

**Newport News Shipbuilding
Contractor Environmental, Health and Safety
Resource Manual**

Fire Protection

FIRE PROTECTION

1. *General*

- a. Contractors shall comply with the requirements of References below, the requirements of this chapter, and all other local, state and federal regulations.
- b. Each location in the shipyard (ships and land facilities) is covered by a local Emergency Action Plan (EAP). The EAP describes actions to be taken in the event of an emergency. Prior to performing work at the shipyard, contractors must familiarize themselves with the contents and requirements the EAP applicable to their work site. EAPs are available from the shipyard contractor coordinator.
- c. Contractors are required to notify the shipyard of fire-related hazards associated with the contractor's work and what the contractor is doing to address them.
- d. Contractors are required to notify the shipyard of any previously unidentified fire-related hazards that the contractor identifies at the shipyard.

2. *Regulations*

Protect flammables and combustibles from ignition by the following:

- a. Remove combustible and flammable materials from beneath hot work. Remove flammable materials that are stored on a deck below where hot work is being done. Materials that cannot be removed shall be covered with Refrasil[®], sheet metal or other approved material. And a fire watch shall be posted to prevent sparks from igniting combustible material.

Hot workers are permitted to use Department O27 approved unshielded foam padding as ergonomic protection during the performance of hot work.
- b. Do not perform any hot work to a hollow structure unless vent hole(s) are present:
- c. When a construction pre-drilled vent hole is not present in the initial installation and welding of new hollow structures, the welder shall leave a one-inch unwelded area at the final weld connection to act as a vent hole. Once all hot work other than the vent hole has been completed, the welder can proceed to seal and weld the vent hole. The welding of any pre-drilled

vent holes in hollow structures would be accomplished in the same manner (after the completion of all hot work).

- d. Hot work and heat transfer is not permitted to foam filled voids/hollow structures without Marine Chemist permission. Often these voids require the removal of foam materials or the inerting of the space prior to hot work. Partially filled voids resulting from the shrinkage of poured-in-place insulations require inerting and a Chemist Work permit prior to any hot work.

Virginia Class submarines- the backfilling of THF 38 insulated voids with raw resin or equivalent materials changes the nature of the voids to that of solid structure; therefore no inert gas purging can be done and hot work is permitted to these solid structures.

- e. Sealed hollow structures including bits, bilge keels, stanchions, nozzles, rudders, etc. must be tested by the Marine Chemist Office for explosive gases or where applicable, flammable or combustible liquid preservatives prior to any hot work. Hot work must be approved by the Marine Chemist Office.

3. *Reference*

- a. OSHA 29 CFR 1915 “Shipyard Industry Standards”
- b. OSHA 29 CFR 1910 “General Industry Standards”
- c. OSHA 29 CFR 1926 “Occupational Safety and Health Regulations for Construction”
- d. NNS Fire Prevention & Control Manual
- e. NNS Health & Safety Manual
- f. NFPA 306 “Standard for Control of Gas Hazards on Vessels”

4. *Housekeeping*

- a. Contractors shall ensure adequate aisles, passageways, and fire lanes are provided and maintained. Contractors shall ensure that adequate access* to all exits, fire alarm boxes, and fire extinguishing equipment is maintained. Contractors shall ensure that work areas are:

- (1) Kept clear of tools and equipment except those in use,

* Three foot clearance is required in front of the equipment.

- (2) Kept free of debris, and
 - (3) Kept clear of construction materials except that which is either in use or properly stored.
- b. Contractors shall ensure that hoses and electrical conductors are so arranged as to preclude their being pinched. Pinching could result in gas or liquid leaks and the removal of electrical conductor insulation.
 - c. Contractors shall ensure that flammable gas lines are not run in “S” or “J” hooks supporting temporary electrical power lines. Contractors shall also ensure that electrical lines (welding, power, etc.) are not run in "S" or "J" hooks already used for flammable gas lines. These lines are commonly painted yellow to identify them as reserved for gases only, no electrical services allowed.
 - d. Contractors shall ensure that whenever practical, temporary gas manifolds for oxygen, propane, etc. are placed at least 10 feet from temporary electrical junction blocks.
 - e. Contractors shall ensure that packing materials including excelsior, cardboard, and paper are removed promptly from all work areas after unpacking material or equipment. Contractors shall ensure that, whenever practical, material and equipment is uncrated off the ship. If this is not practical, shipping containers and packing materials shall be removed from the ship and disposed of promptly.
 - f. Contractors shall require that each contractor employee maintain a clean and orderly work area. Contractors shall ensure each contractor supervisor is responsible for training their personnel in good housekeeping habits.

