COMNAVSURFORINST 3541.1A

From: Commander, Naval Surface Forces

Subj: STANDARD REPAIR PARTY MANUAL FOR NAVAL SURFACE FORCE

Ref: (a) OPNAVINST 3120.32C, Standard Organization and Regulations of the U.S. Navy (SORM)
(b) NTTP 3-20.31, Surface Ship Survivability
(c) NSTM Chapter 074, V3, Gas Free Engineering
(d) NSTM Chapter 079, V1, Stability and Buoyancy
(e) NSTM Chapter 079, V2, Practical Damage Control
(f) NSTM Chapter 079, V3, Damage Control Engineering Casualty Control
(g) NSTM 300, Electric Plant - General
(h) NSTM Chapter 555, V1, Shipboard Firefighting
(i) NTRP 3-20.31.470, Shipboard Biological Warfare/Chemical Warfare Defense and Countermeasures
(j) COMNAVSURFORINST 3502.1D, Surface Force Training Manual
(k) COMNAVSURFORINST 3540.3A, Engineering Department Organization and Regulation Manual (EDORM)
(l) OPNAVINST 3500.34, Personnel Qualification Standards (PQS) Program
(m) OPNAVINST 5100.19, Navy Occupational Safety and Health Program Manual for Forces Afloat
(n) OPNAV P-03C-01-89, U.S. Navy Cold Weather Handbook for Surface Ships
(o) Hazardous Material Information System (HMIS)
(p) Ship's Damage Control Book
(q) NAVAIR 00-80R-14 NATOPS U.S. Navy Aircraft Fire Fighting and Rescue Manual
(r) Ship’s Damage Control Plates (Diagrams)
(s) Ships Loading Characteristics Pamphlet
(t) FLTMPS

Encl: (1) Surface Forces Standard Repair Party Manual

1. **Purpose.** To issue the Surface Force Repair Party Manual (RPM) for Commander Naval Surface Forces Atlantic/Commander Naval Surface Force Pacific ships.

2. **Cancellation.** COMNAVSURFORINST 3541.1.

3. **Scope.** The Commander Naval Surface Forces RPM provides standardized policy and guidance for shipboard damage control parties
and is applicable to all ships of the Force. References (a) through (t) provide the basis for this manual. Pertinent references are listed at the beginning of each chapter.

4. **Revision.** This is a complete revision, individual paragraph changes are not marked, review in its entirety and at least annually thereafter.

5. **Methodology.** This document was developed to provide policy on damage control matters and to serve as a guide that directs the user to the “why” behind prescribed procedures.

6. **Action.** This instruction becomes effective as a ship's instruction after completion of the following (complete with in 60 days from the effective date of the instruction):

   a. Ship specific information is tabulated and inserted where required.

   b. Required ship-specific policies as listed in Chapter 1, Section 2, are established and inserted into its respective tab.

   c. The Commanding Officer (CO) issues this manual as a ship's instruction by letter.

   d. At least one copy of this manual shall be distributed to and maintained in Damage Control Central (DCC), each Damage Control Repair Station (DCRS) and each Command and Control Station.

7. No changes shall be made to provisions and intent of this manual except as noted in paragraph 6a above. The CO is authorized to augment this manual to assist in the overall continuity pertaining to the individual ship. The CO is authorized to insert ship specific information in the areas annotated in this instruction. The RPM is designed solely as a reference for the ship, but not the sole reference. It should either answer or direct the user to the answer for most DC questions.

   P. A. GUMATAOTAO  
   Chief of Staff

Distribution:  
Electronic only via COMNAVSURFOR Directives Website,  
SURFACE FORCES
STANDARD REPAIR PARTY MANUAL
### RECORD OF CHANGES

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CHAPTER 1
DAMAGE CONTROL ORGANIZATION AND RESPONSIBILITIES

SECTION 1
FUNDAMENTAL PRECEPTS

Ref:  (a) OPNAVINST 3120.32, Standard Organization and Regulations of the U.S. Navy (SORM)
(b) NTTP 3-20.31, Surface Ship Survivability
(c) NSTM Chapter 555, V1, Shipboard Firefighting
(d) NSTM Chapter 079, V2, Practical Damage Control
(e) NTRP 3-20.31.470, Shipboard Biological Warfare/Chemical Warfare Defense and Countermeasures
(f) COMNAVSURFORINST 3502.1D, Surface Force Training Manual
(g) COMNAVSURFORINST 3540.3A, Engineering Department Organization and Regulation Manual (EDORM)
(h) Ships Loading Characteristics Pamphlet
(i) FLTMPS

1100. DAMAGE CONTROL READINESS

a. Effective leadership and a well-trained crew achieve Damage Control readiness. This includes all ranks, ratings, and departments. Central to success is heightened command attention on these matters. One of the most important aspects of damage control preparedness takes place before the damage occurs (with knowledge, training, and exercises). Effective damage control organizations routinely exercise and assess themselves.

b. Damage Control is the responsibility of all hands aboard ship. The ship’s ability to fulfill its mission depends upon its effectiveness. The survival of the ship depends upon prompt and correct damage control action.

c. Training should be based on a seminar, brief/execute, debrief, and follow-up methodology. By using this approach, personnel gain knowledge and develop the skills and teamwork needed to successfully combat any damage.

d. It is vitally important that a strong training program is in place to educate and train the entire ship’s company for all possible damage situations. Education, training, organization, and maintenance are the fundamentals of damage control and are applicable to all ships irrespective of type or size.
e. The CO is responsible for adherence to, and the effective application of, the principles and standards established in this and all damage control publications. These standards are the minimum; they should not restrict the CO’s decision to take additional action to control damage. Listed below are some basic tenets of damage control.

(1) Keep your ship watertight.

(2) Do not violate material conditions.

(3) Have confidence in your ship's ability to withstand severe damage.

(4) Know your way around your ship even in the dark.

(5) Know how to use and maintain damage control equipment.

(6) Report damage to the nearest damage control station.

(7) Keep personal articles properly secured at all times.

(8) Practice personal damage control; protect yourself so you can protect the ship.

(9) Take every possible step to save the ship as long as a bit of hope remains.

(10) Keep cool - don't give up the ship.

1101. DAMAGE CONTROL COMMAND POLICIES

a. Commands shall promulgate in this document policies that impact damage control readiness and insert in Tab A.
1200. **SHIP SPECIFIC POLICIES**

   a. The following ship specific policies must be established and inserted into the Repair Party Manual:

   (1) Machinery Space Firefighting (Chapter 4, Tabs E thru U)

   (2) Toxic Gas Bill (CHAPTER 4, TAB S)

   (3) Strip Ship Bill (CHAPTER 5, TAB A)

   (4) Jettison Bill (CHAPTER 5, TAB B)

   (5) Modified Zebra Bill (CHAPTER 5, TAB C)

   (6) Casualty Power Bill (CHAPTER 6, TAB A)

   (7) CBR-D Bill (CHAPTER 7, TAB E)

1201. **REQUIRED CHAPTER TABS:**

   a. TAB A, Command Policies (p 1-16).

   b. TAB B, Condition I Damage Control "Station" Order of Succession (p 1-16).

   c. TAB C, Flying Squad Organization (p 1-17).

   d. TAB D, DC Communication Plan (p 1-18).

   e. TAB E, Damage Control Repair Station Organization Chart (p 1-19).

   f. TAB F, Alternate Repair Party Mustering Locations (p 1-20).

   g. TAB G, DCRS Inventory/Shortages (p 1-21).

   h. TAB H, Damage Control Command and Control Organizational Chart (p 1-22).

   i. TAB I, IET Manning Chart (p 1-23).

   j. TAB J, Rescue and Assistance Detail Manning (Inport/Underway) (p 1-24).
1300. COMMAND AUTHORITY

a. Authority to Sprinkle/Flood Magazines. The CO shall publish, as ship’s policy, who has the authority to order the sprinkling of magazines. The policy should distinguish between fires in a magazine and fires in compartments adjacent to a magazine. The decision to flood a magazine can have serious consequences on damage control efforts. The person authorized to exercise command authority shall make this decision.

b. Damage Control Measures Requiring Command Approval. Damage control items requiring command approval are listed in reference (b).

1301. REQUIRED DAMAGE CONTROL CENTRAL EQUIPMENT, MATERIALS, AND PUBLICATIONS

a. Certain damage control items shall be maintained by the DCA. Many are listed in the references and are required to be part of the Damage Control Library. Items that are required and are not listed in any reference are listed below. The DCA shall maintain the following items:

(1) Updated liquid loading status to reflect the latest tank and void soundings provided by the Oil King and the Sounding and Security Watch.

(2) Clinometers to determine list and trim.

(3) AN/PDR-65 High Range Survey Meter (may only be available on Bridge).

(4) Tank sequencing chart and/or tables.

(5) The non-propulsion tag out log, if separate from the engineering tag out log, shall be used to tag out any major damage control systems [e.g., firemain or fittings or any procedures affecting stability or involving hot work, reference (d)].

(6) Lists of preplanned routes to deep shelter, combat systems equipment casualty control supply support centers, battle dressing stations, battle messing, and other battle logistics supply centers or storerooms.
(7) Charts, nomograms, and other required materials to calculate various radiological factors.

(8) Repair Party Manual with complete Chapter Tabs.

(9) COMNAVSURFOR publishes serialized Damage Control Readiness Advisories (DCRA) to provide prompt dissemination of information, policies, or procedures not available in other references. All DCRAs, when received, shall be distributed to all applicable personnel for information purposes. DCRAs are available for download on the COMNAVSURFOR and NAVSEA DC web sites.

(10) Ship’s Loading Characteristic Pamphlet (SLCP) for Amphibious Ships.

1302. DAMAGE CONTROL CENTRAL SUCCESSION

a. Provisions must be made for the functions of Damage Control Central (DCC) to be carried out by other stations if DCC needs to be evacuated. Most ships are built with the Damage Control Repair Station (DCRS) furthest from DCC having most of the interior communications circuits necessary to be a secondary DCC. A major conflagration will disrupt the repair organization and may require reorganization topside. The Damage Control Assistant (DCA) shall make provisions to provide the topside location with a copy of the completed RPM and damage control plates for plotting and evaluating damage. The succession of DCC on each ship and the designated topside space shall be annotated in the RPM Chapter 1 Tab B (complete as many as necessary).

1303. DUPLICATE DC MATERIALS FOR COMMAND AND CONTROL

a. To ensure the CO/CDO are aware of and can better visualize the damage control situation, a duplicate set of up-to-date damage control plates showing the hull, all decks and compartments will be provided to any space the CO designates as a Command and Control Station (damage control subdivision plates 2 and 3).

b. The plates need not be permanently mounted or hard laminated like those in DCC/CCS. Because of space considerations, they may be cut down or modified as appropriate so long as they remain functional.

c. A copy of the RPM complete with chapter tabs shall also be provided to all Command and Control Stations.
a. DCRS inventories shall be in accordance with the ship's Allowance Equipage Lists (AEL) or Damage Control - Operating Space Item Management System (DC-OSIMS) Program (PMS 400F3). A paper copy of the ship's current DCRS AEL(s) shall be available to personnel conducting inventories per reference (b). A current DC-OSIMS shortage list shall be maintained in each DCRS's RPM Chapter 1 Tab G:

(1) Ships with a modified DCRS use AEL: 2-880044200.
(2) Ships with one DCRS use AEL: 2-880044201.
(3) Ships with two DCRS use AEL: 2-880044202.
(4) Ships with three DCRS use AEL: 2-880044203.
(5) Ships with four DCRS use AEL: 2-880044204.
(6) Ships with five DCRS use AEL: 2-880044205.
(7) Ships with six DCRS use AEL: 2-880044206.
(8) Ships with seven DCRS use AEL: 2-880044207.
(9) Ships with eight DCRS use: 2-880044208 and 2-880044209.
(10) Ships with nine DCRS use: 2-880044219 and 2-880044220.
(11) Ships with ten DCRS use: 2-880044210 and 2-880044211.

b. To assist in inventories, ships are encouraged to use the following:

(1) Inventory Aid Booklet for Damage Control Equipment (NAVSEA S5090-BL-DCB-010).
(2) Stowage Aid Booklet for Damage Control Equipment (NAVSEA S5090-B1-MMO-010).

c. As much as possible, the equipment should be distributed throughout the DCRS's designated area of responsibility via spread stowage as per reference (b).
1400. **DC ORGANIZATION**

a. Damage Control Organization. The concept behind the changes to the damage control organization is to allow the ship to continue its tactical mission while responding to a casualty in a tiered approach. The tiered response allows the CO the ability to utilize resources more efficiently. Tiered response consists of three layers: Flying Squad, Condition II Damage Control, and General Quarters.

b. Flying Squad shall consist of, at a minimum (see references (b), (c), and (d) for duties and responsibilities):

1. Fire Marshall\(^1\)
2. Electrician\(^3\)
3. Rapid Responders\(^1,2\) (2)
4. Scene Leader\(^3\)
5. Team Leader\(^3\)
6. Team Members\(^2,3\) (3)
7. Investigators\(^3\) (2)

**NOTE:**
\(^1\) Rapid Response Team - Shall report directly to the scene.
\(^2\) Shall be PQS qualified up to DC 308.
\(^3\) Back up Team - Shall report to the designated DCRS.

() Denotes the number of personnel required. Plotter and talker/messenger functions listed in reference (b) may be performed by Non-Flying Squad personnel on watch in control stations.

c. Condition II Damage Control (DC) allows a significant increase in Damage Control response without disrupting tactical watchstations. This provides the CO a multi-tiered response to combat damage. Designated DCRS and DC Central shall be manned up when Condition II DC is set. At a minimum, one DCRS and one Battle Dressing Stations (BDS) shall be manned. For example, when Condition II DC is called, Repair 5 is manned with Repair 5 personnel. As the damage becomes bigger, an additional DCRS is manned. This allows flexibility for additional DCRS to man up
if required (see Figure 1). Primary boundaries, such as fire, smoke and/or flooding shall be set as required.

d. General Quarters (GQ) will be set for tactical reasons as deemed necessary by the CO. Material condition Zebra shall be set during GQ.

e. Functional requirements for individual DCRS shall be in accordance with reference (b).
FIGURE 1 – DC ORGANIZATION 1 FLOW CHART

Damage Reported

Yes

Does the damage affect ship’s survivability or more than one space?

No

Flying Squad
Rapid Response Team
Backup Team

Is the Flying Squad containing the damage?

No

Set Condition II DC
Man 1 or 2 DCRSSs as needed

Is the DCRS containing the damage?

No

Man additional DCRSSs as needed

Is Condition II DC containing the damage?

No

GQ

Yes

No additional personnel required

No additional personnel required

No additional personnel required

No additional personnel required
1401. CONCEPT

a. The Flying Squad’s purpose is to quickly respond to casualties and determine the extent of damage. Designated initial responders will proceed directly to the scene of damage while the rest of the Flying Squad provides from designated DCRS. The actions required for a larger casualty or a change in threat level would drive the ship to Condition II DC. Condition II DC allows the CO flexibility to fight the ship with a tiered DC response without disrupting tactical watchstations. The CO retains the option of setting GQ.

1402. INPORT EMERGENCY TEAM (IET) ORGANIZATION

a. The CO will develop an IET that is an effective fire fighting force considering current circumstances (including machinery space fires). This team must also be capable of effectively controlling flooding and its possible effects, as well as any other condition described in the Emergency Bills (insert manning chart into Tab I). Reference (b), Chapters 2 and 9 refer.

NOTE: The term "circumstances" will include considerations for cold iron, cold iron with flammable liquid systems running, auxiliary steaming and operation of main engines.

b. For units with fewer than three DCRSs (MHC/MCM/PC/LCS): While at home port the IET may be comprised of ship’s force backed up by members of the Base Fire Department or Rescue and Assistance Teams from surrounding ships inport.

c. For units with three or more DCRSs: The requirement for the inport fire party is listed in reference (b).

1403. RESCUE AND ASSISTANCE DETAIL (R&A)

a. The R&A Detail shall maintain the functional capabilities listed in reference (b). Personnel will be taken from the IET. Underway, the R&A team shall be as described in reference (b). When the decision to deploy an R&A Detail is made, the possible degradation of the damage control readiness of the ship providing assistance must be carefully considered. Own ship’s safety and security are the primary concerns. The R&A Detail shall be event specific, that is, only those functions appropriate to a particular casualty will be dispatched. For example: For flooding, the ship would dispatch a de-watering team and a plugging team; for a small fire, the ship would dispatch a hose team; etc.
SECTION 5
DAMAGE CONTROL TRAINING

1500. **SHIPBOARD DAMAGE CONTROL TRAINING SPECIALISTS**

   a. NEC-4805 Shipboard Chemical, Biological, and Radiological-Defense (CBR-D) Operations and Training Specialists. Responsibilities include:

   (1) Conduct training on shipboard CBR-D.

   (2) Advise the CO on how to integrate CBR-D preparation, defense and recovery into the normal command organization.

   (3) Supervise and perform shipboard organizational level maintenance on CBR-D equipment.

   b. NEC-4811 Senior Enlisted Damage Control Program Management and Training Specialists. Responsibilities include:

   (1) Perform managerial and safety supervisor functions in support of DC, Fire Fighting (FF), and CBR-D programs.

   (2) Perform duties as the ship's DC, FF, and CBR-D Subject Matter Expert and is responsible for shipboard DC/FF/CBR-D equipment maintenance and quality assurance.

   (3) Troubleshoot installed FF systems.

   (4) Assist the DCA in organizing and training the ship's DC and FF Teams.

   (5) Plan and evaluate DC/FF/CBR-D exercises.

   (6) Act as the ship's Assistant Gas Free Engineer.

   c. Damage Control Training Team (DCTT). All ships shall have a designated DCTT. It shall provide effective training to the ship’s crew on all types of DC casualties listed in reference (f). For additional guidance and requirements see reference (b).

   d. Required Fire Fighting Team Training conducted in accordance with references (f) and (i).
e. All Hands General DC PQS Training. The DCA will monitor and ensure that all ship-wide general DC PQS meet the requirements set forth in reference (a).
The following are recommended topics, policies or practices that should be included (but are not limited to):

a. When will modified-Zebra be set? (Mod Zebra fittings will be listed in Chapter 5, Tab C).

b. Who responds inport while the main engineering plant is in operation? Day? Night? (IET, GQ or Condition II DC) What about the auxiliary spaces?

c. When is it permissible to discharge oily waste/AFFF overboard? What constitutes an emergency?

d. Who authorizes the placing of DC systems out of commission? How many systems at once?

e. Is there a preferred method for re-entering a main space during fire fighting operations?

f. What tripwires, if any, are there for personnel in command positions (Executive Officer, Command Duty Officer) for flooding a magazine? Using main space educators inport?

g. How will the IET be augmented while in homeport?

h. Where do the members of the training team go during an actual casualty?
NOTE: In the case of Condition II DC, order of succession is the same as Condition I.

