

6.18 WORKER SAFETY

This section describes the systems and procedures that will be implemented to provide occupational safety and health protection for VV2 Project workers. The section includes descriptions of the health and safety programs that will be used during both Project construction and operation. The section also provides information on the VV2 Project's planned fire prevention and protection program system; descriptions of the Project's fire suppression system and fuel gas system are provided in Section 2.0, Project Description.

6.18.1 LORS Compliance

Construction and operations of the VV2 Project will be performed in accordance with the applicable LORS, in order to ensure a safe and healthy workplace. The applicable LORS are briefly discussed below and summarized in Table 6.18-1.

6.18.1.1 Federal Regulations

Federal regulations dealing with worker health and safety are administered by the Occupational Safety and Health Administration (OSHA) under the Occupational Safety and Health Act of 1970. The Occupational Safety and Health Act provides regulations dealing with equipment and employee safety practices during construction and operation of an industrial facility. Occupational health and safety standards are provided in 29 Code of Federal Regulations (CFR) §1910 *et seq.*, including § 1910.100 (permissible exposure limits for toxic air contaminants, § 1910.137 (electrical protective equipment requirements, § 1910.269 (electrical worker safety standards, and § 1910.1200 (requirement for employers to provide information to employees concerning hazards associated with the use of all chemicals). Construction health and safety regulations are provided in 29 CFR § 1926. Worker personal protective equipment requirements are addressed in Subpart I of §1910 and Subpart E of §1926. Federal safety and health regulations for construction also are provided in 40 U.S. Code (USC) 327 *et seq.*; these requirements are addressed in Title 8, California Code of Regulations (CCR), Chapter 4, Subchapter 4, General Construction Safety Orders.

Per the 1989 Occupational Status Agreement between the federal OSHA and the California Department of Occupational Safety and Health, the state enforces most federal regulations and standards, although the federal OSHA has retained concurrent enforcement jurisdiction for certain federal standards (e.g., those related to hazardous waste).

**Table 6.18-1
Safety LORS Summary**

LORS	Applicability	Where Discussed in AFC
Federal:		
Occupational Safety and Health Act of 1970	Created Occupational Safety and Health Administration (OSHA) and provides federal regulations for worker safety and health in industrial facilities	Sections 6.18.3.1 and 6.18.3.2
Title 29, CFR, Part 1910 et seq.	Contains federal minimum occupational safety and health standards for industrial facilities.	Sections 6.18.3.1 and 6.18.3.2
Title 29, CFR, Part 1926 et seq.	Contains federal minimum occupational safety and health standards for the construction industry.	Section 6.18.3.1
State:		
California Occupational and Safety and Health Act, 1970	Establishes minimum safety and health standards for construction activities and industrial facilities in California.	Sections 6.18.3.1 and 6.18.3.2
Title 8, California Code of Regulations (CCR)	Establishes requirements for a safe and hazard-free work environment. Categories of requirements include General Industrial Safety Orders, General Construction Safety Orders, Electrical Safety Orders, and Pressure Vessel Safety Orders (see Table 6.18-2 for list of applicable topics covered)	Sections 6.18.3.1 and 6.18.3.2
Health and Safety Code, Sections 25500 through 25541	These sections address the requirements for the preparation of a Hazardous Material Business Plan (HMBP) and an Emergency Response Plan for a hazardous materials emergency at the facility.	Sections 6.18.3.1 and 6.18.3.2 Section 6.7.2 (Hazardous Materials Handling)
Local:		
City of Victorville Municipal Code Chapter 6.49, Hazardous Materials Releases	Adopts State requirements and guidelines as governing hazardous materials release response plans and inventories for the city.	Sections 6.18.3.1 and 6.18.3.2 Section 6.7.2 (Hazardous Materials Handling)

**Table 6.18-1
Safety LORS Summary**

LORS	Applicability	Where Discussed in AFC
City of Victorville Municipal Code, Sections 8.04, Fire Department and 8.05, Fire Code	Addresses organization, roles, responsibilities, etc. of City Fire Department and provisions of Victorville City fire code	Section 6.18.3.
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 6.18.3. Section 6.7.2 (Hazardous Materials Handling)
National Fire Protection Association (NFPA)	Standards needed to establish reasonable level of safety and property protection from hazards created by fire and explosion (see Table 6.18-3 for list of standards)	Section 6.18.3. Section 6.7.2 (Hazardous Materials Handling)
American National Standards Institute (ANSI) and American Society of Mechanical Engineers (ASME)	Provides specifications and other requirements for pressure vessels.	Appendix D (Engineering Design Criteria)
ANSI, B31.2§	Provides specifications and requirements for fuel gas piping systems.	Appendix D (Engineering Design Criteria)

6.18.1.2 State

The California Occupational Safety and Health Administration (Cal-OSHA) is responsible for enforcing most federal health and safety regulations and standards, as well as state regulations dealing with 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 California Code of Regulations, Title 8. Table 6.18-2 identifies specific topical areas covered in applicable portions of CCR Title 8.

