TULE WIND PROJECT
MULTI AGENCY CONSTRUCTION
FIRE PREVENTION/PROTECTION PLAN

February 21, 2012

IN THE EVENT OF A CONFIRMED EMERGENCY, CALL 911 (619-442-1615) WITHOUT DELAY.

THE SITE ADDRESS IS:

_____

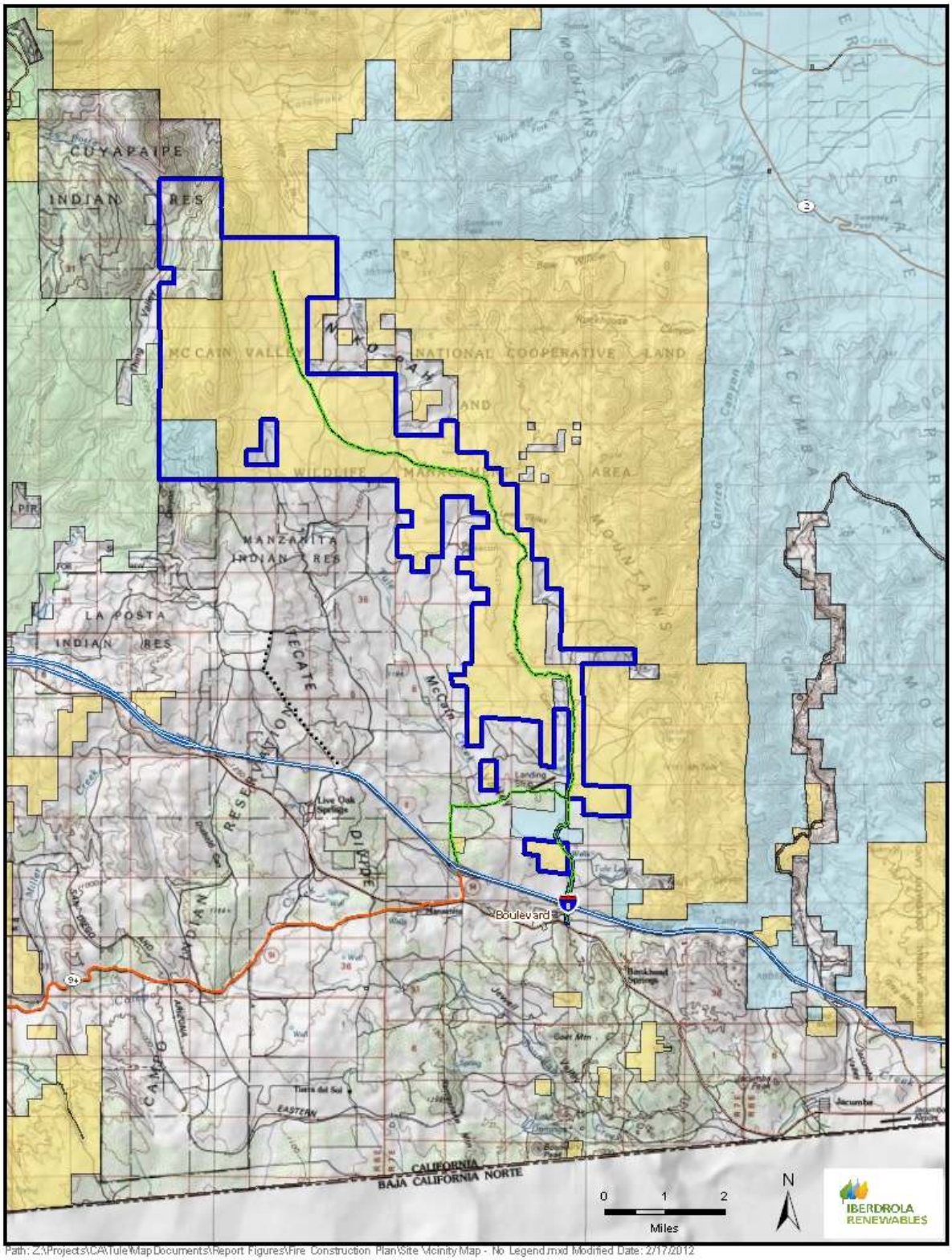
in the Boulevard area.

The Thomas Guide page number and coordinates are Page 430, D-8.

Latitude and Longitude are:

- **NW corner: 32.845897° N, 116.380572° W**
- **NE corner: 32.845054° N, 116.236055° W**
- **SE corner: 32.660277° N, 116237625° W**
- **SW corner: 32.661096° N, 116.381811° W**

See map on next page.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MC CAIN VALLEY
NATIONAL COOPERATIVE LAND
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I. INTRODUCTION

This is the Construction Fire Prevention/Protection Plan for the Tule Wind Project, which satisfies Final EIR/EIS Mitigation Measure FF-1 and APM Tule PDF-2, and APM Tule PDF-1, "Fire Prevention during Welding, Cutting, and other Hot Work". This plan is prepared, in part, by Jim Hunt, Hunt Research Corporation for Tule Wind LLC (Tule).

This document follows the Mitigation and Monitoring Program Tracking Form provided by David Hochart of Dudek.

All construction work shall follow these guidelines and commitments. The contents of this plan are to be incorporated into the standard construction contracting agreements for the construction of the project. Primary plan enforcement and implementation responsibility will remain with Tule and its contractors and vendors. Copies of this plan shall be given to all contractors, and a kick-off safety meeting will be conducted. Workers shall sign a form stating they received this training.

This plan includes compliance with the California Fire Code, Chapter 26 "Welding and Other Hot Work" and with National Fire Protection Association (NFPA) 51-B: "Fire Prevention during Welding, Cutting and other Hotwork".

II. REQUIREMENTS

The following requirements shall be implemented to the satisfaction of the fire authorities having jurisdiction, which include the San Diego County Fire Authority (SDCFA), San Diego Rural Fire Protection District (SDRFPD), Bureau of Land Management (BLM), CAL FIRE, and the Ewiiaapaayp Tribal Government (jointly, the Fire Agencies).

A. Construction of Access Roads Prior to On Site Construction

It is important that the Fire safety provisions in this plan, and any other requirements made by the Fire Agencies be in place when "pioneering" through vegetation with tractors, and other equipment, grading roads, etc. The possibility exists for equipment or tools to strike rocks or other hardscape, steel fencing, or buried or partially buried pipe, materials, etc., and ignite a vegetation fire. Vehicles can also emit sparks and burning pieces of carbon, ignite vegetation with hot parts of a vehicle (i.e., the muffler, etc.) or have an engine fire. The use of hand tools (powered saws, shovels, axes, weed whackers, masticators, etc.) can cause sparks in contact with rocks, steel, etc. It will be important that construction workers are alert and immediately available to suppress a fire while it is small. The first action shall be to immediately call 911 before taking any actions to control or extinguish the fire. It is also important that when Red Flag Warning weather or other high fire hazard weather as determined by the Fire Safety Coordinator is occurring, that any operation that can cause sparks, hot slag, ignition sources, or otherwise cause a fire be allowed only at the direction of the Fire Safety Coordinator. See Section 0, *infra*.

Route Signs: To reduce confusion and reduce response times, all routes shall be designated or named and permanently signed in contrasting reflective colors. The signs and site maps shall be accurate and maintained.

B. Training

Each member of the construction crew and on site Tule personnel shall be trained and equipped to extinguish small fires (and to understand when it is safe to do so) in order to prevent them from growing into more serious threats. They shall be trained in the following:

a. Fire prevention (including the preservation of the scene of origin for fire cause determination).

b. Firefighting safety.

c. Hot work and Red Flag Warning procedures

d. Use of the laminated notification and action checklist. Refer to example in this plan. See Section LL.5, *infra*.

e. Initial attack firefighting.

f. Fire reporting (confirmed fires must be reported to 911 without delay by the authorized on site Tule personnel.). If possible, include wind speed and direction for dispatch center, so they can relay this to the responding Incident Commander. Note: this allows the responding Incident Commander to determine the need for additional resources.

g. Use of small hand held fire extinguishers and shovels.

h. Requirement to be within 100 yards of fire suppression equipment.

i. Operation of the Type 6 skid mounted pumps and hose on certain pickup trucks.

j. Location of the fire water storage tanks. Note: tanks to be located in cooperation with BLM Fire for those tanks placed on BLM land.

k. Operation of Tule contractor construction water tenders.

l. All construction crews and inspectors shall be equipped with radios and cell phones. Training shall be provided regarding operation and use of the radios and cell phones throughout the project construction area. Radios shall allow communication with on-site Tule vehicles and the construction trailer. Radios and cell phones shall be fully charged. tested daily, and confirmed operational, before construction begins.

Regular “Tailgate” training meetings will be conducted for all construction personnel, and all new construction personnel will have initial training before beginning work.

C. Water Storage Tanks

There will be four on site fire water storage tanks located and installed, including with required gated outlets for fire trucks, per San Diego Rural Fire Protection District (SDRFPD) requirements prior to construction, including pioneering of roads. The gallon capacity is 10,000

gallons for each tank. The tanks are equipped with gated connections for use by fire apparatus. Tanks shall be clearly labeled in 6" high letters: "Fire Water tank; 10,000 gallons". Plumbing connections for fire services shall be National Hose (NH) thread. Tanks to be outfitted and installed per County of San Diego Consolidated Fire Code Section 508.2.2. Tanks are installed by Tule and maintained and kept full by the SDRFPD. All workers shall know the location of the tanks.

D. Tule Fire Safety Coordinator

Tule shall designate a trained and experienced Fire Safety Coordinator. This position is required by the California Fire Code Section 1408.1. This person shall be responsible for implementation and enforcement of this plan and the Hot Work procedure. The coordinator shall interface with the applicable Fire Agencies. The coordinator shall also take weather readings every day at start of construction, including road construction, to determine if "fire weather" exists, check National Weather Service website for Red Flag Warnings, and will implement the Red Flag Warning requirements for the project. He/she will be responsible to assure all training is done. This person may also be able to serve as the EMT if properly trained.

This person will have the following qualifications and equipment:

- Knowledge of County, State and federal Fire Laws governing activities in hazardous fire areas.

- Skill in operation and maintenance of the Type 6 skid mounted pump equipment and various hand tools, such as shovels, McLeod tools, and Pulaski tools.

- Trained and equipped to take weather readings and to calculate 1-hour fuel moisture.

- Knowledge of the California Fire Code, fire prevention, basic wildland fire risks and firefighting procedures, and use of fire equipment including fire extinguishers and the Type 6 skid mount fire pump unit. Coordinator should preferably have graduated from a State Certified Firefighter 1 Academy or approved equivalent

- The coordinator shall be assigned one of the Tule pickup trucks with the Type 6 skid mount fire pump unit.

- Coordinator shall have one copy of the current California Fire Code and County Fire Code, and one copy of NFPA Standard 51-B regarding welding and Hot Work, and shall be familiar with the requirements in these documents.

- Coordinator shall have a Tule and Contractor radio, cell phone, and laptop with internet capability.

- Coordinator will develop and maintain a Pre Fire Plan as required by the California Fire Code Section 1408.2. The Pre Fire Plan will be a tactical summary of the initial actions and considerations to be taken prior to arrival of firefighters should a fire

emergency occur. It will take into consideration possible areas for fire ignition and the appropriate onsite response. Refer to an example in Appendix of this plan.

E. Road Widths and Roadside Fuel Modification

Construction phase temporary road widths will be from 15 feet wide, for Geotech access, and 18 feet wide minimum during construction. A staffed water tender shall be located at the site of temporary road construction and will keep the roadsides wet out to approx. 10 feet during pioneering and clearing. Prior to starting the road construction, the Fire Safety Coordinator will contact the Fire Chief, Fire Marshal or the applicable Fire Agencies first to determine whether the proposed road grade is sufficient for Fire Truck access. Two escape routes shall be provided from all construction areas. These may be footpaths or construction roads. Roads during construction (and after Geotech surveys) will be 18 feet minimum width per CCR Title 14, Division 1.5, Chapter 7, Subchapter 2, SRA Fire Safe Regulations, Article 2, Emergency Access, Section 1273.01. Permanent roads shall comply with applicable County Private Road standards, the Tule Fire Protection Plan, and be certified by the developer.

F. Fuel Modification at Construction Sites

All construction sites, laydown areas, etc., including any area where equipment is being used (for example, but not limited to, portable saws, augers, drills, tamper or other portable tools powered by a gasoline internal combustion engine), shall have 50 feet of fuel modification around them. In addition, there will be a staffed water tender on site and available to go to sites where there are construction activities which require fuel modification, to wet down the vegetation between approximately 50 and 100 feet when deemed necessary by the Fire Safety Coordinator due to weather conditions. All brush and dead and decaying vegetation shall be cleared from work areas prior to starting construction and/or maintenance work. Construction sites and work areas include those areas where personnel are active or where equipment is in use or stored, and may include parts of the transmission right-of-way (ROW), construction lay down areas, pull sites, access roads, parking pads, turbine pads, Operation and Maintenance building, substation, turbine pads, and any other areas adjacent to the ROW where personnel are active or where equipment is used or stored.

Each construction area shall have a 5-gallon backpack pump water extinguisher, a minimum 3-A-40 BC rated fire extinguisher, and a serviceable round-point shovel of not less than 46 inches in length, within 25 feet of the work area.

Combustible materials in Lay down areas shall be separated by a clear space to allow access for Fire Trucks. Clear foot traffic access must be provided to all fire equipment including fire extinguishers.

Fuel modification at turbine pads shall be a 100-foot distance in all directions (so that the resulting fuel modification area will have a diameter of 200 feet) around base of each turbine, depending on topography, per the Fire Protection Plan. If the topography is such that machinery cannot be used to clear the vegetation, fuel modification will be done by hand as long as it is physically and safely possible.

Where pioneering, clearing, cutting, grinding, welding, burning or where track laying equipment is deployed, the cleared area (in areas other than where pioneering or initial clearing is occurring) shall clear an area 50 feet in all directions. Welding pads, welding curtains and welding blankets shall comply with ANSI/FM Standard 4950 (American National Standard for evaluating welding pads, welding blankets and welding curtain hot work operations), in addition to the 50 feet. A staffed water tender will be available on site to wet down vegetation beyond 50 feet if deemed necessary by the Fire Safety Coordinator, and to also wet down vegetation as deemed necessary by the Fire Safety Coordinator during initial pioneering and clearing of roads.

Cut trees, vegetation, down and dead vegetation, and other combustible spoil, shall be removed from the construction site and to be placed outside the fuel modification zone and stored in neatly stacked, small separate piles, as soon as possible.

G. Fire Patrols

Permanently assigned project vehicles will carry, as a minimum, a pressurized 3-A-40 BC rated fire extinguisher. Fire patrols shall occur on a regular basis during construction and Hot Work and for one hour after end of daily construction and Hot Work. The Tule Fire Safety Coordinator shall operate one of the three pick-ups equipped with a "Type 6" Skid Mounted unit. Fire Patrols shall occur on a regular basis during construction hours and for 1 hour after construction and Hot Work stops. Patrols shall cover the area of the construction site where construction is occurring or has occurred.

Patrols shall be conducted in compliance with the following equipment requirements for each patrol are summarized as follows:

- Pickup truck with Type-6 Skid Mounted unit (including fire pump, water tank, hose, and approved nozzle.
- Two 5-gallon backpack-type pump water extinguishers full of water;
- Three serviceable round-point shovels not less than 46 inches in length that meet U.S. Forest Service spec. # 5100-0326 or are CALFIRE approved;
- Two Pulaski axe hand brush firefighting tools (U.S. Forest Service National Standard spec. # 355) or equivalent;
- One McLeod hand brush firefighting tool (U.S. Forest Service National Standard spec. # 353) or equivalent;
- One cellular phone capable of calling 911;
- 2-way radio on Contractor frequencies and Tule frequencies capable of contacting an on-site base unit where telephones are available;
- First Aid kit with EMT-level CPR equipment;
- Public Access automatic defibrillator (AED);

- 3-A-40 BC rated fire extinguisher and PPE, safety clothes, goggles, helmets, etc.

H. "Type 6" Skid Mounted Pump Units

Tule shall install "Type 6" skid mounted pump units in three Tule pickup trucks prior to beginning construction. There will only be two Tule pickup trucks with skid mounted pump units during operation. The specifications are as set forth in the submittal titled, "'Type 6' Firefighting Unit Specifications and Training Outline" dated July 22, 2011, and approved by SDRFPD and SDCFA. These are required by Mitigation Measure FF-2. The "Type 6" units will have a 25-30 GPM pump, 100 feet of ¾" rubber fire hose on a reel, a tank with 100 gallons of water, and a combination Forestry Fog and Straight stream nozzle. 1 and ½" diameter and larger couplings and adaptors shall be National Hose (NH) thread. See Hunt Research Corporation, Submittal "Type 6" Firefighting Unit Specifications and Training Outline (July 22, 2011). Refer to the details in the submittal referenced above. The submittal also describes the required training. All potential operators shall be trained in advance of construction starting as to operation of these units. Training will be provided by the SDRFPD. These units will be used for Fire Patrol purposes and initial response to fires.

I. Construction Water Tenders

There will be construction water tenders on site during road construction activities, foundation construction, hot work, and during turbine erection. Water tenders shall be equipped with a pump, which can off load water into a fire engine or water tank, if necessary, and with built in spray nozzles, and a hose outlet with fire hose and spray nozzle. The fire hose will be 1 ½" diameter with a combination Fog / Stream nozzle, unless different parameters are appropriate to perform the wetting down function described in Section W, *infra*. The tenders may also be used by firefighters at a fire scene. Tenders shall carry the appropriate fittings to connect fire hose provided by firefighters at a fire, to the truck or to a fire engine. Couplings shall be adapted from quick connect to National Hose (NH) thread on hose lines greater than 1 and ½" diameter. Tenders shall also have a Tule and contractor radio.

J. Portable Fire Extinguishers

Vehicles: Permanently assigned project vehicles will carry, as a minimum, a fire extinguisher with a minimum 3-A-40 BC rating, shovel, and a 2-way radio.

Fire patrol units ("Type 6" skid mount units): two 5 gallon "Indian back pack pump" (or equivalent) extinguishers, and one fire extinguisher with a minimum 3-A-40 BC rating.

Construction sites (including any area where any motor, boiler, engine, stationary equipment, welding equipment, cutting torch, tarpot, or grinding device from which a spark, fire or flame may originate): There shall be at least one 5-gallon backpack pump water extinguisher, one extinguisher with a minimum rating of 3-A-40 BC, and one serviceable round-point shovel of at least 46" in length.

Hotwork (welding, grinding, etc.): A fire extinguisher with a minimum 3-A-40 BC rating and 5 gallon backpack pump type water extinguisher within 25 feet of work site.

Clearing crews shall have a minimum of five (5) five (5)-gallon hand pump type fire extinguishers per 20-person crew.

All tag along or truck-mounted welders shall have a fire extinguisher with a minimum 3-A-40 BC rating permanently mounted to the welder unit or truck.

Each piece of construction equipment (such as graders, tractors, loaders, tenders, etc.) shall have at least one shovel and fully charged fire extinguisher with a minimum rating of 3-A-40 BC.

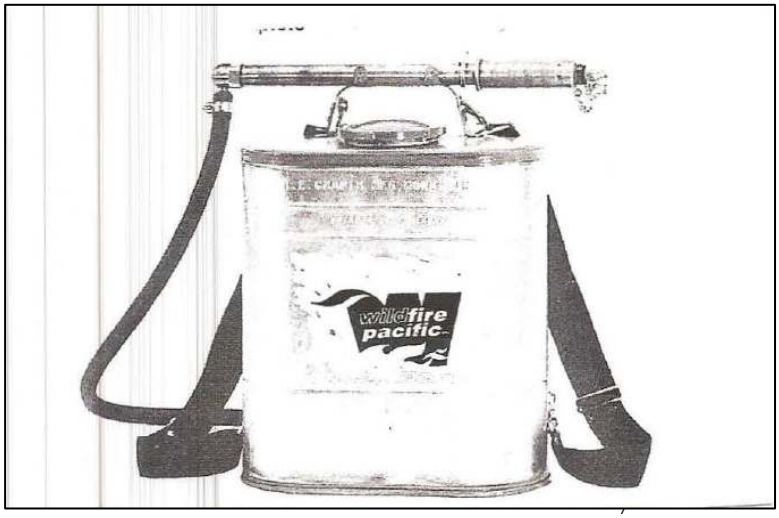
Each person doing Hot Work (including welding) shall have a fire extinguisher with a minimum 3-A-40 BC rating, a 5 gallon back pack pump fire extinguisher, and 46" round point shovel, readily accessible within 30 feet of Hot Work area. (See Section W; "Hot Work", *infra*.)

Each internal combustion engine powered tool, including but not limited to, chain saws, soil augers, rock drills, generators, portable compactors, compressors and similar equipment, shall have one dry chemical fire extinguisher with a minimum 3-A-40 BC rating (fully charged) within 30 feet. Fire Extinguishers shall be UL listed and approved by the applicable Fire Agencies, and shall have tags indicating recharge date.

Note: Actual UL extinguisher ratings of the fire extinguishers may need to exceed the minimums based on location and hazard of the construction work, and based upon the sizes commonly manufactured, such as a 3-A-40 BC rated fire extinguisher in lieu of the 2-A-20 BC rated extinguisher required by Fire Code but not commonly manufactured. The 3-A-40 BC rating exceeds the minimum requirement. Extinguishers which are designated to remain at one location shall be mounted on a post and be clearly visible and accessible.

Offices and any other structures (storerooms, warehouses, etc.) shall have 2-A-10 BC rated fire extinguishers mounted not more than 5 feet above the floor, in a visible and accessible location, and 75 feet apart in routes of travel.

All on site areas where there can be any ignition sources shall have fire extinguishers, of a type and size complying this plan, present. Refer to the following photos of representative fire extinguishers:



5-gallon "Indian" Back Pack hand pump water extinguisher
(Vendor: Wildfire Pacific; 800-426-5207)

Dry Chemical Fire Extinguishers

Extinguishing Capacity Ratings will vary from 2-A, 10-BC (small extinguisher usually found in offices) to a 3-A-40 BC, 4-A- 80 BC and a 10-A-120 BC (20 pound capacity). Which are the types required by this plan for other than offices. They may be “stored pressure” type (shown in photos) or may have an external pressure cartridge. To determine the extinguishing capacity, read the label on the actual extinguisher. Vendor is Amerex Corporation or equivalent UL listed and rated extinguisher. Photos show Amerex-brand extinguishers. (A suggested vendor is Joy Equipment Protection, 805-684-0805.)

“A” ratings are based on extinguishing small fires in ordinary combustibles (wood, paper, etc.). “B” rated extinguishers are based on extinguishing small flammable liquid fires. "C” rated extinguishers means they can be used on fire involving electricity (nonconductive). The number of units on an extinguisher label (on back of the extinguisher) is based on actual test fires. Actual results will vary. Only use extinguishers on small incipient fires and only when safe to do so.

K. Red Flag Warnings; High Fire Hazard Weather Conditions

Red Flag warnings are issued by the National Weather Service (NWS), San Diego. NWS, San Diego office. The warning is based on a combination of relative humidity less than or equal to 15%, and a sustained average wind speed of 25 MPH or greater (gusts of 35 or greater) for 6 hours. Note that the temperature is not a factor. During Red Flag warning events, as issued daily by the National Weather Service over geographical areas including Federal Responsibility Areas (FRA), State Responsibility Areas (SRA) and Local Responsibility Areas (LRA), all nonessential, nonemergency construction, including, but not limited to, road grading, and

maintenance activities shall cease, or with written permission of an authorized Fire Agency representative, may be done under Hot Work Permit requirements.

In addition to Red Flag Warning criteria, High fire hazard weather conditions can also exist when the 1-hour reference fuel moisture level is at 6% or below. Under these conditions, low fuel moisture makes the vegetation more hazardous to fire. Therefore, it is also recommended that hazardous construction activities should also cease if the 1-hour reference fuel moisture is at 6% or below, unless permitted under Hot Work Permit requirements. This will be determined by the Fire Safety Coordinator based on his or her weather readings, Remote Automated Weather Station (RAWS) data, and weather station data.

Tule and contractor personnel will be informed of changes to the Red Flag event status as stipulated by CALFIRE. Prior to any Hot Work commencing, the Fire Safety Coordinator will monitor the daily National Weather Service (NWS) Red Flag Warning information and Fire Watch information on the National Weather Service-San Diego website. The website can be accessed by through these steps:

- Google National Weather Service; San Diego
- A map will appear.
- Click on red Flag warning on the right
- Also check for Fire Weather Watch information on the left of map.
- Can also click on Forecast Discussion to get weather updates and projections.

The project is located in the NWS San Diego Mountain (CA 258) zone. In the event of a Red Flag warning, prior to Hot Work activity commencing, the Coordinator can also contact the NWS Public Service desk at 858-675-8700 (Monday-Friday 8 AM TO 4:30 PM), or, if unable to contact the NWS, call the CALFIRE Dispatch center, at 619-401-7787, (24/7), or CALFIRE office number 619-590-3100 from 8-5 PM Monday-Friday, to determine the level of warning specific to the project area.

Tule shall provide three (3) Fire Agency approved portable weather stations at various representative locations on site. In addition, there is a RAWS site at Boulevard, which can be contacted via the Internet. Website is RAWS.dri.edu. The following is the procedure to contact the RAWS site:

- Google RAWS stations, or go to http://raws.dri.edu.
- A map will appear.
- Click on the California portion and the project area by border.
- Scroll on left to Boulevard California and Click on it.
- Station will come up

- Scroll on left to choose type of data wanted.

- RAWS site will have wind, air temperature, 10-hour fuel moisture, Relative Humidity. 1-hour fuel moisture will be calculated, including the use of temperature and relative humidity data from the weather station.

In addition, there is another website for MESA WEST weather station data for Boulevard, from a university in Utah. The site is http://Mesowest.Utah.Edu.

SDG&E also has wind monitoring equipment in the area, which is shared with the NWS.

The Fire Safety Coordinator is responsible for determining if Red Flag type weather conditions exist at the Tule Wind Project. The Fire Safety Coordinator shall take regular weather readings, including air temperature, relative humidity, wind speed and direction, time of day, aspect, and calculate one (1) hour reference fuel moisture using a portable kit approved by the Fire Agencies, to determine whether Red Flag type weather, or other high fire hazard weather, exists on site, notwithstanding any warnings or alerts issued by the NWS, as such NWS warnings may not be applicable to the certain locations on site. It is important to not wait until a Red Flag Warning is issued as fire conditions may already be occurring. He or she shall log and record such weather information for review by the Fire Agency. In other words, even if there is no Red Flag warning issued by NWS, the Red Flag conditions may be present if on site or fuel moisture may be dangerously low. The Fire Safety Coordinator is also responsible for determining when Red Flag conditions no longer exist at the Tule Wind Project.

No exceptions to the Red Flag Warning criteria will be granted by Fire Agencies without written justification of a Practical Difficulty in compliance due to common weather onsite. Acceptable alternatives must be proposed.[1]

Red Flag Warning Criteria is summarized as follows:

1. Relative humidity less than or equal to 15%; AND

2. Sustained average wind speed of 25 MPH or greater (gusts of 35 MPH or greater)

3. Items 1 and 2 need to exist for 6 hours. Note that temperature is not a factor.

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[1] See California Fire Code, Chapter 1, Section 104.8 Modifications, which states:

> Whenever there are *practical difficulties* involved in carrying out the provisions of this code, the fire code official shall have the authority to grant modifications for individual cases, provided the fire code official shall first find that special individual reason makes the strict letter of this code impractical and the modification is in compliance with the intent and purpose of this code and that such modification does not lessen health, life and fire safety requirements. The details of action granting modifications shall be recorded and entered in the files of the department of fire prevention.

(Emphasis added).

4. Note that in addition to the above criteria it is recommended that hazardous construction activities should also cease if the 1-hour reference fuel moisture is at 6% or below, unless permitted by the Hot Work permit issued by the Fire Safety Coordinator.

L. No Work Provisions

Red Flag Warnings and Other Critical Fire Declarations:

All project activities that would take place in or within 100 feet of wildland vegetation for the entire duration of any "Red Flag Warning" (RFW) will cease. Project managers and supervisors will be responsible for exchanging their contact information with the Tule Fire Safety Coordinator to insure they are notified of these events. At end of the RFW, confirmation should be obtained from the on-site Fire Safety Coordinator that work can begin again and under what continued restrictions. At the work areas, once brush clearing has been done, construction and maintenance activities that are at least 100 feet away from wildland vegetation areas will be allowed to proceed during a RFW event and shall be required to have a Hot Work permit. During RFW, event construction traffic will be permitted along the access road to the substations.

Other critical declarations can be made by the jurisdictional Fire Chief for a given period of time, due to unusual circumstances or conditions. As soon as these declarations are shared with the Tule Fire Safety Coordinator, they will be communicated to project personnel. Upon notification, all work activities that apply to the specific declaration will cease in those areas identified.

Iberdrola Tule Wind Farm Fire Safety Coordinator has the authority to stop any project work activity that appears to pose a particular fire risk or hazard not uniquely covered by this plan.

