Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

HARRY DEWOLF CLASS

SAFETY AND ENVIRONMENTAL MANAGEMENT SYSTEM (SEMS) MANUAL

COMMANDER'S SAFETY AND ENVIRONMENTAL POLICY

Maritime Forces Atlantic (MARLANT) plays a critical role in Canada's maritime security, and its success is due to the concerted effort of our skilled and experienced military and civilian personnel. Consequently, it is MARLANT's responsibility to safeguard its people and protect the environment for future generations. To accomplish this, MARLANT has made it a priority to prevent safety and environmental incidents. Personnel are to consider safety and environmental risks or impacts while performing their duties, for which MARLANT will provide the necessary support, resources and training. All military and civilian personnel should be proud of the work they do to ensure readiness of the Navy's surface and submarine forces while contributing to meeting MARLANT's commitment to safety and environmental management.

For almost two decades, MARLANT has demonstrated its commitment through the implementation of a formally-documented safety and environmental management system (SEMS). The SEMS provides the framework for MARLANT to implement the Strong, Secure, Engaged: Canada's Defence Policy, Defence Occupational Health and Safety Strategy and Defence Energy and Environment Strategy. The SEMS provides guidance to senior management to set and review objectives and targets; thus, ensuring the continual improvement of our safety and environmental performance. Implementation of the SEMS ensures MARLANT complies with applicable safety and environmental legal requirements; protects and enhances the health, safety and well-being of personnel in the workplace; engages with Indigenous communities; prevents pollution; reduces greenhouse gas emissions; safeguards our Arctic resources; and sustains the environment.

An understanding and adherence to MARLANT's safety and environmental policy and the SEMS is required by all MARLANT military and civilian personnel, as well as all other persons who work for or on behalf of the MARLANT, to ensure due diligence in the daily execution of their duties. MARLANT will continue to be a leader in safety and environmental management through their collective efforts.

With sound leadership and individual commitment, MARLANT is "Ready, Aye, Ready" to meet our safety and environmental obligations while fulfilling our mission. I am committed to collaborating with labour representatives and providing the leadership, direction and resources to fulfil these obligations and ensure a safe and healthy workplace and sustainable environment.

LA POLITIQUE DU COMMANDANT EN MATIÈRE DE SÉCURITÉ ET D'ENVIRONNEMENT

Les Forces maritimes de l'Atlantique [FMAR(A)] jouent un rôle essentiel dans le domaine de la sécurité maritime et doivent leur succès aux efforts concertés de leurs employés militaires et civils compétents et chevronnés. Par conséquent, il incombe aux FMAR(A) de protéger leurs membres et l'environnement pour les générations futures. À cette fin, les FMAR(A) se sont donné comme priorité de prévenir les incidents touchant la sécurité et l'environnement. Les membres du personnel sont invités à tenir compte des risques et des conséquences associés à la sécurité et l'environnement dans l'exercice de leurs fonctions, pour lesquelles les FMAR(A) fournissent le soutien, les ressources et la formation nécessaires. L'ensemble du personnel militaire et civil doit être fier du travail qu'il accomplit pour garantir la disponibilité opérationnelle des forces sous-marines et de surface de la Marine tout en contribuant à la réalisation de l'engagement des FMAR(A) à l'égard de la gestion de la sécurité et de l'environnement.

Pendant près de deux décennies, les FMAR(A) ont confirmé leur engagement au moyen de la mise en œuvre d'un système de gestion de la sécurité et de l'environnement (SGSE) officiellement documenté. Le SGSE fournit aux FMAR(A) le cadre pour mettre en œuvre la Politique de défense du Canada : Protection, Sécurité, Engagement, la Stratégie en matière de santé et de sécurité au travail de la Défense et la Stratégie énergétique et environnementale de la Défense. Le SGSE donne des conseils à la haute direction sur l'établissement et l'examen des objectifs, favorisant ainsi une amélioration continue de notre rendement en matière de sécurité et d'environnement. La mise en œuvre du SGSE permet de s'assurer que les FMAR(A) satisfont aux exigences des lois en vigueur sur la sécurité et l'environnement; de protéger et d'améliorer la santé, la sécurité et le bien-être du personnel au travail; de nouer le dialogue avec les collectivités autochtones; de prévenir la pollution; de diminuer les émissions de gaz à effet de serre; de sauvegarder nos ressources de l'Arctique; de préserver l'environnement.

Tous les employés militaires et civils des FMAR(A), ainsi que toutes les personnes qui travaillent pour les FMAR(A) ou au nom de celles ci doivent comprendre et respecter la politique des FMAR(A) en matière de sécurité et d'environnement et le SGSE pour qu'ils puissent faire preuve de diligence dans l'exécution de leurs fonctions. Les FMAR(A) continueront d'être un chef de file de la promotion de la sécurité et de l'environnement grâce aux efforts concertés de leurs membres.

Grâce à un leadership solide et à l'engagement de chacun de ses membres, les FMAR(A) sont « toujours là, toujours prêtes » à remplir leurs obligations à l'égard de la sécurité et de l'environnement tout en menant à bien leur mission. J'ai la ferme intention de collaborer avec les représentants syndicaux, d'assurer le leadership, et de fournir les directives et les ressources nécessaires pour remplir ces obligations et assurer un milieu de travail sain et sécuritaire, et un environnement viable.

C. A. BAINES
Rear-Admiral/Contre-amiral
Commander/Commandant
Maritime Forces Atlantic/ Forces maritimes de l'Atlantique
October 2019/Octobre 2019

J. RYAN
Federal Government Dockyard Trades & Labour Council East (FGDT&LC(E))/Counseil des métiers et du travail du chantier maritime du gouvernement fédéral est (CMTCM-E)

R. CASHIN
Federal Government Dockyard Chargehands Association (FGDCA)/ Association des chefs d'équipes des chantiers maritimes du gouvernement fédéral (ACECM)

J. DUCEY
International Brotherhood of Electrical Workers (IBEW) Local 2228/Fraternité internationale des ouvriers en électricité (FIOE), section locale 2228

T. KILEY
Union of National Defence Employees (UNDE)/ Union des employés de la Défense nationale (UEDN)

L. MACKINNON
Professional Institute of Public Service of Canada (PIPSC)/ Institut professional de la fonction publique du Canada (IPFPC)

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

HARRY DEWOLF CLASS
SAFETY AND ENVIRONMENT MANAGEMENT SYSTEM (SEMS)
MANUAL

PREFACE

Formation Commander's Safety and Environmental Policy
Commanding Officer's Safety and Environmental Policy
Contents
Foreword
Certification
Signature Sheet
Revision History

PART 1 – ADMINISTRATION

Chapter 1 - GENERAL	1/13
Introduction	1/13
Chapter 2 - POLICY	1/13
Chapter 3 - PLANNING	1/13
Safety Hazards and Environmental Aspects	1/13
Legal and Other Requirements	2/13
Objectives, Targets and Programs	2/13
CHAPTER 4 - IMPLEMENTATION AND OPERATION	3/13
Resources, Roles, Responsibility and Authority	3/13
Competence, Training and Awareness	6/13
Communication and Consultation	7/13
SEMS Documentation	8/13
Control of Documents	8/13
Operational Control	9/13
Emergency Preparedness and Response	9/13
Chapter 5 - CHECKING AND CORRECTIVE ACTION	10/13
Performance Measurement and Monitoring	10/13
Evaluation of Compliance	10/13
Non-conformity, Preventive Action and Corrective Action	10/13
Control of Records	11/13
Safety/Environment Inspections/Rounds	11/13
Internal Verification	12/13
Chapter 6 - MANAGEMENT REVIEW	13/13

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

PART 1 – ADMINISTRATION

ANNEXES

Annex 1A	Glossary
Annex 1B	Acronyms
Annex 2A	Policy Template
Annex 3A	Identification and Determination of Significance for Safety Hazards and Environmental Aspects
Annex 3B	Applicable Legal and Other Requirements
Annex 3C	Objectives and Targets
Annex 3D	Safety and Environmental Management Programs
Annex 4A	Safety and Environmental Responsibilities
Annex 4B	Terms of Reference for the Ship's Safety and Environmental Committee (SSEC)
Annex 4C	Terms of Reference for Unit General Safety Officer
Annex 4D	Terms of Reference for the Unit RF Safety Officer
Annex 4E	Terms of Reference for the Unit Laser Systems Safety Officer
Annex 4F	Terms of Reference for the Ship's Lockout/Tagout Coordinator
Annex 4G	Terms of Reference for Departmental Safety and Environmental Representatives
Annex 4H	Terms of Reference for the Unit Environment Officer
Annex 4I	Terms of Reference for the Unit Hazardous Materials Coordinator
Annex 4J	Terms of Reference for the Solid Waste Coordinator
Annex 4K	Terms of Reference for the Spill Cleanup Team
Annex 4L	In-Routine Briefs
Annex 4M	Five-Minute Safety Talk Subjects
Annex 4N	Master Document List
Annex 4O	Safety and Environmental Training
Annex 4P	SEMS Change Request Form
Annex 5A	Performance Measurement and Monitoring Master List
Annex 5B	Safety/Environment Concerns Form
Annex 5C	Records Master List
Annex 5D	Department Inspection Report
Annex 5E	Inspection of Ship's Books/Logs
Annex 6A	Instruction for Conducting a Management Review

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

PART 2 – STANDARD OPERATING PROCEDURES

SAFETY

SOP-S01	**Hazardous Occurrence Investigation and Reporting**
Annex SOP-S01A	Hazardous Occurrence Investigation and Reporting References
Annex SOP-S01B	Significant Incident Report Message for Serious Accidents
Annex SOP-S01C	Sports Chit
Annex SOP-S01D	Hazardous Occurrence Message Format
SOP-S02	**Personal Protective Equipment (PPE)**
Annex SOP-S02A	Personal Protective Equipment References
Annex SOP-S02B	Department PPE Inventory List
SOP-S03	**Respiratory Protection Program**
Annex SOP-S03A	Respiratory Protection Program References
SOP-S04	**Lockout/Tagout**
Annex SOP-S04A	Lockout/Tagout References
Annex SOP-S04B	Lockout/Tagout List
Annex SOP-S04C	Lockout/Tagout Amplifying Details
Annex SOP-S04D	Lockout/Tagout Verification
Annex SOP-S04E	Lockout/Tagout Form
Annex SOP-S04F	Lockout/Tagout Compliance Audit Form
Annex SOP-S04G	Lockout/Tagout SPDET
Annex SOP-S04H	Near Miss Report
Annex SOP-S04I	Transfer of Responsibility
Annex SOP-S04J	Forcible Removal of Padlock
SOP-S05	**Fall Protection and Elevated Structures**
Annex SOP-S05A	Fall Protection and Elevated Structures References
Annex SOP-S05B	Fall Protection Inventory List
Annex SOP-S05C	Fall Hazard Assessment
Annex SOP-S05D	Fall Arrest Rescue Plan
SOP-S06	**Tool Safety**
Annex SOP-S06A	Tool Safety References
Annex SOP-S06B	Tool Inventory, Inspection and Maintenance Log
SOP-S07	**Hot Work**
Annex SOP-S07A	Hot Work References
Annex SOP-S07B	Hot Work Certificate (sample)
SOP-S08	**Confined Space Entry**
Annex SOP-S08A	Confined Space Entry References
Annex SOP-S08B	Confined Space Certificate (sample)
Annex SOP-S08C	Confined Space Hazard Assessment
Annex SOP-S08D	Confined Space Rescue Plan
SOP-S09	**Radio Frequency Hazard Safety**

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

PART 2 – STANDARD OPERATING PROCEDURES

Annex SOP-S09A	Radio Frequency Hazard Safety References
Annex SOP-S09B	AOPV Class (Post MLR) Radio Frequency Safety Instructions
Annex SOP-S09C	Harbour RF Emitter Radiate Procedures
Annex SOP-S09D	Aircraft RF Safety Procedures
Annex SOP-S09E	CF Fuels and Liquids with Flashpoints below 60C
Annex SOP-S09F	RF Energy Leak Check Record Sheet
Annex SOP-S09G	RF Signage NATO Stock Numbers
Annex SOP-S09H	Monthly and Quarterly Audit Checklists
Annex SOP-S09I	RFSP Audit Assessment Matrix Ships
SOP-S10	**Laser Safety**
Annex SOP-S10A	Laser Safety References
Annex SOP-S10B	Laser Inventory
Annex SOP-S10C	Ranger 25B LFR of the MK 38 Mod 2A 25mm Gun
Annex SOP-S10D	Vaisala Ceilometer CL31 Subsystem
Annex SOP-S10E	Vigy Observer EO/IR Subsystem
Annex SOP-S10F	Laser Safety Program Self Verification
Annex SOP-S10G	Laser Warning Sign
SOP-S11	**Radiation Safety**
Annex SOP-S11A	Radiation Safety References
Annex SOP-S11B	Sample Ship's IRS Inventory List
Annex SOP-S11C	Warning and Emergency Procedures for Gaseous Tritium
Annex SOP-S11D	Contact Numbers
Annex SOP-S11E	Helicopter Typical Holdings
Annex SOP-S11F	Radiological Compliance Certificate
SOP-S12	**Surface Preparation**
Annex SOP-S12A	Surface Preparation References
SOP-S13	**High Voltage Switching Program**
Annex SOP-S13A	High Voltage Switching Program References
Annex SOP-S13B	High Voltage Switching Schedule (HVSS) Form
Annex SOP-S13C	Permit to Work (PTW) Form
Annex SOP-S13D	Sanction for Test (SFT) Form
Annex SOP-S13E	Limitation of Access (LOA) Form
Annex SOP-S13F	Serial Tracking List
Annex SOP-S13G	SEPM Handover Certificate
Annex SOP-S13H	APC Handover Certificate
Annex SOP-S13I	Certificate of Appointment Authorizing Engineer (High Voltage)
Annex SOP-S13J	Certificate of Appointment Authorized Person (High Voltage)
Annex SOP-S13K	Certificate of Appointment Competent Person (High Voltage)
Annex SOP-S13L	HV Aware Trained Personnel List
Annex SOP-S13M	Master Key Register
Annex SOP-S13N	HV Switching Program Compliance Audit Form
Annex SOP-S13O	High Voltage Switching Program SPDET
Annex SOP-S13P	HV Near Miss Report Form

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

PART 2 – STANDARD OPERATING PROCEDURES

SOP-S14	**Dive Operations Safety**
Annex SOP-S14A	Dive Operations Safety References
Annex SOP-S14B	Diving Safety Checklist

SAFETY/ENVIRONMENT

SOP-SE01	**Hazardous Material/Hazardous Waste Management**
Annex SOP-SE01A	Hazardous Material/Hazardous Waste Management References
Annex SOP-SE01B	Hazardous Material Inventory Form
Annex SOP-SE01C	Hazardous Waste Disposal Instructions
Annex SOP-SE01D	Hazardous Material Training Qualification Record
Annex SOP-SE01E	Asbestos Handling Instructions

ENVIRONMENT

SOP-E01	**Fuelling**
Annex SOP-E01A	Fuelling References
Annex SOP-E01B	Alongside/At Anchor Fuelling Orders
Annex SOP-E01C	Standing RAS/TACRAS Fuelling Orders
Annex SOP-E01D	Alongside and at Anchor Fuel Transferring Orders
Annex SOP-E01E	De-fuelling Orders
Annex SOP-E01F	Documentation Requirements
Annex SOP-E01G	Monthly Fuel Report Message Format
SOP-E02	**Liquid Effluent Management**
Annex SOP-E02A	Liquid Effluent Management References
Annex SOP-E02B	Sewage Treatment Plant Log
Annex SOP-E02C	Oily Water Separator Rounds Sheet
Annex SOP-E02D	Bilge/Oily Water Log
Annex SOP-E02E	Ballast Water Log
Annex SOP-E02F	Chlorination/De-chlorination of Tanks
Annex SOP-E02G	MARPOL Special Area Pollution Matrix
SOP-E03	**Halocarbon Management**
Annex SOP-E03A	Halocarbon Management References
Annex SOP-E03B	Halocarbon Service Log Sheet
Annex SOP-E03C	Halocarbon Release Message
Annex SOP-E03D	Leak Test Notice
Annex SOP-E03E	Dismantling/Decommissioning Notice
Annex SOP-E03F	Typical Holdings
Annex SOP-E03G	Halocarbon System Inventory
Annex SOP-E03H	Halocarbon Cylinder Inventory
SOP-E04	**Solid Waste Management**
Annex SOP-E04A	Solid Waste Management References
Annex SOP-E04B	Source Separation Guidelines
Annex SOP-E04C	Suggested Recycling Station Collection Points
Annex SOP-E04D	Record of Solid Waste Disposal at Sea

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

PART 2 – STANDARD OPERATING PROCEDURES

SOP-E05	**Marine Mammal Impact Mitigation Procedures**
Annex SOP-E05A	Marine Mammal Impact Mitigation Procedures References
Annex SOP-E05B	Marine Mammal Impact Mitigation Procedures for Active Sonar Use
Annex SOP-E05C	Marine Mammal Recording and Reporting
SOP-E06	**External Ship's Husbandry**
Annex SOP-E06A	External Ship's Husbandry References
SOP-E07	**Environmental Impact Assessment**
Annex SOP-E07A	Environmental Impact Assessment References
Annex SOP-E07B	Environmental Effects Determination (EED) Checklist
SOP-E08	**Small Boat Operations**
Annex SOP-E08A	Small Boat Operations References
SOP-E09	**Not Applicable to the HARRY DEWOLF Class**
SOP-E10	**Arctic Waters Considerations**
Annex SOP-E10A	Arctic Waters Considerations References
Annex SOP-E10B	Arctic Waters Boundaries
SOP-E11	**Canadian Inland and Internal Waters Considerations**
Annex SOP-E11A	Canadian Inland and Internal Waters Considerations References
Annex SOP-E11B	Maritime Zones

PART 3 - EMERGENCY PREPAREDNESS AND RESPONSE PLANS

Plan-P01	**Spill Response Plan**
Annex Plan-P01A	Spill Response Plan References
Annex Plan-P01B	Spill Message Format
Annex Plan-P01C	Fuel Spill Cleanup Team Procedures
Annex Plan-P01D	Fuel Spill Plotting and Milestones
Annex Plan-P01E	Fuel Spill Cleanup Material Requirements
Annex Plan-P01F	HazMat Spill Cleanup Team Procedures
Annex Plan-P01G	HazMat Spill Plotting and Milestones
Annex Plan-P01H	Medical Response and Decontamination Team
Annex Plan-P01I	HazMat Spill Cleanup Material Requirements

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

FOREWORD

1. This HARRY DEWOLF Class Safety and Environmental Management System (SEMS) Manual was developed to provide Defence Team members with processes and procedures to safely perform shipboard activities with minimal impact to the environment. The purpose of SEMS is to ensure compliance with regulations and reduce the frequency and severity of safety accidents and environmental incidents through the implementation of the safety and environmental procedures in accordance with legislative, DND and RCN requirements. Input for the class manual is received from ship staff, safety and environmental staff and technical authorities on both coasts, and the relevant DGMEPM Class Desk and Equipment Managers. The Manual is consistent with both ISO 14001:2015 and CSA Z1000-14 management system standards. It has been extensively researched and strongly influenced by existing RCN Class manuals and lessons learned through similar activities under operational conditions on existing and previous RCN ships. The Manual:

a. describes the procedures used to meet the administrative requirements of the Standards;

b. provides the Standard Operating Procedures (SOPs) used to mitigate the ship's activities that have the potential to cause the most significant safety and environmental risk; and

c. details the response plan for HazMat and Fuel spills.

2. The 'Class' Manual was developed to provide a consistent approach to safety and environmental management for all ships in the Class. The documentation in this Manual provides the standard that ships of the Class must follow, and conformance to this Manual will be checked through the Formation verification program. Adherence to these procedures provides a uniform demonstration of due diligence for the Class.

3. Should an individual ship feel it is possible to practice a 'higher' standard than outlined in this Manual, they should inform the MARLANT or MARPAC Safety and Environmental Officer (MARL/MARP SEO) who, together with the appropriate stakeholders, will consider this for use as an improved standard for the Class. It should also be noted that, as this is a Class Manual, individual ships are not permitted to make changes to the documentation. If revisions are deemed necessary, the procedures outlined in Chapter 4 must be followed.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

CERTIFICATION

1. This Manual provides guidance to personnel for the implementation and maintenance of the HARRY DEWOLF Class Safety and Environmental Management System (SEMS) and:

a. satisfies the requirements of applicable Legislation and Treasury Board, National Defence, Command and Formation safety and environmental policy and directives;

b. is consistent with the principals of the CSA Z1000-14 – "Occupational Health and Safety Management"; and

c. is consistent with ISO 14001:2015 – "Environmental management systems – Requirements with guidance for use".

R. A. Feltham
Commodore
Commander Canadian Fleet (Atlantic)

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

SIGNATURE SHEET

1. For review and signature by members of the Ship's Safety and Environmental Management Committee (SSEC). Once signed, a copy of this signature sheet is to be retained by the XO.

2. All ship's staff shall have a basic understanding of the SEMS, know where a copy can be found and be able to identify their ship's Unit General Safety Officer (UGSO) and Unit Environmental Officer (UEnvO).

3. All ship's staff shall have a detailed knowledge of how their duties impact, or could impact on the safety of the crew or the environment, how to respond to an emergency and the SOPs in the SEMS that relate to their duties.

Name and Rank	Signature	Date

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

REVISION HISTORY

SEMS Procedure	Date of Issue	Details of Revision	Replaced by

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

HARRY DEWOLF CLASS

SAFETY AND ENVIRONMENTAL MANAGEMENT SYSTEM

Chapter 1 - GENERAL

INTRODUCTION

1. The purpose of the Safety and Environmental Management System (SEMS) is to facilitate the implementation of the Formation's Safety and Environmental Policy. This is achieved by ensuring compliance with relevant safety and environmental legislation, regulations, policies, procedures and directives, and by monitoring and continually improving performance.

2. The SEMS Manual follows the concept of the Plan-Do-Check-Act (PDCA) model. The PDCA model is an iterative process used to achieve continual improvement and includes the following steps:

a. **Plan**: establish safety and environmental objectives and targets and the processes necessary to achieve them.

b. **Do**: Implement the processes to meet the intended goals.

c. **Check**: Conduct audits to verify compliance with legal and safety and environmental policies.

d. **Act**: take actions to continually improve policy and processes.

3. The scope of the HARRY DEWOLF Class SEMS Manual encompasses the ships' activities, operations and training of personnel. A glossary of definitions and a list of acronyms are contained in Annexes 1A and 1B respectively.

4. The Manual was developed as a Class Manual to provide a consistent approach to safety and environmental management for all ships in the Class. The system is documented to make it robust to frequent turnover in personnel and support a uniform demonstration of due diligence.

Chapter 2 - POLICY

5. All personnel are required to follow the Formation Commander's Safety and Environmental Policy Statement, which is located at the front of this Manual. The ship's Commanding Officer (CO) shall promulgate a Safety and Environmental Policy Statement using either the template attached at Annex 2A, or an equivalent format. The CO's Policy Statement is to be signed and dated, posted on the ship's Safety and Environmental Notice Board, and made readily available to the public on demand.

Chapter 3 - PLANNING

SAFETY HAZARDS AND ENVIRONMENTAL ASPECTS

6. The identification of the ways in which an organization's activities impact on the work force and the environment is a necessary first step in the design of a SEMS. Canadian Standards Association (CSA) Z1000-14 and International Standards Organization (ISO) 14001:2015 require that the significance

of these safety hazards and environmental aspects be determined, and documented, based on their risk and impact. The mitigation of the hazards and aspects can then be prioritized in order of significance.

7. The safety hazards and environmental aspects for the HARRY DEWOLF Class were identified, and their significance rating determined at planning workshops using the methods provided at Formation SEMS. The current list of hazards and aspects applicable to the HARRY DEWOLF Class, and their relative significance, are listed at Annex 3A. Safety hazards and significant environmental aspects are taken into account when:

a. setting objectives and targets;

b. determining training requirements; and

c. determining which activities require Standard Operating Procedures (SOPs).

8. Both the Ship's Safety and Environment Committee (SSEC) and the Fleet Safety and Environment Management Committee (FltSEMC) review the safety hazards and environmental aspects annually. Annex 3A is also reviewed when there are changes in activities and/or equipment that could alter the significance of hazards and aspects, or introduce new hazards and/or aspects. MARLANT/MARPAC Safety and Environment (MARL/MARP SE) shall action all necessary revisions.

LEGAL AND OTHER REQUIREMENTS

9. The legal and other requirements that are applicable to the safety hazards and environmental aspects of the Class are listed at Annex 3B. Through revisions made to Annex 3B, ships are kept informed by MARL/MARP SE of any changes to the legislation, regulations and other requirements applicable to their safety hazards and environmental aspects. The Unit General Safety Officer (UGSO) and the Unit Environment Officer (UEnvO) disseminates this information to all ship's staff whose duties demand knowledge of these requirements.

10. It is DND/CF policy to have its military component comply with General Safety Policy as contained in A-GG-040-001/AG-001 and its related documentation, and with the General Safety Standards as contained in C-02-040-009/AG-001. A CO may override a General Safety Standard if it places a serious limitation on the capability to fulfill a Canadian Forces operational or training commitment. When the nature or urgency of an operational or a training situation requires the departure from General Safety Policy or Standards, the applicable CO shall employ recognized risk management practices to determine an appropriate course of action and must be prepared to justify the decision. In cases where the departure from General Safety Policy or Standards will be of a continuing nature, applicable COs must seek approval from higher headquarters for the continued action.

11. In addition, CAF personnel shall abide by the provisions of the Royal Canadian Navy (RCN), the applicable Formation SEMS, and this Class SEMS Manual.

OBJECTIVES, TARGETS AND PROGRAMS

12. The class objectives and targets are set based on input from ship, Formation and RCN management reviews. MARL/MARP SE will promulgate the class objectives and targets upon completion of the Royal Canadian Navy Safety and Environmental Management Committee (RCN SEMC). Current objectives and targets are listed at Annex 3C.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

13. The OPI for each objective and target indicated in Annex 3C is responsible for implementation of the program/action required to meet the objective and target and reports on progress quarterly to the SSEC using the information collected under the section Performance Measurement and Monitoring. The current Safety and Environment Management Programs (SEMPs) and overall OPIs are listed at Annex 3D.

14. The SSEC conducts an annual management review as prescribed in Chapter 6 – Management Review, in which the objectives and targets and SEMPs are reviewed to ensure relevancy and to evaluate overall performance. The results of which are presented at the annual FltSEMC management review.

15. When new developments, products, or modified activities/services are introduced, amendments to the SEMPs are proposed by the UGSO/UEnvO to be considered by the FltSEMC to ensure that they remain current and applicable. Any approved changes are documented and reported to the MARLANT/MARPAC Safety and Environment Management Committee (MARL/MARP SEMC). In addition, new initiatives shall be reviewed by the proponent to determine whether a Hazard Analysis and/or Environmental Effects Determination (EED) should be conducted. Results of the Hazard Analysis and/or EED are to be reported at the next FltSEMC. Instructions for carrying out an EED are available in Part 2, SOP-E07 of this Manual.

Chapter 4 - IMPLEMENTATION AND OPERATION

RESOURCES, ROLES, RESPONSIBILITY AND AUTHORITY

16. The roles and responsibilities of key organizations and personnel are outlined below and detailed in Annexes 4A through 4M. Where relevant, roles and responsibilities are also detailed in SOPs and Response Plans.

17. MARL/MARP SE is responsible for the maintenance and administration of this Manual with input from appropriate stakeholders.

18. The CO has overall responsibility for the ship's safety and environmental management. The CO provides oversight, direction and resources for occupational health and safety and environmental matters, and conducts an annual management review of the suitability, adequacy and effectiveness of the Class SEMS for their ship IAW this Manual.

19. The Executive Officer (XO) shall act on behalf of the CO and is the chair of the SSEC (Annex 4B). The SSEC provides a forum for the discussion and resolution of safety and environmental issues and carries out any safety and environmental tasks assigned by the CO.

20. The CO assigns secondary duties, which are documented in a Commanding Officer's Temporary Memorandum (COTM). The following is a list of safety and environmental secondary duties and includes the Annex number, which contains the TOR for each of the duties:

a. Unit General Safety Officer (UGSO) - 4C;

b. Unit RF Safety Officer – 4D;

c. Unit Laser Systems Safety Officer (ULSSO) – 4E;

d. Lock Out - Tag Out Coordinator – 4F;

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

e. Unit Environment Officer (UEnvO) – 4H;

f. Unit Hazardous Material Coordinator (UHMC) – 4I; and

g. Solid Waste Coordinator – 4J.

21. Department Representatives on the SSEC for both safety and environment shall be assigned from each Department reflecting, as much as possible, a cross-section of all ranks. The TOR for the Department Safety and Environmental Representative (DSER) is in Annex 4G. The Department Representative position may be assigned to one or two personnel depending on the Department's size.

22. The Engineering Department form the Spill Cleanup Team and follows the TOR at Annex 4K.

23. All Heads of Departments (HODs) and Senior Non Commissioned Member (Snr NCM) of each department are responsible for managing their personnel and areas of jurisdiction in a safe and environmentally responsible manner. Specifically, each HOD and Snr NCM is responsible to:

a. be aware of and enforce the safety and environmental standards, legislation, policies, orders, regulations and procedures that are applicable to their area of responsibility;

b. ensure subordinates are aware of changes to the safety and environmental standards, legislation, policies, orders, regulations and procedures that are applicable to their area of responsibility;

c. ensure that personnel working with HazMat or equipment containing HazMat are aware of the dangers, the appropriate personal protective equipment to wear and the training required to properly handle and manage the subject HazMat IAW policy and regulations;

d. ensure all personnel are trained with respect to safety and environmental protection;

e. ensure all training received is documented in Guardian/Monitor MASS including a list of Workplace Hazardous Information System (WHMIS) controlled products the person has been briefed on (IAW SOP-SE01, HazMat Management);

f. promote safety and environmental awareness, incident prevention, and due diligence in the conduct of sensitive processes and procedures;

g. report all incidents and suspect hazards, risks or conditions to the UGSO or UEnvO, as applicable;

h. know and comply with the requirements of the HARRY DEWOLF Class SEMS;

i. employ all applicable protective equipment and precautions detailed in this Manual;

j. ensure they have received the proper training/briefing prior to commencing a task;

k. inspect the work place and equipment for unsafe and environmentally suspect conditions or hazards prior to commencing a job and on its completion; and

l. correct, if possible, and report all unsafe and environmentally suspect conditions, hazards and hazardous occurrences to the UGSO and/or UEnvO as applicable through the chain of command.

24. The Training Chief is responsible for the coordination of safety and environmental training for the ship's staff.

25. Supervisors responsibilities are as follows:

a. be knowledgeable of and enforce at all times occupational health and safety policies, regulations, standards and procedures pertaining to activities, personnel, materiel, and works for which they are directly responsible (C-02-040-009/AG-001 and C-02-040-007/TS-001);

b. conduct occupational health and safety indoctrination and hazardous material (WHMIS) training to newly assigned personnel and give weekly five minute safety talks to all subordinates or when new equipment or operating procedures are implemented (A-GG-040-003/AG-001 and A-GG-040-004/AG- 001);

c. ensure personnel are adequately trained, qualified and fit to perform their assigned tasks in a safe and environmentally responsible manner;

d. conduct weekly unplanned and planned occupational health and safety inspections of activities and materiel in all areas under their functional control to identify and rectify (or report) personnel operating errors or unsafe conditions for corrective action;

e. investigate and report all hazard occurrences that occur in all areas under their functional control;

f. make occupational health and safety training, educational and motivational material available to all personnel under their control and promote occupational health and safety and accident prevention on a continuing basis;

g. determine and report special occupational health and safety and environmental training requirements for personnel under their control;

h. review accidents, incidents, near misses, first aid injury occurrences, etc., to identify potential accident causes or trends for corrective measures;

i. report unsafe situations beyond their capability to resolve to the appropriate authority and develop interim measures to protect personnel and materiel;

j. ensure all personnel are made aware of workplace hazards and are trained on appropriate safety precautions;

k. stop work immediately whenever they observe an unsafe condition on a job site which in their opinion is a serious danger or hazard to workers, and initiate positive action to ensure that no personnel, other than those required to rectify the hazard, enter the unsafe area until the hazard has been controlled; and

l. display an exemplary occupational health and safety and environmental attitude, which will inspire subordinates to embrace.

26. Whenever supervisors observe a personnel operating error they shall:

a. immediately stop the operation (if not practicable, record for follow-up action);

b. review the reason the operating error was committed by the individual;

c. provide remedial training, counseling, etc., to the individual to correct performance; and

d. ensure if applicable that other personnel are briefed in order to prevent a recurrence.

27. Supervisors shall periodically review personnel operating error records with their superior officer, section head, etc., to ensure systems defects that contribute to personnel operating errors are properly identified and permanently eliminated from the system.

28. Any crew member who witnesses personnel, including contractors, not complying with the ship's safety and/or environmental policies and procedures shall notify the Officer of the Day (OOD), Duty PO, UGSO or UEnvO, who shall take appropriate action.

COMPETENCE, TRAINING AND AWARENESS

29. It is the responsibility of those in a leadership role to ensure only competent personel perform tasks that have the potential to cause injury and/or a significant environmental impact. Competency for the task is based on the appropriate level of education, training and experience. RCN Staff and Canadian Forces Support Training Group (CFSTG) determine the requirements for specific tasks. It is the responsibility of each HOD to determine if there are gaps between the requirements and the crew member's qualifications. These gaps are closed by appropriate in-house and/or external training. Information on available training courses is available through MARL/MARP SE. Leaders shall ensure that the training records are updated and retained in Guardian/Monitor MASS. Also, the Training Chief shall maintain a database that indicates the training each crew member has received to enable timely refresher training.

30. Each member of the crew shall receive a safety and environmental briefing as part of their In-routine. The ship's UGSO, UEnvO, supervisors or subject matter experts (SMEs) normally provide these briefings. If required, assistance may be sought from MARL/MARP SE. See Annex 4L for an example. Additional, training or instruction shall be provided prior to potential exposure to identified workplace hazards.

31. Supervisors are to ensure five-minute safety talks are conducted on a weekly basis. These talks do not necessarily have to be work specific. See Annex 4M for a list of subjects that can be used for briefings.

32. All ship's staff are to receive a General Safety and Environmental Awareness Brief (GSEAB) as a minimum once every two years. Some training material may be available from MARL/MARP SE. The GSEAB should discuss the following topics:

a. departmental policy;

b. federal safety regulations;

c. supervisor and individual responsibilities;

d. safety organization;

e. CSA Z1000-14 Occupational Health and Safety Management;

f. SEMS, unit-specific issues, objective, targets and programs.

g. federal environmental legislation;

h. due diligence and individual responsibility;

i. ISO 14001:2015 EMS; and

j. SEMS, unit-specific issues, objective, targets and programs.

33. To assist the UGSO and UEnvO, the RCN has prepared a Safety and Environmental Briefing (SEB) video, which is available on the MARL/MARP SE website.

34. Other topics for awareness sessions may include changes to equipment, policy and procedures, etc. The SSEC reports on the percentage of ship's staff that is current in GSEAB training during the annual management review.

35. The member shall acknowledge in writing the training received, and the employer/trainer shall acknowledge in writing that they provided it. The training record shall be held by the members unit IAW Annex 5C. A signed nominal role, also signed by the trainer is acceptable and shall be held by the unit conducting the training.

COMMUNICATION AND CONSULTATION

36. In addition to formal training, awareness is raised by events such as Safety Week, Environment Week, Routine Order entries, posters, periodicals, committee minutes, videos and postings on the ship's Safety and Environment Notice Board. Safety periodicals are distributed to the All Ranks Cafeteria. Safety videos are obtained through the UGSO.

37. The ship's Safety and Environment Notice Board(s) shall be located in an easily accessible, widely used area. Summaries of hazardous occurrences shall be placed on the ship's Safety Notice Board and in Routine Orders.

38. Ship's staff are encouraged to participate in events whenever possible. Any member of the ship's staff may raise a concern to the attention of the HODs, Snr NCM, UGSO, UEnvO, or DSER as applicable.

39. The ship may award individuals who have significantly contributed to the safety program or who have prevented a serious accident. Supervisors who deem that an individual should be so awarded shall inform the appropriate DSER. The DSER will inform the SSEC, which will determine if an award is warranted. The award will be at the discretion of the SSEC Chair and the individual's supervisor. If

deemed appropriate, the SSEC Chair can contact MARL/MARP SE to raise the award up to and including the national level.

40. Communication with other government departments, external agencies and outside contractors, are a Formation responsibility. The CO's prior approval must be obtained if there is a requirement for immediate external communications on safety or environmental issues, e.g., as a result of an incident in a foreign port. In the event of a ship conducting external communications, Navy Public Affairs and MARL/MARP SE must be notified as soon as possible. Records of such communications are to be retained and a copy sent to MARL/MARP SE.

SEMS DOCUMENTATION

41. SEMS documentation provides evidence of conformance to the SEMS. The SEMS documentation includes:

a. this Manual:

(1) **Part 1 - Administration**: includes Chapters 1-6 to meet the general CSA Z1000-14 and ISO 14001:2015 requirements for administration and documentation;

(2) **Part 2 - Standard Operating Procedures (SOPs):** addresses the CSA Z1000-14 and ISO 14001:2015 requirement for documented procedures to minimize the safety risks and environmental impacts of activities with the potential to cause significant impacts; and

(3) **Part 3 - Emergency Preparedness and Response Plans:** contains the plans used by the ship to respond to emergency situations relating to safety and/or environment;

b. supporting documents needed by the ship to ensure effective planning, implementation, operation and control of the SEMS; and

c. other documents or records required by this Manual, including those needed to prove compliance with legal requirements.

CONTROL OF DOCUMENTS

42. The purpose of document control is to ensure that documents required by the SEMS:

a. can be located, and are readily accessible;

b. are reviewed, revised and approved as necessary, and up-to-date versions are issued only by authorised personnel; and

c. obsolete documents are promptly removed from use.

43. MARL/MARP SE O has overall administrative responsibility for the Class SEMS Manuals including, development and distribution of the original and revised documents. The Master Document List of controlled documents is located at Annex 4N.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

44. The current controlled copy of the Class SEMS Manual is maintained on the MARL/MARP SE web site.

45. The XO is responsible for ensuring any obsolete hard or electronic copies of the SEMS are replaced with the most recent version provided on the MARL/MARP SE website, and ensures obsolete paper and electronic copies are collected and destroyed.

46. If procedures from this Manual are copied for internal use, they are no longer considered controlled. Users of uncontrolled copies must confirm they are using the most current procedures by referencing the controlled copy of the SEMS on the MARL/MARP SE website.

47. Requests from the ship's company for new documents or procedures to be added to the Master Document List or changes to existing sections of the Manual shall be sent in writing, using the form provided at Annex 4P, to the UGSO and UEnvO. They will discuss the request with the person seeking the change/revision and the HOD. If the UGSO and/or UEnvO agree with the request, it is forwarded to the CO. If the CO approves, the request is sent to MARL/MARP SE for action. Ships are informed of any changes to the Manual.

48. The RCN Fleet SEMS Working Group, with input from the FltSEMC and SMEs, review the Class SEMS Manual and make any necessary changes. For major changes, the manual is re-issued IAW the Manual Distribution List. Minor changes are sent to the ship accompanied by an updated Revision History. The changes and new revision list replace the pages indicated in the hard copy of the manual, and an updated electronic copy is sent to replace the ship's current copy.

OPERATIONAL CONTROL

49. Part 2 of this Manual contains documented SOPs for the activities that have the potential to be hazardous to human life, result in materiel loss or cause significant environmental impacts. When implemented effectively, these procedures ensure that safety hazards and environmental impacts are eliminated or mitigated.

50. It is understood that under certain circumstances, such as an equipment malfunction, shortage of personnel, or regulatory concerns, it may be necessary to amend one or more SOP(s). In these situations, documented temporary instructions can be issued and noted in a Commanding Officer's Temporary Memorandum (COTM). A copy of the COTM describing the temporary instructions, its likely duration and the reason for its introduction is sent to MARL/MARP SE. The relevant SOPs are "flagged" and a copy of the COTM inserted in front of the relevant SOP. Once the situation has been resolved, the flag(s) is removed, MARL/MARP SE is informed and the COTM is discontinued and filed.

EMERGENCY PREPAREDNESS AND RESPONSE

51. Part 3 of this Manual contains documented Emergency Preparedness and Response Plans for potential emergency situations or accidents that have the potential to be hazardous to human life, result in materiel loss or damage or cause significant environmental impacts.

52. These plans are the basis for the response to actual emergency situations and accidents. The purpose of which is to prevent further injury/death or mitigate and prevent further adverse environmental impacts. The CO is responsible for ensuring an appropriate state of readiness to respond to potential hazards and impacts caused by emergency situations by providing relevant information and training, and implementing, maintaining and testing the plans on a regular basis.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

53. The ship OPIs for the Emergency Preparedness and Response Plans are to review them annually and after every incident, and make recommendations to MARL/MARP SE. The reviews and recomendations are retained as records.

54. All hazardous occurrences, spills and releases, are reported to the CO. This is followed by a review of the action taken during the incident by the relevant plan OPI. Corrective action, if required, is implemented to improve performance. All incidents are reported IAW Part 3.

Chapter 5 - CHECKING AND CORRECTIVE ACTION

PERFORMANCE MEASUREMENT AND MONITORING

55. A Performance Measurement and Monitoring Master List is attached at Annex 5A. This list indicates the type of information that must be collected, the purpose of the measurement and the OPI.

56. The ship's UGSO and UEnvO, as appropriate inform the OPIs of their responsibility to collect the required data. The OPIs document the monitoring results, perform any required calculations and retain the data as safety or environment records. This data is used to measure safety and environmental performance, progress in meeting objectives and targets and for implementing corrective and preventive action. Information collected by monitoring is also used when reporting at the management review.

57. The OPIs responsible for calibrating and maintaining measurement and monitoring equipment are to document the results, and keep these as records. Note this should be coordinated as part of the ship's Test Equipment Maintenance Management Information System (TEMMIS) program.

EVALUATION OF COMPLIANCE

58. Compliance with legislation and other requirements is evaluated during internal verifications at a frequency described below, and records are retained by both the unit and MARL/MARP SE.

NON-CONFORMITY, PREVENTIVE ACTION AND CORRECTIVE ACTION

59. The XO ensures that the ship's activities and Class SEMS implementation are evaluated regularly to identify actions that should be taken to prevent non-conformities. Non-conformities to the SEMS are identified by:

a. verifications and inspections (including SPDETs);

b. results from measurement and monitoring programs;

c. SIs/TIs;

d. Unsatisfactory Condition Reports (UCRs);

e. day-to-day observations; and

f. results from Hazardous Incident Investigations.

60. When actual or potential non-conformities or concerns are identified, they must be brought to the attention of the SSEC and XO through the chain of command. Personnel shall inform the DSER as appropriate by completing the Safety/Environment Concerns Form, Annex 5B. Instructions on how to

use the form are included on the back of the form. The UGSO/UEnvO should have blank copies of the form available on the Safety and Environment Notice Board. If the non-conformity or concern warrants, the XO shall ensure an investigation is conducted to determine the root causes(s) and ensure an appropriate action plan is put in place. If a concern cannot be resolved using unit resources then MARL/MARP SE shall be consulted along with the Chain of Command. Consideration for raising a UCR, Work Order (WO), EC, etc. as appropriate may be warranted. Also, if a concern may affect the Fleet or Class then MARL/MARP SE should be advised so that it may be dealt with accordingly.

61. Hazardous occurrences are reported using the DND Hazardous Occurrence Investigation Report (DND663) and documented accordingly. If personnel have been injured or exposed to a hazardous substance, they shall also complete a CF 98 report.

62. During the regular SSEC meetings, the Committee will review any safety and environment reports, safety/environment concerns, etc. received by the UGSO/UEnvO since the last SSEC meeting, update the status of ongoing issues, and make recommendations for changes.

63. Any changes to documented procedures and SOPs may be requested IAW Chapter 4 – Control of Documents.

CONTROL OF RECORDS

64. Safety and environmental records are maintained IAW DND procedures for records management. File numbers are assigned as shown in the Records' Master List at Annex 5C. The list identifies the records that are used to meet compliance and conformance requirements and to monitor the effectiveness of the SEMS. Additionally, it provides information on how the records are filed, retention times, and the person responsible for maintaining them.

SAFETY/ENVIRONMENT INSPECTIONS/ROUNDS

65. There is a requirement to carry out Safety/Environment Inspections/Rounds at various times. The following table indicates the rounds to be carried out, the frequency and the position responsible for conducting the rounds.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Type	Frequency	OPI	Record
Safety/Environment Department Inspection	Monthly	DSER	Annex 5D
Safety/Environment Rounds	Quarterly	UGSO/UEnvO	A-GG-040-001/AG-001 Annex B, Chapter 9, Appendix III
Safety/Environment Department Inspection	Weekly	Supervisors	N/A
Safety/Environment Department Inspection	Monthly	HOD/Snr NCM	Rounds Book
SPDET	Every 12 months	UGSO	A-GG-040-007/AG-001

Note: Monthly Safety/Environmental Department Inspections to include first aid kits and eye wash stations.

66. There should be consideration for safety and environment issues during the HODs/Snr NCM daily departmental rounds at sea and those rounds in harbour delegated to senior departmental personnel.

67. Each safety program has different requirements for inspections. Surveys for General, Laser and Explosives Safety are typically similar in that they are part of the review process for the specific programs. Surveys for RF Safety involve taking various measurements as applicable to the source hazard, for which the requirements are outlined in C-55-040-001/TS-001 RF Safety Program. Surveys for RF Safety program are generally conducted at the national level; however, designated units that have the proper training can also conduct surveys.

68. The CO or appropriate HOD is required to inspect and sign ship's books and logs according to the schedule provided at Annex 5E.

INTERNAL VERIFICATION

69. The Formation Verification is considered an internal verification and as a minimum is conducted on each ship every 18 months. It is a combined compliance and SEMS conformance verification. Prior to the Formation Verification, the UGSO and UEnvO should ensure that all SEMS controlled documents and all safety and environmental records, as listed at Annexes 4P and 5C respectively, are available for review.

70. The XO or his/her designate is the ship's liaison for the duration of the verification, and is responsible for providing:

a. the verification team access to the documents and records;

b. a place to conduct the review;

c. a person to escort the verification team on rounds of the ship's spaces; and

d. the interview schedule to allow the verification team to speak with a diverse range of ship's staff.

71. Upon completion of the verification, the Lead Verifier debriefs the CO at the closing meeting and documents the results of the audit. In addition, a copy of a written verification report is sent to the ship and respective Group Commander. The verification report will contain a write-up for all non-

conformities/ findings as per the Non-Conformance Report (NCR). The XO works with the relevant UGSO, UEnvO and HOD to develop an appropriate action plan based on the magnitude of the problem and likelihood of recurrence to address the findings of the verification. The XO verifies that the action plan has been successfully implemented. The verification report and corrective action plan are retained as records.

Chapter 6 - MANAGEMENT REVIEW

72. The adequacy, effectiveness and suitability of the SEMS are reviewed on an on-going basis by the XO, and annually by the SSEC to ensure continual improvement. The process is outlined in Annex 6A. The CO chairs an annual management review of the ship's safety and environmental performance. The following should be considered during the review:

a. Is the ship meeting safety and environmental objectives and targets?

b. Are changes needed to the ship's policy, or any other components of the SEMS?

c. Does the Class SEMS continue to be suitable, adequate and effective?

d. Is the ship meeting the three commitments: prevention of hazardous occurrences and environmental incidents, legislative compliance, and continual improvement of safety and environment performance?

e. Has the ship's safety and environmental performance improved since the last review, and what has to be done to keep on improving?

73. Any proposed modifications to the Class Manual shall also be discussed at the management review. The CO presents all suggested modifications during the FltSEMC management review.

74. The XO is responsible for providing the information needed to conduct the management review. This includes:

a. non-conformance reports;

b. verifications and action plans;

c. internal incident reports;

d. monitoring results; and

e. status reports for Safety and Environmental Management Programs (SEMPs).

75. The annual management review occurs no later than 30 April to allow COs to report the results to the FltSEMC no later than 31 May of each year. The MARL/MARP SEMC incorporates the results of the FltSEMC review into the annual MARL/MARP SE MC management review. Minutes of the meeting are maintained as records IAW the section Control of Records.

ANNEX 1A - GLOSSARY

Accident: an undesired event that results in physical harm or occupational illness to a person, or damage to materiel, works or buildings.

Accident cause: anything that has, or could have, contributed to the occurrence of an accident.

Appropriate Stakeholder: an organization or individual whom may provide technical or operational expertise in there area of responsibility (e.g. Fleet Technical Authority, Sea Training, and Fleet Maintenance Facility).

Client: organization commissioning the verification. The client may be the organization to be verified, or any other organization, which has the regulatory, contractual or administrative right to commission the verification.

Compliance verification: a review of operations products and services directed towards determining whether or not a facility meets all of its current applicable legislative and regulatory requirements.

Continual improvement: process of enhancing the management system to achieve improvements in overall performance in line with the organization's policy. The process need not take place in all areas of activity simultaneously.

Contractor: an organization or individual providing services to another organization in accordance with agreed-upon specifications, terms and conditions.

Controlled copy: manual, procedure, work instruction or other document that is maintained up-to-date. Authorized holders of the manual, procedure and/or work instructions, receive revised copies of these documents as appropriate.

CSA Z1000: Canada's national standard for the development and implementation of an occupational health and safety management system.

Deleterious substance: any substance that, if added to any water, would degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water; or any water that contains a substance in such quantity or concentration, or that has been so treated, processed or changed, by heat or other means, from a natural state that it would, if added to any other water, degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water.

Disabling injury: a work injury that prevents the person from returning to work for his/her next regular shift.
Document: a medium containing information related to the SEMS.

Due diligence: is the reasonable standard of care for the health and safety of others and for the environment that individuals exercise in the course of carrying out their duties.

Emergency: a sudden situation or set of circumstances which if not prevented, eliminated, controlled, contained or addressed could result in a significant danger or injury to personnel and/or the environment.

Emergency Response: an action carried out in a particular organization, community or region to protect human health and the environment from the impacts of an emergency.

Environment: surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans, and their interrelation. Surroundings in this context extend from within an organization to the global system.

Environmental aspect: element of an organization's activities, products or services that can interact with the environment. This may include a discharge or release or consumption of a natural resource. A significant aspect is an environmental aspect that has or can have a significant environmental impact.

Environmental impact: any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's activities, products or services.

Ergonomics: integrated knowledge derived from the social and technical sciences, used to match jobs, systems, products, and environments with the physical and mental attributes of the people involved.

General safety: provides occupational safety policy and guidelines aimed at preventing accidents in operations, training and support activities of DND/CAF. In addition there are stand-alone safety programs for civilian return to work, flight, explosives, fire, ionising radiation, laser, mobile support operations, non-ionizing, nuclear, and RADHAZ.

Hazard: a source of potential harm to personnel.

Hazardous Materials (HazMat): dangerous substances, dangerous goods, hazardous commodities and hazardous products, such as poisons, corrosive agents, flammable substances, or any other material that can endanger human health, well being, the environment or equipment if handled improperly.

Hazardous Materials Reference Application (HMRA): a centralized database for hazardous material (HazMat) holdings and related information including material safety data sheets (MSDS).

Hazardous Occurrence: an undesirable event that results in (or has the potential to result in) injury or illness to personnel, materiel losses and/or property damage and includes accidents and incidents.

Hazardous Occurrence Investigation: the determination and analysis of all facts relating to a hazardous occurrence in order to establish its causes and take corrective measures to prevent its recurrence.

Hot Work: any activity that has the potential of generating a source of ignition. Examples include but may not be limited to burning, welding and grinding or spark producing equipment.

Incident: an undesired event that gave rise to an accident, or had the potential to lead to an accident. Note: An incident where no ill health, injury, damage, or other loss occurs is also referred to as a "near miss". The term "incident" includes "near misses."

Interested party: individual or group concerned with or affected by the safety or environmental performance of an organization.

Ionizing Radiation: the emission by a nuclear substance having an energy of more than 10 electron volts (eV) and a wavelength of approximately 100 nanometres (100×10^{-9} m) or smaller.

ISO 14001: an international standard titled, "Environmental Management Systems – Specification with guidance for use". This has been adopted as the National Standard for Canada and has worldwide recognition.

Laser: a source of intense coherent monochromatic and collimated optical radiation.

Lead verifier: person qualified to manage and perform verifications.

Legal and Other Requirements: the legislation, regulations, bylaws, industry standards and the organization's own policies, orders and directives regarding the environment and occupational health & safety.

Lockout/Tagout: the systems and/or equipment has been rendered inoperative with a lockout device, locked, and tagged by a Qualified Person. When Lockout/Tagout has been achieved, the system/equipment cannot be operated or energized without the consent of the maintainer or the supervisor of the maintainer that rendered it inoperative.

Management programs: the process by which objectives and targets are achieved which may include projects, tasks or studies. The program addresses the required schedule, resources and responsibilities, and outlines the methodology by which they are to be achieved.

Management representative: individual delegated responsibility by senior management to provide the leadership for SEMS implementation, and oversight for the ongoing administration of the SEMS. The Management representative also presents senior management with the information to conduct the Management Review of the SEMS.

Management system: the part of the overall management system that includes organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy.

Management system verification: a systematic and documented verification process of objectively obtaining and evaluating evidence to determine whether an organization's SEMS conforms to the management system verification criteria set by the organization, and for communication of the results of this process to management. From a DND/CAF perspective, management is the most senior person in the chain of command at site being verified.

Materiel: the materials and equipment used in warfare. Includes ships, land vehicles, aircraft, weapons, munitions, clothing etc.

Non-compliance: any deviation from applicable legislative, regulatory or policy requirements. It is customary to use non-compliance relative to a legislation or policy.

Non-conformance/Non-conformity: any deviation from work standards, practices, procedures, management system requirements, performance, etc. It is customary to use non-conformance relative to a standard.

Non-disabling injury: a work related illness or injury that results in medical attention beyond first aid, but involves no lost time beyond the day, shift or watch on which the injury occurred.

Non-ionizing Radiation (NIR): the portion of the electromagnetic spectrum with a wavelength above 1 nanometre (10^{-9}m) and energy less than 10 electron volts (eV). Absorption of any electromagnetic radiation

by the body can cause tissue heating and other effects. However, absorbed NIR never causes creation of ions in the tissue, thus there is no disruption of the tissue. NIR resulting from radio frequency exposure must not be confused with ionizing radiation such as X-rays.

Objective: overall goal arising from the policy, that an organization sets itself to achieve, and which is quantified where practical, (see "target").

Objective evidence: information which can be proved true, based on facts obtained through observation, measurement, test or other means.

Occupational health and safety (OHS): conditions and factors that affect the well-being of personnel, employees, temporary workers, contractor personnel, visitors and any other person in the workplace.

Occupational illness: any abnormal physical condition, or disorder caused by exposure to factors directly associated with employment.

Office of Primary Interest (OPI): an assigned point of responsibility for a specific management task, project or program, etc.

Opportunity for Improvement (OFI): a finding in a verification that although not considered to be a non-conformance could potentially lead to one if not addressed.

Organization: company, corporation, enterprise, authority, institution, unit or ship, or part or combination thereof, whether incorporated or not, public or private, that has its own functions and administration. For organizations with more than one operating unit, a single operating unit may be defined as an organization.

Performance: measurable results of the management system, related to an organization's control of its safety hazards and environmental aspects, based on its policy, objectives and targets.

Personal Protective Equipment (PPE): safety materials, equipment, systems, devices and clothing whose purpose is to protect from injury or illness.

Policy: statement by the organization of its intentions and principles in relation to its overall performance, which provides a framework for action and for the setting of objectives and targets.

Prevention of pollution: use of processes, practices, materials or products that avoid, reduce, or control pollution, which may include recycling, treatment, process changes, control mechanisms, efficient use of resources and material substitution. The potential benefits of prevention of pollution include the reduction of adverse environmental impacts, improved efficiency and reduced costs.

Procedure: a documented or undocumented method of carrying out an activity

Process: a set of interrelated or interacting activities, which transform inputs into outputs.

Qualified person: in respect of a specified duty, a person who because of their knowledge, training, and experience, is qualified to perform that duty safely and properly exercising Due Diligence.

Radio-Frequency (RF) Radiation**:** RF radiation covers the energy spectrum from 10 kHz to 300 GHz; it is also called Non-Ionizing Electromagnetic Radiation, as it doesn't normally have enough energy to ionize matter like nuclear radiation. High RF radiation levels can pose a serious safety hazard if proper safety precautions are not observed: excessive RF energy levels heat up human tissue in the same way a

microwave oven cooks food, even to the extent of causing burns on contact with an antenna. High RF levels can also detonate ammunition or ignite fuel under the right circumstances.

Records: document stating results achieved or providing evidence of activities performed.

Respiratory Protection Device (RPD): any device that is worn to protect the quality of air entering the person's respiratory system.

Risk: combination of the likelihood and consequences of a specified hazardous event occurring.

Risk assessment: overall process of estimating the magnitude of risk and deciding whether or not the risk is tolerable.

Safety: freedom from unacceptable risk of harm.

Safety and Environmental Management System (SEMS): an integrated management system has been developed since both the safety and environmental programs have the common aim of prevention of accidental death or injury to personnel, and damage or destruction to DND assets and the natural environment.

Safety hazard: source or situation with a potential for harm in terms of death, injury, ill health, damage to assets, damage to the workplace environment, or a combination of these.

Safety hazard identification: process of recognizing that a hazard exists and defining its characteristics.

Safety Program Development and Evaluation Technique (SPDET): a survey tool used to evaluate the safety performance of formations and units. This evaluation tool assists the line organization and safety staff in developing their General Safety Program to the required standard and also in evaluating how well the program is being managed.

SEMS verification criteria: policies, practices, procedures or requirements, such as those covered by CSA Z1000-06 and ISO 14001. If applicable, any additional SEMS requirements against which the verifier compares collected verification evidence about the organization's management system. Requirements may include but are not limited to standards, guidelines, specified organizational requirements, and legislative or regulatory requirements.

SEMS documents: documents, which describe the core elements of the SEMS and their interaction and provide direction on where to obtain more detailed information on the operation of specific parts of the SEMS.

Significant environmental aspect: refers to an environmental aspect that has, or has the potential to have, a significant environmental impact.

Subject matter: specified environmental activity, event, condition, management system and/or information about these matters.

Summary Investigation (SI): an investigation, other than a board of inquiry, ordered by the CMS, an officer commanding a command or formation or a commanding officer to establish the cause of an incident/accident.

Supervisor: a qualified person appointed by management to ensure the safe and proper conduct of an operation or of the work of personnel.

Target: detailed performance requirement, quantified where practicable, applicable to the organization or parts thereof, that arises from the objectives and that needs to be set and met in order to achieve those objectives.

Technical expert: person who provides specific knowledge or expertise to the verification team, but who does not participate as a verifier.

Technical Investigation (TI): a TI is a procedure for investigating the technical or procedural aspects of a significant material failure or unsatisfactory equipment or system performance in ships, submarines and supporting units of the Royal Canadian Navy.

Uncontrolled copy: manual, procedure, work instruction or other document, which is not maintained up-to-date once released from MARL/MARP SE. Recipient(s) of uncontrolled copies are not included in distribution lists and do not receive revisions to these documents.

Verification: systematic examination in order to determine whether activities and related results conform to planned arrangements and whether these arrangements are implemented effectively and are suitable for achieving the organization's policy and objectives.

Verification concern: an inference, based on incomplete evidence, that the system being verified may not conform to the verification criteria. This indicates the need to obtain more evidence to substantiate that either the system does or does not conform.

Verification conclusion: professional judgement or opinion expressed by a verifier about the subject matter of the verification, based on and limited to reasoning the verifier has applied to verification findings.

Verification criteria: policies, practices, procedures or requirements against which the verifier compares collected verification evidence about the subject matter. Requirements may include but are not limited to standards, guidelines, specified organizational requirements, and legislative or regulatory requirements.

Verification evidence: verifiable information, records or statements of fact, which:

a. can be qualitative or quantitative, used by the verifier to determine whether verification criteria are met; and

b. is typically based on interviews, examination of documents, observation of activities and conditions, existing results of measurements or tests or other means within the scope of the verification.

Verification findings: results of the evaluation of the collected evidence compared with the agreed verification criteria, which provide the basis for the verification report.

Verification observation: statement of fact made during a verification and substantiated by objective evidence.

Verification program: a set of one or more verification planned for a specific time frame and directed towards a specific purpose. A verification program includes all activities necessary for planning, organizing and conducting the verifications.

Verification team: group of verifiers, or a single verifier, designated to perform a given verification; the verification team may also include technical experts and verifiers-in-training. One of the verifiers on the team performs the function of lead verifier.

Verifier: person qualified to perform verifications.

Work injury: any injury or occupational illness that arises out of and in the course of work or duty.

ANNEX 1B - ACRONYMS

ACOS Mat	Assistant Chief of Staff Materiel
AIR O	Air Officer
AJAG	Assistant Judge Advocate General
BComd	Base Commander
BLog	Base Logistics
CANFLTLANT	Canadian Fleet Atlantic
CANFLTPAC	Canadian Fleet Pacific
CBTO	Combat Officer
CFFA	Canadian Forces Fire Academy
CFNBCS	Canadian Forces Nuclear, Biological and Chemical School
CFSTG	Canadian Forces Support Training Group
CHOD	Chief of Department
CO	Commanding Officer
COMCANFLTLANT	Commander Canadian Fleet Atlantic
COMCANFLTPAC	Commander Canadian Fleet Pacific
COTM	Commanding Officer's Temporary Memorandum
CSEO	Combat Systems Engineering Officer
DAOD	Defence Administrative Orders and Directive
DeckO	Deck Officer
DFO	Department Fisheries and Oceans
DGE	Director General Environment
DGMEPM	Director General Maritime Equipment Program Management
D Safe G	Director of General Safety
DSER	Department Safety and Environmental Representative
DWS	Duty Watch Supervisor
EC	Engineering Change
EED	Environmental Effects Determination
EMP	Environmental Management Program
FltSEMC	Fleet Safety and Environment Management Committee
FLSSO	Formation Laser Systems Safety Officer
FMF	Fleet Maintenance Facility
FOD	Foreign Object Damage
FTA	Formation Technical Authority
GSEAB	General Safety and Environmental Awareness Brief
GTO	Group Technical Officer
GWP	Global Warming Potential
HazMat	Hazardous Material
HMRA	Hazardous Material Reference Application
HOD	Head of Department
IAW	In accordance with
ISO	International Organization for Standardization
LogO	Logistics Officer
MAF	Maintenance Action Form
MARLANT	Maritime Forces Atlantic
MARLANTORD	Maritime Forces Atlantic Order
MARL SE	MARLANT Safety and Environment
MARL SEMC	MARLANT Safety and Environment Management Committee
MARL SEO	MARLANT Safety and Environment Officer
MARPACORD	Maritime Forces Pacific Order

MARP SE	MARPAC Safety and Environment
MARP SEMC	MARPAC Safety and Environment Management Committee
MARP SEO	MARPAC Safety and Environment Officer
MOAMP	MARLANT Operation Area Management Plan
MSDS	Material Safety Data Sheet
NAVORD	Naval Order
NCR	Non-Conformance Report
NDCC	National Defence Command Centre
NDHQ	National Defence Headquarters
ODP	Ozone-depleting Potential
OOD	Officer of the Day
OOW	Officer of the Watch
OPI	Office of Primary Interest
OSC	On Scene Commander
OWS	Oily-water Separator
POC	Point of Contact
POL	Petroleum Oil and Lubricants
PPE	Personal Protective Equipment
QHM	Queens Harbour Master
RCN	Royal Canadian Navy
RCN SEMC	RCN Safety and Environment Management Committee
RF	Radio Frequency
RPP	Respiratory Protection Program
RRT	Rapid Response Team
SCT	Spill Cleanup Team
SDS	Sustainable Development Strategy
SEB	Safety and Environmental Briefing
SEMS	Safety and Environmental Management System
SEMP	Safety and Environmental Management Program
SI	Summary Investigation
SME	Subject Matter Expert
SOP	Standard Operating Procedure
SPDET	Safety Program Development and Evaluation Technique
SSEC	Ship's Safety and Environment Committee
SWHS	Solid Waste Handling System
TDG	Transportation of Dangerous Goods
TEMMIS	Test Equipment Maintenance Management Information System
TI	Technical Investigation
TOR	Terms of Reference
UEnvO	Unit Environment Officer
UCR	Unsatisfactory Condition Report
UDER	Upper Deck Engineer Roundsman
UER	Unit Employment Record
UGSO	Unit General Safety Officer
UHMC	Unit Hazardous Material Co-ordinator
ULLSO	Unit Laser Systems Safety Officer
URFSO	Unit RF Safety Officer
WHMIS	Workplace Hazardous Materials Information System
XO	Executive Officer

ANNEX 2A – POLICY TEMPLATE

HMCS <insert ship's name>
THE COMMANDING OFFICER'S SAFETY AND ENVIRONMENTAL POLICY

Protection of personnel and the environment during peacetime operations is essential. Activities such as fuelling, weapons firing exercises in a sensitive location, ammunition transfer, engine exhaust, disposal of garbage and sewage and accidental release of Halocarbons or Hazardous material are but a few examples of activities that may cause injuries, damage/loss or adversely impact on the environment.

The objective of this policy is to ensure that operations are conducted in such a way that injuries to personnel, damage or loss of materiel and adverse impacts on the environment are prevented or minimized. To this end HMCS <insert ship's name> endorses the Commander's Safety and Environmental Policy Statement, and shall adhere to DND, RCN and Formation safety and environmental orders and directives.

Accordingly, HMCS <insert ship's name> is committed to comply with all applicable safety and environmental legislation, the prevention of pollution and the continual improvement of safety and environmental performance. Implementing and maintaining a Safety and Environmental Management System (SEMS) consistent with the principles of the Canadian Standards for safety and environmental management, CSA Z1000-14 and ISO 14001:2015 respectively shall achieve this.

The SEMS provides the framework for reviewing progress in meeting DND, RCN and Formation safety and environmental objectives and targets through the establishment of a Ship's Safety and Environment Committee and a Management Review process.

This policy is communicated to all personnel who shall implement it by carrying out their duties in a safe and environmentally responsible manner.

<insert Commanding Officer's Name>
<insert Commanding Officer's Rank>

Commanding Officer
HMCS <insert ship's name>

Date: _____

LA POLITIQUE DE SECURITÉ ET D'ENVIRONNEMENT DU COMMANDANT

La protection du personnel et de l'environnement pendant les opérations en temps de paix est essentielle. Les activités telles que le ravitaillement en carburant, les exercices de tir d'armes dans un endroit sensible, le transfert de munitions, les émissions de boyaux d'échappement, le déversement des eaux usés, ordures domestique et la libération accidentelle de Halo carburés ou de matières dangereuses ne sont que quelques exemples d'activités susceptibles de causer des blessures, des dommages/pertes ou des effets néfaste sur l'environnement.

L'objectif de cette politique est de veiller à ce que les opérations soient menées de telle sorte que les blessures au personnel, les dommages ou la perte de matériel et les impacts néfaste sur l'environnement soient prévenir ou minimisés. À cette fin, NCSM HARRY DEWOLF approuve l'énoncé de politique sur la sécurité et l'environnement du commandant et doit respecter les directives sur la sécurité de la formation et le MDN.

En conséquence, NCSM HARRY DEWOLF s'engage à respecter toutes les lois applicables en matière de sécurité et de l'environnement, la prévention de la pollution et l'amélioration continue sur la sécurité et sur la performance environnementale. La mise en œuvre et le maintien d'un système de gestion de la sécurité et de l'environnement (SGSE) conformément aux principes de la Norme canadienne pour la sécurité et la gestion de l'environnement, CSA Z1000-14 et ISO 14001:2015, doivent par conséquent atteindre cet objectif.

Le SGSE fournit le cadre pour examiner les progrès accomplis dans la réalisation des objectifs et des cibles de la sécurité du MDN, de la MRC et de la Formation et de l'environnement en créant un Comité de la sécurité et de l'environnement du navire et un processus d'examen de la gestion.

Cette politique est communiquée à tout personnel qui doit l'appliquer en s'acquittant de ses tâches de manière sûre et respectueuse de l'environnement.

ANNEX 3B - APPLICABLE LEGAL AND OTHER REQUIREMENTS

The Federal requirements applicable to safety hazards and environmental aspects of HARRY DEWOLF Class Ships are given in Table 1. Provincial, Municipal and Other requirements are provided in Tables 2-4.

Table 1 - APPLICABLE FEDERAL LEGAL REQUIREMENTS

SAFETY HAZARDS/ENVIRONMENTAL ASPECTS	FEDERAL LEGISLATION[1]
BLACK, GREY, BILGE, BALLAST, HABITAT, WILDLIFE	Arctic Waters Pollution Prevention Act R.S.C, 1985, c. A-12
BLACK, GREY, BILGE, BALLAST, HABITAT, WILDLIFE	*Arctic Shipping Safety and Pollution Prevention Regulations SOR/2017-286*
ALL ASPECTS	*Arctic Waters Pollution Prevention Regulations C.R.C., c. 354*
ALL HAZARDS	Canada Labour Code R.S.C., 1985, c. L-2, Part II
ALL HAZARDS	*Canada Occupational Health and Safety Regulations SOR/86-304*
ALL HAZARDS	*Policy Committees, Work Place Committees and Health and Safety Representatives Regulations SOR/2015-164, s. 15*
ALL HAZARDS, ALL ASPECTS	Canada Marine Act S.C. 1998, c. 10
HABITAT, WILDLIFE	Canada National Marine Conservation Areas Act S.C. 2002, c. 18
BLACK, GREY, BILGE, BALLAST, ALL HAZARDS	Canada Shipping Act, 2001 (S.C. 2001, C. 26)
BALLAST	*Ballast Water Control and Management Regulations (SOR/2011-237)*
HAZMAT, HAZWASTE, SOLID	*Vessel Pollution and Dangerous Chemicals Regulations SOR/2012-69*
BALLAST	*A Guide to Canada's Ballast Water Control and Management Regulations (TP 13617E)*
WATER	Canada Water Act R.S.C., 1985, c. C-11
BLACK, GREY, BILGE, BALLAST, PROCESS, STORM	*Guidelines for Effluent Quality and Wastewater Treatment at Federal Establishments, April 1976*
BIOLOGICAL, WATER	*Health Canada - Guidelines for Canadian Drinking Water Quality Summary Table (current)*
ALL ASPECTS	Canadian Environmental Protection Act, 1999 S.C. 1999, c. 33
ALL ASPECTS	*Canadian Environmental Quality Guidelines, 1999*
ALL ASPECTS	*CCME Canadian Water Quality Guidelines for the Protection of Aquatic Life*
HAZMAT, HAZWASTE	*CCME, Guidelines for the Management of Biomedical Waste in Canada, CCME EPC-WM-42E - February 1992*
HAZMAT, HAZWASTE	*Disposal at Sea Regulations SOR/2001-275*
HALOCARBON	*Environmental Code of Practice for Elimination of Fluorocarbon Emissions from Refrigerant and Air Conditioning Systems, 1996*

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

SAFETY HAZARDS/ENVIRONMENTAL ASPECTS	FEDERAL LEGISLATION[1]
HALOCARBON	*Environmental code of practice on Halons*
HALOCARBON	*Federal Halocarbon Regulations, 2003 SOR/2003-289*
HABITAT, WILDLIFE	Navigation Protection Act R.S.C., 1985, c. N-22
ALL ASPECTS	CCME Guidelines (as applicable)
BLACK, GREY, BILGE, BALLAST, HAZMAT, HAZWASTE, HABITAT, WILDLIFE	Fisheries Act R.S.C., 1985, c. F-14
HABITAT, WILDLIFE	*Marine Mammal Regulations SOR/93-56*
HABITAT, WILDLIFE	*Guidelines for the Use of Explosives in or near Canadian Fisheries Waters, 1998*
ALL ASPECTS	Canadian Environmental Protection Act, 1999 S.C. 1999, c. 33
ALL HAZARDS	Government Employees Compensation Act R.S.C., 1985, c. G-5
HABITAT, HAZWASTE, TOXIC	Hazardous Products Act R.S.C., 1985, c. H-3
HAZMAT, HAZWASTE, TOXIC	*Hazardous Products Regulations SOR/2015-17*
BIOLOGICAL, WATER	Health Canada - Interdepartmental Working Group on Drinking Water - Guidance for providing safe drinking water in areas of federal jurisdiction - Version 2 May 2013
ALL ASPECTS	Impact Assessment Act, S.C. 2019, c. 28, s. 1
HABITAT, WILDLIFE	Migratory Birds Convention Act, 1994 S.C. 1994, c. 22
TOXIC	Non-smokers Health Act R.S.C. 1985, c. 15 (4th Supp.) and regulations
IONIZING	Nuclear Safety and Control Act S.C. 1997, c. 9
HABITAT, WILDLIFE	Oceans Act S.C. 1996, c. 31
IONIZING, NON-IONIZING	Radiation Emitting Devices Act R.S.C., 1985, c. R-1
IONIZING, NON-IONIZING	*Radiation Emitting Devices Regulations C.R.C., c. 1370*
HABITAT, WILDLIFE	Species at Risk Act S.C. 2002, c. 29
HAZMAT, HAZWASTE	Transportation of Dangerous Goods Act, 1992 S.C. 1992, c. 34
HAZMAT, HAZWASTE	*Transportation of Dangerous Goods Regulations SOR/2001-286*

NOTE 1: Whenever an act applies, some or all the relevant regulations, codes and guides also apply.

Table 2 - APPLICABLE PROVINCIAL LEGAL REQUIREMENTS

SAFETY HAZARDS/ENVIRONMENTAL ASPECTS	PROVINCIAL LEGISLATION[1]
HABITAT, WILDLIFE	Ecological Reserve Act, RSBC 1996, c 103
HABITAT, WILDLIFE	Ecological Reserve Regulations B.C. Reg. 335/75 O.C. 1456/75
ALL ASPECTS	Environmental Management Act, SBC 2003, c 53
HABITAT, WILDLIFE	Protected Areas of British Columbia Act SBC 2000 Chapter 17
HAZMAT, HAZWASTE	Transport of Dangerous Goods Act, RSBC 1996, c 458
HABITAT, WILDLIFE	Endangered Species Act SNL2001 Chapter E-10.1
ALL ASPECTS	Environmental Protection Act SNL2002 Chapter E-14.2
WILDLIFE, HABITAT	Endangered Species Act. 1998. C. 11
ALL ASPECTS	Environment Act. 1994-95, c. 1, s. 1
PROCESS, STORM	Halifax Regional Water Commission Act (Schedule B)
ALL HAZARDS	Occupational Health and Safety Act. 1996, c. 7, s. 1(only applies to contractors)

NOTE 1: Whenever an act applies, some or all the relevant regulations, codes and guides also apply.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Table 3 - APPLICABLE MUNICIPAL LEGAL REQUIREMENTS

SAFETY HAZARDS/ENVIRONMENTAL ASPECTS	MUNICIPAL LEGISLATION[1]
CAPE BRETON REGIONAL MUNICIPALITY	
NOISE	Cape Breton Regional Municipality Bylaw N-100 - Bylaw Respecting Noise
PROCESS, STORM	Cape Breton Regional Municipality Bylaw W-100 - Wastewater Discharge Bylaw Respecting Discharge into Public Sewers
SOLID	Cape Breton Regional Municipality Bylaw S-300 - Solid Waste Resource Management Bylaw
CAPITAL REGIONAL DISTRICT - VICTORIA	
BLACK	Capital Regional District Bylaw 2827 - A Bylaw to Regulate The Discharge of Septage Into Septage Disposal Facilities Operating Under A Septage Services Agreement With The Capital Regional District
BLACK	Capital Regional District Bylaw No. 2922 - Capital Regional District Sewer Use Bylaw No. 5, 2001
BLACK	Capital Regional District Bylaw 3479 - A Bylaw to Regulate the Maintenance Of Onsite Sewage Systems In The Capital Regional District
SOLID	Capital Region District Bylaw No. 3881 - Hartland Landfill Tipping Fee and Regulation Bylaw No. 6, 2013
STORM	Storm Water Bylaw - No.01-154 The Corporation of the City of Victoria
STORM	Storm Water Bylaw, Amendment Bylaw (No. 1) - No.05-80 A Bylaw of the City of Victoria
CITY OF COLWOOD	
NOISE	City of Colwood Noise Control bylaw No. 1594, 2016
CITY OF VANCOUVER	
SOLID	Solid Waste By-law No. 8417
NOISE	Noise Control By-law No. 6555
CORPORATION OF THE TOWNSHIP OF ESQUIMALT	
NOISE	Maintenance of Property and Nuisance Regulation Bylaw, 2014, N0. 2826
DISTRICT OF CENTRAL SAANICH	
NOISE	Central Saanich Noise Suppression Bylaw No. 1, 1989 - The Corporation of the District of Central Saanich Bylaw No. 933
ALL HAZARDS, ALL ASPECTS	Central Saanich Wharf Regulation Bylaw No. 1484, 2004
DISTRICT OF METCHOSIN	
NOISE	District of Metchosin Noise Bylaw, 1995, No. 260
HALIFAX REGIONAL MUNICIPALITY	
NOISE	Noise By-Law – HRM By-Law N-200
SOLID	Solid Waste Resource Collection and Disposal By-Law - HRM By-Law S-600
PROCESS, STORM	Wastewater Discharge By-Law – HRM By-Law W-101
REGIONAL DISTRICT OF NANAIMO	
NOISE	Regional District of Nanaimo Electoral Area 'E' Noise Control Regulatory Bylaw No. 1054, 1996
ST. JOHN'S	

SAFETY HAZARDS/ENVIRONMENTAL ASPECTS	MUNICIPAL LEGISLATION[1]
SOLID	Anti-litter by-law No. 1382
NOISE	Noise By-law No. 1405
SOLID	Recycling Policy
SOLID	Sanitation Regulations No. 985
HAZMAT, HAZWASTE, PROCESS	Water Pollution by-law No. 293
TOWN OF VIEW ROYAL	
NOISE	Noise Control Bylaw, 2003, No. 523

NOTE 1: Whenever a By-Law applies, some or all the relevant policies, codes and guides also apply.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Table 4 - APPLICABLE OTHER REQUIREMENTS

SAFETY HAZARDS/ENVIRONMENTAL ASPECTS	APPLICABLE OTHER REQUIREMENTS
HALOCARBON	ADM(IE) Instruction 01/03 Halon Management Policy 2003
LASER	ANSI Standard Z136.1 (2014), Safe Use of Lasers (Guidance only)
LASER	ANSI Standard Z136.6 (2015) Safe Use of Lasers Outdoors
HABITAT, WILDLIFE	Annual Notices to Mariners (current year) - Section A.2 - Marine Mammal Guidelines and Marine Protected Areas
ALL HAZARDS	CAN/CSA B354.1-04 (R2016) Portable elevating work platforms
ALL HAZARDS	CAN/CSA B354.2-01 (R2013) Self-propelled elevating work platforms
ALL HAZARDS	CAN/CSA B354.4-02 (R2013) Self-propelled boom-supported elevating work platforms
ALL HAZARDS	CAN/CSA-C225-10 (R2015) Vehicle-Mounted Aerial Devices
ALL HAZARDS	CAN/CSA-S269.2-M87 (R2003) Access Scaffolding for Construction Purposes
ALL HAZARDS	CAN/CSA-Z1000-14 - Occupational health and safety management
TOXIC	CSA Standard Z94.4.11 (R2016) Selection, use, and care of respirators
TOXIC	CSA Standard Z180.1-13 (R2018) Compressed breathing air and systems
ELECTRIC	CSA STANDARD Z462-12 Workplace Electrical Safety
HALOCARBON	CSA B52-13 Mechanical Refrigeration Code
HEAT	CSA W117.2-12 (R2017) Safety in welding, cutting, and allied processes
ALL HAZARDS, ALL ASPECTS	CFB Esquimalt Emergency Response Plan
ALL HAZARDS, ALL ASPECTS	CFB Halifax Emergency Response Plan
ALL HAZARDS, ALL ASPECTS	CSA Standards (as applicable)
ALL ASPECTS	Directive Regarding Environmental Impact Assessment
HAZMAT, HAZWASTE	Emergency Response Guidebook - A Guidebook for First Responders During the Initial Phase of a Dangerous Goods/Hazardous Materials Transportation Incident (current version)
BILGE, BALLAST, BLACK, GREY, HAZMAT, HAZWASTE, SOLID	International Convention for the Prevention of Pollution from Ships (MARPOL)
ALL ASPECTS	ISO 14001:2015 Environmental management systems - Requirements with guidance for use
NON-IONIZING	Limits of Human Exposure to Radiofrequency Electromagnetic Energy in the Frequency Range from 3kHz to 300GHz - Safety Code 6 (2015)
HABITAT, WILDLIFE	Marine Mammals and Noise (Richardson, WJ, et al., 1995)
ALL HAZARDS, ALL ASPECTS	MARLANT Commander's Safety and Environmental Policy
HABITAT, WILDLIFE	MARLANT Marine Mammal Identification Tool - Posters (Identifying Whales, Dolphins, Seals and Sea turtles Atlantic Coast)
HABITAT, WILDLIFE	MARLANT OP Area Management Plan (MOAMP)
ALL HAZARDS, ALL ASPECTS	MARLANT Safety and Environmental Management System (SEMS)
ALL HAZARDS, ALL ASPECTS	MARPAC Commander's Safety and Environmental Policy
ALL HAZARDS, ALL ASPECTS	MARPAC Formation Safety and Environmental Management System (SEMS) Manual
HABITAT, WILDLIFE	MARPAC Marine Mammal Identification Tool – Whales, Dolphins & Porpoises of British Columbia
HAZMAT	National Joint Council Directives Occupational Health and Safety Directive - Part XI - Hazardous Substances
ALL HAZARDS	National Safety Council – Accident Prevention Manual for Business and Industry – Engineering and Technology – Edition 14
HAZMAT. TOXIC	NIOSH Pocket Guide to Chemical Hazards, Department of Health and Human Services, Centers for Disease Control and Prevention, (current version)

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

SAFETY HAZARDS/ENVIRONMENTAL ASPECTS	APPLICABLE OTHER REQUIREMENTS
IONIZING	Nuclear Safety Information and Control System (NSICS)
IONIZING	Nuclear Safety Instructions (NSIs)
IONIZING	Nuclear Safety Orders and Directives (NSODs)
ALL ASPECTS	Polar Code
HABITAT, WILDLIFE	Proposed Ramp-up Protocol for AN/SQS-510 Active Sonar (U), DRDC Atlantic TM 2005-206 (Theriault, JA, 2005)
HAZMAT	QHM Harbour Control Instructions
HAZMAT	QHM Pollution Contingency Plan (Part III of QHM SEMS)
ALL HAZARDS	Queen's Regulations and Orders
ALL HAZARDS, ALL ASPECTS	RCN SEMS
HABITAT, WILDLIFE	SANDS (Sea Animal Noise Database System), UK MOD ADAC, 1999
BALLAST, HAZMAT	The Seaway Handbook - Joint Practices and Procedures Respecting the Transit of Ships on the St. Lawrence Seaway (current)
HABITAT, WILDLIFE	SHINNADS Ecosystem Additional Military Layer
BALLAST	Shipping Federation of Canada - Code of Best Practices for Ballast Water Management
ALL HAZARDS, ALL ASPECTS	Royal Canadian Navy Ship's Standing Orders
LASER	STANAG 3606 Annex C, International Exchange of Laser Safety Information
HALOCARBON	Underwriters Laboratories of Canada - ORD-C1058.18-2004, The servicing of Halon and Clean Agent Extinguishing Systems
HALOCARBON	Underwriters Laboratories of Canada - ORD-C1058.5-2004 Halon and Halocarbon Clean Agent Recovery and Reconditioning Equipment
BALLAST	United States Coast Guard Ballast Water Management (BWM) Program
HABITAT, WILDLIFE	Whales and Other Marine Mammals of Atlantic Canada - Feb 2012 (Tamara Eder)
ALL ASPECTS	A-EN-007-000/FP-001 DND Environmental Assessment Manual
ALL HAZARDS	A-GG-040-001/AG-001 General Safety Program, Volume 1 - Policy and Program
ALL HAZARDS	A-GG-040-003/AG-001 General Safety Program, General Safety Training Manual
HAZMAT, HAZWASTE	A-GG-040-004/AG-001 General Safety Program - Hazardous Materials Safety and Management Manual
ALL HAZARDS	A-GG-040-005/AG-001 General Safety Program -Workplace Health and Safety Committee Guide
EXPLOSION	A-GG-040-006/AG-001 DND Explosives Safety Program
EXPLOSION	A-GG-040-006/AG-002 DND Ammunition Accident/Incident/Defect/Malfunction Reporting
ALL HAZARDS	A-GG-040-007/AG-001 General Safety Program - Handbook on The Safety Program Development and Evaluation Technique (SPDET)
ALL HAZARDS	A-GG-040-009/AG-001 General Safety Program - Return to Work Program Manual
EXPLOSION, HAZMAT	A-LM-007-100/AG-001 Supply Administration Manual (SAM)
HAZMAT	A-LM –188-001/JS-001, Supply Manual for POL/Fuel Handling
ELECTRIC	C-01-001-0F0/SP-001 Naval Personnel Protection Equipment (PPE) For Electrical Arc Flash
LASER	C-02-040-002/TS-001 Laser Safety
ALL HAZARDS	C-02-040-007/TS-001 General Safety Precautions
ALL HAZARDS	C-02-040-009/AG-001 General Safety Program - Volume 2 - General Safety Standards
ALL HAZARDS, ALL ASPECTS	C-03-005-033/AA-000 Naval Engineering Manual
HALOCARBON	C-03-005-036/AG-001, Management of Ozone Depleting Substances within the Canadian Navy
HEAT	C-03-040-000/TS-001 Maritime Command Precautions and Safety Practices for Welding and Burning
EXPLOSION	C-09-153-003/TS-000 Explosives Safety Manual Vol. 3 – Naval Vessels
HAZMAT	C-12-124-A00/MB-002, Joint Maritime Command 1 Canadian Air Division Shipborne Helicopter Operating Procedures (SHOPs)

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

SAFETY HAZARDS/ENVIRONMENTAL ASPECTS	APPLICABLE OTHER REQUIREMENTS
ALL HAZARDS	C-23-045-000/AG-001, Damage Control (Sea), Volume 1 of 4 Shipboard Damage Control
ELECTRIC	C-26-010-048/TB-001 Arc Flash Warning Labels Installation Instructions
ELECTRIC	C-26-010-047/TS-01 Safety Bulletin Arc Flash Hazard in Naval Environments
BLACK	C-27-890-000/MS-002, Installation, Operation, and Maintenance Instructions for Sewage Treatment Plant Omnipure Model 15MX3-1
NON-IONIZING	C-55-040-001/TS-001 Radio Frequency Safety Program
TOXIC	C-87-040-000/MS-001 DND Respiratory Protection Program
HAZMAT	C-94-115-000/CL-001, Liquid Cargo Management Manual for Replenishment Vessels
HAZMAT, HAZWASTE, TOXIC	C-98-007-002/TP-001, Maintenance - Asbestos Cement Products
HAZMAT, HAZWASTE	D-23-003-005/SF-002 Specification for Maintenance Painting of HMC Ships
ALL HAZARDS	CFAO 24-1 Casualties – Reporting and Administration
ALL HAZARDS	CFAO 34-23 Occupational Health
ALL HAZARDS	DAOD 2007-0 Safety
ALL HAZARDS	DAOD 2007-1 General Safety Program
ALL HAZARDS, ALL ASPECTS	DAOD 2008-3 Issue and Crisis Management
LASER	DAOD 2050-1 Laser Safety Program
EXPLOSION	DAOD 3002 Series – Ammunition and Explosives
HAZMAT	DAOD 3015-0 Green Procurement
NON-IONIZING	DAOD 3026-1 Radio Frequency Safety Programme
IONIZING	DAOD 4002-0 Nuclear Technology Regulation and Control
IONIZING	DAOD 4002-1 Nuclear and Ionizing Radiation Safety
ALL ASPECTS	DAOD 4003-0 Environmental Protection and Stewardship
HAZMAT, HAZWASTE	DAOD 4003-1 Hazardous Materials Management
EXPLOSION, FIRE	DAOD 4007-1 Reporting an Investigation of Fires and Incidents
EXPLOSION, FIRE, IONIZING, TOXIC, HAZMAT	DAOD 4007-5, Initial Response by Fire Fighters to Hazardous Material Incidents or Chemical, Biological, Radiological and Nuclear Incidents
TOXIC	DAOD 5018-2 Report of Injuries and Exposure to Toxic Substances
TOXIC	DAOD 5021-1 Respiratory Protection
ALL HAZARDS	DAOD 5023-2, Physical Fitness Program
ALL HAZARDS	DAOD 5045-0 Canadian Forces Personnel Support Programs
ALL HAZARDS, ALL ASPECTS	DAOD 7002-2, Summary Investigations
ALL HAZARDS, ALL ASPECTS	DAOD 7002-3, Subjects of Investigation and References
HAZMAT	ED 4003-1/2003 Environmental Directive, Spill Reporting
ALL ASPECTS	ED-4003-3 Responding to Environmental Enforcement Actions
HALOCARBON	ED-4003-05 Environmental Directive, Halocarbon Management
LEACH, PROCESS, STORM	ED-4003-07 Environmental Directive, Management and Monitoring of Liquid Effluents
HAZMAT	ED-4003-9 Hazardous Materials Management Plan
SOLID	MARCORD G-18 Environmental Management of Shipboard Discharges
HALOCARBON	MARCORD G-19 Halocarbon Management
HAZMAT	MARCORD MS-03 Shipboard Aviation Fuel Management

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

SAFETY HAZARDS/ENVIRONMENTAL ASPECTS	APPLICABLE OTHER REQUIREMENTS
ALL HAZARDS, ALL ASPECTS	NAVORD 1000-6 Inspection of Ship's Books by Commanding Officer
ALL HAZARDS, ALL ASPECTS	NAVORD 1002-0 Naval Orders - RCN Safety and Environmental Program
ALL HAZARDS, ALL ASPECTS	NAVORD 1080-0 Technical Investigations - Policy
ALL HAZARDS, ALL ASPECTS	NAVORD 1080-1 Technical Investigations - Process
HAZMAT, HAZWASTE	NAVORD 3000-6 Fuel and Stores Requirements
HABITAT, WILDLIFE	NAVORD 3001-1 In-Service Naval Material Risk Management - Process
ALL HAZARDS, ALL ASPECTS	NAVORD 3250-7 Royal Canadian Navy Operational Deficiency Process
HABITAT, WILDLIFE	NAVORD 4003-6 Marine Mammal Mitigation Procedures for Active Sonar Use
EXPLOSION, FIRE, HAZMAT	NAVORD 4008-0 Fire Protection and Emergency Services in HMC Dockyard
ALL HAZARDS, ALL ASPECTS	NAVORD 4995-0 Safety Firing Orders for Ships and Submarines
ELECTRIC	NAVORD 11100-1 Qualifications and Access Requirements for High Voltage Ships
ALL HAZARDS, ALL ASPECTS	MARLANTORD 1000-81 Reporting of Significant Issues/Incidents
ALL HAZARDS, ALL ASPECTS	MARLANTORD 1080-1 Boards of Inquiry, Summary Investigations, and Commanding Officers' Investigations
FIRE, EXPLOSION, AREA	MARLANTORD 7665-1 MARLANT Fire Prevention Program
ELECTRIC	MARLANTORD 66-3 Lockout/Tag out Program
BLACK	MARLANTORD 66-7 Procedure for Cleaning and Working on Sanitary Tanks/Systems
ALL HAZARDS, ALL ASPECTS	MARLANTORD 1262-1 Maritime Forces Atlantic Safety and Environmental Management
ALL HAZARDS, ALL ASPECTS	MARPACORD 1006-0 Maritime Forces Pacific Safety and Environmental Management Policy
ALL HAZARDS, ALL ASPECTS	MARPACORD 1080-0 Administrative Investigations
ALL HAZARDS, ALL ASPECTS	MARPACORD 1080-1 Administrative Investigations – Staffing Procedures
ALL HAZARDS, ALL ASPECTS	MARPACORD 45-02 Inspection Of HMC Ships And Shore Establishments
SOLID, BLACK, BILGE, GREY	MARPACORD 43-05 Liquid Waste Management Source Control And Recycling In Maritime Forces Pacific
HAZMAT, HAZWASTE	MARPACORD G-104 De-Fuelling Ships
WILDLIFE	MARPACORD 1006-2 Special Operating Procedure – Race Rocks
OXYGEN	MARPACORD 66-06 Maritime Forces Pacific Respiratory Protection Program

ANNEX 3C – OBJECTIVES AND TARGETS

Table 3C.1 and Table 3C.2 list the current safety and environmental objectives and targets respectively. These are consistent with the RCN and Formation objectives and targets for the identified safety hazards and higher priority environmental aspects.

Table 3C.1 – Safety Objectives and Targets

Safety Hazards	Objective	Target	Programs/ Actions	OPI
All Hazards	Effectively evaluate and enhance the Unit Safety Program	Achieve 80% or greater on SPDET.	General Safety Program Conduct SPDET IAW General Safety Program Handbook. Identify and provide resources to control and mitigate weak elements in the Unit Safety program.	UGSO
All Hazards	Improve general safety awareness within the Unit	90% of ship's crew to receive GSEAB.	Safety and Environmental Awareness Training Conduct GSEABs during PD days or as required annually. Report number of crew to receive GSEAB annually at the FLTSEMC.	UGSO/UEnvO
All Hazards	Reduction of Hazardous Occurrences	10% reduction of disabling and non-disabling injuries.	Hazard ID and Assessment Identify the type of highest risk hazardous occurrence using unit stats and provide resources to mitigate annually.	UGSO
All Hazards	Implement a functional SSEC	Meet a minimum of four times annually.	Safety Management	XO
All Hazards	Increase training for personnel holding safety positions in SSEC	50% of SSEC members to receive appropriate safety training.	Safety Awareness Training IAW Annex 4R	XO

Table 3C.2 - Environmental Objectives and Targets

Environmental Aspect	**Objective**	**Target**	**Programs/ Actions**	**OPI**
Halocarbon	Reduce frequency and quantity of releases	Demonstrate a downward trend in frequency and quantity.	Halocarbon Management Report Halocarbon equipment inventory.	NTO/UEnvO
Black, Grey, HazMat, Bilge	Reduce the impact of liquid effluent discharges on the environment	Demonstrate a downward trend in frequency and quantity of spills.	Liquid Effluent Management	NTO/UEnvO
HazMat	Reduce incidences and quantity of fuel and HazMat spilled	Demonstrate a downward trend in frequency and quantity of releases.	Fuel Spill and HazMat Prevention and Response	NTO, UEnvO, UHMC
Solid	To reduce environmental impact and costs associated with the management of Solid Waste	No occurrences of solid waste cross contamination at the jetty.	Solid Waste Management	Solid Waste Coord
All Hazards	Improve general safety awareness within the Unit	90% of ship's crew to receive GSEAB.	Safety and Environmental Awareness Training Conduct GSEABs during PD days or as required annually. Report number of crew to receive GSEAB annually at the FLTSEMC.	UGSO/UEnvO

ANNEX 3D – SAFETY AND ENVIRONMENTAL MANAGEMENT PROGRAMS

PROGRAM NO.	PROGRAM	DESCRIPTION	OPI
HDW SEMP 01	Hazard I.D. and Assessment	To identify and assess the workplace risks of injury, occupational illness and asset loss associated with the various jobs conducted on the ship. Initial focus will be on the jobs that historically have caused the most OH&S issues. As much preparatory work as possible will be conducted by MARL/MARP SE off site to minimize disruption to operational personnel. Facilitators will work with ships to ensure collaboration and to verify that work carried out off site is correct. The Internet, MARL/MARP SE experience, SMEs and consultants will be used to compile list of hazards commonly known for relevant jobs. Once risks have been identified and assessed, the control methods will be evaluated for effectiveness, and if considered necessary improved control methods will be recommended. The first phase of the process ends when accepted recommendations are implemented, but Job Hazard Analysis is an on-going process of continual improvement.	UGSO
HDW SEMP 02	Safety Awareness Training	To provide a basic understanding of applicable safety legislation, DND/CAF safety policy and due diligence and liability. Ship's staff is made aware of the potential for ship activities to cause downgrading incidents with possible serious consequences to personnel as well as damage and/or loss of assets. The benefits of continual improvement in safety performance for the unit as well as individually are also emphasized. Awareness and Training is provided IAW Part 1, Chapter 4.	UGSO
HDW SEMP 03	Fuel Spill Prevention and Response	The nature of DND/CAF operations requires the use of many hazardous materials, which if handled improperly, can have adverse environmental impacts. DND/CAF recognizes that it must be aware of the current implications of its management of fuel spills. To this end the HARRY DEWOLF class will implement SOP-E01 Fuelling and review and exercise Plan-P01 Spill Response Plan.	NTO
HDW SEMP 04	HazMat Management	The procurement, use, storage and disposal of HazMat. The HARRY DEWOLF Class will implement SOP-SE01 HazMat/HazWaste Management and review and exercise Plan-P01 Spill Response Plan. Important components of the program include: • Controlling HazMat purchases and the quantity of HazMat stored onboard; • Controlling the generation of HazWaste by promptly repairing equipment defects/leaks as they occur;	UHMC

PROGRAM NO.	PROGRAM	DESCRIPTION	OPI
		• Responding to HazMat spills; • Ensuring appropriate training is provided to personnel using HazMat; and • Using the HazMat Reference Application (HMRA) to track inventory and SDS.	
HDW SEMP 05	Halocarbon Management	Ships use halocarbons for refrigeration and air conditioning and halon for fire fighting. As an environmental compliance requirement, the consumption of CFCs and Halons shall be reduced and accidental releases prevented by effective management and maintenance of halocarbon containing equipment. To this end the HARRY DEWOLF class will implement SOP-E03 Halocarbon Management.	NTO
HDW SEMP 06	Solid Waste Management	There are opportunities in DND/CAF operations to reduce the consumption of materials, increase the efficiency of resource use and limit the effects of waste. The HARRY DEWOLF class will implement SOP-E04 Solid Waste Management.	Solid Waste Coordinator
HDW SEMP 07	Environmental Awareness and Training	To provide a basic understanding of environmental legislation, DND/CAF environmental policies, due diligence and liability. There is an emphasis on the environmental impacts of ship's activities as well as the benefits of continual improvement as a unit and as individuals. Awareness and Training is provided IAW Part 1, Chapter 4.	UEnvO

ANNEX 4A – SAFETY AND ENVIRONMENTAL RESPONSIBILITIES

The key safety and environmental responsibilities on the ship are outlined below and detailed in Annexes 4B – 4N.

POSITION	ROLES & RESPONSIBILITIES
Commanding Officer (CO)	Overall responsibility for the ship. Signs the ship's Safety and Environmental Policy. Conducts the SEMS Management Review and reports results to the FltSEMC. Assigns a Unit Environment Officer (UEnvO) and Unit General Safety Officer (UGSO). Assigns appropriate resources to meet objectives/targets and implement Safety and Environmental Management Programs (SEMPs).
Executive Officer (XO)	Chairs the ship's Safety & Environment Committee (SSEC). Acts as Management Representative for the ship's SEMS, including the preparation requirements for the management review. Assign remainder of secondary duties and OPIs to carry out the SEMPs. Through the SSEC, reviews SEMP status and reports this to the SSEC. Additionally, the XO oversees the safety and environmental protection aspects of contracts, IAW the C-02-040-009/AG-001 Chapter 12 "Contractor Liaison Safety Standard."
Ship's Safety and Environmental Committee (SSEC)	Participates in the annual SEMS Management Review. Membership and TOR are given in Annex 4B.
Unit General Safety Officer (UGSO)	Assists the XO in the implementation of the SEMS - safety management. Acts as liaison with MARL/MARP SE. See TOR at Annex 4C.
Unit RF Safety Officer (URFSO)	See TOR at Annex 4D.
Unit Laser System Safety Officer (ULSSO)	See TOR at Annex 4E.
Lockout/Tagout Coordinator	See TOR at Annex 4F.
Departmental Safety and Environmental Representative	Liaison between UGSO, UEnvO and department, see TOR at Annex 4G.
Unit Environmental Officer (UEnvO)	Assists the XO in the implementation of the SEMS - environmental management. Acts as liaison with MARL/MARP SE. See TOR at Annex 4H.

Unit HazMat Coordinator (UHMC)	Manages the HazMat Management Program, see TOR at Annex 4I.
Solid Waste Coordinator	Manages the Solid Waste Management program, see TOR at Annex 4J.
Spill Cleanup Team	Respond to fuel and HazMat spills, see Part 3, and team membership and TOR at Annex 4K.
Heads of Departments (HODs)	Ensure that documented procedures are implemented.
All personnel	Adhere to the Formation and ship safety and environmental policies and procedures.

ANNEX 4B - TERMS OF REFERENCE FOR THE SHIP'S SAFETY AND ENVIRONMENTAL COMMITTEE (SSEC)

1. The Ship's Safety and Environmental Committee (SSEC) is responsible for:

   a. reviewing safety and environmental policies, applicable legislation, guidelines, and workplace practices as promulgated;

   b. providing direction for SEMS implementation;

   c. reviewing safety and environmental objectives, targets and Safety and Environmental Management Projects/Programs (SEMPs);

   d. monitoring progress in meeting current safety and environmental objectives and targets; and

   e. participating in an annual Management Review of the SEMS conducted by the CO. The Review is scheduled to allow the CO to present the results to the Fleet Safety and Environment Management Committee (FltSEMC).

2. Committee membership comprises:

   a. XO – Chair;
   b. UEnvO – Ex-officio;
   c. UGSO – Ex-officio;
   d. Unit Radio Frequency Safety Officer;
   e. Unit Laser System Safety Officer;
   f. Naval Technical Officer;
   g. Unit HazMat Coordinator;
   h. Solid Waste Coordinator;
   i. DSERs as appropriate;
   j. Snr PA;
   k. Junior Ranks Safety and Environmental Representative;
   l. Ammunition Safety Representative;
   m. LOTO Coordinator; and
   n. Electrical Safety Representative (High/Low Voltage).

3. The Committee meets quarterly or more often as required. One of these meetings is the annual ship SEMS Management Review chaired by the CO. Minutes are kept of all meetings as safety/environmental records IAW Part 1, Chapter 5, Control of Records. Current minutes are also posted on the ship's notice boards and forwarded to MARL/MARP SE.

ANNEX 4C - TERMS OF REFERENCE FOR UNIT GENERAL SAFETY OFFICER

1. Details of the Unit General Safety Officer's (UGSO's) responsibilities are listed in Chapter 2 of the Safety Policy and Program – A-GG-040-001-AG-001, Vol 1, Chapter 2, and are summarized below.

2. The UGSO is responsible to his/her commander to develop and manage the organization's General Safety Program as follows:

a. providing oversight and co-ordination for SEMS implementation;

b. develop, plan, coordinate, and administer the organization's General Safety Program and ensure its compliance with the departmental General Safety Program;

c. review the existing local occupational health and safety program and suggest revisions where problem areas exist;

d. conduct occupational health and safety surveys of the organization on at least a yearly basis;

e. develop and verify, in conjunction with the line authority, safety inspection checklists;

f. brief line officers on weaknesses found on safety inspections and surveys to enable corrective action and program development;

g. maintain a file system to regulate inspection schedules, hold inspection report records, and keep available various inspection checklist formats;

h. develop, prepare and administer the annual allocated general safety budget;

i. recommend changes to safety policies, standards, and procedures that will improve local operations;

j. develop, plan, co-ordinate, host, instruct, evaluate and verify a wide range of General Safety, and WHMIS training and education programs;

k. provide in-routine briefings and General Safety and Environmental Awareness Briefs (GSEAB);

l. respond to problems and queries arising from the field of General Safety;

m. promote good health, safety attitudes and accident prevention, and motivate individuals to improve their occupational health and safety performance;

n. administer the accident prevention, investigation, reporting, compiling and analysis procedures based on the Hazardous Occurrence form and the Occupational Health and Safety Module in the Human Resource Management System (HRMS);

o. sit on various boards and committees as a safety advisor;

p. acting as the liaison between the SSEC and MARL/MARP SE for safety issues;

q. ensuring safety information is disseminated to all appropriate personnel;

r. assigning OPIs to collect and evaluate safety monitoring data;

s. investigating safety incidents, accidents and other non-conformances with the SEMS, and verifying that corrective action has been successfully implemented;

t. work with XO to co-ordinate MARL/MARP SE safety verifications, inspections and surveys, such as the SPDET;

u. identifying and implementing, where possible, opportunities for the continual improvement of safety performance through the SEMS; and

v. conducting spot checks of contractors to ensure compliance with legislation and policy and conformance with the SEMS.

ANNEX 4D – TERMS OF REFERENCE FOR THE UNIT RF SAFETY OFFICER

1. Commanding Officers shall appoint a Unit RF Safety Officer (URFSO). In HARRY DEWOLF Class ships the Naval Technical Officer (NTO) shall be designated as the URFSO. The Weapons Engineering Manager shall be designated as the Alternate.

2. The URFSO (and alternate) is responsible to implement the RCN Radio Frequency Safety Program (RFSP) in the unit. They shall:

a. Have the URFSO AJCQ designation for major/minor warships and submarines or the AJAH designation for Auxiliary vessels and shore units;

b. Advise the Formation RF Safety Officer (FRFSO) of the appointee particulars;

c. Be fully conversant with the contents of this SOP as well as other RF Safety references such as Ship Standing Orders;

d. Ensure that unit personnel are well informed of, and adhere to unit RF Safety procedures;

e. Implement the RF safety training program applicable to the unit's needs;

f. Maintain a Unit RF File, containing;

(1) a list of fitted RF emitters;

(2) ship RF Survey Reports;

(3) RF Training Log;

(4) Internal and external Conformance Verification Log;

(5) RF Incident Log; and

(6) An RF Leak Check Log.

g. Conduct periodic RF Safety Program (RFSP) self-verifications;

h. Co-ordinate Unit RF surveys with the FRFSO;

i. Ensure that any new RF or RF susceptible equipment has the appropriate RF safety information promulgated prior to use; and

j. Ensure that unit RF safety infractions, EMI and potential overexposure incidents are promptly investigated and reported to the FRFSO and the UGSO

ANNEX 4E – TERMS OF REFERENCE FOR THE UNIT LASER SYSTEMS SAFETY OFFICER

1. Commanding Officers shall appoint a Unit Laser Systems Safety Officer (ULSSO) in accordance with NAVORD 1002-0. The Naval Technical Officer (NTO) shall be designated as the ULSSO. The Weapons Engineering Manager shall be designated as the alternate.

2. The Unit Laser Systems Safety Officer (and alternate) shall:

a. have the ULSSO AEWF designation;

b. advise the Formation Laser Systems Safety Officer (FLSSO) of the appointee's particulars;

c. be familiar with the contents of NAVORD 1002-0 and its related references;

d. be familiar with the contents of HDW SEMS SOP-S10 and its related references;

e. ensure that unit personnel are well informed of and adhere to laser safety policies, standards and procedures;

f. develop and implement a training program that is appropriate to all personnel within the unit, according to their employment;

g. maintain pertinent information dealing with policy documentation, fitted laser systems, related reports, incidents, and actions taken;

h. provide assistance to resolve laser safety related work conflicts within the unit;

i. ensure that all laser devices classified as Class 3B and 4 are within their area of jurisdiction at all times, and are properly installed, maintained, and operated in accordance with relevant instructions;

j. ensure that unit laser safety infractions and overexposure incidents are promptly investigated and reported to the FLSSO; and

k. co-ordinate unit surveys with the FLSSO.

ANNEX 4F - TERMS OF REFERENCE FOR THE SHIP'S LOCKOUT/TAGOUT COORDINATOR

References

A. SEMS Directive DS-01 Lockout/Tagout Program

1. When performed correctly, Lockout/Tagout eliminates the possibility of low voltage or current exposure, accidentally releasing radiation, energizing a circuit or releasing a liquid or gas under pressure during training, maintenance or repair work.

2. Where the Lockout/Tagout of systems or equipment is required for work conducted onboard HMC ships, submarines or auxiliary vessels, personnel involved in that work shall be trained in Lockout/Tagout policy and procedures.

3. All personnel of the Naval Technical Department shall receive Lockout/Tagout training. The NTO is responsible to ensure members receive training.

4. The duties and responsibilities for Lockout/Tagout Coordinator are found in SOP-S04.

5. All completed forms/lists from the SOP-S04 shall be retained as records by the Unit for one year after the last date of entry.

ANNEX 4G - TERMS OF REFERENCE FOR DEPARTMENTAL SAFETY AND ENVIRONMENTAL REPRESENTATIVES

1. The Departmental Safety and Environmental Representatives (DSERs) are responsible to their respective HOD, UGSO, UEnvO and XO for the following duties:

a. educating personnel in their departments on safety, environmental and recycling procedures;

b. ensuring that their departments are adequately supplied with the equipment and materials necessary to implement the Class SEMS and associated management programs effectively;

c. providing a list, and updating it as required, of their department's HazMat holdings to the UHMC;

d. ensuring that all HazMat are adequately labelled, stored and disposed of within their department. They are also responsible for HazMat inspection, current SDS availability and reporting requirements for their department as outlined in Part 2, SOP-SE01 of the Class SEMS Manual;

e. ensuring that all HazMat stored in a compartment are compatible with both the product(s) SDS sheet and the compatibility chart;

f. serving as a liaison between Department personnel, the UGSO, the UEnvO and members of the SSEC;

g. carrying out any other safety and environmental management duties assigned by the HOD, UGSO, UEnvO and XO; and

h. attending SSEC meetings.

ANNEX 4H - TERMS OF REFERENCE FOR THE UNIT ENVIRONMENT OFFICER

1. The Unit Environment Officer (UEnvO) is appointed by the CO. If not already qualified, the UEnvO shall be loaded on the first available UEnvO course. The UEnvO is responsible for:

a. providing oversight and co-ordination for SEMS implementation;

b. controlling environmental documents and managing records at the ship level;

c. supporting the XO in their position as SEMS Management Representative;

d. administrating the SEMS by keeping the manuals up-to-date by adding new procedures and/or replacing revised procedures and destroying obsolete documents;

e. acting as the principal advisor on compliance with environmental regulations, monitoring the ship's environmental compliance and reporting any infractions to the CO, through the XO.

f. acting under the CO's authority to stop any activity that they believe contravenes an order or regulation pertaining to the environment;

g. advising the Unit HazMat Coordinator and Solid Waste Coordinator in carrying out their duties;

h. briefing the CO/XO on the pertinent regulation for any port, territorial waters or OP AREA that the ship visits;

i. ensuring the Logistics Request (LOGREQ) contains arrangements for environmental services, such as recycling/disposal and liquid waste management, upon arrival in foreign ports;

j. identifying environmental training needs, and delivering General Safety and Environmental Awareness Briefs (GSEABs) and reporting annually to MARL/MARP SE on the number and percentage of personnel who received the awareness briefing;

k. acting as the liaison between the SSEC and MARL/MARP SE for environmental issues;

l. ensuring environmental information is disseminated to all personnel on board;

m. assigning OPIs to collect and evaluate environmental monitoring data;

n. investigating environmental incidents, accidents and other non-conformances with the SEMS, and verifying that corrective action has been successfully implemented;

o. work with XO to co-ordinate MARL/MARP SE environmental verifications, inspections and surveys;

p. presenting a summary of the OPIs Progress Reports on the status of EMPs at the Management Review Meeting;

q. identifying and implementing, where possible, opportunities for the continual improvement of environmental performance through the SEMS;

r. conducting spot checks of contractors to ensure compliance with legislation and policy and conformance with the SEMS; and

s. assessing the potential impact of a spill, providing advice on mitigation, and preparing the spill report message and TI or SI if necessary for the CO to sign and issue.

ANNEX 4I - TERMS OF REFERENCE FOR THE UNIT HAZARDOUS MATERIALS COORDINATOR

1. The Unit Hazardous Materials Coordinator (UHMC) is responsible to the UEnvO for the management of HazMat including:

a. co-ordinating queries with respect to HazMat;

b. maintaining an inventory of the types and locations of all HazMat held on board, by ensuring that departments update the HazMat inventory database, known as Hazardous Material Reference Application (HMRA), at least once per quarter, and providing an updated inventory to MARL/MARP SE annually on 15 October;

c. assessing the requirement for, and ensuring the procurement of all necessary hazardous material handling equipment. Reducing the types and quantities of HazMat onboard should always be considered;

d. reviewing all incidents involving HazMat to evaluate the need to improve procedures to prevent similar incidents;

e. ensuring that HazMat (WHMIS controlled products) are properly WHMIS labelled;

f. ensuring that storage areas include a copy of the Compatibility Chart and that labelling is IAW Transportation of Dangerous Goods (TDG);

g. ensuring that the ship's master file of SDSs is maintained for all SDS on board, and readily accessible to all personnel;

h. ensuring departments properly identify all spaces that contain HazMat, and the relevant and up to date SDSs are available immediately outside each space containing HazMat;

i. ensuring departments record the acquisition of HazMat;

j. advising departments on the safe storage of all HazMat whether stored in the ship's storerooms or department spaces;

k. ensuring the proper disposal of all HazWaste, whether it results from normal usage or from an accidental spill;

l. advising the NTO with respect to cleanup requirements associated with HazMat releases;

m. ensuring rounds of the ship are conducted to make certain that all HazMat is stored as itemized in the HMRA and IAW SOP-SE01 of the Class SEMS Manual. The rounds should focus on all HazMat storage spaces, upper deck stowage and disposal procedures;

n. ensuring that HazMat/HazWaste are properly packaged, WHMIS labelled, prepared for transport, reaches the approved storage site, and/or is disposed of correctly;

o. attending the SSEC meetings;

p. co-ordinating second level or product-specific WHMIS training for all personnel who routinely use specific types of HazMat;

q. ensuring that WHMIS training and Product Specific Training records are maintained for all crew;

r. implementing control measures to ensure that all HazMat have a proper WHMIS and/or TDG label at all times while in storage, use, during handling, etc.; and

s. delegating responsibilities within this annex to departmental representatives to assist with the HazMat Program.

ANNEX 4J - TERMS OF REFERENCE FOR THE SOLID WASTE COORDINATOR

1. The Solid Waste Coordinator duty is normally conducted by the DeckO or Senior Bosun Mate and is responsible to the XO for managing the ship's Solid Waste Program, including:

a. when the ship is alongside in home port, they ensure that recycling stations and waste receptacles are maintained;

b. organizing a training program for the ship's company on solid waste regulations, policy and procedures;

c. ensuring that cleaning station personnel are appropriately briefed on recycling procedures and that these procedures are followed;

d. organizing work parties to land recyclable material, compostable material and solid waste upon arrival in ports;

e. monitor jetty bins upon return from deployment and not less than every two weeks. Any cross-contamination is to be reported to the UEnvO;

f. identifying and correcting those personnel/sections who are not following proper waste management procedures; and

g. attending the SSEC meetings.

ANNEX 4K - TERMS OF REFERENCE FOR THE SPILL CLEANUP TEAM

1. The Spill Cleanup Team (SCT) is responsible for:

   a. responding to all situations involving hydrocarbon and HazMat spills;

   b. taking appropriate actions to contain fuel and HazMat spills, (see Part 3, Plan-P01);

   c. cleaning up the spill site including the jetty, the water around the ship or any other area covered by the spill;

   d. responding to directions from the On-Scene Supervisor;

   e. reporting the action taken, probable consequences of the spill and the success of the clean-up operation;

   f. maintaining response equipment, and taking the training required to meet its mandate; and

   g. participating in spill exercises both at sea and in harbour IAW CFCD 102.

2. Plan-P01 – Spill Response Plan in Part 3 contains additional information on the SCT's duties and responsibilities.

ANNEX 4L – IN-ROUTINE BRIEFS

GENERAL

1. As part of an integrated approach to safety and environmental management, HMCS <*unit*> is committed to minimizing the adverse impact of the ship's operations on the environment and making the greatest possible effort to protect the safety of others and ourselves. The Ship's Safety and Environment Committee (SSEC) is described in Annex 4B of the Safety and Environmental Management System (SEMS) manual and also is posted on the ship's Safety and Environment Notice Board. The SSEC is charged with ensuring we meet the objectives set out in the Formation Commander's Safety and Environmental Policy, and the Commanding Officer's Safety and Environmental Policy. To achieve safety and environmental goals, HMCS <*unit*> follows direction in the SEMS manual that details procedures and standard practices that must be adhered to. Copies of the SEMS manual can be obtained from the Unit Environment Officer (UEnvO) or Unit General Safety Officer (UGSO).

DUE DILIGENCE

2. One of the most important concepts of safety and environmental management is ***due diligence.*** Essentially, due diligence means that you are responsible for doing everything expected of someone of your rank and experience to attempt to prevent a safety or environmental incident or accident. Specifically, you must:

a. behave in a responsible manner and obey all applicable laws/regulations;

b. prepare for all risks that a thoughtful and reasonable person would foresee; and

c. respond to risks and incidents as soon as practicable.

3. Most importantly, if something does happen, you must report it to your supervisor or your HOD. Safety and environmental issues are judged on the basis of strict liability. In other words, you are guilty until proven innocent. The only way you can avoid this liability is to prove that you took every reasonable precaution to prevent an incident and then made every effort to clean up or otherwise respond to the incident. Failing to apply due diligence could leave the department or you open to possible legal action.

GENERAL SAFETY

4. Safety is everyone's responsibility, from the most junior Ordinary Seaman to the Commanding Officer. In HMCS <*unit*>, all evolutions shall be conducted with due regard for the safety of personnel and the protection of material resources. Safety is not a concept that is casually brushed aside when situations dictate a sense of urgency. You are responsible for the following safety practices:

a. always use the appropriate safety gear and wear the proper Personal Protective Equipment (PPE) – *it sounds obvious but this is one of the most common sources of injury*;

b. all safety infractions and potential safety hazards **shall** be reported immediately to your supervisor – if in doubt, stop and ensure that the activity can be safely completed;

c. if you are involved in or witness an accident, it must be reported immediately to your supervisor; and

d. as a supervisor, if an accident or injury is reported to you, you must ensure that it is reported to the UGSO and all necessary forms, such as a DND 663 or CF 98, are completed accurately – failure to ensure the completed paperwork could deprive someone of a pension or other compensation.

RADIO FREQUENCY (RF) RADIATION HAZARDS

General

5. There are a number of emitters (radars and radios) onboard that can be a serious safety hazard for personnel, ordnance and fuel. For your protection, RF is controlled by the SWK in harbour and the OOW at sea. A thorough safety policy is laid out in the SEMS manual, SOP-S09.

Man Aloft Areas

6. Aloft areas are any elevated platforms or work site more than 2.4 metres above a deck or obstruction, particularly when a loss of a foothold or grasp could lead to injury or loss of life. No personnel are to proceed aloft without first completing a man aloft chit and receiving permission from the OOW/SWK. All personnel heading aloft shall be trained and wear the appropriate safety harness. Aloft areas are defined in HDW-SOP-S05 Fall Protection.

Crane Operations

7. As the energy from HMCS <*unit's*> radars and radios can be picked up and conducted by long conductors such as crane wires, you will never operate a crane without first checking with the OOW/SWK to ensure that it is safe to do so, and you must be qualified.

Radiating in Harbour

8. You may not draw keys or radiate on any emitter without first completing a Radiation Control Chit (Man Aloft Chit). This chit must be signed by the NTO or Weapons Engineering Manager and approved by the SWK before commencing.

FLIGHT SAFETY

9. Even when HMCS <*unit*> is not involved in flight operations, flight safety is an important concern as flight operations can be conducted at short notice. The biggest hazard for a helicopter operating with the ship is Foreign Object Damage (FOD). FOD is every ones responsibility and can be caused by things as benign as rags, bolts, or zip ties left lying on the upper decks. FOD could be catastrophic for the helicopter and her crew, a FOD check shall be conducted after any activity or maintenance is conducted on the upper decks.

ENVIRONMENT

General

11. Damage to the environment as a result of peacetime naval operations is unacceptable. You must at all times adhere to environmentally sound practices and obey the letter and spirit of all applicable environmental laws and regulations.

Key Regulations

12. Annex 3B of the SEMS has a list of regulations that affect the ship. Some important rules that you must be aware of include:

a. no overboard discharge of any sort without the permission of the SWK/OOW;

b. no plastic or hazardous waste shall ever be released overboard;

c. as a general rule, any untreated overboard discharge is not permitted within 12 nm of land (includes OWS discharge, black and grey water);

d. there is no discharge of garbage at sea;

e. garburated food waste can be discharged >3 nm from any coastline, >12 nm in MARPOL special areas, and zero discharge in Arctic waters; and

f. non-garburated food waste can be discharged >12 nm from any coastline, zero discharge in MARPOL special areas, and zero discharge in Arctic waters.

Spills

13. All petroleum, oil or lubricants (POL) spills or water containing POL are considered fuel spills and require immediate response. All dangerous substances (e.g. poisons, corrosive agents, flammable materials, ammunition, explosives, radioactive materials, etc) spills are considered HazMat spills and require immediate response. If you observe a fuel or HazMat spill, as the discoverer, you are required to do the following:

a. raise the alarm by yelling "Spill, Spill, Spill in (location)";
b. attempt to contain the spill (if safe to do so);
c. if possible, prevent the spill from going overboard or into scuppers; and
d. remain at the scene (if safe to do so) until the Spill Response Team (SRT) arrives.

14. The Spill Response Plan in Part 3 of SEMS details the spill response procedures. It is your responsibility to know them.

Solid Waste Handling System (SWHS)

15. For simplicity, all onboard waste is handled the same way in port as at sea. All ship staff are responsible for ensuring that gash is separated at the source. Failure to comply may lead to familiarization duties in the Solid Waste Handling Compartment. Gash shall be separated as follows:

a. **Paper:** place in proper bins for recycling;

b. **Plastics:** place in gash buckets for disposal (in harbour) or processing (at sea);

c. **Pop/Beer Cans:** place in designated recycling container;

d. **Glass/Metal:** place in designated recycling container (in harbour) or processing (at sea); and

e. **Wet Gash:** place in wet gash bins for disposal (in harbour) or garburating (at sea, if permitted). Wet gash placed in bins in homeport must be double bagged

Note: There are several items (e.g., batteries, razor blades) that require special handling. If you have any questions about the SWHS, ask the Solid Waste Coordinator for direction.

CONCLUSION

16. HMCS <*Unit*>'s Commanding Officer has a Safety and Environmental Policy that is posted on the Safety and Environment Information Board located at <*location*>. More information regarding safety and environmental management can be found on the board and in the SEMS manual. As a member of the <*Department*>, your departmental safety and/or environmental representative is <*rank & name*>. If you have any questions or concerns regarding safety or environmental procedures you can go to your departmental representative, the UGSO, the UEnvO, or through the chain of command. Do you have any questions?

17. UGSO is _____

18. UEnvO is _____

ANNEX 4M – FIVE-MINUTE SAFETY TALK SUBJECTS

1. Briefings from specialists and UGSOs can be given to cover a myriad of subjects. One of the responsibilities of Supervisors is the weekly five-minute safety talk. These briefs can be either work related (eg. PPE, RPP) or deal with off-duty safety topics such as sun exposure, recreational vehicles, etc. The goal of these briefs is to ensure personnel are aware of any activity and the associated risks that could pose a risk to the health and safety of personnel. This Annex lists some of the general topics that the five-minute safety briefs can cover:

a. General Safety;
b. Safety Responsibility;
c. Lifting and Back Care;
d. Slips and Falls;
e. Housekeeping;
f. Machine Guarding;
g. Hazardous Materials;
h. Personal Protective Equipment;
i. First Aid;
j. Fire Safety - Building Evacuation;
k. Home Safety; and
l. Field Safety.

2. A list of safety talk subjects can be found in A-GG-040-003/AG-001, DND General Safety Program, General Safety Training Manual. Other resources for safety talks can be found at:

a. MARLANT SE http://halifax.mil.ca/MarlantSafetyEnvironment/pages/safety_general_safety.html;

b. MARPAC SE http://esquimalt.mil.ca/fse/Formation_Safety/Index_Safety.htm; and

c. 17 Wing http://17wing.winnipeg.mil.ca/cms/en/home/winginfo/safety/groundsafety/SafetyTalks.aspx.

Attachment

Appendix 1: Five Minute Safety Talk Attendance List

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX 4M APPENDIX 1– FIVE MINUTE SAFETY TALK ATTENDANCE LIST

Unit: _____ Department: _____

Date: _____ Presenter: _____

Topic: _____

Name	Signature

ANNEX 4N - MASTER DOCUMENT LIST

DOCUMENT TITLE	ORIGINAL DATE of ISSUE	DATE of LAST REVIEW	OPI
SHIP CLASS SEMS MANUAL			
Preface	July 2020		MARL SE
Part 1 - Administration	July 2020		MARL SE
Part 2 – Standard Operating Procedures	July 2020		MARL SE
Part 3 – Emergency Preparedness and Response Plans	July 2020		MARL SE
EXTERNALLY GENERATED DOCUMENTS (MARLANT)			
Safety and Environmental Briefing (SEB) DVD	2010	2014	CMS
QHM Harbour Control Instructions (MARLANT)	1997	2017	QHM
MARLANT OP Area Management Plan (MOAMP) User's Guide	2005	2012	MARL SE
CFB Halifax Emergency Response Plan	2016	2016	BOps
EXTERNALLY GENERATED DOCUMENTS (MARPAC)			
Harbour Control Instructions	2004	2018	QHM/POESB
QHM Marine Spill Plan	2003	2011	QHM/POESB
CFB ESQUIMALT – Internal Hazardous Waste Pick-up Request	2007	2017	BLog
RCN Safety and Environmental Awareness Briefing (SEAB) Version 7.0	2010	2014	RCN
Environmental Assessment of Military Training in MARPAC Exercise Areas	1998	2018	MARL/MARP SE
INTERNALLY GENERATED DOCUMENTS			
The Ship's XO completes this table.			
CSOs			
OOD Duty Pack			
OOW Duty Pack			
Brow Duty Pack			
Coxswain Duty Pack			
Etc			

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX 4O – SAFETY AND ENVIRONMENTAL TRAINING

Course \ Position	Chairman	UEnvO	Solid Waste Cord	UGSO	UHMC	RFSO	ULLSO	Lockout/Tagout	NTD DSER	OPS DSER	Logistics DSER	Air DSER	Spill Cleanup Team	Snr Mech Maintainer	OOD/SWK
Basic Safety Officer Training Course (BSOTC)				■											
Safety Management Course (SMC)	▒	▒	▒	■	▒	▒	▒	▒	▒	▒	▒	▒	▒		
Safety Program Evaluators Course (SPEC)				■											
Safety Legislation Course (SLC)				■											
Occupational Health Course (OHC)				▒											
Return to Work Awareness Course (1/2 day)				▒											
Loss Control Management (LCM)				▒											
Haz. Occ. Investigation Crse (HOIC)(4 day)				■											
Haz. Occ. Investigation Crse (HOIC)(1 day)					▒	▒	▒	▒	▒	▒	▒	▒			
Supervisor Safety Course (SSC)									▒	▒	▒	▒			
Safety Committee Course (SCC)	■		■	■	■	▒	▒	▒	▒	▒	▒	▒			
Compliance Awareness Course (CAC)				■											
WHMIS Orientation	■	■	■	■	■	■	■	■	■	■	■	■	■		
WHMIS Secondary Product Specific	■	■	■	■	■	■	■	■	■	■	■	■	■		
Laser Safety Course (LSC)							■								
Confined Spaces Entry (CSE)														■	
Respiratory Protection (RP)	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Fall Protection (FP)									■	▒					
Lockout/Tagout Course (MARLANT only)		▒						■							▒
HRAI															
DRMIS		■													
Unit Environment Officer's Course (UEnvO)		■	▒												
HazMat Spill Cleanup					■								■		
Unit RF Safety Officer's Course						■									
Fuel Spill Course		■											■		
HMRA		▒		▒	■				▒	▒	■	▒			

■ Member requires course ▒

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX 4P - SEMS CHANGE REQUEST FORM

IAW SEMS Part 1 Chapter 4 - To request a change to the Class SEMS Manual, the table below must be completed, signed and submitted to MARL/MARP SE. State where the information can be found or where it should be inserted in the manual. Identify what has to be changed, added or removed and what should it be changed to. Also, provide any substantiation or comments. (See example on page 2).

SEMS Reference (eg. SOP#, Annex, Chapter, Paragraph etc.)	Details of requested change	Amplifying details or comments

Change requested by:_____ Unit: _____ Date: _____

UGSO or UEnvO:_____ Date: _____

Commanding Officer:_____ Date: _____

Sample SEMS Change Request - When making a request for change, addition or removal of the content within the Class SEMS Manual, provide clear details of your requested changes along with the exact location where you want the change to be made within the SEMS manual. Here is an example showing the information required when submitting a change request.

SEMS Reference (eg. SOP#, Annex, Chapter, Paragraph etc.)	Details of requested change	Provide substantiation or comments
HDW SEMS, Part 2, SOP-E01 - Fuelling, Page E1-7/15, Para 12	Change "ship staff must limit fuelling the tanks to 80 % tank capacity" to "ship staff must limit fuelling the tanks to xx % tank capacity".	Discussed this request with FTA, STA ….

ANNEX 5A – PERFORMANCE MEASUREMENT AND MONITORING MASTER LIST

Table 1 - SAFETY

Parameter/ Information To Be Monitored	Risk/ Performance Indicator	Objective/ Target	Method/ Instrument	Appropriate Record	OPI/ Position
Unit's Safety Program	SPDET results	Achieve greater than 80%.	Handbook on the SPDET	SPDET corrective action report forms	UGSO
Unit's Safety Program	Number of SSEC meetings per year	Implement a functional SSEC. Committee to meet a minimum of four times annually.	Class SEMS Manual Annex 4B	Meeting Minutes	XO and UGSO
Hazardous occurrence	Quantity and type of injuries and days lost	Reduction of hazardous occurrences. The timely reporting (14 working days) of and proper investigation of all Incidents / Accidents.	Hazardous occurrence statistics	DND663 and CF 98	XO and UGSO
Training	Number receiving safety training, categorized by course	Increase training for personnel holding safety positions in the SSEC. 50% of SSEC members to receive appropriate safety training IAW Annex 4O.	Training statistics	Training records and UERs	XO, Trg Chief and Supervisors
Training	Number personnel having received a GSEAB as a percentage of unit strength.	90% of ship's staff to have received GSEAB every two years. Unit percentage to be reported to MARL/MARP SE annually prior to 15 Apr.	Training statistics	Training records and UERs	UGSO and Trg Chief

Table 2 – ENVIRONMENTAL

Parameter/ Information To Be Monitored	Aspect/ Performance Indicator	Objective/ Target	Method/ Instrument	Appropriate Record	OPI/ Position
ODP and GWP of Halocarbon released	Halocarbon releases	Reduce the frequency and quantity of releases. Demonstrate a downward trend in ODP and GWP of releases.	Preventative maintenance, leak tests and administrative controls	SOP-E03, Annex E03B Halocarbon Service Log SOP-E03, Annex E03C Halocarbon Release Message	NTO and UEnvO
Volume/mass (litres/ kg) or quantity (#) of Hazardous material (HazMat) released	HazMat and Fuel releases	Demonstrate a downward trend in frequency and quantity of releases.	Preventative maintenance, rounds, inspections, spill response equipment and administrative controls	Annex 5D - Department Inspection Report Annex 5E - Inspection of Ship's Books/Logs Annex Plan-P10B – Spill Message Format	NTO, Snr W Eng Tech, UEnvO and UHMC
HazMat Inventory and hazardous waste disposed of	HazMat and hazardous waste	Reduce quantity and number of items in inventory. Report inventory status via HMRA annually by 15 October.	Preventative maintenance, rounds, inspections and administrative controls	Annex 5D - Department Inspection Report Annex 5E - Inspection of Ship's Books/Logs Annex SE01B - HazMat Inventory Form Annex SE01C - Hazardous Waste Disposal Instructions	Dept Reps, UEnvO and UHMC

Parameter/ Information To Be Monitored	**Aspect/ Performance Indicator**	**Objective/ Target**	**Method/ Instrument**	**Appropriate Record**	**OPI/ Position**
Training	Number receiving environment training categorized by course	Improve environmental awareness within the Unit.	Training statistics	Training records and UERs SOP SE1, Annex SE01D - Military/Civilian HazMat Training Qualification Record	UEnvO and Trg Chief
Training	Number personnel having received GSEAB as a percentage of unit strength.	90% of ship's staff to have received GSEAB every two years. Unit percentage to be reported to MARL/MARP SE annually prior to 15 Apr.	Training statistics	Training records and UERs	UEnvO and Trg Chief
Effectiveness of solid waste management (At sea)	Solid waste (at sea)	Ensure that amount of disposable containers and packaging is minimized on board the vessel. Number of plastic disc retained for disposal alongside.	Rounds, inspection and administrative controls	Garbage Record Book, OOW Notebook, LOGREQ Annex E04D - Record of Solid Waste Disposal at Sea	UEnvO, OOW, and Solid Waste Coord
Effluent discharges	Liquid effluent	All effluents (bilge, oily water, and grey, black and ballast water) are managed IAW policy. Reduce number of incidents and duration of overboard BW and GW discharges while alongside.	Rounds, inspection, engineered and administrative controls	OOW Note book SOP-E02, Annex E0B SOP-E02, Annex E02C SOP-E02, Annex E02D SOP-E02, Annex E02E Effluent Pumping Receipts Notifications to MARL/MARP SE (normally e-mail)	NTO and OOW/SWK

Table 3 - Calibration Equipment

Parameter/ Information To Be Monitored	Aspect/ Performance Indicator	Objective/ Target	Method/ Instrument	Appropriate Log	OPI/ Position
Oily water discharge	Liquid effluent (ppm oil)	Discharged IAW policy in approved locations only (5 ppm/15 ppm).	oil content meter, flow meter	Oil content monitor calibration notice TEMMIS database SOP-E02 Annex E02C	NTO
Black water discharge	Liquid effluent (location)	Discharged IAW policy in approved locations only.*	Plant certification	Captain's Ship Book SOP-E02 Annex E02B	NTO
Integrity of halocarbon containing equipment	Halocarbon releases (ppm)	Reduce the frequency and quantity of releases.	Electronic halocarbon leak detector	TEMMIS database	NTO
Gas detection in response to a release	HazMat release	Ensure that response teams are working in environments with appropriate PPE or atmospheric controls.	Multi Gas Detector	TEMMIS database	Snr W Eng Tech and NTO

**Current operational objectives are provided in SOP-E02.*

ANNEX 5B – SAFETY/ENVIRONMENT CONCERNS FORM **YR-Unit-##**

SAFETY/ENVIRONMENT CONCERN OBSERVED:

_____
_____
_____
_____

OBSERVER SIGN AND DATE: _____

DEPARTMENT REPRESENTATIVE (DSER) REMARKS:

_____
_____
_____

DSER SIGN AND DATE: _____

SHIP'S UGSO or UEnvO REMARKS:

_____
_____
_____

UGSO/UEnvO SIGN AND DATE: _____

XO REMARKS:

_____
_____
_____

Approved ☐ / Not Approved ☐ OPI Assigned**:** _____

XO SIGN AND DATE: _____

OPI REMARKS:

_____
_____
_____

OPI SIGN AND DATE: _____

SHIP'S UGSO or UEnvO REMARKS:

_____
_____

SS advised/briefed UGSO/UEnvO SIGN AND DATE: _____

Instructions:

Raised by whomever, when there is a situation that needs to be improved or corrected.

Passed to the DSER as appropriate to review and discuss with the SHOD to determine what action may be required and corrected if possible. If not possible to correct it is forwarded to the UGSO/UEnvO.

The UGSO/UEnvO review the situation and in conjunction with the appropriate SHOD ensures that the root cause of the issue has been corrected or that the action plan is developed to correct the problem. The UGSO/UEnvO shall assign a number to the form as Year-Unit-number (example 07-HDW-03).

The UGSO/UEnvO will brief the XO whom will decide if the action plan is appropriate and make the changes necessary to ensure the concern/issue is appropriately resolved. The XO will designate the OPI.

OPI takes action as prescribed and advises the UGSO/UEnvO. The UGSO/UEnvO will verify the actions and brief/advise ship's staff as appropriate.

Note: All concerns shall be brought forward to the SSEC meetings so that all in attendance may benefit.

ANNEX 5C - RECORDS MASTER LIST

Table 1 – Safety Records

Safety Record	I.D.[1]	Location	Minimum Retention Time (years)	Person Responsible
Annual Safety Reports	1006-1	Admin Files	At least six years	UGSO
Department PPE Inventory List (SOP-S02B)		Dept Files	2	HOD/UGSO
Fall Protection Inventory List (SOP-S05B)		Snr W Eng Tech Files	2	Snr W Eng Tech
Fire/Police Notifications	1006-1	Admin Files	10	UGSO
Hazard Investigation Reports	1006-1	Admin Files	30	UGSO
Hazardous Occurrence Investigation Reports (DND 663)	1006-2/1006-3	Admin Files	10 30 if HazMat exposure	UGSO
Laser Verifications	1006-1	ULSSO Files	1[2]	ULSSO
Laser Firing Log	1006-1	ULSSO Files	1[2]	ULSSO
Laser Inventory	1006-1	ULSSO Files	1[2]	ULSSO
Lockout/Tagout Log (Includes forms in SOP-S04)			1	ULockout/Tagout Coord
RF Safety Control Chits (DND 2145)	1006-1	ULSSO Files	5	URFSO /ULSSO
Radiation Emitters, Inventory, Verifications and Surveys.	1006-1	ULSSO Files	Indefinitely	URFSO/ULSSO
Radiation General Correspondence	1006-1	ULSSO Files	Indefinitely	URFSO /ULSSO
Report on Injury or Exposure to Toxic Material (CF 98)	1006-2/1006-3 also member's pers file	Admin Files	10 30 if HazMat exposure	XO, Ship's Office
Safety COTMs	1006-1	Admin Files	Until superseded	UGSO
Safety General	1006-1	Admin. Files	3	XO
Safe to Work Certificates (SOP-S08B)		NTO Files	1[3]	NTO
Safety training records	4500-1	Dept Files, UGSO Files, Trg Chief Files	Indefinitely	HOD/Trg Chief and UGSO
Significant Incident Reports (SOP-S01B)		Admin Files	Indefinitely	UGSO
SPDET Results	1006-1	Admin Files	3	UGSO
Sports Chit (SOP-S01C)		Member's file	Until member posted	HOD
Tool Inventory, Inspection and Maintenance Log (SOP-S06B)		Dept Files	2	HOD

NOTE:

1 Method of filing is - alpha numeric in reverse chronological order.
2 Retained on ship for one year, and then sent to FLSSO for archiving.

3 Retained on ship for one year, and then sent to FMF Safety.

Table 2 – Environment Records

Environment Record	I.D. [1]	Location	Retention Time (Years)	Person Responsible (Position)
Ballast Water Log (SOP-E02E)	Ballast Water Log	NTO Files	3	NTO
Bilge/Oily Water Log (SOP-E02D)	Bilge/Oily Water Log	NTO Files	3	NTO
Black/Grey Water Discharge	OOW Notebook	NavO	3	NavO
Black/Grey Water Discharge (SOP-E02B)	Black Water/Grey Water Log (Includes E2A)	NTO/Snr Mech Maintainer Files	3	NTO/Snr Mech Maintainer
Chlorination/De-chlorination of Tanks (SOP-E02F)		NTO Files	3	NTO
Completed Fuelling Checklists (See SOP-E01 Annexes)		NTO Files	1	NTO
EFL Request and Approval Fuelling List		NTO Files	3	NTO
Emergency Response Exercises – Fuel and HazMat	Ship's Log/CRRs	Ship's Log/CRRs	3	NavO/OpsO
Emissions Control				
Environment General	1262-1	Admin Files	3	UEnvO
Environmental COTMs	1262-1	Admin Files	Until superseded	UEnvO
Environmental Training Records	Ship's Training Records/UERs/CRRs	Admin Files	3/30/3	UEnvO/Trg Chief/HOD
Firing Orders				
Incinerator Operation				
Solid Waste Discharge	OOW Notebook	NavO	3	NavO
Solid Waste Discharge	Garbage Record Book (Includes E4C)	Solid Waste Coordinator	3	Solid Waste Coordinator
Halocarbon Logs (Includes annexes in SOP-E03)	Halocarbon Logs	NTO Files	5	NTO
Maintenance Records	Engineering Maint Logs	NTO Files	3	NTO

Environment Record	I.D. [1]	Location	Retention Time (Years)	Person Responsible (Position)
Marine Mammal Sighting Record (SOP-E05C1)	Marine Mammal Log	NavO Files	1	NavO
Marine Mammal or Reptile Report Message (SOP-E05C2)	Marine Mammal Log	NavO Files	1	NavO
Operating Log for Oily Water Separator (SOP-E02C)		NTO Files	3	NTO
Post Deployment Reports	3350-10	Admin Files	10	XO
Spill/Release Reports (Fuel/HazMat) – completed (Annex Plan-P01B)		UEnvO Files	5	UEnvO
Spill/Release Reports (Halocarbons) – completed (SOP-E03C)		UEnvO Files	5	UEnvO

NOTE:

1 Method of filing is - alpha numeric in reverse chronological order.

Table 3 – Safety and Environmental Records

Safety and Environmental Record	I.D. [1]	Location	Minimum Retention Time (years)	Person Responsible
Asbestos Inventory		Captain's Ship Book	Indefinitely	NTO
Department Inspection Report (5D)		HOD's Files	3	UGSO/UEnvO
HazMat Inventory (SOP-SE01B)		UHMC Files	3	UHMC
HazWaste Registry (SOP-SE01C)		UHMC Files	3	UHMC
LOGREQ*	Messages for foreign ports	NavO	1	NavO
SSEC Meeting Minutes	1180-1	Admin Files	5	XO
Management Review minutes	1268-1	Admin. Files	5	XO
SDS	SDS Binders		Until superseded	UHMC
PCB Inventory		Captain's Ship Book	Indefinitely	NTO
Safety and Environmental Verification Reports	1268-2	Admin. Files	10	XO
Summary and Technical Investigation Reports	1080-1/1080-Case File #	Admin. Files	3/10	XO

NOTE:

1 Method of filing is - alpha numeric in reverse chronological order.
* Information contained in the LOGREQ is incorporated into the MARPIF update for the port visited

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX 5D – DEPARTMENT INSPECTION REPORT

_____ Department

INSPECTORS: ***include DSER and one supervisor (rank MS or higher)**			
INSPECTION DATE (D/M/Y):			
REPORT COMPLETION DATE (D/M/Y):			
Space	**Observation/Deficiency (Description, Inspectors' initials)**	**Recommended Action (Description, HOD, UGSO/UEnvO initials)**	**Action Complete (Date, UGSO/UEnvO initials)**

Comments:

_____

_____

_____

_____

XO Signature: _____ **Date: _____**

COMPLETION INSTRUCTIONS

Introduction

1. The purpose of the safety and environment inspection report is to standardize inspections throughout the departments, introducing a method that facilitates keeping track of infractions and monitoring corrective action.

2. The Safety and Environment Management is a ship-wide responsibility and is not the sole responsibility of the Ship's Safety and Environment Committee (SSEC). The role of the SSEC is management, co-ordination and review of the overall safety and environment programs, not to personally carry out all safety and environment program functions. The Departmental Inspection Report is designed to get more of the ship's company involved in safety and environment issues, which is the bare minimum required for a successful program. It is also designed with the intention that sufficient action and follow-up action is verifiably taken, and that someone can be held accountable for that action. It is to be submitted to the Head of Department (HOD), as it is he/she who is ultimately responsible for safety within his/her department.

The Inspection

3. Where applicable, each departmental inspection report is broken down into spaces by section. A supervisor of that section who is familiar with the spaces being inspected is to complete the inspection.

The Inspection Report

4. The Departmental Inspection Report is to be actioned within 10 days. If complete rectification is not possible within this timeframe, any actions taken (i.e. a Work Order (WO) or UCR) that are meant to eventually resolve infractions are to be detailed. An update, on ongoing unrectified infractions and/or deficiencies, is to be included in each monthly report.

5. The S/HOD will review all inspections reports. If a deficiency is noted, the S/HOD will discuss the action plan with the UGSO/UEnvO. This is to ensure that the S/HOD can be confident that deficiencies identified within his or her department are being given the proper attention and are on the road to correction. Once the deficiencies have been corrected the XO reviews, signs and returns the inspection report to the UGSO/UEnvO.

Inspection Report Field Descriptions

6. The following is a description of the different fields of the Inspection Report. The fields that require a signature, initials or a date are indicated on the Inspection Report document.

Observation/Deficiency:

A brief, but detailed description, by the inspectors of any deficiency or the potential of any future deficiency. This section includes observations for deficiencies observed in previous months that have yet to be rectified.

General observations that do not necessarily require action are also welcome in this block.

Recommended Action:

The S/HOD and UGSO/UEnvO are to develop and initial the approved recommended action.

Action Complete:

Once the infraction or deficiency has been rectified, the S/HOD and UGSO/UEnvO are to date and initial accordingly.

ANNEX 5E – INSPECTION OF SHIP'S BOOKS/LOGS

Reference: NAVORD 1000-6: Inspection of Ship's Books by Commanding Officer

1. The table below indicates the frequency that the ship's books and logs are to be inspected and signed, and the person responsible. Annex 5E Appendix 1 template is to be used and placed at the front of each ship's books and logs to show when the document was reviewed:

SOP	SOP Name	Log Description	Responsibility	Frequency
E1	Fuelling	Fuelling Reports Log	CO	Quarterly
E2	Liquid Effluent Management	Black Water/Grey Water Log	CO	Semi-annually
E2	Liquid Effluent Management	Oily Water Separator Log	CO	Semi-annually
E2	Liquid Effluent Management	Ballast Log	CO	Semi-annually
E2	Liquid Effluent Management	Bilge/Oily Water Log	CO	Semi-annually
E3	Halocarbon Management	Halocarbon Log	NTO CO	Monthly Quarterly
E5	Marine Mammals and Reptiles	Marine Mammal Log	CO	Semi-annually
SE1	HazMat/HazWaste Management	HazMat/HazWaste Log	CO	Semi-annually
S1	Hazardous Occurrence Investigation and Reporting	CF98 & DND663	CO	Ongoing process, regulations require CO's to review and sign every report.
S2	Personal Protective Equipment (PPE)	PPE Control Log	HOD	Annually
S2	Personal Protective Equipment (PPE)	PPE Inventory List	HOD	Annually
S3	Respiratory Protection Program (RPP)	Compressed Breathing Air System – Air Purity Log	CO	Semi-annually
S3	Respiratory Protection Program (RPP)	Fit Test Log	XO/Snr Mech Maintainer	Annually
S4	Lockout/Tagout	Lockout/Tagout Log	NTO/CO/UGSO	Monthly Quarterly
S5	Fall Protection and Elevated Structures	Fall Protection Inventory	HOD	Annually
S6	Tool Safety	Tool Inventory	HOD	Annually
S10	Laser Safety	Laser Inventory	NTO	Annually
S11	Radiation Safety	IRS Logbook	URadSC	Annually
S13	High Voltage Switching Program	Switchboard Register	AE/CO	Monthly Quarterly
	Incinerator	TBD	TBD	TBD
	Emission Controls	TBD	TBD	TBD

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX 5E APPENDIX 1 – SIGNATURE PAGE FOR BOOKS/LOGS REVIEW

Reviewer	Date Reviewed	Reviewer's Signature	Comments

ANNEX 6A - INSTRUCTION FOR CONDUCTING A MANAGEMENT REVIEW

PURPOSE

1. To describe the procedures ship's staff use to conduct a SEMS Management Review to meet the requirements of the Formation SEMS for CSA Z1000-14 Clause 5: Management Review and Continual Improvement and ISO 14001:2015 Clause 9: Performance evaluation.

SCOPE

2. The instruction applies to all ships and outlines the concepts of the ship management review.

RESPONSIBILITIES

3. The Commanding Officer conducts a management review of the Ship Class SEMS, and reports the results up the Chain of Command. The normal forum for the review is the Ship's Safety and Environment Committee (SSEC).

4. The XO is responsible for providing the input material for the management review.

INSTRUCTION

5. Conducting a management review involves three steps:

   a. Scheduling;

   b. Preparing for Management Review; and

   c. Conducting the Meeting.

The activities within each step are discussed below.

Scheduling

6. The Ship Class SEMS management review is conducted annually no later than the end of April at a meeting of the SSEC convened for this purpose. The CO presents the results of the ship's management review, with other COs from the Fleet, at a meeting of the Fleet Safety and Environmental Management Committee (FltSEMC). This occurs annually around the mid-May timeframe.

7. Since there is a high potential for conflicts between time commitments, and since it takes time to assemble the review material, it is recommended that the various meeting dates be set by the end of February.

Preparing for Management Review

8. The reporting period of the management review is the fiscal year, 01 April – 31 March. The management review involves collecting information on the ship's safety and environmental performance during the fiscal year, the review of this by an appropriate committee, followed by an evaluation to determine whether the Ship Class SEMS is suitable, adequate and effective. Proposed revisions to the

policy, the SEMS manual, training statistics and updates to the safety hazards/environmental aspects are also discussed. Ships also report the status of objectives/targets and SEMPs.

9. The ship management reviews will be prepared as a written report with a supporting PowerPoint presentation and sent to the MARL/MARP SE one to two weeks prior to the FltSEMC.

10. The XO, with support from the UGSO and UEnvO, is responsible for collecting the material for review, and distributing it, with an agenda, to committee members, HODs and the CO. This is be done approximately one month before the meeting date. The material for review can include, but is not limited to, the following:

a. proposed changes to the policy and other parts of the management system;

b. updated safety hazards/environmental aspects lists identifying those that are considered significant;

c. status of relevant objectives and targets from the previous fiscal year;

d. legislative and other pressures and proposed objectives and targets for current fiscal year;

e. safety/environmental training statistics;

f. incident/accident reports;

g. safety statistics including number of time lost accidents and time lost, etc.;

h. average number of personnel on unit strength;

i. result(s) of internal and external verifications, inspections and investigations, including the SPDET;

j. number and volume of fuel/HazMat spills;

k. number, amount and ozone depleting potential of halocarbon releases;

l. performance of the Solid Waste and HazMat Management Programs; and

m. other indicators of safety/environmental performance.

11. For MARLANT units, the safety/environmental performance data to be collected is listed as a "fill-in-the-blanks" form that is found in the MARLANT SEMS Manual Annex 6A, Appendix 1. Guidelines for providing the safety performance data requested in the form are found in MARLANT SEMS Manual Annex 6A, Appendix 2. The completed Annex 6A Appendix 1 is to be included with the written management review report that is submitted to MARL/MARP SE.

Conducting the Meeting.

12. The meeting agenda includes:

a. review/revise updated list of safety hazards and environmental aspects;

b. review/revise policy;
c. status of achievement of objectives/targets and SEMPs;
d. need for any other changes to the management system;
e. proposed objectives and targets for current fiscal year; and
f. any other business.

13. The CO conducts the ship's management review. The SSEC evaluates the entire information and reaches consensus on whether the Ship Class SEMS is suitable, adequate and effective. The results of each ship's management review will be presented by the ship's CO to the FltSEMC.

INFORMATION FOR FLTSEMC

14. FltSEMC presentations are scheduled by Ship Class and a summary of the results for each class will be prepared by MARL/MARP SE and presented to the MARL/MARP SEMC. The output from the review must be documented, and retained as a record. The information presented should include but is not limited to:

Overall:

a. status of objectives and targets and any proposed changes;

b. proposed changes to the hazards and aspects list;

c. proposed changes to the policy;

d. proposed changes to the SEMS documentation;

e. status of significant NCRs;

f. percentage of personnel that are current with GSAB and GEAB;

g. lessons learned, best practices and any safety/environment awards presented; and

h. findings with respect to the suitability, adequacy and effectiveness of the SEMS at the unit level.

Safety:

a. average number of personnel on unit strength;

b. total number and type of hazardous occurrences with associated time lost for each;

c. number of personnel who received Safety Training and the number of personnel who require Safety Training; and

d. number of Safety Hazards that were identified and their status/disposition.

Environment:

a. number of Fuel/HazMat spills and volume spilled;

b. number of Halocarbon releases, amount released and Ozone Depleting Potential of the releases; and

c. number of personnel who have received Environment Training and the number of personnel who require Environment Training.

COMMAND LEVEL REVIEW

15. An annual Safety and Environmental Report detailing the Formation's safety and environmental performance is prepared by MARL/MARP SE and given to MARL/MARP SEMC members as input for the review process.

16. The ACOS Mat/BComd presents the overall results of the Formation Management Review to the Formation Commander and A/CMS at ECM and Royal Canadian Navy Safety and Environmental Management Committee (RCN SEMC) meetings respectively.

RECORDS

Minutes of SEMS Management Review meetings
Appropriate Memorandums
See also Records Master List - Part 1, Annex 5C

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

STANDARD OPERATING PROCEDURE SOP-S01

HAZARDOUS OCCURRENCE INVESTIGATION AND REPORTING

Purpose

1. This procedure outlines the requirements and procedures for hazardous occurrence investigation and provides instructions on when it is necessary to complete and process the DND 663 DND/CF General Safety Hazardous Occurrence Investigation Report and CF 98 Report on Injuries or Exposure to Toxic Material.

2. The purpose of a hazardous occurrence investigation is to find the cause(s) of the hazardous occurrence, and to use that information to develop corrective actions to prevent similar hazardous occurrences from recurring. Hazardous occurrence investigations must not be used to assess blame.

3. The purpose of off-duty safety is to provide direction and assign responsibility for implementing the off-duty hazardous occurrences and physical fitness safety procedures to maximize the safety of all military personnel.

Scope

4. This SOP applies to all ships of this class under the jurisdiction of the Commander Maritime Forces Atlantic and Commander Maritime Forces Pacific.

Definitions

5. The following definitions are used within this SOP:

Term	Definition
Hazardous Occurrence	An undesirable event, which results in, or has the potential to result in, injury or illness to personnel, material losses and/or property damage, and includes the following terms: a. Accident - an undesired event that results in physical harm or occupational illness to a person, or damage to materiel, works or buildings; b. Incident - an undesired event (commonly referred to as a near miss) that could, but does not, result in physical harm or occupational illness to a person, or damage to materiel, works or buildings; and c. Serious Hazardous Occurrence - an event that has resulted in, or could have resulted in, a very serious injury to any person covered by the General Safety Program.
Disabling Injury	A work-related illness or injury that prevents the person from returning to work for his/her next regular shift.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Non-disabling Injury	A work-related illness or injury that results in medical attention beyond first aid, but involves no lost time beyond the day, shift or watch on which the injury occurred.
First Aid	Treatments of a minor scratch, cut, burn, etc., which does not result in subsequent medical attention by a physician. It does not include suturing, use of specialized equipment or use of prescription medicines.
Days Lost	The number of days a person should have worked at his/her normal duties but could not because of a work-related illness or injury (the day of the work injury and the day the injured person resumes duty are not included). Days lost are categorized as days off duty when the individual remains absent from the workplace and days on light duties when the individual is present at the work place but not able to carry out his/her normal duties.

Responsibilities

6. Commanding Officer (CO):

   a. The CO is the final responsibility for hazardous occurrence investigation and prevention, and must set unit policies.

7. Unit General Safety Officer (UGSO):

   a. The UGSO is responsible for ensuring that hazardous occurrence investigations are properly conducted and that all recommendations are carried out;

   b. The UGSO must ensure that there are sufficient personnel within the unit that have been trained in safety and hazardous occurrence investigations; and

   c. The UGSO coordinates tasks related to off-duty safety.

8. Supervisor:

   a. The Supervisor carries much of the responsibility for safety in the department and initiates the hazardous occurrence investigation.

Procedure

REQUIREMENT

9. In accordance with reference A, the ship's CO shall ensure that all on duty hazardous occurrences are investigated. Different reports are required depending on the status of the person injured and the nature of the injury incurred as a result of the on-duty hazardous occurrence. These reporting requirements are set out in Chapter 4 Section 3 of reference A.

10. Hazardous occurrences resulting in a fatality, a disabling injury or other circumstances listed in Chapter 4, paragraph 45 of reference A must be reported. These serious accidents must be reported to the CO, Formation Commander and MARL/MARP SE immediately after the occurrence of the accident,

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

IAW the procedures in the section labelled Significant Incident Reports starting at paragraph 30 of reference A.

11. All hazardous occurrences, including lock out/tag out, arc flash or high voltage, confined space, working at height or fall and ionizing radiation exposure incidents, are to be reported using the message format provided in Annex SOP-S01D. This message is to be completed and released within 24 hours of the occurrence.

12. The DND 663 form is to be completed for all hazardous occurrences and forwarded to MARL/MARP SE within 14 calendar days in accordance with references A and D. The unit is to retain the original for 10 years. If the hazardous occurrence is due to an exposure of a toxic substance, the unit will retain the record for 30 years.

13. All personnel who could potentially be involved in a hazardous occurrence investigation are highly recommended to attend a Hazardous Occurrence Investigation Course; MARL/MARP SE facilitates this course. Additional information regarding training and assistance with hazardous occurrence investigation and/or the preparation and submission of the required forms may be obtained from the MARL/MARP SE.

14. The following forms are used to report hazardous occurrences and to report on hazardous occurrence investigations:

a. Hazardous Occurrence Message – used to report all hazardous occurrences within 24 hours of occurrence happening;

b. DND 663 - DND/CF General Safety Hazardous Occurrence Investigation Report – used to report military and civilian hazardous occurrence investigations; and

c. CF 98 – "Report On Injuries Or Exposure To Toxic Material" – used for possible future medical pension information and other reasons for military personnel. Completion is self- explanatory.

HAZARDOUS OCCURRENCE INVESTIGATION PROCEDURE

15. A hazardous occurrence investigation should begin immediately, or as soon as possible, after the hazardous occurrence. Investigations should not be limited to serious accidents. Near misses, incidents, and property damage are all signals to initiate a thorough investigation before something more serious happens. They should always take place at the scene of the hazardous occurrence. However, also look at any other locations where additional information might be available. Investigators should be trained in hazardous occurrence investigation. A useful hazardous occurrences investigation pocket guide has been developed for DND and should be consulted.

16. Personnel involved in the accident investigation are as follows:

a. Immediate Supervisor - the immediate supervisor shall initiate the hazardous occurrence investigation by contacting the UGSO;

b. Injured Person - the injured person will often have firsthand details about the hazardous occurrence and may be able to contribute valuable information to investigators;

c. Witnesses – both direct and indirect witnesses (i.e. other personnel doing the same job) can often contribute valuable information to an investigation; and

d. Unit General Safety Officer - the XO normally assigns the hazardous occurrence investigation to a member(s) of the organization. Besides assisting in the investigation itself, the UGSO can contribute to the investigation by coordinating the activities of the investigation, analyzing reports, and planning programs to prevent recurrences.

COMPLETION OF FORMS

17. For relatively minor work-related occurrences, including those that occur during section sponsored activities, the investigator can be the supervisor of the person or function involved.

18. For hazardous occurrences occurring during authorized sports, a fitness instructor should assist with the investigation if available, though the supervisor must initiate the report.

19. For all other hazardous occurrences, the investigation should be assigned to a unit member(s), other than the supervisor, who is trained in hazardous occurrence investigation. Normally, but not always, the investigator would be a member of the Ship's Safety and Environmental Committee (SSEC).

20. After completion of parts 1 to 8 and 10 of form DND 663, the form is passed to the SSEC or Departmental Representative for comments and signature in part 9. When the investigator is a Fitness Instructor, the Fitness and Sports Director or the Facilities Coordinator will complete this part. The form is subsequently forwarded to the section head for review then to the UGSO for comment, who will also check for completeness and accuracy before submitting to the Commanding Officer for review and comment.

21. As a minimum, form DND 663 shall be completed whenever there is an on-duty occurrence, which results in:

a. a death;

b. a disabling injury;

c. a non-disabling injury;

d. a loss of consciousness due to exposure to any oxygen deficient or toxic atmosphere or electric shock;

e. the implementation of rescue, revival or similar emergency procedure;

f. an occurrence which results in an unplanned fire or explosion that puts at risk or injures a person; or

g. a hazardous occurrence that results in material or property damage in excess of $500 and had the potential to kill or seriously injure someone.

22.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

23. In addition to the mandatory requirements for completion of form DND 663 listed above, units are urged to investigate and submit DND 663s and a hazard occurrence message for the following:

a. accidents that caused property or had the potential to do so;

b. incidents that did not kill or injure someone, but had the potential to do so; and

c. off duty accidents that resulted in non-disabling and disabling injuries.

24. If in doubt about the requirement for a DND 663, generate a hazard occurrence message and request MARL/MARP SE feedback regarding the requirement to complete a DND 663..

25. General Safety Hazardous Occurrence Investigations are not conducted for the occurrences listed in chapter 4, paragraph 5 of reference A. However, in occurrences where there is an injury or occupational illness, the investigation is conducted and reported by the specialist safety program but the injuries and/or occupational illness are reported through the General Safety Program. This ensures that records of the injuries or occupational illness are included in the national database for DND and CF personnel.

26. Form DND 663 should be typed. All signature blocks shall have the names either printed or typed as well as being signed.

27. A separate DND 663 is required for each person injured in an accident however, only a single hazard occurrence message is required. The same report serial number shall be used for a single occurrence that causes injury to more than one individual.

SIGNIFICANT INCIDENT REPORTS

28. Significant Incident Reports (SIRs) are required when a hazardous occurrence leads to:

a. the death of a person;

b. disabling injuries to two or more people;

c. the loss by a person of a body member or part thereof or the complete loss of the usefulness of the body member or part thereof;

d. the permanent impairment of a body function of a person; or

e. an unplanned explosion that puts personnel at risk or causes injury.

29. The CO, Formation Commander, and MARL/MARP SE shall be immediately informed of all serious accidents. Such accidents are to be reported by priority message in accordance with reference E using the SIR message template at Annex SOP-S01B. MARL/MARP SE is required to report all serious accidents to NDHQ within 24 hours of the accident.

30. Military casualties and unusual occurrence casualties (multiple deaths or multiple injuries involving DND civilians and dependants) are reported in accordance with references D and G.

31. If the person(s) involved are civilian employees, there is a legal requirement to report to Human Resources and Skills Development Canada (HRSDC) within 24 hours through MARL/MARP SE.

32. In addition to the above-mentioned serious accidents, the following must be reported to the Unit CO and MARL/MARP SE:

a. all injuries involving either military personnel or civilians that result in a 911 call being placed;

b. all injuries requiring medical attention beyond first aid; and

c. injuries attended to by the first aid attendant that requires either military personnel or a civilian employee to be transported to a medical facility other than a personal doctor.

33. Note: MARL/MARP SE will do the reporting to NDHQ/D Safe G if requested by the unit.

OFF-DUTY SAFETY

34. It is in everyone's interest that members are safe while off duty so that they are able to perform when they are on duty. Accidents that occur off duty are to be reported to the individual's supervisor and a CF 98 is to be completed as per reference I. If any recommendations can be made to lessen the risk to other members, they are to be passed on in Routine Orders.

35. Articles that relate to seasonal activities should be distributed as necessary on the Ship's Safety Notice Board, such as skiing, hunting, ice-fishing, swimming, hiking, camping, etc. Briefs that relate to off-duty activities should be part of the weekly five-minute safety briefs.

PHYSICAL FITNESS SAFETY

36. Ship's members shall request authorization to participate in physical activities from home to work and return, and after working hours as part of the physical fitness program. A sample of a sports chit is attached as Annex SOP-S01C. Completed sports chits are retained on the member's pers file.

37. Injuries that occur during on-duty/approved sports are to be treated as any other accident/incident. Supervisors will be required to conduct an investigation as per reference I and complete form DND 663. Consideration shall be given for a PSP Sports and Fitness Staff to be a participant during the investigation.

Procedure Performance Criteria and Records

DND 663
CF 98
Significant Incident Report Message
Sports chits (shall be retained as records by the Unit on the member's file until they have been posted).
Hazardous Occurrence Message

Attachments

Annex SOP-S01A - Hazardous Occurrence Investigation and Reporting References
Annex SOP-S01B - Significant Incident Report Message for Serious Accidents
Annex SOP-S01C - Sports Chit
Annex SOP-S01D - Hazardous Occurrence Message Format

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S01A

HAZARDOUS OCCURRENCE INVESTIGATION AND REPORTING REFERENCES

A. Volume 1 of A-GG-040-001/AG-001, DND General Safety Program: Policy and Program, Chapter 4 – Hazardous Occurrence, Investigation, Reporting and Analysis
B. Volume 2 of C-02-040-009/AG-001 DND General Safety Program: Standards, Chapter 23 – Accident Investigation and Reporting Safety Standard
C. DAOD 2007-1, General Safety Program
D. DAOD 2008-3, Issue and Crisis Management
E. CFAO 24-1, Casualties – Reporting and Administration
F. DAOD 5023-2, Physical Fitness Program
G. QR&O Chapter 21 Section 6, Personal Injuries and Death
H. DAOD 7002-3, Subjects of Investigation and References
I. DAOD 5018-2, Report of Injuries and Exposure to Toxic Substances

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S01B

SIGNIFICANT INCIDENT REPORT MESSAGE FOR SERIOUS ACCIDENTS

The significant incident message format for serious accidents is as follows:

FROM: HMCS (SHIP)

For East Coast Units	*For West Coast Units*
TO: MARLANTHQ HALIFAX//N48//	TO: MARPACHQ ESQUIMALT//FSE//
INFO: MARLANTHQ HALIFAX//N00	INFO: MARPACHQ ESQUIMALT//J00/ J02/J3
COMD/N4 MAT/ N02PA//	MAR/J02 SSO ADMIN/J02PA//
	MOC ESQUIMALT
COMCANFLTLANT	COMCANFLTPAC
NDCC OTTAWA	NDCC OTTAWA
	(See note 2)

SIC: LAL
SUBJ: SIGNIFICANT INCIDENT REPORT (CONCISE DESCRIPTION OF THE INCIDENT)

A. DTG AND LOCATION OF SIGNIFICANT INCIDENT
B. NAME, LOCATION AND TELEPHONE NUMBER OF PERSON OR AGENCY INITIALLY REPORTING INCIDENT
C. WHO OR WHAT WAS INVOLVED, WHAT HAPPENED AND HOW IT HAPPENED
D. NAME OF THE PARENT UNIT AND SPECIFIC INFORMATION CONCERNING THE PERSONS AND EQUIPMENT INVOLVED
E. ANY POSSIBLE BROADER IMPLICATIONS OF THE INCIDENT, INCLUDING THE EFFECT ON FUTURE OPERATIONS
F. LOCAL PUBLIC AFFAIRS ACTIONS, RECOMMENDATIONS AND PROPOSED FURTHER ACTION
G. DETAILS OF ACTUAL AND PROBABLE MEDIA INTEREST AND INVOLVEMENT, INCLUDING NUMBER OF MEDIA CALLS, INTERVIEWS AND INFORMATION REQUESTS, AND WHETHER THE MEDIA WERE NATIONAL, LOCAL OR INTERNATIONAL

NOTES:

1. Refer to DAOD 2008-3 for further clarification on completing the SIR.
2. Issues and significant incidents with implications on domestic operations will include LFWA DET ESQUIMALT as an information addressee.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S01C

SPORTS CHIT

HMCS (*Ship's Name)* 5190-1 (*Service number*)

(*Date*)

Commanding Officer

AUTHORIZED PHYSICAL TRAINING/SPORTS ACTIVITY

Refs: A. DAOD 5023-2 Physical Fitness Program
DAOD 5045-0, Canadian Forces Personnel Support Programs
FORCE Evaluation

1. As per refs A and B, I _____ request
(SN, rank, name, initials, MOC)
permission to participate in physical activities from home to work and return and after working hours.

2. The activities requested are _____.

3. These activities will help me maintain an acceptable level of physical fitness and will assist me in improving my FORCE Fitness Profile.

_____
Member's signature

_____ Recommended/not Recommended
Chief of Department

_____ Recommended/not Recommended
Head of Department

_____ Approved/not approved
Executive Officer

1 copy to PERS file, 1 copy to member

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S01D

HAZARDOUS OCCURRENCE MESSAGE FORMAT

The message format for hazardous occurrence reporting is as follows:

FROM: HMCS (SHIP)

For East Coast Units
TO: MARLANTHQ HALIFAX//N48//
INFO: FMF CAPE SCOTT (if FMF workers involved)

For West Coast Units
TO: MARPACHQ ESQUIMALT//FSE//
INFO: FMF CAPE BRETON (if FMF workers involved)

SIC: LAL
SUBJ: HAZARDOUS OCCURRENCE REPORT
REF:

A. DTG OF OCCURRENCE
B. DESCRIPTION OF THE OCCURRENCE
C. CASUALTIES OR EQUIPMENT DAMAGE
D. CORRECTIVE ACTION TAKEN AND ACTION PLAN TO PREVENT FURTHER OCCURRENCES
E. TI OR SI REQUIRED
F. ADDITIONAL COMMENTS
G. COMMANDING OFFICER (Name/Rank/Contact Number)

NOTES:

1. All hazardous occurrences, including lock out/tag out, arc flash or high voltage, confined space, working at height or fall and ionizing radiation exposure incidents are to be reported via this message format.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

STANDARD OPERATING PROCEDURE SOP-S02

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Purpose

1. To provide direction in the use of Personal Protective Equipment (PPE) to ensure that when an employment hazard cannot be eliminated or controlled within accepted safe limits, injuries are prevented or reduce in severity.

Scope

2. This SOP applies to all ships of this class under the jurisdiction of the Commander Maritime Forces Atlantic and Commander Maritime Forces Pacific.

Definitions

3. The following definitions are used within this SOP:

Term	Definition
PPE	Safety materials, equipment, systems, devices and clothing whose purpose is to protect from injury or illness.
Respiratory Protection Device (RPD)	Any device that is worn to protect the quality of air entering the person's respiratory system.
Qualified Person	In respect of a specified duty, a person who because of their knowledge, training, and experience, is qualified to perform that duty safely and properly exercising due diligence.
Safety Restraining Device	Any safety belt, safety harness, seat, rope, belt, strap or life-line designed to be used by personnel to protect that person from falling, and includes every fitting, fastening or accessory.
Supervisor	A qualified person appointed by management to ensure the safe and proper conduct of an operation or of the work of personnel.

Responsibilities

4. <u>UGSO</u>:

   a. Responsible for ensuring that departments maintain a list of PPE holdings;

   b. Ensuring that PPE is inspected regularly;

   c. Ensuring that departments are issuing PPE;

   d. Confirming personnel are properly trained;

e. Coordinating the training as required; and

f. Assisting departments in maintaining the PPE documentation.

5. Supervisors:

a. Ensure inspections and consultations with personnel are conducted to confirm the appropriate PPE is being used; and

b. If required, replace the PPE before proceeding with any work. Personnel are to report any damaged PPE to the supervisor.

6. Each Department:

a. Appoint a qualified person to ensure personnel safely, properly and appropriately use PPE;

b. Ensure personnel are instructed and properly trained on the fitting, use, inspection, preventive maintenance of the PPE that they will employ, and train personnel to effectively deal with emergency situations;

c. Ensure that all PPE worn or used by any personnel shall not in itself create an employment hazard. PPE shall as much as possible not add to the total heat burden. Where PPE adds to the total heat burden, rest periods shall be routinely provided and the employer shall ensure that personnel take those rest periods;

d. Ensure that all PPE:

(1) is stored, maintained, inspected and tested by a qualified person for the purpose of ensuring that it is in a safe and fully useable condition at all times;

(2) in cases of defective equipment that may render it unsafe for use, is marked or tagged as unsafe and removed from service; and

(3) in cases of defective equipment, is repaired by a qualified person to ensure that the equipment is in safe and fully effective condition, or permanently removed from service; and

e. Keep and make available a record, in the Department PPE Inventory List - Annex SOP-S02A, of all PPE provided to personnel for as long as the equipment is in use. A copy of Annex SOP-S02A is to be forwarded to the UGSO.

7. Personnel shall not commence a work assignment or enter a work area where any kind of PPE is required to be worn unless the member:

a. is wearing or using that kind of PPE in the proper manner;

b. has been instructed and trained in the proper use of that PPE; and

c. has visually inspected that PPE to ensure that, as far as reasonably practicable, it will protect them against the hazards of their employment.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

8. The use of PPE must be enforced by all personnel. Where necessary, additional training and supervision shall occur to ensure PPE is being properly used.

Procedure

GENERAL

9. All potential hazards that were identified should be properly reviewed by supervisors and the SSEC so as to eliminate them by means other than PPE. For example, substitution, ventilation, guarding, isolation, automation, procedural or process change, etc., should be utilized since PPE should be considered as the "last resort" and used only when all other avenues of approach do not satisfactorily control the hazard. PPE must be periodically evaluated by the line organization (supervisors) as changes in the system, technology, etc., will change the type and nature of the hazards. Part I, Annex 3A of the Formation SEMS manual can be used in this evaluation.

DETERMINING CORRECT PPE

10. The correct type of PPE for each work type and area is prescribed by government agencies and meets the applicable standards such as CSA. Documents indicating the required safety precautions for that particular work unit include the correct type of PPE to be used. Some PPE items have an NDHQ Life Cycle Material Manager (LCMM) who is responsible for the overall life cycle of that particular item. In addition, general safety and medical officers may provide advice. PPE is procured through normal logistics channels, ensuring that the appropriate standards are quoted and complied with. The proper PPE required for the hazard is identified with the assistance of specialists such as medical, industrial hygiene, safety, etc. The following are the more common types of PPE:

a. Head Protection. They should be properly fitted and inspected periodically for checks, scratches, and cracks;

b. Eye Protection. Correct eye protection should be matched to the hazard, e.g., chipping, chemical splash, and general protection. The list includes safety glasses, mono-goggles and face shields. The policy and procedures to obtain safety and prescription safety glasses are found in reference A;

c. Foot Protection. Protective footwear is issued to military personnel and should be periodically inspected for tread wear;

d. Hand Protection Devices. There are a variety of gloves available to protect against various hazards, i.e., chemicals or toxins, meat cutting, handling lumber or metal, electrical, etc. They must be matched to the hazard and inspected prior to use to ensure their serviceability. Electrical gloves shall be listed, inspected, and tested every six (6) months as per Reference A, Chapter 14, Annex D;

e. There are a variety of respiratory hazards from common dust to lethal gases. The appropriate mask, respirator, or pressure breathing apparatus must be matched to the hazard; and

f. Hearing Protection. Depending on the level and duration of the noise, personnel are required to use earplugs, ear defenders, or a combination of both and be time-limited to exposure as per Reference A, Chapter 10, Annex A.

g. Arc Flash Protection. The requirements for Arc Flash Protective Equipment is prescribed in Ref. B. Note that it overlaps with other forms of PPE such as hearing, head, hand and others.

CONSULTATION WITH SPECIALISTS

11. If questions or concerns regarding the appropriateness of PPE arise, contact MARL/MARP SE through the UGSO.

Procedure Performance Criteria and Records

Department PPE Inventory List

Attachments

Annex SOP-S02A – Personal Protective Equipment References
Annex SOP-S02B – Department PPE Inventory List

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S02A

PERSONAL PROTECTIVE EQUIPMENT REFERENCES

A. C-02-040-009/AG-001, General Safety Program, General Safety Standards, Chapter 14 - PPE
B. Hary DeWolf Class ARC FLASH Bulletin

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S02B

DEPARTMENT PPE INVENTORY LIST (Add rows as required)

Department: _____

HEARING PROTECTION							
Control Number	Type	Number on Hand	Date of Purchase	Date Inspected	User	Date Maintained	Maintained By (Init.)
FOOT PROTECTION							
Control Number	Type	Number on Hand	Date of Purchase	Date Inspected	User	Date Maintained	Maintained By (Init.)
EYE PROTECTION							
Control Number	Type	Number on Hand	Date of Purchase	Date Inspected	User	Date Maintained	Maintained By (Init.)
HAND PROTECTION							
Control Number	Type	Number on Hand	Date of Purchase	Date Inspected	User	Date Maintained	Maintained By (Init.)
RESPIRATORY PROTECTION							
Control Number	Type	Number on Hand	Date of Purchase	Date Inspected	User	Date Maintained	Maintained By (Init.)
HEAD PROTECTION							
Control Number	Type	Number on Hand	Date of Purchase	Date Inspected	User	Date Maintained	Maintained By (Init.)

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

STANDARD OPERATING PROCEDURE SOP-S03

RESPIRATORY PROTECTION PROGRAM

Purpose

1. To provide direction and assign responsibility for the implementation of the Respiratory Protection Program (RPP). This SOP includes instructions for testing, wearing, and maintenance of respiratory protection devices.

Scope

2. This SOP applies to all ships of this class under the jurisdiction of the Commander Maritime Forces Atlantic and Commander Maritime Forces Pacific. This SOP is applicable to both closed and open circuited Self-Contained Breathing Apparatus (SCBA) and Air Purifying Respirators (e.g. disposable, quarter-mask face piece, half-mask face piece, and full-mask face piece).

Definitions

3. The following definitions are used within this SOP:

Term	Definition
Respiratory Protection Device (RPD)	Commonly referred to as respirator - a device to protect the user from inhaling a hazardous atmosphere
Compressed Breathing Air System	An assembly of various components such as air intake, ambient air system, compressor, purification system, receiver, cylinder, proportioning system, piping, fittings, compressed breathing air pipeline, control equipment, etc., required to produce and/or deliver compressed breathing air to the point of use.

Responsibilities

4. Overall responsibility for the Formation RPP rests with the Formation RPPA. For MARLANT and MARPAC units, the Formation RPPA is Formation Fire Services.

5. Units that use respiratory protection equipment must hold copies of all of the references. This procedure is to be read in conjunction with the applicable sections of the above references.

6. It is the responsibility of each department to ensure that personnel are using the appropriate respirator and have been properly fit tested for assigned tasks.

7. Supervisors, the Unit RPPA and the UGSO are to conduct regular workplace inspections to ensure that respiratory protection devices are being used IAW the requirements of references A and C.

8. Any concerns should be brought to the attention of the supervisor and Unit Respirator Protection Program Administrator (RPPA). Note that on the HARRY DEWOLF class ships, the RPPA is the Senior Mechanical Maintainer.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Procedure

GENERAL

9. Where there is an oxygen deficient atmosphere in the work place, or a hazard of an airborne hazardous substance that cannot be controlled through engineering controls, a respiratory protection device shall be used, in accordance with references A and D and the applicable safety data sheet (SDS).

USE OF RESPIRATOR

10. Respirators shall be used in accordance with the following:

a. respirators shall be selected based on the applicable hazard. These hazards are to be determined by the Ships Safety and Environment Committee (SSEC) and in consultation with the Formation Preventive Medicine (P Med) section; and

b. there shall be an assortment of sizes of respirators available to meet the unit's needs.

RESPIRATOR FIT TEST

11. All personnel shall be fit tested and issued respirators IAW the instructions in reference D. Specifically:

a. personnel are to be clean shaven where the sealing surface of the respirator comes in contact with the face for fit testing;

b. personnel are fit tested at least every two years, however it is recommended to conduct fit tests annually;

c. a wallet sized fit test record shall be issued to each tested and trained member. This card is used to obtain the correct size, type and manufacturer of RPD which he/she has been fit tested and trained on;

d. units that conduct in house fit testing shall forward a copy of the fit test to the Formation RPPA. Military personnel shall have the date of fit testing and training entered in their PERS File; and

e. fit test is considered invalid if member does not remain clean shaven where the sealing surface of the respirator comes in contact with the face for fit testing and use.

TRAINING

12. Personnel shall be instructed in the following:

a. hazard recognition, the dangers associated with respiratory hazards;

b. the proper use of respirators and their limitations;

c. cleaning and sanitizing procedures of respirators; and

d. the proper care and use of respiratory equipment.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

CARE AND USE OF RESPIRATORS

13. All respirators shall be cleaned, sanitized and stored as follows:

    a. respirators shall be regularly cleaned and sanitized in accordance with the manufacturer's instructions;

    b. respirators used by more than one user shall be cleaned and sanitized after every use;

    c. facilities are to be available to clean and sanitize respirators; and

    d. respirators are to be stored in a manner that prevents deterioration and deformation of the face pieces, straps and other parts.

INSPECTION OF RESPIRATORS

14. All respirators shall be inspected as follows:

    a. Inspection, testing and repair of respirators shall be done in accordance with the manufacturer's instructions and documented;

    b. respirators that are routinely used shall be inspected before and after every use and defective components replaced by the user or other qualified person and documented;

    c. respirators for emergency use, such as SCBA, shall be thoroughly inspected after each use and at least once a month as per maintenance schedules, and records shall be retained;

    d. at MARLANT, all SCBAs shall be sent to the Fire Department for calibration testing;

    e. at MARPAC, SCBA bottles shall be sent to FMF CB and SCBA masks shall be sent to the Fire Department for calibration testing;

    f. defective equipment shall be tagged "OUT OF SERVICE" and removed from service until repaired or replaced;

    g. workers are not to use any equipment that is defective or has been quarantined;

    h. air cylinders that have not been used during the previous 12 months shall be drained and refilled with clean dry breathing air;

    i. at MARLANT, new SCBA equipment shall be inspected by the Fire Department before being put in use;

    j. at MARPAC, new SCBA bottles shall be inspected by FMF CB and new SCBA masks shall be inspected by the Fire Department before being put in use; and

    k. a copy of all maintenance and repair records shall be returned to the holding unit.

COMPRESSED BREATHING AIR SYSTEMS

15. Air quality checks shall be conducted in accordance with reference D and the following:

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

a. breathing air purity checks shall be conducted every six (6) months on all breathing air compressors, normally under contract through NDHQ; and

b. a copy of the breathing air purity check results are to be posted next to the air system.

MEDICAL HEALTH SURVEILLANCE

16. The user shall fill out a Medical and Health screening form IAW reference B. If there are any medical problems identified in the screening form that could affect the member's ability to wear respiratory protection, the member shall be directed to a doctor for further evaluation.

PROGRAM EVALUATION

17. Unit RPP will be evaluated by MARL/MARP SE during verifications or as required.

Procedure Performance Criteria and Records

18. Units are responsible for maintaining a record of the following, for 10 years:

a. fit test results;

b. training records; and

c. a copy of all air quality checks carried out on breathing air compressors.

19. Units must ensure that breathing air purity checks that fail are dealt with expeditiously in accordance with reference B. Copies of the records for CAF members and civilians shall be sent to the RPPA, Formation PMed, and one copy placed on the members PERS File.

Attachments

Annex SOP-S03A - Respiratory Protection Program References

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S03A

RESPIRATORY PROTECTION PROGRAM REFERENCES

A. CSA Standard Z94.4-02, Selection, Use and Care of Respirators
B. CSA Standard Z-180.1-00, Compressed Breathing Air and Systems
C. DAOD 5021-1, Respiratory Protection
D. CFTO C-87-040-000/MS-001, DND Respiratory Protection Program

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

STANDARD OPERATING PROCEDURE SOP-S04

LOCKOUT/TAGOUT

Purpose

1. Lockout/Tagout applies to, but is not limited to, all mechanical, fluid, gas and low voltage electrical systems/equipment that may accidentally become energized or released during maintenance, repair work or training. Lockout/Tagout eliminates the possibility of accidentally energizing a circuit, releasing potential energy or releasing a liquid or gas during training, maintenance or repair work. This SOP provides information to protect personnel from injury and equipment from damage by applying Lockout/Tagout properly and safely and provides information to mitigate arc flash hazards when working on live equipment.

Scope

2. This SOP applies to all ships of this class under the jurisdiction of the Commander Maritime Forces Atlantic and Commander Maritime Forces Pacific. This includes all DND military and civilian personnel and contractors working on the ship's behalf. All safety concerns should be brought to the attention of the supervisor and the Unit General Safety Officer (UGSO).

Definitions

3. The following definitions are used within this SOP:

Term	Definition
Arc Flash	The result of a rapid release of energy due to an arcing fault between phases, between phase and neutral, or between phase and ground.
Arc Flash Hazard	A dangerous condition associated with the possible release of energy caused by an electric arc. Note: An arc flash hazard can exist when energized electrical conductors or circuit parts are exposed or are within equipment in a guarded or enclosed condition, if a person is interacting with the equipment in a manner that could cause an electric arc. Under normal operating conditions, enclosed energized equipment that has been properly installed and maintained is not likely to pose an arc flash hazard
Arc flash suit	A complete arc-rated clothing and equipment system that covers the entire body except for the hands and feet. Note: An arc flash suit may include pants or overalls, jacket, or a coverall and beekeeper-type hood fitted with a face
Arc rating	The value attributed to materials that describes their performance on exposure to an electrical arc discharge. Notes:

(1) The arc rating is expressed in cal/cm2 and is derived from the determined value of the arc thermal performance value.

(2) Arc-rated clothing or equipment indicates that it has been tested for exposure to an electric arc. Flame-resistant (FR) clothing without an arc rating has not been tested for exposure to an electric arc.

Assurance Test	A test procedure in order to confirm the adequacy and effectiveness of the Lockout/Tagout. For example, pressing the start button to ensure the equipment will not start. It is important to note ship staff must pay close attention when conducting assurance tests to confirm multisource or redundant systems are de-energized and deemed safe (e.g. heaters).
Blank	A plate used in a fluid system to positively stop the passage of a fluid. Devices such as banjo plates, spectacle plates, or blank flanges are in common use. Blanks once installed shall be tagged to identify their location and recorded in Annex SOP-S04B. Note: Blanks must be of sufficient thickness/strength to be able to withstand the expected working pressure of the system in which they are installed.
Departmental Representative	The member of the ship staff that is qualified to isolate the system(s) so the maintainer can complete the require work.
Electrical hazard	A dangerous condition such that contact or equipment failure can result in electric shock, arc flash burn, thermal burn, or blast.
Hazard Risk Category (HRC)	Represents the potential level of risk or danger involved in completing a task. These categories are dependent on the incident energy (measured in cal/cm²), and help to determine the appropriate arc flash rated clothing needed to safely perform the task.
High Voltage (Marine)	High voltage (HV) is where the working voltage measured between any two circuit conductors exceeds 1000V AC or 1500V DC and when working voltage measured between a phase conductor and earth exceeds 600V AC or 900V DC.
Lockout Device	A device that will safely disconnect or render inoperative systems or equipment from its source of energy. Lockout devices shall prevent the inadvertent operation or energizing of systems/equipment to which the device is affixed and applies equally to mechanical, fluid, gas and electrical systems/equipment. In order to meet this SOP, lockout devices shall be: a. durable for the environment in which they will be used; b. sturdy enough to minimize early or accidental removal; and c. unique, distinctive, easily recognizable and clearly visible.

	Note: Units are responsible to obtain necessary lockout devices to meet this standard and are encouraged to consult FTA, MARL/MARP SE, and/or FMF Safety for guidance in the selection of lockout devices.
Lockout/Tagout	The systems and/or equipment has been rendered inoperative with a lockout device, locked, and tagged by a qualified person. When Lockout/Tagout has been achieved, the system/equipment cannot be operated or energized without the consent of the maintainer or the supervisor of the maintainer that rendered it inoperative.
Lockout/Tagout Station	The location in which the Lockout/Tagout Co-ordinator positively controls the Lockout/Tagout book, lockout devices, locks, and tags.
Locks	For the Lockout/Tagout SOP means a key-operated padlock. Locks shall have only one key able to open the lock. Series locks may be used to lockout a system or equipment if only one key exists for the whole series (Example: Safe to Dive). Series locks shall not be used to lock a Lockout/Tagout Station lockbox.
Maintainer	A qualified person (has the requisite knowledge, training, and experience) that can perform corrective/preventive maintenance on systems/equipment safely and properly exercising due diligence. Only qualified personnel shall conduct maintenance on specified systems/equipment. This can be a member of the ship staff, FMF staff, or a contractor.
Qualified Person	In respect to a specified duty, a person who because of their knowledge, training, and experience is qualified to perform that duty safely and properly exercising due diligence. A qualified person shall be trained in the proper procedure of the Lockout/Tagout system as laid out in this SOP. Only qualified personnel shall complete a Lockout/Tagout.
Shock hazard	A dangerous condition associated with the possible release of energy caused by contact with or approach to energized electrical conductors or circuit parts.
Tagout Device	The tags that are placed on the system or equipment that identifies them as inoperable. The reusable tag shall conform to the following: a. be a minimum of 7.5 cm x 12.5 cm (3"x 5" approx), white background, reusable, with a stain and mildew resistant plastic surface suitable for writing upon; b. provide the following information: i. "DANGER" at the top, with "LOCKED OUT DO NOT OPERATE" below; and

ii. a place to record the form number, maintainer and date;

c. only red and/or black colouring in keeping with industry standard; and

d. be English on one side, French on the other.

An example of the tag is shown below in English and French.

DANGER
LOCKED OUT
DO NOT OPERATE
FORM NO._____
MAINTAINER_____
DATE_____

DANGER
VERROUILLÉ
NE PAS FAIRE FONCTIONNER
No FORMULAIRE_____
MAINTAINER_____
DATE_____

Responsibilities

4. Commanding Officer (CO):

a. The CO shall comply with this policy while in home port;

b. CO shall review and sign LOTO log monthly;

c. In ports, other than home port, when only DND/CF personnel are working on affected systems/equipment, this SOP shall apply. For non-DND/CF personnel and/or host country workers the CO shall comply with local laws and regulations and/or existing Canadian standards ensuring the highest safety standards are employed, always exercising due diligence;

d. At sea, the CO shall comply with this SOP. The CO may override this SOP if it places a serious limitation on the capability to fulfill a CF commitment. When the nature or urgency of a situation requires the departure from this SOP, the CO shall employ recognized risk management practices to determine an appropriate course of action and must be prepared to justify the decision; and

e. The CO shall designate, in writing, a MS or above of the MSE and/or CSE Department to be the unit's Lockout/Tagout Coordinator(s); although, the Ship's Senior Electrician is normally designated the Lockout/Tagout Co-ordinator.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

5. NTO:

   a. Ensure personnel in their department are trained in Lockout/Tagout and Arc Flash policy and procedures. Direction on training is provided under the Training section of this order. It is important to note Lockout/Tagout is not just about electrical safety but also encompasses all systems that store potential energy or could release a fluid, gas or harmful emissions (e.g. hydraulic lines, mechanical systems, fire main components, engine exhausts, etc.);

   b. Ensure only qualified personnel complete a Lockout/Tagout of a system;

   c. Ensure any system/equipment to be locked out/tagged out is authorized in writing using Annex SOP-S04E. Authorization may be delegated, in writing, to departmental representatives;

   d. Ensure the Lockout/Tagout Log is reviewed and signed monthly; and

   e. Ensure Duty Techs are conducting LOTO procedure correctly and are aware of their responsibilities.

6. UGSO:

   a. The UGSO shall ensure the Lockout/Tagout Log is forwarded monthly to the CO for review and signature as per Annex 5E;

   b. That the Lockout/Tagout Program is being followed correctly;

   c. Review and sign LOTO log monthly;

   d. Conduct and record a quarterly review of the Lockout/Tagout Program, using Annex SOP-S04F, to ensure correct documentation and conformance of departmental procedures to this SOP. An assessment of the Lockout/Tagout Program shall be included as part of the annual Safety Program Development and Evaluation Technique (SPDET) submission. Annex SOP-S04G shall be used to complete the LOTO SPDET element; and

   e. The UGSO shall address any safety infractions IAW reference C.

   f. Make an appointment with the CO to have LOTO book signed monthly, limiting the time the log is missing from LOTO compartment.

7. Lockout/Tagout Coordinator(s):

   Responsible to the UGSO for the following:

   a. Ensuring Lockout/Tagout procedures are followed IAW this order;

   b. Ensuring the Lockout/Tagout log is being maintained and forms are correctly completed by departmental representatives;

   c. Maintaining control of documentation;

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

d. Conducting periodic verifications of the Lockout/Tagout documentation and records (Annex SOP-S04F);

e. Submitting the Lockout/Tagout log to the UGSO for CO's signature; and

f. Ensuring the Lockout Station is maintained and strict key control at all times.

8. Duty Tech:

a. Maintain the day-to-day use of the Lockout/Tagout log and Lockout/Tagout Station to ensure forms are correctly completed and strict key control is maintained at all times; and

b. Notify the Senior Watchkeeper of any system/equipment Lockout/Tagout that:

i. has Quality Assurance implications;

ii. has an effect on Water Tight Integrity or Damage Control capability; or

iii. requires the notification or lockout of an adjacent ship; and

c. Prior to secure each day, the Duty Tech shall brief the Senior Watchkeeper on the status and impact on ship's safety of systems/equipment that remain locked out. The Lockout/Tagout log shall be presented to the Senior Watchkeeper for review.

9. Senior Watchkeeper:

a. Sign Annex SOP-S04D of the applicable Lockout/Tagout prior to the commencement of work and again when the Lockout/Tagout is removed;

b. If the Lockout/Tagout requires an adjacent ship to be notified, or if the work on board requires that an adjacent ship's systems/equipment be locked out, then the Senior Watchkeeper shall inform the OOD/Senior Watchkeeper of the adjacent ship; and

c. Any Senior Watchkeeper receiving a call from an adjacent ship requesting that a system/equipment be locked out, the Senior Watchkeeper shall inform the HOD responsible for that system/equipment.

10. Supervisors:

a. Supervisors at all levels have a critical role in the implementation, promotion and maintenance of an effective Lockout/Tagout Program. Their responsibilities include, but are not limited to, ensuring:

(1) All personnel involved with the Lockout/Tagout Program receive awareness training;

(2) Departments exercise strong system/equipment and key control, especially during work periods;

(3) The Duty Tech is kept up to date regarding the status of systems/equipment locked and tagged out;

(4) Personnel correctly complete required documentation and maintain records; and

(5) Safety infractions are addressed immediately, and reported to the Lockout/Tagout Coordinator and UGSO.

11. All personnel involved in the Lockout/Tagout Program have responsibilities that include, but are not limited to, ensuring:

a. The Lockout/Tagout of systems/equipment is completed correctly and locking devices are properly affixed and secured following manufacture requirements (e.g. circuit breaker tab locking devices);

b. All documentation is completed correctly;

c. Any recommendations for improving the Lockout /Tagout Program are forwarded through the divisional system;

d. Ensuring departments are informed of system/equipment status and foreseeable problem areas; and

e. Safety infractions are addressed immediately and reported to their supervisor.

12. The ship's relevant departmental coordinator (depending upon the origin of the contract) is to ensure non-DND contractors employed on board are aware of the Lockout/Tagout and arc flash safety requirements in this SOP.

13. Once on board, before any work commences, contractors and FMF employees shall report immediately to the relevant departmental coordinator to be provided a point of contact (POC). The POC should be a qualified departmental representative who will complete all necessary forms and brief the contractor/FMF employee on procedures to be followed while working on board. The contractor/FMF employee is to provide the names of workers and/or supervisor's name, name of company (if applicable) and a contact phone number for the Lockout/Tagout form, Annex SOP-S04E.

Procedure

14. The qualified departmental representative shall obtain permission from the applicable HOD or delegated departmental supervisor to Lockout/Tagout the system/equipment. If the system/equipment has an effect on Watertight Integrity (WTI) or Damage Control (DC) capability, or if the notification or lockout of an adjacent ship is required, the Senior Watchkeeper shall be informed prior to the Lockout/Tagout being initiated.

15. The qualified departmental representative shall complete Sections 1 and 2 of Annex SOP-S04E - Lockout/Tagout Form.

16. A qualified person shall complete the Lockout/Tagout using ship supplied lockout devices, locks and tags. The qualified person shall complete Annex SOP-S04C and Annex SOP-S04E ensure they are printed back to back. All keys used for the Lockout/Tagout shall be placed into one compartment of the

Lockout/Tagout Station lockbox. A multi-lock device shall be affixed to the lockbox, locked by the department and remain locked until the Lockout/Tagout is finished and signed off. The keys to department locks can be retained in the Duty Tech key press under responsibility of the Duty Tech (alongside) or Senior Engineering Watchkeeper (at sea). The Duty Tech key press is not to be used to retain individual maintainer keys.

17. The maintainer conducting the maintenance on a locked out system shall ensure the Lockout/Tagout Station lockbox is secured with a maintainer supplied lock. The lock shall be inscribed, labeled or tagged with the maintainer's name, supervisor's name and contact telephone number. The maintainer shall retain the key. If more than one maintainer is performing work, then each maintainer shall secure the lockbox with his/her own lock.

18. The maintainer and qualified departmental representative shall complete Section 3 of Annex SOP-S04E Lockout/Tagout Form and obtain the necessary signatures to complete Section IV of Annex SOP-S04E prior to work commencing.

19. Once Sections 1 through 4 of Annex SOP-S04E Lockout/Tagout Form are complete, a copy of the form shall be given to the maintainer. The original shall be retained in the Lockout/Tagout Log. The Lockout/Tagout Coordinator, or a qualified departmental representative shall make an entry in Annex SOP-S04B Lockout/Tagout List.

20. The qualified departmental representative shall conduct an assurance test, to be witnessed by the maintainer, to prove the effectiveness of the Lockout/Tagout.

21. The maintainer may now carry out work as necessary.

22. Upon completion of work:

    a. the maintainer shall inform the qualified departmental representative prior to removing the lock(s) from the system/equipment or the Lockout/Tagout Station lockbox. Once notified, the maintainer and the qualified departmental representative shall remove all system/equipment locks, tags and lockout devices in accordance with Annex SOP-S04C Amplifying Details, and ensure the system/equipment is inspected, tested and proven safe; and

    b. the Lockout/Tagout Coordinator or qualified departmental representative shall obtain the necessary signatures to complete Section 5 of Annex SOP-S04E, Lockout/Tagout Form, and the form is retained in the Lockout/Tagout Log for 6 months. The entry in Annex SOP-S04B, Lockout/Tagout List, shall be signed and dated to indicate its completion.

23. If the maintainer must leave the vessel at any time, ship policy shall dictate whether the key must be surrendered to the Lockout/Tagout Coordinator or retained by the maintainer. Upon the maintainer's return to the ship, if the key was surrendered, then the Lockout/Tagout Verification must be completed IAW the procedure described in this SOP prior to recommencing work. If the maintainer retained the key, then the maintainer may conduct a visual inspection of the Lockout/Tagout Station lockbox and conduct or witness an assurance test IAW Section 3 of Annex SOP-S04E in order to ensure positive control was preserved. Any disputes arising between FMF personnel and ship staff as a result of this process shall be referred to FMF Safety section for resolution.+

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

24. If work is conducted on HV systems then all applicable HV forms must first be completed and that a Permit to Work must be acquired from the APC on a daily basis.

TRANSFER OF RESPONSIBILITY

25. Annex SOP-S04I –Transfer of responsibility, shall be completed anytime;

a. It becomes evident that a job will not be completed in the designated time allotted, this will ensure that ships staff are aware of the overall readiness of the vessel and documentation is as accurate as possible.

b. Personnel posted out, don't happen without notice. Once formal notification has been given the individual and the LOTO coordinator shall proceed to Transfer Responsibility from posted member to a new maintainer will continue to be a member of ships staff.

LOCKOUT/TAGOUT SYSTEM VERIFICATION

26. Annex SOP-S04D, Lockout/Tagout System Verification, shall be completed any time the Lockout/Tagout configuration of a system is in doubt or prior to recommencing work whenever the maintainer has had to remove their lock from the lockbox. The following Lockout/Tagout System Verification procedure is to be followed:

a. the maintainer shall inform the qualified departmental representative;

b. the qualified departmental representative shall inform their supervisor;

c. the qualified departmental representative verifies the system/equipment in accordance with the original Annex SOP-S04C Amplifying Details and to correct any discrepancies; and

d. the qualified departmental representative completes Annex SOP-S04D Lockout/Tagout System Verification and informs the Lockout/Tagout Coordinator and departmental supervisor of any discrepancies.

27. For maintenance conducted by ship staff, the maintainer and the qualified departmental representative may be the same person. However, the Lockout/Tagout System Verification procedure shall remain the same.

TERMINATION OF LOCKOUT/TAGOUT

28. Normally, only the maintainer who applied the lock may remove the lock from the system/equipment, and/or the Lockout/Tagout Station lockbox. In exceptional circumstances, such as in response to an emergency, it may be necessary to operate a system/equipment that is subject to Lockout/Tagout. In this exceptional circumstance the following procedure shall be followed:

a. the order to remove the Lockout/Tagout shall be given by the CO or a delegated authority;

b. if on board, the maintainer shall be informed and every effort shall be made to have the maintainer remove their lock from the system/equipment, or the Lockout/Tagout Station lockbox;

c. if the maintainer is not on board, the lock may be forcibly removed or the lockbox may be accessed by breaking the protective cover;

d. a qualified person shall remove all necessary locks, tags and lockout devices IAW Annex SOP-S04C and SOP-S04E, in order to respond to the exceptional circumstance, and shall ensure if the system/equipment is to be operated that it is inspected and verified safe to operate prior to operating;

e. Annex SOP-S04J TERMINATION OF LOCKOUT/TAGOUT will be completed.

f. a note shall be entered into Annex SOP-S04B of the Lockout/Tagout log indicating which Lockout/Tagout was removed, the date/time of the removal, and the reason for the removal;

g. every effort shall be made to contact the maintainer and the maintainer's supervisor in order to inform the maintainer that the Lockout/Tagout was removed;

h. if the maintainer cannot be contacted, a sentry shall be posted at the worksite or at the brow in order to prevent the maintainer from resuming work; and

i. work shall not resume until either the Lockout/Tagout System Verification is completed or the existing Lockout/Tagout documentation is signed off and a new Lockout/Tagout is completed.

LOCKOUT/TAGOUT LOG

29. The Lockout/Tagout Log as a minimum shall contain the following:

a. CO's signature sheet (Annex 5E (monthly inspection));

b. NTO's signature sheet (Annex 5E (monthly inspection));

c. UGSO signature sheet (reviewed and signed monthly);

d. memorandum of appointment of Unit Lockout/Tagout Coordinator;

e. current version of this SOP;

f. Annex SOP-S04B Lockout/Tagout List;

g. active Annex SOP-S04E Lockout/Tagout Form(s) with Annex SOP-S04C Amplifying Details attached, or duplex copied (back to back);

h. Annex SOP-S04D Lockout/Tagout Verification;

i. Annex SOP-S04E Lockout/Tagout Forms with Annex SOP-S04C Amplifying Details attached that were completed within six months; and

j. A completed Annex SOP-S04F Lockout/Tagout Compliance Audit Form (completed within the past year).

ENERGIZED SYSTEMS EQUIPMENT / ARC FLASH

30. Under exceptional circumstances it may be necessary to work on or near energized or partially energized systems/equipment. In exercising due diligence, all attempts to maximize the safety of the maintainer shall be considered before working on or near energized systems/equipment. This may include the Lockout/Tagout of interference items and/or secondary systems/equipment.

31. The HARRY DEWOLF has both HV and LV components. Refer to HDW-SOP-S13 for guidelines on working with HV equipment. Arc flash and shock hazard labels shall be installed on HARRY DEWOLF Class ships IAW Ref H.

32. All personnel, including CAF personnel, DND personnel, and contractors, must follow arc flash safety procedures when conducting work on electrical systems and equipment. Safety precautions are outlined in Annex SOP-S04A Ref G and Ref I.

33. There are instances when conducting maintenance or troubleshooting where work on energized electrical equipment is unavoidable. In such extreme cases suitable PPE must be worn, proper insulated safety tools must be used, and risk identification/mitigation must be determined, authorization must be obtained from departmental supervisors and only appropriately rated test equipment may be used.

34. It is known that the incident energy in the switchboards and generators is extremely high and exceeding HRC 350 cal/cm2 in HARRY DEWOLF Class. Extreme caution must be exercised to ensure power is isolated prior to opening any electrical enclosure, other than the controls section to a switchboard or generator.

35. When PPE is not in use, it must be stored in a protective bag, storage bin, locker or other means by which the PPE will maintain cleanliness and reduce the risk of damage In accordance with Ref I.

FLEET LOTO INCIDENT/NEAR-MISS REPORTING PROCEDURES

36. LOTO incidents and near misses are classified as follows:

a. LOTO Incidents includes those incidents that have resulted in, or had the potential for, personnel injury or damage to equipment; and

b. LOTO Near Miss include all other situations where there was a non-compliance of LOTO policies and procedures.

37. All LOTO incidents and near misses shall be reported immediately to the LOTO Coordinator, and the UGSO.

38. All LOTO Incidents shall be reported via message within 48 hours to FTA and MARL/MARP SE using the message format in SOP S01 – Hazardous Occurrence Investigation and Reporting, Annex SOP-S01D.

39. The UGSO shall ensure:

a. the person/s involved receive medical attention (if required);

b. the equipment/system involved is not returned to normal service until an initial investigation is completed; and

c. as appropriate, form DND 663- DND/CF General Safety Hazardous Occurrence Investigation Report and form CF 98 - Report on Injuries or Exposure to Toxic Material, shall be completed and contain a record of the information specified above, an analysis of the causes of the incident and a statement of corrective actions taken

40. An investigation is required for all LOTO Incidents. The CO shall convene a Technical Investigation (TI) and/or Summary Investigation (SI) as appropriate. The TI Failure Response Checklist shall be provided to FTA to support recommendations as to whether a TI is required. TIs and SIs are conducted IAW NAVORD 1080-1 and DAOD 7002-2. FTA and MARL/MARP SE shall be provided with a copy of the TI or SI.

41. For LOTO Near Misses, which did not result in, or did not have the potential for, personnel injury or damage to equipment, the LOTO Co-ordinator shall investigate and implement corrective action. Minor incidents will not normally result in a SI, but will require units to take remedial action to prevent a re-occurrence of the violation. A LOTO Near Miss Report with pertinent details WRT the violation of policies and procedures, and corrective action, shall be completed using Annex SOP-S04H and placed in the LOTO binder.

TRAINING

42. Where the Lockout/Tagout of systems or equipment is required for work conducted on board HARRY DEWOLF Class ships, personnel involved in that work shall be trained in the Lockout/Tagout policy and procedures contained in this SOP.

43. On board ship, all personnel of the Naval Technical Department shall receive Lockout/Tagout training. The NTO is responsible to ensure personnel receive training. NPTG shall ensure training is accurate, taught at the applicable trade and rank levels, and include the requirements of this SOP.

44. All FMF employees, military and civilian, receive Lockout/Tagout training from FMF Safety. When non-FMF employees (i.e. outside contractors), are designated to conduct work on board HARRY DEWOLF Class ships, a qualified departmental representative shall brief the contractor on the Lockout/Tagout policy and procedures within this order and shall facilitate the contractor's compliance with this SOP. The appropriate ships staff will assist with form completion.

COMPLIANCE CHECKS

45. Periodically, unscheduled compliance checks of unit Lockout/Tagout programs are conducted by representatives of FTA, MARL/MARP SE and/or FMF Safety. The intent of these compliance checks is to provide both positive and constructive feedback and to highlight areas for improving unit Lockout/Tagout Programs. FTA forwards the results of each compliance check to unit COs, with copies to Sea Training and MARL/MARP SE.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Procedure Performance Criteria and Records

46. The Lockout/Tagout Log and all completed forms/lists from Annexes SOP-S04B through to SOP-S04G shall be retained as records by the unit for six months after the last date of entry. Annexes SOP-S04H and SOP-S01D shall be kept for a period of one year.

Attachments

Annex SOP-S04A - Lockout/Tagout References
Annex SOP-S04B - Lockout/Tagout List
Annex SOP-S04C - Lockout/Tagout Amplifying Details
Annex SOP-S04D - Lockout/Tagout Verification
Annex SOP-S04E - Lockout/Tagout Form
Annex SOP-S04F - Lockout/Tagout Compliance Audit Form
Annex SOP-S04G - Lockout/Tagout SPDET
Annex SOP-S04H - Near Miss Report
Annex SOP-S04I - Transfer of Responsibility
Annex SOP-S04J - Forcible Removal of Padlock

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S04A

LOCKOUT/TAGOUT REFERENCES

A. MARPAC SEMS, Directive DS14 Lockout/Tagout
B. MARLANT SEMS, Directive S1 Lockout/Tagout
C. NAVORD 1002-0, RCN Safety and Environmental Program Management MARCORD
D. C-02-040-009/AG-001, General Safety Program - Volume 2 - General Safety Standards
E. CSA STANDARD Z462-12 Workplace Electrical Safety
F. C-26-010-047/TS-01 Safety Bulletin Arc Flash Hazard in Naval Environments
G. C-26-010-048/TB-001 Arc Flash Warning Labels Installation Instructions
H. C-01-001-0F0/SP-001 Naval Personnel Protection Equipment (PPE) For Electrical Arc Flash

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S04B

LOCKOUT/TAGOUT LIST

START DATE	DEPT (ME, EL, CS)	FORM NO.	SYSTEM EQUIPMENT	LOCKBOX NO.	DATE COMPLETE	SIGNATURE

This form is to be retained for 6 months after date of last entry.
May be reproduced locally.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

LOCKOUT/TAGOUT LIST INSTRUCTIONS

Annex SOP-S04A, Lockout/Tagout List, shall be filled out first whenever a Lockout/Tagout is authorized. An example of how to enter information into this Annex is shown in the table below. The first four columns shall have an entry when the Lockout/Tagout is authorized and active. The departmental identifiers are as follows:

ME-Mechanical;

EL-Electrical; and

CS-CSE all sections.

The form number shall be sequential, three digits, and independent of department. The number shall be reset to 001 each calendar year. The last two columns shall have an entry when the Lockout/Tagout is completed. This Annex shall be retained in the Lockout/Tagout log.

Lockout/Tagout List Sample:

START DATE	DEPT (ME, EL, HL, CS)	FORM NO.	SYSTEM EQUIPMENT	LOCKBOX NO.	DATE COMPLETE	SIGNATURE
8 Jan 01	ME	001	Main Engine Lube Oil System	3	23 Jan 01	*PO2 Bloggins*
8 Jan 01	EL	002	Propulsion Switch Board	5	11 Jan 01	*MS Buckland*
9 Jan 01	CS	003	Switch Board - Radar Gear	6	9 Jan 01	*LS Simons*
10 Jan 01	ME	004	Port fuel Transfer Pump	2	16 Jan 01	*PO2 Sandel*
17 Jan 01	ME	005	Bilge Pump	8	17 Jan 01	*MS Oscar*

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S04C

LOCKOUT/TAGOUT AMPLIFYING DETAILS

THIS FORM SHALL BE ATTACHED TO ANNEX SOP-S04D LOCKOUT/TAGOUT FORM

DATE _____ FOR FORM NO._____

Details shall include: the specific method used to lockout/tagout the system/equipment affected, location of affected areas, safety concerns, and additional information carried over from Annex S04E.

If the lockout is extensive, a schematic drawing of the system illustrating lockout/tagout positions shall be attached to this form.

QUALIFIED PERSON

_____/_____/_____
PRINT DATE SIGNATURE

This form is to be retained for 6 months after date of completion.
May be reproduced locally.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S04D

LOCKOUT/TAGOUT VERIFICATION

DATE	TIME	FORM NO	VERIFIED BY - NAME (Print)	SIGNATURE

Note: Completed forms are to be retained for 6 months after date of last entry.
May be reproduced locally

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S04E

LOCKOUT/TAGOUT FORM

(Section 1) - GENERAL DATA

Unit: _____ Form No. _____ No. of Tags: _____

Date: _____ Cross Ref. Form No.: _____

System/Equipment: _____

Location: _____

Work Order No.: _____ (if applicable) Lockbox No.: _____

Ship's Staff/Work Center Contact: _____ _____
Name Phone Number

Description of Work: _____

(Section 2) - PREREQUISITES

Does an ADJACENT SHIP require notification or lockout? Yes / No

Are there QA implications to this work? Yes / No

Is Watertight Integrity Affected (WTI)? Yes / No

Are Damage Control Systems Affected? Yes / No

Is High Voltage Switching Schedule Required (HVSS)? Yes / No

HVSS FORM NUMBER: _____

If any "Yes", Senior Watchkeeper/DTech Signature are required (Section 4 and 5)

(Section 3) - GUARANTEE OF ISOLATION, LOCKOUT / TAGOUTS IN PLACE
(ALL LOCKOUT/TAGOUT PREREQUISITES HAVE BEEN MET)

Precautions: _____

Assurance Test: _____

Padlock #(s): _____

Tested: _____ Dept. Rep. _____ _____
Date Print Name Signature

Maintainer: _____ _____ _____
Print Date Signature

(Section 4) - AUTHORIZATION OF WORK TO COMMENCE

NTO: _____ / _____ / _____
Print Date Signature

Senior Watchkeeper/DTech: _____ / _____ / _____
(If required) Print Date Signature

(Section 5) - FINAL COMPLETION
(CONFIRMATION THAT ALL LOCKS/TAGS HAVE BEEN REMOVED, SYSTEM/EQUIPMENT HAS BEEN TESTED, INSPECTED AND PROVEN SAFE)

Maintainer: _____ / _____ / _____
Print Date Signature

Dept Rep.: _____ / _____ / _____
Print Date Signature

NTO: _____ / _____ / _____
Print Date Signature

Senior Watchkeeper/DTech: _____ / _____ / _____
(If required) Print Date Signature

Lockout/Tagout: _____ / _____ / _____
(Coordinator) Print Date Signature

This form shall be retained for 6 months after the date of completion. May be reproduced locally.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

LOCKOUT/TAGOUT FORM INSTRUCTIONS

1. The Lockout/Tagout Form shall be filled out whenever a Lockout/Tagout is authorized IAW the Lockout/Tagout Procedure in this order. Sections 1 through 4 shall be completed prior to the commencement of work. Section 5 shall be completed once the Lockout/Tagout is removed and the system/equipment has been inspected, tested and proven safe. This Annex shall be retained in the Lockout/Tagout Log for 6 months after the date of completion. Each section of the form is described in more detail in the following table:

Lockout/Tagout Form Instruction Table:

Section 1	UNIT	Ship Name, (hull number not to be used).
	FORM No.	The form number is a five-digit combination of the section identifier and the sequential number as obtained from Annex SOP-S04B, i.e. ME 011.
	No. OF TAGS USED	The number of tags used to complete the Lockout/Tagout.
	DATE	Use memo format, i.e. 21 Feb 01.
	CROSS REF FORM No.	Shall be completed if the Lockout/Tagout is used in conjunction with another procedure, i.e. confined space entry, hot work, man aloft, HV Lockout/Tagout, etc.
	SYSTEM/EQUIPMENT	The name of the system(s)/equipment that will be affected by the Lockout/Tagout. Details shall be described in Annex SOP-S04C.
	LOCATION	Compartment location(s) affected by the Lockout/Tagout. Details shall be described in Annex SOP-S04C.
	Work Order No.	Use either the FMF Worker Order No. or the SS Work Order number, whichever is applicable.
	LOCKBOX No.	All keys used during the Lockout/Tagout shall be held in a Lockout/Tagout Station lockbox. The lockbox number shall be recorded as the key location.
	WORK CENTRE CONTACT	The maintainer's name and telephone number.
	DESCRIPTION OF WORK	Reason for work requiring Lockout / Tagout, i.e. 48M PM routine, corrective maintenance, etc and an estimate of the duration of the Lockout/Tagout. Additional details, if necessary, may be included in Annex SOP-S04C Amplifying Details.
Section 2	PREREQUISITES	Circle applicable conditions. If any item is circled "YES" then the Senior Watchkeeper/DTech shall be informed and sign Section 4 prior to commencing the Lockout/Tagout.
Section 3	PRECAUTIONS	This section shall contain information regarding special precautions of which the maintainer must be aware, such as, but not limited to, whenever: maintenance must be conducted on energized or partially energized system / equipment, special PPE or a sentry is required; or additional procedures must be followed (i.e. gas free, confined space entry, HV Lockout/Tagout, etc). If additional space is necessary use Annex SOP-S04C Amplifying Details and annotate this space with "see Annex SOP-S04C".
	PADLOCK Nos.	List the identification number of all padlocks used during the Lockout/Tagout. If additional space is necessary use Annex SOP-S04C Amplifying Details and annotate this space with "see Annex SOP-S04B".
	ASSURANCE TEST	List the procedures required in order to confirm that the Lockout/Tagout is adequate. This is necessary to allow the maintainer to conduct or witness an assurance test as defined in this order.
	TESTED	Maintainer shall sign to confirm that an assurance test was conducted or witnessed prior to conducting the work.
	DEPT REP	The qualified person who completed the Lockout/Tagout shall print their name, date, and sign.
	MAINTAINER	The maintainer who completed the Lockout/Tagout shall print their name, date, and sign.
Section 4	NTO	Only after Sections 1 through 3 have been completed in full, authorization for work to commence must be signed by the NTO or their delegated representative. By signing, the NTO or delegated representative acknowledge that the system/equipment is locked and tagged IAW this order and that work may progress.
	Senior Watchkeeper/DTech	Authorization for work to commence must be signed by the Senior Watchkeeper/DTech if any prerequisite in Section 2 has been identified as "YES". By signing, the Senior Watchkeeper/DTech acknowledges that the system/equipment is locked and tagged IAW this order and that work may progress.
Section 5	QUALIFIED DEPARTMENT REPRESENTATIVE	Once the Lockout/Tagout has been completely removed, inspected, tested and proven safe, the Qualified Person who originally signed as "Dept Rep" in Section 2, or in extreme circumstances, the Snr departmental representative can (after verifying the system safe) remove the Lockout/Tagout and shall print their name, date, and sign.
	NTO	The NTO or their delegated representative shall be informed that the Lockout/Tagout has been removed, inspected, tested and proven safe. Upon being informed, the NTO or delegated representative shall print, date and sign.
	MAINTAINER	The maintainer shall confirm with the Ship Staff that the Lockout/Tagout has been removed, inspected, tested and proven safe. The maintainer shall print their name, date, and sign.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S04F

LOCKOUT/TAGOUT COMPLIANCE AUDIT FORM

1. A Lockout/Tagout (LOTO) compliance audit was conducted in _____, on the _____. The Lockout/Tagout Program was judged as (Sat/Un-Sat): _____.

1.	LOCKOUT/TAGOUT CHECKLIST	SAT	UNSAT	REMARKS
a.	**Lockout Station:**			
	Contains the following, as a minimum:			
	Lockout tags			
	The user is to add the form number to the tag i.e. HL 032 in the space provided, to allow for easy cross-reference with the log entry.			
	Designated locks with keys, properly identified			
	Lockout devices			
	Lockout/Tagout forms			
	Lockout/Tagout log			
	Lockout keyboard, lockout boxes (as required)			
b.	**Lockout/Tagout Log:**			
	Log care, custody and control			
	Divided by department			
c.	**Contains the following, as a minimum:**			
	CO signature sheet			
	Mustered monthly for CO's signature			
	Annex SOP-S04B – Lockout/Tagout List (filled out, complete, correct, legible)			
	Annex SOP-S04C – Lockout/Tagout Amplifying Details (complete, as required, drawings used)			
	Annex SOP-S04D – Lockout/Tagout Verification (complete, as required)			
	Annex SOP-S04E – Lockout/Tagout Forms (complete, as required)			
	Annex SOP-S04G – Lockout/Tagout SPDET (complete, as required)			
	Annex SOP-S04H – Near Miss Report (complete, as required)			
	Annex SOP-S01D – Hazardous Occurrence Message (complete, as required)			
	(4) Are shipboard audits being done			
	(5) COTM identifying coordinators			
c.	Lockout/Tagout Procedure is being followed			
	Maintainer obtains permission from Dept Head/Sups. If for WTI sys/equip, Senior Watchkeeper/DWS informed prior to Lockout/Tagout procedure start			
	Dept and maintainer ensure form and tags correctly completed and logged			
	Lockouts and Tags placed on systems/equip as required.			
	Copy 1 of Logout/Tagout form placed in log. Copy 2 retained by maintainer.			
	Maintainer carries out work as necessary. On completion of work:			
	Section V of form signed			
	All Lockouts/Tagouts removed and mustered by qualified person			
	Log Annex A signed and dated to indicate completion			

Copy 1 of form retained for 6 months year

Lockout/Tagout Auditor: _____ Date: _____

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S04G

LOCKOUT/TAGOUT SPDET

NATIONAL DEFENCE

SAFETY PROGRAM DEVELOPMENT AND EVALUATION TECHNIQUE PROFILE FORM

ORGANISATION EVALUATED	EVALUATOR (Print)	DIRECTING AUTHORITY	DATE

PROGRAM ELEMENT	REFERENCES
LOCKOUT TAG OUT (SHIPS)	A. A-GG-040-001/AG-001 B. C-02-040-009/AG-001, Chap 1, Annex E C. Canada Labour Code Part II

REQUIREMENTS (See Evaluator's Guidelines)	VALUE FACTOR	RATING
22.1 Has the CO designated, in writing, a MS or above of the NT Department to be the Unit LOTO Coordinator. (10) And are assigned positions adequate to support the Units LOTO demands? (5)	15	
22.2 Are individuals assigned responsibilities for the LOTO of systems and equipment, adequately trained in LOTO program requirements? (5) And meet the criteria of a Qualified Individual under the Code? (5)	10	
22.3 Are officers and supervisors trained as to their responsibilities for the promotion and implementation of the LOTO program? (10)	10	
22.4 At Sea, is priority given to achieving balance between program and operational requirements? (5)	5	
22.5 Is the available inventory of lockout devices adequate to effectively render equipment and system inoperative? (5)	5	
22.6 Are all individuals held accountable for compliance with LOTO program requirements in their daily activities (10)? And are these efforts documented? (5)	15	
22.7 Is the Duty Tech aware of his/her responsibilities (5)	5	
22.8 Do new and unique work procedures for equipment and systems reflect LOTO requirements? (5)	5	
22.9 Has the LOTO program been evaluated during the previous year meeting, as a minimum, Class SEMS LOTO SOP inspection requirement (10) and has corrective action progressed on identified weaknesses (5)?	15	
22.10 Are hazardous occurrences involving Lockout Tag Out, reported, documented and investigated (10) and appropriate action taken to prevent future re-occurrences (5)?	15	
TOTAL	100	

NOTES ON REQUIREMENTS

22.1 Verify in LOTO binder or message. Positions may be permanently established or assigned to personnel on a secondary duty basis. They must be appointed in sufficient numbers and at an appropriate rank/level with the UGSO reporting safety matters to the CO and XO. Evaluator's judgement following the completion of all elements, interviews and review of safety staff's workload.
22.2 Review training records. Qualified Individual, in respect of a specified duty, is a person who because of their knowledge, training, and experience is qualified to perform that duty safely and properly exercising due diligence.
22.3 Verify by review of training records, safety indoctrination briefings, internal program reviews (i.e. quarterly UGSO review), proper signatures on LOTO forms, safety infractions are addressed in a timely manner and regular safety talks.
22.4 Confirm by reviewing the policy statement and by questioning supervisors. To get full marks respondents *must emphasise* that safety is a primary consideration in the performance of all tasks.
22.5 Confirm by interviewing the LOTO Coordinator and through inspection of locked out equipment.
22.6 Confirm by interviewing senior ship staff as to the methods used to ensure personnel are held accountable, and by reviewing safety infraction follow-up corrective action.
22.7 Verify by interviewing senior management, UGSO and LOTO Coordinator as to the methods used to ensure the Duty Tech is aware of his/her responsibilities.
22.8 Confirm with the senior officer and verify by reviewing documents that SOPs and WIs are available and updated.
22.9 Confirm by checking previous SPDET, UGSO quarterly reviews, LOTO Coordinator periodic verifications and external verification and inspection records (FTA and MARL/MARP SE), and verify that follow-up action is being actively pursued or has been completed on identified weaknesses.
22.10 Confirm through Hazardous Occurrence reports, CO Investigations, TIs or SIs

GENERAL Evaluator comments to justify a rating over 90 or under 70 are required. Line authority comments on action that will improve upon any particular requirement or the program are to be recorded.

_____

_____

REMARKS: (SEE REVERSE FOR ADDITIONAL REMARKS AND LINE AUTHORITY COMMENTS)

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S04H

NEAR MISS REPORT

Unit/Ship: _____ Date: _____
Near Miss: (Brief description of the events leading to the near miss)
Policy or Procedure violated: (What policy or procedure was not followed correctly. Can reference specific sections in SOP)
Recommended Action: (Brief explanation of remedial action required to prevent re-occurrence)
LOTO Coord Signature: _____ Date: _____

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S04I

TRANSFER OF RESPONSIBILITY

CHECK APPROPRIATE BOX FOR TRANSFER OF OWNERSHIP (check one):

a. Transfer of responsibilities is from _____(unit);

b. Transfer of responsibilities is to _____ (unit); or

c. Transfer of responsibilities is from _____(individual)

SECTION 1 EQUIPMENT CURRENTLY LOCKED / TAGGED OUT

Form number	
Equipment/ Machinery	
Location	

SECTION 2 – LOCKOUT/TAGOUT OWNERSHIP TRANSFERRED FROM

Name/Rank	Trade/Classification
Unit/Company	Ship/Shop

I have briefed the individual identified in Section 3 of the current status of the equipment/machinery that has been Locked and Tagged out at (time 24 hr clock) _____ on (date DD/MM/YY)_____ and acknowledge that they have accepted the transfer of ownership.

Signature of Individual transferring the Responsibility_____

SECTION 3 – LOCKOUT/TAGOUT OWNERSHIP TRANSFERRED TO

Name/Rank	Trade/Classification
Unit/Company	Ship/Shop

I have briefed the individual identified in Section 2 of the current status of the equipment/machinery that has been Locked and Tagged out at (time 24 hr clock) _____ on (date DD/MM/YY)_____ and acknowledge that they have accepted the transfer of ownership.

Signature of Individual transferring the Responsibility_____

(FORM MUST BE KEPT FOR A MINIMUM OF 6 MONTHS AFTER THE DATE OF COMPLETION)

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S04J

FORCABLE REMOVAL OF PADLOCK

Unit: _____ Form No._____ Box No._____

Name of Maintainer: _____Notification — Yes / No

System Equipment: _____

REASON FOR EMERGENCY REMOVAL OF LOCKOUT/TAGOUT

_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Date: _____ Time_____ Authorization: _____

Signature: _____ Date: _____

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

STANDARD OPERATING PROCEDURE SOP-S05

FALL PROTECTION AND ELEVATED STRUCTURES

Purpose

1. To provide direction to ensure that when personnel are put into a position where a fall from height is possible, the proper equipment and procedures are put into place.

Scope

2. This SOP applies to all ships of this class under the jurisdiction of the Commander Maritime Forces Atlantic and Commander Maritime Forces Pacific. This SOP applies to all personnel working at heights on board the ship.

Definitions

3. The following definitions are used within this SOP:

Term	Definition
At Height	Is defined as from an unguarded position, at a height of 2.4m and greater, above the nearest permanent safe level.
Elevated Work Structure	A structure or device that is used as an elevated work base for persons or as an elevated platform for material and includes any scaffold, staging, walk-way, decking, bridge, boatswain's chair, tower, temporary floor, any portable ladder or means of access or egress from any of the foregoing, and any safety net, landing or other device used in connection with such a structure.
Fall Protection Equipment (FPE)	Consists of a full body harness, a connecting system, and may include an improvised anchorage.
Fall Protection System	A fall protection system may include any or all of the following: a. guardrails that prevent falling from the upper work surface; b. a travel restricting device worn by the person; c. a fall arresting device worn by the person, attached to an anchor point having sufficient dynamic and static load bearing capacity; d. a net to safely catch a person if they fall; and e. a rescue plan.
Harness Hang Syndrome (Suspension Trauma)	This occurs when a person is left hanging immobile from a rope or in a harness and can result in death. The rope or harness leg straps may act as

	tourniquets above each thigh in certain circumstances, such as dorsal suspension in a fall arrest harness, and may bring about a lack of circulation within the legs. The victim's potential responses include fainting/unconsciousness, toxin release within the legs and cardiac arrhythmia.
Mobile Elevated Work Platform	A vehicle-mounted aerial device, elevating rolling work platform, boom-type elevating work platform or self-propelled elevating work platform.
Person in Charge	A qualified person appointed by management to ensure the safe and proper conduct of an operation or of the work of personnel.
Qualified Person	In respect of a specified duty, a person who because of their knowledge, training and experience is qualified to perform that duty safely and properly exercising Due Diligence.
Rescue Plan	A plan, which would utilize either a self-rescue technique or in-house personnel (minimum of 2 personnel), trained and practiced in performing a rescue on a suspended casualty or an outside agency qualified to perform a rescue (DND Fire Department).
Safety Restraining Device	Any equipment that is specifically designed to be used by a person or persons to protect or prevent falling while working at height, and includes any fitting, fastening or accessory, such as, but not limited to, safety harnesses, seats, ropes, belts, straps and life-lines.
Suspended Casualty	A person who due to illness, injury or entanglement is incapable of getting down on his or her own from height.
Suspension Trauma Straps	Straps that can be attached to the harness if required based on the hazard assessment. If an individual falls and is suspended these straps can be deployed and used to counter act the effects of harness hang syndrome.

Responsibilities

4. CO:

   a. The CO is to ensure that FPE is properly maintained and controlled.

5. Naval Technical Department (NTD):

   a. The NTD will maintain all holdings of FPE; and

   b. They are to ensure, through regular inspections, that equipment is suitable for use and are to maintain the Fall Protection Inventory List (Annex SOP-S05B) and ensure the Person Aloft Chits (DND 2145) are properly completed.

6. Organization:

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

a. Prior to commencing the job, all personnel involved shall be qualified to perform the tasks expected of them and should include a Person in Charge and all other personnel required to carry out the task.

7. Supervisors:

a. Supervisors are to ensure that personnel are instructed and properly trained on all aspects of Fall Protection/Fall Arrest including but not limited to:

(1) the inspection, proper fitting and wearing of fall protection equipment;

(2) preventive maintenance;

(3) suspension trauma straps;

(4) life of the equipment that they will employ; and

(5) rescue equipment/procedures.

Procedure

8. Fall hazards must first be identified and then controlled through engineering controls if feasible. When engineering controls are not feasible, then personal fall arrest systems, administrative controls and training must be instituted. Due to the inherent risks of working aloft on board ships, factors such as motion, wind, waves, rain and emissions, both exhaust and Radio frequency Hazards, can and will significantly alter the conduct of the job.

9. An assessment of hazards, which includes developing a rescue plan, must be carried out prior to commencement of the work and it is essential that all personnel involved in the work are involved in the planning. If the rescue plan involves potential high angle rescue, the plan shall include simple written protocols for the various approaches and maneuvers that are to be implemented for the rescue.

10. If the assessment identifies that an individual has the potential to be suspend for a period of time (e.g. Mast work) then the harness shall have suspension trauma straps attached and the rescue plan will include the requirement for the individual to deploy these straps in the event of a fall.

FALL PROTECTION EQUIPMENT

11. FPE is to be worn by all personnel working 2.4 meters above a permanent safe level. Only CSA approved FPE is to be used for working aloft. The user must inspect all equipment prior to its use. Typically HARRY DEWOLF Class ships hold 6 to 10 harnesses to conduct all operations as part of the fall protection equipment inventory. Harnesses shall be stored in a dry and clean location.

INSPECTION

12. The annual inspection of FPE shall be conducted by the qualified Formation inspector (MARL SE in MARLANT or FMF in MARPAC) and before each use by the user. The FPE shall be inspected for rips, burns, discoloration, chemicals, paint, and solvents. Hardware such as D rings, carabineers, buckles, snaps, and eyes must be inspected for possible scratches, cracks, tears, dents, etc. All FPE that fails inspection must be removed from service and reported to the appropriate supervisor. If required, replace

the FPE before proceeding with the work and report the damaged FPE to the NTD. Any new FPE shall be reported to the Formation representative. The NTO is to ensure that FPE that does not pass inspection, or is greater than 10 years old, is destroyed and replaced.

13. At no time shall alterations of any kind be carried out on any piece of FPE, including: marking on cutting, sewing, adding to or removing pieces.

14. Elevated Work Structures. Departments shall ensure that a qualified person visually inspects each temporary structure prior to each work shift to ensure, insofar as possible by such inspection, that it is safe to use and ensure that a record of each inspection is made by the person who carried out the inspection. Where an inspection reveals a defect or condition that adversely affects the structural integrity of a temporary structure, no personnel shall use the temporary structure until the defect or condition is remedied.

15. Every person shall report to the supervisor, as soon as practicable any defect or condition in a temporary structure that may, in the opinion of that person, create a hazard. No personnel shall use any temporary structure that has a defect or condition that, in the opinion of that person, may endanger the person or any other personnel, until the structure has been examined by a qualified person and declared to be safe.

16. No person shall use a temporary structure unless:

a. There are no permanent structures available;

b. authority has been received from the supervisor to use it;

c. the person has been trained and instructed in its safe and proper use; and

d. the person, or the person in charge, visually inspects the structure prior to each work shift to ensure, that it is safe to use.

17. No personnel shall work on a temporary structure in rain, snow, hail or an electrical or wind storm that is likely to be hazardous to the safety or health of the person, except where the work is required to remove a hazard or to rescue another person. Every platform, hand-rail, guardrail and work area on a temporary structure shall be kept free of accumulations of ice and snow while the temporary structure is in use.

18. Guardrails and toe boards shall be installed at every open edge of the platform of a temporary structure. Every guardrail shall consist of:

a. a horizontal top rail not less than 900 mm and not more than 1100 mm above the base of the guardrail;

b. a horizontal intermediate rail spaced midway between the top rail and the base; and

c. supporting posts spaced not more than 3 m apart at their centres.

19. When guardrails or ladders are removed for any reason, temporary guardrails shall be rigged and a barrier erected at the top of the ladder. In addition, when escape hatches are left open an appropriate barrier shall be erected in front of the hatch.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

20. When there is a hazard that tools, equipment or materials may fall onto or from a temporary structure, a safety net shall be provided to protect from injury any personnel on or below the temporary structure.

21. Where a vehicle or a pedestrian may come into contact with a temporary structure, a person shall be positioned at the base of the temporary structure or a barricade shall be installed around it to prevent any such contact.

PAINT CATS

22. When a ship is using a paint cat, the Deck Department is responsible to ensure it is inspected daily, prior to use. The Senior Watchkeeper is responsible for ensuring the safety of personnel on the paint cat and should place someone in charge while on the paint cat. The Senior Watchkeeper must also consider weather conditions, ship's movements and other yard and port activities that could affect personnel on the paint cat. Personnel on the paint cat shall wear PPE such as life jackets and FPE as required. Refer to SOP-E06 - External Ship Husbandry for further environmental considerations.

MOBILE ELEVATED WORK STRUCTURES

23. Departments shall ensure that the design, construction, maintenance, and use of mobile elevated work structures shall comply as appropriate, with:

a. CAN 3 B354.1-M82 Elevating Rolling Work Platforms;

b. CAN 3 B354.2-M82 Self-Propelled Elevating Work Platforms for Use on Paved/Slab;

c. CAN 3 B354.3-M82 Self-Propelled Elevating Work Platforms for Use as Off-Slab;

d. CAN 3 B354.4-M82 Boom Type Elevating Work Platforms; and

e. CSA C225-1976 Vehicle Mounted Aerial Devices.

24. Departments shall ensure, to the extent that is practicable, that where it is necessary to use or move a mobile elevated work structure with personnel on such a device, the person in charge ensures that the device is observed until it is no longer in use.

TEMPORARY STAIRS, RAMPS AND PLATFORMS

25. Temporary stairs, ramps and platforms shall be capable of supporting at least four times the load that is likely to be imposed on it to allow safe passage of persons and equipment on them.

26. Temporary stairs shall have uniform steps in the same flight:

a. a slope not exceeding 1.2(Vertical) to 1(Horizontal); and

b. a hand-rail that is not less than 900 mm and not more than 1100 mm above the stair level on open sides, including landings.

27. Temporary ramps and platforms shall be:

a. securely fastened in place;

b. braced, if necessary, to ensure their stability; and

c. provided with cleats or surfaced in a manner that provides a safe footing for personnel.

28. A temporary ramp shall be so constructed that its slope does not exceed:

a. where the temporary ramp is installed in the stairwell of a building not exceeding two storeys in height, 1 to 1, if cross cleats are provided at regular intervals not exceeding 300 mm; and

b. in any other case, 1(Vertical) in 3(Horizontal).

SCAFFOLDS

29. Departments shall ensure, that the design, construction and use of scaffolds meet the requirements of CSA Standards. Every scaffold shall be capable of supporting at least four times the load that is likely to be imposed on it. The platform of every scaffold shall be at least 480 mm wide and securely fastened in place. The footings and supports of every scaffold shall be capable of carrying, without dangerous settling, all loads that are likely to be imposed on them.

30. The erection, use, dismantling or removal of a scaffold shall be carried out by or under the supervision of a qualified person.

PORTABLE LADDERS

31. Only CSA approved portable ladders, appropriate to the task, that meet the Class 1 standard shall be used on board ship. The class standard is indicated on the ladders manufacturer tag.

32. Where, because of the nature of the location or of the work being done, a portable ladder cannot be securely fastened in place, it shall, while being used, be sloped so that the base of the ladder is not less than one-quarter and not more than one-third of the length of the ladder from a point directly below the top of the ladder and at the same level as the base. Every portable ladder shall, while being used:

a. be placed on a firm footing; and

b. be secured in such a manner that it cannot be dislodged accidentally from its position.

33. Every portable ladder that provides access from one level to another shall extend at least three rungs above the higher level.

34. Metal or wire-bound portable ladders shall not be used where there is a hazard that they may come into contact with any live electrical circuit or equipment.

35. No person shall work from any of the three top rungs of any single or extension portable ladder or from either of the two top steps of any portable step ladder.

SAFETY NETS

36. Where there is a hazard that tools, equipment or materials may fall onto or from a temporary structure, the department shall provide a protective structure or safety net to protect from injury any personnel on or below the temporary structure.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

RESCUE PLAN

37. If a rescue is required while alongside in homeport, Dockyard Fire hall is to be called immediately to initiate the rescue of a suspended casualty.

38. If a suspended casualty should happen away from homeport, then an in-house rescue team that has received competent training, proper equipment and practice on a regular schedule (i.e. monthly) would be competent to initiate and conduct a rescue. This includes training, equipment and practice for high angle rescue. The condition and location of the suspended casualty will determine the method required to implement a rescue.

39. After the rescue, the suspended casualty's FPE shall be quarantined until the completion of the investigation surrounding the fall. Once the investigation has been completed and no further action is required, the FPE shall be disposed of in the appropriate manner.

COMMUNICATION

40. If any job poses a danger to other personnel, the Senior Watchkeeper/OOW is to be notified immediately. The Senior Watchkeeper/OOW shall make the appropriate pipe to warn all personnel onboard.

WARNING SIGNS

41. If any job poses a danger to other personnel, warning signs shall be placed in a conspicuous place, and at a sufficient distance from the job to ensure the safety of other personnel. Upon completion of the job, all warning signs are to be removed.

Procedure Performance Criteria and Records

42. Records of all FPE are to be maintained by the NTD including all items previously held on board and any new additions. Training records shall be maintained for both supervisors and any other personnel who by job or position will be required to work at heights and use FPE. The Unit Training Chief shall maintain copies of all training records.

Attachments

Annex SOP-S05A - Fall Protection and Elevated Structures References
Annex SOP-S05B - Fall Protection Inventory List
Annex SOP-S05C - Fall Hazard Assessment
Annex SOP-S05D - Fall Arrest Rescue Plan

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S05A

FALL PROTECTION AND ELEVATED STRUCTURES REFERENCES

A. Canada Occupational Health & Safety Regulations Part XII
B. C-02-040-009/AG-001, Chapter 6 - Elevated Work Structures
C. C-02-040-009/AG-001, Chapter 14 – PPE
D. MARLANT Safety and Environmental Management System (SEMS) Manual
E. MARPAC Formation Safety and Environmental Management System (FSEMS)

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S05B

FALL PROTECTION INVENTORY LIST

Serial #	Manufacturer	Equipment Type	Model #	Date Of Mfr.	Inspection Expiry

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S05C

FALL HAZARD ASSESSMENT

Location of work: _____
Working height: _____

1) Access to Work Area (check a where applicable)

O Staging O Ship's Ladder O Portable Ladder O Aerial Lift

O Other _____

Note: Work conducted on ladders is limited to those activities that allow the employee to maintain three points of contact with the ladder at all times.

2) Reason for Conducting Work (check all that apply and provide a brief description of the work that will be conducted)

O Repair _____
O Maintenance _____
O Cleaning _____
O Inspection _____
O Other _____

3) Other Identified Hazards (check a where applicable)

O Slippery Surfaces O Moving Parts O Trip hazards O Low Light
O Hidden Drop-offs O Sloping Surfaces O Protruding Objects
O Other _____

4) Engineering Controls (check a where applicable)

O Guard Rail System O Anchor O Other _____

5) Fall Protection Required

O Class 3 – Full Body Harness O Web Lanyard O Rope Lanyard
O Boatswain's Chair O Rope Grabs O Other _____
_____

6) Comments

Supervisor: _____ / _____ / _____
Print Date Signature

NTO/NTC: _____ / _____ / _____
Print Date Signature

Senior Watchkeeper/OOW: _____ / _____ / _____
Print Date Signature

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S05D

FALL ARREST RESCUE PLAN

Location of work: _____
Working height: _____
Date: _____

Methods of Communication (check where applicable)

O Phone O Audible Signal O Radio O Ship's Intercom O Verbal/Face to face

Methods of Rescue (Check all that apply)

O Elevating Work Platform O Ladder O Basket O Work Area or Deck Below
O Self Rescue O Other: _____

Rescue Equipment Requirements (check where applicable)

O Ladder O Scaffold O Stokes Litter O Block & Tackle
O Rescue Rope O Boatswain's Chair O Rescue Pole
O Other _____

Rescue Equipment Location

O On site O Other: _____

Medical Equipment Requirements (check where applicable)

O First Aid Kit: _____ O Oxygen: _____ O Other: _____

Additional Considerations (Check for yes)

O Have alternatives to using fall arrest equipment been considered?
O Has rescue equipment been inspected and found in good shape?
O Is equipment adequate for the rescue plan (weight ratings, length, etc.)?
O Have communication devices been identified, located, & tested?
O Are all rescuers familiar with the use of the rescue equipment?
O If working over water, is there a boat available?

6) Comments

Supervisor: _____ / _____ / _____
Print Date Signature

NTO/NTC: _____ / _____ / _____
Print Date Signature

Senior Watchkeeper/OOW: _____ / _____ / _____
Print Date Signature

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

STANDARD OPERATING PROCEDURE SOP-S06

TOOL SAFETY

Purpose

1. To provide direction and assign responsibility for the proper and safe use of hand and power tools.

Scope

2. This SOP applies to all ships of this class under the jurisdiction of the Commander Maritime Forces Atlantic and Commander Maritime Forces Pacific.

Definitions

3. The following definitions are used within this SOP:

Term	Definition
Explosive actuated fastening tool	Means a tool that, by means of an explosive force, propels or discharges a fastener for the purpose of impinging it on, affixing it to or causing it to penetrate another object or material
Fire Hazard Area	Means an area that contains explosive or flammable concentrations of dangerous substances.
Machine Guard	A device that is installed on a machine to prevent a person, or any part of his/her body or clothing, from becoming engaged in any rotating, moving, electrically charged, hot or other dangerous part of a machine, or the material that the material is processing, transporting or handling. It also means a device that makes the machine inoperative if a person or any part of his/her clothing is in or near a part of the machine that can cause injury.
Person In Charge	Means a qualified person who supervises personnel performing work in order to ensure the safe and proper conduct of an operation.
Qualified Person	In respect of a specified duty, a person who because of their knowledge, training, and experience, is qualified to perform that duty safely and properly exercising due diligence.

Responsibilities

4. Supervisors are to ensure personnel are competent in the use of a tool before allowing an individual to operate the tool. Supervisors are to ensure personnel are provided with the appropriate PPE to provide protection when conducting the task. Supervisors shall ensure, to the extent that is practicable, that exposure to continuous vibration from tools and machinery is minimized.

5. Personnel are to ensure they have read and understand the appropriate Original Equipment Manufacturer (OEM) tool manual. Taking special notice of the safety features and PPE required.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Personnel are to ensure they wear the appropriate PPE while operating the tool, and are not to wear loose clothing, or items such as a tie, ring, bracelet, etc., which could become caught or entangled when using a power tool. Personnel operating equipment requiring guards and/or barriers shall be properly instructed on their proper use. This should occur as part of the individual's safety indoctrination into the department and his/her job.

INSTRUCTIONS AND TRAINING

6. Every person shall be instructed and trained by a qualified person appointed by the department in the safe and proper inspection, maintenance and use of all tools and machinery that he or she is required to use. Individuals not trained to use the equipment shall not do so unsupervised.

7. Every department shall maintain a manual of operating instructions for each model/type of portable electric tool, portable air-powered tool, explosive actuated fastening tool and stationary machine. The manuals shall be kept by the department and readily available for reference.

DESIGN, CONSTRUCTION, OPERATION AND USE

8. To the extent that it is practicable, departments shall ensure that all tools have been designed and constructed so as to be safe under all conditions of intended use. All portable tools used by personnel shall meet the CSA standards.

9. All portable electric tools shall be grounded unless the tools:

   a. are powered by a self-contained battery;

   b. have a protective system of double insulation; or

   c. are used in a location where reliable grounding cannot be obtained if the tools are supplied from a double insulated portable ground fault circuit interrupter of the class A type that meets the CSA standards.

10. No person shall ground an electrical portable power tool that has a protective system of double insulation. All portable electric tools used by personnel in a fire hazard area shall be marked as appropriate for use or designed for use in the area of that hazard.

MACHINE GUARDS

11. Every machine that has exposed, moving, rotating, electrically charged or hot parts, or that processes, transports or handles material that constitutes a hazard to personnel, shall be equipped with a machine guard that:

   a. prevents the person or any part of his or her body from coming into contact with the parts or material;

   b. prevents exposure to the hazard during the operation of the machine; or

   c. makes the machine inoperative if the person or any part of his or her clothing is in/or near a part of the machine that is likely to cause injury.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

12. Machine guards shall be installed on any machine or part of a machine that constitutes a source of danger to personnel. The guard shall be designed and placed in such a manner that it does not in itself create a hazard. It is the duty of the person starting a piece of machinery to ensure that the protective guard is secured in place before the machinery is started.

13. Where it is necessary to remove a machine guard from a machine in order to perform repair or perform maintenance work on the machine, no person shall perform the repair or maintenance work unless the machine has been locked out.

14. If a temporary guard is required, it must be approved by a supervisor prior to use. The supervisor shall provide written instructions on the procedure.

OPERATION AND USE

15. Personnel shall not operate tools or machinery unless they are wearing the appropriate personal protective equipment. Determination of the protective clothing and equipment to be used shall be IAW standard practices and the recommendations of the OEM manual.

16. Personnel who use a pneumatic portable power tool shall shut off the air supply to that tool and bleed the air line before disconnecting it from the tool, unless the air hose is equipped with a quick disconnect coupling that makes such precautions unnecessary.

17. No person is to use a pneumatic portable power tool or air hose in such a manner that an air stream might be directed forcibly against his/her body, or the body of any other person.

18. Personnel shall ensure that the tool end of any flexible shaft portable power tool is secured in a manner that will prevent the flexible shaft from whipping when the motor is started.

19. No person is to use an explosive actuated portable power tool without the approval of the person in charge and unless the person has been trained in the safe use of the tool.

20. A bench grinder shall be equipped with a work rest or other device that prevents the work piece from jamming between the abrasive wheel and the wheel guard and does not make contact with the abrasive wheel at any time.

SPARK ARRESTING EQUIPMENT

21. It was once the practice to use non-sparking tools for every repair project in fuel compounds because of the belief that ordinary tools will cause sparking. The practice now is to use ordinary tools for all operations and maintenance with the exception of tank inspection and cleaning.

INSPECTION AND MAINTENANCE

22. Departments shall ensure that all hand tools and portable power tools used are inspected at regular intervals and maintained in a safe working condition. If fitted, emergency stop buttons are in good condition and easily identified. An inspection and maintenance plan for tools and machinery shall be instituted and a record kept of all inspections and maintenance work performed in accordance with the plan.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

23. Before operating portable power tools, the individual shall inspect the tool to ensure it is safe to operate. Individuals are responsible for inspecting their work site before each and every job. This inspection includes ensuring all required equipment is in good working order and all safety devices are functioning properly. The individual shall also confirm if proper ventilation, fume, dust collection, etc. equipment is available if required.

24. In addition, privately-owned electrical equipment is not to be operated in the ship without having been inspected and approved for use on board with a certificate signed by the NTO. All hand and portable power tools shall be transported and stored in a safe manner.

DEFECTIVE TOOLS AND MACHINERY

25. Where a person finds any defect in a tool or machine that may render it unsafe for use, he or she shall report the defect to the person in charge as soon as possible. Defective equipment is to be tagged and removed from the work area. Equipment shall be repaired or replaced as required.

Procedure Performance Criteria and Records

Tool Inventory, Inspection and Maintenance Logs (by department)
Personnel training record

Attachments

Annex SOP-S06A - Tool Safety References
Annex SOP-S06B - Tool Inventory, Inspection and Maintenance Log

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S06A

TOOL SAFETY REFERENCES

A. C-02-040-009/AG-001 General Safety Standards, Chapter 4 - Tools and Machinery Safety Standard
B. C-03-005-033/AA-000, Naval Engineering Manual
C. Ship Standing Orders

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S06B

TOOL INVENTORY, INSPECTION AND MAINTENANCE LOG

Department: _____

Tool Description	Manufacturer	Model #	Serial #	Date of Purchase	Date of Inspection	Signature

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

STANDARD OPERATING PROCEDURE SOP-S07

HOT WORK

Purpose

1. To provide direction to ensure that hot work conducted on board is done safely. The primary danger is the potential for fire in the immediate area and adjacent compartments.

Scope

2. This SOP applies to all ships of this class under the jurisdiction of the Commander Maritime Forces Atlantic and Commander Maritime Forces Pacific.

Definitions

3. The following definitions are used within this SOP:

Term	Definition
Burning	The cutting of metal using heat to melt the metal, leaving a void or cut.
Hot Work	Any activity, which has the potential of generating a source of ignition. Examples include but may not be limited to burning, welding and grinding or spark producing equipment.
Grinding	The removal of metal or coatings on a metal surface, normally through the use of portable tools or abrasive wheels.
Welding	The joining of metal using welding equipment to fill the void.
Workshop	In the case of hot work, workshop is the designated space where personnel can conduct hot work. The only designated spaces onboard HARRY DEWOLF Class ships is the Shipwright Workshop.

Responsibilities

4. FMF:

   a. FMF Safety reviews the technical components of this SOP.

5. NTO:

   a. The NTO shall ensure that ships staff conducting hot work are qualified to use valid welding and cutting procedures and carry out welding and cutting operations; and

   b. Ensure that safety precautions are adhered to in accordance with references A and G.

6. Senior Watchkeeper:

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

a. The Senior Watchkeeper is responsible for the overall safety of the ship and is informed of all hot work being carried out. Further details on the actions and responsibilities of the Senior Watchkeeper are contained within the "Procedure" section.

7. Fire Sentries:

a. The fire sentries shall conduct their duties as briefed by the OPI. They are to be briefed on:

(1) the need to inspect adjacent spaces;

(2) adequate ventilation;

(3) appropriate signals for help (alarms);

(4) possess the correct fire extinguisher;

(5) all potential hazards;

(6) the removal of combustible materials in adjacent compartments;

(7) post welding checks; and

(8) having read and signed the Hot Work Certificate (Annex SOP-S07B).

8. The OPI for the hot work shall appoint and brief the safety numbers/boundaries known as fire sentries and ensure the Senior Watchkeeper is advised once the work is completed.

Procedure

GENERAL

9. The NTO shall be consulted prior to all hot work operations carried out on board outside the designated workshops. Welding operations include arc welding, brazing, acetylene and oxygen gas welding, or other relevant joining processes. Cutting operations include arc cutting, oxygen cutting, thermal cutting or other relevant cutting processes.

10. The NTO must ensure the following precautions have been taken before hot work operations are authorized:

a. compartment(s) have been certified gas free (this is normally done by FMF), but when away from home port a Level II Certified Mar Tech can complete the test;

b. combustible or flammable material within 10 metres has been protected (with fire-resistant silica cloth) or removed from the space;

c. bulkheads and deck openings within a 10 metre radius have been protected;

d. access covers to closed adjacent compartments have been removed and the compartments ventilated and certified gas free;

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

e. combustible material in adjacent compartments have been removed or protected;

f. electrical cables liable to be damaged have been covered with protective material;

g. Systems that are blanked are recorded as part of the ship's lockout/tagout program, as detailed in SOP-S04 - Lockout/Tagout;

h. Gas free testing along with a new Hot Work Certificate is conducted every 24 hours;

i. repair facility gas cylinders shall normally not be brought on board and are never to be taken below the weather deck;

j. ventilation has been provided to prevent the build-up of unburned gas and to minimize health risks of breathing the welding gases;

k. appropriate damage control zone has been isolated;

l. the Hot Work Certificate has been signed by the Senior Mechanical Propulsion Manager, NTO/NTC, or their designate (i.e., Duty Tech, I/C of Space), and sentry(s); and

m. the Senior Watchkeeper signs and retains a copy of the Hot Work Certificate while the work is being conducted.

11. Whenever hot work is carried out, a fire sentry, trained and equipped with a first aid extinguisher, shall be in constant attendance.

HOT WORK CERTIFICATE DISTRIBUTION

12. Signed copies of the Hot Work Certificate shall be held by the following personnel while the work is being conducted:

a. the fire sentry/person carrying out the job (Yellow copy); and

b. Senior Watchkeeper (White copy).

13. On completion of the job and subsequent inspection, both copies of the Hot Work Certificate shall be collected and turned over to the Senior Watchkeeper who in turn passes them to the Engineering Office for record keeping.

14. The ship shall retain a copy of the appropriate documents upon the successful completion of the gas free testing.

Note: Contact MARL/MARP SE for additional Hot Work Certificate Forms (FSES07B).

FIRE SENTRIES

15. Fire sentries shall be stationed in the compartment where hot work is taking place and in adjacent compartments if welding is taking place on bulkheads, deck heads or decks. The fire sentry must be fully aware of his/her responsibilities located on the back of the Hot Work Certificate, which include, but are not limited to:

a. the standing by with a first aid extinguisher;

b. being alert for fires in all exposed and adjacent compartment areas and taking action in the event of a fire;

c. remaining for a minimum of 30 minutes after hot work is completed;

d. inspecting the area on completion and then reporting to the Senior Mechanical Propulsion Manager/Duty Tech that the operation is complete;

e. donning appropriate action dress (minimum sleeves rolled down – jacket in hand); and

f. ensuring all personnel in the area are aware of the hot work activities to prevent the introduction of combustible solids, liquids, gasses or dusts.

16. Before hot work can commence, the fire sentry shall be briefed to ensure:

a. combustible or flammable materials within 10 metres are protected or removed;

b. bulkhead or deck openings within a 10 metre radius are protected; and

c. combustible materials adjacent to decks, deckheads and bulkheads in adjacent compartments are removed and protected.

DUTY TECH

17. No earlier than 30 minutes after the hot work ceases, the Duty Tech shall ensure all adjacent compartments to the hot work area are checked and reported safe to the Senior Watchkeeper. The time when the hot work was completed and compartment checked is to be recorded on the Hot Work Certificate (White Copy).

PROHIBITED HOT WORK

18. Hot work is prohibited:

a. in compartments containing unsealed flammable material, e.g. fuel, oil, wet paint, easily ignited solids;

b. on pipes containing any trace of fuel or lube oil. Pipes fitted as drains for water are not assumed to be oil-free and must be checked;

c. within two (2) metres of a magazine or fittings that enter the magazine; and

d. on pipes containing any trace of sewage inside.

Procedure Performance Criteria and Records

19. Ships shall forward all completed ship Hot Work Certificates and FMF Ship Hot Work/Gas Free to FMF Safety by the end of December. FMF Safety retains the completed certificates on file for 10 years.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Hot Work Certificate (Annex SOP-S07B)
Confined Space Certificate (Annex SOP-S08B)
Copies of completed FMF Ship Hot Work/Gas Free

Attachments

Annex SOP-S07A - Hot Work References
Annex SOP-S07B - Hot Work Certificate

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S07A

HOT WORK REFERENCES

A. C-02-040-009/AG-001, General Safety Standards, Chapter 7 – Hazardous Confined Spaces Safety Standard
B. C-020-040-009/AG-001, DND General Safety Standards, Chapter 25 - Welding and Cutting Operations Safety Standard
C. C-03-005-033/AA-000, Naval Engineering Manual
D. C-03-040- 000/TS-001, Maritime Command Precautions and Safety Practices for Welding and Burning
E. C-23-045-000/AG-001, Damage Control (Sea), Volume 1 of 4 Shipboard Damage Control
F. C-09-153-003/TS-000 Explosive Manual Vol. 3 – Navy Vessels
G. Ship Standing Orders
H. NAVORD 1002-0 RCN Safety and Environmental Program Management

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S07B

HOT WORK CERTIFICATE (SAMPLE)

HOT WORK CERTIFICATE **(Valid for 24 Hours Only)**

SAFE FOR HOT WORK ☐ | **NOT SAFE** FOR HOT WORK ☐

Ship/Customer: _____ Date: _____

Work Started @: _____ Work Completed @: _____ Compartment Checked @: _____

THIS CERTIFICATE SHALL NOT BE EXTENDED BEYOND 24 HOURS FROM THE TIME WORK WAS STARTED.

The following compartments have been certified safe for Hot work by: SS ☐

FMF ☐ Certificate # _____ (attached)

ISSC ☐ Certificate # _____ (attached)

SPACE (S): _____

CERTIFIED BY: _____ Signature: _____
PRINT

JOB: _____

Compartments have been tested/examined and the following conditions exist:

Adequate Ventilation ☐ No Oxygen deficiency ☐ Fire Retardant Material Required (Y/N)

No Explosive gases ☐ No Flammable materials ☐ Closest Fire Alarm Location: _____

No Toxic gases/vapours ☐ No Combustible materials ☐ Type of Extinguisher Reqd: _____

IN THE EVENT OF A FIRE, REFER TO DIRECTIONS ON THE BACK OF THIS FORM

Ammunition Considerations: (Hot Work **SHALL NOT** be performed within 2 meters of any magazine, other ammunition or explosives stowage space)

Inspected By: _____ AMMO INSPECTOR I.A.W. C 09-153-003/TS000

And therefore are safe, with a fire watch in attendance for the following:

Heating ☐ Cutting ☐ Remarks: _____

Brazing ☐ Welding ☐ _____

Grinding ☐ Needle Gun ☐ _____

SENTRY REQUIREMENTS

Number of Sentries Required ☐ Emergency Escape Routes Clear (Y/N) Communication (Y/N)

These spaces have been checked and will be checked upon completion of the hot work

Above: _____ Fwd: _____ Port: _____

Below: _____ Aft: _____ Stbd: _____

DC SYSTEMS – ZONE(S) ISOLATION

Fire: _____ AFFF: _____

Halon: _____ Mag Spray: _____

Duty Tech/Ship OPI: Sentry / Worker (s) have been briefed by a Qualified Gas Free Tech and fully understand their responsibilities:

Print Name: _____ Signature: _____

SENTRY/WORKER(s): *This certifies that the Duty Tech/OPI has briefed you about the specific hazards pertaining to your responsibilities and the emergency procedures listed on the back of this form.*

Print Name: _____ Sign Name: _____ Location: _____

Print Name: _____ Sign Name: _____ Location: _____

Print Name: _____ Sign Name: _____ Location: _____

Print Name: _____ Sign Name: _____ Location: _____

Print Name: _____ Sign Name: _____ Location: _____

MSEO/SNR HT: *This certifies that the form is complete and all reasonable precautions have been taken to ensure the health and safety of the workers.*

SNR HT: Print Name: _____ Sign Name: _____

MSEO/CEng: Print Name: _____ Sign Name: _____

OOD: Print Name: Sign Name:

This permit is invalid if there is any change to the conditions from the initial certification and the space must be retested. See the back of this form for more information.

DISTRIBUTION

White - CUSTOMER / OOD / OOW **Yellow - SENTRY / WORKER (S)** **Pink – SNR HT**

Form # FSES07B Date of Issue (Aug 2018)

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

FIRE SENTRIES INSTRUCTIONS

THESE INSTRUCTIONS MUST BE READ AND CERTIFICATE SIGNED PRIOR TO ASSUMING SENTRY DUTIES

1. As a Fire Sentry you are now responsible to the Engineering Officer for the compartment(s) noted on the "Hot Work Certificate", and adjacent compartments during hot work activities.
2. Obtain the proper fire extinguisher from the Hull Tech/OPI and proceed to the compartment noted on the "Hot Work Certificate".
3. As a Fire sentry, you will be introduced to the burner/welder and you will be shown the location and nature of the work to be done.
4. Keeping in mind that sparks can travel up to a distance of 11 meters, check out the compartment(s) for fire hazards such as paper, oil, rags, etc., to ensure they have been removed, ensure all equipment in the vicinity has been protected from the ingress of foreign particles.
5. In adjacent compartments, ensure bedding, boxes, etc., have been removed from bulkhead, deckhead or deck on which burning/welding is to be done.
6. When you are certain that nothing can catch on fire, the burning/welding can commence.
7. At start of operations, enter the start time on the "Hot Work Certificate".
8. You must remain in the vicinity, continually checking for fires throughout the whole operation.
9. ***YOU MAY NOT LEAVE UNDER ANY CIRCUMSTANCES*** unless you are relieved officially by another sentry or the burning/welding operation is stopped.
10. If at any time during the burning/welding operation, you **SMELL….SEE….FEEL** any dangers, stop the operator and inform him and the Senior Hull Tech/Fire Fighter immediately.
11. During the burning/welding operations watch for blistering paint or other hazards such as lingering hot metal, and use the extinguisher if necessary.
12. A fire watch shall be maintained during and for at least one-half hour after completion of burning/welding operations, to detect and extinguish possible smoldering fires.
13. Fire sentries shall be alert for fires in all exposed and adjacent compartments and take action IAW SSOs Chapter 3, which states in part:

IN THE EVENT OF A FIRE:

a. **SHOUT…FIRE, FIRE, FIRE IN THE " COMPT ";**
b. **Have Command/HQ1 (brow in Harbour) informed by the quickest possible means;**
c. **Attack with first aid extinguisher if possible;**
d. **If attack is impractical or unsuccessful, commence confinement; and**
e. **Brief and assist rapid response team.**

14. Have extinguisher within reach and at the ready at all times.
15. On completion of burning/welding operations, enter the time completed on the "Hot Work Certificate".
16. One-half hour after completion of burning/welding operations, check all compartments in and around that compartment to make sure metal work is cool and no smoldering fires exist, and that no potential dangers exist.
17 Enter time compartment and adjacent compartments checked on the "Hot Work Certificate".
18. Collect "Hot work Certificate" Copies from the Sentry/Worker and OOD/OOW and return to Engineering Office.

NOTE:

1. Sign the Certificate to the fact that you have read and understood these instructions.
2. If there are any questions, see the Senior Hull Tech/Ship OPI.

SUPERVISOR INSTRUCTIONS

- **THIS CERTIFICATE SHALL NOT BE EXTENDED BEYOND 24 HOURS FROM THE TIME WORK WAS STARTED. IAW SEMS SOP-S07 - Hot Work and SOP-S08 - Confined Space Entry.**
- **HOT WORK SHALL NOT BE PERMITTED IN A CONFINED SPACE UNLESS THIS CERTIFICATE IS SIGNED AND A COMPLETED SIGNED "CONFINED SPACE CERTIFICATE" IS ATTACHED PRIOR TO COMMENCING ANY HOT WORK.**

Note: Contact MARL SE/FSE for additional Hot Work Certificate Forms (FSES07B).

Form # FSES07B Date of Issue (Aug 2018)

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

STANDARD OPERATING PROCEDURE SOP-S08

CONFINED SPACE ENTRY

Purpose

1. To provide direction to personnel on the safe entry and work in a confined space, and procedures to follow in case of a casualty.

Scope

2. This SOP applies to all ships of this class under the jurisdiction of the Commander Maritime Forces Atlantic and Commander Maritime Forces Pacific. This SOP applies to all personnel entering, and those responsible for personnel entering, a confined space onboard HARRY DEWOLF Class Ships.

Definitions

3. The following definitions are used within this SOP:

Term	Definition
Confined Space	An enclosed or partially enclosed space that: a. is not designed or intended for human occupancy except for the purpose of performing work; b. has restricted means of access and egress; and c. may become hazardous to any person entering it owing to: i. its design, construction, location or atmosphere; ii. the materials or substances in it; or iii. any other conditions relating to it. Note: On board a ship, confined spaces can include but are not limited to, all tanks, poorly ventilated bilges, cofferdams and antenna domes. Extreme caution is necessary when opening any such space. The contents of a closed compartment may, over a period, give off flammable or toxic vapours in sufficient quantities to become a threat to life, or they may consume the oxygen in the compartment. Even an empty compartment must be suspected, since many paints create similar dangers.
High Risk Entry	Anytime personnel are required to enter a confined space in which the hazards present, not limited to atmosphere, are immediately dangerous to life or health (IDLH), or where conditions in a confined space or the nature of the work to be performed in a confined space is such that GSP Vol II 7.3.3 cannot be complied with, the entry will be considered high

	risk and the requirements identified in the COHSR 11.5 and GSP Vol II 7.5 must be met.
Qualified personnel	A person who is authorized to perform compartment safety certifications (provided they have the required qualification Level). They are: a. FMF General Safety and Environment Inspectors (SEIs); and b. personnel current with Gas Free Certification (AFPY). Note: Compartment safety certifications in HMC Ships are frequently contracted to non-DND contractors (e.g. KINGSTON Class maintenance). Non-DND inspectors are to possess an accredited civilian qualification.
Safe to Enter	This is described as being able to safely enter a previously confined space without the use of an air-purifying or supplied air (SAR/SCBA) respirator.
Safe for Hot Work	This is described as being able to perform any type of hot work in an internal space without working in an explosive atmosphere.

Responsibilities

4. MARL/MARP SE:

   a. MARL/MARP SE administers the review of this SOP utilizing input from FMF, FTA, FTO and other stakeholders as required.

5. Qualified personnel:

   a. Qualified personnel are to be used to certify that confined spaces are free from all dangers and are safe to enter;

   b. Alongside in homeport, the FMF Safety and Environment Office issues all gas free certificates, even for outside contractors;

   c. Qualified personnel may prove an area gas free away from homeport.

6. NTO/NTC:

   a. The NTO/NTC or their delegated representative shall ensure the space has been properly flushed (if required), ventilated, tested safe by qualified personnel, and the documentation is prepared and signed accordingly prior to anyone entering a confined space.

7. Officer or Technician PO2 or above:

   a. An officer or technician of the rank of PO2 or above will be in charge of any party opening or working in a confined space; and

b. The Senior Watchkeeper/OOW is to be advised when the work commences and is complete.

Procedure

SHIPS IN HOME PORT

8. Only qualified personnel (as defined in this SOP) shall perform compartment safety certifications in "Ships in Home Port". Only a qualified FMF inspector shall conduct safety certification of compartments where FMF or other non-ship's personnel will be working. Ships are to contact FMF Safety to schedule Gas Free prior to the commencement of work. Annex SOP-S08B is the ship's form only. FMF will continue to use their own form and attach to Annex SOP-S08B.

SHIPS AT SEA

9. In the absence of a qualified FMF inspector, the CO may authorize an individual with an AFPY qualification to issue a Confined Space Certificate (Annex SOP-S08B) for work by ship's personnel in all compartments.

SHIPS AWAY FROM HOME PORT

10. Ships Away from Home Port shall implement the same policies and procedures implemented for Ships at Sea. When alongside a foreign port, SS shall enforce the regulations contained in this SOP when local contractors are required to perform work onboard.

PERSONNEL QUALIFICATIONS

11. Personnel who perform "safe to enter" and "safe for hot work" certifications shall be qualified to the appropriate Level. CAF personnel will hold the AFPY qualification. FMF SEIs will hold the FMF Level qualification.

PRECAUTIONS

12. No person shall enter a confined space without permission of the NTO/NTC or his/her delegated representative who shall ensure that a hazard assessment is completed and the appropriate precautions are taken.

13. An explosion proof ventilation fan with discharge hose shall be used to ventilate with fresh air by taking suction from the bottom of the space and discharging to the upper deck. The discharge is to be in a safe place to avoid impact on personnel/ship's operations (i.e. close to the waterline).Until testing has successfully been completed to confirm the space is gas free, entry to the space shall have a sign posted outside the confined space entrance, stating "CAUTION! CONFINED SPACE VENTING - DO NOT ENTER" to ensure personnel safety.

14. In exceptional circumstances, when the space has not been certified safe to enter, personnel may be required to enter the space. This must be done with PPE as identified by the hazard assessment (e.g., approved breathing apparatus, safety harness, lifeline, etc.). The Confined Space sentry is not to enter the space, but shall remain in constant communication with the member(s) inside.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

15. The ship shall retain a copy of the appropriate documents for two years upon the successful completion of the gas free testing. Gas free testing, along with a new Confined Space Certificate, are to be conducted at the discretion of the qualified inspector, but is not to exceed 24 hours. Any system that terminates within a confined space is to be appropriately blanked prior to entering the space. Systems that are blanked shall be recorded as part of the ship's lockout/tagout program, as detailed in SOP-S04 - Lockout/Tagout.

16. Before entering the confined space, the absence of flammable gas must be proved by using an approved gas detecting and indicating device. The presence of sufficient oxygen must be subsequently demonstrated. Proper PPE shall be worn by any person entering a confined space as indicated on the confined space chit.

17. After a space has been confirmed 'Safe To Enter' the following conditions must be met in order for personnel to work in the space:

a. the 'Pink' copy of the signed "Annex SOP-S08B - Confined Space Certificate" must be placed at the entrance to the Confined Space;

b. a sentry is to be stationed outside the space, to log (on the back side of the form mentioned above) worker entries / exits and monitor their condition while inside;

c. Position rescue equipment as determined within the rescue plan;

d. establish and test communication device with the worker(s) prior to entry into the confined space and no less than every 20 minutes while work is being performed in the Confine Space;

e. if a space requires forced ventilation (positive exhaust), it will be vented to the upper decks with the exhaust hose in a safe location. The ventilation system shall be equipped with an alarm or monitored by the sentry. If the ventilation equipment fails to operate, the sentry shall immediately inform the worker(s) and they shall exit the Confined Space area until proper ventilation is restored. If the conditions at the time of certification change in any manner or if at any time the atmosphere is suspect, re-testing of the compartment atmosphere must be conducted;

f. sentry(s) shall not leave the entrance to a Confined Space, while worker(s) are inside, unless relieved by a person who has been briefed on the requirements of a confined space sentry (IAW Annex SOP-S08B – Confined Space Certificate, pg. S08B-2/2) by the Duty Tech/Senior Watchkeeper or any other personnel listed in paragraph 5 of this SOP ;

g. any required lighting must be an approved explosion proof light; and

h. emergency procedures have been reviewed and understood by all those involved.

18. Ship staff shall ensure contractors adhere to all requirements identified in this SOP.

Note: Contact MARL/MARP SE for additional Confined Space Certificate Forms (FSES08B).

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

HAZARD ASSESSMENT/RESCUE PLAN

19. Before any personnel enter a confined space, a hazard assessment must be completed and documented using Annex SOP-S08B.

20. Alongside homeport this assessment will be completed by the work supervisor, Duty Tech and a FMF Safety and Environmental Inspector (SEI). At sea, the hazard assessment will be conducted by the NTO or his delegate (i.e., NTC or Senior Mechanical Propulsion Manager), and the supervisor in charge of personnel working in the confined space.

21. Things to include in the assessment include, but are not limited to:

a. configuration of confined space;

b. location of work in space;

c. atmospheric conditions;

d. number of personnel working in space;

e. known hazards inside and outside the space;

f. identification of any other work that may affect work procedures in the confined space; and

g. communication.

22. Based on the hazard assessment a rescue plan is to be formulated and documented using Annex SOP-S08C. The rescue plan may include, but is not limited to the following:

a. type of evacuation required (e.g. vertical or horizontal, entry rescue or non-entry rescue;

b. rescue personnel capabilities (who and what roles);

c. emergencies services (e.g. Dockyard Fire Department);

d. type and location of rescue equipment and PPE required;

e. atmospheric conditions/requirements;

f. rescue due to change in atmospheric conditions (i.e. high risk entry); and

g. first aid response capabilities.

Note: The Duty Tech is to ensure that the Senior Watchkeeper is made aware of the rescue plan requirements.

23. Anytime personnel are required to enter a high risk confined space the CO must ensure the requirements identified on page two of Annex SOP-S08C are met. These cases are rare and in most cases the COHSR and GSP requirements will be implemented by the contractor, a third-party, or the local Fire Department trained in confined space emergency response. The supervisor shall ensure a copy of any

third-party hazard assessments and rescue plans meet the requirements of this SOP and the final signed and dated copy is placed on file.

EMERGENCY PROCEDURES

24. The specific roles and responsibilities for a response to a casualty in a confined space are defined below.

25. Alongside homeport, the Dockyard Fire Department will be the primary resource for a confined space rescue. The Duty Watch will be utilized to conduct the initial response and for on-scene management until the arrival of the Dockyard Fire Department. The Senior Watchkeeper should utilize onboard SMEs, ie NTO, NTC, Senior Mechanical Propulsion Manager, to assist with the initial response if available.

26. Rescue is to be conducted based on the rescue plan discussed, with modifications based on the state of the casualty and the state of the confined space. This will determine whether entry of response personnel is required, the type of PPE to be worn and the rescue equipment needed to be set-up.

27. Before proceeding to assist an unresponsive casualty, it must be assumed that a toxic atmosphere is present in the space. Personnel shall don SCBAs prior to entering the confined space, unless it is obvious the casualty is down for another reason. The Senior Watchkeeper or Duty Tech/supervisor in charge of work will brief casualty clearing personnel on the hazards present in the space.

Note: If casualty clearing personal are required to enter the confined space their primary purpose is to stabilize the casualty until rescue personnel arrive.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Table S08.1 – Confined Space Casualty Alongside Homeport

Personnel	Actions
Sentry	(1) raises the alarm in accordance with SSOs; (2) inform the Brow/MCR by the quickest means, and continue to raise the alarm until satisfied that the correct pipe is made; (3) Attempts to communicate with casualty to determine: a. level of consciousness; b. extent of injury; c. cause of injury; d. name of casualty; and e. location in space; and (4) Remain at the scene to brief the remainder of the Rapid Response Team upon their arrival. Note: At no time is the sentry to enter the space. Rescue can be attempted only if the casualty is within arm's reach of the entrance and at least 1 other person is present.
SENIOR WATCHKEEPER	(1) Responsible for the proper and safe handling of casualty; (2) Ensures that the Brow Watchkeeper has made the required phone calls, (ie Dockyard Fire Department, ambulance and Military Police); (3) Conducts O Group with DTech to discuss: a. rescue plan (ie, who will conduct the rescue, Dockyard Fire Department or SS); b. Equipment required (e.g. rescue and medical); c. individual duties; and d. communication plan; and (4) Proceeds to the brow and establishes a command position. Note: If the Dockyard Fire Department is unavailable to respond, the Senior Watchkeeper must utilize onboard SMEs (e.g. NTO, NTC, Senior Mechanical Propulsion Manager, PA, etc), or adjacent ships, to assist with the casualty extraction. If there are no SMEs onboard and the extraction is beyond the capability of the Duty Watch, a recall of personnel should be initiated.

Personnel	Actions
DTech	(1) Tasks personnel to retrieve rescue equipment and bring it to the entrance of the confined space; (2) Responsible for the management of casualty clearers and first aid equipment; (3) Details escort for Mutual Aid Agency as required; (4) Assists with casualty as required; (5) Prepares evacuation route from the scene to the jetty; (6) Provides regular sitreps to the Senior Watchkeeper; (7) Ensures scene is safe by verifying there are no mechanical, electrical, ventilation, atmospheric or other concerns which may jeopardize responders or the casualty's safety; (8) If required, ensures SS tasked with casualty extraction are properly dressed; and (9) Remains at the scene to assist the Dockyard Fire Department as required.
Off Watch Personnel	(1) Act as casualty clearers as detailed by the Senior Watchkeeper.

CONFINED SPACE CASUALTY AT SEA

28. The major difference between the response to a confined space casualty at sea to one alongside homeport is the absence of the Dockyard Fire Department.

29. The NTO/NTC/Senior Mechanical Propulsion Manager will be responsible for conducting the hazard assessment and formulating the rescue plan with assistance from other departments as required. All the precautions listed in the response to a confined space casualty alongside shall be adhered to.

TRAINING

30. Supervisors are to ensure that personnel detailed to conduct any aspect of confined space entry are provided with instruction and training on:

a. the requirements of this SOP;

b. the use of personal protection equipment, electrical safety insulated protection equipment and tools that a person may need in the confined space;

c. the protection equipment and emergency equipment to be used by a person who takes part in the rescue of a person from a confined space or in responding to other emergency situations in the confined space; and

d. established emergency procedures to be followed in the event of an accident or other emergency in or near the confined space.

31. The CO shall ensure that no person enters a confined space unless the person is instructed and trained as noted in para 30.

32. A confined space entry emergency exercise shall be conducted and recorded by ship staff monthly.

Procedure Performance Criteria and Records

33. Ships staff shall forward completed chits to FMF safety monthly, or following the end of a work period.

Confined Space Certificate (Annex SOP-S08B)
Copies of completed FMF Ship Hot Work/Gas Free/Safe to Enter Chit

Attachments

Annex SOP-S08A - Confined Space Entry References
Annex SOP-S08B - Confined Space Certificate
Annex SOP-S08C - Confined Space Hazard Assessment
Annex SOP-S08D - Confined Space Rescue Plan

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S08A

CONFINED SPACE ENTRY REFERENCES

A. C-02-040-009/AG-001, General Safety Standards, Chapter 7 – Hazardous Confined Spaces Safety Standard
B. Canadian Occupational Health and Safety Regulations, Chapter 7 – Confined Spaces
C. NAVORD 1002-0 RCN Safety and Environment Program Management
D. Ship Standing Orders

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S08B

CONFINED SPACE CERTIFICATE (SAMPLE)

CONFINED SPACE CERTIFICATE

Unit/Location: _____ / _____ Date: _____ Time: _____

(Section A) - CONFINED SPACE (this certificate shall not be valid beyond the expiry date and time below to a maximum of 24 hrs)

Space: _____

Space Certified "SAFE-FOR-ENTRY" By: CLASS: _____

Gas Free Tech/Safety Inspector: _____ (Print) Signature: _____

Secure means of isolation confirmed/CSIP: _____ FMF Shop/Contractor Certificate #: _____

Work being performed: Inspection / Cleaning / Repair / Paint **By**: Ships Staff / FMF Shop / Contractor

(Section B) - ENTRY INTO THIS SPACE SHALL NOT BE PERMITTED UNLESS;
This certificate has a valid expiry date and time in the space below and has been signed fully.

Date of Entry:	Time of Entry:	Date Expires:	Time Certificate Expires:

(Section C) - ATMOSPHERIC TEST RESULTS

Oxygen %		Toxic Atmosphere (PPM)		Test Equip Serial #	
Explosive LEL %		CO Content		Model #	
H_2S Content		Other _____		Calibration Date	

(Section D) - SPACE ENTRY REQUIREMENTS

Blanking or Disconnection to prevent the ingress of a solid, liquid or gas, has been completed. ☐ _____ (Customer/Ship Representative)

All Electrical/Electronic Equipment has been Isolated (In Accordance With SO 3.03.8 and 3.03.9) ☐ _____ (Customer/Ship Representative)

Emergency Escape Routes Clear ☐ Communication ☐ Lighting requirements

Hazard ID Conducted/Rescue Plan Formulated ☐ _____ (Customer/DTech)

Number of Sentries Required ☐ Closest Fire Alarm Location: _____

Mechanical Ventilation Reqd

(Section E)

PPE to be worn: Hard Hats ☐ Respiratory Protection ☐ Eye Protection ☐ Gloves ☐ Footwear ☐ Harness ☐

(Section F) - Special Instructions: (Any additional Instructions shall be attached to the back of this form)

(Section G) - ALL SHIP STAFF / EMPLOYEES ENTERING THIS CONFINED SPACE SHALL SIGN THIS REPORT INDICATING THAT THE ABOVE RESULTS AND ANY SPECIAL INSTRUCTIONS ARE UNDERSTOOD.
(See back for additional Instructions and Entry/Exit Log)

Sentry / Worker Signatures

1. _____ 7. _____
2. _____ 8. _____
3. _____ 9. _____
4. _____ 10. _____
5. _____ 11. _____
6. _____ 12. _____

(Section H) - MSEO/SNR HT/CEng: By signing below, this certifies that the form is complete and all reasonable precautions have been taken to ensure the health and safety of the workers.

SNR HT: Print Name: _____ Sign Name: _____

MSEO/CEng: Print Name: _____ Sign Name: _____

OOD: Print Name: _____ Sign Name: _____

This permit is no longer valid if the atmospheric conditions have changed from the initial certification and the space must be retested.

DISTRIBUTION

White - CUSTOMER / OOD / OOW **Yellow - SAFETY / ENGINEERING OFFICE** **Pink - CONFINED SPACE ENTRANCE**

Form # FSES08B Date of Issue (July 2018)

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

CONFINED SPACE SENTRIES AND WORKERS INSTRUCTIONS

THESE INSTRUCTIONS MUST BE READ AND CERTIFICATE SIGNED PRIOR TO ASSUMING SENTRY DUTIES

1. As a Confined Space Sentry you are now responsible to the Engineering Officer for the compartment(s) and the safety of the Confined Space Worker(s) during your shift, as noted on the "Confined Space Certificate";
2. Once the Confined Space Certificate has been filled and signed, the "Pink" copy must be placed by the entrance to the Confined Space;
3. As sentry, you are responsible for recording all entries and exits into the Confined Space compartment in the log listed below. Only workers listed in Section "G" on the front of this report are allowed to enter the Confined Space;
4. Keep entrance to the Confined Space and any Emergency Exits clear at all times;
5. Establish and test communication device with the workers prior to their entry into the Confined Space, and ensure constant communication is maintained with the workers while in the confined space;
6. Ensure workers entering the Confined Space are wearing appropriate PPE as stated in section "E";
7. Ventilation Fans are to be monitored by the sentry. If the ventilation equipment fails to operate properly, he/she shall immediately inform the worker(s) in the Confined Space of the failure of the equipment and they shall exit the Confined Space immediately until proper ventilation is restored and atmosphere is re-tested;
8. No person shall close off a Confined Space until the sentry has verified and recorded that no worker is left inside the Confined Space;
9. You must remain in the vicinity of the Confined Space Entrance and continually check the worker(s) status;
10. ***YOU MAY NOT LEAVE UNDER ANY CIRCUMSTANCES*** unless you are officially relieved by another sentry or the Confined Space work/operation has stopped; and
11. At the end of the 24 hour period or the expiry Date and Time listed in section "B", Collect all "Confined Space Certificate" copies for that day and return them to Engineering Office.

IN THE EVENT OF A WORKER NOT RESPONDING OR TO GET HELP IN AN EMERGENCY:

DO NOT ENTER SPACE TO RENDER ASSISTANCE (unless you are trained to do so, and another qualified sentry person is stationed at the entranceway). Your job is to get help.

1. **SHOUT…CASUALTY, CASUALTY, CASUALTY IN THE " COMPT ";**
2. **Have Command/HQ1 (brow in Harbour) informed by the quickest possible means;**
3. **Only attempt to rescue a worker if they are within arms reach of the entrance;**
4. **NO UNTESTED OR UNSAFE CONFINED SPACE IS TO BE ENTERED WITHOUT THE USAGE OF:**
   a. Positive pressure approved self contained breathing apparatus (SCBA);
   b. Secure life-line which will be securely fastened outside the compartment; and
   c. Constant communication with a supervisor that is in open air.
5. **Brief and assist rapid response team.**

NOTE:
1. Sign the Certificate to the fact that you have read and understood these instructions.
2. If there are any questions, see the MSEO or Senior Hull Tech.

Entry/Exit Log

Sentry person to write a "1" each time the named worker enters the confined space and write a "Ø" each time the named workers exits the Confined Space.

Name of Worker	Status IN = 1 OUT = Ø															

Note: Contact FSE for additional Confined Space Certificate Forms (FSES8A).

Form # FSES08B Date of Issue (July 2018)

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S08C

CONFINED SPACE HAZARD ASSESSMENT

ID#:

Confined Space Name/Location: _____
Atmospheric condition (e.g. clear or toxic): _____
Area gas Free: O Yes O No
Condition measured by: O Air monitoring O Other means _____

1) Access to the Confined Space (check a where applicable)

Entrance/Exit easily accessible O Yes O No
Location: O Top O Bottom O Side
Size (Diameter, etc.): _____
Vertical Entry/Exit O Yes O No
O Stairs O Fixed Ladder O Portable Ladder O Other (i.e. tripod): _____
Distance down/in: _____
Horizontal Entry/Exit O Yes O No
Distance in: _____

2) Internal Configuration and Hazards of Confined Space (check a where applicable)

Low ceilings O Yes O No
O Walk in O Crawl in O Stomach/Back
Head Hazards O Yes O No
O Flat surface O Sloping Surface O Slippery surface
O Tripping Hazards (e.g. pipelines, step over obstructions) O Yes O No _____
Poor lighting O Yes O No _____
Possible contact with energized conductors O Yes O No _____
Mechanical hazards (sharp objects, gears, pinch points, etc) O Yes O No _____
Hydraulic/Pneumatic hazards O Yes O No _____
O Welding O Cutting O Grinding O Power Tools O Other _____

3) External Hazards (check a where applicable)

High traffic area at entrance O Yes O No _____
Overhead obstructions O Yes O No _____
Other work in vicinity of confined space O Yes O No _____
Spill or possibility of objects falling into opening O Yes O No_____

4) Other Considerations (check a where applicable)

Lockout procedures required O Yes O No _____
Adequate ventilation O Yes O No _____
Purpose of ventilation O For comfort O To maintain atmosphere
Communications O Yes O No _____

5) Comments

Duty Tech: _____ / _____ / _____
Print Date Signature
Work Supervisor: _____ / _____ / _____
Print Date Signature
FMF Safety: _____ / _____ / _____
Print Date Signature

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S08D

CONFINED SPACE RESCUE PLAN

Hazard Assessment ID (as recorded in Annex SOP-S08C) _____
Confined Space Name/Location: _____

Methods of Communication: O Phone O Audible Signal O Radio O Ship's Intercom

Methods of Rescue: (Check all that apply)

O External (Retrieval) O Internal O Horizontal O Vertical
O Hauling System required O Patient lowering system required High Risk? O Yes O No
O Anchor overhead (If yes refer to instructions on back)
Anchorage: O Beam O Stairwell O Support Strut O Other: _____
Pre-Rigging required? O Yes O No

Rescue Personnel (Check all that apply)

O Dykd FD O Duty Watch O Casualty Clearers O Other (i.e onboard SMEs): _____

Rescue Equipment Requirements (check where applicable and indicate quantity needed)

O Hauling Systems: ____ O Carabiners: ____ O Pulleys: _____ O Safety Lines: _____
O Anchor Straps: _____ O Webbing: _____ O Ascenders: _____ O Body Harnesses: _____
O Rigging Plates: _____ O Main Lines: _____ O Fire Extinguishers: _____ O Stretcher: _____
O Other: _____

Medical Equipment Requirements (check where applicable and indicate quantity needed)

O First Aid Kit: _____ O Oxygen: _____ O Other: _____

Additional PPE Requirements (Indicate what is needed):

O High Visibility Vests O Hearing Protection O Safety Boots O Hard Hats
O Safety Glasses/Goggles O Gloves O Face Shield O Other: _____

Rescue Equipment Location

O On site O Other: _____

Comments

Duty Tech: _____ / _____ / _____
Print Date Signature
Work Supervisor: _____ / _____ / _____
Print Date Signature
FMF Safety: _____ / _____ / _____
Print Date Signature

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

HIGH RISK ENTRY INSTRUCTIONS

1. Anytime personnel are required to enter a confined space in which the hazards present, not limited to atmosphere, are immediately dangerous to life or health (IDLH), the entry will be considered high risk.

2. Entry into high risk confined spaces is rare and requires the following additional control measures:

a. a qualified person trained in the entry and emergency procedures is in attendance outside the confined space, and in communication with the personnel inside the confined space;

b. in addition to the qualified person, a minimum two or more persons are in the immediate vicinity of the confined space to assist in the event of an accident or other emergency;

c. one of the persons referred to above shall:

(1) be trained in emergency procedures;

(2) be the holder of a basic first aid certificate; and

(3) be provided with the required protection equipment and emergency equipment.

d. every person entering, exiting or occupying the confined space must wear an appropriate safety harness that is securely attached to a lifeline;

e. the lifeline shall be attached to a secure anchor outside the confined space and be controlled by the qualified person;

f. the lifeline shall protect the person from the hazard for which it is provided and shall not in itself create a hazard; and

g. the lifeline shall, where reasonably practicable, be equipped with a mechanical lifting device.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

STANDARD OPERATING PROCEDURE SOP-S09

RADIO FREQUENCY HAZARD SAFETY

Purpose

1. The purpose of this SOP is to amplify the RADHAZ policy and procedures outlined in Reference E as they pertain to HARRY DEWOLF Class ships.

Scope

2. This SOP applies to all ships of this class under the jurisdiction of the Commander Maritime Forces Atlantic and Commander Maritime Forces Pacific. This SOP applies to all personnel working on board the ship.

Definitions

3. The following definitions are used within this SOP:

Term	Definition
A&E	Ammunition and Explosives
Adjacent Ships	Any vessel(s), including nested vessels, within the largest MEL of the RF emitter(s) in use or 100m for HF transmissions.
Aircraft RF Safety Distance[m]	Safety distance for operation of specific RF Transmitters while helicopters are in operation that reflects the greater between HERP and Electro-Magnetic Interference (EMI) hazards.
Air Control Zone	An aircraft control zone is established to ensure aircraft safety and is to be assumed active at all times. This zone is a volume of space surrounding a ship that is 1/2 nautical mile radius up to an altitude of 3500 feet.
Aloft Areas	The following areas shall not be accessed without the permission of the Senior Watchkeeper or OOW.

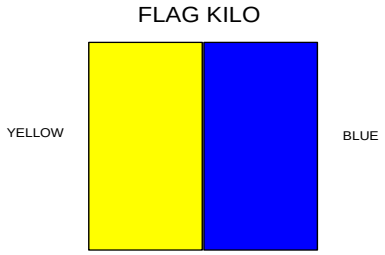
CLASS	Bridge Top	FWD MAST Area	Funnel Area	AFT MAST Area	FWD/AFT Mast
HDW	X	X	X	X	X

Personnel Aloft procedures are to be utilized for adjacent areas where personnel breaks the plane of aloft area and within the MEL of the operational RF transmitter encompassing cranes, buildings, ships, Man Lift, Bucket/Mast Box and other structures where personnel may be present.

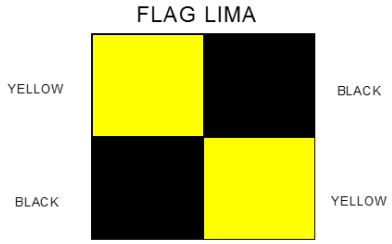
Alongside	The term used to describe a ship when it is secured to a jetty or to another ship that is secured to a jetty.
Approved Low Power Safety Device	A safety device that is connected to RF system that reduces RF energy output such that the MEL distance is insignificant.
At Sea	When lines have slipped and sea watches are closed up.
Boat Deck	The designated area on a ship where the ship's service vessels are stored, raised off or lowered into the water.
CCR	Communications Control Room
Contact current	(RF Burn) Contact current occurs when personnel make direct body contact with an antenna or a metallic object that is energized by a Radio Frequency field, and current flows through the body to ground. Contact current is of greatest concern when dealing with long, thin metallic objects in RF fields. This includes antennas, stanchions, guardrails, crane cables and hooks, etc. that are located within high frequency (HF) fields, particularly when the object is similarly polarized to the field (i.e., a vertical object in a vertical field).
Controlled Environment	A safety standard, as defined under Health Canada's Safety Code 6, where the Specific Absorption Rate from RF electromagnetic energy is no greater than 0.4 Watts/kg and the following three conditions are satisfied: a. the RF field intensities in the controlled area have been adequately characterized by means of measurements, calculations or modeling; b. the exposure is incurred by persons who are aware of the potential for RF exposure and are cognizant of the intensity of the RF energy in their environment; and, c. the exposure is incurred by persons who are aware of the potential health risks associated with RF energy exposures and whom can control their risk using mitigation strategies. It is typically expressed as a Maximum Exposure Level (MEL) distance away from the emitter in metres.
Denied Occupancy Area [D]	An area not to be accessed by any person when an RF emitter is transmitting, as directed in the appropriate Annex for specific classes of ship.
Dummy Load	A device for absorbing the power output of an electromagnetic radiation source.
EED	Electro-Explosive Device
EHF	Extra High Frequency transmissions in the 30 to 300 GHz band.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

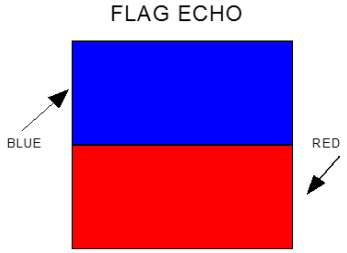
EM	Electro-magnetic
EME	Electro-magnetic Environment
EMI	Electro-Magnetic Interference. An electromagnetic disturbance, whether intentional or not, which interrupts, obstructs, or otherwise degrades or limits the effective performance of electronic or electrical equipment.
Flag KILO	Flag KILO close-up indicates that a person is working aloft.



Flag LIMA	Flag LIMA close-up indicates a warning as a result of the vessel radiating RF energy.



Flag ECHO	Flag ECHO close-up indicates that the vessel is rotating an antenna(s) without radiating RF energy in homeport. It also signifies transmission of a system into its dummy load.



Harbour Limits	Refers to inside the charted limits of a given harbour, unless the local port authority defines it otherwise.
HARPs	Harbour RF Emitter Radiate Procedures
HERF	Hazards of Electromagnetic Radiation to Fuel

	HERF is the potential for electromagnetic radiation to cause spark ignition of volatile combustibles such as gasoline, fuels or solvents. Fuels with a flash point above 60°C are non-hazardous when exposed to RF radiation; however, volatile materials (e.g., gasoline, lubricants, cleaners, paint, etc.) with a flash point at or below 60°C are potentially dangerous when exposed to RF radiation. Appropriate precautions are to be observed when handling these materials.
HERO	Hazards of Electromagnetic Radiation to Ordnance The situations in which transmitting equipment (for example, radios, radar, electronic countermeasures) or other electromagnetic emitting devices can generate radiation of sufficient magnitude to induce or otherwise couple electromagnetic energy sufficient to exceed specified safety and/or reliability margins in electrically initiated devices contained within the A&E, or cause radiation induced damage or degradation of performance in A&E containing electrically initiated devices.
HERO Safe A&E	Any A&E item that is sufficiently shielded or otherwise so protected that all electrically initiated devices contained by the item are immune to adverse effects (safety or reliability) when the item is employed in the radio frequency environment delineated in NATO AECTP 258.
HERO Susceptible (HS) A&E	Any A&E item containing electrically initiated devices proven by test or analysis to be adversely affected by radio frequency energy to the point that the safety and/or reliability of the system is in jeopardy when the system is employed in the radio frequency environment delineated in NATO AECTP 258.
HERO Unsafe (HU) A&E	Any A&E item containing electrically initiated devices that has not been classified as HERO SAFE or HERO SUSCEPTIBLE A&E as a result of a hazards of electromagnetic radiation to A&E analysis or test. Additionally: a. any A&E item containing electrically initiated devices (including those previously classified as HERO SAFE or HERO SUSCEPTIBLE A&E) that has its internal wiring exposed; b. when tests are being conducted on that item that result in additional electrical connections to the item; c. when electrically initiated devices having exposed leads are present and handled or loaded in any but the tested condition; d. when the item is being assembled or disassembled; or e. when such A&E items are damaged causing exposure of internal wiring or components or destroying engineered HERO protective devices.
HERP	Hazards of Electromagnetic Radiation to Personnel HERP is the hazard to personnel which are subjected to a level of RF energy, induced current or a contact current that is higher than the prescribed limit defined under reference B under Controlled or

	Uncontrolled Environment standards. The RCN applies an Uncontrolled Environment standard unless Controlled Environment conditions are met.
HF	High Frequency transmissions in the 2.0 to 30 MHz band.
IFF	Identification Friend or Foe
LCS	Local Control Station
LOS	Line of sight
MEL	Maximum Exposure Limit. The distance (in metres) from an RF emitter at which the energy density of the RF Field generated will not exceed the Specific Absorption Rate standard identified for Controlled or Uncontrolled Environment.
Nested	Ships tied to each other. This shall include ships moored 20m or less from each other.
No-Lingering (NL)	An area within the MEL distance that may be traversed by personnel when a RF emitter is transmitting. Traversing shall take no more than 1 minute within each 6-minute period.
Normal Control	Procedures taken to control radiation and rotation of an RF emitter with the specific purpose of preventing HERP, HERO, HERF, EMI and rotation hazards to personnel, and for which the basic principle prescribes that for all cases where personnel, ammunition and explosives, fuel and EMI susceptible systems have the possibility of being exposed to a radiation or rotation hazard, the respective RF Emitter Key is returned to the RF Emitter Keyboard.
On-site Contact	Required for the DND 2145, he/she shall be the point of contact for the Senior Watchkeeper or OOW with respect to the specific evolution identified. The designated person is directly involved with the job but cannot be the Ship's Staff (job) Supervisor. The On-site Contact must remain on the job site while the DND 2145 remains open. This person retains the yellow copy of the control chit and the key to the padlock on the RF emitter keyboard.
Senior Watchkeeper or OOW	Senior Watchkeeper or Officer of the Watch.
OpsO	Operations Room Officer
Ordnance	Ammunition and Explosives
Positive Control	Administrative procedures normally taken at sea to inhibit RF transmission and/or rotation of an RF emitter with the specific purpose of preventing HERP, HERO, HERF, EMI and rotation hazards to personnel

	without the removal of the system's safe-to-transmit key, or with the removal of the key but without its return to the RF Emitter Keyboard.
QHM	Queen's Harbour Master
RF	Radio Frequency (Non-Ionizing)
RCS	Remote Control Station
RF Danger Zone	The RF Danger Zone is that volume of space that extends from the RF emitter's antenna along the centreline of the main beam to the HERP MEL distance, with the boundaries defined to include the main lobe and side lobes where necessary. RF status safe Halifax/Esquimalt emitter ≥ 75M and HF keys are secured in the emitter keyboard with the URFSO lock prior Leaving or Entering the Harbour limit.
RFSP	Radio Frequency Safety Program
RF Emitter	A device that intentionally generates and/or utilises RF energy and which is capable of producing RF fields.
RF Safety Device	A device that when installed on the RF emitter, it mechanically locks such that no RF can be emitted from the associated antenna. The associated key for the RF Safety Device and key tag shall be placed in the keyboard.
RHIB	Rigid Hull Inflatable Boats.
ROIU	Remote Operator Intervention Unit
On Watch NAV COMM	On Watch NAV COMM
Ship's Staff Supervisor	The Ship's Staff Supervisor shall be a member of the ship's company familiar with the DND RF Safety Policy and applicable RCN procedures. He / She shall remain on board for the duration of the work, shall periodically get updates on its progress, shall ensure that RF and aloft safety rules are being followed, and shall liaise with the OOD/W as required.
Specific Absorption Rate (SAR)	Is a measure of the rate at which energy is absorbed by the human body when exposed to an RF electromagnetic field. It is defined as the power absorbed per mass of tissue and has units of watts per kilogram (W/kg).
Technician Control	Particularized procedures where a qualified technician controls the status of an RF Emitter (and emitter rotation, if applicable) to prevent hazards to personnel, for the purpose of equipment maintenance and/or testing
UHF	Ultra High Frequency transmissions in the 300 to 3000 MHz band.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Uncontrolled Environment(UE)	A safety standard, as defined under Health Canada's Safety Code 6, where the Specific Absorption Rate from RF electromagnetic energy is no greater than 0.08 Watts/kg. It is typically expressed as a Maximum Exposure Level (MEL) distance away from the emitter in metres.
Unrestricted Occupancy Area	An area that is not a Denied or No-Lingering Occupancy Area.
VHF	Very High Frequency transmissions in the 30 to 300 MHz band.

Responsibilities

4. Commanding Officer (CO):

   a. The CO is responsible to ensure the safe operation of RF emitters under their control at all times;

   b. They shall appoint a Unit RF Safety Officer (URFSO) in accordance with reference F;

   c. A Commander may override a General Safety Standard if it places a serious limitation on the capability to fulfill a CAF commitment in accordance with Reference J;

   d. Where contraventions are deemed necessary, COs shall inform their Chain of Command and Formation Safety Officers; and

   e. Formation RF Safety Officers (FRFSO) shall be consulted whenever time permits prior to planned deviations to confirm risk assessments or informed after unplanned incidents to assess impacts and monitor results.

5. Unit Radio Frequency Safety Officer (URFSO):

   a. The URFSO (and alternate) is responsible to implement the RCN Radio Frequency Safety Program (RFSP) in the unit;

   b. Have the URFSO AJCQ designation for major/minor warships and submarines or the AJAH designation for Auxiliary vessels and shore units;

   c. Advise the FRFSO of the appointee particulars;

   d. Be fully conversant with the contents of this SOP as well as other RF Safety references such as Ship Standing Orders;

   e. Ensure that unit personnel are well informed of, and adhere to unit RF Safety procedures;

   f. Implement the RF safety training program applicable to the unit's needs;

   g. Maintain a Unit RF File, containing;

      (1) a list of fitted RF emitters;

(2) ship RF Survey Reports;

(3) RF Training Log;

(4) Internal and external Conformance Verification Log;

(5) RF Incident Log; and

(6) An RF Leak Check Log.

h. Conduct periodic RF Safety Program (RFSP) self-verifications;

i. Co-ordinate Unit RF surveys with the FRFSO;

j. Ensure that any new RF or RF susceptible equipment has the appropriate RF safety information promulgated prior to use; and

k. Ensure that unit RF safety infractions, EMI and potential overexposure incidents are promptly investigated and reported to the FRFSO and the Unit General Safety Officer (UGSO).

Procedure

GENERAL

6. Electromagnetic radiation in the frequency range of 3 KHz to 300 GHz is typically the range used in Naval radios and radars and is commonly referred to as Radio Frequency (RF) range. Radio and radar transmissions are considered as non-ionizing electromagnetic energy because it does not have enough energy to break chemical bonds and produce ionization in matter. There are hazards associated with RF transmissions based on the energy applied and one's proximity to the transmission source. Safety measures must, therefore, be applied to this equipment to prevent injury.

7. RF safety is a requirement under references A and B where the criteria are also specified. The DND RF Safety Compliance Program is specified under references C through I. This SOP further elaborates those references primarily to facilitate the use of radars and radios in the RCN Fleet. Some aspects of this SOP also apply to RCN auxiliary vessels and shore units. Where this SOP does not provide sufficient direction or information, local unit orders and procedures shall be supplemented to ensure compliance with reference D.

8. The electro-magnetic spectrum can be divided into two parts; ionizing and non-ionizing radiation. Ionizing radiation includes alpha and beta particles, neutrons, x-rays, and gamma rays which have enough energy to break atomic bonds at the cellular level within the human body. Safety regarding ionizing radiation is contained in the department's Nuclear Safety Orders and shall be addressed through separate RCN direction outside this SOP; including X-Rays (RF). Human exposure to high levels of non-ionizing radiation in the radio and radar frequencies is typically realized through tissue heating (reference B), including the warming of the skin.

9. The DND RF Safety Program addresses the hazards of (non-ionizing) electro-magnetic radiation to personnel (HERP), to fuel (HERF), to ordnance (HERO), and electro-magnetic interference (EMI)

effects. This SOP contains general and specific HERP, HERF, HERO, and EMI instructions applicable to RCN ships and requires that supporting organizations integrate them into their unit procedures.

RF SAFETY DIRECTION

10. Specific hazards associated with RF energy exposures can be divided into four types:

a. Hazards of Electromagnetic Radiation to Personnel (HERP);

b. Hazards of Electromagnetic Radiation to Ordnance (HERO);

c. Hazards of Electromagnetic Radiation to Fuel (HERF); and

d. Electromagnetic Interference (EMI).

General HERP Instructions

11. Maximum RF energy exposure to humans under reference B is dependent upon RF energy Specific Absorption Rate (SAR). When personnel are exposed to RF at sufficiently high intensity, the two most significant effects are:

a. Body tissue heating; and

b. Electric shock through physical contact.

12. Scientific studies have concluded that a whole-body average Specific Absorption Rate (SAR) of about 4 Watts/kg as the maximum. To limit SAR to safe levels, the Uncontrolled Environment (UE) standard applies a safety factor of 50 so that the specific energy received would be no greater than 0.08 watts/kg averaged over a 6 minute period, and the Controlled environment (CE) standard applies a safety factor of 10 so that the specific energy received would be no greater than 0.4 watts/kg averaged over a 6 minute period. Maximum Exposure Limits (MEL) for radiated fields are derived from the SAR limits. The CE standard can be applied where the RF field intensities have been adequately characterized by means of measurement or calculation and exposure is incurred by persons who are: aware of the potential for RF field exposure, cognizant of the intensity of the RF fields in their environment, aware of the potential health risks associated with RF field exposure and able to control their risk using mitigation strategies. Safety separation distances are established for each emitter to maintain exposure within the prescribed MELs. Reference B describes the scientific background for these safety determinations in more detail.

General HF Restrictions

13. Long conductors exposed to HF Fields pose highest risks for RF energy re-radiation effects typically realized through contact currents. To minimise this risk, all HF transmissions shall cease when evolutions require personnel to be in direct contact with potential re-radiators (e.g., crane cables) that are within 100 metres of the transmission source. For all other scenarios, HF transmissions can occur provided the restrictions as detailed in Annex SOP-S09B, Appendix SOP-S90B1 are followed. Where specific class of ship restrictions require an area of the upper deck to be placed out of bounds, all doors

and hatches leading directly to the out-of-bounds area shall be closed and marked with appropriate signage, unless otherwise specified in this order or directed by the CO.

General HERO Instructions

14. Ammunition enclosed in its designed container and stored in its intended storage locker does not impose any RF restrictions. During ammunition evolutions, ships shall follow the restrictions detailed in Annex SOP-S09B, Appendix SOP-S09B4 and shall ensure adjacent ships are advised of these restrictions if they are in close enough proximity. Ships shall also consider local area RF emitters and HERO restrictions regarding ammunition and abide by them when they are more restrictive.

15. During a RAS, in addition to ammunition regulations in references G and H, all ammunition and explosive items shall be transferred in their sealed CAF approved service containers. Restrictions for simultaneous transfer of fuel and ammunition can be found in reference G.

16. The HERO safe separation distance for HERO Susceptible/HERO Unsafe ammunition and explosives (A&E) can be found in Annex SOP-S09B, Appendix SOP-S09B4.

17. There is no minimum separation distance from portable communication devices for percussion-initiated HERO SAFE ammunition that do not contain electrically-initiated devices (EIDs), including electro-explosive devices (EEDs), as long as the antenna is not permitted to touch any part of the ammunition or weapon.

18. Where no specific precautions exist for ammunition not normally embarked, guidance shall be sought from the Formation Ammunition Technical Officer/Formation Ammunition Inspector or the FRFSO.

General HERF Instructions

19. In accordance with reference F, HERF principles apply as follows:

a. Flammable materials with flash points above 60°C are considered non-hazardous when exposed to RF radiation. Flammable materials with flash points below 60°C are considered potentially hazardous;

b. If the flammable material is heated to its flash point or higher, it must be considered hazardous to RF radiation;

c. Flammable materials in hermetically sealed containers are considered non-hazardous. If the containers are open or leaking, they become hazardous if the flash point is below 60°C; and

d. If the flash point of a material marked flammable is unknown, then it should be assumed to be less than 60°C.

20. Annex SOP-S09E contains a listing of CF petroleum, oils and liquids and other products whose flash point is less than 60°C and the Specific requirement for Flammable with Flash point less than 60°C.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

21. All flammable gases (e.g., acetylene, propane, butane, hydrogen, etc.) can form a potentially explosive mixture with air. All RF transmissions near or in line with these types of gas leaks must cease until the leak has stopped and the area has been vented.

General EMI Instructions

22. In the case of a reported or suspected EMI incident, ships shall immediately cease transmissions and record the date, time, location and description of the incident along with the complainant's name and phone number. This information plus the RF emitter operating parameters are to be sent via message directly to the FRFSO (info DGMEPM/DNCS Comm Eng, QETE 4-7, and the RJOC) for follow-up action/investigation

COMMUNICATION SYSTEMS TRANSMISSIONS AT SEA

23. The Watch Supervisor in the CCR is responsible for controlling power levels and frequencies for communication transmissions at sea, as authorized by the OpsO/OOW; The CCR Watch Supervisor shall maintain transmission power levels at the lowest levels possible in order to minimize access restrictions to the upper decks. The Communications Control Room (CCR) must be operationally aware of making upper deck areas 'Denied Occupancy' in accordance with Annex SOP-S09B, Appendix SOP-S09B1and SOP-S09B5 as power is increased or frequencies changed. If a change in transmission power output and/or frequency affects upper deck access, the CCR supervisor must obtain the OpsO/OOWORO's permission prior to making adjustments. The CCR Watch Supervisor shall maintain a record of transmission power output and frequency changes for all communication systems in the form of Communication Equipment Status Sheets, to be kept for a minimum of 24 hrs after the change occurred.

REPLENISHMENT AT SEA (RAS)

24. In situations that preclude the switching of radars to standby, sector blanking of radars with a MEL distance greater than the RAS distance shall be used to provide a corridor that has minimized RF hazards to the RAS. The sector-blanked area shall consist of the entire engaged side (180 degrees), and shall be applied before the ship assumes station.

25. Ships conducting a RAS shall confirm RF restrictions with the supplying ship prior to the evolution. In the absence of confirmed restrictions, HMC Ships shall assume a maximum combined power not to exceed 600W on HF due to HERF considerations as a well as other class specific HERP restrictions. Access to the span wires is denied during HF operations. The following is a simplistic illustration how two vessels conducting a RAS simultaneously with a supplying ship would be restricted:

a. Ship X radiates at 150W on whips and 50W on fans for a total of 200W;

b. Ship Y radiates at 100W on whips and 150W on fans for a total of 250W;

c. Supplying ship radiates at 150W.

HELICOPTER OPERATIONS

26. Helicopter operations in HMC Ships are generally governed by reference L. Annex SOP-S09B, Appendix SOP-S09B1 contains the Aircraft RF Safety distances of ship's RF emitters and Annex SOP-

S09D are to be taken into consideration for flying ops. HERO considerations are also to be considered based on the weapons and the ammunition carried by the helicopter.

INSTALLATION OF NEW RF EMITTERS

27. To the extent possible, all new RF emitters (and associated systems upgrades) shall be surveyed prior to being put into service. When a ship is to receive a new RF emitter(s) (via EC, mission fit, etc.), the Class Program Manager (CPM), LCMM or MCP PM shall liaise with FRFSO to coordinate survey requirements. The FRFSO normally arranges QETE RF surveys through the RCN GSO. For Major Capital or ship modernization projects the PMO will be required to coordinate RF Surveys with QETE directly; although the applicable FRFSOs should also be advised to coordinate potential concurrent activities.

28. In cases where the requirement to install an RF device comes from outside normal engineering organizations, it is the responsibility of N3 staff to liaise with the FRFSO to coordinate survey requirements and establish any restrictions. In addition, all designs for 'Mission Fits' of RF emitters on ships shall have a control mechanism that inhibits the RF emitter operation.

29. Installation of a new RF emitter or modification to an existing RF emitter installation (modifying output spectrum or antenna position) shall require an RF survey and a message from the applicable DNCS Section detailing applicable restrictions.

30. In the event that a QETE survey cannot be completed prior to equipment usage, or when only theoretical values are available, the CPM shall develop restrictions on the operation of the emitter in consultation with the RCN GSO.

RF ENERGY LEAK TESTS

31. Ship's Staff shall confirm that there are no RF leaks prior to and after maintenance procedures on RF emitters and waveguides. RADMAN RF detectors are the only approved RF test equipment for use by FMF personnel and ship's staff to detect RF energy leaks. Two are to be held per major warship. The URFSO or other designated representative will observe/witness all leak checks when performed by the FMF or a contractor.

32. Units shall maintain a log of all RF leak checks as part of the equipment's maintenance history. The RF Leak Check Record Sheets, Annex SOP-S09F, are to be maintained with the equipment's maintenance file and copies forwarded to the FRFSO along with the DND 2145 Person Aloft/RF Radiate/Antenna Rotate Control Chits as part of the annual report submission.

RF EMITTER CONTROLS

33. Except for maintenance and trial purposes, RF emitters are shut down when alongside and are all fully operational when at sea. All RF emitters shall have locking mechanisms that disable power transmission to the antenna or dish and a second locking mechanism to prevent rotation where applicable. All ships shall have a MAN ALOFT Keyboard that clearly illustrates which transmitters are locked and prevented from operation. Once these RF keys are signed out and removed from the keyboard, it signifies that the applicable transmitter is operational and transmitting and, if applicable, rotating.

34. The Senior Watchkeeper/OOW must have constant awareness and control of what RF equipment is operating and what restrictions are to be applied. Under normal conditions, the Senior

Watchkeeper/OOW shall maintain control of the RF emitter keys at all times to permit personnel to proceed aloft as required. Other locks may be applied to this keyboard to work aloft in accordance with local Lock-out/Tag-out procedures.

35. There are special circumstances to allow Technician Control over the keys in order to expedite maintenance or testing. This typically occurs when a specific antenna or dish requires frequent adjustment which would require nearby emitters to be locked-out to enable maintenance personnel safe access but would not be applied if other personnel are required to be in the vicinity for other purposes. Positive Control may also be exercised as an urgent requirement to allow personnel within the hazard zone of emitters without securing the emitter keys in the RF Emitter Keyboard. This is only applied by ship's personnel at sea or at sea simulations alongside. These scenarios have very specific mitigation measures through checklists contained in this SOP to minimize the potential for injury. A DND 2145 Person Aloft/RF Radiate/Antenna Rotate Control Chit shall be used to ensure that the applicable people are aware of the activity aloft, and that the applicable hazards and safety measures applied are recorded for the people involved and others working aloft.

NORMAL CONTROL PROCEDURES

36. The RF radiate and antenna rotate keys shall be secured in the RF emitter keyboard unless removed with the permission of the Senior Watchkeeper/OOW and others working aloft.

37. In order to exercise control over all onboard RF emitters, the RF Safety Program includes:

a. RF emitter keys;

b. RF emitter key tags;

c. Emitter keyboard and log;

d. DND 2145;

e. Warning flags;

f. Warning signs;

g. Warning pipes;

h. Class of ship RF emitter profile and posters; and

i. Lock-out protocols.

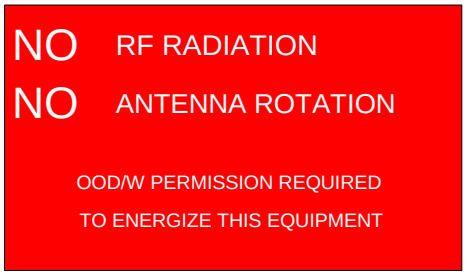
RF EMITTER KEYS

38. Where an RF emitter has a key to enable RF emissions and a separate key for antenna rotation, both keys shall be controlled. RF emitter keys shall not be interchangeable with other RF emitters. For those RF emitters that are not fitted with the RF emission keys, fuses or lockout devices capable of ceasing RF transmissions shall be referred to as the RF Emitter Key.

39. Each RF emitter shall have a readily visible sign noting "No Antenna Rotation, No RF Radiation – Senior Watchkeeper/OOW Permission required to energize this equipment" as shown in Figure SOP-

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

S09.1. This sign shall be located in the immediate vicinity of the RF emitter lock(s) for the RF Radiate and Antenna Rotate keys, such that it may be clearly seen by anyone attempting to insert and activate the key switch. Although not all RF emitters have an antenna that is capable of rotation, all signs and tags shall refer to both rotation and radiation.



RED IN COLOUR WITH WHITE LETTERING

Figure SOP-S09.1 - Equipment Sign

RF EMITTER KEY TAGS

40. The RF Safety Program requires the use of six coloured key tags, which must be obtained via FMF work order if required. A permanent green key tag, as shown in Figure SOP-S09.2, shall be attached to each operational key and will have the key reference number, the name of the equipment and the word "OPERATIONAL" printed on both sides. Each RF emitter key shall have only one duplicate key, which shall reside in the Commanding Officer's Duplicate Keyboard. The duplicate key shall have an identical tag attached; however, it shall say, "DUPLICATE" vice "OPERATIONAL" and shall be black in colour.

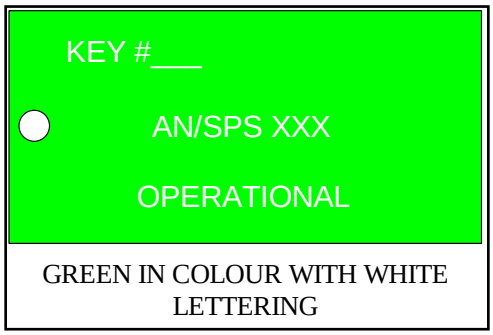
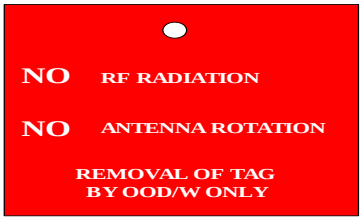


Figure SOP-S09.2 - Permanent Key Tag.

41. When RF emitter keys are issued alongside, one of the key tags as illustrated in figures SOP-S09.3 through SOP-S09.6 shall be attached to the issued key and an identical one put in the keyboard as described later in this order.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.



RED IN COLOUR WITH WHITE LETTERING

Figure SOP-S09.3 - Maintenance Tag

BLUE IN COLOUR WITH WHITE LETTERING

Figure SOP-S09.4 - RF Radiate/Antenna Rotate

YELLOW IN COLOUR WITH BLACK LETTERING

Figure SOP-S09.5 - Antenna Rotate

ORANGE IN COLOUR WITH BLACK LETTERING

Figure SOP-S09.6 - RF Safety Device Installed

42. In the event that RF emitter equipment has been removed from a vessel, the URFSO shall ensure a "Not Fitted" or "Equipment Removed" tag be placed on the RF Emitter keyboard in lieu of the equipment's key. Any time a padlock is used to lock the emitter keyboard, the ship's On-site Contact and the Ship's Staff Supervisor's contact information shall be affixed to the padlock. One method to accomplish this is to use a Personnel Aloft Lock Information Tag (SOP-S09.7).

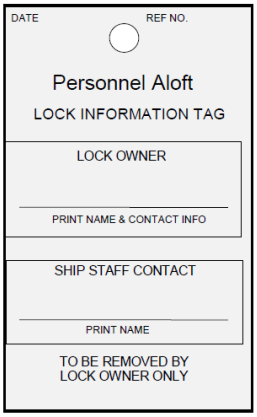


Figure SOP-S09.7 - Personnel Aloft Information Tag

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

RF EMITTER KEYBOARD, STATEBOARD AND LOG

43. Only the standardized emitter keyboards approved by FRFSOs are authorized for use. As a minimum, the emitter keyboard shall have a see through capability in order to identify the presence and/or absence of all keys. In addition:

a. Each unique emitter requires its own hook in the keyboard in order to allow visual identification without opening the keyboard;

b. The keyboard door shall be secured with a lock and fitted with a separate hasp(s) or other locking mechanism to allow padlocks to be applied during personnel aloft and crane evolutions; and

c. The approved ship's class profile shall be maintained as an RF stateboard for the Senior Watchkeeper to track personnel aloft, RF radiate and antenna rotate evolutions.

44. Co-located with the keyboard, the ship shall have a key log as shown at Table SOP-S09.1 for tracking the movement of RF emitter keys. The RF emitter keys shall be returned upon completion of the activity at sea or at the end of each working day alongside.

Table SOP-S09.1 – Ship's Key Log

Name	Rank	Signature	Key #	Time Out	OOD Initial	Time In	OOD Initial	Notes

DND 2145 - PERSON ALOFT/ RF RADIATE/ ANTENNA ROTATE CONTROL CHIT

45. A DND 2145 Person Aloft/RF Radiate/Antenna Rotate Control Chit (NSN 7530-21-911-4739) is required for personnel proceeding aloft, RF radiate and antenna rotate evolutions alongside, and RF equipment maintenance involving activity on the upper decks in order to ensure the safety of personnel and equipment. Personnel aloft locations for HDW Class Ships are defined in the definition list.

46. An On-site Contact must be designated as a point of contact for the Senior Watchkeeper /OOW who is responsible for adherence to RF safety procedures unless otherwise specified elsewhere in this SOP or its annexes. In all situations, the control chit shall be signed by the Senior Watchkeeper /OOW and the On-site Contact, and remains valid:

a. As long as the RF emitter state affecting the area remains unchanged, RF emitter state changes are permitted, however, they must be noted and agreed upon in the special circumstances section of the control chit;

b. While the Senior Watchkeeper /OOW remains on watch, the watch changes are permitted, however, they must be noted and agreed upon in the special circumstances section of the control chit; and

c. For the duration specified on the control chit, unless otherwise arranged by the Senior Watchkeeper /OOW and the On-site Contact.

47. The DND 2145 is divided into four sections:

a. Personnel Aloft section;

b. RF Radiate section;

c. Antenna Rotate section; and

d. Special Circumstances section.

48. The DND 2145 shall be completed in accordance with the instructions on the back of the form and the amplifying instructions in this order. At sea, only the personnel aloft and the special circumstances portion of the control chit are required. All sections of the control chit not applicable for a specific evolution shall be crossed out and initialled by the Senior Watchkeeper /OOW and the On-site Contact. A separate control chit is required for each distinct RF Person Aloft evolution.

49. The URFSO or qualified alternate as well as the Senior Watchkeeper /OOW will sign the special circumstances section on all control chits. If there are no special circumstances, a NIL entry shall be entered in this section. The following summarizes the typical considerations that shall be inserted in the special circumstances section, when applicable:

a. When RF emitter state changes are permitted, they must be noted and agreed upon;

b. When Senior Watchkeeper /OOW turnovers are permitted, they must be recorded, including the name and rank of the incoming Senior Watchkeeper /OOW;

c. When Technician Control is permitted, the details related to the agreed safety measures must be noted, including the name and rank of the technician who will be controlling the emitter key(s);

d. When using an approved RF safety device, it must be stated with its technical name and the owning organization;

e. A clear statement describing the maintenance activity shall be included;

f. All work limitations must be defined (including specified MEL distances for all emitters that are/will be radiating);

g. Other circumstances, events or considerations that may impact or will be impacting the evolution must be entered (e.g., restrictions imposed by emitters from a nested or adjacent ships);

h. List all RF emitters that will be radiated and/or rotated;

i. For Harbour RF Emitter Radiate Procedure (HARP):

(1) ensure that the name and rank of the Safety Sentry and the Console Operator have been inserted; and

(2) record the relative bearings of the RF transmissions; and

j. Record when Positive Control was exercised.

50. In exceptional cases, in the absence of the URFSO or qualified alternate, the Commanding Officer may grant authority for the Senior Watchkeeper or designated members of the Combat Systems Engineering Department (CSED) to sign control chits on behalf of the URFSO.

51. Once the DND 2145 has been initiated and work has commenced, any changes must be annotated on all copies, initialled and agreed to by all parties.

52. On completion of work, the URFSO shall retain the white copy of all control chits. The white copy shall be forwarded to the FRFSO with the annual report. The yellow copy shall be returned to the On-site Contact who should retain it for future reference; particularly if a Hazardous Incident has been associated with the evolution. Control chits are to be retained by the FRFSO for a period not less than 10 years.

WARNING FLAGS

53. The following flags are used to indicate the following RF evolutions when alongside;

a. Flag KILO - personnel aloft;

b. Flag LIMA - RF transmission with or without rotation; and

c. Flag ECHO - rotation only or dummy load in use.

54. Flags shall remain close-up until the end of the RF evolution they indicate, day or night. In foreign ports, the URFSO shall liaise with the local harbour authority to ensure that use of flags does not conflict with local regulations. Flags are not to be flown at sea to indicate the above events.

WARNING SIGNS

55. All aloft areas require permanent warning signs. Temporary warning signs are to be posted at the access points when non-aloft areas are restricted. Caution is to be exercised regarding boat cranes as HF emissions have caused contact currents in these structures and warning signs shall be posted to warn personnel against touching boat cranes and cables unless HF emitters are turned off. Warning signs are available through the supply system and are listed in Annex SOP-S09B, Appendix SOP-S09B5.

WARNING PIPES

56. In conjunction with the use of temporary warning signs and physical barriers, a cautionary pipe shall be made when RF transmissions cause non-aloft area(s) to be made out-of-bounds. The following pipe shall be made throughout the ship and on upper decks initially and at least once every hour thereafter when alongside, and initially, and at the change of every watch, when at sea:

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

"(LOCATION (S)) IS/ARE OUT OF BOUNDS, (RF EMITTER (S)) IS/ARE RADIATING"

57. On completion of RF transmissions, the following pipe shall be made:

"(LOCATION (S)) IS/ARE BACK IN BOUNDS"

58. In order to ensure the safe use of the boat/RHIB cranes during rescue stations, the following pipe shall be made once all required RF safety precautions are established to enable boat work to proceed but restrictions on other parts of the upper deck, if any, remain in effect.

"RADHAZ SAFE FOR BOATWORK, RADHAZ SAFE FOR BOATWORK"

ALONGSIDE PERSONNEL ALOFT, RADIATE, ROTATE PRECAUTION AND CRANE OPERATION

59. The procedures for aloft, radiate, rotate precaution and Crane Operation while Alongside can be found in Annex SOP-S09B, Appendix SOP-S09B2:

60. Special RF Emitter Operation Procedures while alongside or within harbour limits, can be found in Annex SOP-S09C to test the operation of the following RF emitters:

a. SEA TEL X and Ku Band SATCOM

b. Intellian SATCOM Internet

TECHNICIAN CONTROL PROCEDURES

61. Technician Control applies to ship's personnel and allows a technician to control the radiate state of an emitter so that he can work aloft within the MEL distance of the emitter by shutting it off first, without returning the key to the keyboard every time. Technician Control Procedure can be applied if approved by the URFSO, the OOD and the On-site Contact. Emitters operating during aloft work are to be annotated in the special circumstances section of the DND 2145; including their applicable MEL distances. The URFSO shall review the hazards and confirm the safety procedures with the On-site Contact and involved personnel before Technician Control is applied.

PERSONNEL ALOFT PROCEDURES AT SEA

62. In general, personnel aloft activities at sea will employ the same precautions as those applied alongside with the exception of contacting adjacent ships and QHM, and lockouts.

63. Normal personnel aloft safety procedures are to be applied where operational circumstances allow in order to apply the highest safety precautions for personnel proceeding aloft. A DND 2145 chit shall be filled out for every aloft evolution. Keys must be retrieved by the most expedient means possible and delivered to the OOW. In order to expedite the retrieval of keys, the OpsO/OOW and SHOW will each assign personnel to assist technicians to retrieve keys after being given permission to start the personnel aloft procedures from the OpsO/OOW. Once the appropriate keys have been retrieved, the OOW places

the keys in the RF Emitter Keyboard and completes the DND 2145 Control Chit before permission is granted for personnel to go aloft.

PERSONNEL ALOFT PRECAUTIONS AT SEA USING POSITIVE CONTROL

64. The procedure for personnel aloft at sea using Positive Control can be found in Annex SOP-S09B, Appendix SOP-S09B3

65. Ship Commanding Officers shall employ the Positive Control checklists. These checklists may be modified to account for unique emitter configurations and circumstances. Where not addressed in this SOP, the Commanding Officer shall define or augment how they will apply Positive Control over RF emitters in writing. As a minimum, Positive Control over an RF emitter occurs when:

a. The RF emitter is either placed in standby or turned off at the control point, and the control point is clearly marked and continually manned during the entire time;

b. The RF emitter is inhibited at the transmission control unit (where so fitted); and

c. The OpsO/OOW shall maintain a single point of control from the EMCON panel and/or the RCU in the OPS room, when applicable.

66. Commanding Officers are responsible to apply appropriate RF Safety measures at all times. The checklists contained in this SOP have been developed to support typical operational scenarios. Where necessary, Units are to develop supplemental procedures. Copies of these supplemental procedures are to be forwarded to the FRFSO. New or amended local procedures shall be reflected in Annual RF Safety Reports.

67. There are four definable states of Positive Control for emitters depending on the supporting operational requirement. One or more states may apply to one emitter, as can be seen in the Positive Control checklists of this SOP. The four states are:

a. No Radiate - for non-rotating emitters, this is the only Positive Control state available and supports all operational requirements;

b. No Radiate, No Rotate - for rotating emitters, this supports personnel aloft requirements;

c. No Radiate, Rotate Allowed - for rotating emitters, this supports requirements related to rotating an emitter with the radiation capability inhibited (e.g., CEROS camera usage in support of Force Protection requirements); and

d. Sector Blanked - for rotating emitters, to prevent RF transmission to a specific area.

68. To alert personnel of these conditions, the applicable sign below shall be used at the designated control points.

SYSTEM IS UNDER POSITIVE CONTROL

NO RADIATE

SYSTEM IS UNDER POSITIVE CONTROL

NO RADIATE, NO ROTATE

SYSTEM IS UNDER POSITIVE CONTROL

ROTATE ALLOWED, NO RADIATE

SYSTEM IS UNDER POSITIVE CONTROL

BEARING CONTROLLED

69. The Positive Control checklists are predicated on all operator positions being manned; however, due to possible reduced manning levels or when the ship is sailing in the fourth degree of readiness, not all positions may be manned. It is the responsibility of the OpsO/OOW to ensure that sentries are posted at the control points.

POSITIVE CONTROL – BOMB THREAT

70. In the course of conducting a bomb search, ship's personnel will have to proceed aloft and/or into potential RF hazard areas. Bomb searches will typically use normal precautions; however, positive control can be used depending on the operational situation. Under these scenarios, Positive Control of ship's emitters may be applied in order to facilitate the search of all areas of the ship in the quickest time possible and still retain operational readiness flexibility. It is recognized that operational considerations may preclude the removal of certain RF emitter keys from equipment or the cessation of the operation of certain emitters; notwithstanding, personnel safety must remain the primary consideration. Consequently, command must minimize emissions in order to reduce the risk to personnel and carefully link bomb search activity with emitter controls.

71. In order to properly conduct bomb searches as quickly as possible in aloft areas, pre-initiated DND 2145 Control Chits will be placed in the applicable bomb zone box along with copies of the pre-filled Positive Control Chit that lists Positive Control precautions for the applicable aloft area.

72. While Positive Control is mostly an at-sea procedure, it may be used in harbour in response to a Bomb Threat when some emitters are already transmitting and ship's crew is closed up in sea watches; e.g., flash-up, trial, "fast cruise". Otherwise, the keys must be returned to the RF Emitter Keyboard before an aloft search can proceed. This will entail that the related spaces be inspected first (including the equipment cabinets) before the key(s) are removed.

73. The procedures related to searching aloft areas are found in Ship's Standing Orders. These procedures are to be referenced to enable the URFSO to pre-fill a minimum number of control chits for the relevant aloft area bomb search.

RF EMITTER FLASH-UP PREPARATIONS WHEN PROCEEDING TO SEA

74. In preparation for proceeding to sea, the following actions shall be taken:

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

a. Initiate a DND 2145, The Senior Technician of the Watch or designated Flash-Up IC shall sign as the On-site Contact;

b. Enter 'FLASH UP' in the 'Equipment, Purpose' box of the RF Radiate section;

c. List all RF emitters ≤ 75M which will be radiated and/or rotated in the Special Circumstances portion of the Control Chit or attach a separate list of the RF emitters; This will be known as "RF status safe Halifax/Esquimalt"

d. Ensure that all emitter ≥ 75M and HF keys are secured in the emitter keyboard with the URFSO lock until exiting the Harbour limit.

(1) Halifax/Esquimalt Harbour the following emitter's ≥ 75M shall remain LOTO in the Man aloft keyboard: HF; and

(2) Foreign Port IAW CO priority or Local Restriction;

e. Inform QHM immediately (RJOC after hours) of RF status safe Halifax/Esquimalt; and

f. Ensure that the appropriate warning flag(s) is/are hoisted.

SECURING OF EMITTERS ALONGSIDE

75. Prior to coming alongside, ships shall:

a. Initiate a DND 2145, the Senior Technician of the Watch or designated Coming Alongside IC shall sign as the On-Site Contact;

b. Enter 'COMING ALONGSIDE' in the 'Equipment, Purpose' box of the RF Radiate section;

c. List all RF emitters ≤ 75M which will be radiated and/or rotated in the Special Circumstances portion of the Control Chit or attach a separate list of the RF emitters; This will be known as "RF status safe Halifax/Esquimalt"

d. Ensure that all emitter ≥ 75M and HF keys are secured in the emitter keyboard with the URFSO lock prior entering the Harbour limit:

(1) Halifax/ Esquimalt Harbour the following emitter's ≥ 75M shall remain LOTO in the Man aloft keyboard: HF;

(2) Foreign Port IAW CO priority or Local Restriction.

e. Inform QHM immediately (RJOC after hours) of RF status safe Halifax/Esquimalt; and

f. Ensure that the appropriate warning flag(s) is/are hoisted.

76. Ships should take best efforts to avoid crane services while preparing to slip or come alongside; however, if required, the OOW shall report RF status Safe Halifax/Esquimalt. QHM shall transfer this information directly to the crane dispatcher for the immediate removal/addition of the brow.

DRESS SHIP RF EMITTER PRECAUTIONS

77. In addition to the normal harbour restrictions for RF radiation/antenna rotation, when ships are dressed overall or when the dressing line strong-back is rigged, the following precautions are to be taken:

a. No HF transmissions;

b. The arc of rotation of antennas/mountings shall be clear of flags and the strong back prior to rotating the antenna/mounting;

c. Proper LOTO shall be perform for antennas/mounting that are near flag and the strong back i.e. Kelvin Hughes Nav Radar S Band, Main Mast.

DEVIATION

78. FRFSOs shall be the unit's first point of contact if a waiver from this SOP is required. Deviation requests from units should normally be submitted to the FRFSO a minimum of five business days in advance and include the following:

a. Required deviation (include para to be deviated from);

b. Reason for deviation;

c. The date and timeframe (start and end) required;

d. Location(s);

e. Risk assessment; and

f. Proposed risk mitigation measures.

79. FRFSOs shall confirm the risk assessment and the effectiveness of the proposed risk mitigation measures from the requesting unit. If the deviation request is outside FRFSO expertise they shall consult with the RCN GSO and appropriate technical authorities prior to approving a deviation. Responses shall be provided commensurate with the risk assessed: low risk issues may be addressed under authority of Formation Commanders while medium and high risk issues shall be referred to NSHQ. All deviations requests and decisions rendered shall be included in the Formation RFSO's annual report.

80. Initial deviation requests to FRFSOs may be in email format, although deviations granted shall be in message format from the respective office authorizing the deviation. The message's action addressees shall be the requesting unit with info addressees to include:

a. The Respective Formation's;

(1) FRFSO,

(2) Sea Training,

(3) F4 Eng,

(4) Formation Technical Authority

(5) FMF SafetyO, and

(6) QHM;

(7) DNCS Comm Eng; and

(8) RCN GSO.

RF SAFETY TRAINING

81. Unit Commanding Officers shall ensure that DND employees and CAF members under their charge who use or work near RF emitters (other than personal electronic devices such as cellular phones, laptops, etc.) receive appropriate RF hazard identification and safety training. The Online DND/CF Radio Frequency Safety Awareness Course (302212), accessible through the Defence Learning Network, is a DND generic course and is suitable to provide an introduction to RF hazards and safety as required by department policy (Reference D); including land based installations. All personnel who have general concerns or interest in the RF Hazards should be directed to this site. FRFSOs also have an RCN RF Safety Awareness video on Formation Safety and Environment Intranet sites that describes the RCN RF Safety program involving Fleet RF hazards. This video is more specific to ship equipment and safety procedures and is more applicable to RCN. All RCN personnel who work on or near ships should be referred to this site and should contact their URFSO for clarification or additional information if required.

82. RCN Units that have RF equipment or work on RF transmitters must also have a designated Unit RF Safety Officer who has completed the formal URFSO course with the AJCQ designation for major/minor warships and submarines or the AJAH designation for auxiliary vessels and shore units. Naval Personnel and Training Group, Campus Atlantic/Pacific is the authority for this training standard.

UNIT RF SAFETY AWARENESS EDUCATION

83. Naval vessels have the majority of RF transmitters in the RCN and require more comprehensive education on the hazard and ship's internal procedures to protect personnel under normal and abnormal circumstances. These requirements are laid out in the Fleet Combat Readiness Requirement manual, CFCD 102 (reference M). The briefing shall cover the following points:

a. Electromagnetic (EM) energy and their Radio Frequency (RF) sources in the unit;

b. Hazards of EM radiation to ordnance (HERO) and HERO table interpretation;

c. Hazards of EM radiation to fuel (HERF);

d. Hazards of EM radiation to personnel (HERP), over exposure indicators and response, and HERP table interpretation;

e. Controlled Environment and Uncontrolled Environment definitions and when applied;

f. Control of aloft areas in ships and/or RF emitter areas (include permanent and temporary warning signs);

g. Key use and control;

h. Completion of the DND 2145 control chit (processing alongside and at sea);

i. Responsibilities of On-Site Contact (OSC) and work supervisor to brief on hazards and applicable safety measures (e.g., fall protection, sector blanking, access restrictions and control);

j. Differences when work is performed by DND employees and civilian contractors;

k. Other dockyard affected parties (adjacent ships, cranes, QHM, N37, etc.); and

l. Incident investigation and reporting (i.e. initial message and DND 663 Hazardous Occurrence Report).

RF INCIDENT REPORTING PROCEDURES

84. An RF incident is any non-compliance of ship safety procedures contained in this SOP. This includes any instance of personnel within the denied occupancy area of an emitting RF device under the conditions specified in the unit's HERP table.

85. All RF incidents shall be reported immediately to the URFSO who shall assess whether there is a health concern due to the duration and intensity of RF energy involved. If any doubt exists, or if the exposed personnel are concerned, immediate medical assessment is to be sought from a Medical Authority, which includes a Physician's Assistant for ship personnel. Reference N shall be used as a reference in making medical assessments. Civilian personnel are to advise their supervisors immediately. The URFSO shall conduct an investigation to capture all RF equipment states to confirm the cause and whether corrective measures are needed and forward the incident Message to +DGLEPM QETE@ADM(Mat) DLEPS@Ottawa-Hull.

86. Units shall report all RF incidents via message within 48 hours to the MARLANT HQ//N48//or MARPACHQ ESQUIMALT//(INFOMARLANTHQ HALIFAX//N42//.CANSEATRAINLANT/CANSEATRAINPAC, QETE Ottawa//QETE 4-7//, and all other applicable ships on the coast). The message shall be titled "Radio Frequency Safety Incident Report" and include the following information as applicable:

a. A description of the incident;

b. The system radiating, its frequency, mode of operation and power output;

c. Number of people exposed;

d. The length of exposure time;

e. Distance from the emitter;

f. Immediate actions taken and any corrective actions taken;

g. Any other relevant information; and

h. Recommendations for technical or procedural corrective measures, if warranted.

87. As per CANFORGEN 001/18 all radio frequency hazardous occurrences must be reported using the General Hazardous Occurrence Report Form (DND 663) and the data must be entered into the HRMS Health and Safety Module, using the description tab to indicate it is a RF Safety program incident. A form CF 98 - Report on Injuries or Exposure to Toxic Material (7530-21-920-4737) will be required for military personnel or civilian equivalent Worker's Compensation Board form may be required if there are health impact concerns.

88. QETE is responsible for monitoring and supporting RF incident investigations across DND. QETE 4 staff may be contacted directly by FRFSO to obtain a technical assessment of the incident's exposure and health risks to the personnel involved. The results of such requests shall be made available to the individuals affected.

89. The FRFSO will review each incident and consider recommending follow up actions, such as summary or technical investigations, to prevent re-occurrence.

Procedure Performance Criteria and Records

90. The effectiveness of the RCN's RF Safety Program (RFSP) shall be regularly assessed through the conduct of program verifications, the assessment of incidents, and stakeholder feedback. The basis of the RF Safety program verification process shall be monthly and quarterly self-verifications carried out by URFSOs using checklists contained in Annex SOP-S09I. A copy of these reports shall be sent to the FRFSOs on completion.

91. FRFSO's shall conduct unit RFSP verifications as a part of the SEMS verification process (Reference K) with an objective of one program verification per unit every 18 months. RF Safety Program assessment summaries and continual improvement targets will be included in annual Formation SEMS management reviews.

92. Individual units shall submit Annual RF Safety Program Reports by email to the FRFSO for periods to cover the calendar year. These reports are to be submitted to the Formation safety and Environment Officer, attention FRFSO, by the 31st of January. These Unit Annual RF Reports shall include the following as a minimum:

a. Results of any external or self-verifications;

b. RF surveys completed;

c. A list of incidents over the past year;

d. Completed DND 2145 chits;

e. A description of any improvements or modifications to the Unit's RF Safety Program;

f. The current Unit RFSO: Name, Local, and A/Unit RFSO: Name, Local

g. Any anticipated changes to positions;

h. Any other pertinent information regarding the Unit's RF Safety Program (including deviations); and

i. All copies of leak check results (Annex SOP-S09F).

93. FRFSOs shall compile unit submissions and submit an annual report through their Formation Safety and Environment Officers as part of the RCN safety and environment annual management review. All reports should review and comment on the following:

a. All program verifications completed and a summary of highlights, including issues for continual improvement investigation;

b. Schedule for future program verifications for the next three years;

c. RF surveys completed in the past reporting period and planned RF surveys over the next three years;

d. A summary of all RF incidents, including investigation results that have resulted or warrant continual improvement action;

e. A list of new RF equipment that has entered into service in the past year and any associated safety concerns or highlights as well as a summary of RF equipment removed from active service and inventory; and

f. Any other improvements taken, planned or recommended to the RF Safety Policy and related program documentation.

Attachments

Annex SOP-S09A – Radio Frequency Hazard Safety References
Annex SOP-S09B – AOPV Class (Post MLR) Radio Frequency Safety Instructions
Appendix SOP-S09B1 – HERP Uncontrolled Environment Restrictions AOPV Class Ships
Appendix SOP-S09B2 – Alongside Personnel Aloft, Radiate, Rotate Precautions and Crane Operation
Appendix SOP-S09B3 – Personnel Aloft Precautions Using positive Control/ RF Positive Control Checklist
Appendix SOP-S09B4 – HERO Restrictions for AOPS Class Ships
Appendix SOP-S09B5 – RF Warning Sign Placement for AOPV Class Ships
Annex SOP-S09C – Harbour RF Emitter Radiate Procedures
Annex SOP-S09D – Aircraft RF Safety Procedures
Annex SOP-S09E – CF Fuels and Liquids with Flashpoints below 60C
Annex SOP-S09F – RF Energy Leak Check Record Sheet
Annex SOP-S09G – RF Signage NATO Stock Numbers
Annex SOP-S09H – Monthly and Quarterly Audit Checklists
Annex SOP-S09I – RFSP Audit Assessment Matrix Ships

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S09A

LASER SAFETY REFERENCES

A. Canada Occupational Health and Safety Regulations
B. Health Canada Safety Code 6 (2009)
C. DAOD 3026-0 - Radio Frequency Safety
D. DAOD 3026-1 - Radio Frequency Safety Program
E. Directive S9 – RCN Radio Frequency Safety Program
F. C-55-040-001/TS-002 Radio Frequency Safety Program
G. C-09-005-001/TS-000 Ammunition and Explosives Safety Manual, Volume 1, Program Management and Life Cycle Safety
H. C-09-153-003/TS-000 Explosives Safety Manual Volume 3 (Ships)
I. A-GG-040-001/AG-001 General Safety Manual
J. CANFORGEN 122/07 Applicability of the Canada Labour Code, Part II and the General Safety Program to CF Members and DND Employees
K. NAVORD 1002-0 RCN Safety and Environment Program Management
L. Shipborne Helicopter Operating Procedures (SHOPs)
M. CFCD 102 RCN Combat Readiness/ Training Requirements
N. CF H Svcs Gp PG 4440-16 Physical Hazards Surveillance Program (Non-Ionizing Radiation
O. C-09-005-006/TS-000, Ammunition and Explosives Safety Manual, Volume 6, Naval Vessels (Draft)
P. C-09-005-009/TS-000 Ammunition and Explosives Safety Manual, Volume 9, Hazards of Electromagnetic Radiation to Ordnance (Draft)
Q. AOPS – RF Safety Report for FDR ver 2.118 Feb 2015
R. ISI AA-610-010 Top Side Arrangement drawing 03 Nov 2013 (contains further references)

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S09B

HARRY DEWOLF CLASS RADIO FREQUENCY SAFETY INSTRUCTIONS

1. All RF safety instructions specific HARRY DEWOLF Class ships are contained in the following appendices:

Appendix S9B1 – HERP Uncontrolled Environment Restrictions for HARRY DEWOLF Class Ships MEL
Appendix S9B2 – Alongside Personnel Aloft, Radiate, Rotate Precautions and Crane Operation
Appendix S9B3 – Personnel Aloft Precautions Using positive Control/ RF Positive Control Checklist
Appendix S9B4 – HERO Restrictions for HARRY DEWOLF Class Ships
Appendix S9B5 – RF Warning Sign Placement for HARRY DEWOLF Class Ships

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

APPENDIX SOP-S09B1

HERP UNCONTROLLED ENVIRONMENT RESTRICTIONS FOR HARRY DEWOLF CLASS SHIPS
HERP Uncontrolled Environment Restrictions for AOPV Class Ships
***MELs are calculated in ref Q, RF safety report and must be followed until the release of QETE site survey report to be conducted during contractor's sea trials.**

Table SOPS09B1.1 - HERP Uncontrolled Environment Restrictions for HARRY DEWOLF Class Ships

Emitter[5]	Equipment	MEL Stationary [m]	MEL Nodding or Rotating [m]	Forecastle	Bridge Top	Fwd Mast Area	Funnel Area	Aft Mast Area	Boat Deck	Flight Deck	Quarter Deck	Forecastle	Bridge Top	Fwd Mast Area	Funnel Area	Aft Mast Area	Boat Deck	Flight Deck	Quarter Deck	Fwd Mast	Aft Mast
				Port Side								Starboard Side								Center	
HF																					
HF Narrowband Transmitter - Stbd Funnel	Valcom AS-3772B/U	60.38	-	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
HF DSC Transceiver #1 - Aft Mast Area P&S	Shakespeare 390-1 MG	43.5	-	-	D	D	D	D	D	D	D		D	D	D	D	D	D	D	D	D
HF DSC Transceiver #2 - Aft Mast Area P&S	Shakespeare 390-1 MG	50.9	-	-	D	D	D	D	D	D	-	-	D	D	D	D	-	-	-	D	D
HF Transceiver 35' Whip - Funnel area Center	MPS-10M/1A	22.65	-	-	D	D	D	D	-	-	-	-	D	D	D	D	-	-	-	D	D
HF Transceiver 35' Whip - Port Funnel	MPS-10M/1A	22.84	-	-	D	D	D	D	-	-	-	-	D	D	D	D	-	-	-	D	D
HF NVIS Transmitter - Boat Deck Area Above Flyco	Comrod HF230L-N	30.87	-	-	-	D	D	D	D	D	D			D	D	D	D	D	D	D	D
VHF/UHF																					
PRC-117G – Bridge Top Center	SB-101/1	1	-	-	D 1,2	-	-	-	-	-	-	-	D 1,2	-	-	-	-	-	-	-	-
VHF/UHF Air #1 – Aft Mast Port Lower	Skymasts 470	6.62	-	-	D 1,2	D fwd	-	-	-	-	-	-	D 1,2	D fwd	-	-	-	-	-	D fwd	-
VHF/UHF Air #2 – Bridge Top Center	Skymasts 470	5.92	-	-	D 1,2	D fwd	-	-	-	-	-	-	D 1,2	D fwd	-	-	-	-	-	D fwd	-
VHF/UHF Air #3 – Fwd Mast Port	Skymasts 470	4.71	-	-	D aft	D[1]	-	-	-	-	-	-	-	-	-	-	-	-	-	D 1	-
VHF/UHF Air #4 – Fwd Mast Stbd	Skymasts 470	5.23	-	-	-	-	-	-	-	-	-	-	-	D aft	D 1	-	-	-	-	D 1	-

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

VHF/UHF Air #5 – Aft Mast Stbd Upper	Skymasts 470	5.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	D 1
VHF/UHF Air #6 – Aft Mast Port Upper	Skymasts 470	4.38	-	-	-	-	-	D 1	-	-	-	-	-	-	-	-	-	-	-	-	D 1
VHF/UHF Air #7 – Bridge Top Port	Skymasts 470	4.99	-	-	-	-	-	D 1	-	-	-	-	-	-	-	-	-	-			D 1
VHF																					
AIS Antenna – Aft Mast Port Lower	Comrod AV15	1.93	-	-	-	-	-	D 1	-	-	-	-	-	-	-	-	-	-	-	-	D 1
VHF Marine #1 – CO, Bridge Top Port	Valcom AS-2809	2.49	-	-	D 1,2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VHF Marine #2 – OOW, Bridge Top Stbd	Valcom AS-2809	2.17	-	-	-	-	-	-	-	-	-	-	D 1,2	-	-	-	-	-	-	-	-
VHF Marine #3 – Brdg Comms, Aft Mast Stbd Upper	Valcom AS-2809	3.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	D 1
VHF Marine #4 – CCR, Fwd Mast, Fwd Lower	Valcom AS-2809	3.20	-	-	D 1	D 1	-	-	-	-	-	-	D 1	D 1	-	-	-	-	-	-	-
VHF GMDSS #1 – Fwd Mast, Fwd Upper	Valcom AS-2809	2.00	-	-	-	D 1	-	-	-	-	-	-	-	D 1	-	-	-	-	-	-	D 1
VHF GMDSS #2 – Aft Mast, Stbd Lower	Valcom AS-2809	2.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		D 1
UHF Flight Deck – Stbd Machine Gun Deck	Trivec AV 457-9	2.85	-	-	-	-	-	-	-	-	-	-	-	-	-	D 1	-	-	-	-	-
UHF WB #1 - Aft Mast Port	BCV-400SB	2.32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	D 1
UHF WB #2 - Aft Mast Stbd	BCV-400SB	2.17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	D 1
VHF																					
AIS Antenna – Aft Mast Port Lower	Comrod AV15	1.93	-	-	-	-	-	D 1	-	-	-	-	-	-	-	-	-	-	-	-	D 1
VHF Marine #1 – CO, Bridge Top Port	Valcom AS-2809	2.49	-	-	D 1,2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VHF Marine #2 – OOW, Bridge Top Stbd	Valcom AS-2809	2.17	-	-	-	-	-	-	-	-	-	-	D 1,2	-	-	-	-	-	-	-	-

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

VHF Marine #3 – Brdg Comms, Aft Mast Stbd Upper	Valcom AS-2809	3.05	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	D 1
VHF Marine #4 – CCR, Fwd Mast, Fwd Lower	Valcom AS-2809	3.20	-	-	D 1	D 1	-	-	-	-	-	-	D 1	D 1	-	-	-	-	-	-	-
VHF GMDSS #1 – Fwd Mast, Fwd Upper	Valcom AS-2809	2.00	-	-	-	D 1	-	-	-	-	-	-	-	D 1	-	-	-	-	-	-	D 1
VHF GMDSS #2 – Aft Mast, Stbd Lower	Valcom AS-2809	2.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		D 1
UHF Flight Deck – Stbd Machine Gun Deck	Trivec AV 457-9	2.85	-	-	-	-	-	-	-	-	-	-	-	-	-	D 1	-	-	-	-	-
UHF WB #1 - Aft Mast Port	BCV-400SB	2.32	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	D 1
UHF WB #2 - Aft Mast Stbd	BCV-400SB	2.17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	D 1
UHF																					
IFF Interrogator – