, and/or Maintenance Activities	Injury to employees from hand and portable power tools.	Implement Hand and Portable Power Tool Safety Program, PPE Program, Preventative Maintenance, and Tool Inspection Program.

Table 5.18–6 Project Hazard Analysis (Construction and Operations Phases)

Activity	Hazard	Control
Ingress and Egress Issues	Injury to employees and property damage from inadequate walking and work surface areas.	Establish a Housekeeping Policy and Program, and a Confined Space Entry Program.
Hearing Loss	Injury to employees from overexposure or inadequate ear protection.	Implement a Hearing Conservation Program and a PPE Program.
Lifting Heavy Objects	Injury to employees from improper carrying or lifting of materials and equipment.	Establish a Safe Lifting Program and PPE Program for adequate material handling.
Driving Small Vehicles (Cars and Pickups)	Collisions between equipment, injury to operators and construction workers, and damage to construction and operation equipment.	Establish a Safe Driving Program.
Exposure to Hazardous Gases, Vapors, Dust, and Fumes	Injury to employees from exposure or overexposure to hazardous gases, vapors, dusts, and fumes.	Establish a Hazardous Substances Program, Respiratory Protection Program, PPE Program, and Industrial Hygiene Exposure Monitoring Program/Records.
Exposure to Broken Glass	Glass mirrors break periodically due to unusual wind loads or accidental impacts by equipment or tools. Injury to employees from broken/sharp glass.	Establish a Broken Mirror Protection Program; implement safe procedures for mirror handling, installation, and removal. Implement safe procedures for Heat Collector Element (HCE) handling, installation, and removal.
High Pressure Steam/Air Systems Testing, Troubleshooting Repair, and Maintenance	Injury to employees and property damage from sudden unexpected release of high pressure steam or air.	Install proper relief valves or vents. Proof test pressure system components. Establish a Relief Valve Maintenance and Testing Program, Hazardous Energy Control, Lock Out/Tag Out Program, and Line Breaking Safety Program.
Repetitive Motion Activities	Injury to employees from repetitive activities.	Establish an Ergonomics Program.

Injury and Illness Prevention Plan

The construction IIPP will meet Cal/OSHA IIPP requirements. The construction IIPP will be used as the basis for developing the operations phase IIPP, which is required by Title 8 CCR Section 3203. The IIPPs for both phases will include the following elements:

- Specify personnel responsible for implementing the plan.
- Establish safety and health policy of the plan.
- Define work rules and safe work practices for construction activities.
- Determine system for ensuring that employees comply with safe work practices.
- Implement an employee safety communications program.

- Identify and evaluate individual workplace-related hazards and develop necessary program(s).
- Establish 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.
- Specify safety procedures (e.g., fall protection, hearing protection, lock out/tag out, and respiratory protection).
- Determine and establish training and instruction requirements and programs.

Fire Protection and Prevention Program

The Project will rely on both onsite fire protection systems and offsite fire protection services (KCFD) during construction and operation. A Construction Fire Protection and Prevention Plan will be developed and followed throughout all phases of construction. During construction, the permanent facility fire suppression system will be placed in service as early as practicable. Prior to installation of the facility's permanent fire suppression system, fire extinguishers and other portable firefighting equipment will be available on site. These fire extinguishers will be maintained for the full construction duration, in accordance with Cal/OSHA requirements.

Locations of portable fire extinguishers will include, but not necessarily be limited to, portable office spaces, hot work areas, flammable chemical storage areas, and mobile equipment (e.g., passenger vehicles and earthmoving equipment). Firefighting equipment will be located to allow for unobstructed access to the equipment and will be conspicuously marked. Portable firefighting equipment will be routinely inspected per regulatory requirements and replaced immediately, if defective, or if in need of recharge.