M. Agency Specific Requirements

The Project activities must comply with the following sections of the California Forest Practice Rules 2011 rulebook, for the duration of the project:

- Pertinent Excerpts From Protection of Forest, Range and Forage Lands; Prohibited Activities, Public Resources Code, Division 4, Chapter 6 sections:
  - 4427 (Operation of Fire Causing Equipment);
  - 4428 (Use of hydrocarbon powered engines near forest, brush or grass covered lands without maintaining firefighting tools);
  - 4429 (Camps or local headquarters, firefighting equipment);
  - 4431 (Gasoline Powered Saws, etc.; Firefighting Equipment); and
  - 4442 (Spark Arrestors or Fire Prevention Measures; Requirement; Exemption).
- See Appendix K: Excerpts from California Public Resources Code.

N. Tool Caches

Tool cache boxes shall be provided by Tule and located proximate to the main active construction area(s). Caches shall be clearly marked "Fire Fighting tools" and properly sealed to prevent theft, and such tools must only be used in emergencies. Tool cache boxes shall contain the following:

- Two 46" long shovels;
- Two McLeod tools;
- Two Pulaski tools;
- Two axes;
- Five (5) gallon backpack fire extinguishers and pressurized 3-A-40 BC Dry Chemical fire extinguishers; and
- One chain saw with a minimum of 3.5 hp and a minimum 20"-size cutting bar.

O. Mufflers and Spark Arrestors on Equipment Engines

All internal combustion powered hand tools, such as saws, portable pumps, weed whackers, two-cycled motors, augers, motor vehicles, etc., and all generators, shall be equipped with U.S. Forest Service-approved spark arrestors. Turbo powered diesel equipment could possibly be exempted, by the Fire Agency, from having an approved spark arrestor providing there is no turbo by-pass. Non-turbo powered diesel equipment shall be equipped with an approved spark arrestor, and shall be maintained in good condition. Muffler systems that are factory equipped, i.e., trucks, buses, and pickups, could possibly be exempted from spark arrestor requirement, by the Fire Agency, providing the exhaust/muffler is kept in good repair. Vehicles shall not park in vegetative areas. Official requirements for spark arrestors shall be obtained from the Fire Agencies. The USFS spec. number is 5100-1 and 1b. Also refer to 36 C.F.R. These can be obtained from the local Forest Service Station. Vehicles equipped with catalytic converters shall not be parked on vegetation. All equipment on vehicles or otherwise portable equipment not on a vehicle shall be located so that exhaust does not discharge against combustible material.

On BLM lands, Spark Arrestors shall comply with the following:

- *All off-road vehicles being operated on public lands must be equipped with a properly installed spark arrestor pursuant to 43 C.F.R 8343.1(c) and California Vehicle Code 38366(a).*

- *Spark arrestors shall also be provided as required In California Public Resources Code section 4442.*

- *The Spark Arrestor must meet either the U.S. Department of Agriculture – Forest Service Standard 5100-1a, or the 80% efficiency level standard developed by the Society of American Engineers (SAEs) recommended practices J335 or J350.43 C.F.R 9212.2.*

P. Use of Portable Equipment

Chainsaws or other powered saws, generators, portable pumps, weed whackers, augers, two-cycled motors, motor vehicles and other equipment capable of producing sparks or sufficient

exhaust heat or sparks to cause ignition will be located and operated in areas with fuel modification only. When such equipment is used to do fuel modification, there shall be a fire watch present with the required tools, extinguishers, and communications equipment.

Q. Clearing Crews

In areas where combustible materials and combustible vegetation are present, each clearing crew shall designate a minimum of two (2) trained crewmembers to stay a minimum of one (1) hour after cessation of work, to serve as a fire watch. Such personnel shall have a radio, cell phone, a 5-gallon backpack water pump extinguisher, and a shovel.

Clearing operations on "Red Flag" days, or other times declared to be high fire hazard weather, by the Fire Safety Coordinator, shall have a minimum of two properly equipped (2) fire watch personnel at all times during actual work.

The Fire watch personnel shall regularly patrol the area on foot and monitor the area for any signs of fire or unsafe practices. They shall have no other duties and shall not be sitting in a vehicle or using cell phones or computers except for emergency-related calls or for checking for red flag warning or other fire hazard or weather conditions.

R. Storage of Flammable and Combustible Liquids and Fueling of Vehicles and Equipment

Storage, use, handling, and dispensing of flammable and combustible liquids shall comply with the applicable sections 3404, 3405, and 3406 of CFC Chapter 34. The Maximum Allowable Quantities (MAQ) of flammable and combustible materials shall not exceed those in CFC Chapter 34. Refer to the code sections in the Appendix. Flammable and combustible liquids and the fueling of vehicles and equipment shall only be done in the approved fueling areas, which will have fuel modification in and around it for 100 feet. Approved, UL-listed containers or tanks, which comply with CFC Chapter 34, will be provided for storage and dispensing. Tanks and containers shall be labeled as required in CFC Chapter 34. Dispensing shall be done in an approved manner per CFC Chapter 34 using approved devices and hoses with approved shut offs, such approvals are Underwriters Laboratories (UL) or Factory Mutual Global (FM Global), or fire agency equivalent. Approved Fire Extinguishers with a rating of not less than 3-A-40 BC shall be provided within 50 feet of the storage/refueling area. Approved grounding and bonding will be provided for dispensing of flammable liquids. The storage and dispensing area shall have spill control and secondary containment to contain the contents of the largest container. No combustibles shall be stored in the same location as flammable or combustible liquids. All containers shall be labeled as to contents. Safety instructions and No Smoking signs shall be posted. No open flames are allowed. Vehicle or equipment motors shall be shut off prior to fueling. Any fueling of vehicles using CNG or other gases shall comply with the CFC. Gasoline shall not be stored, used, or dispensed, unless required for small equipment.

1. Mobile fuel or lube oil trucks shall comply with the following:

    - Be in good repair and comply with the spark arrestor rules.

    - Have appropriate warning signs and decals.

- Use proper bonding and grounding equipment.
- Shut off all internal combustion engines prior to refueling. Allow engines to cool down sufficiently as to not ignite spilled fuel. Be equipped with a fire extinguisher with a 10-A-120 BC rating (or equivalent).
- Have one 46” round point shovel. Provide one 10-A-120 BC rated fire extinguisher.
- Contain a metal can with lid for storage of rags.
- Have a suitable spill kit on truck.
- Be equipped with contractor radio and have Cell Phone.
- Equipment operators should stay in immediate area but stay off vehicle during refueling.
- Be trained in procedure for reporting emergencies.
- No dispensing (dispensing includes re fueling) within 25 feet of any open flame or ignition source.
- No dispensing within 15 feet of buildings, property lines, or combustible storage, per CFC 3406.5.4.5.
- No smoking within 25 feet of dispensing
- Comply with CFC 3406.2.8. Refer to Code sections in Appendix.
- Post safety signs on the vehicle used for re fueling. Refer to CFC Section 3406.2.8 in Appendix.

2. Refueling / lube oil servicing / solvents shall comply with the following requirements:

- Shut off all internal combustion engines prior to refueling. Allow engines to cool down sufficiently as to not ignite spilled fuel.
- Use only approved and properly marked safety cans or nozzles.
- Equipment operators should stay in immediate area but stay off vehicle during refueling.
- After normal working hours, refueling will require presence of a helper for safety and fire protection.

- Refueling, oil changes, or servicing of gasoline or diesel-powered equipment shall comply with California Fire Code and Fire Agency requirements (to be obtained from the Fire Agency) and industry good practice.

- Such operations shall not be done in proximity to wetland boundaries or streams.

- Utilize proper grounding and bonding.

- Be trained and equipped regarding making emergency notifications.

- No smoking or open flames within 25 feet.

- Nonmobile fuel dispensing shall comply with CFC Sections 3404, 3405, 3406.

S. Temporary Heating Devices

- Temporary heating devices shall comply with California Fire Code and California Mechanical Code.

- Refueling of such devices shall comply with California Fire Code section 3405.

- Equipment or appliance shall be allowed to cool before refueling.

- Use of temporary heating devices shall be supervised and maintained only by competent personnel.

T. Storage Areas and Parking Areas

No vehicles will be parked or sit at idle in areas of combustible fuels such as brush or grass. Equipment service areas, parking areas, and gas and oil storage areas shall be cleared of all flammable materials by a distance of at least 30 feet. Small mobile or stationary engines sites shall be cleared of flammable materials by a distance of at least 15 feet from such engine. No vehicles shall be parked or stopped in uncleared areas (except pioneering tractors).

U. Designated Smoking Areas

Designated smoking areas with an area cleared to mineral soil of 10 feet around them will be designated by the Fire Safety Coordinator. Smoking is only allowed in those areas. Proper ash receptacles will be provided. Signs indicating designated smoking area or “No Smoking” will be posted in conspicuous locations for all workers to see. Under no circumstances shall smoking be permitted while workers are operating light or heavy equipment, or walking or working in grass or brush covered areas.

The above smoking rules shall be enforced by the Fire Safety Coordinator and all supervisory personnel for Iberdrola or contractors. Designated smoking areas and rules shall be

discussed at all safety meetings. Drivers of buses and other transportation vehicles shall also be sure no smoking occurs on the vehicles.

Smoking by workers is not allowed while riding a bus or transportation vehicle. Smoking is permitted in pickup trucks or cars as long as ashes, butts, lighters, or matches stay within vehicle.

V. Warming and Lunch Fires; No Open Burning

Warming fires are not allowed on the construction site. Lunch fires are permitted if the fuel source is propane and the grill is stationary. Fuel source to be at least 5 feet inside a cleared area. And the cooking equipment is to be 30 feet from edge of a cleared area. Lunch fires are not permitted during high fire hazard or Red Flag days.

Open burning on site is prohibited.

During Fire Season, which is approximately May 15 through November 15, BLM lands are under Stage II Fire Restrictions:

- *Setting, building, maintaining, attending or using open fire of any kind, except campfires within approved fire pits and grills provided for in developed recreational sites, is prohibited.*

- *Controlled flame devices such as portable stoves fueled by petroleum or LPG products are allowed by permit"*.

- Authority 43 U.S.C. 1701 et seq., 43 C.F.R. 9212.1.

W. Hot Work (Welding, Grinding, etc.)

These requirements are primarily from California Fire Code (CFC) Chapter 26, "Welding and other Hot Work," and NFPA 51-B, "Fire Prevention During Welding, Cutting and other Hot Work". Hot Work is defined in the CFC as operations involving cutting, welding, thermit welding, brazing, soldering, grinding, thermal spraying, thawing pipe, or other similar operations. Hot Work areas are defined as the areas exposed to sparks, hot slag, radiant heat, or convective heat because of the Hot Work.

A Hot Work Permit shall be obtained from the on-site Fire Safety Coordinator, following guidelines from the Fire Agencies, for all Hot Work regardless of location. See, for example, language for a Hot Work Permit in Appendix Section K. The Fire Safety Coordinator will require all Hot Work to be done per requirements in NFPA 51-B and the Fire Code Chapter 26. Refer to summary in Appendix E of this plan. Tule will require all workers who perform Hot Work to be trained per the requirements in NFPA 51-B and the Fire Code.

Hot Work shall only be done in fire safe areas designated by the Fire Safety Coordinator and shall comply with the following:

- All personnel involved in Hot Work shall be trained in safe operation of the equipment by the Fire Safety Coordinator. This will include providing training at "tailgate safety meetings". They shall also be made aware of the risks involved and emergency procedures, such as how to transmit an alarm and who is responsible to call 911. Review of the Hot Work checklist in Appendix K with workers shall be carried by all involved in hot work and shall be followed as applicable.

- Signage required in areas where workers may enter indicating "Caution; Hot Work in progress; Stay Clear".

- There shall be no combustibles within a 35-foot distance in all directions of the Hot Work area, or non-combustible shields shall be provided to prevent sparks, slag, or heat from igniting exposed combustibles. Fuel modification shall be provided to approval of the Fire Safety Coordinator. A distance of out to approximately 50-foot clearance shall be provided around the Hot Work (and 35 feet vertically). This includes the area around any portable generator supplying power to the welding and grinding. An on-site staffed water tender will be available to come to the hot work area and to wet down vegetation beyond 50 feet, or more, if deemed necessary by the Fire Safety Coordinator.

- Hot Work shall not be done on any containers which contain or have contained flammable liquids, gases or solids until containers have been thoroughly cleaned, purged, or inerted.

- Fire Watch of entire Hot Work area required during Hot Work and for one (1) hour after cessation of work. There shall be two fire watch persons at each hot work area. They shall be properly trained and equipped, including with communications equipment, and shall be responsible to extinguish any spot fires and communicating an alarm. 911 shall be called if the fire cannot be totally extinguished.

- Fire Watch personnel shall be familiar with this plan and NFPA 51-B.

- Fire Watch personnel shall wear proper Personal Protective Equipment (PPE) (i.e., gloves, goggles, boots, helmet, etc.).

- Fire Watch personnel shall have no other duties, which would detract from being attentive to the Hot Work operations. Keep in mind that the welder may not be able to see burning vegetation due to the hood or dark goggles being worn.

- Hot Work Fire Watch personnel shall have the authority to stop any unsafe operations.

- A fire extinguisher with a minimum rating of 3-A-40 BC, a 5-gallon backpack pump fire extinguisher, and a 46-inch round point shovel, shall be readily accessible within 25 feet of Hot Work area.

- The Fire Safety Coordinator shall inspect the Hot Work area before issuing a permit and shall then make daily inspections.

- A pre Hot Work check shall be done by the Fire Safety Coordinator. This shall include:

    - Hot work equipment to be used shall be in satisfactory operating condition and in good repair.

    - Hot work site to be clear of combustibles, including vegetation or combustibles shall be protected from heat slag and sparks. Provide 50 feet minimum (in all directions) fuel modification. (But at turbine pads, there must be a minimum of 100-foot clearance in all directions, so that the clearance area has a 200-foot diameter.) A larger wetted area may be needed due to type or location of work being done, when determined by the Fire Safety Coordinator.

    - Be sure that a staffed water tender is readily available on site to wet down vegetation beyond 50 feet if deemed necessary by Fire Safety Coordinator due to Fire weather conditions.

    - Fire watches assigned. More than one fire watch team may be required if combustible materials, including vegetation, that could be ignited by the hot work operation cannot be directly observed by the one team. (Ref. NFPA 51.B.)

    - Fire extinguishers and shovels are present.

    - Fully charged and operational 2-way radio and cell phone.

    - Gas Welding and cutting shall comply with 2010 California Fire Code (CFC) Section 2605.

    - Electric arc hot work shall comply with CFC 2606.

    - Piping manifolds and Hose Systems for Fuel Gases and Oxygen shall comply with CFC Section 2609.

    - Cylinder use and storage shall comply with CFC Chapter 30, “Compressed Gases”.

    - All equipment shall be approved by a Fire Agency, including torches, manifolds, regulators, or pressure reducing valves, and any acetylene generators.

    - Personal Protective Clothing (PPE) shall be selected to minimize the potential for ignition, burning, trapping hot sparks, and electric shock.

The Fire Safety Coordinator shall have the responsibility to assure safe Hot Work operations, and shall have the authority to modify Hot Work activities associated with construction and/or maintenance activities, and to exceed the requirements in NFPA 51-B and the Fire Code, to the degree necessary to prevent fire ignition. Workers must be trained on the Hot Work Information and Criteria in this plan. A Hot Work checklist is included in Appendix and is to be carried and followed as applicable, by all workers involved in hot work. A copy of NFPA Standard 51-B, regarding hot work will be kept in the construction office for reference.

X. Storage of Combustibles and Trash

Storage of combustibles and trash shall be maintained in an orderly, fire safe manner. Trash shall be placed in approved containers daily and removed from site on a regular basis to prevent large accumulations of combustibles and trash. Such areas shall have thirty (30) feet of fuel modification (or cleared area) around the storage area and the storage area itself shall be cleared of vegetation. Materials susceptible to spontaneous ignition, such as oily rags, shall be stored in a UL listed disposal container. Rubbish, waste, and debris shall not be burned. No open burning allowed without a Fire Agency permit. Combustibles and trash will be stored in a cleared area within a previously analyzed impact area so it does not require additional cleared area.

Y. Storage and Use of Hazardous Materials

Hazardous Materials, such as acids, corrosives, toxic materials, oxidizers, paints, and other chemicals shall be stored, dispensed, and used in a safe manner. Storage, use, and handling shall not exceed the Maximum Allowable Quantities (MAQ) in CFC Chapter 27, Table 2703.1.1 Maximum Allowable Quantities. Dispensing shall be by approved manual pumps taking suction from top of a container. Spill control and secondary containment shall be provided with a capacity to contain contents of largest container. Any incompatible materials shall be separated by 20 feet or a non-combustible partition extending 18 inches above and to the sides. All containers shall be properly labeled as to contents. National Fire Protection Association (NFPA 704) diamond hazard signals shall be provided and be visible at entrance to the area. Use proper grounding and bonding where required. Approved fire extinguishers shall be located within 50 feet of travel.

Flammable and combustible liquid storage, use, and handling to comply with CFC 3406.2 and Section 1405.

Spills must be properly cleaned up and disposed of properly.

Any leaking containers or vessels shall be immediately repaired in a safe manner or taken out of service.

Class 1 and 11 flammable and combustible liquids shall be kept in approved safety containers. Labeling shall comply with CFC Section 3403.5.

Storage, use, and handling of flammable gases shall comply with CFC Chapter 35.

Explosive materials and blasting operations shall comply with CFC Chapter 33 and the San Diego County Consolidated Fire Code section 96.1.3301.2 where applicable. Explosives and

Blasting operations are out of the scope of this plan. Explosives and blasting require a Fire Agency permit from the agency having jurisdiction and a permit from the Sheriff in County jurisdiction.

Z. Warehouses and Construction offices

Any storage warehouses shall have 100 foot of fuel modification around them. They shall be constructed of approved noncombustible or ignition resistant construction, and be to approval of the Fire Agency and the applicable Building Official. Exiting shall comply with the Building Code. Fire extinguishers, with a 2-A-10 BC rating shall be located within 75 feet of travel in the warehouse. Flammable and combustible liquids, hazardous materials, or flammable gases shall not be stored in the warehouse. No stock shall be stacked or racked 12 feet or higher. No flammable or combustible liquids shall be stored over 4 feet high. Combustible materials, flammable or combustible liquids, compressed gases, etc. shall not be stored within 30 feet of buildings.

AA. Construction office trailers or modular buildings:

Such structures and their location shall be approved by the Fire Agency and applicable Building Official. They shall be constructed to applicable codes and be of either non-combustible or ignition resistant construction. Structures shall be separated from one another 30 to 60 feet depending on the length of facing walls (NFPA 241) as to not result in a large single fire area in the event of a structure fire. There shall be no storage or parked vehicles between the structures. Structures shall have 2-A-10 BC rated fire extinguishers mounted within 75 feet of travel in the structure. Exiting shall comply with the Building Code. Approved all weather Fire Truck access shall be provided to within 150 feet of the main entrance of the structures. There shall be 100 feet of fuel modification around the structures.

BB. Temporary Construction Materials:

Noncombustible or fire retardant scaffolds, form work including concrete form work, decking, etc., shall be used. Listed, pressure-impregnated fire retardant lumber or listed fire retardant coatings are generally acceptable, and shall be used in accordance with manufacturer's instructions. The fire retardant used must be suitable for the on-site weather.

Tarpaulins and plastic films should be of listed weather resistant and fire retardant materials.

Cardboard boxes, wooden containers, etc., shall be properly stored and away from buildings and vegetation, until removed from site.

There shall not be large, nonseparated piles of construction materials on site.

CC. Turbine Construction

The contractor for actual construction of turbine towers shall prepare a construction fire safety plan for review of Fire Agencies. Such plan shall describe fire safeguards for any above grade welding, grinding or other Hot Work, shall describe the proposed mitigations for the

potential for sparks and slag, etc., to fall from an elevated position, and shall describe the actual size of the fuel modification zones around turbine construction, which are needed in order to prevent ignition of vegetation by sparks or hot slag, etc. Actual size of Fuel Modification zones around turbine pads would be up to 100 feet in all directions (so that the clearance area around the base of each turbine has a diameter of 200 feet) depending on topography, per the Fire Protection Plan. Wetting of vegetation in areas beyond this distance may be necessary when determined by Fire Safety Coordinator based on type of work being done and location (for example, work at elevated locations). Refer to the Plan in Section M of the Appendix.

DD. Power Line and Structures

The contractor for actual construction of Power Line and structures on site and from Tule site to the Boulevard Substation will prepare and submit a detailed construction fire safety plan to Fire Agencies for review. Such plan shall include description of the size of areas that will be cleared of flammable vegetation, the use of Hot Work permits, and the provision of Fire Patrols, and fire equipment in compliance with this plan. Refer to the Plan in Section M of the Appendix.

EE. Temporary Wiring and Electrical and Heating Equipment

Temporary wiring and electrical equipment shall comply with the California Electrical Code and CFC section 605 and shall not be used in a manner that could start a fire, including a vegetation fire. Temporary heating equipment including heaters in offices shall comply with CFC Section 1403.

FF. First Aid

Suitable first aid equipment to approval of the “First Responder” Fire Agency and Ambulance Company, including a Public Access Defibrillator (AED) shall be provided on site at locations such as construction trailers. It is recommended that a designated and properly equipped EMT person be on site. This person would be employed by the general contractor. Procedures shall be in place to immediately notify onsite first responders of a medical emergency, as well as procedures designating who is to call 911.

GG. Communications

All construction crews, inspectors, supervisors, and the Fire Safety Coordinator shall be provided with 2-way radios and cellular phone access that is tested to be operational in all locations of construction activities, and along entire length of roads. Cell phones should be tested to assure they could contact offsite phone numbers in 619 area code so that the 911-dispatch center can be contacted. 619-590-3100 (nonemergency dispatch center number) can be called from time to time to run a cell phone test. The two-way radios will serve as the primary means for communication if cell coverage is not adequate to make calls. The purpose is to allow the immediate reporting of an emergency. Communications systems and pathways shall be tested each construction day before construction begins to confirm they are operational. A sufficient number of spare radios and cell phones and batteries shall be on site. Radios and Cell Phones shall be kept charged. Radios shall allow communications with all Tule vehicles, contractor vehicles, and construction trailers. The Fire Safety Coordinator shall have a laptop computer and

shall test it daily for contact with the NWS website. A spare laptop, and batteries, shall be available on site.

HH. Emergency Alarms

Tule and contractors shall implement a suitable method of alerting all people on site as to a fire, prior to construction. This may be a horn, siren, etc., followed by announcements on the on-site radio system.

II. Calling 911

A designated on site person, identified by job assignment, shall have the responsibility to call 911. Workers shall notify this person via radio, cell phone, or in person, of a fire or other emergency. There shall be no delay in calling 911. The ten digit backup number for calling 911 emergency dispatch center (CALFIRE) is 619-442-1615. It is preferred that calls to 911 are made by a landline hard wire phone if available as calls to 911 on a cell phone go to the California Highway Patrol. This can result in delays in handing off the call to the 911 dispatcher, and confusion as to where the site is. After 911 is called, a backup call should be made to the CALFIRE dispatch center to confirm receipt of the call for fire emergencies. The address of the site is _____. The site is located off of McCain Valley road, East of Boulevard. The Thomas Guide page number and coordinates are Page 430, D-8. There will also be a procedure in place to send a worker to closest fire station to report an emergency if communications fails.

The latitude and longitude are:

- NW corner: 32.845897° N, 116.380572° W
- NE corner: 32.845054° N, 116.236055° W
- SE corner: 32.660277° N, 116237625° W
- SW corner: 32.661096° N, 116.381811° W

JJ. Emergency Plan

This plan will include an Emergency Organization Chart, in the form of a simple Incident Command System (ICS), for consistency with terminology used by responding Firefighters, which will include indicating who, by position, is in charge of an emergency until arrival of the Firefighters, and will indicate other positions to be filled on the chart during an emergency by on site personnel from Tule or a contractor, such as the Safety officer, Liaison officer, or Logistics, and the person directly in charge of directing any initial firefighting operations. This plan will also include simple field checklists for use by field supervisors during an emergency, such as a fire, traffic accident, medical emergency, or spill of a hazardous material.

This plan will include a simple flow chart that will clearly describe the reporting of an emergency to 911. It will include the person discovering the fire, and who this person contacts on site (and method of contact) such as a designated position at the Construction Trailer, and who by position title, is to make the call and what numbers to call, in addition to the call to 911.

KK. Visitors

In the interest of safety, all visitors to site, including Fire Agency inspectors, and officers or crews from local fire stations conducting pre fire planning inspections, shall be briefed as to Fire Safety requirements and emergency procedures before going on site. It is understood that State law ensures fire inspector access.

LL. Checklists

The following examples of duty checklists are provided and shall be followed to the extent applicable, or modified as needed:

1. Fire Safety Coordinator

- Accompany Fire Agency field representatives on fire inspections of project.
- Ensure that all project personnel are trained on requirements of this plan.
- Assure that construction vehicles are maintained as to meet the "good repair' intent of the plan.
- Take weather readings on a regular basis during workday and prior to any Hot Work.
- Announce and enforce fire safety requirements for Red Flag warning events, or other high fire hazard weather conditions, including low fuel moisture, and announce the end of Red Flag warning events.
- Issue, oversee, and enforce Hot Work permits.
- Inspect individual work areas to assure compliance with this plan.
- Initiate corrective actions.
- Ensure that tool caches and extinguishers are inspected on a regular basis.
- Post no smoking/fire rules in conspicuous locations.
- Call 911 for emergencies when necessary or assure the call has been made. (Follow up with confirming call to Emergency Dispatch Center at 619-442-1615 (24/7).)
- After starting the emergency reporting process, make initial attack on fires in project areas only if properly equipped and trained and if safe to do so.
- Train all fire watch personnel in their duties and responsibilities.
- Be equipped with cell phone, 2-way radio, and laptop computer and test such equipment regularly to ensure they are operational. Confirm operational readiness of all equipment by contacting other personnel on site.

- Assure all Hot Work complies with this plan, the CFC, NFPA 51-B and the requirements on the Hot Work permit.

- Provide a list, and update in writing, 24-hour contact information and inventory of on-site fire suppression equipment, tools and personnel list on a quarterly basis and provide it to the Fire Agencies. Note that Tule equipment and personnel should be used in support roles only as they are not trained Firefighters and the equipment may not necessarily comply with NFPA standards, or local fire agency standards, for Fire Apparatus.

2. Construction Fire Watch

There shall be at least two trained workers serving as fire watch in each location. One of the three Tule type 6 pickup truck fire units shall be within close proximity of each hot work area. That vehicle shall have at least one operator.

- Remain on duty in the immediate area of construction whenever construction activity is in progress and for one (1) hour after all Hot Work has ceased for the day.

- Check all firefighting equipment for access and usability.

- Daily inspect each five (5) gallon backpack pump and fire extinguishers to ensure they are filled and ready for use.

- Be equipped with and test cell phones and radios daily.

- Inspect each tool cache for the presence of tools and equipment and assure tools are not being used for some other purpose other than firefighting.

- Inspect each work area after the work has ceased to ensure that no smoldering materials remain.

- Inform the Fire Safety Coordinator when concerns about fire dangers are recognized.

- Be equipped with cell phone and radio and test them regularly.

3. Construction Crewmembers

- All crewmembers shall be trained in the requirements of this plan, and assure that they comply with all requirements in the plan.

- Know locations of fire equipment, tool caches, and fire extinguishers in the area.

- Be familiar with the Emergency plan and the procedures for reporting a fire and calling 911.

- Obtain Hot Work permit prior to any Hot Work occurring.

4. Construction Supervisors

- Assure all crewmembers are properly trained and equipped and that their communications equipment is operational, and that they can communicate with you.

- Assure Hot Work fire safety requirements are followed.

- Assure no unsafe operations are occurring.

5. EXAMPLE CONTENTS OF THE REQUIRED LAMINATED CARD

CONSTRUCTION WORKERS ARE REQUIRED TO CARRY A REFERENCE CARD CONTAINING THE FOLLOWING INFORMATION:

Numbers to call for emergencies:

- 911 (use hard line phone if available)

- Follow up call with call to Emergency Dispatch Center at 619-442-1615

- Stay on the line. If possible, provide wind speed and direction so that the Dispatcher can decide whether to upgrade the fire response assignment.

- Provide location, address, Thomas Guide page number, and latitude and longitude as follows:

    - Location: Off of McCain Valley road, East of Boulevard
    - Address: _____
    - Thomas Guide page number and coordinates: Page 430, D-8
    - Latitude and Longitude:
        - NW corner: 32.845897° N, 116.380572° W
        - NE corner: 32.845054° N, 116.236055° W
        - SE corner: 32.660277° N, 116237625° W
        - SW corner: 32.661096° N, 116.381811° W

- Isolate area and deny entry

- Notify Fire Safety Coordinator of the emergency

- Provide safety for all workers

- Attempt to extinguish small fire if safe to do so using portable fire extinguisher. Stay upwind of smoke

- Administer First aid if trained and equipped to do so.

- Request that a construction person go to main entrance to escort Firefighters to scene.

III. SUMMARY

This Construction Fire Prevention/Protection Plan is prepared in response to the requirements of the Fire Agencies. All official requirements will be made by the Fire Agencies. Requirements made by the representatives of those agencies can overrule items in this plan. Contractors shall prepare their own Construction Fire Prevention / Protection Plans that shall be in support of this conceptual plan, provide more detail as to actual operations and safeguards to be provided based on the particular operation, shall at least comply with the intent and objective of this plan, and may exceed requirements in this plan. They shall submit them for review the applicable Fire Agencies.

