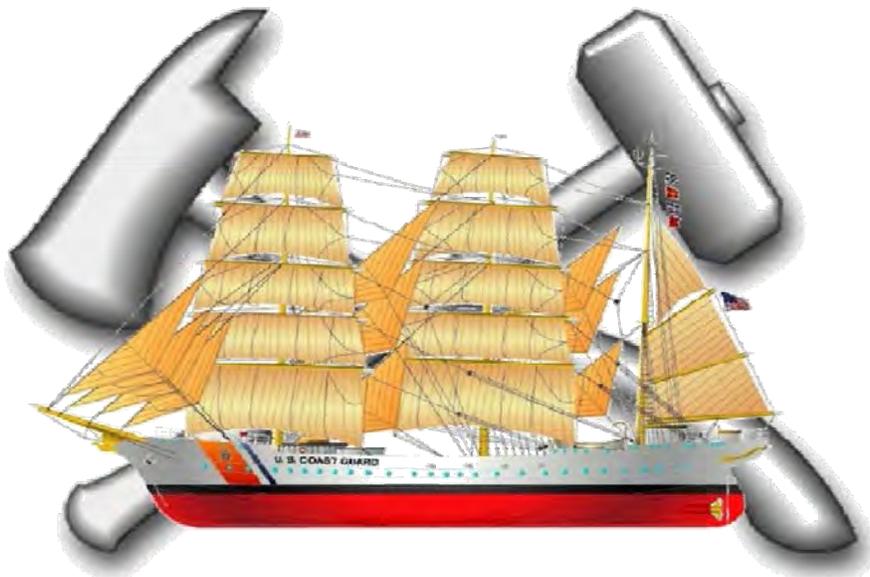


U.S. Department of  
Homeland Security

United States  
Coast Guard



# Machinery Space Firefighting: USCGC Barque *Eagle* (WIX-327) Tactics, Techniques, and Procedures (TTP)



Force Readiness Command  
(FORCECOM)

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COAST GUARD TACTICS, TECHNIQUES, AND PROCEDURES 3-91.14

Subj: MACHINERY SPACE FIREFIGHTING: USCGC BARQUE *EAGLE* (WIX-327)  
TACTICS, TECHNIQUES, AND PROCEDURES 3-91.14

- Ref:
- (a) Shipboard Fire Prevention and Fire Marshal Tactics, Techniques, and Procedures (TTP), CGTTP 3-91.4 (series)
  - (b) Repair Party for Large Cutters (210 feet & above) Tactics, Techniques, and Procedures (TTP), CGTTP 3-91.3 (series)
  - (c) Naval Ships' Technical Manual (NSTM), Chapter 555, Volume 1: Surface Ship Firefighting, S90-86-S3-STM-010 (series)
  - (d) Naval Ships' Technical Manual (NSTM), Chapter 079, Volume 3: Damage Control Engineering Casualty Control, S9086-CN-STM-030/CH-079V3R2 (series)
  - (e) Machinery Space Firefighting Doctrine for Class Bravo Fires, COMDTINST M9555.1 (series)
  - (f) Naval Ships' Technical Manual (NSTM), Chapter 074, Volume 3: Gas Free Engineering, S9086-CH-STM-030 (series)

1. PURPOSE. To provide Coast Guard personnel responding to a machinery space fire onboard the USCGC Barque *Eagle* (WIX-327) with usable tactics, techniques, and procedures (TTP).
2. ACTION. This CGTTP publication applies to CGC *Eagle*. Internet release authorized.
3. DIRECTIVES/TTP AFFECTED. None.
4. DISCUSSION. This TTP publication provides specific equipment, systems, and procedures used to prevent, control, extinguish, and overhaul fires in CGC *Eagle* machinery spaces.
5. DISTRIBUTION. FORCECOM TTP Division posts an electronic version of this TTP publication to the CGTTP Library on CGPortal. In CGPortal, navigate to the CGTTP Library by selecting **References > Tactics, Techniques, and Procedures (TTP)**. FORCECOM TTP Division does not provide paper distribution of this publication.
6. FORMS/REPORTS. None.

7. **REQUEST FOR CHANGES.** Submit recommendations for TTP improvements or corrections via email to [FORCECOM-PI@uscg.mil](mailto:FORCECOM-PI@uscg.mil) or through the TTP Request form on CGPortal. In CGPortal, navigate to the TTP Request form by selecting **References > Tactics, Techniques, and Procedures (TTP) > TTP Request.**

Send lessons learned applicable to this TTP publication via command email to FORCECOM TTP Division at [CMD-SMB-CG-FORCECOM](mailto:CMD-SMB-CG-FORCECOM).

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By Direction of Commander,  
Force Readiness Command

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# Chapter 1: Introduction

## Introduction

This chapter overviews the contents of this tactics, techniques, and procedures (TTP) publication. It also defines the use of notes, cautions, and warnings in TTP publications.

## In This Chapter

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This chapter contains the following sections:

Section	Title	Page
A	Introduction	1-2
B	Notes, Cautions, and Warnings	1-3

---

## Section A: Introduction

---

### **A.1. Introduction**

The machinery space class bravo fire is one of the most hazardous shipboard casualties, both to human life and machinery. Tailored specifically for the USCGC Barque *Eagle* (WIX-327), this TTP publication addresses the following when a major fuel/lube oil leak or a fire occurs:

- Fire prevention.
- Firefighting systems capabilities and limitations.
- Considerations for choosing firefighting equipment.
- Actions necessary inside and outside affected spaces.

This publication provides a basis for proper decisions and actions in response to a major flammable liquid leak or machinery space fire. This publication provides best practices and procedures to prevent, control, extinguish, and overhaul a class bravo fire in a machinery space. This does not replace good judgment, a familiarity with firefighting systems and equipment, and an understanding of which agent or firefighting system to use for different fires.

Read, become familiar with, understand, and practice the TTP contained in this publication. When a fire starts, it is too late to read this publication!

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### **A.2. Deviations**

This TTP publication cannot cover every scenario that might arise. Such cases might result in the need to deviate from guidance in this publication. You may deviate from the TTP as necessary to complete the task with greater safety, effectiveness, or efficiency. Do not take such deviations lightly. Temper any decision to deviate with maturity and a complete understanding of the mission, members' capabilities, and equipment. Whenever possible, consult your unit chain of command before deviating. Report TTP adjustment needs per the Request for Changes paragraph located in the letter of promulgation.

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## Section B: Notes, Cautions, and Warnings

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**B.1. Overview** The following definitions apply to notes, cautions, and warnings found in TTP publications.

**NOTE:** **An emphasized statement, procedure, or technique.**

**CAUTION:** **A procedure, technique, or action that, if not followed, carries the risk of equipment damage.**

**WARNING:** *A procedure, technique, or action that, if not followed, carries the risk of personnel injury or death.*

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## Chapter 2: Fundamental Principles

### Introduction

This chapter discusses fundamental principles of machinery space firefighting aboard the 295 foot, CGC *Eagle*. For this ship, these spaces are the following:

- Engine room (4-75-0-E).
- Generator room (4-68-0-E).
- Emergency diesel generator (EDG) room (1-20-1-E).

The damage control organization is a distinctive organization comprised of damage control central (DCC), repair 2, and the battle dressing station. CGC *Eagle* is equipped with two repair lockers, but usually only repair 2 is manned. The engine room is manned sufficiently to control most damage incurred in that space.

There is one repair party aboard this vessel. The repair party repairs electrical and sound powered phone circuits, renders first aid, and transports casualties without reducing damage control capabilities. It must control and extinguish all types of fires, control flooding, and perform de-watering. The repair party evaluates the extent of damage in its area to ensure on-scene report accuracy.

### In This Chapter

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This chapter contains the following sections:

Section	Title	Page
A	Fire Prevention	2-2
B	Hazards	2-3
C	Administrative Organization	2-5

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## Section A: Fire Prevention

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### A.1. Risk Mitigation

Preventive measures significantly reduce the risk of fire in machinery spaces. Regular and frequent inspections by the fire marshal include (refer to reference (a), Shipboard Fire Prevention and Fire Marshal Tactics, Techniques, and Procedures (TTP), CGTTP 3-91.4 (series) for checklists), but are not limited to the following (refer to reference (b), Repair Party for Large Cutters (210 feet & above) Tactics, Techniques, and Procedures (TTP), CGTTP 3-91.3 (series) for more guidance):

- Combustibles are properly stowed and protected.
  - Likelihood of fire is reduced by:
    - Minimizing combustibles.
    - Performing frequent and thorough watch standing rounds.
    - Exercising with frequent fire drills.
    - Educating all hands to preclude and eliminate fire hazards.
  - The following fire prevention policies and practices are enforced:
    - Maintain flange shields on required flammable liquid piping.
    - Maintain proper covers on flammable liquid strainers; keep sounding tube caps in place and isolation valves closed.
    - Take immediate action to stop and repair all oil leaks.
    - Clean up oil spills and leaks.
    - Keep ventilation ducts free of oily residue.
    - Keep bilges free of oil and trash.
    - Empty flammable/trash cans daily.
    - Prevent stockpiling excess or unauthorized flammables.
    - Do not use uptake spaces to store combustible materials.
  - All firefighting equipment properly maintained.
  - Portable and installed fire fighting systems and equipment are routinely tested, inspected, operated, and maintained per applicable publications and consistent with good engineering practices.
  - Systems and equipment are operated and maintained per applicable publications and consistent with good engineering practices.
  - All machinery space damage control closures and fittings are properly maintained.
  - Shipboard electrical and mechanical tag out procedures are followed.
-

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## Section B: Hazards

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### B.1. Lead Acid Batteries

Lead acid batteries can be a serious hazard during and after a machinery space fire. Hydrogen gas, given off by batteries, is combustible and can be explosive. As the batteries become hotter, they give off more gas, increasing the danger. Battery acid is very corrosive. Battery acid leaks from a meltdown or explosion could be harmful to the ship and/or firefighters. Using water on a battery fire can also cause an explosion. Additionally, salt water mixing with sulfuric acid gives off chlorine gas, which is toxic. Although there are no lead acid batteries in either the engine room or generator room, they can be found in the following locations aboard CGC *Eagle*:

- IC & Gyro room (3-63-1-C) in the battery racks.
- EDG room (1-20-1-E), located between the non-tight door (NTD) and the EDG against the aft bulkhead of compartment.
- Motor surf boats at frame 83 on port and starboard sides.

**WARNING:**

*Extinguish lead acid battery fires with carbon dioxide (CO<sub>2</sub>) portable extinguishers only. Additional corrective responses are any normal form of firefighting.*

**WARNING:**

*Using water (H<sub>2</sub>O) on a lead acid battery fire might cause an explosion. Always use self-contained breathing apparatus (SCBA) when combating battery fires due to the hazardous gases given off. If using water, maintain a minimum of 4 feet from the fire and angle spray at 30-60 degrees. After any fire near lead acid batteries, a gas free engineer (GFE) tests for the presence of chlorine gas.*

**WARNING:**

*Acid from leaks is very corrosive. Use extreme caution and appropriate personal protection.*

---

**B.2.  
Lead-Based  
Paint, Asbestos,  
and PCBs**

---

Cutter crews must be aware of potential exposure risks from fires and other emergency events that disturb asbestos, lead, or polychlorinated biphenyls (PCBs). Damage control operations, including access and overhaul activities, can cause significant damage to asbestos-containing material and lead-containing paint.

Cutters do not have the equipment or expertise to certify a space safe for re-occupancy by unprotected personnel after the release of asbestos fibers, lead dust, or after formation of dioxins when PCBs burn.

Therefore, after a fire or other event that might have damaged or disturbed asbestos containing material, lead, or PCBs, do the following:

- Direct exhaust ventilation for smoke clearance downwind, toward unoccupied areas, and restrict access to these locations.
- After firefighting actions, place contaminated clothing (i.e., firefighter's ensemble (FFE) or other exposed items) in trash bags and seal the bags.
- Restrict access to affected compartments.
- Only enter these compartments while wearing SCBAs and protective clothing.
- Contact the Health, Safety, and Work-Life Service Center (HSWL SC) for assistance with air monitoring and surface wipe sampling to certify spaces safe for re-entry.

**WARNING:**

*Air that is exhausted from compartments to clear smoke after a fire has affected these materials probably contains these hazards and increases exposure risks for unprotected personnel near exhaust locations.*

---

## Section C: Administrative Organization

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**C.1. Damage Control Central** DCC is located in the combat information center (CIC), 01-100-0-C. The engineer officer (EO) receives and evaluates information from the repair locker and other stations. The EO keeps the commanding officer (CO) informed of conditions affecting buoyancy, list, trim, stability, and watertight integrity. The EO relays orders from the CO and issue orders to the repair locker as necessary to control flooding, watertight integrity, and de-watering.

---

**C.2. Equipment** Keep the following equipment available to DCC:

- Casualty plot board.
- Message blanks.
- Damage control (DC) plates and book (EO's stateroom).
- Plans and blue prints (in log office).
- Flooding Casualty Control System computer in CIC.

---

**C.3. Chain of Command** The EO is the designated damage control officer (DCO). In the event that the EO is incapacitated or otherwise unavailable, the damage control assistant (DCA) assumes DCO duties.

In the event CIC becomes unusable, relocate DCC to the log office.

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## Chapter 3: Personnel Actions

**Introduction** This chapter discusses actions and priorities for various personnel upon discovery of a machinery space leak or fire.

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**In This Chapter** This chapter contains the following sections:

Section	Title	Page
A	Underway Actions	3-2
B	In Port Actions	3-6
C	Communications	3-9

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## Section A: Underway Actions

---

### **A.1. Person Discovering the Leak/Fire**

Be aware that a machinery space fire can occur at any moment, without notice. The loss of machinery from this emergency can range from a loss of a generator to the total loss of all propulsion and electrical power.

- Report the leak/fire, location, source/cause, and action being taken to the engineer officer of the watch (EOW).
- Request the OOD sound the alarm and make an appropriate pipe.
- Secure affected equipment and the source of the leak per the cutter's restricted maneuvering doctrine.
- Set ventilation to low.
- Take initial action to combat the leak/fire.
- If a leak/fire is uncontrollable or escape is threatened, evacuate the space immediately.

---

### **A.2. Engineer Officer of the Watch**

Upon receiving report:

- Report the fire to the bridge.
- Take initial actions by shutting down vital machinery as necessary.
- Evacuate the space.
- Mechanically isolate the fuel valve at repair 2 (2-87-1).

If the fire gets out of control:

- Order all machinery secured and the space evacuated.
  - After evacuating the space, muster engineers that were in the affected space during the incident.
  - Report to the repair locker leader (RLL) the fire source, class, location, machinery status, personnel/evacuation status, equipment isolation (including fuel cut-off valves), and current firefighting actions.
  - Request the OOD make an appropriate pipe and sound the alarm over the main circuit (1MC).
  - Activate the aqueous film forming foam (AFFF) system if not already activated.
  - Start the fire pumps.
  - Muster the watch section, including engine room watch standers, on the waist. Report muster results to the RLL.
-

**A.3. Officer of the Deck**

- Upon request from the EOW, use the IMC to pass the word: “Fire, fire, fire, class bravo fire (or major fuel/lube oil leak) in (compartment number), (noun name). All hands man your general emergency stations. Set the main space fire doctrine.” Repeat pipe, then sound the general emergency alarm.
  - Maneuver the cutter to alleviate the effect of winds and smoke and provide the most stable platform possible to enable fire fighters to control damage and fight the fire. Slow to bear steerageway if possible to allow for P-100 pump suction.
  - Notify the EOW of maneuvering situations that might prohibit normal casualty control procedures or require main propulsion machinery to remain on line (i.e., restricted maneuvering rules in effect).
  - Notify other vessels in the area.
  - Ensure a complete record of events is maintained in the deck log.
- 

**A.4. Engineering Officer**

Assist the EOW in any manner possible during a general emergency.

- Take actions independently in support of EOW firefighting efforts.
  - Assume damage control and firefighting responsibilities from the EOW after the machinery space is evacuated.
- 

**A.5. DCTT/ RRT**

The damage control training team (DCTT) serves as the ship’s rapid response team (RRT).

- Take out hoses for the re-entry team.
  - Install smoke curtains.
- 

**A.6. On-Scene Leader**

The on-scene leader (OSL) leads damage control efforts at the scene.

- The OSL reports to the RLL.
  - All personnel involved in damage repairs at the scene report to the OSL.
  - The OSL personally monitors the primary forward topside fire boundary.
  - The OSL briefs the fire team on the fire location, initial actions conducted, and equipment left behind, and
  - The OSL ensures personnel properly don SCBAs prior to departing the locker.
- 

**WARNING:**

***Delay firefighting efforts only if there is a serious risk to repair party personnel if they don’t wait for complete electrical isolation.***

---

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**A.7. Repair Locker Electrician**

The repair locker electrician:

- Secures and/or isolates systems and equipment that are the cause of a fire, have the potential to increase the intensity of a fire, or pose a safety hazard to repair personnel.
- Electrically isolates affected areas to the greatest extent possible, with the exception of lighting. The OSL decides when to secure lighting.
- As directed by the EO, energizes electrical equipment only after a detailed damage assessment that indicates these operations can be conducted without endangering personnel or CGC *Eagle*.

NOTE:

**The CO might choose not to electrically isolate a damaged space, or selected equipment, due to safety or tactical considerations.**

---

**A.8. P-100 Pump Team**

The P-100 pump team has the following tasks:

- Establish communications with DCC and RLLs.
- Rig two P-100s on the fantail, in tandem, and connect to the firemain via jumper lines. Upon notification, start P-100s to send emergency firefighting water to the firemain.
- Rig a third P-100 on the fo'c'sle for backup.
- Prepare breathing air compressor.
- Refill SCBA bottles as directed. Ensure the intake is clear of any smoke or exhaust.

---

**A.9. Damage Control Officer**

The EO is the assigned DCO. The DCO is in charge of overall firefighting efforts during a machinery space fire.

- The DCO takes station in DCC during a major oil leak or machinery space fire. If DCC becomes uninhabitable, the DCO moves to the log office and directs firefighting efforts from that location.
- The DCO ensures repair party personnel follow the machinery space fire doctrine.

---

**A.10. Staging Area Person in Charge**

The person-in-charge has the following tasks:

- Establish communications with DCC and RLLs.
  - Assemble non-essential (extra) personnel. Provide relief fire party personnel as requested.
  - Investigate/set topside fire/smoke boundaries and make reports to RLL.
-

**A.11. Repair  
Locker Leader**

The CGC *Eagle* has two repair lockers, repair 2 and repair 3, but only mans repair locker 2. The RLL remains at or near the repair locker and carries out the following procedures:

- Muster repair 2 personnel.
  - Ensure no one enters the buffer zone without proper battle dress and an SCBA.
  - Manage SCBAs and FFEs.
  - Ensure adequate firemain pressure is available.
  - Assign adequate personnel to the P-100 pump team and ensure the team couples the P-100 output into the ships firemain.
  - Ensure that the appropriate AFFF station is manned immediately upon the sounding of the general emergency alarm.
  - Conduct two AFFF dumps prior to letting the attack team enter the affected space.
- 

**A.12. Attack  
Team Leader**

Dressed in the FFE, carrying the thermal imager (continue to use the fire warrior until no longer serviceable), the attack team leader directs the hose teams.

---

**A.13. Battle  
Dressing Station**

The HS is in charge of the rest area and provides relieved firefighters with fluid replacements such as potable water, a sports drink, etc. The HS:

- Provides energy replacement snacks as needed.
  - Mans a recovery area, designated by the DCC, that is well ventilated, cool, dry, and as low as possible in humidity, for relieved firefighters.
  - Bases the relieved firefighter rest period on a 2:1 ratio of exposure to rest.
  - Checks relieved firefighters exhibiting or reporting heat stress symptoms before returning them to firefighting or heat stress exposure duties.
  - Obtains and distributes dry clothing changes for firefighters as needed.
-

## Section B: In Port Actions

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- B.1. Watchstander** Watchstanders take these actions for a machinery space leak or fire in port:
- Report the leak/fire, location, source/cause, and actions taken.
  - Sound the alarm and make appropriate pipes.
  - Ensure onboard personnel are accounted for and aware of the situation.
  - Secure affected equipment and the source of the leak.
  - Secure ventilation and set zebra around affected area.
  - Take initial action to combat the leak/fire.
  - If a leak is uncontrollable, fire becomes out of control, or escape threatened:
    - Evacuate the space.
    - Call the local fire department per the unit's established memorandum of agreement (MOA). An example MOA is in reference (a), Shipboard Fire Prevention and Fire Marshal Tactics, Techniques, and Procedures (TTP), CGTTP 3-91.4 (series).
  - Secure as much power as possible to isolate the affected space.
- 
- B.2. Off-Duty Personnel** All personnel aboard but not assigned to the day's duty section musters on the waist for further assignment as directed by the OOD/EOW.
- 
- B.3. Damage Control Officer** The EO is the assigned DCO. The DCO is in charge of overall firefighting efforts during a machinery space fire. The DCO takes station in DCC during a major oil leak or machinery space fire. If DCC becomes uninhabitable, the DCO moves to repair 2 and directs firefighting efforts from that location. The DCO ensures repair locker personnel follow machinery space fire doctrine.
- 
- B.4. Engineer Officer of the Watch** In the event an oil fire occurs in a machinery space while CGC *Eagle* is in port, report it to the quarterdeck, which then sounds general emergency and makes appropriate pipes over the 1MC. The quarterdeck watch calls the local fire department.
- The EOW acts as OSL/team leader and directs the hose team into the machinery space to fight the fire (when manning permits), otherwise the EOW sets boundaries, secures equipment, and activates installed fire protection systems.
-

**B.5. Officer of the Deck**

Upon receiving a report of a fire or major flammable liquid leak, use the 1MC to pass the word: “Fire, fire, fire, class bravo fire (or major fuel/lube oil leak) in (compartment number), (noun name). All duty section personnel provide from repair 2. All unassigned personnel muster on the waist.” Repeat pipe, then sound the general emergency alarm.

- Notify the following agencies/commands.
    - Local fire department.
    - Base OOD and senior officer present afloat (SOPA) (if applicable).
    - EO.
    - CO.
  - Hold a muster of unassigned personnel.
  - When local fire fighting authorities arrive, brief the senior member on the extent of the emergency. Have the fire department rig a hose to the international shore tie connection in the air castle (port or starboard) to provide firemain pressure if needed.
  - Maintain security of the ship and create a complete record of events in the deck log.
- 

**B.6. Rapid Response Team**

Due to manning restrictions and training requirements, the damage control training team serves as the ship’s rapid response team. They activate the initial one-minute sprinkling of AFFF in the bilges, take out hoses for the re-entry team, and install smoke curtains.

---

**B.7. Repair Locker Leader**

The CGC *Eagle* has two repair lockers, repair 2 and repair 3, but only mans repair locker 2. The RLL remains at or near the repair locker and carries out the following procedures:

- Muster repair 2 personnel.
  - Ensure no one enters the buffer zone without proper battle dress and an SCBA.
  - Manage SCBAs and FFEs.
  - Ensure adequate firemain pressure is available.
  - Assign adequate personnel to the P-100 pump team and ensure the team couples the P-100 output into the ships firemain.
  - Ensure that the appropriate AFFF station is manned immediately upon the sounding of the general emergency alarm.
  - Conduct two AFFF dumps prior to letting the attack team enter the affected space.
-

---

**B.8. On-Scene  
Leader**

The OSL takes charge of damage control efforts at the scene.

- The OSL reports to the RLL.
- All personnel involved in damage repairs at the scene report to the OSL.
- The OSL personally monitors the primary topside fire boundary.

The OSL briefs the fire team on the situation at hand and ensures all SCBAs are properly donned prior to departing the locker.

**WARNING:**

***Delay firefighting efforts only if there is a serious risk to repair party personnel if they don't wait for complete electrical isolation.***

---

**B.9. Attack  
Team Leader**

Dressed in the FFE, carrying the thermal imager, the attack team leader directs the hose teams.

---

**B.10.  
Repair Locker  
Electrician**

The repair locker electrician:

- Secures and/or isolates systems and equipment that are a cause of a fire, have the potential to increase the intensity of a fire, or pose a safety hazard to personnel.
- Electrically isolates affected areas to the greatest extent possible, with the exception of lighting. The OSL decides when to secure lighting.
- The repair locker electrician, directed by the EO, energizes electrical equipment only after a detailed damage assessment that indicates these operations can be conducted without endangering personnel or the ship.

**NOTE:**

**The CO might choose not to electrically isolate a damaged space, or selected equipment, due to safety or tactical considerations.**

---

**B.11. Battle  
Dressing Station**

The HS is in charge of the rest area and provides relieved firefighters with fluid replacements such as potable water, a sports drink, etc. The HS:

- Provides energy replacement snacks as needed.
  - Mans a recovery area, designated by the DCC, that is well ventilated, cool, dry, and as low as possible in humidity, for relieved firefighters.
  - Bases the relieved firefighter rest period on a 2:1 ratio of exposure to rest.
  - Checks relieved firefighters exhibiting or reporting heat stress symptoms before returning them to firefighting or heat stress exposure duties.
  - Obtains and distributes dry clothing changes for firefighters as needed.
-

## Section C: Communications

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### C.1. General

The primary mode of damage control communication aboard CGC *Eagle* is the 2JZ sound powered phone circuit. The secondary communication mode is portable radios. Portable radios can be primary communications for all watch stations underway. Portable radios eliminate the need for the OSL and investigators to write messages. Radios provide a fast and accurate way to communicate between stations.

Repair party personnel should recognize a communications casualty and be able to shift to alternative means/circuits when required. Use standard damage control terminology.

NOTE:

**Record all reports received in the repair locker on message blanks for both plotting and maintaining a record of communications. Writing message blanks is a fundamental DC skill that must not be lost.**

---

### C.2. Repair Locker Leader

The RLL maintains effective communications, using primary or secondary modes, with the OSL, the portable pump team, engine room, and the pilothouse. The RLL passes word to others in the damage control organization, not specifically noted here, by the most efficient means.

---

### C.3. Underway Communications

Use standard damage control communications in fighting machinery space fires. Brief the damage control organization on the exact location and cause of the fire, status of plant securing and isolation, and personnel status. If possible, the EOW or space supervisor briefs DCC and they pass the information to others in the damage control organization.

In the event primary and secondary communications are lost, rig emergency communications X40J phone circuit (pumpkin line) on the 02 level to the OSL. If portable radios cannot be used, the OSL communicates directly with the repair locker via message blanks. If message traffic cannot be maintained, use any available means to maintain communications between the repair party and the repair locker.

---

#### C.3.a. EOW (Underway)

The EOW establishes and maintains communications with the pilothouse and the repair locker. The EOW keeps them informed of machinery plant status. Specifically concerning securing and isolation, personnel status, and the exact location and cause of the fire. The EOW briefs the RLL on machinery plant status when forced to evacuate the engine room.

---

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**C.4. In port  
Communications**

The primary mean of communications is portable radios between the watchstander and the OOD. If portable radios cannot be used, the watchstander communicates directly with the OOD via ship phone. If message traffic cannot be maintained, use any available means to maintain communications between the watchstander and the OOD.

---

C.4.a. EOW  
(In Port)

The EOW establishes and maintains communications with the OOD and quarterdeck. The EOW keeps the OOD informed about machinery plant status, securing and isolation status, and the location and cause of the fire.

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## Chapter 4: Personnel Protection

**Introduction** This chapter discusses personnel protective clothing, equipment, and procedures.

---

**In This Chapter** This chapter contains the following sections:

Section	Title	Page
A	Protective Clothing	4-2
B	Thermal Imager/Fire Warrior	4-3
C	Firefighter Management	4-4

---

## Section A: Protective Clothing

---

**A.1. Clothing** Personnel not exposed to an immediate threat of injury from flash or flame, do not require fire protective equipment. Firefighters require FFE to re-enter a machinery space that was evacuated because of fire. All other personnel require proper battle dress and flash gear as a minimum. Properly using personal protective clothing, equipment, and procedures reduces the risk of injury.

---

A.1.a.  
Firefighting  
Ensembles

All members of the attack team wear FFE, which includes:

- SCBA.
- Fire protective gear.
  - Firefighter's hood.
  - Damage control helmet.
  - Firefighter's gloves.
  - Firefighter's boots.

**WARNING:**

*“Corfam” shoes melt and cause severe foot injuries during fires. Do not wear “Corfam” shoes aboard ship, except at the CO’s discretion for inspections.*

**WARNING:**

*As soon as firefighting and plant securing efforts allow, personnel in affected spaces each obtain and carry an emergency escape breathing device (EEBD). EEBDs are for escape only and not for firefighting.*

---

## **Section B: Thermal Imager/Fire Warrior**

---

**B.1. Thermal Imager**      The attack team leader, dressed in the FFE, carries the thermal imager.  
During a machinery space fire, use the thermal imager to:

- Locate a fire and direct a hose team to the fire.
- Locate personnel in a space.
- Find cableway, stack, or ventilation duct fires.
- After the fire is out, locate hot spots or hang-fires.

---

**B.2. Fire Warrior**      A Fire Warrior is a helmet-mounted, hands-free, thermal imager.

---

## Section C: Firefighter Management

---

### C.1. Attack Team Relief Process

The RLL manages the attack team relief process.

The relief process starts with the OSL, then the attack team leader, nozzle man, hose tenders and plug man. Relieved attack team members proceed to a location determined by the DCA (or OOD in port) for doffing of SCBAs and FFEs.

Properly manning firefighting billets consumes most FFEs/SCBAs in the locker.

Use additional personnel to augment attack teams as needed. Once a relief attack team is properly dressed out, they muster and stand by while the repair locker leader reports to the OSL that a relief fire party is available.

### C.2. Firefighter's Heat Stress Prevention

The RLL and OSL monitor the fire team for signs of heat exhaustion, heat stroke, and excessive fatigue. Signs to watch for are:

- Staggering and disorientation.
- Difficulty breathing or hyperventilation.
- Overall lack of responsiveness.

#### NOTE:

**Relax FFE while resting and while waiting to re-enter an affected space to minimize heat stress caused by sweat flashing off into steam.**

#### C.2.a. Reliefs

The relieved fire party musters on the waist. The HS designated on the watch, quarter, and station bill musters, or accounts for, relieved personnel and ensures they rest, drink plenty of water (not soda), and seek necessary medical attention. When available, provide snacks to relieved personnel.

#### C.2.b. Recovery

Relieved firefighters assemble in the designated recovery area. Allow firefighters to rest for a period equal to the time they spent firefighting.

#### NOTE:

**Per paragraph 7.5.10, Reliefs, of reference (c), Naval Ships' Technical Manual (NSTM), Chapter 555, Volume 1: Surface Ship Firefighting, S90-86-S3-STM-010 (series), "In a high-heat-stress-environment, personnel endurance in an FFE may be limited to less than 10 minutes. The maximum time for personnel to function in an FFE is 30 minutes."**

### **C.3. SCBA Management**

Until a designated GFE certifies the atmosphere safe for re-entry without SCBAs, each person entering a smoke control zone or an affected machinery space must don an SCBA. Activate SCBAs when smoke is present or when directed by the OSL. If relief personnel are not in a smoke control zone or affected machinery space, they should don SCBAs in the standby position. Once relieved firefighters clear the smoke control zone, they remove SCBA masks and open the tops of their FFEs.

The OSL informs the repair locker concerning:

- Number of personnel entering the space.
- Fire party positions filled (i.e., plug man, hose team, etc.).
- SCBA start time.

The repair locker then reports the information to DCC.

The OSL inspects firefighters for proper FFE and SCBA donning, activation, and functioning before ordering personnel to enter a space with an unsafe atmosphere. OSL orders SCBA personnel relieved as needed.

The muster area for OSL inspection is on the mess deck (2-49-0-L). The primary SCBA change out location is the waist, with the secondary location on the poop deck at frame 108 next to the aft SCBA compressor.

---

#### **C.3.a. SCBA Equipment**

SCBAs and spare SCBA bottles are located as follows.

- 10 SCBAs in passage 1-10-1-L.
  - 6 SCBAs in passage 1-24-0-L.
  - 2 SCBAs in passage 2-68-0-L.
  - 4 SCBAs in passage 2-75-2-L.
  - 4 SCBAs in vestibule 2-84-0-L.
  - 28 spare cylinders in passage 1-10-1-L.
  - 4 spare cylinders in passage 1-24-0-L.
  - 28 spare cylinders in passage 2-75-2-L.
-

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## Chapter 5: Firefighting Systems

### Introduction

This chapter discusses fire fighting systems and equipment installed on CGC *Eagle*. Each has capabilities and limitations that must be understood by fire fighting personnel to ensure quick and proper selection of equipment.

### In This Chapter

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This chapter contains the following sections:

Section	Title	Page
A	Fire and Smoke Detection and Alarm System	5-2
B	Water (Firemain)	5-4
C	Aqueous Film Forming Foam	5-6
D	Carbon Dioxide	5-8
E	Dry Chemical	5-10
F	Choosing the Correct Firefighting Equipment	5-11

---

## Section A: Fire and Smoke Detection and Alarm System

---

**A.1. General** The fire and smoke detection and alarm system provides both audible and visual signals when fire or smoke is detected in any of the cutter's 12 fire detection zones or when the system is manually activated. The types of detection devices in the system include flame detectors, thermal, smoke (ionization), and photoelectric.

---

**A.2. Alarm Panel** The alarm control and enunciator panel, located in passage 1-24-0-L, contains the following components.

- Panel ON (green light).
- Alarm (red light).
- Trouble light (yellow light).
- Trouble indicating lights.
- Test/reset lamp.
- Trouble and alarm silencing switches for each of the 12 fire zones.
- Multiple relay modules.
- Alarm control module.
- Power supply module.
- Battery charger/relay module alarm.

Emergency power is available from the system's installed battery packs.

When the alarm control panel is receiving normal or alternative power, the power ON light (green light emitting diode [LED]) is lit. The panel's audible alarm and the trouble light (yellow LED) indicate a loss of normal or alternative power.

**NOTE:**

**If any smoke detector is removed, the trouble alarm sounds and detectors downstream in the circuit no longer operate.**

**NOTE:**

**A trouble alarm indicates the alarming zone is in a fault condition that might compromise fire and smoke detection capabilities.**

---

**A.3. Flame Detectors** Flame detectors sense infrared radiation given off by flames when the source is sustained for 5 to 20 seconds. In response to a flame, a voltage is generated by the cell and amplified by an electronic circuit.

---

**A.4. Thermal Fire Detectors**

Thermal fire detectors are sealed in an outer shell made of a rapidly expanding alloy that responds to changes in ambient temperature. The inner struts are made of an alloy with a lower rate of expansion. The thermal fire detectors are mounted in explosion proof junction boxes.

**A.5. Ionization Type Smoke Detectors**

Ionization smoke detectors have self-compensating dual-ionization chambers and solid state amplifier switching circuits. One chamber detects the presence of combustible products while the other serves as a reference to stabilize the detector's sensitivity for changes in environmental conditions. The sensitivity of each smoke detector is preset at the factory.

**A.6. Photoelectric Type Smoke Detectors**

Photoelectric smoke detectors operate on light-scattering principles and have a cleanable photo chamber. Each unit is made up of a LED and light sensing photodiode. The photodiode is arranged so that the light emitted by the LED does not reach the photoelectric cell.

**A.7. Fire Alarm System Pull Box Locations**

Pull boxes allow manual activation of the fire alarm system. Locations are as follows:

	O1 level	01-80-0-C 01-100-0-C	pilothouse CIC and chart room
	main deck	1-10-1-L 1-24-0-L 1-30-0-Q 1-46-0-L 1-81-0-L 1-90-0-L 1-103-0-L	passage passage galley laundry passage passage passage
	second deck	2-10-0-L 2-27-0-L 2-37-0-L 2-49-0-L 2-63-0-L 2-84-0-L 2-90-0-L	female berthing (2 ea) passage passage mess deck passage (2 ea) passage passage
	third deck	3-25-0-Q 3-40-0-L 3-49-1-L 3-56-0-A 3-63-0-E	reefer flats passage passage sail locker machine shop
	fourth deck	4-68-0-E 4-75-0-E	generator room engine room (2 ea)

## Section B: Water (Firemain)

---

### B.1. General

Water is available for producing AFFF, cooling hot bulkheads in spaces adjacent to the fire, and extinguishing ordinary combustible (class alpha) fires. When a hose line attack is needed to extinguish a flammable liquid fire and AFFF is not available, high velocity water fog may be used as the primary extinguishing agent. However, time to fight the fire will be longer and more fire fighters needed. Expect increased fire damage and a greater risk of reflash than when AFFF is used.

### B.2. Firemain

The firemain is located on the second deck and spans from frame 13 to frame 110. A riser connects the number 1 fire pump at frame 13 and another riser connects the number 2 fire pump at frame 74. Cutout valves, located forward and aft of each fire pump riser connection, permit isolation of each pump. Damaged sections of firemain can be isolated and jumper hoses installed between fire stations to permit firefighting efforts using the firemain to continue in emergency operations.

The firemain system consists of the following components:

- One 3-inch diameter main header.
- Two fire pumps.
- 19 fire stations.
- Isolation valves.

The CGC *Eagle* normally has two fire pumps on standby. Two centrifugal fire pumps, rated for 360 gallons per minute (GPM) at 100 pounds per square inch (psi), supply the firemain.

### B.3. #1 Fire Pump

The #1 fire pump is in storeroom (4-10-0-A) at frame 12, portside. Normal electrical power supply for the pump is from the emergency switchboard (ES-4EP-A). The pump can be energized from its local controller that is located on the forward bulkhead in female berthing (3-10-0-L), next to the AFFF stowage rack, or from the two remote controllers located at repair 2 and the AFFF station.

### B.4. #2 Fire Pump

The #2 fire pump is on the upper level in the engine room (4-75-0-E) at frame 78, portside, outboard of the control air compressor and flask. Its normal electrical power supply is from the ship service switchboard via power panel (4-68-2). The pump can be energized from its local controller that is located just aft of the pump in the engine room (4-75-0-E) or from the remote controllers located at repair 2 and the AFFF station.

---

**B.5.  
P-100 Pumps**

The CGC *Eagle* has three P-100, air-cooled, diesel powered, portable pumps for dewatering and fire fighting. Two of these pumps, rigged in tandem, are capable of pumping up to 300 GPM. All are located at frame 80 on the waist, starboard side. In the event of a machinery space fire at sea, the repair party rigs a P-100 to pressurize the AFFF system in the event installed fire pumps are inoperative. Connect the P-100 to the AFFF connection on the weather deck at frame 68, starboard side, using a 2½-inch hose.