Construction fire prevention regulations in Title 8 CCR Section 1920 et seq. will be followed, as necessary, to prevent construction fires. Specific requirements for the Construction Fire Protection and Prevention Program are:

- Determine general program requirements.
- Develop good housekeeping practices and procedures (e.g., proper storage of equipment, cleanup of job sites, and neat and orderly work places).
- Establish employee alarm and/or communication system(s).
- Provide portable fire extinguishers at appropriate site locations.
- Locate fixed firefighting equipment in suitable areas.
- Specify fire control requirements and procedures.
- Establish proper flammable and combustible liquid storage facilities.
- Identify the location and use of flammable and combustible liquids.
- Provide proper dispensing facilities for flammable materials.
- Determine proper disposal requirements for flammable liquids.
- Identify proper servicing and refueling locations.
- Establish and determine training and instruction requirements and programs.

Special attention will be given to operations involving open flames, such as welding, cutting, and the use of flammable liquids and gases. Personnel involved in such operations will have appropriate training. A fire watch, utilizing the appropriate class of extinguishers or other equipment, will be maintained during hazardous or hot work operations. Site personnel will not be expected to fight fires past the incipient stage.

Fuel storage areas will be contained and protected in accordance with Cal/OSHA requirements. It is anticipated that the Project will have only diesel and gasoline liquid fuels stored on site during construction. This liquid fuel storage will be used for fueling onsite equipment and vehicles. The capacity and location of the fuel storage containers will be reviewed and approved by the Kern County Environmental Health Services Department prior to installation and use.

Emergency Action Program and Plan

The Project will establish a Construction Emergency Action Program and Plan that will include emergency evacuation procedures. Specific requirements of the plan include:

- Establish emergency procedures for the protection of personnel, equipment, the environment, and materials.
- Identify fire and emergency reporting procedures.
- Determine response actions for accidents involving personnel and/or property.
- Develop response and reporting requirements for bomb threats.
- Specify site assembly and emergency evacuation route procedures.
- Define natural disaster responses (e.g., earthquakes, high winds, and flooding).
- Establish reporting and notification procedures for emergencies (including onsite, offsite, local authorities, and/or state jurisdictions).
- Determine alarm and communication systems needed for specific operations.
- Develop a Spill Response, Prevention, and Countermeasure plan.
- Identify emergency personnel (response team) responsibilities and notification roster.
- Obtain emergency response equipment and strategically locate.
- Establish and determine training and instruction requirements and programs.

Personal Protective Equipment Program

The Project will develop and implement a PPE Program, which will apply to all contractor and subcontractor employees, as well as direct project employees, during both construction and operation. The elements of the PPE Program will be the same for both construction and operation phases, but, as discussed above for the Project Hazard Analysis, program specifics will be tailored as needed as the Project transitions from construction into operation. Specific requirements of the PPE Program include:

- Determine and provide personal protective devices for specific jobs.
- Establish proper head protection requirements.
- Establish eye and face protection requirements.
- Identify body protection equipment requirements.
- Establish hand protection requirements.
- Define proper foot protection.
- Provide proper sanitation facilities.
- Determine safety belts and life lines job requirements.
- Establish procedures to prevent and protect personnel from electric shock.
- Identify onsite and offsite medical services and first aid requirements.
- Specify respiratory protection requirements for jobs.

Required PPE will be approved for use and distinctly marked to facilitate identification. The type of PPE required for each job task will be described in the job safety analysis for that task. The use of PPE for site activities includes, but is not limited to the items specifically described in Table 5.18-7 and will comply with Cal/OSHA requirements (Title 8 CCR Section 1514-1522). The work atmosphere will be sampled and tested per established protocols to evaluate the adequacy of the PPE assigned for specific tasks. A respiratory protection program complying with Title 8 CCR Section 5144 will be developed that includes respirator training, fit testing, monitoring, selection, etc., if testing results indicate that such a program is needed.

Table 5.18–7 Basic Protective Equipment Guide

Body Area	Hazards	Recommended Action
Eyes/Face	Low-velocity flying particles High-velocity chips and sparks Corrosive liquid splash during transfer Entering an acid storage system Welding-injurious light rays	Safety glasses with side shields Impact goggles or safety glasses with full face shield Splash-proof goggles and face shield Acid hood Welding hood or designated area with appropriate eye filter lenses
Head/Ears	General wear, overhead rigging, material handling, maintenance, and general construction operations Noise exposure	Hard hat Ear plugs or muffs
Respiratory System	Low-hazard inert dusts Welding fumes Low concentration solvent vapors Acid mists High-concentration dusts or vapors Oxygen deficiencies or gases	Dust mask Appropriately ventilated area Cartridge-type, positive pressure, full-face respirator Air line respirator Self-contained breathing apparatus
Hands/Arms	Handling rough or sharp objects Handling hot objects Using solvents	Leather gloves Insulated gloves Impervious synthetic gloves
Feet/Legs	General wear for light handling Handling heavy objects Using brush hooks or scythes Working with corrosive liquids Underground work	Safety toe shoes Metatarsal safety shoes Shin guards Safety toe boots, full leather, no breather holes Safety toe synthetic boots
Trunk/Full Body	Hot or corrosive liquids Punctures, impact, or cuts Cleanup of broken acid containers	Full body suit made of appropriate materials, synthetic apron Rubber apron for corrosive liquids Canvas or leather kickback apron or metal mesh apron Full body suit made of appropriate materials
Fall Protection/Rescue	Working from elevated structure of platform w/o standard railings Vessel entry Suspended scaffolds	Safety harness, arrestor, and lanyard Harness and lifeline or wristlets and lifeline Lifeline, safety harness/lanyard Boom lift platform with cage

Safety Training Program

The Project will develop and implement a Construction Safety Training Program that will be adapted to serve as an Operations Safety Training Program as the Project transitions from construction into routine operations. As with the Project Hazard Analysis and PPE Program, the elements of the Safety Training Program will be essentially the same for operations as for construction, but specifics of the training will be adapted as needed to be suitable for the specific work activities associated with operations to the extent that the various activities differ between the two phases. Typical training courses and the employees who are required to receive the training are provided in Table 5.18-8.

Table 5.18–8 Training Programs and Target Employees (Construction and Operation Phases)

Training Course	Target Employees
Injury and Illness Prevention Training	All employees.
Emergency Action Plan Training	All employees.
PPE Training	All employees.
Heavy Equipment Safety Training	Employees working on, near, or with heavy equipment.
Forklift Operation Training	Employees working with forklifts.
Excavation and Trenching Safety Training	Employees involved with trenching or excavation operations.
Fall Protection Training	All employees.
Scaffolding and Ladder Safety Training	Employees required to erect or use scaffolding and employees using ladders.
Hoist and Rigging Program	Employees and supervisors responsible for conducting hoists and rigging operations.
Crane Safety Training	Employees supervising, crane operators, and employees involved in crane operations.
Fire Protection and Prevention Training	All employees.
Confined Space Entry Program	All employees.
Blood-borne Pathogens Training	First Responders.
Hazard Communication Training	All employees.
Electrical Safety Training	Employees performing work with electrical systems, equipment, or electrical extension cords. Additionally, employees working with lock out/tag out activities.
Hand and Portable Power Tool Safety Training	All employees.
Heat Stress and Cold Stress Safety Training	All employees.
Hearing Conservation Training	All employees.
Lock Out/Tag Out Training	All employees.
Back Injury Prevention Training	All employees.
Safe Driving Training	All employees.
Pressure Vessel and Pipeline Safety Training	Employees supervising or working on pressurized vessel, pipes, or equipment.

Table 5.18–8 Training Programs and Target Employees (Construction and Operation Phases)

Training Course	Target Employees
Respiratory Protection Training	All employees required to wear respiratory protection equipment.
Hot Work Training	All employees working with welding, heating, or other equipment that generates ignition sources.
General Solar Field Safety Training	All employees.
Solar Field Components Safe Handling Training	All employees involved in the assembly of the solar collectors and all operational personnel.
Ergonomics	All employees.

Specific safety program requirements for both construction and operations are identified below.

Develop a Motor Vehicle and Heavy Equipment Safety Program:

- Establish a program for operation and maintenance of Project equipment and vehicles.
- Develop a job site inspection procedure.
- Establish PPE requirements for job site personnel.
- Determine and establish training and instruction requirements and programs.

Develop a Forklift Operation Program:

- Define training and certification requirements for operators based on equipment use.
- Determine fueling and refueling procedures and equipment.
- Establish safe operating parameters for specific jobs and equipment.
- Determine and establish training and instruction requirements and programs.

Develop an Excavation and Trenching Program and permit requirements:

- Establish shoring, sloping, and benching requirements.
- Determine job-specific Cal/OSHA permit requirements (e.g., lock out/tag out, confined space, and hot work).

Develop equipment inspection procedures:

- Establish air monitoring requirements and procedures.
- Develop access and egress requirements for job sites.
- Establish calling procedures for the Underground Services Alert program.
- Determine and establish training and instruction requirements and programs.

Develop a Fall Protection Program:

- Evaluate specific job site of fall hazards.
- Provide requirements for protection device use.
- Determine and establish training and instruction requirements and programs.

Develop a Scaffolding and Ladder Safety Program:

- Establish construction and inspection requirements for scaffolding erection.
- Determine scaffolding applicability of use and proper use procedures.
- Determine and establish training and instruction requirements and programs.

Develop an Articulating Boom Platforms Program:

- Establish procedures for inspection of equipment.
- Determine proper load rating of equipment.
- Establish safe operating parameters of equipment.
- Determine and establish training and instruction requirements and programs.

Develop a Crane and Material Handling Program:

- Determine certified and licensed requirements for operators.
- Establish inspection requirements and procedures.
- Determine proper load rates of equipment.
- Establish safe operating parameters of equipment.
- Determine and establish training and instruction requirements and programs.

Develop an Employee Exposure Monitoring Program:

- Determine and evaluate exposure limitations and requirements for specific job sites (e.g., noise, chemicals, and dust).
- Establish monitoring requirements for specific exposures.
- Establish a medical surveillance program and record keeping requirements.
- Determine and establish training and instruction requirements and programs.

Develop an Electrical Safety Program:

- Establish electrical grounding procedures and requirements.
- Determine lock out/tag out permitting procedures.
- Determine overhead and underground utilities design and installation requirements.
- Establish utility clearance requirements.
- Implement electrical equipment inspection procedures.
- Determine and establish training and instruction requirements and programs.

Develop a Hand and Portable Power Tool Safety Program:

- Evaluate power tools guards and tools proper operation.
- Establish requirements and procedures for inspecting power tools prior to use.
- Determine and establish training and instruction requirements and programs.

Develop a Housekeeping and Material Handling and Storage Program:

- Determine chemical and other equipment storage requirements.
- Examine walkways and work surfaces for proper clearance and elimination of obstructions.
- Examine equipment handling and storage requirements.
- Determine and establish training and instruction requirements and programs.

Develop a Hearing Conservation Program:

- Establish proper hearing protective devices and type to use.
- Determine and establish training and instruction requirements and programs.

Develop a Back Injury Prevention Program:

- Determine proper lifting and material handling procedures.
- Provide proper PPE.
- Determine and establish training and instruction requirements and programs.

Develop a Hazard Communication Program:

- Establish labeling requirements for chemicals.
- Determine proper storage and handling requirements.
- Make available Material Safety Data Sheets for chemicals used on site.
- Establish a chemicals inventory.
- Determine and establish training and instruction requirements and programs.

Develop a Respiratory Protection Program:

- Determine the appropriate tasks for use of job-specific respiratory equipment.
- Establish a designated storage area for equipment.
- Perform fit testing for equipment.
- Establish medical record keeping requirements.
- Perform proper inspection and repair.
- Determine and establish training and instruction requirements and programs.

Develop an Ergonomics Program:

- Establish workplace evaluation process.
- Establish a written program.
- Determine reporting and follow up requirements.
- Establish an employee training program.