This plan is not an OSHA worker safety plan. Blasting operations and explosives are out of the scope of this plan. Blasting shall comply with the CFC and the San Diego County Consolidated Fire Code where applicable, and a permit is required from the Fire Agency having jurisdiction and the Sheriff (if in the County). Blasting shall require the following in addition to any other Code or Agency permit requirements:

- Safe storage area;
- Safety plan and warning system;
- Worker training;
- Fuel modification and cleared areas;
- Fire watch;
- Water tender;
- Firefighting tools as required elsewhere in this plan; and
- Fire extinguishers.

Requirements in this plan can be changed by the Fire Agencies based on a submittal of the reason for the change, and an equivalent alternative method of compliance. The specified types and ratings of fire extinguishers can be changed by the Fire Agency upon request of Tule or the Contractor. Notwithstanding whether or not all requirements, recommendations, or situations are addressed in this plan, Tule and its Contractors and Vendors shall be responsible at all times to assure fire safety and shall comply with all applicable Codes and Ordinances.

IV. DISCLAIMER BY AUTHOR HUNT RESEARCH CORPORATION

This Construction Fire Prevention/Protection Plan does not guarantee that a fire or other emergency will not occur or cause property damage, injury, or loss of life. No expressed or implied guarantees are made regarding the adequacy or effectiveness of the recommendations and requirements in this plan for all situations. Engineering and actual construction, etc., are out of the scope of this plan. However, if this plan, after approval by the Fire Agencies, is complied

with, along with compliance with Fire Agency requirements, the construction operation should be reasonably fire safe.

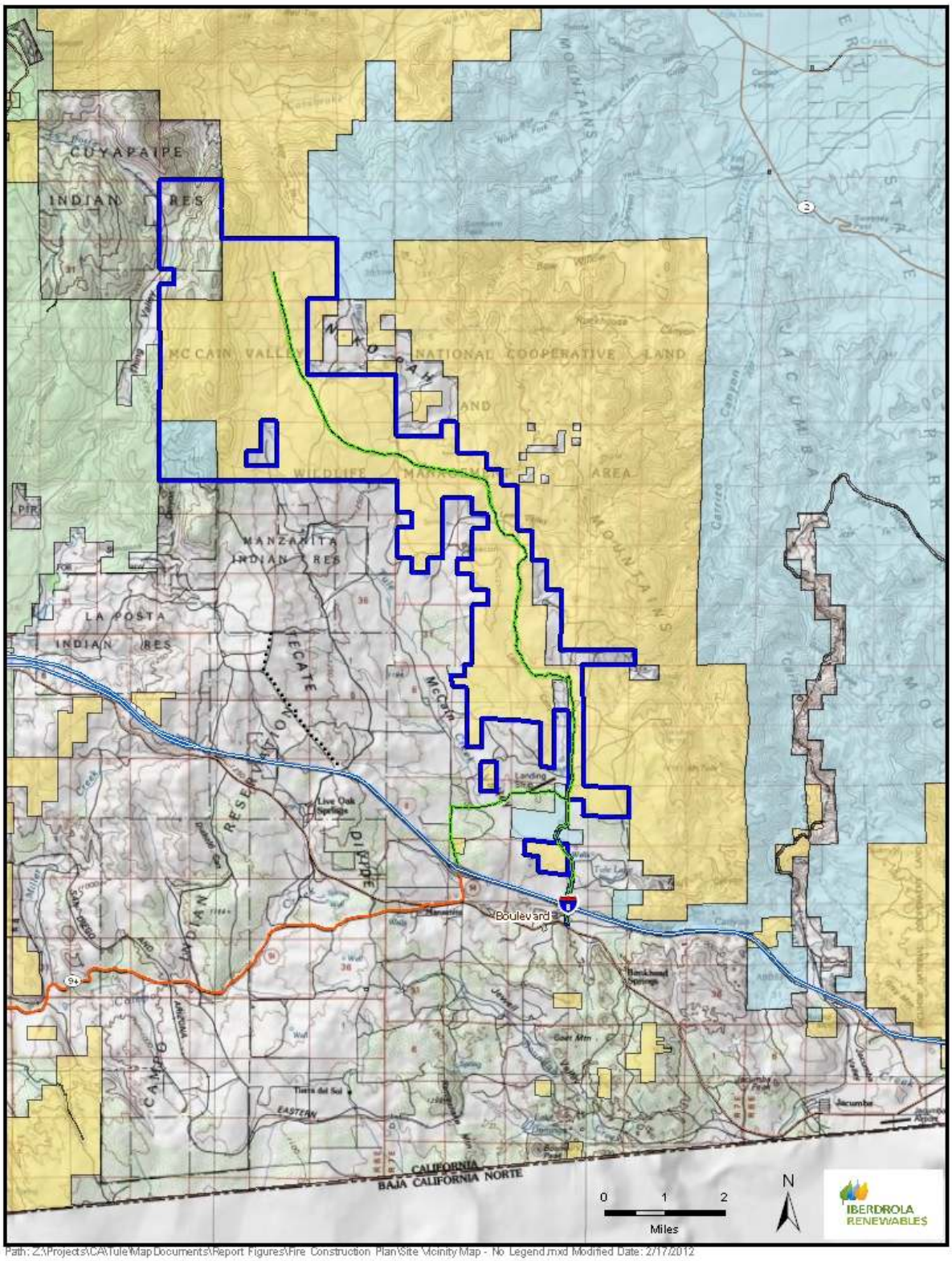
V. APPENDIX[2]

NOTE: INFORMATION IN THE APPENDIX SHALL BE CONSIDERED TO BE A PART OF THIS PLAN AND SHALL BE FOLLOWED AS APPLICABLE.

APPENDIX TABLE OF CONTENTS

[2] Some code sections in the Appendix are not directly applicable to this project but are included for ease of reference. Fire code sections are from the 2010 California Fire Code.

A. Map of Site and Road Routing



B. Tule Wind LLC Contact Information

To be completed 30 days prior to construction. See insert.

C. Agency Contact Information

1. Fire Agency Contact List

This list is provided for non-emergency contacts during normal business hours, and may be subject to revision. In the event of an emergency, call 911 and make a backup confirming call to Fire Dispatch Center at 619-442-1615.

BLM
Clay Howe, Battalion Chief/Fire Mitigation Education Specialist, BLM Fire
10845 Rancho Bernardo Rd,
San Diego Cal 92127-2107
Cell Phone 951-903-4140
Office Phone 858-676-0894

San Diego Rural Fire Protection District
Dave Nissen, Fire Chief
Cal Hendrie, Battalion Chief
14024 Peaceful Valley Ranch Road
Jamul Cal 91935-3202
619-669-1188

For inquiries regarding Fire Prevention or Response issues, call Fire Chief Nissen.

CALFIRE San Diego Unit Headquarters
2249 Jamacha Road
El Cajon, 92019-4301
619-590-3100

San Diego County Fire Authority
Ralph Steinhoff, Fire Service Coordinator; 858-974-5925
Ken Hunter; Fire Service Coordinator; 858-974-5920

Boulevard Volunteer Fire Department / Fire Station 47
39923 Old Highway 94
(Old Highway 94 and Ribbonwood)
Fire Chief; John Francis
619-766-4633

Campo Fire and Rescue/ Fire Station 46
437 Jeb Stuart Road
Campo Cal 91906

Fire Chief Mitchel Sanchez
619-478-5310

Campo Reservation Fire Protection District
36210 Church Road
Campo 91906-2713
Steven Cuero, Fire Chief
619-478-2371

Ewilaapaayp Kumeyaay Fire Department
4390 La Posta Truck Trail
Pine Valley Cal
Desi Vela; Acting Fire Chief
619-445-6315
Dvela@leaningrock.net

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2. Non-Fire Agency Contact Numbers

National Weather Service

For Red Flag Warning information:

858-675-8700 (M-F 8 AM to 4:30 PM).

After hours: call CALFIRE nonemergency dispatch number at 619-407-7787 (24/7)

Google: National Weather Service San Diego

D. Example of Pre Fire Plan

NOTE: THIS IS AN EXAMPLE ONLY. ACTUAL CONTENTS MAY BE CHANGED BY THE FIRE SAFETY COORDINATOR, TO APPROVAL OF THE FIRE AGENCY.

Other areas that would require a Pre Fire Plan would include all construction areas, hot and safe work areas, Turbine pads, laydown area, flammable and combustible liquids storage, and dispensing areas, fueling areas, hazardous materials storage, warehouse, O and M building and substation site, construction warehouse and offices. Power line ROW, etc.

PRE FIRE PLAN

THIS IS AN EXAMPLE OF THE PRE FIRE PLAN REQUIRED BY CFC SECTION 1408.2. A BRIEF PLAN WILL BE DEVELOPED AND MAINTAINED FOR EACH SEPARATE CONSTRUCTION AREA. THE PLANS WILL BE PREPARED AND MAINTAINED BY THE FIRE SAFETY COORDINATOR. THE PLANS ARE TO BE TO FIRE AGENCY APPROVAL:

Pre Plan for pioneering and grading of roads prior to construction:

Introduction:

This Pre Plan is for the pioneering and grading of roads prior to construction occurring. The roads extend from main entrance to site, through the site to all construction areas. The fire risk is that of ignition of vegetation due to vehicle engines, arcs and sparks from engines and motors, hot surfaces, and from striking rocks, concrete, buried objects, etc. with construction tools and equipment, tractor or road grader blades, etc. Vegetation could be ignited and a vegetation fire can begin to spread.

Strategy:

Prevent ignition of vegetation. In the event vegetation is ignited, attempt control of the fire while small, and keep from spreading in vegetation or to structures or equipment, flammable or combustible liquid storage, hazardous materials, etc. Protect exposures and confine the fire. Fire will spread faster upslope than down slope. Fire will burn in direction of any wind. Keep workers who are not involved in suppressing the fire, back and prevent unnecessary entry of people and vehicles into the fire area. Assure 911 is called if fire is not immediately extinguished. Worker safety and safety of anyone on site in the area is the most important tactic. Fire can be unpredictable and change direction of spread or size quickly.

Tactics:

Workers at the site when fire starts:

- Stop construction operation at the area.
- Stop motors/engines.

- Extinguish any vehicle or powered equipment engine/motor fire.
- Move vehicles and equipment out of path of the fire if safe to do so.
- Notify Fire Safety Coordinator to respond with Type IV pump unit. Inform the Fire Safety Coordinator of the location and size of the fire.
- Obtain water based hand pump extinguisher and shovel.
- Attempt to control and extinguish the fire. Stay upwind and away from "front" of the fire. Attempt control or extinguishment only if safe to do so. If not safe to do so, stand back in a safe area until arrival of firefighters.
- Stop traffic on road.
- Keep people back
- Shut off any electrical power at the fire scene.
- Available workers should go to nearest Tool Cache and bring the tools and more water based extinguishers to the fire scene.

Fire Safety Coordinator: Upon becoming aware of a fire, call 911 immediately and request Fire Agency Response.

- Call 911 to report the fire and respond to the scene of fire in a safe manner, with the Type 6 Fire Pump/pickup truck unit.
- Upon arrival, determine if the fire is out.
- Call the 10 digit back up emergency number to confirm receipt of call by the Emergency Dispatch center. Call 619-442-1615. Provide weather information to the emergency dispatcher, including wind speed and direction.
- Request the nearest construction water tender on site to respond safely to the fire.
- Send a worker to main entrance to meet fire fighters and direct them to the fire. Notify firefighters as to location of water tanks.
- Attempt to control or extinguish fire with the Type IV pump unit if safe to do so.
- Direct the water tender to safely wet down areas in path of the fire, if needed.
- Assure that the workers are safe and are not taking risks.

- If the fire is too large to allow safe use of fire extinguishers and shovels, the Type IV pump unit, or a construction water tender, Have everyone stay in a safe area until arrival of Firefighters.

- Move exposed equipment, storage, etc., out of the path of the fire, if safe to do so.

- Note: Only Fire Agency bulldozers can do bulldozer work on fires due to potential danger and resource protection issues.

- If the fire is small and has been extinguished, call the Emergency Dispatch Center back and inform them of this. Follow up with a call to the Fire Agency to report the occurrence of a fire.

- Have all workers and other on-site people stay out of the way of Firefighters and fire apparatus. Be alert for possible water drops from aircraft including helicopters.

E. CFC Chapter 26, "Welding and Other Hot Work", and NFPA 51-B for Welding and Grinding

1. Summary of Requirements

Work shall only be done in fire safe areas designated by the Fire Safety Coordinator and shall comply with the following:

- All personnel involved in Hot Work shall be trained in safe operation of the equipment by the Fire Safety Coordinator. They shall also be made aware of the risks involved and Emergency procedures, such as how to transmit an alarm and who is responsible to call 911.

- Signage required in areas where workers may enter indicating "Caution; Hot Work in progress; Stay Clear".

  There shall be no combustibles within 35 feet of the Hot Work area, or non-combustible shields shall be provided to prevent sparks, slag, or heat from igniting exposed combustibles.

  Note that this plan requires that fuel modification shall be provided for minimum 50-foot distance. Around turbine pads, the minimum distance is 100 feet in all directions, so that the clearance area around the turbine pads has a diameter of 200 feet.

- Hot Work shall not be done on any containers which contain or have contained flammable liquids, gases or solids until containers have been thoroughly cleaned, purged, or inerted.

- Note: this plan requires that a fire Watch of entire Hot Work area be provided during Hot Work and for one (1) hour after cessation of work and that there shall be two fire watch persons at each hot work area. They shall be properly trained and equipped, including with communications equipment, and shall be responsible to extinguish any spot fires and communicating an alarm. 911 shall be called if the fire cannot be totally extinguished.

- Fire Watch personnel shall be familiar with this plan and NFPA 51-B. There is a copy of NFPA 51-B in the Construction office.

- Fire Watch personnel shall wear proper Personal Protective Equipment (PPE).

- Fire Watch personnel shall have no other duties, which would detract from being attentive to the Hot Work operations.

- Hot Work Fire Watch personnel shall have the authority to stop any unsafe operations.

- A fire extinguisher with a minimum 3-A-40 BC rating, a 5-gallon backpack pump fire extinguisher, and shovel, shall be readily accessible within 30 feet of Hot Work area.

- The Fire Safety Coordinator shall inspect the Hot Work area before issuing a permit and shall then make daily inspections.

- A pre Hot Work check shall be done by the Fire Safety Coordinator. This shall include:

- Hot work equipment to be used shall be in satisfactory operating condition and in good repair.

- Hot work site to be clear of combustibles, or combustibles shall be protected from heat slag and sparks.

- Fire watches assigned

- Fire extinguishers and shovels are present.

- Gas Welding and cutting shall comply with 2010 California Fire Code (CFC) Section 2605.

- Electric arc hot work shall comply with CFC 2606.

- Piping manifolds and Hose Systems for Fuel Gases and Oxygen shall comply with CFC Section 2609.

- Cylinder use and storage shall comply with CFC Chapter 30, "Compressed Gases".

- All equipment shall be of an approved type, including torches, manifolds, regulators, or pressure reducing valves, and any acetylene generators.

The Fire Safety Coordinator shall have the responsibility to assure safe Hot Work operations, and shall have the authority to modify Hot Work activities associated with construction and/or maintenance activities, and to exceed the requirements in NFPA 51-B and the Fire Code, to the degree necessary to prevent fire ignition.

2. California Fire Code Chapter 26, "Welding and Other Hot Work"

Section 2601. General

2601.1 Scope. Welding, cutting, open torches and other hot work operations and equipment shall comply with this chapter.

2601.2 Permits. Permits shall be required as set forth in Section 105.6.

2601.3 Restricted areas. Hot work shall only be conducted in areas designed or authorized for that purpose by the personnel responsible for a Hot Work Program. Hot work shall not be conducted in the following areas unless approval has been obtained from the fire code official:

1. Areas where the sprinkler system is impaired.
2. Areas where there exists the potential of an explosive atmosphere, such as locations where flammable gases, liquids, or vapors are present.
3. Areas with readily ignitable materials, such as storage of large quantities of bulk sulfur, baled paper, cotton, lint, dust, or loose combustible materials.
4. On board ships at dock or ships under construction or repair.
5. At other locations as specified by the fire code official.

2601.4 Cylinders and containers. Compressed gas cylinders and fuel containers shall comply with this chapter and Chapter 30.

2601.5 Design and installation of oxygen-fuel gas systems. An oxygen-fuel gas system with two or more manifolded cylinders of oxygen shall be in accordance with NFPA 51.

Section 2602. Definitions

2602.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

HOT WORK AREA. The area exposed to sparks, hot slag, radiant heat, or convective heat as a result of the hot work.

HOT WORK EQUIPMENT. Electric or gas welding or cutting equipment use for hot work.

HOT WORK PERMITS. Permits issued by the responsible person at the facility under the hot work permit program permitting welding or other hot work to be done in locations referred to in Section 2603.3 and pre-permitted by the fire code official.

HOT WORK PROGRAM. A permitted program, carried out by approved facilities-designated personnel, allowing them to oversee and issue permits for hot work conducted by their personnel or at their facility. The intent is to have trained, on-site, responsible personnel ensure that required hot work safety measures are taken to prevent fires and fire spread.

RESPONSIBLE PERSON. A person trained in the safety and fire safety considerations concerned with hot work. Responsible for reviewing the sites prior to issuing permits as part of the hot work permit program and following up as the job progresses.

TORCH-APPLIED ROOF SYSTEM. Bituminous roofing systems using membranes that are adhered by heating with a torch and melting asphalt back coating instead of mopping hot asphalt for adhesion.

Section 2603. General Requirements

2603.1 General. Hot work conditions and operations shall comply with this chapter.

2603.2 Temporary and fixed hot work areas. Temporary and fixed hot work areas shall comply with this section.

2603.3 Hot work program permit. Hot work permits, issued by an *approved* responsible *person* under a hot work program, shall be available for review by the *fire code official* at the time the work is conducted and for 48 hours after work is complete.

2603.4 Qualifications of operators. A permit for hot work operations shall not be issued unless the individuals in charge of performing such operations are capable of performing such operations safely. Demonstration of a working knowledge of the provisions of this chapter shall constitute acceptable evidence of compliance with this requirement.

2603.5 Records. The individual responsible for the hot work area shall maintain "prework check" reports in accordance with Section 2604.3.1. Such reports shall be maintained on the premises for a minimum of 48 hours after work is complete.

2603.6 Signage. Visible hazard identification signs shall be provided where required by Chapter 27. Where the hot work area is accessible to *persons* other than the operator of the hot work equipment, conspicuous signs shall be posted to warn others before they enter the hot work area. Such signs shall display the following warning:

CAUTION

HOT WORK IN PROGRESS

STAY CLEAR.

Section 2604. Fire Safety Requirements

2604.1 Protection of combustibles. Protection of combustibles shall be in accordance with Sections 2604.1.1 through 2604.1.9.

2604.1.1 Combustibles. Hot work areas shall not contain combustibles or shall be provided with appropriate shielding to prevent sparks, slag or heat from igniting exposed combustibles.

2604.1.2 Openings. Openings or cracks in walls, floors, ducts, or shafts within the hot work area shall be tightly covered to prevent the passage of sparks to adjacent combustible areas, or shielded by metal fire-resistant guards, or curtains shall be provided to prevent passage of sparks or slag.

2604.1.3 Housekeeping. Floors shall be kept clean within the hot work area.

2604.1.4 Conveyor systems. Conveyor systems that are capable of carrying sparks to distant combustibles shall be shielded or shut down.

2604.1.5 Partitions. Partitions segregating hot work areas from other areas of the building shall be noncombustible. In fixed hot work areas, the partitions shall be securely connected to the floor such that no gap exists between the floor and the partition. Partitions shall prevent the passage of sparks, slag, and heat from the hot work area.

2604.1.6 Floors. Fixed hot work areas shall have floors with noncombustible surfaces.

2604.1.7 Precautions in hot work. Hot work shall not be performed on containers or equipment that contains or has contained flammable liquids, gases, or solids until the containers and equipment have been thoroughly cleaned, inerted or purged; except that “hot tapping” shall be allowed on tanks and pipe lines when such work is to be conducted by approved personnel.

2604.1.8 Sprinkler protection. Automatic sprinkler protection shall not be shut off while hot work is performed. Where hot work is performed close to automatic sprinklers, noncombustible barriers, or damp cloth guards shall shield the individual sprinkler heads and shall be removed when the work is completed. If the work extends over several days, the shields shall be removed at the end of each workday. The fire code official shall approve hot work where sprinkler protection is impaired.

2604.1.9 Fire detection systems. Approved special precautions shall be taken to avoid accidental operation of automatic fire detection systems.

2604.2 Fire watch. Fire watches shall be established and conducted in accordance with Sections 2604.2.1 through 2604.2.6.

2604.2.1 When required. A fire watch shall be provided during hot work activities and shall continue for a minimum of 30 minutes after the conclusion of the work. The fire code official, or the responsible manager under a hot work program, is authorized to extend the fire watch based on the hazards or work being performed.

Exception: Where the hot work area has no fire hazards or combustible exposures.

2604.2.2 Location. The fire watch shall include the entire hot work area. Hot work conducted in areas with vertical or horizontal fire exposures that are not observable by a single individual shall have additional personnel assigned to fire watches to ensure that exposed areas are monitored.

2604.2.3 Duties. Individuals designated to fire watch duty shall have fire-extinguishing equipment readily available and shall be trained in the use of such equipment. Individuals assigned to fire watch duty shall be responsible for extinguishing spot fires and communicating an alarm.

2604.2.4 Fire training. The individuals responsible for performing the hot work and individuals responsible for providing the fire watch shall be trained in the use of portable fire extinguishers.

2604.2.5 Fire hoses. Where hoselines are required, they shall be connected, charged and ready for operation.

2604.2.6 Fire extinguisher. A minimum of one portable fire extinguisher complying with Section 906 and with a minimum 2-A:20-B:C rating shall be readily accessible within 30 feet (9144 mm) of the location where hot work is performed.

2604.3 Area reviews. Before hot work is permitted and at least once per day while the permit is in effect, the area shall be inspected by the individual responsible for authorizing hot work operations to ensure that it is a fire safe area. Information shown on the permit shall be verified prior to signing the permit in accordance with Section 105.6.

Section 2605. Gas Welding and Cutting

2605.1 General. Devices or attachments mixing air or oxygen with combustible gases prior to consumption, except at the burner or in a standard torch or blow pipe, shall not be allowed unless *approved*.

2605.2 Cylinder and container storage, handling and use. Storage, handling, and use of *compressed gas* cylinders, containers, and tanks shall be in accordance with this section and Chapter 30.

2605.3 Precautions. Cylinders, valves, regulators, hose and other apparatus and fittings for oxygen shall be kept free from oil or grease. Oxygen cylinders, apparatus, and fittings shall not be handled with oily hands, oily gloves, or greasy tools or equipment.

2605.4 Acetylene gas. Acetylene gas shall not be piped except in *approved* cylinder manifolds and cylinder manifold connections, or utilized at a pressure exceeding 15 pounds per square inch gauge (psig) (103 kPa) unless dissolved in a suitable solvent in cylinders manufactured in accordance with DOTn 49 C.F.R Part 178. Acetylene gas shall not be brought in contact with unalloyed copper, except in a blowpipe or torch.

2605.5 Remote locations. Oxygen and fuel-gas cylinders and acetylene generators shall be located away from the hot work area to prevent such cylinders or generators from being heated by radiation from heated materials, sparks or slag, or misdirection of the torch flame.

2605.6 Cylinders shutoff. The torch valve shall be closed and the gas supply to the torch completely shut off when gas welding or cutting operations are discontinued for a period of 1 hour or more.

2605.7 Prohibited operation. Welding or cutting work shall not be held or supported on *compressed gas* cylinders or containers.

2605.8 Tests. Tests for leaks in piping systems and equipment shall be made with soapy water. The use of flames shall be prohibited for leak testing.

Section 2606. Electric Arc Hot Work

2606.1 General. The frame or case of electric hot work machines, except internal-combustion-engine-driven machines, shall be grounded. Ground connections shall be mechanically strong and electrically adequate for the required current.

2606.2 Return circuits. Welding current return circuits from the work to the machine shall have proper electrical contact at joints. The electrical contact shall be periodically inspected.

2606.3 Disconnecting. Electrodes shall be removed from the holders when electric arc welding or cutting is discontinued for any period of 1 hour or more. The holders shall be located to prevent accidental contact and the machines shall be disconnected from the power source.

2606.4 Emergency disconnect. A switch or circuit breaker shall be provided so that fixed electric welders and control equipment can be disconnected from the supply circuit. The disconnect shall be installed in accordance with *the California Electrical Code.*

2606.5 Damaged cable. Damaged cable shall be removed from service until properly repaired or replaced.

Section 2607. Calcium Carbide Systems

2607.1 Calcium carbide storage. Storage and handling of calcium carbide shall comply with Chapter 27 of this code and Chapter 9 of NFPA 51.

Section 2608. Acetylene Generators

2608.1 Use of acetylene generators. The use of acetylene generators shall comply with this section and Chapter 6 of NFPA 51A.

2608.2 Portable generators. The minimum volume of rooms containing portable generators shall be 35 times the total gas-generating capacity per charge of all generators in the room. The gas-generating capacity in cubic feet per charge shall be assumed to be 4.5 times the weight of carbide per charge in pounds. The minimum ceiling height of rooms containing generators shall be 10 feet (3048 mm). An acetylene generator shall not be moved by derrick, crane, or hoist while charged.

2608.3 Protection against freezing. Generators shall be located where water will not freeze. Common salt such as sodium chloride or other corrosive chemicals shall not be utilized for protection against freezing.

Section 2609. Piping Manifolds and Hose Systems for Fuel Gases and Oxygen

2609.1 General. The use of piping manifolds and hose systems shall be in accordance with Section 2609.2 through 2609.7, Chapter 30 and Chapter 5 of NFPA 51.

2609.2 Protection. Piping shall be protected against physical damage.

2609.3 Signage. Signage shall be provided for piping and hose systems as follows:

1. Above-ground piping systems shall be marked in accordance with ASME A13.1.
2. Station outlets shall be marked to indicate their intended usage.
3. Signs shall be posted, indicating clearly the location and identity of section shutoff valves.

2609.4 Manifolding of cylinders. Oxygen manifolds shall not be located in an acetylene generator room. Oxygen manifolds shall be located at least 20 feet (6096 mm) away from combustible material such as oil or grease, and gas cylinders containing flammable gases, unless the gas cylinders are separated by a *fire partition*.

2609.5 Identification of manifolds. Signs shall be posted for oxygen manifolds with service pressures not exceeding 200 psig (1379 kPa). Such signs shall include the words:

LOW-PRESSURE MANIFOLD

DO NOT CONNECT HIGH-PRESSURE CYLINDERS

MAXIMUM PRESSURE 250 PSIG

2609.6 Clamps. Hose connections shall be clamped or otherwise securely fastened.

2609.7 Inspection. Hoses shall be inspected frequently for leaks, burns, wear, loose connections or other defects rendering the hose unfit for service.

F. CFC Chapter 30, "Compressed Gases"

1. Summary

   a. Cylinders to be clearly marked with name of gas and have color markings and labels.

   b. Containers, cylinders and tanks shall be properly designed and maintained to comply with Dotn 49 C.F.R., parts 100-185 or the ASME Boiler and Pressure Vessel code Section VIII.

   c. Pressure relief devices are required unless exempted by Code and shall be properly designed and sized.

   d. Pressure relief devices shall be arranged to discharge upward and unobstructed into the open air to prevent any impingement of escaping gas upon container, adjacent structures, or personnel. Exception: DOTn spec containers with internal volume of 30 cubic feet or less.

   e. Pressure relief valves or vent piping to be designed or located so that moisture cannot collect and freeze in a manner that would interfere with the operation of the device.

   f. Portable Containers, cylinders, and tanks shall be marked in accordance with CGA C-7. Stationary cylinders shall be properly marked including name of the gas. Markings to be visible from any direction of approach.

   g. Piping systems shall comply with section 3003.4.3, CFC.

   h. Security: compressed gas containers, cylinders, and tanks shall be secured against accidental dislodgement and safeguarded in an approved manner.

   i. Compressed gas containers, cylinders, tanks, and systems shall be protected from physical damage including vehicular damage, by guard posts or other approved means.

   j. Securing containers, cylinders, and tanks: Shall be secured to prevent falling caused by vibration, contact, or seismic activity. Use one of the following methods:

      - Secure them to a fixed object with one or more restraints.
      - Secure them on a cart or other mobile device designed for movement of compressed gas cylinders, containers, or tanks.

- Securing compressed gas cylinders, containers or tanks to or within a rack, framework, cabinet or similar assembly designed for such use.
- Exception when in the process of examination, filling, transport, or servicing.

k. Valve Protection. Protect all valves from physical damage. Use caps, collars, etc.

l. Separation from hazardous conditions. Separate containers, cylinders, and tanks from any hazardous conditions, which could cause an exposure to, or from, them. These include:

- Incompatible materials such as different hazards of various gases. Separate by 20 feet or non-combustible partitions extending 18" above and to sides.
- Combustible waste, vegetation, and similar materials. Provide 10 feet or more separation.
- Do not place near elevators, ledges or platforms where falling would result in them falling more than ½ height of container.

- Temperature extremes: do not expose to artificially created high temperatures exceeding 125 degrees f, or sub-ambient low temperatures unless designed for use under the exposed conditions.

- Do not place cylinders in areas where they can be damaged by falling objects.