A P-100 can be set up and used to pressurize the firemain through any hose station with a 1½ inch fire hose and a double female connection.

**NOTE:**

**Firemain pressure must be at least 65 psi for the AFFF bilge sprinkling system to work properly.**

---

**B.6. Dewatering  
Pumps**

Two P-6 portable pumps are aboard CGC *Eagle*. Both are on top of CIC at frame 102. These pumps are primarily for dewatering and are capable of pumping 120 GPM. They are stored in waterproof containers that float if dropped overboard. Use these pumps as a secondary means of fire fighting during a sustained loss of ship's power.

---

**B.7. Electric  
Submersible  
Pumps**

CGC *Eagle* has three portable, electric, submersible pumps, each capable of pumping 180 GPM against a 50-foot head or 140 GPM against a 70 foot head. These pumps are primarily used for dewatering.

Pump locations:	1-24-1-L	repair 2
	2-75-2-L	repair 3
	2-49-0-L	mess deck, frame 63
Electrical outlets:	1-12-0-L	passage, frame 13
	1-24-0-L	passage, frame 24
	2-63-0-L	passage, frame 63
	1-80-2-L	passage, frame 82

---

## Section C: Aqueous Film Forming Foam

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### C.1. General

AFFF, the primary agent used for space re-entry, is a surfactant produced by mixing water with AFFF concentrate either by a fixed proportioning unit or by using an in line proportioner attached to one of the installed fire stations. Apply AFFF from:

- An installed AFFF hose reel with vari-nozzle or,
- A fire station and hose with portable in-line eductor and vari-nozzle and,
- The bilge sprinkling systems.
  - Bilge sprinkling, where available, is activated as part of initial action when responding to a major oil leak or fire scenario.

AFFF is effective on class bravo bilge fires, in vapor securing surfaces, and in preventing large scale reflashes. When a hose line attack is made to extinguish a flammable liquid fire, use AFFF if it is available. When expending AFFF, set the vari-nozzle to the “power cone” position. A good match between the flow rate of the vari-nozzle and the portable in-line eductor is a minimum 65 psi for efficient foam application.

**NOTE:**

**Foam generation requires a minimum firemain pressure of 65 psi.**

The AFFF system is mounted on the second deck at frame 68 and consists of the following:

- 50-gallon AFFF stowage tank.
- Bilge sprinklers serving (4-68-0-E) and (4-75-0-E).
- Two hose reels with 150 feet of 1½-inch hose.
- Ship’s service diesel generator (SSDG) emergency shutdowns.
- Fire pump activation pushbuttons.

---

### C.2. Hose Reels

The two hose reels are designated for generator room and engine room re-entry. Two hose coverage to either space is possible through the machine shop (3-63-0-Q).

---

**C.3. AFFF  
Eductors**

CGC *Eagle*'s portable AFFF equipment includes in-line eductors, 50-foot sections of 1½-inch hose with a vari-nozzle, and concentrate pails. Each in-line eductor has a removable, reinforced, flexible pickup tube and wand with strainer for insertion into AFFF concentrate pails. The eductor incorporates a ball check device and a metering orifice. In addition to AFFF in-line eductors installed at various fire plugs throughout the ship there is one spare eductor in each repair locker.

Portable AFFF eductors and installed bilge sprinklers can operate simultaneously without degradation.

**C.4.  
AFFF Refills**

Five gallon pails of 6 percent AFFF concentrate are provided for a recharge of the proportioner tank, and for use with each in-line eductor.

AFFF stowage locations are:

<u>Quantity</u>	<u>Compartment Number</u>	<u>Compartment</u>
8	2-63-2-L	cadet berthing Denmark
24	2-37-0-L	passageway
16	4-37-0-A	storeroom
4	2-63-0-L	AFFF system
1	4-75-0-E	engine room
1	4-68-0-E	SSDG space
4	2-82-0-L	passage

**C.5.  
Portable AFFF  
Extinguishers**

Portable AFFF fire extinguishers are primarily for flushing small oil pools into the bilge or in combating small class bravo fires before they are out of control. Portable AFFF extinguishers are in the following locations:

<u>Quantity</u>	<u>Compartment Number</u>	<u>Compartment</u>
1	1-24-1-L	repair 2
1	4-68-0-E	generator room
2	4-75-0-E	engine room

## Section D: Carbon Dioxide

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### **D.1. Portable CO<sub>2</sub> Extinguishers**

Fifteen pound portable CO<sub>2</sub> extinguishers are primarily for small electrical fires (class charlie). These CO<sub>2</sub> extinguishers have little effect on small class alpha and bravo fires except those of low heat intensity and with an involved surface no greater than four square feet. A successful attack requires a close approach due to an effective range of four to six feet. Cylinders subject to high temperatures (135 degrees Fahrenheit or greater) are filled to 90 percent and are marked accordingly.

Use portable CO<sub>2</sub> extinguishers on major electrical or electronic equipment such as generators, motors, switchboards, storage batteries, electronic and computer equipment, and major control equipment. CO<sub>2</sub> extinguishers are installed in passageways and other areas that contain electrical equipment such as motor controllers, transformers, distribution panels, and connection boxes. Extinguishers are within the same watertight subdivision as the equipment they are intended to protect.

#### **WARNING:**

*Use caution when discharging more than one extinguisher, as CO<sub>2</sub> displaces oxygen, which might cause asphyxiation.*

---

**D.2.  
Portable CO<sub>2</sub>  
Extinguisher  
Locations**

	<u>Quantity</u>	<u>Compartment Number</u>	<u>Compartment</u>
<u>O1 Level:</u>	2	01-100-0-C	CIC and chart room
	1	01-104-0-C	radio room
<u>Main deck:</u>	1	1-20-1-E	EDG compartment
	1	1-24-0-L	passage
	1	1-46-0-Q	laundry
	1	1-81-0-L	passage
	1	1-90-2-L	passage
<u>Second deck:</u>	1	2-10-0-L	crew berthing
	1	2-17-2-L	petty officer berthing
	1	2-27-0-L	passage
	1	2-31-2-L	CPO mess
	2	2-37-0-L	passage
	1	2-49-0-L	mess deck
	1	2-63-0-L	passage
	1	2-63-1-L	chase berthing
	1	2-63-2-L	Danmark berthing
	1	2-63-3-L	Itaska berthing
	1	2-69-2-L	Gorch Fock II berthing
	1	2-74-0-Q	engine room Fidley
	1	2-75-1-L	J. C. Dobbins berthing
	1	2-75-2-L	passage
	1	2-75-4-L	Marcea berthing
	1	2-82-1-L	Sagres II berthing
	1	2-84-0-L	passage
	1	2-82-2-L	Tovarish berthing
	1	2-90-0-L	passage
<u>Third deck:</u>	1	3-10-0-L	female crew berthing
	1	3-25-0-Q	reefer flats
	1	3-37-0-L	female cadet berthing
	1	3-40-0-L	passage
	1	3-43-2-L	cadet lounge
	1	3-49-1-L	passage
	1	3-63-0-E	machine shop
	1	3-68-0-E	generator room
	1	3-90-0-Q	ET shop (10 pound capacity)
1	3-92-0-A	centralized supply	
<u>Fourth deck:</u>	1	4-68-0-E	generator room
	2	4-75-0-E	engine room

---

## Section E: Dry Chemical

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### E.1. Purple K Powder

Purple K Powder (PKP) is a dry chemical agent (potassium bicarbonate) stored in portable extinguishers. These extinguishers are very effective on small, isolated, class bravo pool fires (fires less than ten square feet). The maximum range for the extinguisher is 20 feet. PKP is best used by unprotected operators who take initial action to extinguish a fire at its onset. Successful use of PKP for initial action on oil spray fires is time critical. Application of PKP is required before the fire is out of control. PKP is not designed for use on a fire that is out of control or for re-entry. Simultaneous action to secure the source of the fuel is required. A total of seven, 27 pound PKP extinguishers are installed aboard CGC *Eagle*.

**WARNING:**

*Dispense PKP properly to avoid breathing difficulties and reduced visibility.*

**CAUTION:**

**Do not discharge PKP into electrical equipment, as serious corrosion of components might occur.**

---

### E.2. 27-Pound Portable PKP Extinguisher Locations

	Compartment	
<u>Quantity</u>	<u>Number</u>	<u>Compartment</u>
1	1-24-0-L	passage
1	1-37-0-L	passage
1	1-90-0-L	passage
1	2-75-2-L	passage
1	4-68-0-E	generator room
2	4-75-0-E	engine room

---

## Section F: Choosing the Correct Firefighting Equipment

---

### F.1. General

Use the most effective installed system first. Base the choice of firefighting equipment on:

- Fire classification.
  - Fire location.
  - Phase of firefighting action (e.g., action against a lube oil/fuel leak, a class bravo fire, a class bravo fire out of control, or for re-entry).
  - Flow rate of the flammable liquid released and whether the source can be secured quickly.
  - Whether the flow is a spill or spray.
  - The extent of the area covered by the spill, spray, or fire.
- 

### F.2. Lube Oil Leak

To prevent fire during major lube oil/fuel leak:

- Use portable AFFF extinguisher to wash oil/fuel off machinery and deck plates into the bilge.
  - Use AFFF from bilge sprinkling system to vapor-secure the hazard.
  - Use AFFF station hose to wash oil or fuel from deck plates, bulkheads, and machinery into the bilge.
- 

### F.3. Class Bravo Fire

Action against class bravo fires:

- Use portable AFFF or PKP extinguishers on small, confined, class bravo fires.
  - Initial action might not extinguish pool fires that cover an area greater than 10 square feet. However, AFFF or PKP might extinguish or knock down flames of large fires temporarily, allowing added time to secure the oil or fuel source.
  - Use the AFFF bilge sprinkling system to fight a class bravo fire larger than 10 square feet and confined to the bilge.
  - Initial action is not recommended against large unconfined class bravo fires, spraying oil or fuel fires, or when the oil or fuel source cannot be secured quickly, unless such actions are required to evacuate the space. Normally, consider these fires out of control.
  - For concurrent use of bilge flooding and hose stations, the RLL must ensure that the AFFF station is manned and adequately supplied with replenishment AFFF.
-

**F.4. Class Bravo  
Fire Out of  
Control**

Action against class bravo fires out of control:

- Extinguish by firefighters using AFFF hose lines. For a main or auxiliary machinery space fire, activate AFFF bilge sprinklers for a second 2-minute dump prior to fire party re-entry.
- Vapor secure the bilge after re-entry using AFFF hose lines.

**NOTE:**

**Flammable liquid spray fires are automatically considered a class bravo fire out of control.**

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## Chapter 6: Boundaries

**Introduction** This chapter discusses setting and maintaining smoke and fire boundaries.

---

**In This Chapter** This chapter contains the following sections:

Section	Title	Page
A	Space Isolation	6-2
B	Smoke Boundaries	6-4
C	Fire Boundaries	6-6

---

## Section A: Space Isolation

---

**A.1. General** Before a class bravo fire gets out of control, completely isolate the machinery space with the exception of firefighting systems, lighting, and ventilation. Per reference (d), Naval Ships' Technical Manual (NSTM), Chapter 079, Volume 3: Damage Control Engineering Casualty Control, S9086-CN-STM-030/CH-079V3R2 (series), once the fire is out of control, secure all systems, except lighting. Fume tight is the minimum degree of tightness for a fire boundary.

**NOTE:**

**Set condition zebra, from the affected space moving outward.**

---

**A.2. Fuel Tanks** Transfer of fuel to a safe location to remove fuel contents puts the empty fuel tank at maximum risk to fire. Therefore, do not transfer fuel from the fire area. The only action necessary to prevent tank contents from contributing to a machinery space fire is to isolate and secure the fuel system.

---

**A.3.  
Fire Boundaries**

- Establish fire boundaries around the affected space to confine the fire and designate bulkheads to check for heat.
  - These boundaries are generally the watertight bulkheads and decks immediately adjacent to the affected space.
  - Fume tight is the minimum degree of tightness for a fire boundary.
  - Sound general emergency to establish fire boundaries quickly.
  - Set material condition zebra from the affected space out.
- 

**A.4. Mechanical  
and Electrical  
Isolation**

[Appendix B: Mechanical and Electrical Isolation](#) include lists of local and remote control valves, switchboards, breaker and distribution panel locations, etc. for total space isolation.

**NOTE:**

**Ensure mechanical and electrical isolations comply with the restricted maneuvering doctrine.**

---

A.4.a. Electrical Isolation

Complete electrical isolation is very difficult due to the number of cables within and transiting affected spaces. To the extent possible, secure all electrical equipment from outside the affected space at the cutter's service, main, and emergency switchboards, load centers, or distribution panels.

Secure lighting if the OSL determines that an actual hazard to firefighters, such as arcing or sparking, exists. Normally firefighters benefit from improved visibility when lighting is left energized.

---

A.4.b. Mechanical Isolation

Secure and/or isolate systems, machinery, and tanks that have a potential to feed or otherwise contribute to the intensity of the fire. Not all systems have remote securing or isolating capabilities. Along with other concurrent firefighting actions, locally secure those systems without remote securing or isolating capabilities as soon as possible. Engineering watch stander familiarity with location and type of local securing and isolating capabilities per casualty control procedures is essential.