Develop a Heat and Cold Stress Monitoring and Control Program:

- Determine monitoring requirements.
- Develop a process to prevent and control exposures.
- Determine and establish training and instruction requirements and programs.

Develop a Lock Out/Tag Out Safety Program:

- Establish a written lock out/tag out program.
- Establish equipment inspection and maintenance procedures.
- Determine and implement training and instruction requirements.

Develop a Pressure Vessel and Pipeline Safety Program:

- Implement a pressure line-breaking program.
- Establish equipment inspection and maintenance procedures.
- Determine blocking, bleeding, and blanking requirements.
- Determine and establish training and instruction requirements and programs.

Develop a Solar Components Safe Handling Program:

- Implement safe procedures for mirror handling, installation and removal.
- Implement safe procedures for HCE handling, installation and removal.
- Determine PPE requirements.
- Determine and establish training and instruction requirements and programs.

5.18.3.2 Operation

As noted earlier, many of the workplace health and safety programs for Project operation will be similar to those developed for construction activities. Thus, many of the construction programs and plans will be revised so they are appropriate for routine operations activities, and the health and safety programs will transition from the construction phase into the operations phase as the overall Project makes the transition between phases. A significant difference between construction activities and operation activities include the addition of propane use during operations. The discussions presented earlier for the construction phase concerning the Project's Hazard Analysis and IIPP apply to operations as well and are not repeated in this subsection.

Fire Protection and Prevention Program

Fire protection at the Project site during operation will include measures relating to safeguarding human life, preventing personnel injury, preserving property, preserving wildlife, and minimizing downtime due to fire or explosion. Fire protection measures will include fire prevention methods to prevent the inception of fires. Of concern are adequate exits, fire-safe construction, reduction of ignition sources, control of fuel sources, and proper maintenance of fire water supply and sprinkler systems.

Because the KCFD will have fire protection responsibility for the Project site, the Project's fire suppression systems will be subject to review and approval by the KCFD. In addition, the fire suppression facilities will be designed by a California-registered Fire Protection Engineer and fire protection equipment will be installed and maintained in accordance with applicable NFPA standards and recommendations. Project facilities also will be designed and operated in conformance with Uniform Fire Code requirements for safe storage, dispensing, use, and handling of hazardous materials, as well as meeting State and local requirements for preparation of hazardous materials release plans and inventories (also see Section 5.6, Hazardous Materials Handling).

The KCFD also will perform the final inspection of the Project site when construction is complete and periodic fire and life safety inspections thereafter, including reviewing and approving programs for regular equipment inspections and servicing and for the training of employees in fire protection procedures. In addition, the Project's insurance carrier will likely provide annual inspections by a fire protection specialist.

The operations phase Fire Prevention Plan will contain the required elements as defined in Title 8 CCR Section 3221 including:

- Scope, purpose, and applicability;
- Potential fire hazards;
- Proper handling and storage of potential fire hazards;
- Potential ignition sources;
- Control of potential ignition sources;
- Persons responsible for equipment and systems maintenance;
- Portable fire extinguishers;
- Automatic sprinkler fire suppression system;
- Water-spray fire system;
- Local fire department;
- Training;
- Housekeeping procedures; and
- Recordkeeping requirements.

Fire Protection System

Fire protection systems are provided to limit personnel injury, property loss, and Project downtime resulting from a fire. The systems include a fire protection water system and portable fire extinguishers. The Project's fire protection water system would be supplied from a dedicated 360,000-gallon portion of the 1,500,000-gallon potable water storage tank located at the power block on the plant site. One electric and one diesel-fueled backup firewater pump, each with a capacity of 1,500 gallons per minute (gpm), would deliver water to the fire protection piping network. A smaller electric motor-driven jockey pump would maintain pressure in the piping network. If the jockey pump is unable to maintain a set operating pressure in the piping network, the diesel fire pump will start automatically.

The fire water system capacity will be at least equal to the flow rate required for the largest single fire hazard, plus a 500 gpm allowance for two-hose streams. All fire protection systems and components will be designed and supplied in accordance with the appropriate requirements of NFPA, United Laboratories (UL), Factory Mutual (FM), and the local Fire Marshall. Two 100-percent capacity fire pumps and one jockey pump will be provided. One pump will be a horizontal, electric motor driven, centrifugal pump taking suction from a dedicated volume of water in the service/fire water storage tank. A backup diesel driven horizontal, centrifugal pump will provide emergency service in the event of an electrical outage.

The service/fire water storage tank will contain a two-hour dedicated storage volume for fire protection, per NFPA 850 recommendations, and will be protectively coated on inside and outside surfaces. Such dedicated water will not be available to the service water system and will be below the level detector indicating when make-up is needed. All fire pump equipment will be UL listed, FM approved, and designed in compliance with NFPA 20 and 850 recommendations. All fire pump equipment will be located in an enclosed building with sufficient room for access to facilitate equipment maintenance. The underground fire main will supply firewater throughout the power block area. The fire main will be looped, and will supply water to fire hydrants, hose stations and fixed water suppression systems installed in buildings and elsewhere around the plant. The underground fire main will be an FM-approved, high density polyethylene piping.

The piping network will be configured in a loop so that a piping failure can be isolated with shutoff valves without interrupting the supply of water to a majority of the loop. The piping network will supply fire hydrants located at intervals throughout the power plant site, a sprinkler deluge system at each unit transformer, heat transfer fluid (HTF) expansion tank and circulating pump area, and will supply sprinkler systems at the steam turbine generator and in the operations and administration buildings. Portable fire extinguishers of appropriate sizes and types will be located throughout the plant site.

Fire protection for the solar field will be provided by zoned isolation of the HTF lines in the event of a rupture that results in fire. The HTF will be allowed to extinguish itself naturally, since the remainder of the field is of nonflammable material (aluminum, steel, and glass). Fire protection in the HTF areas of the power island will be provided by installation of isolation valves in the HTF piping and an onsite plant fire fighting foam truck.

Fuel Handling System

The auxiliary boiler and HTF heater would be fueled by propane. Propane would be delivered to the site via truck from a local distributor and stored in an 18,000 gallon aboveground tank. The estimated propane usage for normal operations is eight million British thermal units per hour (MMBtu/hr) overnight, and approximately 34 MMBtu/hr for one half hour during startup each morning.

Emergency Action Plan

In addition to the other design and procedural elements of the health and safety program, the Project will have a site-specific operation phase Emergency Action Plan. This plan will have many similarities to the construction phase Emergency Action Plan. The operations Emergency Action Plan will address a variety of potential emergencies, including chemical releases, fires, bomb threats, pressure vessel ruptures, and other catastrophic events. The plan will describe evacuation routes, alarm systems, points of contact, assembly areas, responsibilities, and other actions to be taken in the event of an emergency. The plan will have a layout map and a fire extinguisher list, and will describe arrangements with local emergency response agencies. The Emergency Action Plan will be used in conjunction with the IIPP. As required in Title 8 CCR Section 3220, the written Emergency Action Plan will be comprised of the following components:

- Scope, purpose, and applicability;
- Roles and responsibilities;
- Emergency incident response training;
- Emergency response protocol;
- Evacuation protocol;
- Post emergency response protocol; and
- Notification and incident reporting.

5.18.3.3 Cumulative Impacts

The Project will comply with any applicable health and safety plans and regulations; therefore, the Project will have insignificant impacts to worker safety. Each project considered for potential cumulative effects in Section 5.1, Environmental Introduction, will be responsible for complying individually with applicable worker safety requirements. Accordingly, the Project would not result in or contribute considerably to impacts on worker safety.

5.18.4 Mitigation Measures

Because the Project will implement the various worker safety programs and procedures discussed above and, thus complying with the applicable regulatory requirements to maintain a safe workplace, the Project will not have significant impacts on worker safety and health. No mitigation measures are required and none are proposed.

5.18.5 References

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