- Do not heat cylinders.

- Keep open flames and high temperature devices away.

- Do not expose cylinders to corrosive chemicals or fumes.

m. Electrical wiring and equipment. Comply with California Electrical Code. Cylinders, containers, and tanks shall not be used for grounding and shall not become part of an electrical circuit.

n. Service and repair or modifications shall only be performed by trained personnel.

o. Leaking or damaged cylinders, containers or tanks, or those exposed to fire shall be removed from service and handled in an approved manner.

p. To prevent bottom corrosion, protect cylinders, tanks, containers from direct contact with soil or unimproved surfaces. Surface to be graded to prevent accumulation of water.

q. Provide overhead covers for cylinder, tank, and container storage during hot weather.

r. Store and use compressed gas containers, cylinders and tanks in an upright position with valve end up (excepting those designed for use in horizontal position).

s. Piping including tubing, valves, fittings, pressure regulators, and other apparatus shall comply with the California Fire Code and be kept gas tight to prevent leakage.

t. Valve handles or operators for shut off valves shall not be removed or otherwise altered.

u. Any venting of gases shall be to an approved location with no ignition sources.

v. Transfer of gases between cylinders, containers, and tanks shall only be done by trained and qualified persons using equipment and operating procedures in accordance with CGA P-1.

w. Cylinders, tanks, and containers shall be moved using an approved method such as an approved cart or hand truck. Cylinders, tanks, and containers must be secured against dropping or striking each other or other objects.

x. Lifting Device (ropes, chains, or slings) shall not be used to suspend compressed gases.

2. CFC Chapter 30, "Compressed Gases"

Section 3001. General

3001.1 Scope. Storage, use, and handling of compressed gases in compressed gas containers, cylinders, tanks, and systems shall comply with this chapter, including those gases regulated elsewhere in this code. Partially full compressed gas containers, cylinders, or tanks containing residual gases shall be considered as full for the purposes of the controls required.

Exceptions:

1. Gases used as refrigerants in refrigeration systems (see Section 606).
2. Compressed natural gas (CNG) for use as a vehicular fuel shall comply with Chapter 22, NFPA 52 and the California Mechanical Code.

Cutting and welding gases shall also comply with Chapter 26.

Cryogenic fluids shall comply with Chapter 32. Liquefied natural gas for use as a vehicular fuel shall also comply with NFPA 52 and NFPA 59A.

Compressed gases classified as hazardous materials shall also comply with Chapter 27 for general requirements and chapters addressing specific hazards, including Chapters 35 (Flammable Gases), 37 (Highly Toxic and Toxic Materials), 40 (Oxidizers, Oxidizing Gases and Oxidizing Cryogenic Fluids) and 41 (Pyrophoric Materials).

LP-gas shall also comply with Chapter 38 and the California Mechanical Code.

[California Code of Regulations, Title 19, Division 1, §3.18(a) and (b)] Hazardous Areas.

(a) General. Occupancies or portions thereof used or intended to be used as operating rooms, surgeries, delivery rooms, storage rooms and similar hazardous locations in which flammable or nonflammable mixtures of gases are used or stored shall be maintained in accordance with the provisions of NFPA 99-2005 Inhalation Anesthetics, NFPA 99-2005 Laboratories, NFPA 99-2005 Hyperbaric Facilities, NFPA 55-2010 Bulk Oxygen Systems at Consumer Sites, and this section.

(b) Containers. Cylinders and fittings for compressed gases shall conform to the regulations of the Federal Department of Transportation.

Compressed gas cylinders shall be clearly marked with the name of the gas contained therein. Cylinders shall bear color makings and labels conforming to the following:

Gas	Color
(1) Oxygen.	Green
(2) Carbon Dioxide	Gray
(3) Nitrous Oxide	Light Blue
(4) Cyclopropane	Orange
(5) Helium	Brown
(6) Ethlene.	Red
(7) Carbon Dioxide and Oxygen	Gray and Green
(8) Helium and Oxygen	Brown and Green

Note: Polished metal or chrome-plated cylinders shall have color tags in addition to color labels.

When deemed necessary by the enforcing agency compressed gas cylinders shall be secured by chains, metal straps or other approved materials to prevent overturning.

Section 3002. Definitions

3002.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

COMPRESSED GAS CONTAINER. A pressure vessel designed to hold compressed gases at pressures greater than one atmosphere at 68° F (20° C) and includes cylinders, containers, and tanks.

COMPRESSED GAS SYSTEM. An assembly of equipment designed to contain, distribute, or transport compressed gases. It can consist of a compressed gas container or containers, reactors and appurtenances, including pumps, compressors and connecting piping and tubing.

NESTING. A method of securing flat-bottomed compressed gas cylinders upright in a tight mass using a contiguous three-point contact system whereby all cylinders within a group have a minimum of three points of contact with other cylinders, walls or bracing.

TUBE TRAILER. A semitrailer on which a number of tubular gas cylinders have been mounted. A manifold is typically provided that connects the cylinder valves enabling gas to be discharged from one or more tubes or cylinders through a piping and control system.

Section 3003. General Requirements

3003.1 Containers, cylinders and tanks. Compressed gas containers, cylinders, and tanks shall comply with this section. Compressed gas containers, cylinders, or tanks that are not designed for refillable use shall not be refilled after use of the original contents.

3003.2 Design and construction. Compressed gas containers, cylinders and tanks shall be designed, fabricated, tested, marked with the specifications of manufacture and maintained in accordance with the regulations of DOTn 49 C.F.R., Parts 100-185 or the ASME Boiler and Pressure Vessel Code, Section VIII.

3003.3 Pressure relief devices. Pressure relief devices shall be in accordance with Sections 3003.3.1 through 3003.3.5.

3003.3.1 Where required. Pressure relief devices shall be provided to protect containers, cylinders, and tanks containing compressed gases from rupture in the event of overpressure.

Exception: Cylinders, containers and tanks when exempt from the requirements for pressure relief devices specified by the standards of design listed in Section 3003.3.2.

3003.3.2 Design. Pressure relief devices to protect containers shall be designed and provided in accordance with CGA S-1.1, CGA S-1.2, CGA S-1.3 or the ASME *Boiler and Pressure Vessel Code,* Section VIII, as applicable.

3003.3.3 Sizing. Pressure relief devices shall be sized in accordance with the specifications to which the container was fabricated and to material specific requirements as applicable.

3003.3.4 Arrangement. Pressure relief devices shall be arranged to discharge upward and unobstructed to the open air in such a manner as to prevent any impingement of escaping gas upon the container, adjacent structures or personnel.

Exception: DOTn specification containers having an internal volume of 30 cubic feet (0.855 m^3) or less.

3003.3.5 Freeze protection. Pressure relief devices or vent piping shall be designed or located so that moisture cannot collect and freeze in a manner that would interfere with the operation of the device.

3003.4 Marking. Stationary and portable compressed gas containers, cylinders, tanks, and systems shall be marked in accordance with Sections 3003.4.1 through 3003.4.3.

3003.4.1 Stationary compressed gas containers, cylinders, and tanks. Stationary compressed gas containers, cylinders, and tanks shall be marked with the name of the gas and in accordance with Sections 2703.5 and 2703.6. Markings shall be visible from any direction of approach.

3003.4.2 Portable containers, cylinders, and tanks. Portable compressed gas containers, cylinders, and tanks shall be marked in accordance with CGA C-7.

3003.4.3 Piping systems. Piping systems shall be marked in accordance with ASME A13.1. Markings used for piping systems shall consist of the content's name and include a direction-of-flow arrow. Markings shall be provided at each valve; at wall, floor, or ceiling penetrations; at each change of direction; and at a minimum of every 20 feet (6096 mm) or fraction thereof throughout the piping run.

Exceptions:

1. Piping that is designed or intended to carry more than one gas at various times shall have appropriate signs or markings posted at the manifold, along the piping and at each point of use to provide clear identification and warning.
2. Piping within gas manufacturing plants, gas processing plants, refineries, and similar occupancies shall be marked in an approved manner.

3003.5 Security. Compressed gas containers, cylinders, tanks, and systems shall be secured against accidental dislodgement and against access by unauthorized personnel in accordance with Sections 3003.5.1 through 3003.5.3.

3003.5.1 Security of areas. Areas used for the storage, use and handling of compressed gas containers, cylinders, tanks and systems shall be secured against unauthorized entry and safeguarded in an approved manner.

3003.5.2 Physical protection. Compressed gas containers, cylinders, tanks, and systems which could be exposed to physical damage shall be protected. Guard posts or other approved means

shall be provided to protect compressed gas containers, cylinders, tanks, and systems indoors and outdoors from vehicular damage and shall comply with Section 312.

3003.5.3 Securing compressed gas containers, cylinders, and tanks. Compressed gas containers, cylinders, and tanks shall be secured to prevent falling caused by contact, vibration, or seismic activity. Securing of compressed gas containers, cylinders, and tanks shall be by one of the following methods:

1. Securing containers, cylinders, and tanks to a fixed object with one or more restraints.
2. Securing containers, cylinders and tanks on a cart or other mobile device designed for the movement of compressed gas containers, cylinders, or tanks.
3. Nesting of compressed gas containers, cylinders, and tanks at container filling or servicing facilities or in seller's warehouses not accessible to the public. Nesting shall be allowed provided the nested containers, cylinders, or tanks, if dislodged, do not obstruct the required means of egress.
4. Securing of compressed gas containers, cylinders and tanks to or within a rack, framework, cabinet or similar assembly designed for such use.

Exception: Compressed gas containers, cylinders, and tanks in the process of examination, filling, transport, or servicing.

3003.6 Valve protection. Compressed gas container, cylinder, and tank valves shall be protected from physical damage by means of protective caps, collars, or similar devices in accordance with Sections 3003.6.1 and 3003.6.2.

3003.6.1 Compressed gas container, cylinder or tank protective caps, or collars. Compressed gas containers, cylinders and tanks designed for protective caps, collars or other protective devices shall have the caps or devices in place except when the containers, cylinders, or tanks are in use or are being serviced or filled.

3003.6.2 Caps and plugs. Compressed gas containers, cylinders, and tanks designed for valve protection caps or other protective devices shall have the caps or devices attached. When outlet caps or plugs are installed, they shall be in place.

Exception: Compressed gas containers, cylinders or tanks in use, being serviced or being filled.

3003.7 Separation from hazardous conditions. Compressed gas containers, cylinders and tanks, and systems in storage or use shall be separated from materials and conditions which pose exposure hazards to or from each other. Compressed gas containers, cylinders, tanks, and systems in storage or use shall be separated in accordance with Sections 3003.7.1 through 3003.7.11.2.

3003.7.1 Incompatible materials. Compressed gas containers, cylinders, and tanks shall be separated from each other based on the hazard class of their contents. Compressed gas containers, cylinders, and tanks shall be separated from incompatible materials in accordance with Section 2703.9.8.

3003.7.2 Combustible waste, vegetation, and similar materials. Combustible waste, vegetation, and similar materials shall be kept a minimum of 10 feet (3048 mm) from compressed gas containers, cylinders, tanks, and systems. A noncombustible partition, without openings or penetrations and extending not less than 18 inches (457 mm) above and to the sides of the storage area is allowed in lieu of such distance. The wall shall either be an independent structure, or the exterior wall of the building adjacent to the storage area.

3003.7.3 Ledges, platforms and elevators. Compressed gas containers, cylinders and tanks shall not be placed near elevators, unprotected platform ledges or other areas where falling would result in compressed gas containers, cylinders or tanks being allowed to drop distances exceeding one-half the height of the container, cylinder, or tank.

3003.7.4 Temperature extremes. Compressed gas containers, cylinders and tanks, whether full or partially full, shall not be exposed to artificially created high temperatures exceeding 125° F (52° C) or subambient (low) temperatures unless designed for use under the exposed conditions.

3003.7.5 Falling objects. Compressed gas containers, cylinders, tanks, and systems shall not be placed in areas where they are capable of being damaged by falling objects.

3003.7.6 Heating. Compressed gas containers, cylinders and tanks, whether full or partially full, shall not be heated by devices which could raise the surface temperature of the container, cylinder, or tank to above 125° F (52° C). Heating devices shall comply with the California Mechanical Code and the California Electrical Code. Approved heating methods involving temperatures of less than 125° F (52° C) are allowed to be used by trained personnel. Devices designed to maintain individual compressed gas containers, cylinders or tanks at constant temperature shall be approved and shall be designed to be fail-safe.

3003.7.7 Sources of ignition. Open flames and high-temperature devices shall not be used in a manner which creates a hazardous condition.

3003.7.8 Exposure to chemicals. Compressed gas containers, cylinders, tanks and systems shall not be exposed to corrosive chemicals or fumes which could damage containers, cylinders, tanks, valves, or valve-protective caps.

3003.7.9 Exhausted enclosures. When exhausted enclosures are provided as a means to segregate compressed gas containers, cylinders and tanks from exposure hazards, such enclosures shall comply with the requirements of Section 2703.8.5.

3003.7.10 Gas cabinets. When gas cabinets are provided as a means to separate compressed gas containers, cylinders and tanks from exposure hazards, such gas cabinets shall comply with the requirements of Section 2703.8.6.

3003.7.11 Tube trailers. Tube trailers, including those containing compatible compressed gases, shall be surrounded by a clear space of not less than 3 feet (914 mm) to allow for maintenance, access and inspection.

3003.7.11.1 Individual tube trailers containing incompatible materials. Increased separation distances between individual tube trailers containing incompatible gases shall be provided when required by Section 3003.7.1.

3003.7.11.2 Connections. Piping systems used to connect tube trailers to a user piping system shall not be viewed as an encroachment into the 3-foot (914 mm) clear space.

3003.8 Wiring and equipment. Electrical wiring and equipment shall comply with the California Electrical Code. Compressed gas containers, cylinders, tanks, and systems shall not be located where they could become part of an electrical circuit. Compressed gas containers, cylinders, tanks, and systems shall not be used for electrical grounding.

3003.9 Service and repair. Service, repair, modification, or removal of valves, pressure-relief devices or other compressed gas container, cylinder or tank appurtenances shall be performed by trained personnel.

3003.10 Unauthorized use. Compressed gas containers, cylinders, tanks, and systems shall not be used for any purpose other than to serve as a vessel for containing the product which it is designed to contain.

3003.11 Exposure to fire. Compressed gas containers, cylinders, and tanks which have been exposed to fire shall be removed from service. Containers, cylinders, and tanks so removed shall be handled by approved, qualified persons.

3003.12 Leaks, damage or corrosion. Leaking, damaged, or corroded compressed gas containers, cylinders, and tanks shall be removed from service. Leaking, damaged, or corroded compressed gas systems shall be replaced or repaired in accordance with the following:

1. Compressed gas containers, cylinders, and tanks which have been removed from service shall be handled in an approved manner.
2. Compressed gas systems which are determined to be leaking, damaged, or corroded shall be repaired to a serviceable condition or removed from service.

3003.13 Surface of unprotected storage or use areas. Unless otherwise specified in Section 3003.14, compressed gas containers, cylinders and tanks are allowed to be stored or used without being placed under overhead cover. To prevent bottom corrosion, containers, cylinders, and tanks shall be protected from direct contact with soil or unimproved surfaces. The surface of the area on which the containers are placed shall be graded to prevent accumulation of water.

3003.14 Overhead cover. Compressed gas containers, cylinders, and tanks are allowed to be stored or used in the sun except in locations where extreme temperatures prevail. When extreme temperatures prevail, overhead covers shall be provided.

3003.15 Lighting. Approved lighting by natural or artificial means shall be provided.

3003.16 Vaults. Generation, compression, storage, and dispensing equipment for compressed gases shall be allowed to be located in either above- or below-grade vaults complying with Sections 3003.16.1 through 3003.16.14.

3003.16.1 Listing required. Vaults shall be listed by a nationally recognized testing laboratory.

Exception: Where approved by the fire code official, below-grade vaults are allowed to be constructed on site, provided that the design is in accordance with the California Building Code and that special inspections are conducted to verify structural strength and compliance of the installation with the approved design in accordance with Section 1707 of the California Building Code. Installation plans for below-grade vaults that are constructed on site shall be prepared by, and the design shall bear the stamp of, a professional engineer. Consideration shall be given to soil and hydrostatic loading on the floors, walls and lid; anticipated seismic forces; uplifting by ground water or flooding; and to loads imposed from above, such as traffic and equipment loading on the vault lid.

3003.16.2 Design and construction. The vault shall completely enclose generation, compression, storage, or dispensing equipment located in the vault. There shall be no openings in the vault enclosure except those necessary for vault ventilation and access, inspection, filling, emptying or venting of equipment in the vault. The walls and floor of the vault shall be constructed of reinforced concrete at least 6 inches (152 mm) thick. The top of an above-grade vault shall be constructed of noncombustible material and shall be designed to be weaker than the walls of the vault to ensure that the thrust of any explosion occurring inside the vault is directed upward.

The top of an at- or below-grade vault shall be designed to relieve safely or contain the force of an explosion occurring inside the vault. The top and floor of the vault and the tank foundation shall be designed to withstand the anticipated loading, including loading from vehicular traffic, where applicable. The walls and floor of a vault installed below grade shall be designed to withstand anticipated soil and hydrostatic loading. Vaults shall be designed to be wind and earthquake resistant, in accordance with the California Building Code.

3003.16.3 Secondary containment. Vaults shall be substantially liquid-tight and there shall be no backfill within the vault. The vault floor shall drain to a sump. For premanufactured vaults, liquid tightness shall be certified as part of the listing provided by a nationally recognized testing laboratory. For field-erected vaults, liquid tightness shall be certified in an approved manner.

3003.16.4 Internal clearance. There shall be sufficient clearance within the vault to allow for visual inspection and maintenance of equipment in the vault.

3003.16.5 Anchoring. Vaults and equipment contained therein shall be suitably anchored to withstand uplifting by groundwater or flooding. The design shall verify that uplifting is prevented even when equipment within the vault is empty.

3003.16.6 Vehicle impact protection. Vaults shall be resistant to damage from the impact of a motor vehicle, or vehicle impact protection shall be provided in accordance with Section 312.

3003.16.7 Arrangement. Equipment in vaults shall be listed or approved for above-ground use. Where multiple vaults are provided, adjacent vaults shall be allowed to share a common wall. The common wall shall be liquid and vapor tight and shall be designed to withstand the load imposed when the vault on either side of the wall is filled with water.

3003.16.8 Connections. Connections shall be provided to permit the venting of each vault to dilute, disperse, and remove vapors prior to personnel entering the vault.

3003.16.9 Ventilation. Vaults shall be provided with an exhaust ventilation system installed in accordance with Section 2704.3. The ventilation system shall operate continuously or be designed to operate upon activation of the vapor or liquid detection system. The system shall provide ventilation at a rate of not less than 1 cubic foot per minute (cfm) per square foot of floor area [0.00508 $m^3/(s \cdot m^2)$], but not less than 150 cfm [0.071 $m^3/(s \cdot m^2)$]. The exhaust system shall be designed to provide air movement across all parts of the vault floor for gases having a density greater than air and across all parts of the vault ceiling for gases having a density less than air. Supply ducts shall extend to within 3 inches (76 mm), but not more than 12 inches (305 mm), of the floor. Exhaust ducts shall extend to within 3 inches (76 mm), but not more than 12 inches (305 mm) of the floor or ceiling, for heavier-than-air or lighter-than-air gases, respectively. The exhaust system shall be installed in accordance with the California Mechanical Code.

3003.16.10 Monitoring and detection. Vaults shall be provided with approved vapor and liquid detection systems and equipped with on-site audible and visual warning devices with battery backup. Vapor detection systems shall sound an alarm when the system detects vapors that reach or exceed 25 percent of the lower explosive limit (LEL) or one-half the immediately dangerous to life and health (IDLH) concentration for the gas in the vault. Vapor detectors shall be located no higher than 12 inches (305 mm) above the lowest point in the vault for heavier-than-air gases and no lower than 12 inches (305 mm) below the highest point in the vault for lighter-than-air gases. Liquid detection systems shall sound an alarm upon detection of any liquid, including water. Liquid detectors shall be located in accordance with the manufacturers' instructions. Activation of either vapor or liquid detection systems shall cause a signal to be sounded at an approved, constantly attended location within the facility served by the tanks or at an approved location. Activation of vapor detection systems shall also shut off gas-handling equipment in the vault and dispensers.

3003.16.11 Liquid removal. Means shall be provided to recover liquid from the vault. Where a pump is used to meet this requirement, it shall not be permanently installed in the vault. Electric-powered portable pumps shall be suitable for use in Class I, Division 1 locations, as defined in the California Electrical Code.

3003.16.12 Relief vents. Vent pipes for equipment in the vault shall terminate at least 12 feet (3658 mm) above ground level.

3003.16.13 Accessway. Vaults shall be provided with an approved personnel accessway with a minimum dimension of 30 inches (762 mm) and with a permanently affixed, nonferrous ladder. Accessways shall be designed to be non-sparking. Travel distance from any point inside a vault

to an accessway shall not exceed 20 feet (6096 mm). At each entry point, a warning sign indicating the need for procedures for safe entry into confined spaces shall be posted. Entry points shall be secured against unauthorized entry and vandalism.

3003.16.14 Classified area. The interior of a vault containing a flammable gas shall be designated a Class I, Division 1 location, as defined in the California Electrical Code.

Section 3004. Storage of Compressed Gases

3004.1 Upright storage. Compressed gas containers, cylinders and tanks, except those designed for use in a horizontal position, and all compressed gas containers, cylinders and tanks containing nonliquefied gases, shall be stored in an upright position with the valve end up. An upright position shall include conditions where the container, cylinder, or tank axis is inclined as much as 45 degrees (0.80 rad) from the vertical.

Exceptions:

1. Compressed gas containers with a water volume less than 1.3 gallons (5 L) are allowed to be stored in a horizontal position.
2. Cylinders, containers and tanks containing nonflammable gases or cylinders, containers and tanks containing nonliquefied flammable gases, which have been secured to a pallet for transportation purposes.

3004.2 Material-specific regulations. In addition to the requirements of this section, indoor and outdoor storage of compressed gases shall comply with the material-specific provisions of Chapters 31, 35 and 37 through 44.

Section 3005. Use and Handling of Compressed Gases

3005.1 Compressed gas systems. Compressed gas systems shall be suitable for the use intended and shall be designed by persons competent in such design. Compressed gas equipment, machinery, and processes shall be listed or approved.

3005.2 Controls. Compressed gas system controls shall be designed to prevent materials from entering or leaving process or reaction systems at other than the intended time, rate, or path. Automatic controls shall be designed to be fail safe.

3005.3 Piping systems. Piping, including tubing, valves, fittings and pressure regulators, shall comply with this section and Chapter 27. Piping, tubing, pressure regulators, valves, and other apparatus shall be kept gas tight to prevent leakage.

3005.4 Valves. Valves utilized on compressed gas systems shall be suitable for the use intended and shall be accessible. Valve handles or operators for required shutoff valves shall not be removed or otherwise altered to prevent access.

3005.5 Venting. Venting of gases shall be directed to an approved location. Venting shall comply with the California Mechanical Code.

3005.6 Upright use. Compressed gas containers, cylinders and tanks, except those designed for use in a horizontal position, and all compressed gas containers, cylinders and tanks containing nonliquefied gases, shall be used in an upright position with the valve end up. An upright position shall include conditions where the container, cylinder, or tank axis is inclined as much as 45 degrees (0.80 rad) from the vertical. Use of nonflammable liquefied gases in the inverted position when the liquid phase is used shall not be prohibited provided that the container, cylinder or tank is properly secured and the dispensing apparatus is designed for liquefied gas use.

Exception: Compressed gas containers, cylinders, and tanks with a water volume less than 1.3 gallons (5 L) are allowed to be used in a horizontal position.

3005.7 Transfer. Transfer of gases between containers, cylinders, and tanks shall be performed by qualified personnel using equipment and operating procedures in accordance with CGA P-1.

Exception: Fueling of vehicles with compressed natural gas (CNG).

3005.8 Use of compressed gas for inflation. Inflatable equipment, devices, or balloons shall only be pressurized or filled with compressed air or inert gases.

3005.9 Material-specific regulations. In addition to the requirements of this section, indoor and outdoor use of compressed gases shall comply with the material-specific provisions of Chapters 31, 35 and 37 through 44.

3005.10 Handling. The handling of compressed gas containers, cylinders, and tanks shall comply with Sections 3005.10.1 and 3005.10.2.

3005.10.1 Carts and trucks. Containers, cylinders, and tanks shall be moved using an approved method. Where containers, cylinders or tanks are moved by hand cart, hand truck or other mobile device, such carts, trucks or devices shall be designed for the secure movement of containers, cylinders or tanks. Carts and trucks utilized for transport of compressed gas containers, cylinders and tanks within buildings shall comply with Section 2703.10. Carts and trucks utilized for transport of compressed gas containers, cylinders, and tanks exterior to buildings shall be designed so that the containers, cylinders, and tanks will be secured against dropping or otherwise striking against each other or other surfaces.

3005.10.2 Lifting devices. Ropes, chains, or slings shall not be used to suspend compressed gas containers, cylinders, and tanks unless provisions at time of manufacture have been made on the container, cylinder, or tank for appropriate lifting attachments, such as lugs.

Section 3006. Medical Gas Systems

3006.1 General. Compressed gases at hospitals and similar facilities intended for inhalation or sedation including, but not limited to, analgesia systems for dentistry, podiatry, veterinary and similar uses shall comply with Sections 3006.2 through 3006.4 in addition to other requirements of this chapter.

3006.2 Interior supply location. Medical gases shall be stored in areas dedicated to the storage of such gases without other storage or uses. Where containers of medical gases in quantities greater than the permit amount are located inside buildings, they shall be in a 1-hour exterior room, a 1-hour interior room or a gas cabinet in accordance with Section 3006.2.1, 3006.2.2 or 3006.2.3, respectively. Rooms or areas where medical gases are stored or used in quantities exceeding the maximum allowable quantity per control area as set forth in Section 2703.1 shall be in accordance with the International Building Code for high-hazard Group H occupancies.

3006.2.1 One-hour exterior rooms. A 1-hour exterior room shall be a room or enclosure separated from the remainder of the building by fire barriers with a fire-resistance rating of not less than 1 hour. Openings between the room or enclosure and interior spaces shall be self-closing smoke- and draft-control assemblies having a fire protection rating of not less than 1 hour. Rooms shall have at least one exterior wall that is provided with at least two vents. Each vent shall not be less than 36 square inches (0.023 m^2) in area. One vent shall be within 6 inches (152 mm) of the floor and one shall be within 6 inches (152 mm) of the ceiling. Rooms shall be provided with at least one automatic sprinkler to provide container cooling in case of fire.

3006.2.2 One-hour interior room. When an exterior wall cannot be provided for the room, automatic sprinklers shall be installed within the room. The room shall be exhausted through a duct to the exterior. Supply and exhaust ducts shall be enclosed in a 1-hour-rated shaft enclosure from the room to the exterior. Approved mechanical ventilation shall comply with the California Mechanical Code and be provided at a minimum rate of 1 cubic foot per minute per square foot [0.00508 $m^3/(s \cdot m^2)$] of the area of the room.

3006.2.3 Gas cabinets. Gas cabinets shall be constructed in accordance with Section 2703.8.6 and the following:

1. The average velocity of ventilation at the face of access ports or windows shall not be less than 200 feet per minute (1.02 m/s) with a minimum of 150 feet per minute (0.76 m/s) at any point of the access port or window.
2. They shall be connected to an exhaust system.
3. They shall be internally sprinklered.

3006.3 Exterior supply locations. Oxidizer medical gas systems located on the exterior of a building with quantities greater than the permit amount shall be located in accordance with Section 4004.2.1.

3006.4 Medical gas systems. Medical gas systems including, but not limited to, distribution piping, supply manifolds, connections, pressure regulators and relief devices and valves, shall comply with NFPA 99 and the general provisions of this chapter.

Section 3007. Compressed Gases Not Otherwise Regulated

3007.1 General. Compressed gases in storage or use not regulated by the material-specific provisions of Chapters 6, 31, 35 and 37 through 44, including asphyxiant, irritant and radioactive gases, shall comply with this section in addition to other requirements of this chapter.

3007.2 Ventilation. Indoor storage and use areas and storage buildings shall be provided with mechanical exhaust ventilation or natural ventilation in accordance with the requirements of Section 2704.3 or 2705.1.9. When mechanical ventilation is provided, the systems shall be operational during such time as the building or space is occupied.