Systems to secure in order of priority:

1. Fuel piping plus transfer, service pumps, and centrifugal purifiers.
2. Lube oil piping, pumps, and centrifugal purifiers.
3. Ship's service and diesel start air systems.
4. Air compressors.
5. Lube oil storage tank.
6. Damage control deck cutout valve to AFFF station.

**NOTE:**

**Establish communications with DCC and exercise care to prevent cascading casualties to equipment necessary to maintain propulsion, electrical power, and firemain pressure in unaffected spaces. Fuel, oil, and, air systems located close to space boundaries are of particular concern.**

**NOTE:**

**Do not isolate AFFF systems unless personnel are evacuated.**

---

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## Section B: Smoke Boundaries

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### B.1. Establish Boundaries

Set machinery space fire and smoke boundaries upon evacuation.

Establish a smoke boundary around the affected space to prevent the spread of smoke and to provide controlled areas for local firefighting.

- Establish a smoke control zone by closing hatches and doors immediately adjacent to the access to the affected space.
- Secure ventilation to make the smoke control zone a dead air space. Only personnel with SCBAs enter the smoke control zone.
- Activate SCBAs when smoke is present or on orders from the OSL.

Set a second boundary around the smoke control zone to check the spread of smoke and provide a safe area for firefighting personnel without SCBAs.

Set smoke boundaries and then set zebra within the secondary boundary.

Use smoke curtains to control the spread of smoke where accesses must be open for the passage of equipment, hoses, or personnel.

---

### B.2. Smoke Curtains

Use smoke curtains where hatches and doors remain open for firefighting.

Sections [B.3.a. Engine Room \(4-75-0-E\)](#) through [B.3.c. Machine Shop \(3-63-0-E\)](#) contain smoke control curtains installation locations. These locations are not all-inclusive and additional curtains might be required, depending on the severity of fire and smoke.

---

#### B.2.a. Engine Room (4-75-0-E)

<u>Type</u>	<u>Fitting</u>	<u>Name</u>
QAWTD	4-75-0	entrance to engine room from generator room.
WTD	4-90-2	entrance to engine room from shaft alley.
QAWTD	3-68-2	generator room access.

---

#### B.2.b. Generator Room (4-68-0-E)

<u>Type</u>	<u>Fitting</u>	<u>Name</u>
QAWTD	4-75-0	entrance to generator room from engine room.
WTD	4-90-2	entrance to engine room from shaft alley.
QAWTD	3-68-2	generator room access.

---

#### B.2.c. Machine Shop (3-63-0-E)

This compartment is transited to attack a fire in either the generator room or engine room. Set a smoke curtain at the access to the machine shop (WTH 2-67-2) from passage 2-63-2-L.

---

### B.3. Ventilation

If a fire is declared out of control, secure ventilation in the affected space after personnel are evacuated. Otherwise, when a machinery space fire is reported, set ventilation as follows:

- In the affected machinery space, set negative ventilation (exhaust on high, supply on low) using local controllers if conditions permit.
- To create a buffer zone in spaces surrounding the affected machinery space, set specific fans as listed in [Appendix D: Ventilation Supply, Discharge, and Controller Locations](#).
  - Where possible, set positive ventilation (supply on high, exhaust off) to limit smoke movement to unaffected spaces.
  - If smoke is sucked into spaces from the weather-exposed intakes, maneuver the cutter to clear the vent intakes or secure ventilation.

#### CAUTION:

**Do not control smoke by establishing positive air pressure on the damage control deck, breaking fire and smoke boundaries, or opening accesses to unaffected spaces. It creates a potential path for fire to spread from the affected space to unaffected spaces by way of the damage control deck.**

- Secure buffer zone ventilation to provide a dead air space at the entrance to the affected space.
- Get permission from the EO, or EOW when in port, to de-smoke a machinery space using the installed ventilation system.

### B.4. List of Fans and Controllers

A list of all supply intake and exhaust discharge fans and associated controllers affecting machinery spaces and adjoining spaces is in [Appendix D: Ventilation Supply, Discharge, and Controller Locations](#).

---

## Section C: Fire Boundaries

---

### C.1. Engine Room (4-75-0-E)

#### Primary

- Fwd: bulkhead 63 in the sail locker.
- Aft: bulkhead 90 in shaft alley, central supply stores/ET shop/armory.
- Topside:
  - J. C. Dobbins (2-75-1-L).
  - Passage (2-75-2-L) and (2-84-0-L).
  - Mircea (2-75-4-L).
  - Tovarish (2-82-2-L).
  - Sagres II (2-82-1-L).
  - Fidley skylights.

#### Secondary

- Fwd: bulkhead 49 in the DC shop and bo's'n hole.
  - Aft: wine locker (2-112-0-A).
  - Topside:
    - Chase (2-63-1-L).
    - Passage (2-63-0-L).
    - Danmark (2-63-2-L).
    - Itaska (2-63-4-L).
    - Gorch Fock II (2-68-2-L).
-

**C.2. Generator Room (4-68-0-E)**

Primary

- Fwd: bulkhead 63 in the sail locker.
- Aft: bulkhead 75 in the engine room.
- Topside:
  - Chase (2-63-1-1).
  - Passage (2-63-0-1).
  - Danmark (2-63-2-1).
  - Itaska (2-63-4-1).
  - Gorch Fock II (2-68-2-1).

Secondary

- Fwd: bulkhead 49 in the DC shop and bo's'n hole.
- Aft: bulkhead 90 in shaft alley.
- Topside:
  - J. C. Dobbins (2-75-1-1).
  - Passage (2-75-2-1) and (2-84-0-1).
  - Mircea (2-75-4-1).
  - Tovarish (2-82-2-1).
  - Sagres II (2-82-1-1).
  - Fidley skylights.

---

**C.3. Emergency Diesel Generator Room (1-20-1-E)**

Primary

- Fwd: NTD 1-22-1 access to 1-20-1-E
- Aft: 1-24-3-X, frame 24-51 stbd
- Topside: fo'c'sle

Secondary

- Fwd: R2 1-24-0-L in passageway 1-10-1-L
  - Aft: waist
-

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## Chapter 7: Major Leaks and Firefighting

### Introduction

This chapter discusses what to do once a major leak or machinery space fire is detected.

---

### In This Chapter

This chapter contains the following sections:

Section	Title	Page
A	Flammable Leak	7-2
B	Class Bravo Firefighting	7-5

---

## Section A: Flammable Leak

---

**A.1. Scenario** A major flammable liquid leak presents an immediate fire hazard that crews must deal with quickly. An oil leak, which forms a spray, can ignite when it encounters any hot surface or equipment capable of electrical arcing. Rapidly securing the oil source and using AFFF to cover liquid surfaces greatly reduces the risk of fire. In addition, small problems (e.g., non-securable drips) not dealt with promptly, can become large problems.

---

A.1.a.  
Report the Leak At sea, the person discovering the leak reports the leak immediately to the EOW to begin concurrent actions. The EOW reports the leak to the OOD. When in port notify the OOD/quarterdeck watch. Sound general emergency and pipe as directed by ship's policy.

---

A.1.b.  
Secure the Source Stop the leak, or isolate it as quickly as possible by locally or remotely closing system cutout valves or shutdown controls. Initiatives, such as rag wraps and collection using a bucket, can control the flow of oil effectively or deflect it away from hot surfaces. When consistent with reference (d), Naval Ships' Technical Manual (NSTM), Chapter 079, Volume 3: Damage Control Engineering Casualty Control, S9086-CN-STM-030/CH-079V3R2 (series), or the cutter's restricted maneuvering doctrine, securing an engine or other piece of equipment might be the quickest, most effective way to reduce or stop the flow of oil.

---

A.1.c.  
Apply AFFF Start the fire pumps and activate the installed AFFF systems. Installed AFFF system provides a blanket of AFFF in the engine room and generator room bilges. To flush oil into the bilges apply AFFF either by portable AFFF extinguisher or local fire station using in-line eductor and 5 gallon AFFF can. Discharge AFFF into the bilge to cover liquid surfaces to prevent ignition of the oil. Reapply AFFF as necessary to maintain blanket coverage. Refill AFFF tank as necessary.

**CAUTION:**

**Prevent disturbing AFFF blankets, which provide a vapor barrier covering the bilge and other areas of heavy fuel buildup.**

---

**A.2. Concurrent Action**

As time and personnel permit, the EOW directs the following:

- Per reference (d), Naval Ships' Technical Manual (NSTM), Chapter 079, Volume 3: Damage Control Engineering Casualty Control, S9086-CN-STM-030/CH-079V3R2 (series), secure operating machinery near the leak to control the casualty.
- Secure WTDs 4-75-0 and 4-90-0.
- RRT lay to passage 2-68-2-L and energize the #1 fire pump and activate the bilge sprinkling system for the affected compartment. Sprinkle the bilge for one minute.
- Open WTH 2-67-2 and install smoke blanket.
- Pay out both AFFF hoses and fake them out to the entrance of the generator room at QAWTD 3-68-2.
- Fire teams dress out and proceed to mess deck. OSL ensure personnel properly don FFEs and SCBAs prior to entering the buffer zone.

**A.3. Initial Firefighting Actions**

Work rapidly because class bravo fires and smoke spread quickly and a fire can grow out of control in seconds. The person discovering the fire should report the fire, its cause, and its location to the EOW.

The EOW assesses the report and directs watch standers to extinguish the fire or evacuate the space.

**WARNING:**

*Do not attack flammable liquid oil spray fires. Experience and fire testing have demonstrated a pressurized release of a flammable liquid can create an unapproachable fire. Extreme heat, smoke and toxic gases can cause life-threatening conditions in less than 60 seconds. Under such conditions, the only prudent action, time permitting, is to secure the affected machinery, don EEBDs, and evacuate. Such fires are commonly fueled by an oil source, which cannot be secured quickly and completely.*

**WARNING:**

*Watch standers or day workers lacking adequate breathing and flash/burn protection will likely be the ones taking initial action. Therefore, it might be impossible to take initial action without risk of severe personal injuries.*

Stop or isolate the leak as quickly as possible by locally or remotely closing system cutout valves or shutdown valves. When consistent with reference (d), Naval Ships' Technical Manual (NSTM), Chapter 079, Volume 3: Damage Control Engineering Casualty Control, S9086-CN-STM-030/CH-079V3R2 (series), or the cutter's restricted maneuvering doctrine, securing an engine or other piece of equipment might be the quickest way of reducing or stopping the flow of fuel. [Appendix B: Mechanical and Electrical Isolation](#) lists controls to secure.

If the fire is localized and small, attack the fire with portable AFFF and/or PKP extinguishers, based on the size, anticipated behavior, and travel of the fire. Good judgment must dictate the course to pursue. When within 15 feet of the fire use the AFFF and/or PKP to knock down flames.

If more than one person on scene takes initial actions, the first person takes initial action with AFFF or PKP extinguishers, while the second sounds the alarm, informs the EOW and breaks out/mans the nearest AFFF hose.

NOTE:

**Alter the sequence of events if the individual discovering the fire can secure the oil source and extinguish the fire faster than reporting the fire. For instance, if the watch stander is near a diesel engine when a lube oil fire flashes around the engine. In a few motions he/she might be able to secure the source of the oil by securing the engine locally, then pick up a portable extinguisher and extinguish the fire. Because class bravo fires can get out of control extremely fast, reporting the fire first could allow the fire to get out of hand.**

NOTE:

**Do not delay firefighting efforts awaiting complete electrical isolation unless there is a serious risk to personnel.**

## Section B: Class Bravo Firefighting

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### **B.1. Contained Scenario**

Take the following actions for a machinery space class bravo fire generated by pooled oil.