First Alternate DCC

Second Alternate DCC

Third Alternate DCC
TAB C
FLYING SQUAD ORGANIZATION

See reference (b) for requirements of the Flying Squad.
### DC COMMUNICATION PLAN

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1-18
See reference (b), Chapters 2 and 9.
Consider accessibility to Damage Control Equipment and other assets, as well as location of fire/damage.
TAB G
DCRS INVENTORY/SHORTAGES

Insert copies of DC OSIMS inventory and shortage lists that are applicable to the DCRS and area of responsibility.
See reference (b).
## TAB I
### IET MANNING CHART

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<tr>
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### NOTES:
1. If the Fire Marshal is also the Engineering Duty Officer (EDO), a separate Scene Leader is required.
2. Member of the Rapid Response Team shall not be assigned to the ship’s security force.
3. All IET personnel shall be qualified as First Aid Provider. The First Aid Provider shall be trained in performing First Aid, CPR, and burn treatment.
4. Also serves as the NFTI operator, if required.
5. Also serves as the Reflash Watch and Overhaulman.
6. Also serves as the Accessman and an extra Hoseman, if required. The Plugman need not man the plug continuously if his/her services are needed elsewhere.
7. Also sets and monitors fire boundaries. Primary fire boundaries need not be continuously manned unless determined necessary by the Scene Leader.
8. Stationed in CCS/DCC.
9. Any electrical rating (EM, ET, IC, GSE, DS, ST, FC, CTM, GM, EW) can PQS qualify and serve as the duty electrician.
10. Also serves as Smoke Control and Dewaterman.
TAB J

RESCUE AND ASSISTANCE DETAIL MANNING (INPORT/UNDERWAY)

See reference (b).
CHAPTER 2
INVESTIGATING DAMAGE

SECTION 1
REQUIRED INFORMATION

Ref: (a) NSTM 079, V2, Practical Damage Control
    (b) NSTM Chapter 555, V1, Surface Ship Firefighting

2100. REQUIRED CHAPTER TABS

    a. TAB A, DCRS and Damage Control Unit Locker (DCUL)/Damage
       Control Unit Patrol Station (DCUPS) Areas of Responsibility. A
       sample is provided.

    b. TAB B, Tanks and Voids. A listing of all tanks and voids in each DCRS area of responsibility, along with their access, sounding tube and air escape locations (if fitted). A sample is provided.
SECTION 2
INVESTIGATING DAMAGE

2200. BASIC PRINCIPLES OF INVESTIGATION

a. These principles are listed in reference (a) and are based on investigators knowing their areas of responsibility. Pre-determined investigator routes have proven worthwhile, but are not required.

2201. INVESTIGATOR REQUIREMENTS:

a. Travel in pairs so one investigator can report damage or casualties while the other takes initial actions.

b. Wear an OBA/SCBA (activate when required). Anti-flash gear, firefighting gloves, helmet, long sleeve shirt, or fire retardant coveralls and rubber boots must always be worn. CBR protective mask and inflatable life vest need not be worn, but must be assigned and readily available in the DCRS or vicinity.

c. Investigators shall carry only the equipment deemed necessary, based on initial response, to conduct investigations. The investigator kit is designed to respond to all types of damage investigations, and if carried in its entirety will slow down the investigation process. The kit may be broken down into sub-kits for investigating during specific casualties. However, these kits, when combined, must include all equipment listed on the applicable AEL.

d. Investigators will be familiar with Chapter 2, Tabs A and B.

2202. INVESTIGATION PROCEDURES

a. Investigators shall be familiar with investigating procedures found in chapter 40 of reference (a).

b. Personnel in manned spaces shall conduct investigation on station and report results to the cognizant supervisory watch station, which in turn shall report results to DCC. Investigators will concentrate on unmanned spaces.

c. The inspection for damage must not be confined to the primary damage area. Inspect outward from the damaged area and along the projectile path, if applicable.
d. Ship system damage reports must pinpoint the system affected and damage location by frame. This will ensure that the required sections of the system are isolated with a minimal impact on the rest of the ship. The investigator shall be knowledgeable of all ship’s systems that are in or traverse their areas of responsibility.

e. When investigating for underwater hull damage and flooding, it may be unwise to open a watertight closure to a potentially flooded space. To determine if the space is flooded:

1. Check for condensation on adjacent bulkheads, if accessible.

2. Tap on the bulkhead a minimum of six inches from welds with a dogging wrench or similar object, listening for a distinct change in the echo tone.

3. Carefully loosen air test fittings/sounding tubes, if provided, remembering to tighten when done.

Note: Caution must be exercised in the removal of sounding tube caps. Back the cap off slowly while listening for rushing air and looking for trickling water from the threads; either symptom may indicate the tank or void is open to the sea. Rushing air might also indicate fire, as oxygen is being sucked into the space to feed it.

4. Check air escape/vents, remembering that they may be located several decks above the damaged space.

f. When underwater hull damage is found or suspected, all tanks and voids should be sounded and compared with the pre-damage soundings. The closest tanks and voids to the suspected damage should be sounded first, but underwater structural damage may not necessarily be confined to the area adjacent to the damage.

g. Indications of possible damage are listed in reference (a).

h. If available, use the Navy Firefighter Thermal Imager (NFTI) because it is an infrared thermal-imaging device that helps to find heat sources. It may be used for the following:

1. Navigating through smoke filled compartments.
(2) Locating the source or seat of the fire.

(3) Finding personnel casualties.

(4) Locating hidden fires, hot spots on bulkheads, decks, overheads and within ventilation ducting.

NOTE: Ventilation systems can be a primary path for fire spread and must be checked early and often.

NOTE: Investigators may also use a "Fire Finder," if available.

2203. DAMAGE CONTROL WIREFREE COMMUNICATIONS (DC WIFCOM/HYDRA/ SIWCS/WPCS) SYSTEMS

a. Emission Control (EMCON) considerations. All handheld wireless radios (e.g. DC WIFCOM, HYDRA, and SIWCS) emit Radio Frequency (RF) signals that can be detected. Therefore, use of any of these types of radios must be addressed in the ship's EMCON plan.

b. Hazardous Electromagnetic Radiation to Ordnance (HERO). For safety reasons, wireless communications systems generally shall not be used during weapons handling evolutions. Specifically, portable radios shall not be used closer than 10 feet of HERO susceptible or unsafe ordnance, especially in the presence of any damaged, broken, or otherwise exposed explosives.

c. Maintaining communication records. The use of handheld wireless radios eliminates the need for the scene leader and investigators to use message blanks. Reports received in the DCRS shall be recorded on message blanks or logbooks to be used for both plotting and maintaining a record of communications in support of subsequent locker leader decisions.

d. Maintaining proficiency in writing messages. The writing of message blanks is a fundamental damage control skill that must not be lost. Scene leaders, investigators, and other handheld, wireless radio users must continue to train in message writing to stay proficient and prepare for scenarios involving a complete loss of wireless communications.
DCRS AND DAMAGE CONTROL UNIT LOCKER (DCUL)/DAMAGE CONTROL UNIT PATROL STATION (DCUPS) AREAS OF RESPONSIBILITY

DCRS TWO (Sample)

1. AREA OF RESPONSIBILITY – Forepeak to Fr. 67, all decks; Fr. 69 FWD main deck and above.

2. LOCATION OF DCRS – 2-51-1-A

<table>
<thead>
<tr>
<th>COMPARTMENT NO.</th>
<th>COMPARTMENT NAME</th>
<th>LOCKED</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-5-0-E</td>
<td>Anchor Windless Room</td>
<td>NO</td>
</tr>
<tr>
<td>1-54-0-A</td>
<td>ASROC Storeroom</td>
<td>YES</td>
</tr>
<tr>
<td>2-54-01-L</td>
<td>Degaussing Equip. Room</td>
<td>YES</td>
</tr>
</tbody>
</table>

Note: Spaces that are normally locked (e.g., Store rooms, Offices, Staterooms etc.) and unmanned during General Quarters should be annotated to aid the RPL and Investigators. Divisions responsible for locked spaces shall post a sign at the entry point stating who maintains keys to the space.
## TANKS AND VOIDS

**DCRS 5 (Sample)**

<table>
<thead>
<tr>
<th>TANK NUMBER</th>
<th>MANHOLE LOCATION</th>
<th>SOUNDED TUBE</th>
<th>SOUNDED TUBE</th>
<th>FIRESCAPE LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-204-2-F</td>
<td>2-205-2</td>
<td>2-209-2</td>
<td>2-180-4-L</td>
<td>MAIN DECK</td>
</tr>
<tr>
<td></td>
<td>2-180-4-L</td>
<td></td>
<td></td>
<td>FR 176 PORT</td>
</tr>
<tr>
<td>5-260-1-F</td>
<td>5-278-1</td>
<td>1-269-2</td>
<td>1-212-0-L</td>
<td>MAIN DECK</td>
</tr>
<tr>
<td></td>
<td>5-230-0-E</td>
<td></td>
<td></td>
<td>FR 255 STBD</td>
</tr>
<tr>
<td>5-308-1-W</td>
<td>3-324-1</td>
<td>3-308-1</td>
<td>5-292-0-E</td>
<td>1-278-1-L</td>
</tr>
</tbody>
</table>
CHAPTER 3
COMPARTMENT ISOLATION

SECTION 1
REQUIRED INFORMATION

Ref: (a) NSTM Chapter 555, V1, Surface Ship Firefighting

3100. REQUIRED CHAPTER TABS

a. TAB A, Compartment Isolation Lists/Kill Cards. Prepared for each significant compartment in the DCRS respective areas of responsibility, with copies maintained in DCC. Each isolation list shall identify:

(1) Electrical. 440V/110V electrical loads

(2) Mechanical
   (a) All fuel/lube/hydraulic oil systems
   (b) Compressed air systems
   (c) Steam systems
   (d) Chill water systems
   (e) Firemain Isolation Valves

(3) Ventilation
   (a) Ventilation controllers: Supply, Exhaust, and Recirculation.
   (b) Natural ventilation closures
   (c) Circle William fittings

(4) Damage Control Equipment: Fire fighting equipment as required.


(6) Water, Air, and Oil tight Closures: Damage Control closures in the compartment.
b. List individual items logically while considering its relative importance. A sample is provided in Chapter 3, TAB A.

NOTE: Main machinery spaces are covered by Chapter 4.

NOTE: Electrical cables only passing through the space do not have to be listed. However, in the event of a cableway fire, cables must be traced and isolated.

NOTE: Compartment isolation lists shall be frequently verified/updated by DCRS/DCTT personnel during Damage Control drills and following significant maintenance periods.
3200. COMPARTMENT ISOLATION CONSIDERATIONS

a. Every effort should be made to secure and/or isolate 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.

b. The isolation of all potentially hazardous systems in the affected space prior to entry is not necessarily required; each casualty must be evaluated individually based on the tactical situation.

c. When a space is abandoned because of fire, flooding, or other damage, the space should be mechanically and electrically isolated to the greatest extent possible under the circumstances. Priority must be given to isolating those systems, which pose the greatest hazard.

d. The CO may choose not to electrically isolate a damaged space, or selected equipment, for safety or tactical reasons. The decision not to electrically isolate must be clearly understood by repair personnel.

e. Fire fighting may start before electrical power is secured. If all power is not secured, the team leader should be aware of what circuits or equipment are still energized. It may be necessary for electrical power to be energized in order to effect mechanical isolation. Mechanical isolation is the priority.

f. The decision to secure lighting should be made by the Scene Leader. Reference (a), Section 7, addresses other items to be considered, such as, hazards to fire fighting.
**COMPARTMENT ISOLATION LISTS/KILL CARDS**

**COMPARTMENT NAME:** ____________________  
**COMPARTMENT NUMBER:** ____________________

**ELECTRICAL ISOLATION:**

<table>
<thead>
<tr>
<th>EQUIPMENT/SYSTEM</th>
<th>CIRCUIT ID NUM</th>
<th>BREAKER LOCATION(S)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. LOAD CENTER 11</td>
<td>1S-3P-11</td>
<td>1-2-3-E/1-3-2-E</td>
</tr>
<tr>
<td>2. 115 V OUTLETS</td>
<td>(3-45-2)-1P-C1P</td>
<td>3-45-2-L</td>
</tr>
</tbody>
</table>

**MECHANICAL ISOLATION:**

<table>
<thead>
<tr>
<th>PIPING</th>
<th>VALVE SYSTEM NUMBER</th>
<th>DAMAGE CONTROL NUMBER</th>
<th>VALVE LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. MAIN DRAIN</td>
<td>5-107-2</td>
<td>5-170-0-E</td>
<td></td>
</tr>
<tr>
<td>2. F/O SUPPLY FO-1</td>
<td>1-2-0-L</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. LP AIR LPA-1</td>
<td>1-2-0-L</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**VENTILATION:**

<table>
<thead>
<tr>
<th>VENTILATION NAME</th>
<th>NUMBER</th>
<th>CONTROLLER LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. SUPPLY</td>
<td>1-2-1</td>
<td>1-2-0-L</td>
</tr>
<tr>
<td>2. EXHAUST</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. NATURAL</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DAMAGE CONTROL EQUIPMENT:**

<table>
<thead>
<tr>
<th>EQUIPMENT NAME</th>
<th>FRAME</th>
<th>VLV/SWITCH NUM.</th>
<th>REMOTE OPERATOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. FIXED HALON</td>
<td>FR 10(P)</td>
<td>5 LB CO2 BOTTLE</td>
<td>2-30-2-L</td>
</tr>
<tr>
<td>2. 15LB C02 BTL</td>
<td>FR 3(S)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>3. FIRE STATION</td>
<td>FR 8(S)</td>
<td>FPL 1-8-1</td>
<td>N/A</td>
</tr>
<tr>
<td>4. RAM FAN</td>
<td>FR 1</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
HAZARDOUS MATERIALS:

<table>
<thead>
<tr>
<th>STORAGE AREA</th>
<th>FRAME NUMBER</th>
<th>CONTENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. HAZMAT LOCKER</td>
<td>FR 5(P)</td>
<td>OILS (VARIOUS)</td>
</tr>
</tbody>
</table>

WATER, AIR, AND OIL TIGHT CLOSURES:

<table>
<thead>
<tr>
<th>CLOSURE TYPE</th>
<th>CLASSIFICATION</th>
<th>NUMBER</th>
<th>ACCESS TO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. QAWTD</td>
<td>ZEBRA</td>
<td>1-12-0</td>
<td>1-12-2-L</td>
</tr>
<tr>
<td>2. WTD</td>
<td>YOKE</td>
<td>1-9-1</td>
<td>1-4-1-Q</td>
</tr>
<tr>
<td>3. ATC</td>
<td>X-RAY</td>
<td>1-8-1</td>
<td>1-4-1-Q</td>
</tr>
</tbody>
</table>
CHAPTER 4
FIREFIGHTING

SECTION 1
REQUIRED INFORMATION

Ref:  (a) OPNAVINST 3120.32, Standard Organization and Regulations of the U.S. Navy (SORM)
(b) OPNAVINST 5100.19, Navy Occupational Safety and Health Program Manual for Forces Afloat
(c) NTTP 3-20.31, Surface Ship Survivability
(d) NSTM Chapter 555, V1, Surface Shipboard Firefighting
(e) NSTM Chapter 079, V2, Practical Damage Control
(f) NSTM Chapter 079, V3, Damage Control Engineering Casualty Control
(g) Hazardous Material Information System (HMIS)
(h) Ship's Damage Control Book
(i) NAVAIR 00-80R-14, NATOPS U.S. Navy Aircraft Fire Fighting and Rescue Manual
(j) NSTM Chapter 074, V3, Gas Free Engineering

4100. REQUIRED CHAPTER TABS FOR SECTION 2

a. TAB A, Firefighting Methods. The firefighting agents for each class of fire are listed in preferential order. A sample format is provided.

b. TAB B, Repair Party Leader's (RPL) Firefighting Checklist. This checklist must be tailored by each ship for use by the DCA, Repair Party Leader, On Scene Leader, and bridge/quarterdeck personnel. A sample format is provided.

c. TAB C, Compartment Hazards. Per references (d) and (e), each DCRS shall have a listing of all hazards in all spaces including, but not limited to, hazardous material, flammable liquids, ammunition/pyrotechnics, industrial chemicals, industrial gases and any other items of concern to the repair party. They may be segregated according to the DCRS areas of responsibility. A sample format is provided.

d. TAB D, Magazine Sprinkler Control Valves. Per reference (h), DCRSs will list by location all magazine sprinkler root/control valves in their area. A sample format is provided.

4101. REQUIRED CHAPTER TABS FOR SECTION 3

a. TAB A, Reentry checklist - Class B Fire - Halon Protected Machinery Space. Reference (d) refers.
b. TAB B, Reentry checklist - Class B Fire - Water Mist Protected Machinery Space. Reference (d) refers.

c. TAB C, Reentry checklist - Class B Fire - HFP Protected Machinery Space. Reference (d) refers.

d. TAB D, Reentry checklist - Class B Fire - Machinery Space - Agent Not Available. Reference (d) refers.

e. TAB E, Fire Boundaries. Per references (d), (e), and (h), list by location each boundary to be set.

f. TAB F, Smoke Boundaries. Per references (d), (e) and (h), list by location each boundary to be set.

g. TAB G, Electrical Isolation. Per references (d), (e), and (h), list by location each item to be operated to isolate each space.

h. TAB H, Mechanical Isolation. Per references (d), (e), and (h), list by location each item to be operated to isolate each space.

i. TAB I, Ventilation System. Per references (d), (e), and (h), list by location all ventilation systems and controllers for each space.

j. TAB J, De-watering From Outside the Space. Per references (d), (e), and (h), list by location and in sequence the valves and procedures to be used.

k. TAB K, OBA Canister/SCBA Change Out Area/SCBA Charging Station. Per references (d) and (g), list the procedures to be used for disposal of OBA canisters and EEBD's.

l. TAB L, Primary / Secondary Space Reentry Plan. Per reference (d), list by location all methods and procedures for entering each space.

m. Tab M, De-Smoking. Per references (d) and (e), list by location.

n. TAB N, Atmospheric Testing. Per reference (j), list all required tests to be completed.
o. TAB O, Fixed CO2 Flooding System Actuation Stations. Per references (d) and (h), list by location all fixed CO2 actuation stations, if applicable.

p. TAB P, HALON/HFP Flooding System Activation Stations. Per references (d) and (h), list by location all HALON/HFP actuation stations, if applicable.

q. TAB Q, AFFF Stations. Per references (d) and (h), list by location all AFFF actuation stations, if applicable.

r. TAB R, Smoke Ejection System. List Smoke Ejection Routes, spaces protected, and power sources.

s. TAB S, Toxic Gas Bill. Per reference (j), insert Toxic Gas Bill.

t. TAB T, FIRE/SMOKE DETECTION SYSTEMS. List detection zones, power sources, and operating locations.

u. TAB U, WATER MIST FIRE EXTINGUISHING SYSTEM (WMFES). List Spaces protected, pump and tank locations, activation, and alignment procedures.
(THIS PAGE INTENTIONALLY LEFT BLANK)
4200. GENERAL SHIPBOARD FIREFIGHTING

a. All hands must be concerned with fire prevention and aware of fire fighting tactics detailed in references (c) through (e). The major steps involved in shipboard firefighting are: establishing communications; locating, reporting, containing, and extinguishing the fire; and restoring from the casualty.

   (1) Establishing communications with DC Command and Control. Time is critical when establishing DC communications. When designating DC command centers and mustering locations, consider the accessibility to quick and reliable communications systems.

   (2) Locating the fire. Considerations for locating the fire include knowledge of the ventilation systems and employment of the NFTI. The discovery of smoke normally precedes the discovery of a fire. Therefore, personnel should be familiar with the ventilation systems and airflow path through their spaces to allow for a quicker response. The NFTI is an effective tool for locating the fire source; however, once inside the space, the thermal layer and high temperature can cause a "white out" condition requiring close adherence to procedures outlined in reference (d).

   (3) Reporting the fire. Personnel must be trained to report the fire/smoke in the following manner:

      (a) Access the ship's emergency number.

      (b) Identify him/herself.

      (c) Report class of fire or color of smoke.

      (d) Give location (space noun name).

      (e) Give space’s DC identification compartment number, if known.

      (f) If the space is accessible, return to the fire and initiate fire-fighting actions.
(g) If the space is inaccessible, isolate the space, break out fire fighting equipment, and stand by in the area to brief the Scene Leader.