G. CFC Chapter 14, "Fire Safety During Construction and Demolition"

1. Summary

   a. Temporary heating devices shall comply with California Fire Code and California Mechanical Code.

   b. Refueling of such devices shall comply with California Fire Code section 3405.

   c. Equipment or appliance shall be allowed to cool before refueling.

   d. Use of temporary heating devices shall be supervised and maintained only by competent personnel.

   e. Smoking only allowed in approved areas. Signs shall be posted and approved ash receptacles shall be provided.

   f. Rubbish, waste and debris shall not be burned. No open burning allowed without a Fire Agency permit.

   g. Materials susceptible to spontaneous ignition, such as oily rags, shall be stored in listed disposal container.

   h. Cutting and welding to comply with CFC Chapter 26 (which is discussed in this plan).

   i. Temporary wiring for electrical power and lighting shall comply with California Electrical Code.

   j. Storage, use, and handling of flammable and combustible liquids shall comply with CFC Section 3406.2.

   k. Flammable and combustible liquid storage areas shall be maintained clear of combustible vegetation and waste materials. Such areas shall not be used for storage of combustible materials.

   l. Sources of ignition and smoking shall be prohibited in flammable and combustible liquid storage areas. Signs shall be posted.

   m. Class 1 and 11 liquids shall be kept in approved safety containers.

   n. Leaking vessels shall be immediately repaired or taken out of service and spills cleaned up and disposed of properly.

   o. Storage, use and handling of flammable gases shall comply with CFC Chapter 35.

p. Explosive materials and blasting operations shall comply with CFC Chapter 33. (Explosives and Blasting are out of the scope of this plan)

q. Owner shall designate a person to be the "Fire Prevention Program Superintendent". (Fire Safety Coordinator required by this plan complies with this section. The term Fire Safety Coordinator is thus used herein).

r. Fire Safety Coordinator shall have an approved Pre Fire plan developed in cooperation with the Fire Agency.

s. Fire Safety Coordinator responsible for training workers in use of fire equipment.

t. Fire Safety Coordinator shall assure all fire protection equipment is maintained and serviced properly.

u. Fire Safety Coordinator responsible for supervising the permit system for Hot Work.

v. Readily accessible emergency telephone facilities shall be provided in an approved location. Street address of the site and the telephone numbers of the Fire Agencies shall be posted adjacent to phone.

w. Approved vehicle access for fire trucks is required via temporary or permanent roads capable of supporting vehicle loading under all weather conditions.

x. Approved water supply for fire trucks is required.

y. Portable fire extinguishers required, including in areas where flammable and combustible liquids are stored or used.

z. Internal combustion powered construction equipment shall not be refueled while in operation.

2. <u>CFC Chapter 14, "Fire Safety During Construction and Demolition"</u>

Section 1401. General

1401.1 Scope. This chapter shall apply to structures in the course of construction, alteration or demolition, including those in underground locations. Compliance with NFPA 241 is required for items not specifically addressed herein.

1401.2 Purpose. This chapter prescribes minimum safeguards for construction, alteration and demolition operations to provide reasonable safety to life and property from fire during such operations.

Section 1402. Definitions

1402.1 Terms defined in Chapter 2. Words and terms used in this chapter and defined in Chapter 2 shall have the meanings ascribed to them as defined therein.

Section 1403. Temporary Heating Equipment

1403.1 Listed. Temporary heating devices shall be listed and labeled in accordance with the California Mechanical Code. Installation, maintenance and use of temporary heating devices shall be in accordance with the terms of the listing.

1403.2 Oil-fired heaters. Oil-fired heaters shall comply with Section 603.

1403.3 LP-gas heaters. Fuel supplies for liquefied-petroleum gas-fired heaters shall comply with Chapter 38 and the California Mechanical Code.

1403.4 Refueling. Refueling operations for liquid-fueled equipment or appliances shall be conducted in accordance with Section 3405. The equipment or appliance shall be allowed to cool prior to refueling.

1403.5 Installation. Clearance to combustibles from temporary heating devices shall be maintained in accordance with the labeled equipment. When in operation, temporary heating devices shall be fixed in place and protected from damage, dislodgement or overturning in accordance with the manufacturer’s instructions.

1403.6 Supervision. The use of temporary heating devices shall be supervised and maintained only by competent personnel.

Section 1404. Precautions Against Fire

1404.1 Smoking. Smoking shall be prohibited except in approved areas. Signs shall be posted in accordance with Section 310. In approved areas where smoking is permitted, approved ashtrays shall be provided in accordance with Section 310.

1404.2 Waste disposal. Combustible debris shall not be accumulated within buildings. Combustible debris, rubbish and waste material shall be removed from buildings at the end of each shift of work. Combustible debris, rubbish and waste material shall not be disposed of by burning on the site unless approved.

1404.3 Open burning. Open burning shall comply with Section 307.

1404.4 Spontaneous ignition. Materials susceptible to spontaneous ignition, such as oily rags, shall be stored in a listed disposal container.

1404.5 Fire watch. When required by the fire code official for building demolition that is hazardous in nature, qualified personnel shall be provided to serve as an on-site fire watch. Fire watch personnel shall be provided with at least one approved means for notification of the fire department and their sole duty shall be to perform constant patrols and watch for the occurrence of fire.

1404.6 Cutting and welding. Operations involving the use of cutting and welding shall be done in accordance with Chapter 26.

1404.7 Electrical. Temporary wiring for electrical power and lighting installations used in connection with the construction, alteration or demolition of buildings, structures, equipment or similar activities shall comply with the California Electrical Code.

Section 1405. Flammable And Combustible Liquids

1405.1 Storage of flammable and combustible liquids. Storage of flammable and combustible liquids shall be in accordance with Section 3404.

1405.2 Class I and Class II liquids. The storage, use and handling of flammable and combustible liquids at construction sites shall be in accordance with Section 3406.2. Ventilation shall be provided for operations involving the application of materials containing flammable solvents.

1405.3 Housekeeping. Flammable and combustible liquid storage areas shall be maintained clear of combustible vegetation and waste materials. Such storage areas shall not be used for the storage of combustible materials.

1405.4 Precautions against fire. Sources of ignition and smoking shall be prohibited in flammable and combustible liquid storage areas. Signs shall be posted in accordance with Section 310.

1405.5 Handling at point of final use. Class I and II liquids shall be kept in approved safety containers.

1405.6 Leakage and spills. Leaking vessels shall be immediately repaired or taken out of service and spills shall be cleaned up and disposed of properly.

Section 1406. Flammable Gases

1406.1 Storage and handling. The storage, use and handling of flammable gases shall comply with Chapter 35.

Section 1407. Explosive Materials

1407.1 Storage and handling. Explosive materials shall be stored, used and handled in accordance with Chapter 33.

1407.2 Supervision. Blasting operations shall be conducted in accordance with Chapter 33.

1407.3 Demolition using explosives. Approved fire hoses for use by demolition personnel shall be maintained at the demolition site whenever explosives are used for demolition. Such fire hoses shall be connected to an approved water supply and shall be capable of being brought to bear on post-detonation fires anywhere on the site of the demolition operation.

Section 1408. Owner's Responsibility For Fire Protection

1408.1 Program superintendent. The owner shall designate a person to be the fire prevention program superintendent who shall be responsible for the fire prevention program and ensure that it is carried out through completion of the project. The fire prevention program superintendent shall have the authority to enforce the provisions of this chapter and other provisions as necessary to secure the intent of this chapter. Where guard service is provided, the superintendent shall be responsible for the guard service.

1408.2 Pre-fire plans. The fire prevention program superintendent shall develop and maintain an approved pre-fire plan in cooperation with the fire chief. The fire chief and the fire code official shall be notified of changes affecting the utilization of information contained in such pre-fire plans.

1408.3 Training. Training of responsible personnel in the use of fire protection equipment shall be the responsibility of the fire prevention program superintendent.

1408.4 Fire protection devices. The fire prevention program superintendent shall determine that all fire protection equipment is maintained and serviced in accordance with this code. The quantity and type of fire protection equipment shall be approved.

1408.5 Hot work operations. The fire prevention program superintendent shall be responsible for supervising the permit system for hot work operations in accordance with Chapter 26.

1408.6 Impairment of fire protection systems. Impairments to any fire protection system shall be in accordance with Section 901.

1408.7 Temporary covering of fire protection devices. Coverings placed on or over fire protection devices to protect them from damage during construction processes shall be

immediately removed upon the completion of the construction processes in the room or area in which the devices are installed.

Section 1409. Fire Reporting

1409.1 Emergency telephone. Readily accessible emergency telephone facilities shall be provided in an approved location at the construction site. The street address of the construction site and the emergency telephone number of the fire department shall be posted adjacent to the telephone.

Section 1410. Access For Fire Fighting

1410.1 Required access. Approved vehicle access for fire fighting shall be provided to all construction or demolition sites. Vehicle access shall be provided to within 100 feet (30 480 mm) of temporary or permanent fire department connections. Vehicle access shall be provided by either temporary or permanent roads, capable of supporting vehicle loading under all weather conditions. Vehicle access shall be maintained until permanent fire apparatus access roads are available.

1410.2 Key boxes. Key boxes shall be provided as required by Chapter 5.

Section 1411. Means Of Egress

1411.1 Stairways required. Where a building has been constructed to a building height of 50 feet (15 240 mm) or four stories, or where an existing building exceeding 50 feet (15 240 mm) in building height is altered, at least one temporary lighted stairway shall be provided unless one or more of the permanent stairways are erected as the construction progresses. [B]

1411.2 Maintenance. Required means of egress shall be maintained during construction and demolition, remodeling or alterations and additions to any building.

Exception: Approved temporary means of egress systems and facilities.

Section 1412 Water Supply For Fire Protection

1412.1 When required. An approved water supply for fire protection, either temporary or permanent, shall be made available as soon as combustible material arrives on the site.

Section 1413. Standpipes

1413.1 Where required. In buildings required to have standpipes by Section 905.3.1, not less than one standpipe shall be provided for use during construction. Such standpipes shall be installed when the progress of construction is not more than 40 feet (12 192 mm) in height above the lowest level of fire department vehicle access. Such standpipe shall be provided with fire department hose connections at accessible locations adjacent to usable stairs. Such standpipes shall be extended as construction progresses to within one floor of the highest point of construction having secured decking or flooring.

1413.2 Buildings being demolished. Where a building is being demolished and a standpipe is existing within such a building, such standpipe shall be maintained in an operable condition so as to be available for use by the fire department. Such standpipe shall be demolished with the building but shall not be demolished more than one floor below the floor being demolished.

1413.3 Detailed requirements. Standpipes shall be installed in accordance with the provisions of Section 905.

Exception: Standpipes shall be either temporary or permanent in nature, and with or without a water supply, provided that such standpipes comply with the requirements of Section 905 as to capacity, outlets and materials.

Section 1414. Automatic Sprinkler System

1414.1 Completion before occupancy. In buildings where an automatic sprinkler system is required by this code or the California Building Code, it shall be unlawful to occupy any portion of a building or structure until the automatic sprinkler system installation has been tested and approved, except as provided in Section 105.3.4.

1414.2 Operation of valves. Operation of sprinkler control valves shall be allowed only by properly authorized personnel and shall be accompanied by notification of duly designated parties. When the sprinkler protection is being regularly turned off and on to facilitate connection of newly completed segments, the sprinkler control valves shall be checked at the end of each work period to ascertain that protection is in service.

Section 1415. Portable Fire Extinguishers

1415.1 Where required. Structures under construction, alteration or demolition shall be provided with not less than one approved portable fire extinguisher in accordance with Section 906 and sized for not less than ordinary hazard as follows:

1. At each stairway on all floor levels where combustible materials have accumulated.
2. In every storage and construction shed.
3. Additional portable fire extinguishers shall be provided where special hazards exist including, but not limited to, the storage and use of flammable and combustible liquids.

Section 1416. Motorized Equipment

1416.1 Conditions of use. Internal-combustion-powered construction equipment shall be used in accordance with all of the following conditions:

1. Equipment shall be located so that exhausts do not discharge against combustible material.
2. Exhausts shall be piped to the outside of the building.
3. Equipment shall not be refueled while in operation.
4. Fuel for equipment shall be stored in an approved area outside of the building.

Section 1417. Safeguarding Roofing Operations

1417.1 General. Roofing operations utilizing heat-producing systems or other ignition sources shall be conducted in accordance with Sections 1417.2 and 1417.3 and Chapter 26.

1417.2 Asphalt and tar kettles. Asphalt and tar kettles shall be operated in accordance with Section 303.

1417.3 Fire extinguishers for roofing operations. Fire extinguishers shall comply with Section 906. There shall be not less than one multipurpose portable fire extinguisher with a minimum 3-A 40-B:C rating on the roof being covered or repaired.

H. CFC Chapter 35, "Flammable gases and Flammable Cryogenic Fluids"

1. Summary

   a. Design, construction, installation, testing and maintenance of cylinders and pressure vessels for flammable gases shall comply with CFC Chapter 30.

   b. Shall have approved manual or automatic fail-safe shut off valve on piping at cylinder or bulk source.

   c. Manual or automatic emergency shut off valve required at point of use or where equipment is connected to supply system.

   d. Ignition sources shall be controlled.

   e. Static producing equipment located in flammable gas storage areas shall be grounded.

   f. No Smoking signs shall be posted.

   g. Containers shall be positioned in upright position or positioned so that the pressure relief valve is in direct contact with vapor space in container.

   h. Outdoor storage of flammable gases in amounts exceeding the Maximum Allowable Quantity (MAQ) per control area per table 2703.1.1(3) in the CFC shall comply with CFC Chapters 2701, 2703, 2704 and this chapter

   i. Container storage or use shall be located away from property lines.

   j. Maximum distance required in CFC Chapter 35, Table 3504.2.1, based on quantities, is 25 feet, and 20 feet from buildings.

   k. Weather protection canopies for containers shall comply with California Building Code and Section 2704.13 of the CFC.

   l. Use of flammable gas in amounts exceeding the MAQ per control area per table 2703.1.1 shall comply with CFC sections 2701, 2703, 2705 and this Chapter.

   m. Flammable Cryogenic fluids shall comply with CFC Section 3506. (it is doubtful that cryogenics will be used on site).

2. CFC Chapter 35, “Flammable gases and Flammable Cryogenic Fluids”

Section 3501. General

3501.1 Scope. The storage and use of flammable gases shall be in accordance with this chapter. Compressed gases shall also comply with Chapter 30 and cryogenic fluids shall also comply with Chapter 32. Bulk hydrogen compressed gas systems and bulk liquefied hydrogen gas systems shall comply with NFPA 55. Hydrogen motor fuel-dispensing facilities and repair garages and their associated above-ground hydrogen storage systems shall also be designed and constructed in accordance with Chapter 22.

Exceptions:

1. Gases used as refrigerants in refrigeration systems (see Section 606).
2. Liquefied petroleum gases and natural gases regulated by Chapter 38.
3. Fuel-gas systems and appliances regulated under the California Mechanical Code or the California Plumbing Code.
4. Pyrophoric gases in accordance with Chapter 41.

3501.2 Permits. Permits shall be required as set forth in Section 105.6.

Section 3502. Definitions

3502.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

BULK LIQUEFIED HYDROGEN GAS SYSTEM. An assembly of equipment, consisting of, but not limited to, storage containers, pressure regulators, pressure relief devices, vaporizers, manifolds and piping, with a storage capacity of more than 39.7 gallons (150 L) of liquefied hydrogen, including unconnected reserves integral to the system. The bulk system terminates at the point where the gas supply, at service pressure, first enters the supply line. The containers are either stationary or portable, and the gas is stored as a cryogenic fluid.

FLAMMABLE GAS. A material which is a gas at 68° F (20° C) or less at 14.7 pounds per square inch atmosphere (psia) (101 kPa) of pressure [a material that has a boiling point of 68° F (20° C) or less at 14.7 psia (101 kPa)] which:

1. Is ignitable at 14.7 psia (101 kPa) when in a mixture of 13 percent or less by volume with air; or
2. Has a flammable range at 14.7 psia (101 kPa) with air of at least 12 percent, regardless of the lower limit.

The limits specified shall be determined at 14.7 psi (101 kPa) of pressure and a temperature of 68° F (20° C) in accordance with ASTM E 681.

FLAMMABLE LIQUEFIED GAS. A liquefied compressed gas which, under a charged pressure, is partially liquid at a temperature of 68° F (20° C) and which is flammable.

METAL HYDRIDE. A generic name for compounds composed of metallic element(s) and hydrogen.

METAL HYDRIDE STORAGE SYSTEM. A closed system consisting of a group of components assembled as a package to contain metal-hydrogen compounds for which there exists an equilibrium condition where the hydrogen-absorbing metal alloy(s), hydrogen gas and the metal-hydrogen compound(s) coexist and where only hydrogen gas is released from the system in normal use.

Section 3503. General Requirements

3503.1 Quantities not exceeding the maximum allowable quantity per control area. The storage and use of flammable gases in amounts not exceeding the maximum allowable quantity per control area indicated in Section 2703.1 shall be in accordance with Sections 2701, 2703, 3501 and 3503.

3503.2 Quantities exceeding the maximum allowable quantity per control area. The storage and use of flammable gases in amounts exceeding the maximum allowable quantity per control area indicated in Section 2703.1 shall be in accordance with Chapter 27 and this chapter.

Section 3504. Storage

3504.1 Indoor storage. Indoor storage of flammable gases in amounts exceeding the maximum allowable quantity per control area indicated in Table 2703.1.1(1), shall be in accordance with Sections 2701, 2703 and 2704, and this chapter.

3504.2 Outdoor storage. Outdoor storage of flammable gases in amounts exceeding the maximum allowable quantity per control area indicated in Table 2703.1.1(3) shall be in accordance with Sections 2701, 2703 and 2704, and this chapter.

Section 3505. Use

3505.1 General. The use of flammable gases in amounts exceeding the maximum allowable quantity per control area indicated in Table 2703.1.1(1) or 2703.1.1(3) shall be in accordance with Sections 2701, 2703 and 2705, and this chapter.

Section 3506. Flammable Cryogenic Fluids

3506.1 General. The storage and use of flammable cryogenic fluids shall be in accordance with Sections 3506.2 through 3506.4.8.3 and Chapter 32.

3506.2 Limitations. Storage of flammable cryogenic fluids in stationary containers outside of buildings is prohibited within the limits established by law as the limits of districts in which such storage is prohibited (see Section 3 of the Sample Ordinance for Adoption of the California Fire Code on page xiii).

3506.3 Above-ground tanks for liquid hydrogen. Aboveground tanks for the storage of liquid hydrogen shall be in accordance with Sections 3506.3 through 3506.3.2.1.

3506.3.2.1 Vacuum level monitoring. A connection shall be provided on the exterior of the vacuum jacket to allow measurement of the pressure within the annular space between the inner and outer vessel. The connection shall be fitted with a bellows-sealed or diaphragm-type valve equipped with a vacuum gauge tube that is shielded to protect against damage from impact.

3506.4 Underground tanks for liquid hydrogen. Underground tanks for the storage of liquid hydrogen shall be in accordance with Sections 3506.4.1 through 3506.4.8.3.

3506.4.1 Construction. Storage tanks for liquid hydrogen shall be designed and constructed in accordance with ASME Boiler and Pressure Vessel Code (Section VIII, Division 1) and shall be vacuum jacketed in accordance with Section 3506.4.8.

3506.4.2 Location. Storage tanks shall be located outside in accordance with the following:

1. Tanks and associated equipment shall be located with respect to foundations and supports of other structures such that the loads carried by the latter cannot be transmitted to the tank.
2. The distance from any part of the tank to the nearest wall of a basement, pit, cellar or lot line shall not be less than 3 feet (914 mm).
3. A minimum distance of 1 foot (305 mm), shell to shell, shall be maintained between underground tanks.

3506.4.3 Depth, cover and fill. The tank shall be buried such that the top of the vacuum jacket is covered with a minimum of 1 foot (305 mm) of earth and with concrete a minimum of 4 inches (102 mm) thick placed over the earthen cover. The concrete shall extend a minimum of 1 foot (305 mm) horizontally beyond the footprint of the tank in all directions. Underground tanks shall be set on firm foundations constructed in accordance with the California Building Code and surrounded with at least 6 inches (152 mm) of noncorrosive inert material, such as sand.

Exception: The vertical extension of the vacuum jacket as required for service connections.

3506.4.4 Anchorage and security. Tanks and systems shall be secured against accidental dislodgement in accordance with this chapter.

3506.4.5 Venting of underground tanks. Vent pipes for underground storage tanks shall be in accordance with Sections 2209.5.4 and 3203.3.

3506.4.6 Underground liquid hydrogen piping. Underground liquid hydrogen piping shall be vacuum jacketed or protected by approved means and designed in accordance with Chapter 32.

3506.4.7 Overfill protection and prevention systems. An approved means or method shall be provided to prevent the overfill of all storage tanks.

3506.4.8 Vacuum jacket construction. The vacuum jacket shall be designed and constructed in accordance with Section VIII of ASME Boiler and Pressure Vessel Code and shall be designed to withstand the anticipated loading, including loading from vehicular traffic, where applicable. Portions of the vacuum jacket installed below grade shall be designed to withstand anticipated soil, seismic and hydrostatic loading.

Section 3507. Metal Hydride Storage Systems

3507.1 General requirements. The storage and use of metal hydride storage systems shall be in accordance with Sections 3501, 3503, 3504, 3505 and 3507. Those portions of the system that are used as a means to store or supply hydrogen shall also comply with Chapters 27 and 30, as applicable.

3507.2 Portable containers or systems. Portable containers or systems shall comply with Sections 3507.2.1 through 3507.2.2.

3507.2.1 Securing containers. Containers, cylinders and tanks shall be secured in accordance with Section 3003.5.3.

3507.2.2 Valves. Valves on containers, cylinders and tanks shall remain closed except when containers are connected to closed systems and ready for use.

I. CFC Chapter 34, Section 3406.2, "Flammable and Combustible Liquid Storage, Use and Handling"

1. Summary

   a. No weeds or extraneous combustible material allowed in the storage or dispensing area.

   b. Open flames and smoking prohibited.

   c. Tanks and containers to be conspicuously marked with name of contents and the words" FLAMMABLE-KEEP FIRE AND FLAME AWAY. KEEP 50 FEET FROM BUILDINGS".

   d. Metal containers for storage of Class 1 and 11 containers to be in accordance with DOTn requirements or shall be of an approved design.

   e. Discharge devices shall not create an internal pressure on container.

   f. Pumping devices or approved self-closing faucets shall not leak and be properly maintained. Individual containers shall not be interconnected and shall be kept closed when not in use.

   g. The capacity of temporary aboveground tanks shall not exceed 10,000 gallons. Tanks to be of single compartment design.

   h. Fill openings shall be equipped with locking closure device. Fill openings shall be separate from vent openings.

   i. Vents shall be provided with a method of normal and emergency venting. Vents to comply with CFC section 3404.2.7.3 and 4.

   j. Tanks containing Class 1 and 11 liquids to be at least 50 feet from buildings or combustible storage.

   k. Tanks shall be provided with top openings only or shall be elevated for gravity discharge (Note: elevated gravity discharge is subject to Fire Agency inspection and approval. Use of a Fire Agency approved pump taking suction from top of tank is preferred).

   l. Tanks with top openings only to be mounted on well-constructed metal legs connected to shoes or runners to stabilize tank if it is to be moved, OR for stationary tanks, on a stable base of timbers or blocks approx. 6" in height that prevents tank from contacting ground.

m. Tanks with top openings only shall have approved pumping device with approved hose. Effective anti-siphoning device is required in pump discharge unless self-closing nozzle provided. Siphons or internal pressure discharge devices shall not be used.

n. Tanks for gravity discharge: Supports to elevate tank for gravity discharge shall be designed to carry all required loads and provide stability.

o. Bottom or end openings for gravity discharge shall have valve adjacent to tank shell which closes automatically in event of fire by an effective heat activated releasing device. Where this valve cannot be operated manually, it shall be supplemented by a second, manually operated, valve. Gravity discharge outlet to have approved hose equipped with a self-closing valve at discharge end of a type that can be padlocked into its hanger.

p. Drainage control or diking required and shall comply with CFC 3404.2.10.

q. Portable fire extinguisher with a minimum 3-A-40 BC rating required.

r. Dispensing from tank vehicle into tanks of motor vehicles or special equipment shall be subject to Fire Agency approval and shall comply with the following:

- Tank vehicle's specific function is to transfer fuel to motor vehicle fuel tanks.
- Dispensing hose to not exceed 100 feet.
- Dispensing nozzle to be of approved type.
- Hose to be on approved reel or compartment provided before tank vehicle is moved.
- Signs on vehicle: no smoking within 25 feet of vehicle or point of refueling.
- Electrical devices and wiring to comply with California Electrical Code.
- Tank vehicle dispensing equipment is only operated by designated trained personnel.
- Provisions for controlling and mitigating unauthorized discharges.
- No dispensing within 50 feet of structures or combustible storage.
- Note that approved grounding or bonding may be required or necessary.
- Vehicles to be in good state of repair, clean, and with no leaks.

- Driver, operator or attendant shall not remain in cab, and shall attend at the truck while filling tank or discharging.
- Motor shall be shut down while making/breaking connections. If loading/unloading done without a power pump, tank vehicle or tractor motor shall be shut down.
- Overfill protection procedure shall be used, so that tanks are not overfilled.
- Tank vehicle to have fire extinguisher with minimum rating of 3-A-40 BC. Extinguisher shall be located 15 feet from truck unloading valve during refueling.

2. CFC Chapter 34, "Flammable and Combustible Liquid Storage, Use and Handling"[3]

Section 3401. General

3401.1 Scope and application. Prevention, control and mitigation of dangerous conditions related to storage, use, dispensing, mixing and handling of flammable and combustible liquids shall be in accordance with Chapter 27 and this chapter.

[California Code of Regulations, Title 19, Division 1, §3.15] Flammable and Combustible Liquids.

Flammable and combustible liquids shall not be placed, stored or handled in any occupancy within the scope of California Code of Regulations, Title 19, Division 1 regulations except as provided in the California Fire Code.

3401.2 Nonapplicability. This chapter shall not apply to liquids as otherwise provided in other laws or regulations or chapters of this code, including:

1. Specific provisions for flammable liquids in motor fuel-dispensing facilities, repair garages, airports and marinas in Chapter 22.
2. Medicines, foodstuffs, cosmetics, and commercial, institutional and industrial products in the same concentration and packaging containing not more than 50 percent by volume of water-miscible liquids and with the remainder of the solution not being flammable, and alcoholic beverages in retail or wholesale sales or storage uses when packaged in individual containers not exceeding 1.3 gallons (5 L).
3. Storage and use of fuel oil in tanks and containers connected to oil-burning equipment. Such storage and use shall be in accordance with Section 603. For abandonment of fuel oil tanks, this chapter applies.
4. Refrigerant liquids and oils in refrigeration systems (see Section 606).
5. Storage and display of aerosol products complying with Chapter 28.

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[3] Note: This information is provided for ease of reference only for construction personnel. Some sections may not apply.

6. Storage and use of liquids that have no fire point when tested in accordance with ASTM D 92.
7. Liquids with a flash point greater than 95° F (35° C) in a water-miscible solution or dispersion with a water and inert (noncombustible) solids content of more than 80 percent by weight, which do not sustain combustion.
8. Liquids without flash points that can be flammable under some conditions, such as certain halogenated hydrocarbons and mixtures containing halogenated hydrocarbons.
9. The storage of distilled spirits and wines in wooden barrels and casks.

3401.3 Referenced documents. The applicable requirements of Chapter 27, other chapters of this code, the California Building Code and the California Mechanical Code pertaining to flammable liquids shall apply.

3401.4 Permits. Permits shall be required as set forth in Sections 105.6 and 105.7.

3401.5 Material classification. Flammable and combustible liquids shall be classified in accordance with the definitions in Section 3402.1.

When mixed with lower flash-point liquids, Class II or III liquids are capable of assuming the characteristics of the lower flash-point liquids. Under such conditions, the appropriate provisions of this chapter for the actual flash point of the mixed liquid shall apply. When heated above their flash points, Class II and III liquids assume the characteristics of Class I liquids. Under such conditions, the appropriate provisions of this chapter for flammable liquids shall apply.

Section 3402. Definitions

3402.1 Definitions. The following words and terms shall, for the purposes of this chapter and as used elsewhere in this code, have the meanings shown herein.

BULK PLANT OR TERMINAL. That portion of a property where flammable or combustible liquids are received by tank vessel, pipelines, tank car or tank vehicle and are stored or blended in bulk for the purpose of distributing such liquids by tank vessel, pipeline, tank car, tank vehicle, portable tank or container.

BULK TRANSFER. The loading or unloading of flammable or combustible liquids from or between tank vehicles, tank cars or storage tanks.

COMBUSTIBLE LIQUID. A liquid having a closed cup flash point at or above 100° F (38° C). Combustible liquids shall be subdivided as follows:

Class II.	Liquids having a closed cup flash point at or above 100° F (38° C) and below 140° F (60° C).
Class IIIA.	Liquids having a closed cup flash point at or above 140° F (60° C) and below 200° F (93° C).
Class IIIB.	Liquids having closed cup flash points at or above 200° F (93° C).

The category of combustible liquids does not include compressed gases or cryogenic fluids.

FIRE POINT. The lowest temperature at which a liquid will ignite and achieve sustained burning when exposed to a test flame in accordance with ASTM D 92.

FLAMMABLE LIQUID. A liquid having a closed cup flash point below 100° F (38° C). Flammable liquids are further categorized into a group known as Class I liquids. The Class I category is subdivided as follows:

Class IA.	Liquids having a flash point below 73° F (23° C) and having a boiling point below 100° F (38° C).
Class IB.	Liquids having a flash point below 73° F (23° C) and having a boiling point at or above 100° F (38° C).
Class IC.	Liquids having a flash point at or above 73° F (23° C) and below 100° F (38° C).

The category of flammable liquids does not include compressed gases or cryogenic fluids.

FLASH POINT. The minimum temperature in degrees Fahrenheit at which a liquid will give off sufficient vapors to form an ignitable mixture with air near the surface or in the container, but will not sustain combustion. The flash point of a liquid shall be determined by appropriate test procedure and apparatus as specified in ASTM D 56, ASTM D 93 or ASTM D 3278.

FUEL LIMIT SWITCH. A mechanism, located on a tank vehicle, that limits the quantity of product dispensed at one time.

LIQUID STORAGE ROOM. A room classified as a Group H-3 occupancy used for the storage of flammable or combustible liquids in a closed condition.

LIQUID STORAGE WAREHOUSE. A building classified as a Group H-2 or H-3 occupancy used for the storage of flammable or combustible liquids in a closed condition.

MOBILE FUELING. The operation of dispensing liquid fuels from tank vehicles into the fuel tanks of motor vehicles. Mobile fueling may also be known by the terms “Mobile fleet fueling,” “Wet fueling” and “Wet hosing.”

PROCESS TRANSFER. The transfer of flammable or combustible liquids between tank vehicles or tank cars and process operations. Process operations may include containers, tanks, piping and equipment.

REFINERY. A plant in which flammable or combustible liquids are produced on a commercial scale from crude petroleum, natural gasoline or other hydrocarbon sources.

REMOTE EMERGENCY SHUTOFF DEVICE. The combination of an operator-carried signaling device and a mechanism on the tank vehicle. Activation of the remote emergency shutoff device sends a signal to the tanker-mounted mechanism and causes fuel flow to cease.

REMOTE SOLVENT RESERVOIR. A liquid solvent container enclosed against evaporative losses to the atmosphere during periods when the container is not being utilized, except for a solvent return opening not larger than 16 square inches (10 322 mm^2). Such return allows pump-cycled used solvent to drain back into the reservoir from a separate solvent sink or work area.

SOLVENT DISTILLATION UNIT. An appliance that receives contaminated flammable or combustible liquids and which distills the contents to remove contaminants and recover the solvents.

TANK, PRIMARY. A listed atmospheric tank used to store liquid. See "Primary containment."

Section 3403. General Requirements

3403.1 Electrical. Electrical wiring and equipment shall be installed and maintained in accordance with Section 605 and the California Electrical Code.

3403.2 Fire protection. Fire protection for the storage, use, dispensing, mixing, handling and on-site transportation of flammable and combustible liquids shall be in accordance with this chapter and applicable sections of Chapter 9.

3403.3 Site assessment. In the event of a spill, leak or discharge from a tank system, a site assessment shall be completed by the owner or operator of such tank system if the fire code official determines that a potential fire or explosion hazard exists. Such site assessments shall be conducted to ascertain potential fire hazards and shall be completed and submitted to the fire department within a time period established by the fire code official, not to exceed 60 days.

3403.4 Spill control and secondary containment. Where the maximum allowable quantity per control area is exceeded, and when required by Section 2704.2, rooms, buildings or areas used for storage, dispensing, use, mixing or handling of Class I, II and IIIA liquids shall be provided with spill control and secondary containment in accordance with Section 2704.2.

3403.5 Labeling and signage. The fire code official is authorized to require warning signs for the purpose of identifying the hazards of storing or using flammable liquids. Signage for identification and warning such as for the inherent hazard of flammable liquids or smoking shall be provided in accordance with this chapter and Sections 2703.5 and 2703.6.

3403.6 Piping systems. Piping systems, and their component parts, for flammable and combustible liquids shall be in accordance with Sections 3403.6.1 through 3403.6.11.

3403.6.1 Nonapplicability. The provisions of Section 3403.6 shall not apply to gas or oil well installations; piping that is integral to stationary or portable engines, including aircraft, watercraft

and motor vehicles; and piping in connection with boilers and pressure vessels regulated by the California Mechanical Code.

3403.6.2 Design, fabrication and installation of piping systems and components. Piping system components shall be designed and fabricated in accordance with the applicable standard listed in Table 3403.6.2 and Chapter 27 of NFPA 30, except as modified by Section 3403.6.2.1.

TABLE 3403.6.2 PIPING STANDARDS

PIPING USE	STANDARD
Power Piping	ASME B31.1
Process Piping	ASME B31.3
Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids	ASME B31.4
Building Services Piping	ASME B31.9

3403.6.2.1 Special materials. Low-melting-point materials (such as aluminum, copper or brass), materials that soften on fire exposure (such as nonmetallic materials) and nonductile material (such as cast iron) shall be acceptable for use underground in accordance with the applicable standard listed in Table 3403.6.2. When such materials are used outdoors in above-ground piping systems or within buildings, they shall be in accordance with the applicable standard listed in Table 3403.6.2 and one of the following:

- Suitably protected against fire exposure.
- Located where leakage from failure would not unduly expose people or structures.
- Located where leakage can be readily controlled by operation of accessible remotely located valves.

In all cases, nonmetallic piping shall be used in accordance with Section 27.4.6 of NFPA 30.

3403.6.3 Testing. Unless tested in accordance with the applicable section of ASME B31.9, piping, before being covered, enclosed or placed in use, shall be hydrostatically tested to 150 percent of the maximum anticipated pressure of the system, or pneumatically tested to 110 percent of the maximum anticipated pressure of the system, but not less than 5 pounds per square inch gauge (psig) (34.47 kPa) at the highest point of the system. This test shall be maintained for a sufficient time period to complete visual inspection of joints and connections. For a minimum of 10 minutes, there shall be no leakage or permanent distortion. Care shall be exercised to ensure that these pressures are not applied to vented storage tanks. Such storage tanks shall be tested independently from the piping.

3403.6.4 Protection from vehicles. Guard posts or other approved means shall be provided to protect piping, valves or fittings subject to vehicular damage in accordance with Section 312.

3403.6.5 Protection from corrosion and galvanic action. Where subject to external corrosion, piping, related fluid-handling components and supports for both underground and above-ground applications shall be fabricated from noncorrosive materials, and coated or provided with corrosion protection. Dissimilar metallic parts that promote galvanic action shall not be joined.

3403.6.6 Valves. Piping systems shall contain a sufficient number of manual control valves and check valves to operate the system properly and to protect the plant under both normal and emergency conditions. Piping systems in connection with pumps shall contain a sufficient number of such valves to control properly the flow of liquids in normal operation and in the event of physical damage or fire exposure.

3403.6.7 Connections. Above-ground tanks with connections located below normal liquid level shall be provided with internal or external isolation valves located as close as practical to the shell of the tank. Except for liquids whose chemical characteristics are incompatible with steel, such valves, when external, and their connections to the tank shall be of steel.

3403.6.8 Piping supports. Piping systems shall be substantially supported and protected against physical damage and excessive stresses arising from settlement, vibration, expansion, contraction or exposure to fire. The supports shall be protected against exposure to fire by one of the following:

1. Draining liquid away from the piping system at a minimum slope of not less than 1 percent.
2. Providing protection with a fire-resistance rating of not less than 2 hours.
3. Other approved methods.

3403.6.9 Flexible joints. Flexible joints shall be listed and approved and shall be installed on underground liquid, vapor and vent piping at all of the following locations:

1. Where piping connects to underground tanks.
2. Where piping ends at pump islands and vent risers.
3. At points where differential movement in the piping can occur.

3403.6.10 Pipe joints. Joints shall be liquid tight and shall be welded, flanged or threaded except that listed flexible connectors are allowed in accordance with Section 3403.6.9. Threaded or flanged joints shall fit tightly by using approved methods and materials for the type of joint. Joints in piping systems used for Class I liquids shall be welded when located in concealed spaces within buildings.

Nonmetallic joints shall be approved and shall be installed in accordance with the manufacturer’s instructions.

Pipe joints that are dependent on the friction characteristics or resiliency of combustible materials for liquid tightness of piping shall not be used in buildings. Piping shall be secured to prevent disengagement at the fitting.

3403.6.11 Bends. Pipe and tubing shall be bent in accordance with ASME B31.9.

Section 3404. Storage

3404.1 General. The storage of flammable and combustible liquids in containers and tanks shall be in accordance with this section and the applicable sections of Chapter 27.

3404.2 Tank storage. The provisions of this section shall apply to:

1. The storage of flammable and combustible liquids in fixed above-ground and underground tanks.
2. The storage of flammable and combustible liquids in fixed above-ground tanks inside of buildings.
3. The storage of flammable and combustible liquids in portable tanks whose capacity exceeds 660 gallons (2498 L).
4. The installation of such tanks and portable tanks.

3404.3 Container and portable tank storage. Storage of flammable and combustible liquids in closed containers that do not exceed 60 gallons (227 L) in individual capacity and portable tanks that do not exceed 660 gallons (2498 L) in individual capacity, and limited transfers incidental thereto, shall comply with Sections 3404.3.1 through 3404.3.8.5.

3404.3.1 Design, construction and capacity of containers and portable tanks. The design, construction and capacity of containers for the storage of Class I, II and IIIA liquids shall be in accordance with this section and Section 9.4 of NFPA 30.

3404.3.2 Liquid storage cabinets. Where other sections of this code require that liquid containers be stored in storage cabinets, such cabinets and storage shall be in accordance with Sections 3404.3.2.1 through 3404.3.2.2.

3404.3.2.1 Design and construction of storage cabinets. Design and construction of liquid storage cabinets shall be in accordance with Sections 3404.3.2.1.1 through 3404.3.2.1.4.

3404.3.2.1.1 Materials. Cabinets shall be listed in accordance with UL 1275, or constructed of approved wood or metal in accordance with the following:

1. Unlisted metal cabinets shall be constructed of steel having a thickness of not less than 0.044 inch (1.12 mm) (18 gage). The cabinet, including the door, shall be double walled with 11/2-inch (38 mm) airspace between the walls. Joints shall be riveted or welded and shall be tight fitting.
2. Unlisted wooden cabinets, including doors, shall be constructed of not less than 1-inch (25 mm) exterior grade plywood. Joints shall be rabbeted and shall be fastened in two directions with wood screws. Door hinges shall be of steel or brass. Cabinets shall be painted with an intumescent-type paint.

3404.3.2.1.2 Labeling. Cabinets shall be provided with a conspicuous label in red letters on contrasting background which reads: FLAMMABLE-KEEP FIRE AWAY.

3404.3.2.1.3 Doors. Doors shall be well fitted, self-closing and equipped with a three-point latch.

3404.3.2.1.4 Bottom. The bottom of the cabinet shall be liquid tight to a height of at least 2 inches (51 mm).

3404.3.2.2 Capacity. The combined total quantity of liquids in a cabinet shall not exceed 120 gallons (454 L).

3404.3.3 Indoor storage. Storage of flammable and combustible liquids inside buildings in containers and portable tanks shall be in accordance with Sections 3404.3.3.1 through 3404.3.3.10.

Exceptions:

1. Liquids in the fuel tanks of motor vehicles, aircraft, boats or portable or stationary engines.
2. The storage of distilled spirits and wines in wooden barrels or casks.

3404.3.3.1 Portable fire extinguishers. Approved portable fire extinguishers shall be provided in accordance with specific sections of this chapter and Section 906.

3404.3.3.2 Incompatible materials. Materials that will react with water or other liquids to produce a hazard shall not be stored in the same room with flammable and combustible liquids in accordance with Section 2703.9.8.

3404.3.3.3 Clear means of egress. Storage of any liquids, including stock for sale, shall not be stored near or be allowed to obstruct physically the route of egress.

3404.3.3.4 Empty containers or portable tank storage. The storage of empty tanks and containers previously used for the storage of flammable or combustible liquids, unless free from explosive vapors, shall be stored as required for filled containers and portable tanks. Portable tanks and containers, when emptied, shall have the covers or plugs immediately replaced in openings.

3404.3.3.5 Shelf storage. Shelving shall be of approved construction, adequately braced and anchored. Seismic requirements shall be in accordance with the California Building Code.

3404.3.3.6 Rack storage. Where storage on racks is allowed elsewhere in this code, a minimum 4-foot-wide (1219 mm) aisle shall be provided between adjacent rack sections and any adjacent storage of liquids. Main aisles shall be a minimum of 8 feet (2438 mm) wide.

3404.3.3.7 Pile or palletized storage. Solid pile and palletized storage in liquid warehouses shall be arranged so that piles are separated from each other by at least 4 feet (1219 mm). Aisles shall

be provided and arranged so that no container or portable tank is more than 20 feet (6096 mm) from an aisle. Main aisles shall be a minimum of 8 feet (2438 mm) wide.

3404.3.3.8 Limited combustible storage. Limited quantities of combustible commodities are allowed to be stored in liquid storage areas where the ordinary combustibles, other than those used for packaging the liquids, are separated from the liquids in storage by a minimum of 8 feet (2438 mm) horizontally, either by open aisles or by open racks, and where protection is provided in accordance with Chapter 9.

3404.3.3.9 Idle combustible pallets. Storage of empty or idle combustible pallets inside an unprotected liquid storage area shall be limited to a maximum pile size of 2,500 square feet (232 m^2) and to a maximum storage height of 6 feet (1829 mm). Storage of empty or idle combustible pallets inside a protected liquid storage area shall comply with NFPA 13. Pallet storage shall be separated from liquid storage by aisles that are at least 8 feet (2438 mm) wide.

3404.3.3.10 Containers in piles. Containers in piles shall be stacked in such a manner as to provide stability and to prevent excessive stress on container walls. Portable tanks stored more than one tier high shall be designed to nest securely, without dunnage. Material-handling equipment shall be suitable to handle containers and tanks safely at the upper tier level.

3404.3.4 Quantity limits for storage. Liquid storage quantity limitations shall comply with Sections 3404.3.4.1 through 3404.3.4.4.

3404.3.4.1 Maximum allowable quantity per control area. For occupancies other than Group M wholesale and retail sales uses, indoor storage of flammable and combustible liquids shall not exceed the maximum allowable quantities per control area indicated in Table 2703.1.1(1) and shall not exceed the additional limitations set forth in this section.

3404.3.4.3 Quantities exceeding limits for control areas. Quantities exceeding those allowed in control areas set forth in Section 3404.3.4.1 shall be in liquid storage rooms or liquid storage warehouses in accordance with Sections 3404.3.7 and 3404.3.8.

3404.3.4.4 Liquids for maintenance and operation of equipment. In all occupancies, quantities of flammable and combustible liquids in excess of 10 gallons (38 L) used for maintenance purposes and the operation of equipment shall be stored in liquid storage cabinets in accordance with Section 3404.3.2. Quantities not exceeding 10 gallons (38 L) are allowed to be stored outside of a cabinet when in approved containers located in private garages or other approved locations.

3404.3.5 Storage in control areas. Storage of flammable and combustible liquids in control areas shall be in accordance with Sections 3404.3.5.1 through 3404.3.5.4.

3404.3.5.1 Basement storage. Class I liquids shall be allowed to be stored in basements in amounts not exceeding the maximum allowable quantity per control area for use-open systems in Table 2703.1.1(1), provided that automatic suppression and other fire protection are provided in accordance with Chapter 9. Class II and IIIA liquids shall also be allowed to be stored in basements, provided that automatic suppression and other fire protection are provided in

accordance with Chapter 9.

3404.3.5.2 Storage pile heights. Containers having less than a 30-gallon (114 L) capacity which contain Class I or II liquids shall not be stacked more than 3 feet (914.4 mm) or two containers high, whichever is greater, unless stacked on fixed shelving or otherwise satisfactorily secured. Containers of Class I or II liquids having a capacity of 30 gallons (114 L) or more shall not be stored more than one container high. Containers shall be stored in an upright position.

3404.3.5.3 Storage distance from ceilings and roofs. Piles of containers or portable tanks shall not be stored closer than 3 feet (914 mm) to the nearest beam, chord, girder or other obstruction, and shall be 3 feet (914 mm) below sprinkler deflectors or discharge orifices of water spray or other overhead fire protection system.

3404.3.5.4 Combustible materials. In areas that are inaccessible to the public, Class I, II and IIIA liquids shall not be stored in the same pile or rack section as ordinary combustible commodities unless such materials are packaged together as kits.

3404.3.6.1 Container type. Containers for Class I liquids shall be metal.

Exception: In sprinklered buildings, an aggregate quantity of 120 gallons (454 L) of water-miscible Class IB and Class IC liquids is allowed in nonmetallic containers, each having a capacity of 16 ounces (0.473 L) or less.

3404.3.6.2 Container capacity. Containers for Class I liquids shall not exceed a capacity of 5 gallons (19 L).

Exception: Metal containers not exceeding 55 gallons (208 L) are allowed to store up to 240 gallons (908 L) of the maximum allowable quantity per control area of Class IB and IC liquids in a control area. The building shall be equipped throughout with an approved automatic sprinkler system in accordance with Table 3404.3.4.1. The containers shall be provided with plastic caps without cap seals and shall be stored upright. Containers shall not be stacked or stored in racks and shall not be located in areas accessible to the public.

3404.3.6.3 Fire protection and storage arrangements. Fire protection and container storage arrangements shall be in accordance with Table 3404.3.6.3(1) or the following:

1. Storage on shelves shall not exceed 6 feet (1829 mm) in height, and shelving shall be metal.
2. Storage on pallets or in piles greater than 4 feet 6 inches (1372 mm) in height, or where the ceiling exceeds 18 feet (5486 mm) in height, shall be protected in accordance with Table 3404.3.6.3(4), and the storage heights and arrangements shall be limited to those specified in Table 3404.3.6.3(2).
3. Storage on racks greater than 4 feet 6 inches (1372 mm) in height, or where the ceiling exceeds 18 feet (5486 mm) in height shall be protected in accordance with Tables 3404.3.6.3(5), 3404.3.6.3(6), and 3404.3.6.3(7) as appropriate, and the storage heights and arrangements shall be limited to those specified in Table 3404.3.6.3(3).

Combustible commodities shall not be stored above flammable and combustible liquids.

TABLE 3404.3.6.3(1) MAXIMUM STORAGE HEIGHT IN CONTROL AREA

TYPE OF LIQUID	NONSPRINKLERED AREA (feet)	SPRINKLERED AREA[a] (feet)	SPRINKLERED WITH IN-RACK PROTECTION[a, b] (feet)
Flammable liquids:			
Class IA	4	4	4
Class IB	4	8	12
Class IC	4	8	12
Combustible liquids:			
Class II	6	8	12
Class IIIA	8	12	16
Class IIIB	8	12	20

For SI: 1 foot = 304.8 mm.

a. In buildings protected by an automatic sprinkler system, the storage height for containers and portable tanks shall not exceed the maximum storage height permitted for the fire protection scheme set forth in NFPA 30 or the maximum storage height demonstrated in a full-scale fire test, whichever is greater. NFPA 30 criteria and fire test results for metallic containers and portable tanks shall not be applied to nonmetallic containers and portable tanks.

Section 3405. Dispensing, Use, Mixing And Handling

3405.1 Scope. Dispensing, use, mixing and handling of flammable liquids shall be in accordance with Section 3403 and this section. Tank vehicle and tank car loading and unloading and other special operations shall be in accordance with Section 3406.

Exception: Containers of organic coatings having no fire point and which are opened for pigmentation are not required to comply with this section.

3405.2 Liquid transfer. Liquid transfer equipment and methods for transfer of Class I, II and IIIA liquids shall be approved and be in accordance with Sections 3405.2.1 through 3405.2.6.

3405.2.1 Pumps. Positive-displacement pumps shall be provided with pressure relief discharging back to the tank, pump suction or other approved location, or shall be provided with interlocks to prevent over-pressure.

3405.2.2 Pressured systems. Where gases are introduced to provide for transfer of Class I liquids, or Class II and III liquids transferred at temperatures at or above their flash points by pressure, only inert gases shall be used. Controls, including pressure relief devices, shall be provided to limit the pressure so that the maximum working pressure of tanks, containers and piping systems cannot be exceeded. Where devices operating through pressure within a tank or container are used, the tank or container shall be a pressure vessel approved for the intended use. Air or oxygen shall not be used for pressurization.

Exception: Air transfer of Class II and III liquids at temperatures below their flash points.

3405.2.3 Piping, hoses and valves. Piping, hoses and valves used in liquid transfer operations shall be approved or listed for the intended use.

3405.2.4 Class I, II and III liquids. Class I liquids or Class II and Class III liquids that are heated up to or above their flash points shall be transferred by one of the following methods:

1. From safety cans complying with UL 30.
2. Through an approved closed piping system.
3. From containers or tanks by an approved pump taking suction through an opening in the top of the container or tank.
4. For Class IB, IC, II and III liquids, from containers or tanks by gravity through an approved self-closing or automatic-closing valve when the container or tank and dispensing operations are provided with spill control and secondary containment in accordance with Section 3403.4. Class IA liquids shall not be dispensed by gravity from tanks.
5. Approved engineered liquid transfer systems.

Exception: Liquids in containers not exceeding a 5.3-gallon (20 L) capacity.

3405.2.5 Manual container filling operations. Class I liquids or Class II and Class III liquids that are heated up to or above their flash points shall not be transferred into containers unless the nozzle and containers are electrically interconnected. Acceptable methods of electrical inter-connection include:

1. Metallic floor plates on which containers stand while filling, when such floor plates are electrically connected to the fill stem; or
2. Where the fill stem is bonded to the container during filling by means of a bond wire.

3405.2.6 Automatic container-filling operations for Class I liquids. Container-filling operations for Class I liquids involving conveyor belts or other automatic-feeding operations shall be designed to prevent static accumulations.

3405.3 Use, dispensing and mixing inside of buildings. Indoor use, dispensing and mixing of flammable and combustible liquids shall be in accordance with Sections 3405.2 and 3405.3.1 through 3405.3.5.3.

3405.3.1 Closure of mixing or blending vessels. Vessels used for mixing or blending of Class I liquids and Class II or III liquids heated up to or above their flash points shall be provided with self-closing, tight-fitting, noncombustible lids that will control a fire within such vessel.

Exception: Where such devices are impractical, approved automatic or manually controlled fire-extinguishing devices shall be provided.

3405.3.2 Bonding of vessels. Where differences of potential could be created, vessels containing Class I liquids or liquids handled at or above their flash points shall be electrically connected by bond wires, ground cables, piping or similar means to a static grounding system to maintain equipment at the same electrical potential to prevent sparking.

3405.3.3 Heating, lighting and cooking appliances. Heating, lighting and cooking appliances which utilize Class I liquids shall not be operated within a building or structure.

Exception: Operation in single-family dwellings.

3405.3.4 Location of processing vessels. Processing vessels shall be located with respect to distances to lot lines of adjoining property which can be built on, in accordance with Tables 3405.3.4(1) and 3405.3.4(2).

Exception: Where the exterior wall facing the adjoining lot line is a blank wall having a fire-resistance rating of not less than 4 hours, the fire code official is authorized to modify the distances. The distance shall not be less than that set forth in the California Building Code, and when Class IA or unstable liquids are involved, explosion control shall be provided in accordance with Section 911.

TABLE 3405.3.4(1) SEPARATION OF PROCESSING VESSELS FROM LOT LINES

PROCESSING VESSELS WITH EMERGENCY RELIEF VENTING	LOCATION[a]	
	Stable liquids	Unstable liquids
Not in excess of 2.5 psig	Table 3405.3.4(2)	2.5 times Table 3405.3.4(2)
Over 2.5 psig	1.5 times Table 3405.3.4(2)	4 times Table 3405.3.4(2)

For SI: 1 pound per square inch gauge = 6.895 kPa.

a. Where protection of exposures by a public fire department or private fire brigade capable of providing cooling water streams on structures is not provided, distances shall be doubled.

TABLE 3405.3.4(2) REFERENCE TABLE FOR USE WITH TABLE 3405.3.4(1)

TANK CAPACITY (gallons)	MINIMUM DISTANCE FROM LOT LINE OF A LOT WHICH IS OR CAN BE BUILT UPON, INCLUDING THE OPPOSITE SIDE OF A PUBLIC WAY (feet)	MINIMUM DISTANCE FROM NEAREST SIDE OF ANY PUBLIC WAY OR FROM NEAREST IMPORTANT BUILDING ON THE SAME PROPERTY (feet)
275 or less	5	5
276 to 750	10	5
751 to 12,000	15	5
12,001 to 30,000	20	5
30,001 to 50,000	30	10
50,001 to 100,000	50	15
100,001 to 500,000	80	25
500,001 to 1,000,000	100	35
1,000,001 to 2,000,000	135	45
2,000,001 to 3,000,000	165	55
3,000,001 or more	175	60

For SI: 1 foot = 304.8 mm, 1 gallon = 3.785 L.

3405.3.5 Quantity limits for use. Liquid use quantity limitations shall comply with Sections 3405.3.5.1 through 3405.3.5.3.

3405.3.5.1 Maximum allowable quantity per control area. Indoor use, dispensing and mixing of flammable and combustible liquids shall not exceed the maximum allowable quantity per control area indicated in Table 2703.1.1(1) and shall not exceed the additional limitations set forth in Section 3405.3.5.

Exception: Cleaning with Class I, II and IIIA liquids shall be in accordance with Section 3405.3.6.

Use of hazardous production material flammable and combustible liquids in Group H-5 occupancies shall be in accordance with Chapter 18.

3405.3.5.2 Occupancy quantity limits. The following limits for quantities of flammable and combustible liquids used, dispensed or mixed based on occupancy classification shall not be exceeded:

Exception: Cleaning with Class I, II, or IIIA liquids shall be in accordance with Section 3405.3.6.

1. Group A occupancies: Quantities in Group A occupancies shall not exceed that necessary for demonstration, treatment, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 2703.1.1(1).
2. Group B occupancies: Quantities in drinking, dining, office and school uses within Group B occupancies shall not exceed that necessary for demonstration, treatment, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 2703.1.1(1).
3. Group E occupancies: Quantities in Group E occupancies shall not exceed that necessary for demonstration, treatment, laboratory work, maintenance purposes and operation of equipment and shall not exceed quantities set forth in Table 2703.1.1(1).
4. Group F occupancies: Quantities in dining, office and school uses within Group F occupancies shall not exceed that necessary for demonstration, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 2703.1.1(1).
5. Group I occupancies: Quantities in Group I occupancies shall not exceed that necessary for demonstration, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 2703.1.1(1).
6. Group M occupancies: Quantities in dining, office and school uses within Group M occupancies shall not exceed that necessary for demonstration, laboratory work, maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 2703.1.1(1).
7. Group R occupancies: Quantities in Group R occupancies shall not exceed that necessary for maintenance purposes and operation of equipment, and shall not exceed quantities set forth in Table 2703.1.1(1).

8. Group S occupancies: Quantities in dining and office uses within Group S occupancies shall not exceed that necessary for demonstration, laboratory work, maintenance purposes and operation of equipment and shall not exceed quantities set forth in Table 2703.1.1(1).

3405.3.5.3 Quantities exceeding limits for control areas. Quantities exceeding the maximum allowable quantity per control area indicated in Sections 3405.3.5.1 and 3405.3.5.2 shall be in accordance with the following:

1. For open systems, indoor use, dispensing and mixing of flammable and combustible liquids shall be within a room or building complying with the California Building Code and Sections 3405.3.7.1 through 3405.3.7.5.
2. For closed systems, indoor use, dispensing and mixing of flammable and combustible liquids shall be within a room or building complying with the California Building Code and Sections 3405.3.7 through 3405.3.7.4 and 3405.3.7.6.

3405.3.6 Cleaning with flammable and combustible liquids. Cleaning with Class I, II and IIIA liquids shall be in accordance with Sections 3405.3.6.1 through 3405.3.6.2.7.

Exceptions:
1. Dry cleaning shall be in accordance with Chapter 12.
2. Spray-nozzle cleaning shall be in accordance with Section 1503.3.5.

3405.3.6.1 Cleaning operations. Class IA liquids shall not be used for cleaning. Cleaning with Class IB, IC or II liquids shall be conducted as follows:

1. In a room or building in accordance with Section 3405.3.7; or
2. In a machine listed and approved for the purpose in accordance with Section 3405.3.6.2.

Exception: Materials used in commercial and industrial process-related cleaning operations in accordance with other provisions of this code and not involving facilities maintenance cleaning operations.

3405.3.6.2 Listed and approved machines. Parts cleaning and degreasing conducted in listed and approved machines in accordance with Section 3405.3.6.1 shall be in accordance with Sections 3405.3.6.2.1 through 3405.3.6.2.7.

3405.3.6.2.1 Solvents. Solvents shall be classified and shall be compatible with the machines within which they are used.

3405.3.6.2.2 Machine capacities. The quantity of solvent shall not exceed the listed design capacity of the machine for the solvent being used with the machine.

3405.3.6.2.3 Solvent quantity limits. Solvent quantities shall be limited as follows:

1. Machines without remote solvent reservoirs shall be limited to quantities set forth in Section 3405.3.5.
2. Machines with remote solvent reservoirs using Class I liquids shall be limited to quantities set forth in Section 3405.3.5.
3. Machines with remote solvent reservoirs using Class II liquids shall be limited to 35 gallons (132 L) per machine. The total quantities shall not exceed an aggregate of 240 gallons (908 L) per control area in buildings not equipped throughout with an approved automatic sprinkler system and an aggregate of 480 gallons (1817 L) per control area in buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1.
4. Machines with remote solvent reservoirs using Class IIIA liquids shall be limited to 80 gallons (303 L) per machine.

3405.3.6.2.4 Immersion soaking of parts. Work areas of machines with remote solvent reservoirs shall not be used for immersion soaking of parts.

3405.3.6.2.5 Separation. Multiple machines shall be separated from each other by a distance of not less than 30 feet (9144 mm) or by a fire barrier with a minimum 1-hour fire-resistance rating.

3405.3.6.2.6 Ventilation. Machines shall be located in areas adequately ventilated to prevent accumulation of vapors.

3405.3.6.2.7 Installation. Machines shall be installed in accordance with their listings.

3405.3.7 Rooms or buildings for quantities exceeding the maximum allowable quantity per control area. Where required by Section 3405.3.5.3 or 3405.3.6.1, rooms or buildings used for use, dispensing or mixing of flammable and combustible liquids shall be in accordance with Sections 3405.3.7.1 through 3405.3.7.6.3.

3405.3.7.1 Construction, location and fire protection. Rooms or buildings classified in accordance with the California Building Code as Group H-2 or H-3 occupancies based on use, dispensing or mixing of flammable or combustible liquids shall be constructed in accordance with the California Building Code.

3405.3.7.2 Basements. In rooms or buildings classified in accordance with the California Building Code as Group H-2 or H-3, dispensing or mixing of flammable or combustible liquids shall not be conducted in basements.

3405.3.7.3 Fire protection. Rooms or buildings classified in accordance with the California Building Code as Group H-2 or H-3 occupancies shall be equipped with an approved automatic fire-extinguishing system in accordance with Chapter 9.

3405.3.7.4 Doors. Interior doors to rooms or portions of such buildings shall be self-closing fire doors in accordance with the California Building Code.

3405.3.7.5 Open systems. Use, dispensing and mixing of flammable and combustible liquids in open systems shall be in accordance with Sections 3405.3.7.5.1 through 3405.3.7.5.3.

3405.3.7.5.1 Ventilation. Continuous mechanical ventilation shall be provided at a rate of not less than 1 cubic foot per minute per square foot [0.00508 $m^3/(s \cdot m^2)$] of floor area over the design area. Provisions shall be made for introduction of makeup air in such a manner to include all floor areas or pits where vapors can collect. Local or spot ventilation shall be provided when needed to prevent the accumulation of hazardous vapors. Ventilation system design shall comply with the California Building Code and California Mechanical Code.

Exception: Where natural ventilation can be shown to be effective for the materials used, dispensed or mixed.

3405.3.7.5.2 Explosion control. Explosion control shall be provided in accordance with Section 911.

3405.3.7.5.3 Spill control and secondary containment. Spill control shall be provided in accordance with Section 3403.4 where Class I, II or IIIA liquids are dispensed into containers exceeding a 1.3-gallon (5 L) capacity or mixed or used in open containers or systems exceeding a 5.3-gallon (20 L) capacity. Spill control and secondary containment shall be provided in accordance with Section 3403.4 when the capacity of an individual container exceeds 55 gallons (208 L) or the aggregate capacity of multiple containers or tanks exceeds 100 gallons (378.5 L).

3405.3.7.6 Closed systems. Use or mixing of flammable or combustible liquids in closed systems shall be in accordance with Sections 3405.3.7.6.1 through 3405.3.7.6.3.

3405.3.7.6.1 Ventilation. Closed systems designed to be opened as part of normal operations shall be provided with ventilation in accordance with Section 3405.3.7.5.1.

3405.3.7.6.2 Explosion control. Explosion control shall be provided when an explosive environment can occur as a result of the mixing or use process. Explosion control shall be designed in accordance with Section 911.

Exception: When process vessels are designed to contain fully the worst-case explosion anticipated within the vessel under process conditions considering the most likely failure.

3405.3.7.6.3 Spill control and secondary containment. Spill control shall be provided in accordance with Section 3403.4 when flammable or combustible liquids are dispensed into containers exceeding a 1.3-gallon (5 L) capacity or mixed or used in open containers or systems exceeding a 5.3-gallon (20 L) capacity. Spill control and secondary containment shall be provided in accordance with Section 3403.4 when the capacity of an individual container exceeds 55 gallons (208 L) or the aggregate capacity of multiple containers or tanks exceeds 1,000 gallons (3785 L).
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3405.3.8 Use, dispensing and handling outside of buildings. Outside use, dispensing and handling shall be in accordance with Sections 3405.3.8.1 through 3405.3.8.4.

Dispensing of liquids into motor vehicle fuel tanks at motor fuel-dispensing facilities shall be in accordance with Chapter 22.

3405.3.8.1 Spill control and drainage control. Outside use, dispensing and handling areas shall be provided with spill control as set forth in Section 3403.4.

3405.3.8.2 Location on property. Dispensing activities which exceed the quantities set forth in Table 3405.3.8.2 shall not be conducted within 15 feet (4572 mm) of buildings or combustible materials or within 25 feet (7620 mm) of building openings, lot lines, public streets, public alleys or public ways. Dispensing activities that exceed the quantities set forth in Table 3405.3.8.2 shall not be conducted within 15 feet (4572 mm) of storage of Class I, II or III liquids unless such liquids are stored in tanks which are listed and labeled as 2-hour protected tank assemblies in accordance with UL 2085.

Exceptions:

1. The requirements shall not apply to areas where only the following are dispensed: Class III liquids; liquids that are heavier than water; water-miscible liquids; and liquids with viscosities greater than 10,000 centipoise (cp) (10 Pa · s).
2. Flammable and combustible liquid dispensing in refineries, chemical plants, process facilities, gas and crude oil production facilities and oil blending and packaging facilities, terminals and bulk plants.

TABLE 3405.3.8.2 MAXIMUM ALLOWABLE QUANTITIES FOR DISPENSING OF FLAMMABLE AND COMBUSTIBLE LIQUIDS IN OUTDOOR CONTROL AREAS[a,b,c]

CLASS OF LIQUID	QUANTITY (gallons)
Flammable	
Class IA	10
Class IB	15
Class IC	20
Combination Class IA, IB and IC	30[c]
Combustible	
Class II	30
Class IIIA	80
Class IIIB	3,300

For SI: 1 gallon = 3.785 L.

a. For definition of “Outdoor Control Area,” see Section 2702.1.

b. The fire code official is authorized to impose special conditions regarding locations, types of containers, dispensing units, fire control measures and other factors involving fire safety.

c. Containing not more than the maximum allowable quantity per control area of each individual class.

3405.3.8.3 Location of processing vessels. Processing vessels shall be located with respect to distances to lot lines which can be built on in accordance with Table 3405.3.4(1).

Exception: In refineries and distilleries.

3405.3.8.4 Weather protection. Weather protection for outdoor use shall be in accordance with Section 2705.3.9.

3405.4 Solvent distillation units. Solvent distillation units shall comply with Sections 3405.4.1 through 3405.4.9.

3405.4.1 Unit with a capacity of 60 gallons or less. Solvent distillation units used to recycle Class I, II or IIIA liquids having a distillation chamber capacity of 60 gallons (227 L) or less shall be listed, labeled and installed in accordance with Section 3405.4 and UL 2208.

Exceptions:

1. Solvent distillation units installed in dry cleaning plants in accordance with Chapter 12.
2. Solvent distillation units used in continuous through-put industrial processes where the source of heat is remotely supplied using steam, hot water, oil or other heat transfer fluids, the temperature of which is below the auto-ignition point of the solvent.
3. Solvent distillation units listed for and used in laboratories.
4. Approved research, testing and experimental processes.

3405.4.2 Units with a capacity exceeding 60 gallons. Solvent distillation units used to recycle Class I, II or IIIA liquids, having a distillation chamber capacity exceeding 60 gallons (227 L) shall be used in locations that comply with the use and mixing requirements of Section 3405 and other applicable provisions in this chapter.

3405.4.3 Prohibited processing. Class I, II and IIIA liquids also classified as unstable (reactive) shall not be processed in solvent distillation units.

Exception: Appliances listed for the distillation of unstable (reactive) solvents.

3405.4.4 Labeling. A permanent label shall be affixed to the unit by the manufacturer. The label shall indicate the capacity of the distillation chamber, and the distance the unit shall be placed away from sources of ignition. The label shall indicate the products for which the unit has been listed for use or refer to the instruction manual for a list of the products.

3405.4.5 Manufacturer’s instruction manual. An instruction manual shall be provided. The manual shall be readily available for the user and the fire code official. The manual shall include

installation, use and servicing instructions. It shall identify the liquids for which the unit has been listed for distillation purposes along with each liquid's flash point and auto-ignition temperature. For units with adjustable controls, the manual shall include directions for setting the heater temperature for each liquid to be instilled.

3405.4.6 Location. Solvent distillation units shall be used in locations in accordance with the listing. Solvent distillation units shall not be used in basements.

3405.4.7 Storage of liquids. Distilled liquids and liquids awaiting distillation shall be stored in accordance with Section 3404.

3405.4.8 Storage of residues. Hazardous residue from the distillation process shall be stored in accordance with Section 3404 and Chapter 27.

3405.4.9 Portable fire extinguishers. Approved portable fire extinguishers shall be provided in accordance with Section 906. At least one portable fire extinguisher having a rating of not less than 40-B shall be located not less than 10 feet (3048 mm) or more than 30 feet (9144 mm) from any solvent distillation unit.

3405.5 Alcohol-based hand rubs classified as Class I or II liquids. The use of wall-mounted dispensers containing alcohol-based hand rubs classified as Class I or II liquids shall be in accordance with all of the following:

1. The maximum capacity of each dispenser shall be 68 ounces (2 L).
2. The minimum separation between dispensers shall be 48 inches (1219 mm).
3. The dispensers shall not be installed directly adjacent to, directly above or below an electrical receptacle, switch, appliance, device or other ignition source. The wall space between the dispenser and the floor shall remain clear and unobstructed.
4. Dispensers shall be mounted so that the bottom of the dispenser is a minimum of 42 inches (1067 mm) and a maximum of 48 inches (1219 mm) above the finished floor.
5. Dispensers shall not release their contents except when the dispenser is manually activated.
6. Storage and use of alcohol-based hand rubs shall be in accordance with the applicable provisions of Sections 3404 and 3405.
7. Dispensers installed in occupancies with carpeted floors shall only be allowed in smoke compartments or fire areas equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1 or 903.3.1.2.

Section 3406. Special Operations

3406.1 General. This section shall cover the provisions for special operations which include, but are not limited to, storage, use, dispensing, mixing or handling of flammable and combustible liquids. The following special operations shall be in accordance with Sections 3401, 3403, 3404 and 3405, except as provided in Section 3406.

1. Storage and dispensing of flammable and combustible liquids on farms and construction sites.
2. Well drilling and operating.
3. Bulk plants or terminals.
4. Bulk transfer and process transfer operations utilizing tank vehicles and tank cars.
5. Tank vehicles and tank vehicle operation.
6. Refineries.
7. Vapor recovery and vapor-processing systems.

3406.2 Storage and dispensing of flammable and combustible liquids on farms and construction sites. Permanent and temporary storage and dispensing of Class I and II liquids for private use on farms and rural areas and at construction sites, earth-moving projects, gravel pits or borrow pits shall be in accordance with Sections 3406.2.1 through 3406.2.8.1.

Exception: Storage and use of fuel oil and containers connected with oil-burning equipment regulated by Section 603 and the California Mechanical Code.

3406.2.1 Combustibles and open flames near tanks. Storage areas shall be kept free from weeds and extraneous combustible material. Open flames and smoking are prohibited in flammable or combustible liquid storage areas.

3406.2.2 Marking of tanks and containers. Tanks and containers for the storage of liquids above ground shall be conspicuously marked with the name of the product which they contain and the words: FLAMMABLE-KEEP FIRE AND FLAME AWAY. Tanks shall bear the additional marking: KEEP 50 FEET FROM BUILDINGS.

3406.2.3 Containers for storage and use. Metal containers used for storage of Class I or II liquids shall be in accordance with DOTn requirements or shall be of an approved design.

Discharge devices shall be of a type that do not develop an internal pressure on the container. Pumping devices or approved self-closing faucets used for dispensing liquids shall not leak and shall be well-maintained. Individual containers shall not be interconnected and shall be kept closed when not in use.

Containers stored outside of buildings shall be in accordance with Section 3404 and the California Building Code.

3406.2.4 Permanent and temporary tanks. The capacity of permanent above-ground tanks containing Class I or II liquids shall not exceed 1,100 gallons (4164 L). The capacity of temporary above-ground tanks containing Class I or II liquids shall not exceed 10,000 gallons (37 854 L). Tanks shall be of the single-compartment design.

Exception: Permanent above-ground tanks of greater capacity which meet the requirements of Section 3404.2.

3406.2.5 Type of tank. Tanks shall be provided with top openings only or shall be elevated for gravity discharge.

3406.2.6 Spill control drainage control and diking. Indoor storage and dispensing areas shall be provided with spill control and drainage control as set forth in Section 3403.4. Outdoor storage areas shall be provided with drainage control or diking as set forth in Section 3404.2.10.

3406.2.7 Portable fire extinguishers. Portable fire extinguishers with a minimum rating of 20-B:C and complying with Section 906 shall be provided where required by the fire code official.

3406.2.8 Dispensing from tank vehicles. Where approved, liquids used as fuels are allowed to be transferred from tank vehicles into the tanks of motor vehicles or special equipment, provided:

1. The tank vehicle's specific function is that of supplying fuel to motor vehicle fuel tanks.
2. The dispensing hose does not exceed 100 feet (30 480 mm) in length.
3. The dispensing nozzle is an approved type.
4. The dispensing hose is properly placed on an approved reel or in a compartment provided before the tank vehicle is moved.
5. Signs prohibiting smoking or open flames within 25 feet (7620 mm) of the vehicle or the point of refueling are prominently posted on the tank vehicle.
6. Electrical devices and wiring in areas where fuel dispensing is conducted are in accordance with the California Electrical Code.
7. Tank vehicle-dispensing equipment is operated only by designated personnel who are trained to handle and dispense motor fuels.
8. Provisions are made for controlling and mitigating unauthorized discharges.

3406.3 Well drilling and operating. Wells for oil and natural gas shall be drilled and operated in accordance with Sections 3406.3.1 through 3406.3.8.

3406.3.1 Location. The location of wells shall comply with Sections 3406.3.1.1 through 3406.3.1.3.2.

3406.3.1.1 Storage tanks and sources of ignition. Storage tanks or boilers, fired heaters, open-flame devices or other sources of ignition shall not be located within 25 feet (7620 mm) of well heads. Smoking is prohibited at wells or tank locations except as designated and in approved posted areas.

Exception: Engines used in the drilling, production and serving of wells.

3406.3.1.2 Streets and railways. Wells shall not be drilled within 75 feet (22 860 mm) of any dedicated public street, highway or nearest rail of an operating railway.

3406.3.1.3 Buildings. Wells shall not be drilled within 100 feet (30 480 mm) of buildings not necessary to the operation of the well.

3406.3.2 Waste control. Control of waste materials associated with wells shall comply with Sections 3406.3.2.1 and 3406.3.2.2.

3406.3.2.1 Discharge on a street or water channel. Liquids containing crude petroleum or its products shall not be discharged into or on streets, highways, drainage canals or ditches, storm drains or flood control channels.

3406.3.2.2 Discharge and combustible materials on ground. The surface of the ground under, around or near wells, pumps, boilers, oil storage tanks or buildings shall be kept free from oil, waste oil, refuse or waste material.

3406.3.3 Sumps. Sumps associated with wells shall comply with Sections 3406.3.3.1 through 3406.3.3.3.

3406.3.3.1 Maximum width. Sumps or other basins for the retention of oil or petroleum products shall not exceed 12 feet (3658 mm) in width.

3406.3.3.2 Backfilling. Sumps or other basins for the retention of oil or petroleum products larger than 6 feet by 6 feet by 6 feet (1829 mm by 1829 mm by 1829 mm) shall not be maintained longer than 60 days after the cessation of drilling operations.

3406.3.3.3 Security. Sumps, diversion ditches and depressions used as sumps shall be securely fenced or covered.

3406.3.4 Prevention of blowouts. Protection shall be provided to control and prevent the blowout of a well. Protection equipment shall meet federal, state and other applicable jurisdiction requirements.

3406.3.5 Storage tanks. Storage of flammable or combustible liquids in tanks shall be in accordance with Section 3404. Oil storage tanks or groups of tanks shall have posted in a conspicuous place, on or near such tank or tanks, an approved sign with the name of the owner or operator, or the lease number and the telephone number where a responsible person can be reached at any time.

3406.3.6 Soundproofing. Where soundproofing material is required during oil field operations, such material shall be noncombustible.

3406.3.7 Signs. Well locations shall have posted in a conspicuous place on or near such tank or tanks an approved sign with the name of the owner or operator, name of the lessee or the lease number, the well number and the telephone number where a responsible person can be reached at any time. Such signs shall be maintained on the premises from the time materials are delivered for drilling purposes until the well is abandoned.

3406.3.8 Field-loading racks. Field-loading racks shall be in accordance with Section 3406.5.

3406.4 Bulk plants or terminals. Portions of properties where flammable and combustible liquids are received by tank vessels, pipelines, tank cars or tank vehicles and which are stored or blended in bulk for the purpose of distributing such liquids by tank vessels, pipelines, tanks cars, tank vehicles or containers shall be in accordance with Sections 3406.4.1 through 3406.4.10.4.

3406.4.1 Building construction. Buildings shall be constructed in accordance with the California Building Code.

3406.4.2 Means of egress. Rooms in which liquids are stored, used or transferred by pumps shall have means of egress arranged to prevent occupants from being trapped in the event of fire.

3406.4.3 Heating. Rooms in which Class I liquids are stored or used shall be heated only by means not constituting a source of ignition, such as steam or hot water. Rooms containing heating appliances involving sources of ignition shall be located and arranged to prevent entry of flammable vapors.

3406.4.4 Ventilation. Ventilation shall be provided for rooms, buildings and enclosures in which Class I liquids are pumped, used or transferred. Design of ventilation systems shall consider the relatively high specific gravity of the vapors. When natural ventilation is used, adequate openings in outside walls at floor level, unobstructed except by louvers or coarse screens, shall be provided. When natural ventilation is inadequate, mechanical ventilation shall be provided in accordance with the California Mechanical Code.

3406.4.5 Storage. Storage of Class I, II and IIIA liquids in bulk plants shall be in accordance with the applicable provisions of Section 3404.

3406.4.6 Overfill protection of Class I and II liquids. Manual and automatic systems shall be provided to prevent overfill during the transfer of Class I and II liquids from mainline pipelines and marine vessels in accordance with API 2350.

3406.4.7 Wharves. This section shall apply to all wharves, piers, bulkheads and other structures over or contiguous to navigable water having a primary function of transferring liquid cargo in bulk between shore installations and tank vessels, ships, barges, lighter boats or other mobile floating craft.

Exception: Marine motor fuel-dispensing facilities in accordance with Chapter 22.

3406.4.8 Sources of ignition. Class I, II or IIIA liquids shall not be used, drawn or dispensed where flammable vapors can reach a source of ignition. Smoking shall be prohibited except in designated locations. “No Smoking” signs complying with Section 310 shall be conspicuously posted where a hazard from flammable vapors is normally present.

3406.4.9 Drainage control. Loading and unloading areas shall be provided with drainage control in accordance with Section 3404.2.10.

3406.4.10 Fire protection. Fire protection shall be in accordance with Chapter 9 and Sections 3406.4.10.1 through 3406.4.10.4.

3406.4.10.1 Portable fire extinguishers. Portable fire extinguishers with a rating of not less than 20-B and complying with Section 906 shall be located within 75 feet (22 860 mm) of hose connections, pumps and separator tanks.

3406.4.10.2 Fire hoses. Where piped water is available, ready-connected fire hose in a size appropriate for the water supply shall be provided in accordance with Section 905 so that manifolds where connections are made and broken can be reached by at least one hose stream.

3406.4.10.3 Obstruction of equipment. Material shall not be placed on wharves in such a manner that would obstruct access to fire-fighting equipment or important pipeline control valves.

3406.4.10.4 Fire apparatus access. Where the wharf is accessible to vehicular traffic, an unobstructed fire apparatus access road to the shore end of the wharf shall be maintained in accordance with Chapter 5.

3406.5 Bulk transfer and process transfer operations. Bulk transfer and process transfer operations shall be approved and be in accordance with Sections 3406.5.1 through 3406.5.4.5. Motor fuel-dispensing facilities shall comply with Chapter 22.

3406.4.1 Building construction. Buildings shall be constructed in accordance with the California Building Code.

3406.4.2 Means of egress. Rooms in which liquids are stored, used or transferred by pumps shall have means of egress arranged to prevent occupants from being trapped in the event of fire.

3406.4.3 Heating. Rooms in which Class I liquids are stored or used shall be heated only by means not constituting a source of ignition, such as steam or hot water. Rooms containing heating appliances involving sources of ignition shall be located and arranged to prevent entry of flammable vapors.

3406.4.4 Ventilation. Ventilation shall be provided for rooms, buildings and enclosures in which Class I liquids are pumped, used or transferred. Design of ventilation systems shall consider the relatively high specific gravity of the vapors. When natural ventilation is used, adequate openings in outside walls at floor level, unobstructed except by louvers or coarse screens, shall be provided. When natural ventilation is inadequate, mechanical ventilation shall be provided in accordance with the California Mechanical Code.

3406.4.5 Storage. Storage of Class I, II and IIIA liquids in bulk plants shall be in accordance with the applicable provisions of Section 3404.

3406.4.6 Overfill protection of Class I and II liquids. Manual and automatic systems shall be provided to prevent overfill during the transfer of Class I and II liquids from mainline pipelines and marine vessels in accordance with API 2350.

3406.4.7 Wharves. This section shall apply to all wharves, piers, bulkheads and other structures over or contiguous to navigable water having a primary function of transferring liquid cargo in bulk between shore installations and tank vessels, ships, barges, lighter boats or other mobile floating craft.

Exception: Marine motor fuel-dispensing facilities in accordance with Chapter 22.

3406.4.8 Sources of ignition. Class I, II or IIIA liquids shall not be used, drawn or dispensed where flammable vapors can reach a source of ignition. Smoking shall be prohibited except in designated locations. “No Smoking” signs complying with Section 310 shall be conspicuously posted where a hazard from flammable vapors is normally present.

3406.4.9 Drainage control. Loading and unloading areas shall be provided with drainage control in accordance with Section 3404.2.10.

3406.4.10 Fire protection. Fire protection shall be in accordance with Chapter 9 and Sections 3406.4.10.1 through 3406.4.10.4.

3406.4.10.1 Portable fire extinguishers. Portable fire extinguishers with a rating of not less than 20-B and complying with Section 906 shall be located within 75 feet (22 860 mm) of hose connections, pumps and separator tanks.

3406.4.10.2 Fire hoses. Where piped water is available, ready-connected fire hose in a size appropriate for the water supply shall be provided in accordance with Section 905 so that manifolds where connections are made and broken can be reached by at least one hose stream.

3406.4.10.3 Obstruction of equipment. Material shall not be placed on wharves in such a manner that would obstruct access to fire-fighting equipment or important pipeline control valves.

3406.4.10.4 Fire apparatus access. Where the wharf is accessible to vehicular traffic, an unobstructed fire apparatus access road to the shore end of the wharf shall be maintained in accordance with Chapter 5.

3406.5 Bulk transfer and process transfer operations. Bulk transfer and process transfer operations shall be approved and be in accordance with Sections 3406.5.1 through 3406.5.4.5. Motor fuel-dispensing facilities shall comply with Chapter 22.

3406.5.1 General. The provisions of Sections 3406.5.1.1 through 3406.5.1.18 shall apply to bulk transfer and process transfer operations; Sections 3406.5.2 and 3406.5.2.1 shall apply to bulk transfer operations; Sections 3406.5.3 through 3406.5.3.3 shall apply to process transfer operations and Sections 3406.5.4 through 3406.5.4.5 shall apply to dispensing from tank vehicles and tank cars.

3406.5.1.1 Location. Bulk transfer and process transfer operations shall be conducted in approved locations. Tank cars shall be unloaded only on private sidings or railroad-siding facilities equipped for transferring flammable or combustible liquids. Tank vehicle and tank car transfer facilities shall be separated from buildings, above-ground tanks, combustible materials, lot lines, public streets, public alleys or public ways by a distance of 25 feet (7620 mm) for Class I liquids and 15 feet (4572 mm) for Class II and III liquids measured from the nearest position of any loading or unloading valve. Buildings for pumps or shelters for personnel shall be considered part of the transfer facility.

3406.5.1.2 Weather protection canopies. Where weather protection canopies are provided, they shall be constructed in accordance with Section 2704.13. Weather protection canopies shall not be located within 15 feet (4572 mm) of a building or combustible material or within 25 feet (7620 mm) of building openings, lot lines, public streets, public alleys or public ways.

3406.5.1.3 Ventilation. Ventilation shall be provided to prevent accumulation of vapors in accordance with Section 3405.3.7.5.1.

3406.5.1.4 Sources of ignition. Sources of ignition shall be controlled or eliminated in accordance with Section 2703.7.

3406.5.1.5 Spill control and secondary containment. Areas where transfer operations are located shall be provided with spill control and secondary containment in accordance with Section 3403.4. The spill control and secondary containment system shall have a design capacity capable of containing the capacity of the largest tank compartment located in the area where transfer operations are conducted. Containment of the rainfall volume specified in Section 2704.2.2.6 is not required.

3406.5.1.6 Fire protection. Fire protection shall be in accordance with Section 3403.2.

3406.5.1.7 Static protection. Static protection shall be provided to prevent the accumulation of static charges during transfer operations. Bonding facilities shall be provided during the transfer through open domes where Class I liquids are transferred, or where Class II and III liquids are transferred into tank vehicles or tank cars which could contain vapors from previous cargoes of Class I liquids.

Protection shall consist of a metallic bond wire permanently electrically connected to the fill stem. The fill pipe assembly shall form a continuous electrically conductive path downstream from the point of bonding. The free end of such bond wire shall be provided with a clamp or equivalent device for convenient attachment to a metallic part in electrical contact with the cargo tank of the tank vehicle or tank car. For tank vehicles, protection shall consist of a flexible bond wire of adequate strength for the intended service and the electrical resistance shall not exceed 1 megohm. For tank cars, bonding shall be provided where the resistance of a tank car to ground through the rails is 25 ohms or greater.

Such bonding connection shall be fastened to the vehicle, car or tank before dome covers are raised and shall remain in place until filling is complete and all dome covers have been closed and secured.

Exceptions:

1. Where vehicles and cars are loaded exclusively with products not having a static-accumulating tendency, such as asphalt, cutback asphalt, most crude oils, residual oils and water-miscible liquids.
2. When Class I liquids are not handled at the transfer facility and the tank vehicles are used exclusively for Class II and III liquids.
3. Where vehicles and cars are loaded or unloaded through closed top or bottom connections whether the hose is conductive or nonconductive.

Filling through open domes into the tanks of tank vehicles or tank cars that contain vapor-air mixtures within the flammable range, or where the liquid being filled can form such a mixture, shall be by means of a downspout which extends to near the bottom of the tank.

3406.5.1.8 Stray current protection. Tank car loading facilities where Class I, II or IIIA liquids are transferred through open domes shall be protected against stray currents by permanently bonding the pipe to at least one rail and to the transfer apparatus. Multiple pipes entering the transfer areas shall be permanently electrically bonded together. In areas where excessive stray currents are known to exist, all pipes entering the transfer area shall be provided with insulating sections to isolate electrically the transfer apparatus from the pipelines.

3406.5.1.9 Top loading. When top loading a tank vehicle with Class I and II liquids without vapor control, valves used for the final control of flow shall be of the self-closing type and shall be manually held open except where automatic means are provided for shutting off the flow when the tank is full. When used, automatic shutoff systems shall be provided with a manual shutoff valve located at a safe distance from the loading nozzle to stop the flow if the automatic system fails.

When top loading a tank vehicle with vapor control, flow control shall be in accordance with Section 3406.5.1.10. Self-closing valves shall not be tied or locked in the open position.

3406.5.1.10 Bottom loading. When bottom loading a tank vehicle or tank car with or without vapor control, a positive means shall be provided for loading a predetermined quantity of liquid, together with an automatic secondary shutoff control to prevent overfill. The connecting components between the transfer equipment and the tank vehicle or tank car required to operate the secondary control shall be functionally compatible.

3406.5.1.11 Switch loading. Tank vehicles or tank cars which have previously contained Class I liquids shall not be loaded with Class II or III liquids until such vehicles and all piping, pumps, hoses and meters connected thereto have been completely drained and flushed.

Exception: When approved by the Enforcing Agency the procedures prescribed in API (API-RP-2003) Recommended Practices 2003 entitled; Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents may be used for changing tank contents.

3406.5.1.12 Loading racks. Where provided, loading racks, stairs or platforms shall be constructed of noncombustible materials. Buildings for pumps or for shelter of loading personnel are allowed to be part of the loading rack. Wiring and electrical equipment located within 25 feet (7620 mm) of any portion of the loading rack shall be in accordance with Section 3403.1.1.

3406.5.1.13 Transfer apparatus. Bulk and process transfer apparatus shall be of an approved type.

3406.5.1.14 Inside buildings. Tank vehicles and tank cars shall not be located inside a building while transferring Class I, II or IIIA liquids, unless approved by the fire code official.

Exception: Tank vehicles are allowed under weather protection canopies and canopies of automobile motor vehicle fuel-dispensing stations.

3406.5.1.15 Tank vehicle and tank car certification. Certification shall be maintained for tank vehicles and tank cars in accordance with DOTn 49 C.F.R., Parts 100-185.

3406.5.1.16 Tank vehicle and tank car stability. Tank vehicles and tank cars shall be stabilized against movement during loading and unloading in accordance with Sections 3406.5.1.16.1 through 3406.5.1.16.3.