5. *Hot Work Precautions*

- a. Protect flammables and combustibles from ignition by the following:
 - (1) Have the flammables and combustibles moved to a safe distance from the work or have them properly shielded and protected against ignition or unplanned damage.
 - (2) Uncovered ordinary combustibles such as paper, cardboard, Styrofoam, plastic cups, etc. must be removed at least 35 feet or greater from unshielded hot work.
 - (3) Removal of ordinary combustible materials is recommended versus simply shielding (directing residues) hot work or covering with fire resistant cloth ordinary combustibles in area where spark, slag, or flame travel could be expected. If the hot work residues are not adequately

shielded and directed away from combustibles and/or coverings allow residues to travel beneath or permit heat transfer, materials can be ignited.

(4) Move the work to a location free from hazards.

- b. Remove combustible and flammable materials from beneath hot work. Remove flammable materials that are stored on a deck below where hot work is being done. Materials that cannot be removed shall be covered with Refrasil[®], sheet metal or other approved material. And a fire watch shall be posted to prevent sparks from igniting combustible material.

6. *Welding, Burning and Heating*

- a. All work shall be performed in accordance with References.

Note: Any reference to sparks shall be understood to include other ignition sources such as slag, molten metal or heated metal surfaces.

- b. Contractors shall ensure each of their supervisors holds each of their employees who perform welding, burning, grinding, heating, and brazing operations accountable for the fire safety of the work environment.
 - (1) The operator and his fire watch shall inspect the area and the opposite side of bulkheads, decks, or overheads upon which he will be working.
 - (2) He and his fire watch shall assure falling or penetrating sparks and heated surfaces of the material being worked on will not cause injury, damage or fire.
- c. The operator shall conduct welding, burning, grinding, heating and brazing operations so that sparks do not come in contact with combustible or flammable materials such as trash, shavings, paint, etc. He shall avoid welding/burning and grinding so that sparks do not get into any cracks in or behind combustible or flammable material as the sparks may smolder and start a fire that may not blaze up until sometime later.
- d. The operator shall not permit sparks to fall into machinery pits where oil or grease is likely to be. He shall not permit sparks to fall on wooden floors in buildings, and shall not permit sparks to fall or roll into a trunk or duct that may contain flammable materials or which may conduct the sparks into another compartment containing flammable materials.
- e. The operator or his fire watch shall remove combustible or damageable materials from beneath or above hot work. He shall cover those materials that cannot be moved with Refrasil[®], sheet metal, or other approved

- material, and post a fire watch to see that sparks do not ignite combustible materials.
- f. The contractor shall ensure that paint is removed in way of hot work in all interior spaces prior to welding, burning, arcing, etc., and in accordance with OSHA regulations. Additionally, paint must be removed on the opposite side of the surface where there is potential for exposure to personnel due to off gassing. Paint shall also be removed in exterior areas unless specific procedures are addressed in the contractor's hot work program to ensure protection of NNS and contractor personnel.
- (1) Prior to removing paint (or doing any hot work affecting paint) the metals content of the paint must be determined, specifically for lead and chromium, and any other metals as necessary to assure compliance with OSHA regulations,. Sampling must be done by appropriately trained personnel and analyzed by a laboratory licensed and/or accredited to do so.
 - (2) NNS will not conduct this paint sampling for contractors; however, NNS may provide third party sampling and analysis results for facilities work.
- g. The operator shall assure that insulation and connections are maintained in good condition on all temporary light wiring and welding cables. He shall check insulators on electrode holders when welding in the vicinity of materials readily damaged by coming in contact with a bare area of the holder.
- h. The torch operator shall also:
- (1) Have hose clamps in his/her possession when performing hot work.
 - (2) Use only portable lights that have approved guards.
 - (3) Perform a 60-second drop test (safety test) on each torch at the beginning of each day the torch will be used.
 - (4) Hook up and unhook torches on open decks or in open spaces only.
 - (5) Require a "Tank Watch" with hose clamps for torch operations in confined spaces. Tank watch shall be stationed at the entrance to a confined space.
 - (6) Ensure that torch lines with mechanical connections and "Y's" are not allowed below decks.
- i. Specific Requirements for Torch Equipment.