- The EOW or person discovering fire informs the OOD of the fire, reports the class of fire (class bravo), its location, and source, if known.
  - The OOD sounds general emergency and makes the appropriate pipes.
  - The EOW is in charge of all firefighting actions until the affected space is evacuated and repair parties are manned and ready.
  - Notify the OOD of any restrictions in maneuvering caused by the fire or the firefighting efforts.
  - Establish communications and provide DCC with progress reports on firefighting and securing checklists so repair personnel can complete checklists in case they must quickly evacuate the machinery space.
  - Start available fire pumps to maintain at least 95 psi on the firemain.
  - Energize AFFF system and apply foam via the installed bilge flooding system.
  - Rig P-100 pumps to provide back-up water supply via AFFF cross-connect at frame 66 main deck.
  - Set fire and smoke boundaries around the affected space to prevent the spread of fire and smoke to other parts of CGC *Eagle*.
  - Set material condition zebra from the affected space outward to facilitate complete isolation and to establish fire and smoke boundaries.
  - Use smoke curtains when boundaries must be broken to allow passage of people and firefighting equipment.
  - Cool fuel and lube oil tanks within the affected space, if required during local fire fighting efforts, by using seawater on tank boundaries.
-

**B.2.**  
**Out of Control**  
**Scenario**

A class bravo fire, especially a flammable liquid spray fire, or a fire fueled by an un-securable oil source, can get out of control within seconds. Combat the fire using installed systems and re-entry techniques outlined in [Chapter 8: Re-Entry and Firefighting](#). Take the following actions when faced with an out of control fire:

- Size up the fire.
  - When the fire covers a large area, is fed by an oil source that cannot be secured, or threatens firefighting or escape, consider the fire out of control. Evacuate the space.
  - A small fire that is not extinguished rapidly can generate large volumes of smoke and deadly gases thereby forcing evacuation.
  - The EOW is in charge of firefighting efforts until the affected space is evacuated. Control of firefighting then passes to the DCA.
- Secure or isolate systems and equipment that are a cause of a fire, have a potential to increase the intensity of a fire, or pose a safety hazard to repair personnel.
- Mechanically and electrically isolate, with the exception of lighting (the OSL decides whether to secure lighting), any space abandoned due to fire, flooding, or other damage to the greatest extent possible.
- Evacuate unsafe spaces.
  - When evacuating machinery spaces, don EEBDs.
  - The preferred method of exiting the engine room or generator room is by a horizontal route to prevent the spread of smoke.
  - Secure access doors, hatches and scuttles after personnel exit.
  - Muster on the weather deck (waist) with the EOW.
- EOW/RLL Turnover.
  - The EOW reports evacuation of the space, actions taken, and the results of the muster to the RLL.
  - The EOW is in charge of fire fighting until the affected space is evacuated and the repair parties are manned and ready.
  - Control of fire fighting then passes to the DCO/DCA via the RLL.
  - If the fuel oil leak or fire is in the generator room, transfer control of machinery in unaffected spaces to engine room general emergency watch.
  - If the fuel oil leak or fire is in the engine room, transfer control of unaffected machinery to the damage control officer.

- Establish communications.
  - The EOW advises the OOD, RLL, and DCC when the fire is out of control.
  - The EOW briefs the repair locker leader on the location and cause of the fire, personnel, and plant status.

Take the following actions to contain and fight the fire. Report the actions to DCC.

- Continue to man, monitor, and replenish AFFF foam stations. Sprinkle bilges with AFFF for at least 2 minutes, but no more than 4 minutes, if not already completed by the rapid response team.
- Secure supply and exhaust ventilation.
- Secure the space mechanically and electrically.
- Re-enter and fight the fire per [Chapter 8: Re-Entry and Firefighting](#), using proper personnel protection per [Chapter 4: Personnel Protection](#).
- After the fire has been extinguished, take the post fire actions discussed in [Chapter 9: Post-Fire Actions](#).

**B.3.  
Inport/Auxiliary  
Steaming/Cold  
Iron Class Bravo  
Fires**

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If an oil fire occurs in a machinery space while in port:

- Watchstanders, fight the fire (if possible).
- Call the local fire department, SOPA, or port authority. The CO or direct representative (OOD) decides whether to use the fire department.

**NOTE:**

**If adequate cutter firefighting resources are available, the cutter can fight the fire. If cutter is unable to combat the fire, request rescue and assistance from nearby afloat or shore units.**

If the fire department is called:

- Brief fire department personnel. Give fire and plant status to a fire department supervisor if the fire department is to fight the fire.
- The EOW or OOD stand by to advise and assist the fire department supervisor. Shipboard personnel assist as directed by the EOW or fire department supervisor on scene.

**NOTE:**

**Professional firefighters might have more experience than USCG firefighters, but their methods and equipment are different. If using the fire department, have them proceed with the EOW as a supervisor or team leader assistant to help with questions or problems that arise.**

**NOTE:**

**Invite the fire department to the ship for familiarization tours and drills per the MOA and reference (e), Machinery Space Firefighting Doctrine for Class Bravo Fires, COMDTINST M9555.1 (series).**

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## Chapter 8: Re-Entry and Firefighting

### Introduction

Re-entering a machinery space to fight an out of control fire is the most critical part of the firefighting evolution and the most dangerous to personnel. The primary functions of the re-entry team are to attack and extinguish the fire, rescue trapped personnel, secure the source of fuel, and overhaul the affected space (including cooling surfaces and de-smoking).

### In This Chapter

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This chapter contains the following sections:

Section	Title	Page
A	Engine Room (4-75-0-E)	8-2
B	Generator Room (4-68-0-E)	8-3
C	Emergency Diesel Generator Room (1-20-1-E)	8-4
D	Attacking from the Space above the Fire	8-5
E	Hose Teams	8-6
F	Installed AFFF	8-7

---

## Section A: Engine Room (4-75-0-E)

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- A.1. Installed AFFF** The engine room has an installed AFFF bilge sprinkler system. Prior to re-entry, the locker leader sends repair party personnel to fire plug 2-89-2 to hook up the fixed sprinkler system with a jumper hose to the fitting coming out of escape trunk QAFTD 2-89-1-T. Once hooked up, perform a 2-minute dump prior to re-entry.
- A.2. Re-entry Points** The primary re-entry point for the engine room (4-75-0-E) is through the generator room (4-68-0-E) via QAWTD 4-75-0. After hoses are faked out in the Aux shot, advance into the space upon OSL permission.  
The secondary entry point is through shaft alley (4-90-0-E) via WTD 4-90-2.
- 
- A.3. Hose #1** Use hose reel 1 or hose reel 2 from 2<sup>nd</sup> deck at frame 68, through the machine shop (3-63-0-Q).  
The attack team puts AFFF on the affected area. Once the bilge sprinkler is secured, the attack team enters the space from the generator room, back up team to follow.
- 
- A.4. Hose #2** Use hose reel 1 or hose reel 2 from 2<sup>nd</sup> deck at frame 68, through the machine shop (3-63-0-Q).  
The secondary hose team watches over the first attack team.
-

## **Section B: Generator Room (4-68-0-E)**

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- |                             |  |
|-----------------------------|--|
| <b>B.1. Installed AFFF</b>  | The generator room has an installed AFFF bilge sprinkler system. Perform a 2-minute dump prior to re-entry.  |
| <b>B.2. Re-entry Points</b> | The primary re-entry point is from the machine shop (3-63-0-Q) through QAWTD 3-68-2. The secondary entry point is through the engine room (4-75-0-E) via QAWTD 4-75-0. |
| <b>B.3. Hose #1</b>         | Hose reel 1 or 2 from 2 <sup>nd</sup> deck at frame 68, through the machine shop (3-63-0-Q).   |
| <b>B.4. Hose #2</b>         | Hose reel 1 or 2 from 2 <sup>nd</sup> deck at frame 68, through the machine shop (3-63-0-Q).   |
-

## **Section C: Emergency Diesel Generator Room (1-20-1-E)**

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- C.1. Indirect**      Prior to re-entry, pull emergency cutoff handle above NTD 1-22-1 and perform an indirect attack from the starboard weather deck, directing water from fireplug 1-30-1 into EDG intake vent.
- 
- C.2. Re-entry Points**      The primary re-entry through NTD 1-22-1 from passageway 1-20-1-E. There is no secondary re-entry access.
- 
- C.3. Hose #1**      Primary attack team uses the exterior fire hose from fire plug 1-30-1. The attack team advances forward and aims the nozzle into the EDG intake vent. Using 30 degree angle fog for an indirect attack, apply fire fighting water to the engine intake.
- 
- C.4. Hose #2**      The secondary team takes the AFFF hose from reel #1 up the forward double ladder well out the port side QAWTD 1-38-2 up to QAWTD 1-27-1 through repair locker 2 in through QAWTD 1-24-1. The attack team then enters the space and blankets the space with AFFF.
-

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## Section D: Attacking from the Space above the Fire

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### D.1. Dangers of Attack from Above

Sometimes spaces can be entered only from above. Working on the hot deck in the space over a fire presents a severe heat challenge even when wearing FFE. Consider the following when conducting either a direct attack or an indirect attack from the deck over a fire space:

- In most situations, opening a hatch for firefighter re-entry is safer than entering through a scuttle. If escape becomes necessary, escaping through a scuttle is very difficult.
- Rotate personnel frequently to avoid heat exhaustion. Endurance on the hot deck over the fire could be less than 10 minutes when wearing FFE.
- Position the OSL and relief personnel outside the access to the space over the fire, so that the high level of heat stress on the deck does not affect his/her endurance and judgment.
- If practicable, firefighters wear two pairs of socks to improve foot insulation.
- Wear long pants under the FFE and overlap clothing at the ankles to prevent heat and steam from entering the bottom of the FFE coveralls.
- Minimize hose ruptures by cooling the deck with water near the hose and avoiding laying hoses on local hot spots.

**WARNING:**

*Staying low, kneeling on the deck, or crouching in the space above the fire could expose firefighters to greater heat stress than standing erect.*

### D.2. Heat Protection

To conduct a direct attack from the space above the fire, firefighters descend through the hot thermal layer in the overhead of the fire space. Firefighters making such an entry must be fully protected in an FFE and make the decent quickly.

**WARNING:**

*Avoid touching hot metal surfaces, such as handrails, if possible, particularly in the hot upper region of the fire space. If it is necessary to grab a handrail to enter the fire space, the firefighter's glove alone might not provide adequate protection. Use an extra glove or other material to prevent burning hands.*

## Section E: Hose Teams

---

### E.1. Hoses and Hose Teams

AFFF for the lead hose (and all installed AFFF stations) is from a balanced pressure proportioner. AFFF for the backup hose is from 5-gallon cans using an inline eductor and vari-nozzle.

- A team leader, in an FFE, enters the space to coordinate hose team actions.
  - Hose teams must be aggressive, but careful not to get trapped by fire.
  - Maintain sufficient distance between hose teams to permit maneuverability and prevent firefighting progress from being impaired.
  - Additional hose handlers might be needed to maneuver the hoses.
  - Ensure hose handlers are properly spaced to maintain communications with the OSL.
  - The backup hose team should keep heat off the lead hose team, and extinguish fires that form behind the lead hose team.
  - If the OSL deems that the second team needs to attack, then the backup hose team attacks the primary blaze by approaching it from a different direction or enters the affected space after the lead attack hose.

**NOTE:**

**Repeated efforts may be necessary to gain access to the space.**

### E.2. Nozzle Patterns

The nozzle man uses the re-entry AFFF hose with wide-angle fog to protect the hose team. Use the vari-nozzle 30-degree fog pattern or “narrow fog” to cool metal surfaces, attack the fire, and lay down vapor-securing AFFF blankets. Adjust the nozzle pattern to suit the particular tactical situation.

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## Section F: Installed AFFF

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### F.1. AFFF Sprinkling

When an installed AFFF sprinkling system is available, operate the AFFF sprinkling system for 2 minutes prior to re-entry to increase the foam blanket in the bilge. The initial foam application might be disturbed by the fuel source.

- Re-enter through a safe access unobstructed by fire.
    - After receiving plant status and fire location reports, DCC (underway) or the RLL/OOD (in port) make a choice of access.
  - Once inside the space, report when the fire is located, when it is extinguished, when reflash watch is set, and when the fire is overhauled.
    - If the location of the fire is not obvious, due to limited visibility, the attack team leader in an FFE follows the lead attack nozzle man with a thermal imager.
      - This person directs the hose teams until relieved.
    - Extinguish class bravo fires within the space using AFFF.
    - To protect against reflash, replenish AFFF blankets covering flammable liquids that might be disturbed by water.
  - Overhaul fire/de-smoke space.
    - Ensure a continuous; unbroken blanket of foam covers all oil-covered bilges and machinery.
    - Use a thermal imager to check for hot spots, hidden pockets of flames and to inspect installed ventilation ducting for hot spots and damage.
    - If undamaged, consider using the installed ventilation for de-smoking.
    - If ducting, plenums, or fans are damaged, use portable de-smoking equipment.
-

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# Chapter 9: Post-Fire Actions

**Introduction**

This chapter discusses post-fire actions. After the fire is out, overhaul, de-smoke, de-water, and perform atmospheric tests to ensure the space is safe for remanning.

**In This Chapter**

This chapter contains the following sections:

---

Section	Title	Page
A	De-smoking	9-2
B	Compartment Overhaul	9-4

---

## Section A: De-smoking

---

**A.1. Ventilation** When a bravo fire has been extinguished, combustible gas may be present. To avoid igniting combustible gases when operating electric controllers to start fans, do the following:

- Leave circuit breakers and other protective devices that tripped during the fire, in the tripped position until system damage is assessed.
- Repair locker electrician examines the electrical distribution system and when acceptable, and with the EO's permission, reestablishes power to the installed ventilation fans.
- If operational, run all fans on high speed for a minimum of 15 minutes to remove smoke and toxic gases.
- If the installed system is inoperable or only partially operable, de-smoke using portable blowers and operable installed fans or positive pressure from adjacent spaces.
- Another option is for the OOD to position the cutter to take advantage of any wind to aid in de-smoking.

NOTE:

**The safest way to de-smoke the machinery spaces is to exhaust with portable blowers or to use positive pressure from adjacent space. These methods minimize the risk associated with igniting flammable liquid vapors, which have not been secured with AFFF.**

De-smoking with installed ventilation systems can proceed with minimal risk when:

- The space has been allowed to cool.
- The source of fuel has been secured.
- All fuel has been washed into the bilges and is vapor-secured.
- No damage has been sustained to the electrical distribution system.