3406.5.1.16.1 Tank vehicles. When the vehicle is parked for loading or unloading, the cargo trailer portion of the tank vehicle shall be secured in a manner that will prevent unintentional movement.

3406.5.1.16.2 Chock blocks. At least two chock blocks not less than 5 inches by 5 inches by 12 inches (127 mm by 127 mm by 305 mm) in size and dished to fit the contour of the tires shall be used during transfer operations of tank vehicles.

3406.5.1.16.3 Tank cars. Brakes shall be set and the wheels shall be blocked to prevent rolling.

3406.5.1.17 Monitoring. Transfer operations shall be monitored by an approved monitoring system or by an attendant. When monitoring is by an attendant, the operator or other competent person shall be present at all times.

3406.5.1.18 Security. Transfer operations shall be surrounded by a noncombustible fence not less than 5 feet (1524 mm) in height. Tank vehicles and tank cars shall not be loaded or unloaded unless such vehicles are entirely within the fenced area.

Exceptions:

1. Motor fuel-dispensing facilities complying with Chapter 22.

2. Installations where adequate public safety exists because of isolation, natural barriers or other factors as determined appropriate by the fire code official.
3. Facilities or properties that are entirely enclosed or protected from entry.

3406.5.2 Bulk transfer. Bulk transfer shall be in accordance with Sections 3406.5.1 and 3406.5.2.1.

3406.5.2.1 Vehicle motor. Motors of tank vehicles or tank cars shall be shut off during the making and breaking of hose connections and during the unloading operation.

Exception: Where unloading is performed with a pump deriving its power from the tank vehicle motor.

3406.5.3 Process transfer. Process transfer shall be in accordance with Section 3406.5.1 and Sections 3406.5.3.1 through 3406.5.3.3.

3406.5.3.1 Piping, valves, hoses and fittings. Piping, valves, hoses and fittings which are not a part of the tank vehicle or tank car shall be in accordance with Section 3403.6. Caps or plugs which prevent leakage or spillage shall be provided at all points of connection to transfer piping.

3406.5.3.2 Vents. Normal and emergency vents shall be maintained operable at all times.

3406.5.3.3 Motive power. Motors of tank vehicles or tank cars shall be shut off during the making and breaking of hose connections and during the unloading operation.

Exception: When unloading is performed with a pump deriving its power from the tank vehicle motor.

3406.5.4 Dispensing from tank vehicles and tank cars. Dispensing from tank vehicles and tank cars into the fuel tanks of motor vehicles shall be prohibited unless allowed by and conducted in accordance with Sections 3406.5.4.1 through 3406.5.4.5.

3406.5.4.1 Marine craft and special equipment. Liquids intended for use as motor fuels are allowed to be transferred from tank vehicles into the fuel tanks of marine craft and special equipment when approved by the fire code official, and when:

1. The tank vehicle’s specific function is that of supplying fuel to fuel tanks.
2. The operation is not performed where the public has access or where there is unusual exposure to life and property.
3. The dispensing line does not exceed 50 feet (15 240 mm) in length.
4. The dispensing nozzle is approved.

3406.5.4.2 Emergency refueling. When approved by the fire code official, dispensing of motor vehicle fuel from tank vehicles into the fuel tanks of motor vehicles is allowed during emergencies. Dispensing from tank vehicles shall be in accordance with Sections 3406.2.8 and 3406.6.

3406.5.4.3 Aircraft fueling. Transfer of liquids from tank vehicles to the fuel tanks of aircraft shall be in accordance with Chapter 11.

3406.5.4.4 Fueling of vehicles at farms, construction sites and similar areas. Transfer of liquid from tank vehicles to motor vehicles for private use on farms and rural areas and at construction sites, earth-moving projects, gravel pits and borrow pits is allowed in accordance with Section 3406.2.8.

3406.5.4.5 Commercial, industrial, governmental or manufacturing. Dispensing of Class II and III motor vehicle fuel from tank vehicles into the fuel tanks of motor vehicles located at commercial, industrial, governmental or manufacturing establishments is allowed where permitted, provided such dispensing operations are conducted in accordance with the following:

1. Dispensing shall occur only at sites that have been issued a permit to conduct mobile fueling.
2. The owner of a mobile fueling operation shall provide to the jurisdiction a written response plan which demonstrates readiness to respond to a fuel spill and carry out appropriate mitigation measures, and describes the process to dispose properly of contaminated materials.
3. A detailed site plan shall be submitted with each application for a permit. The site plan shall indicate: all buildings, structures and appurtenances on site and their use or function; all uses adjacent to the property lines of the site; the locations of all storm drain openings, adjacent waterways or wetlands; information regarding slope, natural drainage, curbing, impounding and how a spill will be retained upon the site property; and the scale of the site plan.
4. Provisions shall be made to prevent liquids spilled during dispensing operations from flowing into buildings or off-site. Acceptable methods include, but shall not be limited to, grading driveways, raising doorsills or other approved means.
5. The fire code official is allowed to impose limits on the times and days during which mobile fueling operations is allowed to take place, and specific locations on a site where fueling is permitted.
6. Mobile fueling operations shall be conducted in areas not accessible to the public or shall be limited to times when the public is not present.
7. Mobile fueling shall not take place within 15 feet (4572 mm) of buildings, property lines, combustible storage or storm drains.

Exceptions:

1. The distance to storm drains shall not apply where an approved storm drain cover or an approved equivalent that will prevent any fuel from reaching the drain is in place prior to fueling or a fueling hose being placed within 15 feet (4572 mm) of the drain. Where placement of a storm drain cover will cause the accumulation of excessive water or difficulty in conducting the fueling, such cover shall not be used and the fueling shall not take place within 15 feet (4572 mm) of a drain.

2. The distance to storm drains shall not apply for drains that direct influent to approved oil interceptors.
3. The tank vehicle shall comply with the requirements of NFPA 385 and local, state and federal requirements. The tank vehicle's specific functions shall include that of supplying fuel to motor vehicle fuel tanks. The vehicle and all its equipment shall be maintained in good repair.
4. Signs prohibiting smoking or open flames within 25 feet (7620 mm) of the tank vehicle or the point of fueling shall be prominently posted on three sides of the vehicle including the back and both sides.
5. A portable fire extinguisher with a minimum rating of 3-A-40 BC shall be provided on the vehicle with signage clearly indicating its location.
6. The dispensing nozzles and hoses shall be of an approved and listed type.
7. The dispensing hose shall not be extended from the reel more than 100 feet (30 480 mm) in length.
8. Absorbent materials, nonwater-absorbent pads, a 10-foot-long (3048 mm) containment boom, an approved container with lid and a nonmetallic shovel shall be provided to mitigate a minimum 5-gallon (19 L) fuel spill.
9. Tank vehicles shall be equipped with a "fuel limit" switch such as a count-back switch, to limit the amount of a single fueling operation to a maximum of 500 gallons (1893 L) before resetting the limit switch. Exception: Tank vehicles where the operator carries and can utilize a remote emergency shutoff device which, when activated, immediately causes flow of fuel from the tank vehicle to cease.
10. Persons responsible for dispensing operations shall be trained in the appropriate mitigating actions in the event of a fire, leak, or spill. Training records shall be maintained by the dispensing company and shall be made available to the fire code official upon request.
11. Operators of tank vehicles used for mobile fueling operations shall have in their possession at all times an emergency communications device to notify the proper authorities in the event of an emergency.
12. The tank vehicle dispensing equipment shall be constantly attended and operated only by designated personnel who are trained to handle and dispense motor fuels.
13. Fuel dispensing shall be prohibited within 25 feet (7620 mm) of any source of ignition.
14. The engines of vehicles being fueled shall be shut off during dispensing operations.
15. Nighttime fueling operations shall only take place in adequately lighted areas.
16. The tank vehicle shall be positioned with respect to vehicles being fueled to prevent traffic from driving over the delivery hose.
17. During fueling operations, tank vehicle brakes shall be set, chock blocks shall be in place and warning lights shall be in operation.
18. Motor vehicle fuel tanks shall not be topped off.
19. The dispensing hose shall be properly placed on an approved reel or in an approved compartment prior to moving the tank vehicle.
20. The fire code official and other appropriate authorities shall be notified when a reportable spill or unauthorized discharge occurs.
21. Operators shall place a drip pan or an absorbent pillow under each fuel fill opening prior to and during dispensing operations. Drip pans shall be liquid-tight. The pan or

absorbent pillow shall have a capacity of not less than 3 gallons (11.36 L). Spills retained in the drip pan or absorbent pillow need not be reported. Operators, when fueling, shall have on their person an absorbent pad capable of capturing diesel foam overfills. Except during fueling, the nozzle shall face upward and an absorbent pad shall be kept under the nozzle to catch drips. Contaminated absorbent pads or pillows shall be disposed of regularly in accordance with local, state and federal requirements.

3406.6 Tank vehicles and vehicle operation. Tank vehicles shall be designed, constructed, equipped and maintained in accordance with NFPA 385 and Sections 3406.6.1 through 3406.6.4.

3406.6.1 Operation of tank vehicles. Tank vehicles shall be utilized and operated in accordance with NFPA 385 and Sections 3406.6.1.1 through 3406.6.1.11.

3406.6.1.1 Vehicle maintenance. Tank vehicles shall not be operated unless they are in proper state of repair and free from accumulation of grease, oil or other flammable substance, and leaks.

3406.6.1.2 Leaving vehicle unattended. The driver, operator, or attendant of a tank vehicle shall not remain in the vehicle cab and shall not leave the vehicle while it is being filled or discharged. The delivery hose, when attached to a tank vehicle, shall be considered to be a part of the tank vehicle.

3406.6.1.3 Vehicle motor shutdown. Motors of tank vehicles or tractors shall be shut down during the making or breaking of hose connections. If loading or unloading is performed without the use of a power pump, the tank vehicle or tractor motor shall be shut down throughout such operations.

3406.6.1.4 Outage. A cargo tank or compartment thereof used for the transportation of flammable or combustible liquids shall not be loaded to absolute capacity. The vacant space in a cargo tank or compartment thereof used in the transportation of flammable or combustible liquids shall not be less than 1 percent. Sufficient space shall be left vacant to prevent leakage from or distortion of such tank or compartment by expansion of the contents caused by rise in temperature in transit.

3406.6.1.5 Overfill protection. The driver, operator, or attendant of a tank vehicle shall, before making delivery to a tank, determine the unfilled capacity of such tank by a suitable gauging device. To prevent overfilling, the driver, operator or attendant shall not deliver in excess of that amount.

3406.6.1.6 Securing hatches. During loading, hatch covers shall be secured on all but the receiving compartment.

3406.6.1.7 Liquid temperature. Materials shall not be loaded into or transported in a tank vehicle at a temperature above the material’s ignition temperature unless safeguarded in an approved manner.

3406.6.1.8 Bonding to underground tanks. An external bond-wire connection or bond-wire integral with a hose shall be provided for the transferring of flammable liquids through open connections into underground tanks.

3406.6.1.9 Smoking. Smoking by tank vehicle drivers, helpers or other personnel is prohibited while they are driving, making deliveries, filling or making repairs to tank vehicles.

3406.6.1.10 Hose connections. Delivery of flammable liquids to underground tanks with a capacity of more than 1,000 gallons (3785 L) shall be made by means of approved liquid and vapor-tight connections between the delivery hose and fill tank pipe. Where underground tanks are equipped with any type of vapor recovery system, all connections required to be made for the safe and proper functioning of the particular vapor recovery process shall be made. Such connections shall be made liquid and vapor tight and remain connected throughout the unloading process. Vapors shall not be discharged at grade level during delivery.

3406.6.1.11 Hose protection. Upon arrival at a point of delivery and prior to discharging any flammable or combustible liquids into underground tanks, the driver, operator or attendant of the tank vehicle shall ensure that all hoses utilized for liquid delivery and vapor recovery, where required, will be protected from physical damage by motor vehicles. Such protection shall be provided by positioning the tank vehicle to prevent motor vehicles from passing through the area or areas occupied by hoses, or by other approved equivalent means.

3406.6.2 Parking. Parking of tank vehicles shall be in accordance with Sections 3406.6.2.1 through 3406.6.2.3.

Exception: In cases of accident, breakdown or other emergencies, tank vehicles are allowed to be parked and left unattended at any location while the operator is obtaining assistance.

3406.6.2.1 Parking near residential, educational and institutional occupancies and other high-risk areas. Tank vehicles shall not be left unattended at any time on residential streets, or within 500 feet (152 m) of a residential area, apartment or hotel complex, educational facility, hospital or care facility. Tank vehicles shall not be left unattended at any other place that would, in the opinion of the fire chief, pose an extreme life hazard.

3406.6.2.2 Parking on thoroughfares. Tank vehicles shall not be left unattended on a public street, highway, public avenue or public alley.

Exceptions:

1. The necessary absence in connection with loading or unloading the vehicle. During actual fuel transfer, Section 3406.6.1.2 shall apply. The vehicle location shall be in accordance with Section 3406.6.2.1.
2. Stops for meals during the day or night, if the street is well lighted at the point of parking. The vehicle location shall be in accordance with Section 3406.6.2.1.

3406.6.2.3 Duration exceeding 1 hour. Tank vehicles parked at one point for longer than 1 hour shall be located off of public streets, highways, public avenues or alleys, and:

1. Inside of a bulk plant and either 25 feet (7620 mm) or more from the nearest lot line or within a building approved for such use; or
2. At other approved locations not less than 50 feet (15 240 mm) from the buildings other than those approved for the storage or servicing of such vehicles.

3406.6.3 Garaging. Tank vehicles shall not be parked or garaged in buildings other than those specifically approved for such use by the fire code official.

3406.6.4 Portable fire extinguisher. Tank vehicles shall be equipped with a portable fire extinguisher complying with Section 906 and having a minimum rating of 2-A-20 BC.

During unloading of the tank vehicle, the portable fire extinguisher shall be out of the carrying device on the vehicle and shall be 15 feet (4572 mm) or more from the unloading valves.

3406.7 Refineries. Plants and portions of plants in which flammable liquids are produced on a scale from crude petroleum, natural gasoline or other hydrocarbon sources shall be in accordance with Sections 3406.7.1 through 3406.7.3. Petroleum-processing plants and facilities or portions of plants or facilities in which flammable or combustible liquids are handled, treated or produced on a commercial scale from crude petroleum, natural gasoline, or other hydrocarbon sources shall also be in accordance with API 651, API 653, API 752, API 1615, API 2001, API 2003, API 2009, API 2015, API 2023, API 2201 and API 2350.

3406.7.1 Corrosion protection. Above-ground tanks and piping systems shall be protected against corrosion in accordance with API 651.

3406.7.2 Cleaning of tanks. The safe entry and cleaning of petroleum storage tanks shall be conducted in accordance with API 2015.

3406.7.3 Storage of heated petroleum products. Where petroleum-derived asphalts and residues are stored in heated tanks at refineries and bulk storage facilities or in tank vehicles, such products shall be in accordance with API 2023.

3406.8 Vapor recovery and vapor-processing systems. Vapor-processing systems in which the vapor source operates at pressures from vacuum, up to and including 1 psig (6.9 kPa) or in which a potential exists for vapor mixtures in the flammable range, shall comply with Sections 3406.8.1 through 3406.8.5.

Exceptions:

1. Marine systems complying with federal transportation waterway regulations such as DOTn 33 C.F.R., Parts 154 through 156, and CGR 46 C.F.R., Parts 30, 32, 35 and 39.
2. Motor fuel-dispensing facility systems complying with Chapter 22.

3406.8.1 Over-pressure/vacuum protection. Tanks and equipment shall have independent venting for over-pressure or vacuum conditions that might occur from malfunction of the vapor recovery or processing system.

Exception: For tanks, venting shall comply with Section 3404.2.7.3.

3406.8.2 Vent location. Vents on vapor-processing equipment shall be not less than 12 feet (3658 mm) from adjacent ground level, with outlets located and directed so that flammable vapors will disperse to below the lower flammable limit (LFL) before reaching locations containing potential ignition sources.

3406.8.3 Vapor collection systems and overfill protection. The design and operation of the vapor collection system and overfill protection shall be in accordance with this section and Section 19.5 of NFPA 30.

3406.8.4 Liquid-level monitoring. A liquid knock-out vessel used in the vapor collection system shall have means to verify the liquid level and a high-liquid-level sensor that activates an alarm. For unpopulated facilities, the high-liquid-level sensor shall initiate the shutdown of liquid transfer into the vessel and shutdown of vapor recovery or vapor-processing systems.

3406.8.5 Overfill protection. Storage tanks served by vapor recovery or processing systems shall be equipped with overfill protection in accordance with Section 3404.2.7.5.8.

J. Summary of NFPA 241, "Standard for Safeguarding Construction, Alterations, and Demolition Operations"[4]

1. Separation distances between temporary offices, trailers, sheds, storage buildings and other facilities shall comply with Table 4.2.1. Distances of 30 to 60 feet required based on length of facing walls.

2. Separation between temporary structures, and placement of Fire Extinguishers in them to be to approval of Fire Agency.

3. Only safely designed, located and installed heating appliances are allowed.

4. Clearance between heaters, stoves, vents and combustibles to be located so as to prevent ignition of combustibles and to otherwise comply with NFPA standards.

5. Only non-combustible or fire retardant enclosures are allowed.

6. Enclosures to be fastened securely and anchored so wind does not blow them down or into an ignition source.

7. Travel distance to fire extinguishers in a building to be 50 feet.

8. Exhaust of motors and engines shall be directed away from any combustible materials.

9. Internal combustion engines and associated equipment shall be shut down and allowed to cool sufficiently prior to refueling.

10. Hot work shall comply with NFPA 51-B.

11. Gas operated cutting and welding equipment using multiple oxygen and fuel cylinders shall comply with NFPA 51.

12. Fire watch to have no other duties.

13. Thermit welding shall comply with Section 5.1.4.

14. Temporary heating equipment shall comply with NFPA 241, section 5.2.

15. Smoking only allowed in designated areas. Post "No Smoking" signs and provide safe receptacles.

16. No burning of rubbish without Fire Permit from Fire Agency. No burning of vegetation, rubbish, or trash should be done on site.

17. Oily rags to be stored in a listed disposal container.

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[4] A copy of NFPA 241 is available on site in the construction office for reference.

18. Flammable and combustible liquids and gases shall comply with Section 5.5.

19. Electrical equipment to comply with Section 6.1.

20. All electrical wiring and equipment for light, heat, or power shall comply with National Electrical Code (NFPA70).

21. Electrical cords and equipment to be in safe condition with no damage. Electrical wiring should not be placed in vegetated areas.

22. Temporary wiring and temporary lighting to comply with Section 6.1.

23. Owner shall designate a “Fire Prevention Program Manager” who is responsible for establishing and implementing the Fire Prevention program. Responsibilities are outlined in section 7.2.4.

24. Instructions shall be issued for immediate notification of fire agencies in the event of a fire. Site address and location to be posted “by phone”. At a minimum, instructions should include directions to call 911 and a designated backup number.

25. Every temporary building to be accessible by a (temporary) 20-foot wide fire truck access road to within 150 feet of building. Vertical clearance to be 13.5 feet. The Fire agency may modify the required road width.

26. Fire extinguishers and locations to comply with NFPA 10 “Standard for Portable Fire Extinguishers.” As alternative, Contractor can request Fire Agency inspection of extinguishers and locations.

27. Water supply to be per Fire Agency requirements.

28. Accumulation of unnecessary form lumber and material prohibited.

K. Excerpts from California Public Resources Code

Section 4427. Operation of fire causing equipment.
During any time of the year when burning permits are required in an area pursuant to this article, no person shall use or operate any motor, engine, boiler, stationary equipment, welding equipment, cutting torches, tarpots, or grinding devices from which a spark, fire, or flame may originate, which is located on or near any forest-covered land, brush-covered land, or grass-covered land, without doing both of the following:

(a) First clearing away all flammable material, including snags, from the area around such operation for a distance of 10 feet.

(b) Maintain one serviceable round point shovel with an overall length of not less than forty-six (46) inches and one backpack pump water-type fire extinguisher fully equipped and ready for use at the immediate area during the operation.

This section does not apply to portable powersaws and other portable tools powered by a gasoline-fueled internal combustion engine.

Section 4428. Use of hydrocarbon powered engines near forest, brush or grass covered lands without maintaining firefighting tools.
No person, except any member of an emergency crew or except the driver or owner of any service vehicle owned or operated by or for, or operated under contract with, a publicly or privately owned utility, which is used in the construction, operation, removal, or repair of the property or facilities of such utility when engaged in emergency operations, shall use or operate any vehicle, machine, tool or equipment powered by an internal combustion engine operated on hydrocarbon fuels, in any industrial operation located on or near any forest, brush, or grass-covered land between April 1 and December 1 of any year, or at any other time when ground litter and vegetation will sustain combustion permitting the spread of fire, without providing and maintaining, for firefighting purposes only, suitable and serviceable tools in the amounts, manner and location prescribed in this section.

(a) On any such operation a sealed box of tools shall be located, within the operating area, at a point accessible in the event of fire. This fire toolbox shall contain: one backpack pump-type fire extinguisher filled with water, two axes, two McLeod fire tools, and a sufficient number of shovels so that each employee at the operation can be equipped to fight fire.

(b) One or more serviceable chainsaws of three and one-half or more horsepower with a cutting bar 20 inches in length or longer shall be immediately available within the operating area, or, in the alternative, a full set of timber-felling tools shall be located in the fire toolbox, including one crosscut falling saw six feet in length, one double-bit ax with a 36-inch handle, one sledge hammer or maul with a head weight of six, or more, pounds and handle length of 32 inches, or more, and not less than two falling wedges.

(c) Each rail speeder and passenger vehicle, used on such operation shall be equipped with one shovel and one ax, and any other vehicle used on the operation shall be equipped with one shovel. Each tractor used in such operation shall be equipped with one shovel.

(d) As used in this section:

(1) "Vehicle" means a device by which any person or property may be propelled, moved, or drawn over any land surface, excepting a device moved by human power or used exclusively upon stationary rails or tracks.

(2) "Passenger vehicle" means a vehicle which is self-propelled and which is designed for carrying not more than 10 persons including the driver, and which is used or maintained for the transportation of persons, but does not include any motor truck or truck tractor.

Section 4429. Camps or local headquarters, firefighting equipment.
During any time of the year when burning permits are required in an area pursuant to this article, at any camp maintained in such area for the residence of employees, or at any local headquarters in such area of any industrial, agricultural, or other operations on or near any forest-covered land or brush-covered land, there shall be provided and maintained at all times, in a specific location, for firefighting purposes only, a sufficient supply of serviceable tools to equip 50 percent of the able-bodied, personnel, resident of such camp, or working out of such headquarters, for fighting fires. Among these tools shall be included shovels, axes, saws, backpack pumps, and scraping tools. With such tools there shall also be one serviceable headlight adaptable for attachment to at least one-half of the tractor-bulldozers used on the operation, and a sufficient number of canteens and flashlights to equip a third of the able-bodied personnel.

Section 4431. Gasoline powered saws, etc.; firefighting equipment.
During any time of the year when burning permits are required in an area pursuant to this article, no person shall use or operate or cause to be operated in the area any portable saw, auger, drill, tamper, or other portable tool powered by a gasoline-fueled internal combustion engine on or near any forest-covered land, brush-covered land, or grass-covered land, within 25 feet of any flammable material, without providing and maintaining at the immediate locations of use or operation of the saw or tool, for firefighting purposes one serviceable round point shovel, with an overall length of not less than 46 inches, or one serviceable fire extinguisher. The Director of Forestry and Fire Protection shall by administrative regulation specify the type and size of fire extinguisher necessary to provide at least minimum assurance of controlling fire caused by use of portable power tools under various climatic and fuel conditions.

The required fire tools shall at no time be farther from the point of operation of the power saw or tool than 25 feet with unrestricted access for the operator from the point of operation.

Section 4442. Spark arresters or fire prevention measures; requirement; exemptions.
(a) Except as otherwise provided in this section, no person shall use, operate, or allow to be used or operated, any internal combustion engine which uses hydrocarbon fuels on any forest-covered land, brush-covered land, or grass-covered land unless the engine is equipped with a spark arrester, as defined in subdivision (c),maintained in effective working order or the engine is constructed, equipped, and maintained for the prevention of fire pursuant to Section 4443.
(b) Spark arresters affixed to the exhaust system of engines or vehicles subject to this section shall not be placed or mounted in such a manner as to allow flames or heat from the exhaust system to ignite any flammable material.
(c) A spark arrester is a device constructed of nonflammable materials specifically for the purpose of removing and retaining carbon and other flammable particles over 0.0232 of an inch in size from the exhaust flow of an internal combustion engine that uses hydrocarbon fuels or which is qualified and rated by the United States Forest Service.

(d) Engines used to provide motive power for trucks, truck tractors, buses, and passenger vehicles, except motorcycles, are not subject to this section if the exhaust system is equipped with a muffler as defined in the Vehicle Code.

(e) Turbocharged engines are not subject to this section if all exhausted gases pass through the rotating turbine wheel, there is no exhaust bypass to the atmosphere, and the turbocharger is in effective mechanical condition.

(f) Motor vehicles when being operated in an organized racing or competitive event upon a closed course are not subject to this section if the event is conducted under the auspices of a recognized sanctioning body and by permit issued by the fire protection authority having jurisdiction.

L. Hot Work Checklist and sample language for a hot work permit, from NFPA 51-B.[5]

EXAMPLE HOT WORK CHECKLIST FOR USE BY WORKERS (SUBJECT TO MODIFICATION BY TULE FIRE SAFETY COORDINATOR)

- **Obtain Hot Work permit from Fire Safety Coordinator, and post it and follow it.**
- **Assure you have received safety training in operation of the equipment and training on the Tule Construction Fire Safety plan, and that you follow it.**
- **Be equipped with phone and 2-way radio to notify Fire Safety Coordinator of a fire or emergency. Test it for proper operation and confirm receipt of message by person called.**
- **Post sign; "Caution Hot Work in progress ; stay clear"**
- **Remove combustibles to 35 feet or more from hot work or use Fire Agency approved fire resistant welding pads, blankets, or screens.**
- **Provide minimum 50-foot clearance in all directions around hot work. At turbine pads, provide minimum 100-foot clearance in all directions, so that the clearance area has a diameter of 200 feet. Provide 35 feet vertical clearance.**
- **Cease hot work during Red Flag Warning event unless you have a 100-foot clearance in all directions around the hot work.**
- **Do not do hot work near any flammable atmospheres (such as painting, fueling, etc.)**
- **Assure a staffed water tender is available on site to wet down vegetation beyond 50 feet if required by Fire Safety Coordinator.**
- **Provide fire watch (2 trained persons with no other duties) during and for 1 hour after hot work ceases.**
- **Assure proper Personal Protective Equipment and clothing are worn.**
- **Fire extinguisher with a minimum 3-A-40 BC rating, a 5 gallon back pack pump water extinguisher, and a 48" round point shovel to be available within 30 feet of hot work.**

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[5] Per RFPD, the following and checklist is to be plasticized by Iberdrola and given to each worker involved in hot work, and shall be on the hot work site.

SAMPLE LANGUAGE FOR HOT WORK PERMIT

HOT WORK PERMIT

Seek an alternative/safer method if available.

Before initiating Hot Work be sure precautions are in place as required by the Construction Fire Safety plan, California Fire Code and NFPA 51-B (copy available in Construction office).

This hot work permit is required for any operations involving open flame or producing heat or sparks. This work includes but is not limited to welding, brazing, cutting, grinding, soldering, thawing pipers, etc. The permit is to be issued by the Tule Fire Safety Coordinator after inspection of the proposed hot work area.

THIS PERMIT IS GOOD FOR ONE DAY ONLY.

Date: _____

Physical Location of Hot work: _____

Work to be done: _____

Time started: _____ Time Completed: _____

Hot work by Employee or contractor?: _____

Name (print) of person doing hot work:

_____

Signature of person doing hot work:

_____

I verify that the above location has been examined, the precautions marked on checklist below have been taken, and permission is granted for this work.

Name (print) of authorizing individual for the permit (Tule Fire Safety Coordinator):

_____

Signature of authorizing individual for the permit (Tule Fire Safety Coordinator):

_____

REQUIREMENTS

Hot work equipment to be in good working condition in accordance with Manufacturer specifications

Fire Extinguishers: 3-A-40 BC rated extinguisher, 5-gallon back pack hand pump water extinguisher, and 48" shovel at hot work area.

No combustibles or flammable atmospheres within 35 feet of hot work. No fuel dispensing, painting, etc. Approved fire resistant screens, blankets, and pads can be used as alternative.

Provide minimum 50-foot clearance of vegetation in all directions (and 35 feet vertically). At turbine pads, provide 100-foot clearance in all directions so that the clearance area has a diameter of 200 feet.

Water tender to be available on site to come to hot work area and wet down vegetation beyond 50 feet if needed or in any area that cannot be cleared due to sensitive environmental habitat, etc.

Tule Type 6 fire pump and pickup truck to be available to respond to a fire.

Provide fire watch during and for 1 hour after hot work. Provide two trained and equipped persons with no other duties.

Proper Protective Equipment and clothing to be used.

M. CONSTRUCTION FIRE SAFETY PLAN BY TURBINE CONSTRUCTION CONTRACTOR

See separately bound volume.

N. CONSTRUCTION FIRE SAFETY PLAN BY POWER LINE AND POWER LINE TOWERS CONSTRUCTION CONTRACTOR

See separately bound volume.