(h) Make sure all personnel in the surrounding area are aware of the fire/smoke.

(4) Containing the fire. Lessons learned from shipboard fires have shown how spaces are most vulnerable to vertical fire spread; therefore, the topside fire boundary is paramount. Boundary men must be proactive in removing all combustibles from adjacent spaces, especially adjoining bulkheads. If the space has false decks, make sure all materials below the false deck are removed or wet down. One inch of water on deck may prevent fire spread even when the temperature of the space below is above 1000 degrees Fahrenheit.

(5) Extinguishing the fire. Put the fire out using the preferred agents listed in Section 2, TAB A. The Damage Control organization (DCA, RPL, and OSL) should consider the need to use indirect cooling (fire fighting) prior to using a direct attack, based on space accessibility. Procedures for indirect fire fighting are addressed in reference (d).

(6) Systems restoration. The extent of damage usually determines the speed of casualty restoration. EOSS or other standard operating procedures should be used, where applicable. See reference (f) for equipment reconditioning.

4201. FIREFIGHTING GLASS REINFORCED PLASTIC (GRP) STRUCTURES

a. Minesweepers (MCM) and Mine Hunters (MHC) use GRP for hull and structural components. Greater fire survivability has been achieved by installing mineral wool fire insulation on the bulkheads and in the overheads of vital spaces. Each side of the fire zone boundaries should also have this insulation. This non-toxic material will inhibit radiation and conduction of heat for 30 minutes without external cooling.

b. Fires in GRP boundary compartments will be easier to contain than those in conventional metal compartments because GRP has more fire endurance in terms of heat conduction allowed to the cold side of the boundary. Conversely, GRP is combustible and, because of its insulating abilities, will create a hotter fire than in a compartment with metal boundaries. A fire in a GRP compartment will be much more difficult to extinguish.
c. Obstructions (e.g. machinery, thermal, or acoustic insulation) can shield burning GRP from seawater hose streams or other extinguishing media. The MHC unmanned machinery spaces are limited in maneuvering area making it more vital to ensure complete and reliable fire protection system operation.

4202. AIRCRAFT FIREFIGHTING

a. The ship's aircraft fire fighting personnel shall be organized and trained as per references (a) and (i).
<table>
<thead>
<tr>
<th>Combustible Involved</th>
<th>Fire</th>
<th>Extinguishing Agents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Woodwork, bedding, clothing,</td>
<td>A</td>
<td>1. Fixed water sprinkling</td>
</tr>
<tr>
<td>combustible stores</td>
<td></td>
<td>2. Firemain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. AFFF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. PKP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. CO2 Extinguisher</td>
</tr>
<tr>
<td>Explosives, propellants</td>
<td>A</td>
<td>1. Magazine sprinkling</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Firemain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. AFFF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Jettison overboard</td>
</tr>
<tr>
<td>Paints, spirits, flammable liquid</td>
<td>B</td>
<td>1. Fixed F/F System (CO2/HALON/HFP)</td>
</tr>
<tr>
<td>liquid stores</td>
<td></td>
<td>2. AFFF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Installed sprinklers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Firemain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. PKP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. CO2 Extinguisher</td>
</tr>
<tr>
<td>Fuel Oil, JP-5</td>
<td>B</td>
<td>1. Fixed F/F System (CO2/HALON/WMFES)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. AFFF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. PKP</td>
</tr>
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<td></td>
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<td>4. Water sprinkling system</td>
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<td></td>
<td>5. Firemain</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. Jettison overboard</td>
</tr>
<tr>
<td>Deep Fat Fryer</td>
<td>B</td>
<td>1. Range Guard System</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. AFFF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. PKP and Vari-Nozzle set to Narrow Angle Fog</td>
</tr>
<tr>
<td>Electrical/Electronic</td>
<td>C</td>
<td>1. CO2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. HALON 1301</td>
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<tr>
<td></td>
<td></td>
<td>3. Freshwater FF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Firemain (not solid stream)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. AFFF</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. PKP</td>
</tr>
<tr>
<td>Magnesium alloys</td>
<td>D</td>
<td>1. Jettison overboard</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Firemain (not solid stream)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Dry sand</td>
</tr>
</tbody>
</table>
TAB B
REPAIR PARTY LEADER'S (RPL) FIREFIGHTING CHECKLIST

___ Fire/Smoke Reported Compartment _____________________

___ Damage Control Central (DCC)/Central Control Station (CCS)/Command Duty Officer (CDO) Notified

___ Rapid Response Team _____ (Comms) ______ Ckt

___ Check Firemain Pressure (additional fire pumps req?)

___ Damage Control Repair Station Manned/Ready (Comms) Circuit ________

___ Zebra Set Time (as required) ______

___ Investigators Out (NFTI issued)

___ Order Fire Boundaries (6 Sides)

___ Order Smoke Boundaries (Smoke curtains, blankets)

___ Order Electrical Isolation (Lighting considerations)

___ Order Mechanical Isolation w/exception of fire fighting systems. (Flammable liquid piping, secure vents, Compressed Air systems, secure fuel transfers, and heat sources)

___ Space Evacuated/Casualties

___ Space Hazards (Check Chapter 4 Section 2 TAB C)

___ Class of Fire A ______ B ______ C ______ D ______ (Fuel Source)

___ Installed F/F System Activated Time ______

___ FFEs Required?

___ Status of ventilation/Smoke Ejection System

___ Status of flammable/explosive spaces near casualty

___ Off Ship Assets Req/Backup Fire Party Location
Investigators report at least every 15 Min. Time ____

Fire ____ Smoke ____ Boundaries Set

Status of Mechanical ____ Electrical ____ Isolation
Active De-smoking Required?

OBA/SCBA Activation Time__________

Enter Space - Direct or Indirect Method

Forcible Entry Reqd? - PECU/PHARS/PEARS

Fire Contained

Status of OBA/SCBA - Coordinate Relief _________
(Location)

Fire Out

Reflash Watch Set

Commence Overhaul

Status of hidden fires

Order/Status of De-smoke (CHENG's permission is required
if installed ventilation is to be used)

Order/Status of post-fire atmospheric testing

Order/Status De-watering (CHENG's permission is required)

Vital system restoration - Coordinate with EOOW using Master
Light-Off Check-Off List
### DAMAGE CONTROL REPAIR STATION 3

<table>
<thead>
<tr>
<th>SPACE</th>
<th>HAZARDS</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFTER STEERING</td>
<td>HYDRAULIC OILS</td>
<td>USE AFFF STA 4 WITH INLINE EDUCTOR &amp; 1 1/2&quot; HOSE</td>
</tr>
<tr>
<td>6-506-0-E</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ARMORY</td>
<td>AMMUNITION</td>
<td>MAG SPRINKLER</td>
</tr>
<tr>
<td>2-483-2-Q</td>
<td>GRENADES</td>
<td>ACT VLV 2-481-12</td>
</tr>
<tr>
<td>#2 FLAM LKR</td>
<td>PAINTS/OILS</td>
<td>PRI-CO2 FLOODING</td>
</tr>
<tr>
<td>2-524-0-Q</td>
<td>GREASES</td>
<td>SEC-#4 AFFF STA</td>
</tr>
<tr>
<td>TOWED ARRAY RM</td>
<td>ISOBAR</td>
<td>PRI-HALON FLOODING</td>
</tr>
<tr>
<td>2-506-0-Q</td>
<td></td>
<td>SEC-#4 AFFF STA</td>
</tr>
<tr>
<td>TORPEDO MAGAZINE</td>
<td>OTTO II FUEL</td>
<td>PRI - MAG SPRINKLER</td>
</tr>
<tr>
<td>1-390-1-M</td>
<td>HE</td>
<td>ACT. VLV 1-417-1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SEC - FIREMAIN</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PRI - SCOTT AIR PACK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SEC - OBA</td>
</tr>
<tr>
<td>LAUNDRY</td>
<td>BLEACH</td>
<td>CORROSIVE - PERSONNEL</td>
</tr>
<tr>
<td>2-382-0-Q</td>
<td></td>
<td>HAZARD - DO NOT EXPOSE AL/CU - H2 CREATED</td>
</tr>
</tbody>
</table>

### DAMAGE CONTROL REPAIR STATION 2

<table>
<thead>
<tr>
<th>SPACE</th>
<th>HAZARDS</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANCHOR WINDLASS</td>
<td>HYDRAULIC OIL</td>
<td>PRI -#1 AFFF STA</td>
</tr>
<tr>
<td>1-0-0-E</td>
<td></td>
<td>SEC - FIRE STA #1-79-1 ELECT ISO</td>
</tr>
<tr>
<td>CHT PUMP ROOM</td>
<td>H2S, METHANE</td>
<td>TOXIC/FLAMMABLE</td>
</tr>
<tr>
<td>5-138-0-E</td>
<td>RAW SEWAGE</td>
<td></td>
</tr>
<tr>
<td>RADAR ROOM</td>
<td>HIGH VOLTAGE</td>
<td>SECURE PWR/CO2</td>
</tr>
<tr>
<td>03-138-1-C</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### DAMAGE CONTROL REPAIR STATION 5

<table>
<thead>
<tr>
<th>Location</th>
<th>Item</th>
<th>Priorities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GALLEY</strong></td>
<td><strong>DEEP FAT FRYER</strong></td>
<td>PRI - RANGE GUARD</td>
</tr>
<tr>
<td>1-260-0-Q</td>
<td></td>
<td>SEC - PKP/PORT. AFF</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>OIL LAB</strong></td>
<td><strong>PETROLEUM</strong></td>
<td>PRI - PORT AFF/PKP</td>
</tr>
<tr>
<td>2-274-2-Q</td>
<td><strong>CHEMICALS</strong> (LIST)</td>
<td>SEC - #2 AFF STA</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>#1 SK STOREROOM</strong></td>
<td><strong>(LIST HAZARDS)</strong></td>
<td>PRI - #2 AFF STA</td>
</tr>
<tr>
<td>3-260-0-A</td>
<td></td>
<td>SEC - FIRE STA</td>
</tr>
<tr>
<td></td>
<td></td>
<td>#4-299-1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>LOG ROOM</strong></td>
<td><strong>CAUSTIC SODA</strong></td>
<td>PERSONNEL HAZARD -</td>
</tr>
<tr>
<td>2-260-0-Q</td>
<td></td>
<td>H2 CREATED W/ AL/CU</td>
</tr>
</tbody>
</table>
## TAB D
### MAGAZINE SPRINKLER CONTROL VALVES

<table>
<thead>
<tr>
<th>REPAIR</th>
<th>ROOT/CONTROL VLV</th>
<th>STATION/LOCATION</th>
<th>COMPT SERVED</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>01-31-1 (LOCKED OPEN)</td>
<td>GROUP 1</td>
<td>01-23-1-M</td>
</tr>
<tr>
<td>2</td>
<td>01-33-1</td>
<td>FR 33 - O1 DECK STBD SIDE</td>
<td>01-23-1-M</td>
</tr>
</tbody>
</table>

**NOTE:** Unless otherwise specified, magazine sprinkler systems are to be activated only by order of the CO. The ship's policy may be attached to this list.
SECTION 3
MACHINERY SPACE FIREFIGHTING

4300. MAIN MACHINERY SPACE FIREFIGHTING

a. This section of the RPM is the Force Policy for Combating Main Machinery Space Fires. All flammable liquid leak and initial firefighting procedures are contained in ship’s EOCC. Space reentry procedures are contained in Tabs A thru D. The CO shall ensure completion of the following actions:

(1) Complete Section 3, Tabs E through U. Reference (d) applies when completing the Isolation List Tabs G and H. Ensure isolation lists are completed for the required systems in the prescribed order. Ensure power sources for HALON system alarms and indicators and AFFF bilge sprinklers are clearly identified in the Electrical Isolation List. When completing Tab J, De-Watering from Outside the Space, list valves in the order in which they are to be aligned.

(2) Some line items may not be applicable to all ship classes. In this case, line out any items that does not apply.

(3) Prepare laminated copies of Section 3 Tabs A through U. They contain required actions by repair/fire party personnel and should be kept in the DCRSs.
### CLASS B FIRE - HALON PROTECTED MACHINERY SPACE

**SIZE IT UP**  
Casualty initial reports, assessment, evaluation and information.  
What do I have?

<table>
<thead>
<tr>
<th>ORDERED</th>
<th>EXECUTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>B Time</td>
<td>B Time</td>
</tr>
</tbody>
</table>

**Report Casualty Steps**

1. Verify foam-proportioning station manned.  
   555-10.9.3
2. Verify that the oil source is secured.  
   555-10.9.5
3. Verify AFFF bilge sprinkling activated and time (_______) activated. Leave bilge sprinkling activated until Fire Out is reported or space is evacuated.  
   555-10.9.6a.
4. Verify plant and operating machinery secured in affected space.  
   555-10.9.6b.
5. Verify negative ventilation set in the affected space, or if not possible, ventilation left in operation.  
   555-10.9.6c.1
6. Verify positive ventilation set in unaffected spaces, or if not possible, ventilation left in operation.  
   555-10.9.6c.2

### CASUALTY CHECK-LIST

**FIGHT IT**  
Casualty Engagement  
What am I doing to make progress?

<table>
<thead>
<tr>
<th>ORDERED</th>
<th>EXECUTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>B Time</td>
<td>B Time</td>
</tr>
</tbody>
</table>

**Engage Casualty Steps**

1. Verify primary Halon 1301 activated.  
   555-10.10.4
2. Don’t operate AFFF bilge sprinkling longer than 4 minutes. Bilge sprinkling secured at time __________.  
   555-10.10.8
3. Verify all doors and accesses to space are secured.  
   555-10.10.6.1
4. DC response organization briefed on location of the fire and plant status.  
   555-10.10.10e.
5. Verify mechanical isolation is set.  
   555-10.12.2
6. Verify electrical isolation is in progress.  
   555-10.12.3
7. Verify that fire boundaries are established around the affected space.  
   555-10.12.4

---

**Note:** If fire is contained, go to MONITOR IT, Step 1. If space is evacuated, go to FIGHT IT, Step 1.
8. Establish smoke control.
   a. Set inner and outer smoke boundaries around accesses to the affected space to establish a smoke control zone. 555-10.11.2
   b. For CPS equipped ships, operate CPS to maintain positive pressure on the DC deck. If CPS is ineffective in preventing smoke spread to the DC deck, conduct active desmoking. 555-10.11.2.2
   c. For non-CPS ships, use positive pressure ventilation in the smoke control zone. 555-10.11.2.3.1
   d. For SES equipped ships, activate SES in the smoke control zone. 555-10.11.2.2
   e. For non-SES ships, active desmoking of smoke control zone may be conducted at the scene leader’s discretion. 555-10.11.2.3

   a. If 1st shot was ineffective, rapidly assess reason and correct or actuate 2nd shot, as appropriate. 555-10.14.2, 555-10.14.3a.

---

**CASUALTY CHECK- LIST**

<table>
<thead>
<tr>
<th>ORDERED</th>
<th>EXECUTED</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.</td>
<td></td>
<td>Note: If Halon is Good (effective), follow steps 10 to 16. If Halon is Bad (ineffective), go to step 17.</td>
</tr>
<tr>
<td>11.</td>
<td></td>
<td>Following 15-minute Halon soak period, operate exhaust ventilation, if available, for at least 15 minutes before re-entry.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>555-10.14.3b.</td>
</tr>
<tr>
<td>12.</td>
<td></td>
<td>Activate AFFF bilge sprinkling a second time for at least two minutes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>555-10.14.3c.</td>
</tr>
<tr>
<td>13.</td>
<td></td>
<td>Have standby AFFF hose manned and charged, with agent checked.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>555-10.14.3d</td>
</tr>
<tr>
<td>14.</td>
<td></td>
<td>Assessment team re-enter with minimum of two fully protected (FFE and SCBA) fire party members with NFTI and AFFF extinguishers.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>555-10.14.3d</td>
</tr>
<tr>
<td>15.</td>
<td></td>
<td>Assessment team locate and extinguish any remaining fire, extinguish minor residual fires. Directs use of AFFF hose, if required.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>555-10.14.3e.</td>
</tr>
<tr>
<td>16.</td>
<td></td>
<td>Go to MONITOR IT, Step 1.</td>
</tr>
</tbody>
</table>

---

<table>
<thead>
<tr>
<th>ORDERED</th>
<th>EXECUTED</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.</td>
<td></td>
<td>Secure ventilation within space, if operating, and initiate indirect attack using water high within the space. 555-10.16.1a., 555-7.6</td>
</tr>
<tr>
<td>18.</td>
<td></td>
<td>Stage attack team with 1-1/2” AFFF hose during indirect attack. Re-entry via escape trunk preferred. Seawater hoses may be used to cool access doors, hatches, and scuttles intended for use during re-entry. 555-10.16.1.b. 555-16.1.c</td>
</tr>
<tr>
<td>19.</td>
<td></td>
<td>Before the attack team enters the space, a second backup attack AFFF hose shall be manned to render assistance. 555-10.16.1.c</td>
</tr>
<tr>
<td>20.</td>
<td></td>
<td>When attack team is manned and indirect attack has been applied for at least 5 minutes, secure indirect attack. 555-10.16.1.d</td>
</tr>
<tr>
<td>21.</td>
<td></td>
<td>Set exhaust ventilation in the space on high, if operable. 555-10.16.1.d</td>
</tr>
<tr>
<td>22.</td>
<td></td>
<td>Operate AFFF bilge sprinkling for at least 2 minutes. 555-10.16.1.d</td>
</tr>
<tr>
<td>23.</td>
<td></td>
<td>If Halon had been discharged into the space, test for HF gas. 555-10.16.1.d</td>
</tr>
</tbody>
</table>

---

**CASUALTY CHECK- LIST**
### CASUALTY CHECK-LIST

**MONITOR IT**

The fight is complete, No further spread, Clean it up

<table>
<thead>
<tr>
<th>ORDERED</th>
<th>EXECUTED</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>24.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>If HF concentration is acceptable, &lt;90ppm, attack team re-enters with AFFF, determines if a direct attack is feasible, and extinguishes any remaining fire.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Go to MONITOR IT, Step 1.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ORDERED</th>
<th>EXECUTED</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assessment or attack team reports fire is out and reflash watch is set.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Report when fire overhauled.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>As time permits, verify electrical integrity of ventilation fans for continued use and operate on high speed for a minimum of 15 minutes. Otherwise, exhaust smoke using portable blowers or overpressure from adjacent spaces through open accesses to the affected space.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>When space is cleared of smoke, test for oxygen, combustible and toxic gases.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Note: Steps 5-6 can be performed concurrently.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dewater space with commanding officer’s permission.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clear space of hazards and certify space as safe. Reman space.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Steps 5-6 can be performed concurrently.

**ORDERED**

- 7. Assess damage before attempting restart of any equipment in space. Get photos and prepare report, as required. Restore from casualty and debrief team. 555-10.15.7 and 555-7.10.5
## CLASS B FIRE- WATER MIST PROTECTED MACHINERY SPACE

### SIZE IT UP
Casualty initial reports, assessment, evaluation and information. What do I have?

<table>
<thead>
<tr>
<th>ORDERED</th>
<th>EXECUTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>B Time</td>
<td></td>
</tr>
</tbody>
</table>

**Report Casualty Steps**

1. Verify foam-proportioning and Water Mist stations manned. Verify Water Mist tanks aligned for refilling. 555-10.9.3

2. Verify that the oil source is secured. 555-10.9.5

3. Verify AFFF bilge sprinkling activated and time (____) activated. Leave bilge sprinkling activated until Fire Out is reported or space is evacuated. 555-10.9.6a.

4. Verify plant and operating machinery secured in affected space. 555-10.9.6b.

5. Verify negative ventilation set in the affected space, or if not possible, ventilation left in operation. 555-10.9.6c.1

6. Verify positive ventilation set in unaffected spaces, or if not possible, ventilation left in operation. 555-10.9.6c.2

### CASUALTY CHECK-LIST

**ORDERED**

**EXECUTED**

<table>
<thead>
<tr>
<th>B Time</th>
</tr>
</thead>
</table>

**Engage Casualty Steps**

7. If smoke is being pulled into adjacent machinery spaces from the weather, request the ship maneuver, secure ventilation, or have watchstanders use breathing apparatus. 555-10.9.6c.2

8. Verify that the affected space is isolated except for firefighting equipment, lighting and ventilation. 555-10.9.6d.

9. Verify that smoke boundaries are set around the affected space. 555-10.9.6e.

10. Investigate for fire spread to adjoining compartments. 555-10.9.6e.

11. Fire contained or space evacuation report received. 555-10.10

---

**Note:** If fire is contained, go to MONITOR IT, Step 1. If space is evacuated, go to FIGHT IT, Step 1.

### FIGHT IT
Casualty Engagement What am I doing to make progress?

<table>
<thead>
<tr>
<th>ORDERED</th>
<th>EXECUTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>B Time</td>
<td></td>
</tr>
</tbody>
</table>

**Engaged = (Fight It)**

**Engage Casualty Steps**

1. Verify Water Mist activated. Verify Water Mist tanks being refilled from potable water tanks. 555-10.10.4

2. Don’t operate AFFF bilge sprinkling longer than 4 minutes. Bilge sprinkling secured at time ______________. 555-10.10.8

3. Verify all doors and accesses to space are secured. 555-10.10.6.1

4. DC response organization briefed on location of the fire and plant status. 555-10.10.10e.

5. Verify mechanical isolation is set. 555-10.12.2

6. Verify electrical isolation is in progress. 555-10.12.3

7. Verify that fire boundaries are established around the affected space. 555-10.12.4
8. Establish smoke control.
   a. Set inner and outer smoke boundaries around accesses to the affected space to establish a smoke control zone. 555-10.11.2
   b. For CPS equipped ships, operate CPS to maintain positive pressure on the DC deck. If CPS is ineffective in preventing smoke spread to the DC deck, conduct active desmoking. 555-10.11.2.2
   c. For non-CPS ships, use positive pressure ventilation in the smoke control zone. 555-10.11.2.3.1
   d. For SES equipped ships, activate SES in the smoke control zone. 555-10.11.2.2
   e. For non-SES ships, active desmoking of smoke control zone may be conducted at the scene leader’s discretion. 555-10.11.2.3

   a. If Water Mist did not operate, review and reconfigure system and operate again, as appropriate. 555-10.14.2, 555-10.14.4b.

---

**CASUALTY CHECK-LIST**

<table>
<thead>
<tr>
<th>ORDERED</th>
<th>EXECUTED</th>
<th>TIME</th>
</tr>
</thead>
</table>

**Note:** If Water Mist is Good (effective), follow steps 10 to 16. If Water Mist is Bad (ineffective), go to step 17.

---

10. Report that Water Mist is Good (effective) and the fire is contained. 555-10.14.2

**Note:** Steps 11-15 can be performed concurrently.

11. Activate AFFF bilge sprinkling a second time for at least two minutes. 555-10.14.4d.

12. Re-establish or maintain desmoking with installed ventilation. 555-10.14.4e.

13. Have standby AFFF hose manned and charged, with agent checked. 555-10.14.4f

14. Assessment team re-enter with minimum of two protected (SCBA) fire party members with AFFF extinguishers. 555-10.14.4f, 555-10.14.4g.

15. Assessment team locate and extinguish any remaining fire, extinguish minor residual fires. Directs use of AFFF hose, if required. 555-10.14.4f.

16. Go to MONITOR IT, Step 1.

---

17. Secure ventilation within space, if operating, and initiate indirect attack using water high within the space. 555-10.16.1.a., 555-7.6

18. Stage attack team with 1-1/2” AFFF hose during indirect attack. Re-entry via escape trunk preferred. Seawater hoses may be used to cool access doors, hatches, and scuttles intended for use during re-entry. 555-10.16.1.b, 555-16.1.c

19. Before the attack team enters the space, a second backup attack AFFF hose shall be manned to render assistance. 555-10.16.1.c

20. When attack team is manned and indirect attack has been applied for at least 5 minutes, secure indirect attack. 555-10.16.1.d

21. Set exhaust ventilation in the space on high, if operable. 555-10.16.1.d

22. Attack team re-enters with AFFF, determines if a direct attack is feasible, and extinguishes any remaining fire. 555-10.16.1.e

23. Go to MONITOR IT, Step 1.
| Time | ORDERED | EXECUTED | | | MONITOR IT |
The fight is complete, No further spread, Clean it up |

<table>
<thead>
<tr>
<th>Casuality Check-list</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Assessment team or attack team reports fire is out and reflash watch is set.</td>
</tr>
<tr>
<td>555-10.14.4h.</td>
</tr>
<tr>
<td>2. Report when fire overhauled.</td>
</tr>
<tr>
<td>555-10.14.4h.</td>
</tr>
<tr>
<td>3. As time permits, verify electrical integrity of ventilation fans for continued use and operate on high speed for a minimum of 15 minutes. Otherwise, exhaust smoke using portable blowers or overpressure from adjacent spaces through open accesses to the affected space.</td>
</tr>
<tr>
<td>555-10.15.2.1, 555-10.15.3, 555-10.15.4</td>
</tr>
<tr>
<td>4. When space is cleared of smoke, test for oxygen, combustible and toxic gases.</td>
</tr>
<tr>
<td>555-10.15.5</td>
</tr>
<tr>
<td>5. Dewater space with commanding officer’s permission.</td>
</tr>
<tr>
<td>555-10.15.6</td>
</tr>
<tr>
<td>6. Clear space of hazards and certify space as safe. Reman space.</td>
</tr>
<tr>
<td>555-10.15.7</td>
</tr>
<tr>
<td>7. Assess damage before attempting restart of any equipment in space. Get photos and prepare report, as required. Restore from casualty and debrief team.</td>
</tr>
<tr>
<td>555-10.15.7, 555-7.10.5</td>
</tr>
</tbody>
</table>

---

Note: Steps 5 and 6 can be performed concurrently.
### CLASS B FIRE - HFP PROTECTED MACHINERY SPACE

**SIZE IT UP**

Casualty initial reports, assessment, evaluation and information. What do I have?

<table>
<thead>
<tr>
<th>Time</th>
<th>B</th>
<th>EXECUTED</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
</tbody>
</table>

**ORDERED**

1. Verify foam-proportioning station manned.
   - 555-10.9.3

2. Verify that the oil source is secured.
   - 555-10.9.5

3. Verify AFFF bilge sprinkling activated and time (____) activated. Leave bilge sprinkling activated until Fire Out is reported or space is evacuated.
   - 555-10.9.6.

4. Verify plant and operating machinery secured in affected space.
   - 555-10.9.6a.

5. Verify negative ventilation set in the affected space, or if not possible, ventilation left in operation.
   - 555-10.9.6c.

6. Verify positive ventilation set in unaffected spaces, or if not possible, ventilation left in operation.
   - 555-10.9.6c.2

---

### CASUALTY CHECK-LIST

**FIGHT IT**

Casualty Engagement

What am I doing to make progress?

**ORDERED**

1. Verify HFP activated.
   - 555-10.10.4

2. Don’t operate AFFF bilge sprinkling longer than 4 minutes. Bilge sprinkling secured at time ________ .
   - 555-10.10.8

3. Verify all doors and accesses to space are secured.
   - 555-10.10.6.

4. DC response organization briefed on location of the fire and plant status.
   - 555-10.10.e.

5. Verify mechanical isolation is set.
   - 555-10.12.

6. Verify electrical isolation is in progress.
   - 555-10.12.

7. Verify that fire boundaries are established around the affected space.
   - 555-10.12.3

---

**ENGAGE CASUALTY STEPS**

1. Verify that the affected space is isolated except for firefighting equipment, lighting and ventilation.
   - 555-10.9.6d.

2. Verify that smoke boundaries are set around the affected space.
   - 555-10.9.6e.

3. Investigate for fire spread to adjoining compartments.
   - 555-10.9.6.

4. Fire contained or space evacuation report received.
   - 555-10.10.

---

**Note:** If fire is contained, go to MONITOR IT, Step 1. If space is evacuated, go to FIGHT IT, Step 1.
### CASUALTY CHECK-LIST

<table>
<thead>
<tr>
<th>ORDERED</th>
<th>EXECUTE</th>
<th>B</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Establish smoke control.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f.</td>
<td>Set inner and outer smoke boundaries around accesses to the affected space to establish a smoke control zone.</td>
<td></td>
<td>555-10.11.2</td>
</tr>
<tr>
<td>g.</td>
<td>For CPS equipped ships, operate CPS to maintain positive pressure on the DC deck. If CPS is ineffective in preventing smoke spread to the DC deck, conduct active desmoking.</td>
<td></td>
<td>555-10.11.2.2</td>
</tr>
<tr>
<td>h.</td>
<td>For non-CPS ships, use positive pressure ventilation in the smoke control zone.</td>
<td></td>
<td>555-10.11.2.3.1</td>
</tr>
<tr>
<td>i.</td>
<td>For SES equipped ships, activate SES in the smoke control zone.</td>
<td></td>
<td>555-10.11.2.2</td>
</tr>
<tr>
<td>j.</td>
<td>For non-SES ships, active desmoking of smoke control zone may be conducted at the scene leader’s discretion.</td>
<td></td>
<td>555-10.11.2.3</td>
</tr>
<tr>
<td>9.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Determine effectiveness of HFP.</td>
<td></td>
<td>555-10.14.2</td>
</tr>
<tr>
<td></td>
<td>Note: If HFP is Good (effective), follow steps 10 to 17. If HFP is Bad (ineffective), go to step 18.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Report that HFP is Good (effective) and the fire is contained.</td>
<td></td>
<td>555-10.14.5c.1</td>
</tr>
<tr>
<td>11.</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Following 15-minute HFP soak period, operate exhaust ventilation, if available, for at least 15 minutes before re-entry. Maintain negative ventilation during re-entry and overhaul.</td>
<td></td>
<td>555-10.14.5c.1, 555-10.14.5c.3</td>
</tr>
<tr>
<td>12.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Activate AFFF bilge sprinkling a second time for at least two minutes.</td>
<td></td>
<td>555-10.14.5b</td>
</tr>
<tr>
<td>13.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Have standby AFFF hose manned and charged, with agent checked.</td>
<td></td>
<td>555-10.14.5c.3</td>
</tr>
<tr>
<td>14.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Determine HF level in the space.</td>
<td></td>
<td>555-10.14.5c.3</td>
</tr>
<tr>
<td>15.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Assessment team re-enter with minimum of two fully protected (FFE and SCBA) fire party members with NFTI and AFFF extinguishers.</td>
<td></td>
<td>555-10.14.5c.3, 555-10.14.5d</td>
</tr>
<tr>
<td>16.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Assessment team locate and extinguish any remaining fire, extinguish minor residual fires. Directs use of AFFF hose, if required.</td>
<td></td>
<td>555-10.14.5e</td>
</tr>
<tr>
<td>17.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Go to MONITOR IT, Step 1.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Secure ventilation within space, if operating, and initiate indirect attack using water high within the space.</td>
<td></td>
<td>555-10.16.1.a, 555-7.6</td>
</tr>
<tr>
<td>19.</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Stage attack team with 1-1/2” AFFF hose during indirect attack. Seawater hoses may be used to cool access doors, hatches, and scuttles intended for use during re-entry.</td>
<td></td>
<td>555-10.16.1.b, 555-16.1.c</td>
</tr>
<tr>
<td>20.</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Before the attack team enters the space, a second backup attack AFFF hose shall be manned to render assistance.</td>
<td></td>
<td>555-10.16.1.c</td>
</tr>
<tr>
<td>21.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>When attack team is manned and indirect attack has been applied for at least 5 minutes, secure indirect attack.</td>
<td></td>
<td>555-10.16.1.d</td>
</tr>
<tr>
<td>22.</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Set exhaust ventilation in the space on high, if operable.</td>
<td></td>
<td>555-10.16.1.d</td>
</tr>
<tr>
<td>23.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>If HFP had been discharged into the space, test for HF gas.</td>
<td></td>
<td>555-10.16.1.d</td>
</tr>
<tr>
<td>24.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>If HF concentration is acceptable, &lt;90ppm, attack team re-enters with AFFF, determines if a direct attack is feasible, and extinguishes any remaining fire.</td>
<td></td>
<td>555-10.16.1.d, 555-10.16.1.d</td>
</tr>
<tr>
<td>25.</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Go to MONITOR IT, Step 1.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**MONITOR IT**
The fire is complete, no further spread, clean it up

<table>
<thead>
<tr>
<th>ORDERED</th>
<th>EXECUTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>No = (Monitor It)</td>
<td></td>
</tr>
</tbody>
</table>

**No Casualty Steps**

1. Assessment or attack team reports fire is out and reflash watch is set.  
   555-10.14.5b.

2. Report when fire overhauled.  
   555-10.14.5b.

3. As time permits, verify electrical integrity of ventilation fans for continued use and operate on high speed for a minimum of 15 minutes. Otherwise, exhaust smoke using portable blowers or overpressure from adjacent spaces through open accesses to the affected space.  
   555-10.15.2.1, 555-10.15.3, 555-10.15.4

4. When space is cleared of smoke, test for oxygen, combustible and toxic gases.  
   555-10.15.5

-- -- Note: Steps 5 and 6 can be performed concurrently.

5. Dewater space with commanding officer’s permission.  
   555-10.15.6

6. Clear space of hazards and certify space as safe. Reman space.  
   555-10.15.7

7. Assess damage before attempting restart of any equipment in space. Get photos and prepare report, as required. Restore from casualty and debrief team.  
   555-10.15.7, 555-7.10.5
# Class B Fire in Machinery

## Size It Up

Casualty initial reports, assessment, evaluation and information.

**What do I have?**

<table>
<thead>
<tr>
<th>B-Time</th>
<th>ORDERED</th>
<th>EXECUTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reported = (Size it up)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Report Casualty Steps

1. Verify foam-proportioning station manned.  
   **555-10.9.3**

2. Verify that the oil source is secured.  
   **555-10.9.5**

3. Verify AFFF bilge sprinkling activated and time (____) activated. Leave bilge sprinkling activated until Fire Out is reported or space is evacuated.  
   **555-10.9.6a.**

4. Verify plant and operating machinery secured in affected space.  
   **555-10.9.6b.**

5. Verify negative ventilation set in the affected space, or if not possible, ventilation left in operation.  
   **555-10.9.6c.1**

6. Verify positive ventilation set in unaffected spaces, or if not possible, ventilation left in operation.  
   **555-10.9.6c.2**

7. If smoke is being pulled into adjacent machinery spaces from the weather, request the ship maneuver, secure ventilation, or have watchstanders use breathing apparatus.  
   **555-10.9.6c.2**

## Casualty Check-List

**FIGHT IT**

Casualty Engagement

**What am I doing to make progress?**

<table>
<thead>
<tr>
<th>B-Time</th>
<th>ORDERED</th>
<th>EXECUTED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engaged = (Fight It)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Engage Casualty Steps

1. Don’t operate AFFF bilge sprinkling longer than 4 minutes. Bilge sprinkling is secured at time ____________.  
   **555-10.10.8**

2. Verify all doors and accesses to space are secured.  
   **555-10.10.6.1**

3. Verify space ventilation secured.  
   **555-10.10.6.1**

4. DC response organization briefed on location of the fire and plant status.  
   **555-10.10.10e.**

5. Verify mechanical isolation is set.  
   **555-10.12.2**

6. Verify electrical isolation is in progress.  
   **555-10.12.3**

7. Verify fire boundaries are established around the affected space.  
   **555-10.12.4**

---

*Note: If fire is contained, go to MONITOR IT, Step 1. If space is evacuated, go to FIGHT IT, Step 1.*

4-25
8. Establish smoke control.
   k. Set inner and outer smoke boundaries around accesses to the affected space to establish a smoke control zone.
   
   l. For CPS equipped ships, operate CPS to maintain positive pressure on the DC deck. If CPS is ineffective in preventing smoke spread to the DC deck, conduct active desmoking.
   
   m. For non-CPS ships, use positive pressure ventilation in the smoke control zone.
   
   n. For SES equipped ships, activate SES in the smoke control zone.
   
   o. For non-SES ships, active desmoking of smoke control zone may be conducted at the scene leader’s discretion.

9. Secure ventilation within space, if operating, and initiate indirect attack using water high within the space.

10. Stage attack team with 1-1/2” AFFF hose during indirect attack. Re-entry via escape trunk preferred. Seawater hoses may be used to cool access doors, hatches, and scuttles intended for use during re-entry.

11. Before the attack team enters the space, a second backup attack AFFF hose shall be manned to render assistance.

12. When attack team is manned and indirect attack has been applied for at least 5 minutes, secure indirect attack.

13. Set exhaust ventilation in the space on high, if operable.

14. Operate AFFF bilge sprinkling for at least 2 minutes.

15. Attack team re-enters with AFFF, determines if a direct attack is feasible, and extinguishes any remaining fire.

16. Go to MONITOR IT, Step 1.

---

MONITOR IT
The fight is complete, No further spread, Clean it up

ORDERED EXECUTED

---

No = (Monitor It)
No Casualty Steps

1. Attack team reports fire is out and reflash watch is set.

2. Report when fire overhauled.

3. As time permits, verify electrical integrity of ventilation fans for continued use and operate on high speed for a minimum of 15 minutes. Otherwise, exhaust smoke using portable blowers or overpressure from adjacent spaces through open accesses to the affected space.

4. When space is cleared of smoke, test for oxygen, combustible and toxic gases.

5. Dewater space with commanding officer’s permission.

6. Clear space of hazards and certify space as safe. Reman space.

7. Assess damage before attempting restart of any equipment in space. Get photos and prepare report, as required. Restore from casualty and debrief team.

---

555-10.15.2.1, 555-10.15.3, 555-10.15.4
555-10.15.5
555-10.15.6
555-10.15.7
555-10.15.7 and 555-7.10.5
555-10.16.1.a, 555-7.6.1.j
555-10.16.1.b, 555-10.16.1.c
555-10.16.1.d
555-10.16.1.e
555-10.16.1.f
555-10.16.1.g
<table>
<thead>
<tr>
<th>BOUNDARY or GROUP #</th>
<th>COMPARTMENT NAME/NUMBER</th>
<th>BULKHEAD/DECK</th>
<th>FIRE STATION/# Hose Lengths</th>
<th>RESPONSIBLE PARTY (INPT/UW)</th>
<th>OBA/SCBA REQUIRED? (Y/N)</th>
</tr>
</thead>
<tbody>
<tr>
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</table>

<table>
<thead>
<tr>
<th>BOUNDARY or GROUP #</th>
<th>COMPARTMENT NAME/NUMBER</th>
<th>BULKHEAD/DECK</th>
<th>FIRE STATION/# Hose Lengths</th>
<th>RESPONSIBLE PARTY (INPT/UW)</th>
<th>OBA/SCBA REQUIRED? (Y/N)</th>
</tr>
</thead>
<tbody>
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</tr>
</tbody>
</table>
### SMOKE BOUNDARIES

#### PRIMARY:
*(INCLUDING BUFFER ZONE)*

<table>
<thead>
<tr>
<th>FITTING NUMBER</th>
<th>CLASSIFICATION</th>
<th>CURTAIN/BLANKET</th>
<th>RESPONSIBLE PARTY</th>
<th>INPT/UW</th>
<th>OBA/SCBA REQUIRED? (Y/N)</th>
</tr>
</thead>
</table>

#### SECONDARY:
*(OUTSIDE BUFFER ZONE)*

<table>
<thead>
<tr>
<th>FITTING NUMBER</th>
<th>CLASSIFICATION</th>
<th>CURTAIN/BLANKET</th>
<th>RESPONSIBLE PARTY</th>
<th>INPT/UW</th>
<th>OBA/SCBA REQUIRED? (Y/N)</th>
</tr>
</thead>
</table>

#### ISOLATION LIST

<table>
<thead>
<tr>
<th>COMPARTMENT NAME:</th>
<th>COMPARTMENT NUMBER:</th>
<th>PRIMARY BOUNDARY FWD:</th>
<th>PRIMARY BOUNDARY AFT:</th>
<th>OVERHEAD BOUNDARY:</th>
<th>SECONDARY BOUNDARY FWD:</th>
<th>SECONDARY BOUNDARY AFT:</th>
</tr>
</thead>
<tbody>
<tr>
<td>ELECTRICAL SYSTEMS</td>
<td>SYSTEM TYPE</td>
<td>NOUN NAME</td>
<td>CKT NUMBER</td>
<td>LOCATION</td>
<td>RESPONSIBLE PARTY (INPT/UW)</td>
<td>FUSE/CKT BKR</td>
</tr>
<tr>
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</tr>
</tbody>
</table>

**Note:** Electrical isolation shall include all machinery, switchboards and load centers required to isolate the affected space. Ensure power to any installed fire fighting system that could be utilized remains energized. (Scene Leader may direct that lighting remain ON.)
<table>
<thead>
<tr>
<th>MECHANICAL SYSTEMS</th>
<th>TYPE</th>
<th>NOUN NAME</th>
<th>VALVE NUMBER</th>
<th>REMOTE OPERATOR</th>
<th>RESPONSIBLE PARTY (INPT/UW)</th>
<th>PRIORITY</th>
</tr>
</thead>
</table>

4-30
# VENTILATION SYSTEMS

<table>
<thead>
<tr>
<th>NATURAL/FAN CONTROLLER LOCATION</th>
<th>REMOTE CONTROLLER LOCATION</th>
<th>CLSR TYPE</th>
<th>DESIGNATION</th>
<th>AREA SERVED</th>
<th>RESPONSIBLE PARTY (INPT/UW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WTRDECK</td>
<td></td>
<td></td>
<td></td>
<td>INTAKE</td>
<td>4-31</td>
</tr>
<tr>
<td>WTRDECK</td>
<td></td>
<td></td>
<td></td>
<td>EXHAUST</td>
<td></td>
</tr>
</tbody>
</table>
DE-WATERING FROM OUTSIDE THE SPACE

SPACE TO DEWATER
EDUCTOR NUMBER USED
OPEN THE FOLLOWING VALVES (LOC. OF OPERATORS)
PRIMARY/ALTERNATE
TAB K
OBA CANISTER/SCBA CHANGE-OUT AREA/SCBA CHARGING STATION

FIRE LOCATION
DCRS RESPONSIBILITY
ALTERNATE LOCATION
DCRS RESPONSIBILITY
AUX 1
MER 1
GEN ROOM

EEBD COLLECTION AREA/SCBA CHARGING STATION
Note: For each machinery space include lineup of #1/#2 hoses for both primary and secondary accesses. Also include fireplug location, number of required hoses, and use of in-line eductor or AFFF hose reel, as applicable. Specify designation of primary and secondary access for each space.

<table>
<thead>
<tr>
<th>SPACE: ______________</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRIMARY ACCESS (FILL IN LOCATION)</td>
</tr>
<tr>
<td>HOSE NUMBER</td>
</tr>
<tr>
<td>FIREPLUG NUMBER</td>
</tr>
<tr>
<td>LENGTHS OF HOSE</td>
</tr>
<tr>
<td>IN-LINE EDUCTOR? YES/NO</td>
</tr>
<tr>
<td>AFFF HOSE REELS? YES/NO</td>
</tr>
<tr>
<td>#1 HOSE</td>
</tr>
<tr>
<td>#2 HOSE</td>
</tr>
<tr>
<td>SECONDARY ACCESS (FILL IN LOCATION)</td>
</tr>
<tr>
<td>HOSE NUMBER</td>
</tr>
<tr>
<td>FIREPLUG NUMBER</td>
</tr>
<tr>
<td>LENGTHS OF HOSE</td>
</tr>
<tr>
<td>IN-LINE EDUCTOR? YES/NO</td>
</tr>
<tr>
<td>AFFF HOSE REELS? YES/NO</td>
</tr>
<tr>
<td>#1 HOSE</td>
</tr>
<tr>
<td>#2 HOSE</td>
</tr>
</tbody>
</table>
Note: Ships shall prepare de-smoking plans for each of the following contingencies.

a. Use of positive ventilation/over pressurization.

b. Use of installed ventilation. References (a), (b), (e), and NFTI Technical Manual refer. (Requires Engineer Officer’s permission).

c. Use of portable de-smoking equipment.

d. Use of active de-smoking, reference (b) refers.

STANDARD METHODS

<table>
<thead>
<tr>
<th>FROM</th>
<th>VIA</th>
<th>TO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Compartment #</td>
<td>WTD - Passageway</td>
<td>Portside weather deck</td>
</tr>
<tr>
<td></td>
<td>WTD - Passageway</td>
<td>WTD -</td>
</tr>
<tr>
<td></td>
<td>WTD -</td>
<td></td>
</tr>
</tbody>
</table>

ACTIVE DE-SMOKING METHODS (reference (c), Section 7.7 refers)

<table>
<thead>
<tr>
<th>FROM</th>
<th>VIA</th>
<th>TO</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Compartment #</td>
<td>WTD - Passageway</td>
<td>Portside weather deck</td>
</tr>
<tr>
<td></td>
<td>WTD - Passageway</td>
<td>WTD -</td>
</tr>
</tbody>
</table>
**ATMOSPHERIC TESTING**

Note: Ship must list the atmospheric tests that may be required during post-fire gas free testing for each machinery space. Different spaces may require different gas free tests based on the potential hazards in that particular space. (e.g., if HALON 1301 has been discharged, a test of Hydrogen Fluoride shall be done.) References (a) and (c) apply.

<table>
<thead>
<tr>
<th>SPACE</th>
<th>REQUIRED TEST(S)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-36</td>
<td></td>
</tr>
<tr>
<td>REPAIR STATION</td>
<td>LOCATION/FRAME</td>
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<tr>
<td>----------------</td>
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<tr>
<td>2</td>
<td>2-64-0-L</td>
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<td></td>
<td>FR 64 (S)</td>
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<td>4-64-0-Q</td>
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<td>FR 64 (S)</td>
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<td>2</td>
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<td>FR 64 (S)</td>
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<td>3</td>
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<td>3-464-0-Q</td>
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<td>FR 473 (P)</td>
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<td>REPAIR STATION</td>
<td>LOCATION/FRAME</td>
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<td>2</td>
<td>2-40-2-L</td>
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<td>3</td>
<td>2-328-2-L</td>
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<td>FR 360 (P)</td>
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### AFFF STATIONS

<table>
<thead>
<tr>
<th>DCRS</th>
<th>LOCATION/FRAME</th>
<th>COMPT SERVED</th>
<th>CUT-OUT VALVES</th>
<th>REMOTE ACT</th>
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<tbody>
<tr>
<td>5</td>
<td>2-136-01-L</td>
<td>MAIN ENGINE ROOM</td>
<td>2-156-3</td>
<td></td>
</tr>
</tbody>
</table>
SMOKE EJECTION SYSTEM (SES)

The primary purpose of the Smoke Ejection System is to maintain reasonable conditions and improved visibility to fire fighters. The secondary purpose of the Smoke Ejection System is to prevent smoke infiltration into the medical complex.

Note: SES is not intended to maintain CPS protective pressure within an affected TP zone during activation, and should not be used in a CBR environment.

WARNING: Do not operate SES when a fire is within the purge route of smoke ejection.

Spaces Protected

By TYPE I
By TYPE II
By TYPE III

FOR FIRE IN MMR/AMR:

Required Information
Purge Damper location
Control Damper location
Local Activations (and DCRS Responsibility)
Remote Activation
Power Source (PRI/ALT)
See reference (h).
The primary purpose of the Fire/Smoke Detection System is to provide early warning of a potential fire as well as inform watchstanders of space conditions prior to entering the space.

Note: Smoke detectors may be inoperable after being exposed to any fire fighting suppression system or agent. Fire and temperature detectors should remain operational under similar condition. Fire/Smoke sensors should be replaced after a casualty.

Detection Zones
Frame XX to XXX

Local/Remote Monitoring Stations
Zone X at X-XXX-X-X
Power Source (PRI/ALT)
UPS (YES/NO)
TAB U
WATER MIST FIRE EXTINGUISHING SYSTEM (WMFES)

For a compartment with a functioning Water Mist system, exhaust ventilation should be used during reentry to improve visibility and reduce toxic gas levels (Activation of Water Mist secures ventilation in space). Since Water Mist cools space temperature quickly fire fighters may, at DCA’s discretion, be permitted to wear fire retardant coveralls in lieu of the Fire Fighters Ensemble (FFE). Water Mist should be ran continuously through overhaul. Criteria for remote determination to activate water mist:

- TWO sensors in the same space that indicate a temperature of 140 degrees Fahrenheit/60 degrees Celsius or higher.
- ONE or more sensors that indicate a temperature of 140 degrees Fahrenheit/60 degrees Celsius or higher COMBINED with an optical view of heavy smoke/flames.
- ONE or more sensors that indicate a temperature of 140 degrees Fahrenheit/60 degrees Celsius or higher COMBINED with any local sensor within the vicinity that indicates failure.

Note: The failure of an electronic sensor in the vicinity of other high temperatures may indicate fire damage to that sensor.

Pump Locations:

Storage Tank Locations:

Note: Storage Tanks can be filled during system operation.

Activation Stations:

Spaces Served (PRI/SEC):

<table>
<thead>
<tr>
<th>Machinery Room</th>
<th>Pump No. 1</th>
<th>Pump No. 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMR 1</td>
<td>Primary</td>
<td>Secondary</td>
</tr>
<tr>
<td>MMR 1</td>
<td>Primary</td>
<td>Secondary</td>
</tr>
<tr>
<td>AMR 2</td>
<td>Primary</td>
<td>Secondary</td>
</tr>
<tr>
<td>MMR 2</td>
<td>Secondary</td>
<td>Primary</td>
</tr>
<tr>
<td>AMR 3</td>
<td>Secondary</td>
<td>Primary</td>
</tr>
</tbody>
</table>
Primary and Secondary Alignment Procedures: Use the following sequence to actuate Water Mist utilizing the Primary or Secondary Pump.

Machinery Room (MMR/AMR)
Primary Valve Alignment:
Secondary Valve Alignment:

WARNING: Do not use two pumps simultaneously for the same space when the primary pump is functioning correctly.

Note: Activation in two or more spaces requires both Water Mist systems to be actuated.

Exhaust Ventilation Activation Location:
Local
Remote
CHAPTER 5
SHIP STABILITY AND FLOODING CONTROL

SECTION 1
REQUIRED INFORMATION

Ref:  (a) OPNAVINST 3120.32, Standard Organization and Regulations of the U.S. Navy (SORM)
     (b) NTTP 3-20.31, Surface Ship Survivability
     (c) NSTM Chapter 079, VI, Stability and Buoyancy
     (d) Ship’s Damage Control Book
     (e) OPNAV P-03C-01-89, U.S. Navy Cold Weather Handbook for Surface Ships

5100. REQUIRED CHAPTER TAB

a. Tab A, Strip Ship Bill

b. Tab B, Jettison Bill

c. Tab C, Modified Zebra Bill
SECTION 2
REQUIRED AND AVAILABLE STABILITY

5200. STABILITY

a. Every crewmember should be confident in the ship's ability to survive severe weather conditions and massive amounts of damage in moderate sea conditions. For the ship to have its required stability and reserve buoyancy both before and after damage, the following limitations must be observed:

(1) The limiting drafts specified in reference (d), section II (a), are not submerged before damage.

(2) There are no excessive or unusual topside weights or deck loads, such as icing.

(3) The liquid and dry cargo loading instructions contained in reference (d), section II (a), and Damage Control Diagram 1 (Liquid Loading Diagram) are followed.

(4) A proper degree of watertight integrity is maintained. (Watertight fittings are effectively maintained and personnel are adequately trained to set the required material condition.)

b. The DCA shall determine the ship's stability and complete a draft report at least daily and following any major alteration to the ship's loading. If the liquid and dry cargo loading instructions are followed, only the drafts, trim, and displacement need to be determined. If these instructions are not followed, the DCA must also calculate the position of the center of gravity (KG) and Metacentric Height (GM). All values shall be compared to the acceptable limits prescribed in reference (d), Section II (a).

5201. PROCEDURES AFTER DAMAGE

a. Reference (d), section II (a), provides detailed instructions and procedures to be followed in the event of damage. The following is a generic sequence of events:

(1) Isolate the flooding

(a) Set flooding boundaries
(b) Electrically isolate affected space(s)

(c) Mechanically isolate affected space(s)

(2) Determine impact of flooding and prioritize de-watering efforts

(a) De-water spaces colored pink on the Flooding Effects Diagram.

(b) De-water spaces which have the greatest Free Surface Effect first.

(c) Use locally prepared stability data cards, if applicable, to assess impact of flooding. May wish to mention the Flooding Casualty Control Software as a means to evaluate stability and assess the impact of flooding.

(3) Evaluate Critical Stability

Note: Stability is critical when immediate improvement is necessary to avoid loss of the ship. Stability should be considered critical if any or all of the following conditions exist:

(a) Small or negative metacentric height.

   (1) The ship is logy, with a slow erratic roll period and a tendency to hang at the end of the roll.

   (2) The ship has a tendency to list at the same angle to either side.

   (3) The ship has a list that cannot be accounted for by off-center weight.

(b) Approach or exceed floodable length.

   (1) The extent of flooding approaches or exceeds the maximum amount of flooding tabulated in reference (d), section II (a).

   (c) List exceeds danger angle.

   (1) Generally, the ship lists to a static heel more than the danger angle [varies with ship class, consult references (b), (c), and (d)].
(d) Heavy winds and seas combined with flooding damage.

(1) Heavy winds and rough seas are prevailing or are anticipated.

(4) If Stability is Critical (see table 1).

(a) If freeboard is adequate, completely fill those compartments which will improve stability when flooded solid. (Yellow or green compartments on the Flooding Effects Diagram.)

(b) Eliminate free surface effect by de-watering or filling partially flooded compartments. (See Flooding Effects Diagram.)

(c) Strike down solid weights, such as ammunition, from upper deck handling rooms to magazines. (See Jettison Bill.)

(d) Ballast tanks according to the ship's Liquid Loading Instruction.

(e) Favor stability in the handling and maneuvering of the ship. Limit speed and rudder angle to reduce dynamic forces.

(f) If the ship has a small or negative metacentric height, is approaching or exceeds floodable length conditions, jettison topside weights per Chapter 5 Tab B. This is difficult but urgent. Concentrate on heavy items and plan ahead considering the effect of removing various items.
### Table 1

<table>
<thead>
<tr>
<th>Critical Thumb Rule</th>
<th>Actions to be Taken</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative GM</td>
<td>FLB, Eliminate FSE/FCE, Shift Weight Down, Add Weight Low, Remove Weight High (Symmetrically)</td>
</tr>
<tr>
<td>Flooding Exceeds Floodable Length</td>
<td>FLB, De-Water, Shore Holes and Bulkheads</td>
</tr>
<tr>
<td>List to the Danger Angle</td>
<td>FLB, Determine Cause of List, Correct for GM, Correct for Off-Center Weight</td>
</tr>
<tr>
<td>Damage with Bad Weather</td>
<td>FLB, Maneuver Ship Out of Weather, Repair Damage</td>
</tr>
</tbody>
</table>

Note: FLB - Flooding Boundary

(5) Determine and Eliminate unusual List

(a) List caused by off-center flooding only:

(1) Counter-balance on the high side to reduce the list. Add only that amount that would correct for one-half the list, evaluate the effect of this action and then proceed to correct the list.
(b) List caused by negative metacentric height only:

   (1) DO NOT add weight to the high side to correct for this list. Take action to lower the ship's center of gravity by ballasting low tanks symmetrically, jettisoning topside weight symmetrically, shifting low weight symmetrically, and at all times suppressing free surface effect.

(c) List caused by a combination of off-center loading and negative metacentric height:

   (1) First, take all corrective actions listed above to restore positive GM. Second, correct for off-center flooding.

5202. EFFECTS OF FIRE FIGHTING WATER

   a. Fire Fighting water has the same affect on the ship as an equivalent amount of flooding water for any given space, hence, the use of fire fighting water within the ship must be used judiciously, particularly if:

      (1) Stability is already in jeopardy.

      (2) The fire fighting water is being used high in the ship.

      (3) Filling the space partially with water negatively contributes to stability.

   b. When fire fighting water is used, it must also be removed. Note: A single 1 1/2 hose can add over 2 tons of water in five minutes to a space. Four hoses working for 30 minutes can add 50 tons to the ship.

5203. PREVENTION

When in a high threat environment the CO may set Modified Zebra using CHAPTER 5, Tab C.
See reference (a).
See references (a) and (d).
TAB C
MODIFIED ZEBRA BILL

Ship provide insert.
CHAPTER 6
REPAIRING DAMAGE IN ACTION

SECTION 1
Required Information

Ref:   (a) NTTP 3-20.31, Surface Ship Survivability
       (b) NSTM 079 V2, Practical Damage Control
       (c) NSTM Chapter 079 V3, Engineering Casualty Control
       (d) NSTM 300, Electric Plant - General
       (e) Ship’s Damage Control Book
       (f) Ship’s Damage Control Plates (Diagrams)

6100. REQUIRED CHAPTER TABS

a. Tab A, Casualty Power Bill.

b. Tab B, Casualty Power Checklist.
SECTION 2
SHORING

6200. USE OF SHORING

a. Shoring is the process of placing supports against the side of, beneath, or above a structure to prevent metal fatigue, sagging, and bulging. Ships have often needed to support ruptured decks, build up temporary bulkheads and decks against the sea to support hatches and doors, and provide supports for equipment that has broken loose. This is accomplished largely by shoring. For additional information regarding shoring procedures, see reference (b).

6201. WHEN TO SHORE

a. Shoring should not be immediately initiated after flooding damage. Ships are designed with inherent structural strength to resist the effects of flooding. All principal transverse and longitudinal structural bulkheads and all watertight decks are designed to withstand the maximum static pressure, which any flooding can conceivably produce. If the bulkhead or deck has been properly preserved, this pressure may result in deformation, but there will be no serious threat of failure. One or more of the following may cause bulkhead failure:

   (1) If the structure is old, it may have been weakened by corrosion.

   (2) The damage itself may cause some local structural weakening. This is particularly likely for structures close to an explosion.

   (3) Static pressure from flooding may be exacerbated by dynamic pressure resulting from ship's movement, speed or behavior in a seaway.

Note: Unless one or more of the above conditions exist, there should be no reason to shore.

b. Exercise good judgment when inspecting the damaged area. Deep bulges in plating, bowed frames and stanchions, cracked seams and panting bulkheads indicate the need for shoring. Panting is a dangerous condition; it results in metal fatigue that eventually causes cracking and splitting.
c. Carefully inspect equipment located near damage. Weakened supports under guns and machinery may not be readily noticed. These must be shored so further operation will not make the problem worse.

d. Because of ship construction, each shoring configuration will be different. Many shoring situations require the removal of interferences such as equipment, ventilation ducting or even cableways. DCC must approve and coordinate interference removal to avoid further damage or impact on other damage control evolutions in progress.

e. When in doubt, shore!

6202. FUNDAMENTAL RULES OF SHORING

a. Distribute pressure evenly on the bulkhead or deck (i.e. not concentrated at one or two points).

b. Several shores exerting pressure perpendicular to the bulkhead must back up each horizontal strong back.

c. The butt end of shores must be secured against strong, undamaged structures. Hatches, stanchions, machinery foundations, frames, girders, and armored decks may be used as anchor points. It may be necessary to build a complicated structure to reach from a bulkhead to a strong support.

d. A flooded compartment subjects the deck, all bulkheads and possibly the overhead to pressure. Consider shoring the entire containing structure with priority given to the weakest or most pressured bulkhead.

e. Pressures vary on bulkheads as the ship and the liquid inside the compartment moves. The pressure fluctuates and tends to separate the bulkhead and shoring. No shoring job is complete until all slack is taken up and a continuous shoring watch is posted to tighten wedges as they work loose. Shoring is intended to SUPPORT warped bulkheads, not PUSH them back into shape. Excessive shoring pressure may cause a bulkhead to collapse or rupture.
SECTION 3
CASUALTY POWER SYSTEMS

6300. CASUALTY POWER SYSTEM

a. Ships are designed with an installed casualty power system that enables repair party personnel to quickly respond to a damaged electrical distribution system and provide temporary emergency power to equipment considered vital to ship survivability. This system eliminates the need for time-consuming cable tracing, cutting, and splicing. The system's components include permanently installed vertical risers, bulkhead and switchboard terminals, and portable pre-staged cables and switches. Features of the casualty power systems are:

(1) Preservation of watertight integrity.
(2) Simplicity of installation and operation.
(3) Flexibility of application.
(4) Interchangeability of parts and equipment.

6301. CASUALTY POWER BILL

a. In a damaged condition, the timely and effective response of the ship's repair parties to rig casualty power is vital. Never sacrifice safety for speed. Experience shows that well trained repair parties who know the systems and have practiced for emergencies will be able to rig casualty power safely and with dispatch. Conversely, unprepared/untrained repair parties lose critical hours in getting organized. Tables of normal, alternate, and emergency electrical sources, vital loads, casualty power bulkhead and riser terminals, ABTs and MBTs are included in references (e) and (f) (Vital Load Charts and Casualty Power Diagrams, normally Plates 13 and 14). Preplanned casualty power cable routes shall be developed and included in Chapter 6, Tab A, Casualty Power Bill.
6302. PROCEDURE FOR RIGGING CASUALTY POWER

a. Ensure that power is NOT available at the damaged panel or switchboard by tagging out all applicable sources of power as per ship’s instructions.

b. Ensure that all power supplies are tagged “open.” If a type "K" switch is installed on the panel, OPEN IT.

c. Make sure that there are no short circuits in the panel or equipment. If supply cables are damaged and no switch is available, disconnect the leads.

d. The Engineer Officer will designate the source switchboard and riser.

e. The casualty power cables should then be taken from their stowage racks and laid out, ready for connecting.

f. As per reference (d), All personnel making connections must wear proper PPE and observe all safety precautions: 7500-volt rubber gloves, rubber boots or a rubber mat and de-metalization.

g. Connect all horizontal cables LOAD to SOURCE starting with the riser or bulkhead terminal at the casualty (load) and work toward the switchboard (source) riser or bulkhead terminal entering the compartment from which power will be supplied.

h. Test, then connect, the damaged equipment to the riser or bulkhead terminal leaving the compartment. (The damaged equipment should be the next to last thing connected after all intermediate connections, followed by the source.)

i. ONLY WITH CO’S PERMISSION will use of the riser terminal be used as a connection block when the other end of the riser is to supply some piece of equipment.

j. Install a portable switch (some ships may have newer one piece connectors) in the line near the casualty to kill power in the event of an emergency (e.g. class “C” fire), or for reversing leads to correct phase rotation.

k. When all cables have been connected (including the horizontal connections) to the panel or equipment to be energized, inform DCC/CCS.
1. The DCA will request that the Bridge pass the word, "Stand clear of casualty power cables rigged between frames ____ and ____" (every 5 minutes)

m. When the operator of the designated switchboard (or Repair Electrician) receives word from Main Engine Control to "Rig and energize casualty power cables," the operator shall perform the following:

   (1) Test the bulkhead terminal and rig that end ONLY.

   (2) Rig the cable to the switchboard terminal after checking to make sure the switchboard casualty power circuit breaker is open.

   (3) Test the casualty power terminal in the switchboard to make sure the terminal is de-energized.

   (4) Momentarily close and open the casualty power switch to test the casualty cable run then close the switch again.

Note: This prevents both serious injury to someone still working on the casualty cable run and damage to the cables.

n. Report to Main Control, "Casualty power riser (or bulkhead terminal) rigged and energized." Main Control then notifies DCC.

o. Ensure that motor rotation is in the correct direction. If not, de-energize the circuit at the portable switch (if installed) and reverse any two of the three leads. (If no switch is installed, reversing the leads can be done inside the motor controller.)

6303. PROCEDURES FOR SECURING CASUALTY POWER

a. The DCA will instruct Main Control to "De-energize and disconnect casualty power from riser or bulkhead terminal."

b. The switchboard electrician will:

   (1) Open the casualty power circuit breaker on the switchboard.

   (2) Test to ensure the circuit is de-energized.
(3) Disconnect the casualty power cable from the riser (or bulkhead terminal) leading from the switchboard compartment.

(4) Disconnect the casualty power cable from the switchboard terminal.

(5) Report to Main Control, "Casualty power de-energized and disconnected from riser (or bulkhead terminal) __________."

c. Main Control will notify DCC/CCS.

d. DCC/CCS will direct the repair party to unrig and restow casualty power cables.

e. Procedures for unrigging casualty power cables:

(1) De-energize all casualty power to affected equipment and disconnect cable at the source.

(2) Test each connection block to make sure it is de-energized before removing the cable.

(3) Disconnect cable at the casualty.

(4) Re-connect previously disconnected normal power leads.

(5) Re-energize the load normally.

(4) Disconnect horizontal cable runs.

Note: When disconnecting the older style terminals, keep the leads separated between fingers of the rubber glove. When the three leads are free, they shall be dropped to the deck, making sure that no personnel are in the immediate area. The operator shall turn his/her head away from point of contact of cable with deck to avoid injury.

f. After the casualty has been repaired and the casualty power cables have been unrigged, the repair party(s) will notify DCC.

g. The DCA will inform the Engineer Officer who will then direct the energizing of appropriate power supply circuits. The Engineer Officer will notify the OOD when the casualty has been repaired and the normal power source has been restored.
The following pages lay out the various routes to be used when rigging casualty power from designated vital equipment to an available power source. The responsible DCRS and the terminals and cables to be used are listed. Other routes may be used, but those listed below are the "best case scenario" (the shortest available). In case of damage or other obstruction, the DCA will order an alternate route. The DCRS responsible for rigging casualty power is identified in the column on the right.

Note: Casualty power can only provide power from one source to one load, regardless of ABT or MBT at the power panel or controller. On some ships certain important equipment (e.g. HPAC, FOTP) may be on a non-vital circuit where there is no casualty power terminal at the power panel. If this equipment is required, then casualty power must be rigged directly into the motor controller. This is a special case requiring additional precautions.

**TO 1E SWBD:**

<table>
<thead>
<tr>
<th>FROM</th>
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<th>TO</th>
<th>DCRS</th>
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<td>#1 Fire Pump</td>
<td>3-18-1 (35)</td>
<td>RT 3-23-1</td>
<td>III</td>
</tr>
</tbody>
</table>

**TO 1SA/1SB SWBD:**

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<th>TO</th>
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<tr>
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<td>2-23-1 (20)</td>
<td>BT 2-23-3</td>
<td>III</td>
</tr>
</tbody>
</table>
TAB B

CASUALTY POWER CHECKLIST

___ Identify damaged cables to vital load.

___ Open power panel breakers to load and tag them out (OOC).

___ Are cables from Normal/Alternate/Emergency power supplies damaged?

___ DCO or DCA recommend to CO the rigging of casualty power.

___ DCA check vital load DC Plate for Norm/Alt/Emergency power supplies and load circuit breaker numbers.

___ DCA order Main Control to open and tag-out load circuit breakers on Norm/Alt/Emergency power supplies.

___ DCO designate source and source riser.

___ DCA designate casualty power route according to Casualty Power Bill.

___ Repair Electrician disconnect power feeders from load power panel.

___ Repair personnel rig from load riser to source riser.

___ Rig from load power panel terminal to load riser (install K switch between load power panel and riser).

___ Switchboard watch rig from source riser to source terminal (make sure casualty power breaker is open and de-energized).

___ Bridge passes word "Stand clear of casualty power cables rigged between frames ___ and ___" (every 5 minutes).

___ DCA give permission to flash test switchboard (watch momentarily energize casualty power breaker).

___ DCA gives permission to energize cables.

___ Repair Electrician operationally test the load.

Note: If casualty power is required for more than 24 hours, a Temporary Standing Order is required.
CHAPTER 7
CHEMICAL, BIOLOGICAL, AND RADIOLOGICAL DEFENSE

SECTION 1
REQUIRED INFORMATION

Ref:    (a) NTTP 3-20.31, Surface Ship Survivability
(b) NSTM Chapter 070, Radiological Recovery of Ships after Nuclear Weapons Explosions
(c) NTRP 3-20.31.470, Shipboard BW/CW Defense and Countermeasures
(d) NAVMED P-5041, Treatment of Chemical Agent Casualties and Conventional Military Chemical Injuries
(e) NAVMED P-5059, NATO Handbook on the Medical Aspects of NBC Defense Operations

7100. REQUIRED TABS

a. Tab A, Self Aid for Nerve Poisoning
b. Tab B, Self-Aid for Blistering Agent
c. Tab C, Self-Aid for Blood Agent
d. Tab D, Self-Aid for Choking Agent
e. Tab E, CBR-Defense Bill

Note: The CBR Defense Bill provides important, time sensitive information to the entire damage control organization.
SECTION 2
CHEMICAL WARFARE

7200. CLASSIFICATION OF CHEMICAL AGENTS

a. The following is a brief description of the most common types of chemical agents.

(1) Nerve agents inhibit a chemical neurotransmitter called cholinesterase enzyme, disrupting the normal transmission of nerve impulses.

(2) Blister agents produce pain and injury to the eyes, reddening and blisters of the skin, and when inhaled, damage to the mucous membranes and respiratory tract. Some blister agents like mustard may produce major destruction of the top (epidermal) layer of skin.

(3) Lung-damaging agents (choking agents) injure the lungs and irritate the eyes and respiratory tract. They may also cause uncontrollable pulmonary edema and predispose to secondary pneumonia.

(4) Blood agents are transported to all body tissues where the agent blocks the oxidative processes, preventing tissue cells from utilizing oxygen. This leads to respiratory and cardiovascular failure.

7201. CHEMICAL AGENT CONTAMINATION, DETECTION AND IDENTIFICATION

a. Identification of chemical agents will greatly assist the diagnosis and treatment of injuries. For the most part, shipboard detection devices are used post-attack. The following are means of detecting and identifying chemical agent contamination.

(1) The VGH ABC-M8 Chemical Agent Detector Paper can be used to detect and identify liquid V- and G-type nerve agents and H-type blister agents. It does not detect chemical agent vapors. Some solvents and standard decontaminating solutions cause the M8 paper to falsely react positive.

(2) The M9E1 Chemical Agent Detector Paper (tape) (which can be worn on the uniform) detects liquid nerve agents (V and G) and blister agents (H/HD, HN, and L). M9 paper will detect the presence of agent(s); it can neither distinguish between
agent types nor detect chemical agent vapors. Extremely high
 temperatures, scuffs, or certain types of organic liquids and
decontaminating solution number 2 (DS2) cause the M9 paper to
falsely react positive. (DS 2 is not authorized for use on
Naval vessels.) M9 paper is much more sensitive than M-8 paper.

(3) Portable detection devices, such as the M256
Chemical Agent Detector Kit and the Joint Chemical Agent Monitor
(JCAD)(future fielding), detect and identify vapor
concentrations of nerve, blister, and blood agents. Choking
agents can be detected by using chemical detector tubes carried
for gas free engineering purposes.

7202.  EMERGENCY PERSONNEL DECONTAMINATION

a. Chemical agent contamination of the skin should be
neutralized and removed with the M291 Skin Decontamination Kit
(SDK).

b. Procedures for Decontamination Kit Use:

(1) M291 Skin Decontamination Kit (SDK)

(a) Open the kit container and remove a mylar
packet.

(b) Tear open the mylar packet and remove the
decontamination pad. Unfold the pad and place two fingers
inside the strap, with the pad on the inside of the hand.
Lightly pat the contaminated area until it is covered with the
dark granules. Gently rub the area toward the center. Discard
the used decontamination pad.

Note: Detailed procedures for decontaminating the eyes are
found in reference (d).

(c) Any suspected chemical agent contamination of
your eyes or face must be removed immediately. In most cases,
you will not be able to identify the agent before
decontamination. Quickly obtain overhead shelter to protect
yourself while performing the following:

• Remove and open your canteen.
• Take a deep breath and hold it.
• Lift your mask away from your face.
Flush (irrigate) your eye or eyes immediately with copious amounts of water. To irrigate the eyes with water (from a canteen or other container of uncontaminated water) tilt your head to one side, open the eyelids as wide as possible, and slowly pour water into the eye so that it will run off the side of your face to avoid spreading the contamination. DO NOT use your fingers or gloved hand to hold the eyelids apart. You must irrigate your eyes despite the presence of toxic vapors in the atmosphere. Hold your breath and keep your mouth closed to prevent contamination and absorption through the mucous membranes. Neutralize chemical agent residue along the flush path on the face.

- Reseal, clear, and check your mask. Then resume breathing.

(d) If you face becomes contaminated while flushing your eyes, decontaminate your face as follows:

- Thoroughly scrub exposed skin of face until completely covered with black powder from the applicator pad.
- Hold breath, close eyes, grasp mask beneath chin, and pull hood and mask away from chin enough to allow one hand between the mask and your face.
- Scrub up and down across face beginning at front of one ear to nose to other ear.
- Scrub across face to corner of nose.
- Scrub extra stroke at corner of nose.
- Scrub across nose and tip to other corner of nose.
- Scrub extra stroke at corner of nose.
- Scrub across face to other ear.
- Scrub across cheek to corner of mouth.
- Scrub extra stroke at corner of mouth.
- Scrub across closed mouth to center of upper lip.
- Scrub extra stroke above upper lip.
- Scrub across closed mouth to other corner of mouth.
- Scrub extra stroke at corner of mouth.
- Scrub across cheek to end of jawbone.
- Scrub across the under jaw to chin, cupping chin.
- Scrub extra stroke at center of chin.
- Scrub across the under jaw to the end of the jawbone.
- Turn your hand out, and quickly wipe the inside of the mask that touches your face.
- Discard applicator pad.
- Immediately seal mask, clear, and check seal.
7204. **DIAGNOSIS OF NERVE AGENT POISONING**

a. Nerve agent poisoning may be identified from the characteristic signs and symptoms. If exposure to vapor has occurred, the pupils will be very small, usually pinpointed (known as miosis). If exposure has been cutaneous, or has followed ingestion of a nerve agent in contaminated food or water, the pupils may be normal or, in the presence of severe systemic symptoms, slightly to moderately reduced in size. In this event, one must rely on other symptoms of the nerve agent poisoning for proper diagnosis. No other known chemical agent produces muscular twitching and fasciculation, rapidly developing pinpoint pupils, or the characteristic train of muscarinic, nicotinic, and CNS manifestations.

b. It is important that all service members know the following MILD and SEVERE signs of nerve agent poisoning. Service members who have most or all of the symptoms listed below must IMMEDIATELY receive first aid (self aid or buddy aid).

(1) **MILD poisoning (self-aid).** Casualties with MILD symptoms may experience most or all of the following:

(a) Unexplained runny nose.

(b) Unexplained sudden headaches.

(c) Sudden drooling.

(d) Difficulty seeing (dimness of vision and miosis).

(e) Tightness in the chest or difficulty breathing.

(f) Localized sweating and muscular twitching in the area of the contaminated skin.

(g) Stomach cramps.

(h) Nausea with or without vomiting.

(i) Tachycardia (fast heartbeat) followed by bradycardia (slow heartbeat).

(2) **SEVERE symptoms (buddy aid).** Casualties with SEVERE symptoms may experience most or all of the MILD symptoms, plus most or all of the following:
(a) Strange or confused behavior.
(b) Wheezing, dyspnea (difficulty breathing) and coughing.
(c) Severely pinpointed pupils.
(d) Red eyes with tearing.
(e) Vomiting.
(f) Severe muscular twitching and general weakness.
(g) Involuntary urination and defecation.
(h) Convulsions.
(i) Unconsciousness.
(j) Respiratory failure.
(k) Bradycardia (abnormally slow heartbeat).

Note: Casualties with severe symptoms WILL NOT be able to treat themselves and MUST RECEIVE prompt buddy aid and prompt follow-on medical treatment if they are to survive.

c. Casualties with MODERATE poisoning will experience an increase in the severity of most or all of the MILD symptoms. Especially prominent will be fatigue, weakness, and muscle fasciculation. The progress of symptoms from MILD to MODERATE indicates either inadequate treatment or continuing exposure to the agent.

7205. SYMPTOMS OF BLISTERING AGENT

a. Blister agents will likely be used to produce casualties and force opposing troops to wear full protective equipment. They are used to degrade fighting efficiency rather than kill, although exposure to such agents can be fatal. Blister agents include sulphur mustard (H and HD), nitrogen mustards (HN), lewisite (L), and halogenated oximes [such as phosgene oxime (CX)]. The following symptoms are for the sulphur mustard (HD) agents. For symptoms of all blistering agents see reference (d).
b. In a single exposure, the eyes are more susceptible than either the respiratory tract or the skin to mustard. Symptoms are swelling of eye and/or corneal damage.

c. Ingestion of mustard produces puss and swelling of the lining of the gastrointestinal tract, with eventual hemorrhaging. Absorption of the mustard from the intestinal lumen results in damage to the blood-forming organs such as bone marrow, lymph nodes, and spleen. Such damage will induce blood disorders such as leukopenia, thrombocytopenia and anemia.

d. Inhalation of mustard vapor causes damage primarily to the lining of the lungs. The lesion develops slowly after exposure. A single exposure to a small amount of mustard vapor ordinarily does not produce significant injury. More exposure received will result in more lung damage ultimately leading to respiratory failure.

7206. SYMPTOMS FOR BLOOD AGENT

a. Inhalation is the usual route of entry for blood agents. Examples of blood agents are hydrogen cyanide (AC) and cyanogen chloride (CK). All blood agents are nonpersistent (agents disperse rapidly).

b. Hydrogen cyanide

(1) Sudden stimulation of breath

(2) Odor of bitter almonds

c. Cyanogen chloride

(1) Irritation of eyes, nose, or throat

7207. SYMPTOMS OF CHOKING AGENT

a. Choking agents are classified as lung-damaging agents. They include phosgene (OG), diphosgene (DP), chlorine (CL2), and chloropicrin (PS). The most well-known of these agents is OG. Persons exposed to OG need not be withdrawn during combat, unless signs of pulmonary distress appear. The following are examples of symptoms. For a complete list see reference (d).

(1) Coughing

(2) Choking
(3) Feeling of tightness in the chest

(4) Nausea

(5) Vomiting

(6) Headache

(7) Lacrimation
IMMEDIATELY DON protective mask and hood at the first signs of a chemical attack.

Stop breathing, put on your mask, clear and seal the mask, resume breathing. Secure the mask hood. The mask and protective clothing are worn until the "all clear" signal is given.

Note: All liquid nerve agents must be removed from the skin and/or clothing as described in section 7202 before donning the over garment.

Identify your symptoms of nerve agent poisoning from section 7204.

Administer one atropine injection and one 2-PAM-Cl injection into the outside mid-lower part of the thighs.

Wait 10-15 minutes. During this time the mild nerve agent poisoning symptoms should diminish, or the signs of atropinization will appear (rapid pulse, dry mouth, dry skin).

Repeat self-administration IF no change in symptoms. Use the 2nd atropine injector and the 2nd 2-PAM-Cl injector.

Wait 10-15 minutes. If no change in symptoms, repeat procedure with 3rd and last atropine and 2-PAM-Cl.

If situation permits, proceed to decon/triage area.

Correctly identify the severe symptoms of nerve agent exposure in another individual, and determine if the individual is able to administer self-aid.

If vapor hazard still exists make sure the casualty’s mask is properly adjusted and sealed to the extent practical.

Locate the casualty’s atropine and 2-PAM-Cl automatic injectors. DO NOT USE YOUR INJECTORS!
Inject the casualty with all 6 injections (or the remainder).

Move the casualty to a triage area or decon/treatment station as soon as practical. Buddy aid may be performed en route and at the decon station if the situation warrants.

Artificial respiration is required when the diaphragm and intercostals muscles are stimulated to exhaustion resulting in a physical inability to breathe. DO NOT perform in a chemical hazard environment.
TAB B
SELF AID FOR BLISTERING AGENT

___ Liquid vesicants in eyes or on skin require immediate decontamination.

___ Perform section 7202 (Emergency Personnel Decontamination).

___ Go to triage/decon area as soon as practical.
TAB C
SELF AID FOR BLOOD AGENT

___ IMMEDIATELY don protective mask while holding breath.

Note: Speed is absolutely essential; the effects of this agent are so rapid that within a few seconds you will not be able to don your mask.

___ Go to triage/decon area as soon as practical.

BUDDY AID FOR BLOOD AGENT

___ IMMEDIATELY don your protective mask while holding your breath.

___ If nearest person is unable to don their protective mask, help them.

___ Take buddy to triage/decon area.
TAB D
SELF AID FOR CHOKING AGENT

___ IMMEDIATELY don protective mask.

___ Move out of contaminated environment, if possible.

BUDDY AID FOR CHOKING AGENT

___ IMMEDIATELY don your protective mask while holding breath.

___ If nearest person is unable to don their protective mask help the person.

___ Take buddy to triage/decon area. Have victim remain seated in an upright position while awaiting treatment. Do not lie victim down.
7300. BIOLOGICAL WARFARE

   a. Biological agents can be divided into two general classes: pathogens and toxins. A pathogen is a microorganism that causes disease in humans, animals or plants. A biological toxin is an organic substance that is poisonous to humans or animals. Toxins are not living organisms. When a biological agent is used against a ship, the purpose is to render the crew unable to effectively carry out the ship’s mission.

7301. DETECTION OF BIOLOGICAL ATTACK

   a. Biological Agent Detectors, either those currently onboard ships or in development are “Detect to Treat” systems. It is a technically difficult problem as well as a time consuming process to accurately detect and identify a biological agent. Therefore, when the identification is made using these systems, personnel may have already been exposed and will require medical treatment to offset the effects of the agent. A presumptive identification is obtained using Hand Held Assay’s (HHA’s) which can presumptively identify eight different Biological Warfare Agent’s (BWA’s). A confirmatory identification is one obtained from a certified laboratory and usually involves using several identification technologies. One example would be the deployable laboratory operated by the Navy Environmental Preventive Medicine Units (NEPMUs). All Aircraft Carriers (CVN), and most Amphibious Warfare Ships (LHD and LHA class), have the confirmatory identification capability. A confirmatory identification will be used by Theater and National Commanders to determine future actions.

   b. The Dry Filter Unit (DFU) is an environmental air sampling system designed to be used with HHA’s and Confirmatory Laboratories to provide a biological agent detection and identification capability. The DFU system may be utilized for external or internal air sampling. It is mainly a portable system but may be used as a fixed system using the DFU 2000 configuration.

   c. Limited fielding has begun of the Joint Biological Point Detection System (JBPDS), an automated system that continuously monitors the atmosphere around the ship. It uses a number of technologies, including HHA’s, to provide the individual unit a presumptive identification capability.
d. Biological survey is another method of detection. If a biological attack is suspected because of a large number of breakouts or other indications, biomedical and environmental samples can be collected and sent to laboratories. The Bio Response Kit, maintained in Repair 3 contains the necessary gear to collect surface samples. Repair Party Monitoring Teams perform environmental samplings per steps below.

(1) Ensure ventilation is secured in space and surrounding area’s (should be a dead air zone around affected space).

(2) Ensure personnel in affected space stand fast. If no breathing protection in space (for personnel in incident site), provide MCU-2P until a safe route is established to the decon station.

(3) Set contaminated/uncontaminated boundaries

(4) Activate Decon station

(5) Conduct onsite brief prior to entering affected area

(6) Dress out BW Response Team (2 personnel) in JSLST with MCU-2P or equivalent.

(7) Set up a collection point outside of affected space to collect samples taken.

(a) Pail-/Trash Can or equivalent to collect packaged samples from affected space.

(b) 5% HTH mixture for decontamination of packaged samples

(c) Logbook to log collection times and location (must also include serial numbers for each sample if multiple samples were taken.

(d) Minimum 4 HHA’s

(e) Bio Response Kit

(f) DFU kits minimum 2 each

e. Biological Sampling Team.
(1) Dress out two personnel in full MOPP gear (JSLST with MCU-2P).

(2) Ensure dead air space surrounding effected area and all personnel who were in affected space have been evacuated to the decon station.

(3) One member, called the sampler, will collect the sample(s) and perform the presumptive testing using the HHA’s as per steps 5 thru 9.

(4) The second member will serve as the assistant by passing supplies forward, taking detailed notes of sample locations, serializing each sample, and communicating with the scene leader.

(5) A third person (JSLST and MCU-2P) shall remain at the contaminated / uncontaminated boundary to decon samples and place into the STP-100 shipping container.

(6) Team shall enter the affected space with cotton swaps, conical tube with buffer solution, sample spoon with container HHA(s), packaging materials, DFU kit(s), hype-wipe (for decon), or equivalent and fine point sharpie.

(7) Locate suspected power / liquid, remove cover (if personnel at scene placed cover over suspected substance).

(8) Remove two swabs from the package and conical tube from DFU Kit.
   (a) Open blue topped conical tube.
   (b) Dip one swab into buffer solution.

Note: If a swab is dropped, dispose of it and use a new one. Do not place it back into buffer solution.

(9) Swipe sample area(s) to be tested.
   (a) Move wet applicator swab over area to be tested (non-porous surfaces only) in a rolling motion; ensure that all sides are coated.

Note: If swab dries, break it off into buffer solution and use another other swab, never rewet and reuse it.
(b) Cover at least a 4 in x 4 in area.

(c) Use a second dry swab in same manner to cover the same 4 in x 4 in area.

(10) When collection is complete with swabs, using the sterile spoon (dry samples) or large pipette (wet samples) from BRK collect as much of the suspected substance into the sample container for later laboratory analysis. This container will be package as per steps 13 thru 15.

(11) Perform presumptive testing using HHA.

(a) Break off tip of pre-wetted swab into conical tube, replace cap and shake conical tube for 30 seconds.

(b) Remove a whirl-bag from DFU kit and place dry swap in the bag.

(c) Make sure HHAs are at room temperature before use.

(d) Open HHA panel using tear strip and place it on a flat, level surface.

(e) Check desiccant packs to ensure they are Blue, indicating HHA panel was not previously exposed to moisture. If desiccants are pink/red, dispose of HHA panel and use a new HHA panel for testing.

(f) Squeeze bulb end of pipette and place open end of pipette into fluid of conical tube below any foam but not at bottom of tube which may contain large particles that have settled out.

(g) Release bulb on pipette, allowing fluid into pipette and remove pipette from conical tube.

(h) Place pipette in a vertical position (90° angle) over one sample well of HHA. Slowly squeeze bulb end of pipette to release approximately 3 to 4 drops of fluid (make sure well is full) into sample well being careful not to spill any fluid.

(i) Repeat for each sample well on HHA in panel (eight total). You will have to return to the sample vial between each sample well to refill pipette.
(j) Start timer, set at 15 minutes, after placing sample fluid into last sample well, if using a watch, write finish time (15 minutes after last well filled) onto margin of HHA panel with a marker. Ensure that you do not become distracted.

(12) Interpret HHA; if a presumptive positive result is obtained from a panel immediately retest using another HHA. If you still get a presumptive positive, notify Chain of Command.

(13) The sampler will then place the HHA’S, buffer bottles and any other sample containers into individual Ziploc bags (from BRK). Decon bags and place these items into a large Ziploc bag held open by the assistant. If the Ziploc bag contains a liquid, add an absorbent paper towel to absorb fluid if container breaks.

(14) The assistant decontaminates the secondary watertight bag and transports all packaged items to contaminated/uncontaminated boundary and places these items into a decontamination vessel (for example: an empty trash can).

(15) Final packaging: the third team member places all decontaminated items into an approved shipping container.

(16) Fill out DON EVIDENCE/PROPERTY CUSTODY DOCUMENT (OPNAV 5527/22).

Note: Collect, package, and transport samples as rapidly as possible to ensure that timely information is provided. The sample must also be expeditiously handled based on its potential perishability, especially biological-agent samples. Generally an unrefrigerated sample remains viable for 6 hours and a refrigerated sample remains viable for 24 to 48 hours.

(17) Transport decontaminated package to a confirmatory Laboratory for testing.

CAUTION: Precise records must be sent with each sample. These records are use to expedite the analysis and guide the analysts in the choice of instrumentation and procedures. The records may also be used as evidence at a later stage. Positive control and an unbroken chain of custody must be maintained for the samples due to their critical nature. Reference (c) contains additional instructions on biological sampling and surveying procedures.
f. Concerning samples, it is important to take sufficient amounts to allow testing using both onboard systems and off ship laboratories. When transferring samples off the ship, it is important to utilize appropriate chain of custody procedures.

7302. CONFIRMATION OF BIOLOGICAL ATTACK

a. Positively determining that a biological attack has occurred is difficult, particularly without the use of JBPDS or DFUs. In that case, it will be up to medical to determine if a biological attack has occurred. Medical personnel must become familiar with the symptoms associated with exposure to biological agents. It is normal for a small percentage of the crew to be ill from naturally occurring pathogens. Occasionally, there are outbreaks of illness that affect more personnel. This, too, could be attributable to natural causes, but the following developments could indicate that a biological warfare agent is responsible.

b. The number of casualties reaches epidemic portions within hours to three days, most within a 24-hour period. This is the normal incubation times for exposed personnel to begin exhibiting symptoms.

c. The infection rate or death rate is higher than normally expected for the disease.

d. A disease outbreak occurs that is not normally encountered in the area of the world where the ship is operating.

e. Personnel working in a protected environment do not contract the disease.

f. Outbreak of multiple diseases occurs.

Note: To confirm that a biological attack was responsible for the casualties, samples collected by a biological detection system, environmental samples collected by repair parties or biomedical samples collected by medical personnel are crucial.

g. Quarantine of infected sailors and close contacts onboard naval vessels.

(1) If an outbreak or attack has occurred, sick individuals, personnel who had close contact with the sick individual(s) must be isolated from healthy individuals and groups. Currently healthy individuals that have had close
contact with the sick individual(s) must be quarantined for the disease’s incubation period. Preventing transmission of the disease to healthy individuals is the focus of the effort as well as providing medical care.

(2) Shipboard berthing spaces with head facilities can be easily and rapidly modified to meet the requirements for quarantine.

(a) The berthing space must be in close proximity to a weather opening to facilitate patient ingress and to minimize the lengths of exhaust duct (elephant trunks).

(b) Located as far aft as possible.

(c) Provide racks for approximately 27 sailors.

(d) Access to a head within quarantine space.

(e) Supply and recirculation ventilation must be secured to prevent cross contamination to non-quarantined spaces.

(3) The quarantine zone can be setup using standard shipboard Damage Control equipment, no specialized equipment or supplies are required. Refer to NSTM 470 for detailed instructions.
7303. PROTECTION FROM BIOLOGICAL WARFARE

a. Proper personal and shipboard hygiene is an important defense against both biological weapons and naturally occurring biological organisms. The protective mask is the most important element in biological protection. Most pathogens can enter the body only by inhalation, ingestion or breaks in the skin. With early warning, the Chemical Protective Ensemble (CPE) protective mask, Joint Service Lightweight Integrated Suit Technology (JSLIST) suit, overboots and gloves provide effective protection against biological warfare agents. As per reference (e), standard uniform clothing of good quality, gloves, goggles, and protective mask, offer reasonable protection against biological agent aerosols.
SECTION 4
RADIOLOGICAL WARFARE

7400. RADIOLOGICAL WARFARE

a. A nuclear explosion involves the fission (splitting) of complex radioactive isotopes. These isotopes are unstable forms of certain elements that emit ionizing radiation as they decay to a more stable state. The radiation from fission fragments consists primarily of gamma rays and beta particles. Shipboard instruments are calibrated to measure gamma radiation at the energy levels associated with fallout. The energy levels associated with prompt or initial gamma radiation are higher and not normally measured by the ship’s CBR organization. Current shipboard instruments can detect, but not measure, beta radiation.

7401. DETECTION

a. Human senses are incapable of detecting nuclear radiation, so Radiation Detection, Indication, And Computation (RADIAC) instruments are needed. RADIACs measure different forms of radiation:

(1) AN/PDR-65 is a very high-range gamma survey instrument. Onboard ship, it is normally mounted permanently and used with an external probe, but it could be used as a portable meter. The primary location for the AN/PDR-65 is the ship’s bridge with a second set normally mounted in DCC. For early warning of the arrival and cessation of fallout, the detector unit for the bridge should be mounted on the aft side of the main mast. It should be positioned as high as possible without being located in a radar beam.

(2) AN/PDQ-1/2 Multi-Function RADIAC (MFR) with OA-9449/PDQ Gamma/Beta Probe measures beta-gamma radiation. This RADIAC is being phased into the fleet as a replacement for AN/PDR 27 and 43. The PDQ-1 may be used without the probe for Gamma surveys. With the probe attached the PDQ-1 may be used for Gamma/Beta survey or personnel surveys. The PDQ-2 is nearly identical the PDQ-1, but has an additional line display for the probe.

(3) Dosimeters are devices that measure total dose or exposure. A personal dosimeter measures the accumulated dose of the wearer. There are two types of dosimeter that are commonly used in the military.
7-25

(a) IM 143 PD or Self Indicating Pocket Dosimeter is an ionization chamber pocket dosimeter. It measures gamma radiation and X-ray radiation. Since ships are outfitted with only enough for approximately 10% of the crew, these dosimeters should be issued to the senior member of any group of people (e.g. a watch section,). This person can then be tasked with real-time monitoring of the groups dose.

(b) DT-60 is a radioluminescent dosimeter worn like a necklace. It also measures X-ray and gamma radiation. Sufficient quantities should be carried to issue one to every crewmember. The dosimeter must be read using a CP-95/PD RADIAC Computer Indicator. Since the dose measured by a DT-60 is cumulative, the dosimeters must be read and data recorded upon initial issue. Since changes in photoluminescence require 18-24 hours to take effect, these dosimeters cannot be used for real time management of personnel rotation. An individual’s final dose should be read at least 24 hours after leaving a radiological environment.

7402. PROTECTION FROM RADIOLOGICAL WARFARE

a. Initial nuclear radiation and thermal radiation arrive instantaneously. Other effects arrive sequentially at intervals depending on range to surface. The deposition of fallout may not begin until hours after the detonation and the radiation hazard created by it may last until the ship receives depot level decontamination.

b. Protective clothing and respiratory protection are required in a radiological environment. The MCU-2/P with C-2 canister, as well its future replacement, the Joint Service General Purpose Mask (JSGPM), can be used for respiratory protection, while protective clothing shall consist of durable clothing made from fine weave cloth or a plastic or rubber material. Shipboard work uniforms and battle dress items satisfy this requirement. In wet spray conditions, rain gear shall be worn as the outer layer.

(1) If possible, no one should be allowed topside while the ship is enveloped in the initial blast. In an emergency, personnel topside must have full body coverage and respiratory protection. This will minimize exposure, but not guarantee survival.

(2) All personnel inside the skin of the ship will wear full body coverage and respiratory protection regardless of
status of ventilation (even with Circle William set). When beta radiation is confirmed absent, full body coverage can be relaxed but the mask shall still be worn.

c. To increase the chances of survival from radiological attack, utilize the philosophy of time, distance and shielding. Minimize time spent in area of radiation. Individuals should distance themselves from the radiation area (move away from the blast area). As for shielding, stay inside the skin of the ship or in an area where large dense material can provide protection. Senior members of the Damage Control organization must be proficient in the calculation of Radiation Absorbed Doses to accurately determine stay times and rotation times. See reference (b) for procedures.
Insert applicable Annex per reference (a).
## APPENDIX A

### DCRS FUNCTIONAL REQUIREMENTS

<table>
<thead>
<tr>
<th>Function</th>
<th># of Functional Personnel Required at Condition I</th>
<th>When Required at Condition I</th>
<th>Three or more DCRS ships</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Officer in Charge</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Fire Marshall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Repair Party Leader</td>
<td>1</td>
<td>All</td>
<td>1</td>
</tr>
<tr>
<td>4. Scene Leader</td>
<td>1</td>
<td>All</td>
<td>1</td>
</tr>
<tr>
<td>5. Plotter</td>
<td>1</td>
<td>All</td>
<td>1</td>
</tr>
<tr>
<td>6. Talker</td>
<td>1</td>
<td>All</td>
<td>1</td>
</tr>
<tr>
<td>7. Messenger</td>
<td>1</td>
<td>All</td>
<td>1</td>
</tr>
<tr>
<td>8. Investigator</td>
<td>2</td>
<td>All</td>
<td>2</td>
</tr>
<tr>
<td>9. Electrician</td>
<td>1</td>
<td>All</td>
<td>1</td>
</tr>
<tr>
<td>10. Team Leader</td>
<td>1</td>
<td>Fire</td>
<td>1</td>
</tr>
<tr>
<td>11. Nozzleman</td>
<td>2</td>
<td>Fire</td>
<td>2</td>
</tr>
<tr>
<td>12. Hoseman</td>
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<td>Fire</td>
<td>4</td>
</tr>
<tr>
<td>13. Smoke Control / Removal</td>
<td>2</td>
<td>Fire</td>
<td>2*(11 &amp; 12)</td>
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<tr>
<td>14. Boundaryman</td>
<td>4</td>
<td>Fire / Flooding</td>
<td>4*(23)</td>
</tr>
<tr>
<td>15. Accessman / Overhaulman</td>
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<td>Fire / Flooding</td>
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<td>16. Dewatering</td>
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<td>Damage / Flooding</td>
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<td>17. Choring</td>
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<td>Damage / Flooding</td>
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<td>18. Pipe Patching</td>
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<td>Damage / Flooding</td>
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<td>19. Hull Patching / Plugging</td>
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<td>Damage / Flooding</td>
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<td>20. Sounding</td>
<td>As Required</td>
<td>Damage / Flooding</td>
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<tr>
<td>21. Stretcher Bearer / First Aid</td>
<td>4 per BDS Personnel Casualty</td>
<td>PROVIDE BY BDS NOT DCRS</td>
<td></td>
</tr>
<tr>
<td>22. AFFF Station Operator</td>
<td>As Required</td>
<td>Bravo Fire</td>
<td>VARIES BY SHIP CLASS</td>
</tr>
<tr>
<td>23. Closure Detail / Zebra Setter</td>
<td>As Required</td>
<td>When COND II DC or GQ is set</td>
<td>VARIES BY SHIP CLASS</td>
</tr>
<tr>
<td>24. Magazine Sprinkler Operator</td>
<td>1</td>
<td>Fire</td>
<td>PROVIDED BY NEPS/CB NOT DCRS</td>
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<tr>
<td>25. F-100 Operator</td>
<td>As Required</td>
<td>As Required</td>
<td>AS REQUIRED (*12)</td>
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<tr>
<td>26. F-100 Assistant</td>
<td>As Required</td>
<td>As Required</td>
<td>AS REQUIRED (*12)</td>
</tr>
<tr>
<td>27. DCRS 5 Space Isolation Detail</td>
<td>As Required</td>
<td>When Ordered</td>
<td>AS REQUIRED (*23)</td>
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<td>28. Radiological Plotter</td>
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<td>Radiological Defense</td>
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<td>29. Radiological Recorder</td>
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<td>Radiological Defense</td>
<td>1*(7)</td>
</tr>
<tr>
<td>30. Radiological CP-95 Operator</td>
<td>1</td>
<td>Radiological Defense</td>
<td>1*(35)</td>
</tr>
<tr>
<td>31. Internal Monitor ^</td>
<td>1</td>
<td>All CBR Warfare</td>
<td>1*(16)</td>
</tr>
<tr>
<td>32. External Monitor ^</td>
<td>1</td>
<td>All CBR Warfare</td>
<td>1*(17)</td>
</tr>
<tr>
<td>33. CBR Hoseman ^</td>
<td>2</td>
<td>All CBR Warfare</td>
<td>2*(12)</td>
</tr>
<tr>
<td>34. CBR Scrubber ^</td>
<td>1</td>
<td>All CBR Warfare</td>
<td>1*(11)</td>
</tr>
<tr>
<td>35. CBR Decon Station Leader ^</td>
<td>1</td>
<td>All CBR Warfare</td>
<td>1*(30)</td>
</tr>
<tr>
<td>36. CBR Decon Station Cutter ^</td>
<td>2</td>
<td>All CBR Warfare</td>
<td>2</td>
</tr>
<tr>
<td>37. CBR Traffic Control ^</td>
<td>1</td>
<td>All CBR Warfare</td>
<td>1</td>
</tr>
<tr>
<td>38. HWD System Operator ^</td>
<td>As Required</td>
<td>All CBR Warfare</td>
<td>AS REQUIRED (*22)</td>
</tr>
</tbody>
</table>

1*(30) 1 is the minimum number of personnel required to perform the function

*30 is the line item that can be combined with this function

^ Function of whole ship
## Function

<table>
<thead>
<tr>
<th>Function</th>
<th># of Functional Personnel Required at Condition I</th>
<th>When Required at Condition I</th>
<th>MCM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Officer in Charge</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Fire Marshall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Repair Party Leader</td>
<td>1</td>
<td>All</td>
<td>1</td>
</tr>
<tr>
<td>4 Scene Leader</td>
<td>1</td>
<td>All</td>
<td>1</td>
</tr>
<tr>
<td>5 Plotter</td>
<td>1</td>
<td>All</td>
<td></td>
</tr>
<tr>
<td>6 Talker</td>
<td>1</td>
<td>All</td>
<td>1(*7)</td>
</tr>
<tr>
<td>7 Messenger</td>
<td>1</td>
<td>All</td>
<td>1(*6)</td>
</tr>
<tr>
<td>8 Investigator</td>
<td>2</td>
<td>All</td>
<td>2</td>
</tr>
<tr>
<td>9 Electrician</td>
<td>1</td>
<td>All</td>
<td>1</td>
</tr>
<tr>
<td>10 Team Leader</td>
<td>1</td>
<td>Fire</td>
<td>1</td>
</tr>
<tr>
<td>11 Nozzleman</td>
<td>2</td>
<td>Fire</td>
<td>2</td>
</tr>
<tr>
<td>12 Hoseman</td>
<td>4</td>
<td>Fire</td>
<td>4</td>
</tr>
<tr>
<td>13 Smoke Control / Removal</td>
<td>2</td>
<td>Fire</td>
<td>3(*15)</td>
</tr>
<tr>
<td>14 Boundaryman</td>
<td>4</td>
<td>Fire / Flooding</td>
<td>3(*14)</td>
</tr>
<tr>
<td>15 Accessman / Overhaulman</td>
<td>1</td>
<td>Fire / Flooding</td>
<td></td>
</tr>
<tr>
<td>16 Dewatering</td>
<td>2</td>
<td>Damage / Flooding</td>
<td>1(*11)</td>
</tr>
<tr>
<td>17 Shoring</td>
<td>3</td>
<td>Damage / Flooding</td>
<td>1(*12)</td>
</tr>
<tr>
<td>18 Pipe Patching</td>
<td>2</td>
<td>Damage / Flooding</td>
<td>1(*12)</td>
</tr>
<tr>
<td>19 Hull Patching / Plugging</td>
<td>2</td>
<td>Damage / Flooding</td>
<td>1(*12)</td>
</tr>
<tr>
<td>20 Sounding</td>
<td>As Required</td>
<td>Damage / Flooding</td>
<td>As required</td>
</tr>
<tr>
<td>21 Stretcher Bearer / First Aid</td>
<td>4 per BDS</td>
<td>Personnel Casualty</td>
<td>2(provide from BDS)</td>
</tr>
<tr>
<td>22 AFFF Station Operator</td>
<td>As Required</td>
<td>Bravo Fire</td>
<td>2(total/ship)</td>
</tr>
<tr>
<td>23 Closure Detail / Zebra Setter</td>
<td>As Required by Area</td>
<td>When COND II DC or GQ is set</td>
<td>6(total/ship)(*14 &amp;15)</td>
</tr>
<tr>
<td>24 Magazine Sprinkler Operator</td>
<td>1</td>
<td>Fire</td>
<td></td>
</tr>
<tr>
<td>25 F-100 Operator</td>
<td>As Required</td>
<td>As Required</td>
<td></td>
</tr>
<tr>
<td>26 F-100 Assistant</td>
<td>As Required</td>
<td>As Required</td>
<td></td>
</tr>
<tr>
<td>27 DCRS 5 Space Isolation Detail</td>
<td>As Required When Ordered</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28 Radiological Plotter^</td>
<td>1</td>
<td>Radiological Defense</td>
<td>1(*3)</td>
</tr>
<tr>
<td>29 Radiological Recorder^</td>
<td>1</td>
<td>Radiological Defense</td>
<td>1(*29)</td>
</tr>
<tr>
<td>30 Radiological CP-95 Operator^</td>
<td>1</td>
<td>Radiological Defense</td>
<td>1(*35)</td>
</tr>
<tr>
<td>31 Internal Monitor^</td>
<td>1</td>
<td>All CBR Warfare</td>
<td>1(*16)</td>
</tr>
<tr>
<td>32 External Monitor^</td>
<td>1</td>
<td>All CBR Warfare</td>
<td>1(*17)</td>
</tr>
<tr>
<td>33 CBR Hoseman^</td>
<td>2</td>
<td>All CBR Warfare</td>
<td>2(*12)</td>
</tr>
<tr>
<td>34 CBR Scrubber^</td>
<td>1</td>
<td>All CBR Warfare</td>
<td>1(*11)</td>
</tr>
<tr>
<td>35 CBR Decon Station Leader^</td>
<td>1</td>
<td>All CBR Warfare</td>
<td>1(*30)</td>
</tr>
<tr>
<td>36 CBR Decon Station Cutter^</td>
<td>2</td>
<td>All CBR Warfare</td>
<td>1</td>
</tr>
<tr>
<td>37 CBR Traffic Control^</td>
<td>1</td>
<td>All CBR Warfare</td>
<td></td>
</tr>
<tr>
<td>38 CWD System Operator^</td>
<td>As Required</td>
<td>All CBR Warfare</td>
<td>AS REQUIRED (5 total/ship)</td>
</tr>
</tbody>
</table>

1(*30)  
1 is the min number of personnel required to perform the function  
*30 is the line item that can be combined with this function  
^ Function of whole ship
## APPENDIX C
### MHC-51 FUNCTIONAL REQUIREMENTS

<table>
<thead>
<tr>
<th>Function</th>
<th># of Functional Personnel Required at Condition I</th>
<th>When Required at Condition I</th>
<th>MHC 51</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Officer in Charge</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>2 Fire Marshall</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Repair Party Leader</td>
<td>1</td>
<td>All</td>
<td>1</td>
</tr>
<tr>
<td>4 Scene Leader</td>
<td>1</td>
<td>All</td>
<td>1</td>
</tr>
<tr>
<td>5 Plotter</td>
<td>1</td>
<td>All</td>
<td>1</td>
</tr>
<tr>
<td>6 Talker</td>
<td>1</td>
<td>All</td>
<td>1</td>
</tr>
<tr>
<td>7 Messenger</td>
<td>1</td>
<td>All</td>
<td>1</td>
</tr>
<tr>
<td>8 Investigator</td>
<td>2</td>
<td>All</td>
<td>2</td>
</tr>
<tr>
<td>9 Electrician</td>
<td>1</td>
<td>All</td>
<td>1</td>
</tr>
<tr>
<td>10 Team Leader</td>
<td>1</td>
<td>Fire</td>
<td>1</td>
</tr>
<tr>
<td>11 Nozzleman</td>
<td>2</td>
<td>Fire</td>
<td>1</td>
</tr>
<tr>
<td>12 Hoseman</td>
<td>4</td>
<td>Fire</td>
<td>2</td>
</tr>
<tr>
<td>13 Smoke Control / Removal</td>
<td>2</td>
<td>Fire</td>
<td>3(*15)</td>
</tr>
<tr>
<td>14 Boundaryman</td>
<td>4</td>
<td>Fire / Flooding</td>
<td>2(*8)</td>
</tr>
<tr>
<td>15 Accessman / Overhaulman</td>
<td>1</td>
<td>Fire / Flooding</td>
<td>1(*12)</td>
</tr>
<tr>
<td>16 Dewatering</td>
<td>2</td>
<td>Damage / Flooding</td>
<td>3</td>
</tr>
<tr>
<td>17 Shoring</td>
<td>3</td>
<td>Damage / Flooding</td>
<td>2</td>
</tr>
<tr>
<td>18 Pipe Patching / Plugging</td>
<td>2</td>
<td>Damage / Flooding</td>
<td>4</td>
</tr>
<tr>
<td>19 Hull Patching / Plugging</td>
<td>2</td>
<td>Damage / Flooding</td>
<td>4(*18)</td>
</tr>
<tr>
<td>20 Sounding</td>
<td>As Required</td>
<td>Damage / Flooding</td>
<td>As required</td>
</tr>
<tr>
<td>21 Stretcher Bearer / First Aid</td>
<td>4 per BDS</td>
<td>Personnel Casualty</td>
<td>4(provide from BDS)</td>
</tr>
<tr>
<td>22 AFFF Station Operator</td>
<td>As Required</td>
<td>Bravo Fire</td>
<td>1</td>
</tr>
<tr>
<td>23 Closure Detail / Zebra Setter</td>
<td>As Required by Area</td>
<td>When COND II DC or GQ is set</td>
<td>repair party</td>
</tr>
<tr>
<td>24 Magazine Sprinkler Operator</td>
<td>1</td>
<td>Fire</td>
<td></td>
</tr>
<tr>
<td>25 P-100 Operator</td>
<td>As Required</td>
<td>As Required</td>
<td>1(*16)</td>
</tr>
<tr>
<td>26 P-100 Assistant</td>
<td>As Required</td>
<td>As Required</td>
<td>2(*16)</td>
</tr>
<tr>
<td>27 DCRS 5 Space Isolation Detail</td>
<td>As Required</td>
<td>When Ordered</td>
<td></td>
</tr>
<tr>
<td>28 Radiological Plotter^</td>
<td>1</td>
<td>Radiological Defense</td>
<td>0</td>
</tr>
<tr>
<td>29 Radiological Recorder^</td>
<td>1</td>
<td>Radiological Defense</td>
<td>0</td>
</tr>
<tr>
<td>30 Radiological CP-95 Operator^</td>
<td>1</td>
<td>Radiological Defense</td>
<td>0</td>
</tr>
<tr>
<td>31 Internal Monitor ^</td>
<td>1</td>
<td>All CBR Warfare</td>
<td>0</td>
</tr>
<tr>
<td>32 External Monitor ^</td>
<td>1</td>
<td>All CBR Warfare</td>
<td>0</td>
</tr>
<tr>
<td>33 CBR Hoseman^</td>
<td>2</td>
<td>All CBR Warfare</td>
<td>0</td>
</tr>
<tr>
<td>34 CBR Scrubber^</td>
<td>1</td>
<td>All CBR Warfare</td>
<td>0</td>
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<tr>
<td>35 CBR Decon Station Leader^</td>
<td>1</td>
<td>All CBR Warfare</td>
<td>0</td>
</tr>
<tr>
<td>36 CBR Decon Station Cutter^</td>
<td>2</td>
<td>All CBR Warfare</td>
<td>0</td>
</tr>
<tr>
<td>37 CBR Traffic Control^</td>
<td>1</td>
<td>All CBR Warfare</td>
<td>0</td>
</tr>
<tr>
<td>38 CMWD System Operator^</td>
<td>As Required</td>
<td>All CBR Warfare</td>
<td>0</td>
</tr>
</tbody>
</table>

1(*30)
1 is the minimum number of personnel required to perform the function
*30 is the line item that can be combined with this function
^ Function of whole ship
## Appendix D

### PC Functional Requirements

<table>
<thead>
<tr>
<th>Function</th>
<th># of Functional Personnel Required at Condition I</th>
<th>When Required at Condition I</th>
<th>PC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Officer in Charge</td>
<td>1</td>
<td>All</td>
<td>1(*5,6)</td>
</tr>
<tr>
<td>2 Fire Marshall</td>
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<td></td>
<td>0</td>
</tr>
<tr>
<td>3 Repair Party Leader</td>
<td>1</td>
<td>All</td>
<td>1</td>
</tr>
<tr>
<td>4 Scene Leader</td>
<td>1</td>
<td>All</td>
<td>1(*3,6)</td>
</tr>
<tr>
<td>5 Plotter</td>
<td>1</td>
<td>All</td>
<td>1(*3,5)</td>
</tr>
<tr>
<td>6 Talker</td>
<td>1</td>
<td>All</td>
<td>1(*8)</td>
</tr>
<tr>
<td>7 Messenger</td>
<td>1</td>
<td>All</td>
<td>1(*7)</td>
</tr>
<tr>
<td>8 Investigator</td>
<td>2</td>
<td>All</td>
<td>1(*13)</td>
</tr>
<tr>
<td>9 Electrician</td>
<td>1</td>
<td>All</td>
<td>0</td>
</tr>
<tr>
<td>10 Team Leader</td>
<td>1</td>
<td>Fire</td>
<td>0</td>
</tr>
<tr>
<td>11 Nozzleman</td>
<td>2</td>
<td>Fire</td>
<td>2(*27)</td>
</tr>
<tr>
<td>12 Hoseman</td>
<td>4</td>
<td>Fire</td>
<td>2(*15, 23)</td>
</tr>
<tr>
<td>13 Smoke Control / Removal</td>
<td>2</td>
<td>Fire</td>
<td>1(*9)</td>
</tr>
<tr>
<td>14 Boundaryman</td>
<td>4</td>
<td>Fire / Flooding</td>
<td>2</td>
</tr>
<tr>
<td>15 Accessman / Overhaulman</td>
<td>1</td>
<td>Fire / Flooding</td>
<td>1(*12, 23)</td>
</tr>
<tr>
<td>16 Dewatering</td>
<td>2</td>
<td>Damage / Flooding</td>
<td>2(*17,18,19, 25,26)</td>
</tr>
<tr>
<td>17 Shoring</td>
<td>3</td>
<td>Damage / Flooding</td>
<td>2(*16,18,19, 25, 26)</td>
</tr>
<tr>
<td>18 Pipe Patching</td>
<td>2</td>
<td>Damage / Flooding</td>
<td>2(*16,17,19, 25, 26)</td>
</tr>
<tr>
<td>19 Hull Patching / Plugging</td>
<td>2</td>
<td>Damage / Flooding</td>
<td>2(*16,17,18, 25, 26)</td>
</tr>
<tr>
<td>20 Sounding</td>
<td>As Required</td>
<td>Damage / Flooding</td>
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</tr>
<tr>
<td>21 Stretcher Bearer / First Aid</td>
<td>4 per BDS</td>
<td>Personnel Casualty</td>
<td>BDS</td>
</tr>
<tr>
<td>22 AFFF Station Operator</td>
<td>As Required</td>
<td>Bravo Fire</td>
<td>0</td>
</tr>
<tr>
<td>23 Closure Detail / Zebra Setter</td>
<td>As Required by Area</td>
<td>When COND II DC or GQ is set</td>
<td>2(*12, 15)</td>
</tr>
<tr>
<td>24 Magazine Sprinkler Operator</td>
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<td>Fire</td>
<td>WEP</td>
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<td>25 P-100 Operator</td>
<td>As Required</td>
<td>As Required</td>
<td>1(*16,17,18,19, 26)</td>
</tr>
<tr>
<td>26 P-100 Assistant</td>
<td>As Required</td>
<td>As Required</td>
<td>1(*16,17,18,19, 25)</td>
</tr>
<tr>
<td>27 DCRS 5 Space Isolation Detail</td>
<td>As Required</td>
<td>When Ordered</td>
<td>1(*11)</td>
</tr>
<tr>
<td>28 Radiological Plotter</td>
<td>1</td>
<td>Radiological Defense</td>
<td>0</td>
</tr>
<tr>
<td>29 Radiological Recorder</td>
<td>1</td>
<td>Radiological Defense</td>
<td>0</td>
</tr>
<tr>
<td>30 Radiological CP-95 Operator</td>
<td>1</td>
<td>Radiological Defense</td>
<td>0</td>
</tr>
<tr>
<td>31 Internal Monitor</td>
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<tr>
<td>32 External Monitor</td>
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<td>All CBR Warfare</td>
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</tr>
<tr>
<td>33 CBR Hoseman</td>
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<td>All CBR Warfare</td>
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<tr>
<td>34 CBR Scrubber</td>
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<td>All CBR Warfare</td>
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</tr>
<tr>
<td>35 CBR Decon Station Leader</td>
<td>1</td>
<td>All CBR Warfare</td>
<td>0</td>
</tr>
<tr>
<td>36 CBR Decon Station Cutter</td>
<td>2</td>
<td>All CBR Warfare</td>
<td>0</td>
</tr>
<tr>
<td>37 CBR Traffic Control</td>
<td>1</td>
<td>All CBR Warfare</td>
<td>0</td>
</tr>
<tr>
<td>38 CMWD System Operator</td>
<td>As Required</td>
<td>All CBR Warfare</td>
<td>0</td>
</tr>
</tbody>
</table>

1(*30)

1 is the minimum number of personnel required to perform the function
*30 is the line item that can be combined with this function
^ Function of whole ship