---

**A.2. Alternative Ventilation**

A box fan can be lashed to the Fidley sky light to exhaust smoke from the engine room or generator room. Additionally, box or ram fans with trunks can be rigged from either side of the weather deck at frame 38, main deck and set to force air down through the mess deck and passage to assist in getting air movement through both the generator room and the engine room and out through the Fidley sky lights. QAWTDs 1-39-1 or 1-39-2, QAWTD 2-49-1 and QAWTD 2-63-2, need to be open in order to facilitate positive pressure de-smoking.

---

**A.3.  
Atmospheric  
Testing**

De-smoke first (before atmosphere testing) because:

- Combustible gas analyzers do not operate properly in an oxygen deficient atmosphere.
- Oxygen analyzers do not operate reliably if the sensor is exposed to excessive moisture, heat, or particulates found in post-fire atmospheres.

Per reference (f), Naval Ships' Technical Manual (NSTM), Chapter 074, Volume 3: Gas Free Engineering, S9086-CH-STM-030 (series), a GFE tests for oxygen, toxic gases, and combustible gases when the space is clear of smoke.

- Oxygen must be between 19.5 percent and 22 percent.
  - Combustible gases must be less than 10 percent of the lower explosive limit (LEL).
  - All toxic gases must be below their respective threshold limit values before the space is certified safe for personnel without SCBAs.
- 

**A.3.a.  
Extent of Test**

After a flammable liquid fire has been extinguished, perform toxic gas tests for hydrocarbons, carbon dioxide, carbon monoxide, hydrogen chloride, hydrogen cyanide and chlorine. Threshold limits are set forth by the American Conference of Governmental Industrial Hygienists. Consult the handbook in the repair locker for current threshold values.

Conduct tests near the center and all four corners, taken high and low, with a minimum of ten test points taken. Obtain at least one satisfactory test at each location tested.

**NOTE:**

**A compartment is considered “safe” only after satisfactory test results at all test locations during the latest round of tests. An “unsatisfactory” test result at any test point requires further de-smoking/ventilation, and retesting at all test points.**

---

**A.3.b. Authorized  
Personnel**

As defined in reference (f), shipboard personnel authorized to conduct post-fire atmospheric tests to certify a space as safe for personnel are the GFE or a qualified gas free petty officer (GFPO). When emergency conditions exist and the GFE or GFPO is not available, a performance qualification standard (PQS) qualified repair locker post-fire gas free assistant is authorized to conduct “safe for personnel” gas free testing with the approval of the CO.

---

## Section B: Compartment Overhaul

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- B.1. Dewater** The EO directs the space to be dewatered with the CO's permission and per standard operating procedures. Some AFFF (1 to 1.5 inches) must be left on top of any liquid for 24 to 48 hours to allow cooling and to reduce the risk of reflash. Pump out the bilge to the dirty oil/oily waste holding tank or, with the permission of the CO, pump overboard.
- Retest the space for toxic gasses after dewatering. Water can trap toxic gasses, which are released during dewatering.
- 
- B.2. Re-man** Re-manning can begin once the space has been certified safe for personnel to re-enter without SCBAs.
- 
- B.3. Investigate Damage** The EO directs the damage investigation and determines which, if any, equipment and machinery to restart.
- 
- B.4. Re-Energize Unaffected Systems and Equipment** The EO directs the lineup, starting, and energizing of mechanical and electrical equipment only after a detailed assessment of the damage indicates that these operations can be conducted without endangering personnel or CGC *Eagle*. The damage assessment may include retesting the affected space for explosive gases to ensure it is safe to start machinery or equipment that could produce a spark or provide hot surfaces sufficient to cause a fire or explosion.
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## Appendix A: Glossary and Acronyms

<b>1MC</b>	Main circuit or general shipboard announcing system.
<b>Affected Space</b>	A space involved in an oil or fuel spill, or a fire.
<b>AFFF</b>	Aqueous film forming foam.
<b>Barque</b>	A sailing vessel having three or more masts, square-rigged on all but the aftermost mast, which is fore-and-aft-rigged.
<b>Buffer Zone</b>	An enclosed area immediately adjacent to the entrance to the affected space, i.e., between primary and secondary smoke boundaries. The buffer zone should be a region of dead air. The buffer zone will not be pressurized. The buffer zone is usually located on the damage control deck but may be located around a lower entrance if the fire will be attacked from that entrance.
<b>CIC</b>	Combat information center.
<b>Class Alpha Fire</b>	Ordinary combustibles such as wood, paper, fabric, and most kinds of trash. Class alpha fires leave ash.
<b>Class Bravo Fire</b>	Fires whose fuel is flammable or combustible liquid or gas. Class K fires (cooking oils and fats) are technically a subclass of the flammable liquid/gas class, but special characteristics of these types of fires, namely higher flash points, are important enough to recognize separately.
<b>Class Charlie Fire</b>	Fires involving potentially energized electrical equipment. These fires are a hazard to firefighters using conductive agents, as electricity might be conducted from the fire, to the firefighter's body, and then to ground. Once electricity is shut off to the equipment involved, it becomes an ordinary combustible (class alpha) fire.
<b>Class Delta Fire</b>	Combustible metals such as magnesium, potassium, and titanium.
<b>CO</b>	Commanding officer.
<b>CO<sub>2</sub></b>	Carbon dioxide.

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<b>Contained</b>	The oil/fuel leak/spill is controlled and not allowed to spread.
<b>DC</b>	Damage control.
<b>DCA</b>	Damage control assistant.
<b>DCC</b>	Damage control central.
<b>DCO</b>	Damage control officer.
<b>DCTT</b>	Damage control training team.
<b>De-smoking</b>	Ventilation.
<b>EDG</b>	Emergency diesel generator.
<b>EEBD</b>	Emergency escape breathing device.
<b>Electrical Isolation</b>	The de-energizing of all electrical equipment in and to the affected space.
<b>EO</b>	Engineering officer.
<b>EOW</b>	Engineer Officer of the Watch.
<b>FC-P</b>	FORCECOM TTP Division.
<b>FFE</b>	Firefighter's ensemble.
<b>Fire and smoke boundaries</b>	Any physical barrier can be a fire boundary. Ideally, primary boundaries are the bulkheads, deck, and overhead surrounding the fire. Secondary fire boundaries are usually at fire zone bulkheads or watertight subdivisions.
<b>GFE</b>	Gas free engineer.
<b>GFPO</b>	Gas free petty officer.
<b>GPM</b>	Gallons per minute.

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<b>H2O</b>	Water.
<b>HSWL SC</b>	Health, Safety, and Work-Life Service Center.
<b>LED</b>	Light emitting diode.
<b>Machinery Space</b>	A main machinery or auxiliary machinery space that contains any of the following: installed firefighting systems, oil fired boilers, internal combustion engines, gas turbines, or fuel transfer equipment.
<b>Main Space</b>	A machinery space with internal combustion engines, gas turbines, or boilers.
<b>Major Oil Leak</b>	A major oil leak is defined as a flammable liquid leak (lube oil, fuel oil, or hydraulic oil), more than a drip, that cannot be controlled with a rag by a watchstander in a normal round.
<b>Mechanical Isolation</b>	Used to describe the securing of all machinery and piping systems in and to the affected space.
<b>MOA</b>	Memorandum of agreement.
<b>NSTM</b>	Naval Ships' Technical Manual.
<b>NTD</b>	Non-tight door.
<b>OOD</b>	Officer of the deck.
<b>OSL</b>	On-scene leader.
<b>Out of Control Fire</b>	A fire that creates conditions due to heat and smoke that force personnel to abandon the space. Flammable liquid spray fires are automatically considered a Class B fire out of control.
<b>Overhaul</b>	Determine the extent of the fire while extinguishing residual, embedded fires, followed by clean up operations.
<b>PCBs</b>	Polychlorinated biphenyls.
<b>PKP</b>	Purple K Powder.

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<b>PQS</b>	Performance qualification standard.
<b>psi</b>	Pounds per square inch.
<b>QAWTD</b>	Quick-acting watertight door.
<b>Recovery/ Triage Area</b>	A space designated by DCC for the treatment and recovery of personnel.
<b>Re-entry</b>	Used to describe when a fire team re-enters an affected space after it has been evacuated.
<b>RLL</b>	Repair locker leader.
<b>RRT</b>	Rapid response team.
<b>SCBA</b>	Self-contained breathing apparatus.
<b>Smoke Control Zone</b>	An enclosed area immediately adjacent an access to the affected space, i.e., between the primary and secondary smoke boundaries.
<b>SOPA</b>	Senior officer present afloat.
<b>SSDG</b>	Ship's service diesel generator.
<b>Surfactant</b>	A large group of surface acting compounds that includes detergents, wetting agents, and liquid soaps.
<b>TTP</b>	Tactics, techniques, and procedures.
<b>Unaffected Space</b>	Any space other than the space involved in a major oil leak/spill or fire.
<b>Vapor Secure</b>	Establishing a film or foam blanket over flammable liquids to prevent vaporization thereby isolating the fuel source from oxygen and heat.

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## Appendix B: Mechanical and Electrical Isolation

### 1. Generator Room (4-68-0-E) Mechanical Isolation

<u>Equipment</u>	<u>Primary Location</u>	<u>Remote Location</u>
Both S/S generators	S/S swbd or SSDG shift SSDG to min fuel or pull emergency stop level on right side of engine	passage 1-81-0-L or AFFF station pull to secure engines
generator ventilation	controllers in engine room fwd blkhd, stbd push stop buttons	inside Fidley top platform push off buttons

### 2. Engine Room (4-75-0-E) Mechanical Isolation

<u>Equipment</u>	<u>Primary Location</u>	<u>Remote Location</u>
main diesel engine	main control stand or stbd side of engine. push and hold	passage 1-81-0-L above engine room door entrance pull to secure engine
fuel oil service tank	COV 4-87-2, in engine room turn right to close	2-75-2-L at frame 87 turn right to close
ships service boilers	engine room frame 75 stbd, fwd blkhd switch toggle down	inside Fidley entrance top platform push to secure boilers
engine room vents	generator room aft blkhd (frame 75) port push stop button	inside Fidley entrance top platform push off buttons

### 3. Generator Room (4-68-0-E) Electrical Isolation

- a. Secure any on-line generators.
- b. Secure power panel 4-73-3 at breaker 1-23-1-1EL-D.
- c. Secure power panel 4-70-2 at breaker ES-4EP-L.

**Note: Isolation of (a) thru (c) causes a loss of thrust bearing lubrication and a loss of control air.**

#### 4. Engine Room (4-75-0-E) Electrical Isolation

- a. Secure the following breakers in power panel 4-68-1:
  - C #1 boiler circ pump.
  - D #2 boiler circ pump.
- b. Secure the following breakers in power panel 4-68-2
  - B #2 fire pump.
  - J electric hot water heater.
  - K fuel oil transfer pump.
  - L fuel oil purifier.
- c. Secure the following breakers in power panel 4-68-4
  - A generator room supply vent.
  - B generator room exhaust vent.
  - E #2 S/S air compressor.
  - F engine room supply vent.
  - J engine room exhaust vent.
  - L cadet berthing supply vent.
  - M cadet berthing exhaust vent.
- d. Secure power panel 4-70-2 at ESWBD, breaker ES-4EP-L.
- e. Secure breaker K (domestic hot water heater) in power panel 4-74-2.
- f. Secure the following breakers in power panel 4-74-3
  - A engine room central alarm panel.
  - G flooding alarm panel.
  - H MDE alarm panel.
  - N MDE pre-lube pump.
  - P shaft counter.
  - T fuel oil service tank alarm.
  - Z control air dryer.
- g. Secure breaker H (engine room power panel) in power panel 4-74-4.
- h. Secure the following breakers in power panel 4-74-8
  - E MDE hot start.
  - F #2 R/W cooling pump.