Table 6.18-2
Potentially Applicable Topics Addressed in Title 8 CCR

Standard	Description
Occupational Health and Safety Standards, Title 8, §§ 401-428	Definitions Administration Variances Appeals Officers Hearing Board
General Industrial Safety Orders Title 8, §§ 3200 -6184	Employee/Employer Communications Injury and Illness Prevention Program Emergency Action Plan Fire Prevention Plan Hazardous materials Control of Hazardous Substances Hazard Communications Emergency Medical Procedures Personal Protective Equipment 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)
General Construction Safety Orders High Voltage Electrical Safety Orders Title 8, §§ 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 Personal Protective Equipment Hand and power Tool Use Crane and Hoist Operations Illumination Housekeeping

Table 6.18-2
Potentially Applicable Topics Addressed in Title 8 CCR

Standard	Description
	Excavations
Electrical Safety Orders Title 8, §§2299-2974	High Voltage Installation, Operation, and Maintenance Low and High Voltage Hazards
Unfired Pressure Vessel Safety Orders, Title 8, §§ 450-460	Design and Construction Air Tanks Pressure Vessels other than Air Tanks LP Gas Systems Aqueous Ammonia Safe Practices
Boiler and Fired Pressure Vessel Safety Orders, Title 8, §§ 750-797	Design and Construction Installation, Inspection, Operation, Repairs

6.18.1.3 Local

Title 6 (Health and Sanitation) of the City of Victorville Municipal Code includes portions dealing with hazardous materials (Chapters 649 and 650). Title 8 (Fire) of the Victorville Municipal Code includes Section 8.04 (Fire Department), which discusses organization, roles, responsibilities and authorities of the City fire department. Title 8, Section 8.05 (Fire Code) includes specific requirements of the City fire code, e.g., adoption of the California Fire Code, a number of amendments to the Uniform Fire Code, identification of zoning designations where storage of certain types of hazardous substances are prohibited or limited.

6.18.1.4 Other Regulation 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 the National Fire Protection Association (NFPA), the American National Standards Institute (ANSI), and the American Society of Mechanical Engineers (ASME), as well as the American Welding Society, Heat Exchanger Institute, and Instrument Society of America, among others. Many of these 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 6.18-3.

**Table 6.18-3
Fire Protection Association 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
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 Req'ts 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

6.18.3.4 Involved Agencies and Required Permits

Agency contacts regarding worker health and safety for the VV2 Project are shown in Table 6.18-4.

**Table 6.18-4
Agencies and Agency Contacts**

Agency	Contact	Permit/Issue
California Occupational and Safety Administration (Cal-OSHA) 464 West 4th Street, Room 339 San Bernardino, CA 92408	Duty Officer Consultation Services (909) 383-4567 Compliance Division (909) 383-4321	See Permits in Table 6.18-5
City of Victorville Fire Department P.O. Box 5001 Victorville, CA 92393	Jeff Stinson Fire Safety Inspector (760) 955-5237	Uniform Fire Code and NFPA compliance

Table 6.18-5 provides a listing of applicable health and safety permits, which will be required for the VV2 Project. Additionally, this table provides the activities covered for each permit as well as the application requirements to obtain the permit.

All permits given in Table 6.18-5 can be obtained from any district or field office of Cal-OSHA. 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 in the construction of the plant or during operation.

6.18.2 Affected Environment

Because the VV2 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. It should be noted, however, that VV2 will tie into existing facilities, such as obtaining natural gas fuel by constructing a short pipeline (only approximately 450 feet of which would extend off the Project site) that connects to the existing natural gas delivery pipeline that supplies the HDPP and that runs adjacent to the VV2 Project's southwestern boundary. The Project also will obtain reclaimed water from the existing nearby VVWRA treatment plant, and will involve constructing new transmission lines to connect Project-generated electrical power with the regional grid.