- (1) If a leaking or otherwise unsafe cylinder is discovered, immediately remove from service, place in an isolated area until proper disposal can be arranged.
 - (a) All contractor cylinders shall be identified with a label or tag containing a minimum of company name and emergency telephone number.
- (2) Maintain Acetylene and Propane cylinders upright at all times.
- (3) Close cylinder or manifold valves when they are not in use. Keep caps on manifolds and cylinders when not in use.
- (4) Do not use oil or grease on cylinder or manifold valves, regulators, hoses or torches and do not allow them to come in contact with any oily or greasy substance.
- (5) When regulators are used on high-pressure cylinders, release the regulator adjusting screw each time the cylinder valve is closed.
- (6) Connect regulators firmly with a torch operator's wrench. Do not use pliers or pipe wrenches. (Standard oxygen connections have right-hand threads and fuel connections have left-hand threads.)
- (7) Frequently inspect all connection seats, fittings and tips. If warped, bruised or damaged, do not use. Do not attempt to improve the performance of or modify any of these items.
- (8) Handle torches, regulators and tips carefully and store them in a clean dry place safe from damage when not in use.
- (9) Do not use a check valve in the place of a regulator.
- (10) Do not let hoses become kinked. Do not allow heavy objects to be dropped, laid on, rolled or dragged across hoses. Do not drag hose across sharp objects or ragged edges that could damage it. Do not leave torch or hose lying where it may be damaged by any means.
- (11) Keep hoses away from hot metal. Keep the torch flame, sparks, and molten metal and hot slag away from hose, regulators or cylinders. Do not place cylinders in a location where they may become heated above 125°F.
- (12) Use only hoses that have been specially manufactured for the particular gasses carried: red for fuel gas, green for oxygen. Do not use hose smaller than the standard $5/16$ -inch hose size.
- (13) Do not tape oxygen and fuel gas lines together for use aboard ship.

- (14) Do not handle a torch roughly or use it as a hammer, hook or crowbar.
 - (15) Do not overheat the tip by holding it too close to work or by allowing it to dip into molten slag or by allowing slag to run over it.
 - (16) Do not strain the torch or hose by pulling the torch further than it will go. Move the work closer or get a longer hose or closer manifold or gas bottle.
 - (17) Identify hoses at the supply end with a label or tag containing company name, telephone number and employee name.
 - (18) Fuel and oxygen gas cylinders and distribution manifold systems can not be located in enclosed or confined spaces. Maintain them in open areas.
 - (19) Obtain a cold work permit approval prior to bringing oxygen and fuel gas cylinders or other supply systems aboard ship.
 - (20) Ensure X18 approval prior to using NNS fuel and oxygen gas supply systems.
- j. Specific Requirements for Starting Up Torch Operations.
- (1) Examine hose to see that it is in good condition, and that hose and torch connections are clean and free from grease, oil or bruises.
 - (2) Connect torch to hose; set up the connecting nuts firmly with the torch operator's wrench and carefully avoid crossing the threads. See that the torch valves are properly closed. Place the torch in a safe place where it will not be disturbed or damaged.
 - (3) Proceed to the manifold or cylinder and again examine hose. See that it is in good condition and that the connections are clean and free from grease, oil or bruises. Examine regulators, to ensure their connections are in good condition and clean.
 - (4) Before attaching regulators to high-pressure cylinders, fully release adjusting screws by turning them out (counter-clockwise).
 - (5) Open oxygen valve slightly to blow out any dirt or debris. Close valve quickly. Attach oxygen regulator firmly.
 - (6) Open fuel valve slightly to blow out any dirt or debris. Close valve quickly. Attach fuel gas regulator firmly.

- (7) Open oxygen cylinder or manifold valve slowly, standing to the side of the regulator. Open the valve fully.
 - (8) Connect the hoses to the regulators firmly, careful to avoid cross-threading.
 - (9) At the beginning of each shift, perform a Safety Check or 60-Second Drop Test must be conducted. — Before lighting the torch, but after all connections have been safely made, open the regulators for a short time to permit complete filling of the hoses. Then close the supply valve and watch the gauges for 60 seconds. Any drop in pressure indicates a leak in the torch, hose or regulator. Do not turn on the supply valve again until the leak has been repaired. Torch must not have plug or blank installed during initial safety check, 60- second drop test.
 - (10) Blow out the hoses one at a time in an open area — never in a confined space.
 - (11) Starting Up:
 - (a) Install tip in torch.
 - (b) Open the gas torch valve, light it with a spark lighter and adjust the flame to where it is approximately $\frac{1}{8}$ inch from the tip.
 - (c) With the gas flame burning slowly, turn on the oxygen and adjust the flame.
- k. Specific Requirements for Shutting Down Torch Operations
- (1) Never have torch and lines unattended within a confined space.
 - (2) Brief shutdown (less than 15 minutes):
 - (a) Close the fuel gas torch valve, then immediately close the oxygen torch valve.
 - (b) Do not break the connections. Arrange the hose and torch in an orderly fashion in a safe place where they will not be damaged or disturbed.
 - (c) Remove tip from torch and install plug.
 - (3) Starting up torch after a brief shutdown:
 - (a) Install tip in torch.

- (b) Open the gas torch valve, light it with a spark lighter and adjust the flame to where it is approximately $\frac{1}{8}$ inch from the tip.
 - (c) With the gas flame burning slowly, turn on the oxygen and adjust the flame.
- (4) Shutting down for lunch break or any period for 15 minutes or longer:
- (a) Close the fuel gas torch valve, then immediately close the oxygen torch valve.
 - (b) Remove tip from torch and install plug or blank.
 - (c) Arrange the hose and torch in an orderly fashion in a safe place where they will not be damaged or disturbed within an enclosed or open area.
 - (d) Close the fuel gas cylinder or manifold valve, and then close the oxygen cylinder or manifold valve.
 - (e) Pull the torch and line into an open area or disconnect the lines from the manifold. Crack gas connections at supply and bleed off gas until gauge reads zero psig. If the lines are completely disconnected, ensure that they are connected to the manifold connection by a lanyard.
 - (f) If they are pulled back to open area, note and remember the gauge pressures on the fuel and oxygen regulators.
- (5) Starting up after a break of 15 minutes or longer:
- (a) Reconnect the lines if they had been disconnected from the manifold.
 - (b) Turn-on the gases for a short period of time then turn them off.
 - (c) Observe the gauge pressures on the fuel and oxygen regulators for 60 seconds.
 - (d) If there is a significant loss of pressure, do not use the equipment until the cause of the pressure loss has been found and corrected.
 - (e) If there is no significant loss of pressure:
 - (i) Open the fuel gas cylinder or manifold valve then, close the oxygen cylinder or manifold valve.
 - (ii) Install tip in torch.

- (iii) Open the gas torch valve, light it with a spark lighter and adjust the flame to where it is approximately $\frac{1}{8}$ inch from the tip.
 - (iv) With the gas flame burning, slowly turn on the oxygen and adjust the flame.
- (6) Shutting down for an extended period (end of shift):
- (a) Close the fuel gas torch valve, then immediately close the oxygen torch valve.
 - (b) Carry torch and hose to an open area. Arrange the hose and torch in an orderly fashion in a safe place where they will not be damaged or disturbed.
 - (c) Close the fuel gas cylinder or manifold valve, and then close the oxygen cylinder or manifold valve.
 - (d) Drain the fuel gas hose by disconnecting it from the regulator. Release the adjusting screw on the fuel gas regulator by turning it out (counter-clockwise). Disconnect the regulator from the cylinder or manifold. Replace the protective cap on the cylinder or manifold.
 - (e) Drain the oxygen hose by disconnecting it from the regulator. Release the adjusting screw on the oxygen regulator by turning it out (counter-clockwise). Disconnect the regulator from the cylinder or manifold. Replace the protective cap on the cylinder or manifold.

7. *Hot Work Permits*

- a. Contractors shall ensure that hot work permits are obtained for all hot work performed on all ship repair operations, all overhaul and nuclear refueling, for new construction, and all land based facility related jobs in accordance with requirements in the Fire Prevention and Control Manual (FP&C).
- b. **Ship and other maritime vessels-** Prior to submitting a Hot Work permit request for NNS approval, **shipboard** contractors shall ensure that any hot work and or heat transfer is not permitted for the following spaces without the written approval and certification of a NFPA Certified Marine Chemist:
 - (1) Anywhere on a tank vessel,

- (2) In or on the boundaries of spaces that contain or ever contained substances which are combustible, flammable, toxic, corrosive, irritant, or combustion supportive substances. Some examples:
 - (a) fuel oil or lube oil tanks, lines, pumps, purifiers, heater coils etc.,
 - (b) oily water or waste oil tanks,
 - (c) JP-5 and gasoline tanks,
 - (d) torpedo rooms and ammunition magazines,
 - (e) preservative filled voids such as bilge keels,
 - (f) AFFF lines that have not been flushed and blown out within a day of hot work,
 - (g) chemical holding tanks, lines, pumps, etc.,
 - (h) refrigeration systems including ammonia cooling systems,
 - (i) sewage systems including CHT tanks,
 - (j) battery compartments and paint lockers,
 - (k) flammable gas and oxygen pipe lines.
 - (3) In spaces aboard barges and ships that are immediately adjacent to spaces or fuel tanks that contain or have contained combustible or flammable liquids or gases.
 - (4) In machinery spaces such as engine rooms, boiler rooms, shaft alley, pump rooms, and steering gear rooms where there are oily residues.
- c. **Land and facility operations** - Prior to submitting a Hot Work permit request for NNS approval, contractors shall obtain written approvals and certifications of a NFPA Certified Marine Chemist:
- (1) When heat may be transferred by the hot work to the boundaries of spaces and hollow structures, including pipe lines, that contain or ever contained substances which are combustible, flammable, toxic, corrosive, irritant, or combustion supportive substances, such as:
 - (a) fuel oil or lube oil tanks, lines, pumps, purifiers, heater coils etc.,
 - (b) oily water or waste oil tanks,

- (c) jet fuel and gasoline storage tanks,
 - (d) waste oil railcars or tank trucks,
 - (e) chemical holding tanks, lines, pumps, etc.,
 - (f) sewage lines (not applicable to simple toilet and drain work),
 - (g) chemical holding tanks, and
 - (h) flammable gas and oxygen pipe lines.
- (2) Spaces that are immediately adjacent to spaces that contain or have contained combustible or flammable liquids and gases.
- (a) Exception: No Certified Marine Chemist Certificate is required when location of hot work is greater than one foot from and will not transfer heat to boundaries of spaces, tanks and hollow structures containing corrosive or irritant substances.
 - (b) Exception: No Certified Marine Chemist Certificate is required when landside location of hot work is greater than 25 feet from the boundary of spaces or tanks containing or having contained flammable liquids, gases or combustible liquids with a flashpoint less than 150 degrees Fahrenheit.
 - (c) Exception: No Certified Marine Chemist Certificate is required when landside location of hot work is greater than 3 feet from and no heat will be transferred within 1 foot of the boundary of tank or other spaces containing combustible liquids with a flash point of 150 degrees Fahrenheit or greater.
 - (d) Ensure that a shipyard competent person has approved all hot work as per 29 CFR 1915 Subpart B unless this chapter specifically requires a NFPA Certified Marine Chemist approval.
- d. A copy of the Marine Chemist Certificate must be provided each day to the Marine Chemist Office located in Building 73, between dry docks 1 and 2 west end. The Marine Chemist Office fax number is 688-1639.
- e. Requirements for Hot Work Permits may be increased or relaxed by the Project/Construction Manager via memorandum to the appropriate department heads, or by the Marine Chemist. The Manager of the X18 Welders Department (or his designated representative on each contract) or the O43 Facilities Department, or the NNS Marine Chemist may temporarily invoke stricter requirements for Hot Work Permits as job conditions vary. At

no time can any representative of NNS relieve the contractor of any applicable Federal, State, or local regulations or laws.

- f. Contractors shall ensure that requests for Hot Work Permits are directed to the Hot/Cold Work Coordinator in the X18 Welders Department or the O43 Maintenance Department. (All X18 Personnel performing as production foremen, Ship Fire Safety Administrators and persons designated as hot/cold work coordinators are authorized to issue Hot Work Permits.)
- g. Department O43 designates qualified personnel to approve land based facility hot/cold work permits. Contractors shall ensure that prior to completing a Hot Work Permit; the requesting contractor supervisor personally inspects the space or area involved to assure that safe working conditions exist, and that the appropriate precautionary measures have been taken.
- h. The X18 Welders or O43 Maintenance Department is responsible for issuing Hot Work Permits and ensuring by reviewing the permit that personnel performing hot work provide fire watches as required.
- i. On off-shifts and weekends, when X18 or O43 supervision, a Ship Fire Safety Administrator or a designated hot/cold work coordinator is not available, it is permissible for the Construction Projects to issue necessary Hot Work Permits.
- j. Contractors shall ensure that smoking is not permitted in any area where hot work is prohibited.

8. *Cold Work Permits*

- a. Contractors shall obtain a Cold Work Permit from the NNS X18 Welders Department or O43 Facilities Department prior to using flammable or combustible liquids or gases, or combustible materials (such as wood or cardboard boxes) on ship construction, overhaul, and repair.
- b. The requirements for Cold Work Permits may be increased or relaxed by the cognizant Project Construction Manager via memorandum to the appropriate Department Heads.
- c. The Manager of the X18 Welders Department (or his designated representative on each contract) or O43 Facilities Department may temporarily invoke stricter requirements for Cold Work Permits as job conditions vary.
- d. In areas not specifically required to have Cold Work Permits, such as off-ship sites and buildings, it will be the responsibility of the immediate

supervisor, and the controlling department, to ensure cold work is performed in a safe and responsible manner.

9. *Fire Watches*

- a. Contractors in all areas of the Shipyard (shops, platens, offices, etc.) and involved in all aspects of ship repair (commercial and naval) and new construction shall ensure that fire watches are assigned to monitor hot work operations to prevent fires.
- b. A fire watch is required:
 - (1) Where the hot work requires fire watch in accordance with the requirements of 29 CFR 1915, 29 CFR 1910 and 29 CFR 1926,
 - (2) Where flammable or combustible liquids or other materials adjacent to the hot work operation cannot be removed from exposure,
 - (3) Any time hot slag or sparks will fall or land in an area out of view of the employee performing hot work (i.e., through a deck opening or partition to a lower level or any area out of view of the hot work operator),
 - (4) When flammable or combustible materials near the opposite side of metal partitions, walls, ceilings, or roofs may be ignited by heat conducted or radiated from the hot work operation,
 - (5) When damage to equipment or injury to personnel may result from the hot work being performed,
 - (6) Where, in the opinion of the contractor-employer-welding-supervisor, a fire may result from the hot work operation,
 - (7) When NNS Marine Chemist or other management personnel require a fire watch,
 - (8) When required by the NNS Hot Work Permit.
- c. Contractors shall ensure each supervisor responsible for hot work provides fire watches as necessary, and has an adequate number of personnel trained as fire watches. Contractors shall also ensure each contractor employee performing hot work is responsible for taking actions necessary to prevent fires whether a fire watch is provided or not.
- d. A single fire watch may be considered sufficient to observe more than one hot work operation provided the fire watch's assigned operations are in unobstructed view and the area is cleared of combustible materials.

- e. Contractors shall ensure their fire watches perform the following duties and responsibilities:
- (1) Assure no damage will be caused by hot work being performed under his surveillance.
 - (2) Act immediately to report fire and make every effort to extinguish fire using the equipment provided and additional equipment if needed.
 - (3) Assure access to and check both sides of intersecting bulkheads/walls, compartments, and/or decks/floors for hazardous conditions.
 - (4) Determine that there are no signs or posted cold work permits prohibiting hot work in the area before permitting hot work to commence.
 - (5) Determine exact location of, and assure accessibility to, fire fighting equipment applicable to the types of fires that may be encountered, and telephones and fire alarms for reporting fires.
 - (6) Locate emergency exits from the area and make certain they are kept free of obstructions.
 - (7) Protect combustible or damageable materials that cannot be moved, by covering them with noncombustible material if hot work must be conducted in the vicinity.
 - (8) Protect all painted or other finished structures or equipment by using Refrasil[®], fire screens, metal shielding, or reinforced protective vinyl covering (Herculite[®] or Facilon[®]).
 - (9) Report the need for additional clean up or ventilation in the area to the cognizant supervisor.
 - (10) Locate manifolds and shut-off valves for all gases that will be used during the hot work operations under his surveillance.
 - (11) Understand completely all signals to be used between fire watch and hot work personnel to ensure immediate cessation of hot work, should it become necessary.
 - (12) Ensure all precautionary measures are effective.
 - (13) Be alert for changing conditions within the area and cease hot work if any adverse conditions arise.
 - (14) Be alert for general alarm signals applicable to the cessation of hot work operation.

- (15) Make certain that hot work operators observe “torch shut-down” regulations. (See pages 7-8.)
 - (16) Ensure no hot spots or smoldering material remains in the assigned work area upon completion/cessation of hot work for at least 30 minutes.
 - (17) Thoroughly inspect all areas of the work site **before leaving the area.**
- f. At the outbreak of a fire, fire watches shall attempt to extinguish the fire if it is within the capacity of the equipment available. Otherwise they shall:
- (1) Sound the emergency fire alarm,
 - (2) Report the fire to the Casualty Control Station (if aboard ship), or report the fire by telephone to 0-2222 or *911 (or 380-2222 for cell phones) and
 - (3) Direct or provide for direction of Fire Department personnel to the location of the fire, and assist as directed.
- g. Contractors shall ensure fire watches have the appropriate extinguisher.
- h. Contractors shall ensure that personnel designated as fire watch be trained.
- i. All fires must be reported.
- (1) NNS Form 4700, *Department Fire Report*, shall be forwarded to the Fire Prevention Office whether the Fire Department was requested or not, and no later than 0900 hours the next working day following the fire.
 - (2) The supervisor or foreman in charge of the personnel causing the fire shall submit this report. Where questions occur regarding the responsibility for the fire, the person in charge of the area shall submit this report. Request form from your Contractor Coordinator or in their absence the Fire Prevention Office (Department O15).

10. *Flammable and Combustible Liquids and Gases*

- a. Contractors shall ensure locally used dispensing containers (e.g., a can filled from a 55-gallon drum) are safe for the intended use and are marked or labeled to provide sufficient safety precautions for personnel who may be exposed to the contents. Contractors shall ensure the NNS Fire Marshal approves liquid-fueled portable personnel heating devices prior to use.
- b. Contractors shall ensure all safety cans have the contents identified by means of a metal tag attached to the handle. Contractors shall ensure that

safety cans are metal, painted red and equipped with a spring-loaded self-closing lid on the pour spout, the spout is provided with a flash-arrestor screen, and restricted to transportation, storage, or use of flammable or combustible liquids.

- c. Contractors shall ensure:
 - (1) Flammable materials are separated from other materials.
 - (2) Temperatures of flammable liquids do not exceed 100° F.
 - (3) Flammable materials are stored:
 - (a) Away from sources of fire and heat,
 - (b) Away from heavily traveled areas, and
 - (c) Out of the direct rays of the sun.
 - (4) Signs are installed to identify these storage areas.
- d. Contractors shall ensure employees handling flammable and combustible material are trained on proper handling and storage of hazardous materials. The training must cover topics such as adequate ventilation and dispensing of these liquids from one can to another. All flammable and combustible liquids, excluding paints and paint remover for brush application, shall be contained in safety cans when stored in quantities of five gallons or less.
- e. Flammable and combustible liquids shall be stored in the manufacturer's original container until opened and then transferred to (excluding paints) safety cans or safety containers. The original container shall be promptly removed from the building by the using employer and shall be destroyed or cleaned prior to being used for other materials. (Liquids with a flash point of 200° F or higher do not require special storage requirements, but care must be taken to protect them from hot work.)
- f. Drums used to store flammable or combustible liquids shall be equipped with an approved bung vent and a self-closing faucet. An approved drip-catch can must be provided to collect small quantity drips from the faucet. Drums containing flammable liquids must be electrically grounded when the liquid is being dispensed. They shall also be equipped with a bonding strap and clamp. These shall be used to electrically interconnect the drum and the metal container into which liquid is dispensed. (Drums containing combustible liquids do not require bonding or grounding.)
- g. Metal drum storage of flammable and combustible liquids shall be located outside of buildings whenever possible. Inside storage of flammable or

combustible liquids is permitted only in sprinklered buildings and is subject to approval by the NNS Safety Department.

- h. Stowage of flammable liquids must be located sufficiently remote from shipways or docks to ensure that fire in these stowage areas could not spread to ships under construction/repair/overhaul. Tank trucks or trailer trucks containing flammable liquids, or combustible liquids with a flash point of 200° F or less, are not allowed on piers on first shift, Monday through Friday. Flammable/combustible liquids shall not be stored on piers.
- i. Containers used as remote “gas tanks” for gasoline engines and connected to the engine with hoses shall be metal (outboard motor type), painted red, and labeled “Gasoline - Flammable.” Refueling operations shall be conducted using cold work permits, adequate ventilation and “No Hot Work” signs posted in the vicinity of refueling operations. After refueling, the containers and signs shall be immediately removed from the ship or dry dock. “No Hot Work” signs shall be posted on equipment (other than registered over-the-road vehicles) using gasoline onboard ships and in dry docks. Gasoline shall not be stored onboard ships or in dry docks. At the completion of refueling activities, the transfer/storage containers shall be immediately removed from ships and dry docks.
- j. Flammable liquids shall be under the surveillance of the user at all times or shall be removed from the ship. Flammable liquids (other than hand carried adhesives and conventional paints and paint remover for brush application) shall not be transported on ship in loose top or open containers. The NNS Fire Department or EH&S Department must approve alternative containers (other than those approved by this procedure) prior to their being used.
- k. Contractors shall ensure that, if an approved fire resistant field paint shop with self-contained fire extinguishing system is installed on surface ships in an open deck area (remote from other assembled flammable liquids such as diesel oil), the field shop shall be manned by an experienced paint shopkeeper at all times when it is open for service. The field shop shall be locked when the assigned shopkeeper is not in attendance. The issue, turn-in, and storage of paint products shall be limited to one day’s supply of conventional paints currently being applied. Paint and paint products with a flash point below 80° F, such as adhesives, solvents, cleaners, thinners, and other liquids shall be turned in to the paint field shop for short periods of time; e.g., during lunch period or for off-loading at the end of a shift. Notify the X18 Welders Department with the locations of these shops are onboard ship. If these requirements cannot be met, Contractors shall ensure that field shops are not used for storage or issue.