## Appendix C: Fire Plug Locations

### O1 Level

01-30-1	01-0-0-X	weather deck
01-30-2	01-0-0-X	weather deck
01-81-1	01-80-01-X	weather poop deck
01-110-1	01-80-01-X	weather poop deck

### Main Deck

1-26-0	1-24-0-L	passage
1-46-1	1-24-3-X	weather deck stbd
1-46-2	1-24-6-X	weather deck port
1-74-0	1-51-0-X	weather deck waist
1-104-1	1-103-0-L	passage

### Second Deck

2-13-1	2-10-0-L	crew berthing
2-31-1	2-27-0-L	passage
2-39-0	2-37-0-L	passage
2-62-1	2-49-0-L	mess deck
2-66-1	2-66-0-L	passage
2-89-2	2-84-0-L	passage
2-94-1	2-90-0-L	passage

### Third Deck

3-48-2	3-40-0-L	passage
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### Fourth Deck

4-74-1	4-68-0-E	generator room
4-75-1	4-75-0-E	engine room

Total: 19 fire stations

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## Appendix D: Ventilation Supply, Discharge, and Controller Locations

**Note: All engine room and generator room vent fan primary circuit breakers are in panel 3-68-4, which is located in the Generator Room, port side, behind the switchboard.**

Fan #	Fan Location	Controller #	Circuit Breaker
<b>Engine Room (4-75-0-E)</b>			
S-1-76-2	Fidley fwd draws from Fidley forward fed from 1S-4P-F	S-3-75-2	4-68-2-4P-F
E-1-81-2	Fidley aft exhausts to portside Fidley fed from 1S-4P-F	E-3-90-2	4-68-2-4P-J
<b>Generator Room (4-68-0-E)</b>			
S-2-75-0	Fidley fwd draws from Fidley forward fed from 1S-4P-F	S-3-75-5	4-68-2-4P-A
E-2-74-1	Fidley fwd exhausts to top of Fidley, portside fed from 1S-4P-F	E-37-2	4-68-2-4P-B
<b>First Platform (secured for buffer zone)</b>			
S-1-41-2	port fan room draws from portside fan room fed from 1S-4p-F1	1-42-4	1-29-1-4P-d
S-1-42-1	fan room draws from portside fan room fed from 1S-4P-E	1-42-2	1-29-1-4P-F
S-1-76-1	Fidley fwd draws from Fidley stbd side fed from 1S-4P-F1	S-3-75-3	4-68-2-4P-L
E-1-76-2	Fidley fwd exhausts to portside Fidley fed from 1S-4P-F	E-3-90-0	3-68-2-4P-L
E-1-50-2	laundry stbd discharges at main deck, stbd side of laundry fed from 1S-4P-E	2-49-1	1-29-1-4P-G

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## Appendix E: Emergency Diesel Generator Room (1-20-1-E) Checklist

### A. Major Oil Leak/Fire

- \_\_\_\_\_ Bridge sound general emergency
- Pipe:** *“Major lube/fuel oil leak in the emergency diesel generator room, all hands man your general emergency stations. Provide equipment from repair 2.”*
- \_\_\_\_\_ Secure/isolate source of the leak
- \_\_\_\_\_ Establish communications between all stations  
(2JZ/portable radios/ship’s phone system)
- \_\_\_\_\_ Start #1 fire pump
- \_\_\_\_\_ Rapid response team pulls emergency cutoff handle above NTD 1-22-1
- \_\_\_\_\_ Perform an indirect attack from the starboard weather deck, directing water from fireplug 1-30-1 into EDG intake vent.
- \_\_\_\_\_ Muster obtained:
  - \_\_\_\_\_ Engine room
  - \_\_\_\_\_ Repair 2
  - \_\_\_\_\_ Bridge
  - \_\_\_\_\_ DCC
- \_\_\_\_\_ Repair locker dressed out/fire teams in FFEs and SCBAs
- \_\_\_\_\_ Pump team rigs P-100 pump to supply AFFF system
- \_\_\_\_\_ Investigators away  
(proceed to unaffected engineering space to render assistance, set zebra)
- \_\_\_\_\_ Order fire boundaries set

**B. Class Bravo Fire out of Control**

**Pipe:** *“Fire, fire, fire, class bravo fire in the generator room, all hands man your general emergency stations, set the main space fire doctrine.”*

- \_\_\_\_\_ EDG secured
- \_\_\_\_\_ EOW reports to RLL; status of fire fighting efforts, mechanical isolation, and personnel
- \_\_\_\_\_ Investigators away (if not already)
- \_\_\_\_\_ Electrical isolation ordered
- \_\_\_\_\_ AFFF re-entry hoses faked out from port and starboard weatherdecks
- \_\_\_\_\_ Provide additional AFFF concentrate to AFFF station
- \_\_\_\_\_ Electrical isolation complete
- \_\_\_\_\_ Repair 2 muster complete: all personnel accounted for
- \_\_\_\_\_ Fire team manned and ready
- \_\_\_\_\_ Pump team manned and ready



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## Appendix F: Generator Room (4-68-0-E) Checklist

### A. Major Oil Leak/Fire

- \_\_\_\_\_ Bridge sound general emergency
- \_\_\_\_\_ **Pipe:** *“Major lube/fuel oil leak in the generator room, all hands man your general emergency stations. Provide equipment from repair 2.”*
- \_\_\_\_\_ Secure/isolate source of the leak
- \_\_\_\_\_ Establish communications between all stations  
(2JZ/portable radios/ship’s phone system)
- \_\_\_\_\_ Start #1 fire pump
- \_\_\_\_\_ Rapid response team sprinkles generator room bilge for 1 minute.  
Open WTH, install blanket, and rig AFFF hose to QAWTD 3-68-0.
- \_\_\_\_\_ EWS washes oil into bilge with portable ext or AFFF hose
- \_\_\_\_\_ If possible, set negative ventilation in generator room
- \_\_\_\_\_ Muster obtained:
  - \_\_\_\_\_ Engine room
  - \_\_\_\_\_ Repair 2
  - \_\_\_\_\_ Bridge
  - \_\_\_\_\_ DCC
- \_\_\_\_\_ Repair locker dressed out/fire teams in FFEs and SCBAs
- \_\_\_\_\_ Pump team rigs P-100 pump to supply AFFF system
- \_\_\_\_\_ Investigators away  
(proceed to unaffected engineering space to render assistance, set zebra)
- \_\_\_\_\_ Order fire boundaries set

**B. Class Bravo Fire out of Control**

**Pipe:** *“Fire, fire, fire, class bravo fire in the generator room, all hands man your general emergency stations, set the main space fire doctrine.”*

- \_\_\_\_\_ SSDGs secured remote local
- \_\_\_\_\_ Close fuel oil transfer valves
- \_\_\_\_\_ EWS evacuate space (with EEBD)
- \_\_\_\_\_ EOW reports to RLL; status of fire fighting efforts, mechanical isolation, and personnel
- \_\_\_\_\_ Investigators away (if not already)
- \_\_\_\_\_ Electrical isolation ordered
- \_\_\_\_\_ Re-sprinkle bilge for 2 to 4 min. (RRT)
- \_\_\_\_\_ Smoke curtain installed on WTH 2-67-0
- \_\_\_\_\_ AFFF re-entry hoses faked out to QAWTD 3-68-2
- \_\_\_\_\_ Provide additional AFFF concentrate to AFFF station
- \_\_\_\_\_ Electrical isolation complete
- \_\_\_\_\_ Repair 2 muster complete: all personnel accounted for
- \_\_\_\_\_ Fire team manned and ready
- \_\_\_\_\_ Pump team manned and ready

### Fire boundaries

\_\_\_\_\_ **Primary**

\_\_\_\_\_ Ordered

\_\_\_\_\_ Set

\_\_\_\_\_ fwd: frame 63 \_\_\_\_\_

\_\_\_\_\_ aft: frame 75 \_\_\_\_\_

\_\_\_\_\_ topside: cadet staterooms \_\_\_\_\_  
between frame 63 and  
frame 75, (4 total), stack  
boundary manned by bridge

\_\_\_\_\_ 1-inch cooling water placed on upper boundary (if needed)

\_\_\_\_\_ **Secondary**

\_\_\_\_\_ Ordered

\_\_\_\_\_ Set

\_\_\_\_\_ fwd: frame 48 (DC shop) \_\_\_\_\_

\_\_\_\_\_ aft: shaft alley \_\_\_\_\_

\_\_\_\_\_ topside: ET shop, CSS, \_\_\_\_\_  
cadet staterooms  
frame 75 to frame 90

### Re-entry

\_\_\_\_\_ Re-sprinkle bilge with AFFF for 2 min.

\_\_\_\_\_ Permission granted to re-enter thru QAWTD 3-68-2

### Overhaul equipment

\_\_\_\_\_ On-scene

\_\_\_\_\_ Fuel removed/1inch to 1½ inches AFFF blanket remaining

\_\_\_\_\_ Results received (hot spots)

**De-smoking**

\_\_\_\_\_ Ordered

\_\_\_\_\_ Started: method \_\_\_\_\_ (box fan, ram fan, natural, fixed)

**Atmospheric testing**

\_\_\_\_\_ Equipment tested and on-scene

\_\_\_\_\_ Oxygen \_\_\_\_\_

\_\_\_\_\_ Explosive \_\_\_\_\_

\_\_\_\_\_ Toxic \_\_\_\_\_

**Compartment damage reports**

\_\_\_\_\_ Electrical damage

\_\_\_\_\_ Holes/cracks

\_\_\_\_\_ Sagging overhead/bulkhead

\_\_\_\_\_ Equipment

## Appendix G: Engine Room (4-75-0-E) Checklist

### A. Major Oil Leak/Fire

- \_\_\_\_\_ Bridge sound general emergency
- Pipe:** *“Major lube/fuel oil leak in the engine room, all hands man your general emergency stations. Provide equipment from repair 2.”*
- \_\_\_\_\_ Secure/isolate engine or source of the leak
- \_\_\_\_\_ Establish communications among all stations (2JZ/portable radios/ship’s phone system)
- \_\_\_\_\_ Start #1 fire pump
- \_\_\_\_\_ Rapid response team sprinkles engine room bilge for 1 minute. Open WTH, install blanket, and rig AFFF hose to QAWTD 3-68-0.
- \_\_\_\_\_ EWS washes oil into bilge with portable ext or AFFF hose line
- \_\_\_\_\_ If possible, set negative ventilation in engine room
- \_\_\_\_\_ Muster obtained:
  - \_\_\_\_\_ Engine room
  - \_\_\_\_\_ Repair 2
  - \_\_\_\_\_ Bridge
  - \_\_\_\_\_ DCC
- \_\_\_\_\_ Repair locker dressed out/fire teams in FFEs and SCBAs
- \_\_\_\_\_ Pump team rigs P-100 pump to supply AFFF system
- \_\_\_\_\_ Investigators away  
(proceed to unaffected engineering space to render assistance and set zebra)
- \_\_\_\_\_ Order fire boundaries set

**B. Class Bravo Fire out of Control**

- \_\_\_\_\_ Bridge sound general emergency
- \_\_\_\_\_ **Pipe: “*Fire, fire, fire, class bravo fire in the engine room, all hands man your general emergency stations, set the main space fire doctrine.*”**
- \_\_\_\_\_ MDE secured remote local
- \_\_\_\_\_ Close fuel oil transfer valves
- \_\_\_\_\_ EWS evacuate space (with EEBD)
- \_\_\_\_\_ EOW reports to repair 2; status of fire fighting efforts, engine room mechanical isolation, and personnel
- \_\_\_\_\_ Investigators away (if not already)
- \_\_\_\_\_ Electrical isolation ordered
- \_\_\_\_\_ Re-sprinkle bilge for 2 to 4 min. (RRT)
- \_\_\_\_\_ Smoke curtain installed on WTH 2-67-0
- \_\_\_\_\_ AFFF re-entry hoses faked out to QAWTD 3-68-2
- \_\_\_\_\_ Provide additional concentrate AFFF to AFFF station
- \_\_\_\_\_ Electrical isolation complete
- \_\_\_\_\_ Repair 2 muster complete: personnel accounted for
- \_\_\_\_\_ Fire team manned and ready
- \_\_\_\_\_ Pump team manned and ready

### Fire boundaries

\_\_\_\_\_ **Primary** ordered: fwd - aft, topside

Ordered

Set

\_\_\_\_\_ fwd: frame 63

\_\_\_\_\_

\_\_\_\_\_ aft: frame 90

\_\_\_\_\_

\_\_\_\_\_ topside:

\_\_\_\_\_

(4 cadet staterooms between frames 75 and 90)

(2-84-0-L passage, repair 3, and ET shop)

(stack boundary manned by bridge)

\_\_\_\_\_ 1-inch cooling water placed on upper boundary (if needed)

\_\_\_\_\_ **Secondary** boundaries ordered: fwd: frame 49 (DC shop/bo's'n hole) topside:  
CSS, cadet staterooms frame 63 to frame 75)

\_\_\_\_\_ Secondary boundaries set (investigators)

### Re-entry

\_\_\_\_\_ Re-sprinkle bilge with AFFF for 2 minutes.

\_\_\_\_\_ Permission granted to re-enter thru QAWTD 4-75-0

### Overhaul equipment

\_\_\_\_\_ On-scene

\_\_\_\_\_ Fuel removed/1 inch to 1½ inches AFFF blanket remaining

\_\_\_\_\_ Results received (hot spots)

### De-smoking

\_\_\_\_\_ Ordered

\_\_\_\_\_ Started: method \_\_\_\_\_ (box fan, ram fan, natural, fixed)

**Atmospheric testing**

- \_\_\_\_\_ Equipment tested and on-scene
- \_\_\_\_\_ Oxygen \_\_\_\_\_
- \_\_\_\_\_ Explosive \_\_\_\_\_
- \_\_\_\_\_ Toxic \_\_\_\_\_

**Compartment damage reports**

- \_\_\_\_\_ Electrical damage
- \_\_\_\_\_ Holes/cracks
- \_\_\_\_\_ Sagging overhead/bulkhead
- \_\_\_\_\_ Equipment

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