**Table 6.18-5
Permits and Approvals**

Permit/ Approval	Issuing Agency	Law/Application Requirements	Permit Schedule
Trenching, Excavation, and Erection or Demolition Permit	Cal-OSHA	Permits are required for the following operations: <ul style="list-style-type: none"> • Trenches and excavations of more than 5 feet below ground surface where personnel are required to enter. • Construction of buildings, structures, scaffolding, or false work that are more than three stories high. • Demolition of any building, structure, or the dismantling of scaffolding or false work that are more than three stories high. 	Submit completed permit application within 24 hours to any Cal-OSHA district or field office prior to commencing construction
Erection of a Fixed Tower Crane Permit	Cal-OSHA	Permits are required for the following operations: <ul style="list-style-type: none"> • Erection, climbing, and dismantling of fixed tower cranes. Additionally, notifications to the Cal-OSHA must be made at least 24 hours prior to the initiation of the following activities: <ul style="list-style-type: none"> • Completion of erection and commencement of operation • Climbing of the tower crane • Dismantling of the tower crane 	Submit completed permit application 24 hours prior to beginning work to any Cal-OSHA district or field office.

6.18.3 Environmental Impacts

Potential impacts to worker safety are defined as impacts that could adversely affect Project personnel, including individuals employed directly by the VV2 Project as well as employees of contractors, vendors, or others working on-site, during both Project construction and operations. The following subsections address VV2 Project construction and operations phase worker safety issues.

As discussed in the following subsections, Project work activities, the associated hazards, and the approaches to controlling those hazards are similar during construction and operations, and thus, many of the workplace health and safety programs for VV2 Project operations will be similar to those developed for construction activities. As reflected in

the following discussions, many of the Project construction health and safety programs and plans will be adapted for the Project operations phase so that health and safety efforts transition smoothly from construction to operations as the overall VV2 Project makes the same transition.

6.18.3.1 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 VV2 Project 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 6.18-6 summarizes a hazard analysis of the VV2 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 6.18-6 applies to both Project construction and Project operations. 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. Please note that the hazard analysis and resulting worker safety programs that are implemented will include the solar as well as the combined-cycle elements of the VV2 Project. For example, the various safety plans and training programs will include procedures for the safe handling of the heat transfer fluid that will be used in the solar thermal component of the Project, Therminol VP-1.

**Table 6.18-6
VV2 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 a Motor Vehicle and Heavy Equipment Safety Program.
Forklift Operation	Similar to motor vehicle and heavy equipment use.	Same as above and provide Forklift Operator Training Program
Working in Elevated Locations	Injury to employees from falls from elevated locations.	Establish a Fall Protection Program and Scaffolding Safety Program

**Table 6.18-6
VV2 Project Hazard Analysis (Construction and Operations Phases)**

Activity	Hazard	Control
Trenching and Excavation Operations	Injury to employee and property damage from unsafe trenches and excavations.	Establish Trenching and Excavation Safety Program and confined space permits and use of Excavation Permits per Cal-OSHA
Use of Cranes or Derricks	Equipment and property damage from falling loads and injuries to construction workers.	Implementation of Crane Permits per Cal-OSHA requirements and establishing a Hoisting and Rigging Safety Program
Working with Flammable and Combustible Liquids	Danger of fire or explosions and damage to property and injury to personnel	Establish Flammable and Combustible Liquid Storage and Handling Program and proper storage facility Implement Fire Prevention and Protection Program Implement Proper Housekeeping Policy and Program
Cutting and Welding (Hot Work)	Injury to employee 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 and Industrial Hygiene Monitoring Program as well as a Proper Housekeeping Policy and Program
Plant Systems, Maintenance, and General Construction Activities	Injury to Employee and property damage from various contact with hazardous energy sources (e.g., heat sources, electrical, tools, and mechanical equipment)	Establish procedures to control energy sources (e.g., Lockout/Tagout Program, Hot Work Permits, and Cold Work Permits)
Working on or with Electrical Equipment and Systems	Injury to employee and equipment from flashovers and contact with electricity	Implement an Electrical Safety Program, Personal Protective Equipment Program, Hazardous Energy Control, Lockout/Tagout) Program, etc.
Construction Assembly, Repair, and/or Maintenance Activities	Injury to employee from hand and portable power tools	Implement Hand and Portable Power Tool Safety Program, Personal Protective Equipment Program, and Tool Inspection Program

Table 6.18-6
VV2 Project Hazard Analysis (Construction and Operations Phases)

Activity	Hazard	Control
Aggress and Egress Issues	Injury to employee and property damage from inadequate walking and work surfaces areas	Establishing a Housekeeping Policy and Program
Hearing Loss	Injury to employee from overexposure or inadequate ear protection	Implement a Hearing Conservation Program and a Personal Protective Equipment Program
Lifting Heavy Objects	Injury to employee from improper carrying or lifting and of materials and equipment	Establish a Safe Lifting Program and Personal Protection Equipment Program for adequate material handling.
Driving Small Vehicle (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 employee exposure or overexposure to hazardous gases, vapors, dusts, and fumes	Establish a Hazardous Substances Program, Respiratory Protection Program, Personal Protective Equipment Program, and Industrial Hygiene Exposure Monitoring Program/Records
High Pressure Steam/Air Systems Testing, troubleshooting Repair, and Maintenance.	Injury to employee and property damage from sudden unexpected release of high pressure steam or air.	Install proper relief valving or vents Establish Relief Valve Maintenance and Testing Program Proof testing pressure system components Hazardous Energy Control, "Lockout/Tagout Program, and "Line Breaking Safety Program

Injury and Illness Prevention Plan (IIPP). The VV2 Project construction IIPP will meet Cal-OSHA Injury and Illness Prevention Program requirements. The construction IIPP will be adapted as needed to develop the operations phase IIPP which is required by Title 8 CCR Section 3203. The IIPPs for both Project phases will include the elements shown below:

- Specify personnel responsibility for implementing this 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 work place-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), and
- Determine and establish training and instruction requirements and programs.

Fire Protection and Prevention Program. The VV2 Project will rely on both onsite fire protection systems and local (e.g., City of Victorville) fire protection services during both construction and operations. 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 fire fighting equipment will be available onsite. 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, welding and braising areas, flammable chemical storage areas, and mobile equipment (e.g., passenger vehicles and earthmoving equipment). Fire-fighting equipment will be located to allow for unobstructed access to the equipment and will be conspicuously marked. Portable fire fighting equipment will be routinely inspected and replaced immediately, if defective, or if in need of recharge.

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

- 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 fire fighting 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 by the contractor. 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 on-site equipment and vehicles. The capacity and location of the fuel storage containers will be reviewed and approved by the City of Victorville Fire Department prior to installation and use.

Emergency Action Program and Plan. The VV2 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 on-site, off-site, local authorities, and/or state jurisdictions).
- Determine alarm and communication systems needed for specific operations.
- Develop a Spill Response, Prevention, and Countermeasure (SPCC) 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 (PPE) 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 operations. Specific requirements of the Personnel Protective Equipment Program include:

- Determine and provide personal protective devices for specific jobs.
- Provide proper head protection requirements.
- Establish eye and face protection requirements.
- Identify body protection equipment requirements.
- Implement 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 on-site and off-site 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 6.18-7 and will comply with Cal-OSHA requirements (Title 8 CCR § 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 § 5144 will be developed that includes respirator training, fit testing, monitoring, selection, etc., if testing results indicate that such a program is needed.

**Table 6.18-7
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 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 muff
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 organic vapor respirator Cartridge-type acid mist 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 Canvas or leather kickback apron or metal mesh apron Full body suite made of appropriate materials

**Table 6.18-7
Basic Protective Equipment Guide**

Body Area	Hazards	Recommended Action
Fall Protection/ Rescue	Working from elevated structure of platform w/o standard railings	Safety harness and lanyard
	Vessel entry	Harness and lifeline or wristlets and lifeline
	Suspended scaffolds	Lifeline, safety harness/lanyard

Safety Training Program. The VV2 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 power generation facility operations. As mentioned above for 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 6.18-8.

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.

Table 6.18-8
Training Programs and Target Employees (Construction and Operations 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.
Hazard Communication Training	Employees working with or handling hazardous materials.
Electrical Safety Training	Employees performing work with electrical systems, equipment, or electrical extension cords. Additionally, employees working with lockout/tagout activities.
Hand and Portable Power Tool Safety Training	All employees.
Heat Stress and Cold Stress Safety Training	All employees.
Hearing Conservation 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.
Respiratory Protection Training	All employees required to wear respiratory protection equipment.

Table 6.18-8
Training Programs and Target Employees (Construction and Operations Phases)

Training Course	Target Employees
Hot Work Training	All employees working with welding, heating, or other equipment that generates high temperatures.

Develop an Excavation and Trenching Program and permit requirements:

- Establish shoring, sloping, and benching requirements.
- Determine job-specific Cal-OSHA permit requirements (e.g., lockout/tagout, 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 (USA) 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 lockout/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 (MSDSs) for chemicals used on site.
- Establish a chemical inventories.
- 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 a fit testing for equipment.
- Establish medical record keeping requirements.
- Perform proper inspection and repair.
- Determine and establish training and instruction requirements and programs.

Develop a Heat and Cold Stress Monitoring and Control Program:

- Determine monitoring requirements.
- Develop a prevention and control strategy.
- Determine and establish training and instruction requirements and programs.

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.

6.18.3.1 Operations

As noted earlier, many of the workplace health and safety programs for VV2 Project operations will be similar to those developed for Project construction activities. Therefore, many of the construction programs and plans will be revised so they are appropriate for routine operations activities, and the Project health and safety programs will transition from the construction phase into the operations phase as the overall Project makes the transition between phases. The discussions presented earlier for the Project construction phase concerning the Project's Hazard Analysis and IIP apply to Project operations as well and are not repeated in this subsection.

Fire Protection and Prevention Program. Fire protection at the Project site during Project operations will include measures relating to safeguarding human life, preventing personnel injury, preservation of property 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 City of Victorville Fire Department will have fire protection responsibility for the Project site, the Project's fire suppression systems will be subject to review and approval by the Victorville Fire Department. 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 6.7.2, Hazardous Materials Handling).

The Victorville Fire Department also will perform the final inspection of the VV2 Project plant 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. Servicing of the fixed carbon dioxide or dry chemical systems will be conducted by a licensed contractor.

The Project operations phase Fire Prevention Plan will contain the required elements as defined in Title 8 CCR § 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
- Recordkeeping requirements

Fire Protection System. Project fire protection systems include a water system, carbon dioxide (CO₂) fire suppression systems for the CTGs, and portable fire extinguishers. The Project's fire protection water system will be supplied from a dedicated 250,000-gallon portion of the 740,000-gallon raw water storage tank located on the Project site. One diesel-driven fire pump, with a capacity of 500 gallons per minute, will deliver water to the fire protection water-piping network. A second electric motor-driven pump, a small capacity jockey pump, will maintain pressure in the piping network. If the jockey pump is unable to maintain a set operating pressure in the piping network, the fire pump starts automatically.

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 various locations around the plant site and also will supply a sprinkler system in the operations building and at each of the generating unit transformers. The CO₂ fire suppression system provided for each combustion turbine will include a CO₂ storage tank, CO₂ piping and nozzles, fire detection sensors, and a control system. Upon detection and automated confirmation of the existence of a fire, the control system will automatically shut down the combustion turbine, turn off ventilation fans, close ventilation openings, and release CO₂. Portable fire extinguishers of appropriate sizes and types will be located throughout the plant site.

Fire protection for the solar array 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 other portions of the solar field are constructed of nonflammable material (aluminum, steel, and glass).

Fuel Handling System. Natural gas delivered to the VV2 Project site will flow through a revenue quality flow meter, pressure regulation station, and filtering equipment. Natural gas for the duct burner systems, auxiliary boiler, and HTF heater branches off and is regulated to a lower pressure. Safety pressure relief valves are provided downstream of pressure regulation valves. The combustion turbine systems include a natural gas preheater, and both the combustion turbine and duct burner systems include flow modulation equipment.

Emergency Action Plan. In addition to the other design and procedural elements of the Project health and safety program, the Project will have a site-specific operations 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, aqueous ammonia releases 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, a fire extinguisher list, and describe arrangements with local emergency response agencies for responding to emergencies. The Emergency Action Plan will be used in conjunction with the Injury and Illness Prevention Plan. As required in Title 8 CCR § 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.

6.18.3.2 Cumulative Impacts

As the various projects considered in the cumulative impact evaluation will be responsible for complying individually with applicable worker safety requirements, no cumulative impacts on worker safety are expected as a result of the VV2 Project.

6.18.4 Mitigation Measures

With implementation of the various worker safety and health programs and procedures described above, the Project will comply with the applicable regulatory requirements to provide a safe workplace and will not have significant adverse impacts on worker safety. Thus, no mitigation measures are required.

6.18.5 References

California Code of Regulations. Title 8 General Industry Safety Orders, Construction Safety Orders, High Voltage Safety Orders, and Pressure Vessel Safety Orders.

City of Victorville Municipal Code. Title 6 (Health and Sanitation) and Title 8 (Fire).

Code of Federal Regulations. Title 29 Part 1910. Construction Safety Orders.

Code of Federal Regulations. Title 29 Part 1926. General Industry Safety Orders.

National Fire Protection Association, 1994. A Compilation of NFPA Codes, Standards, Recommended Practices and Guides.

National Safety Council, 1992. Accident Prevention Manual. Volume 2, Chapter 6, Fire Protection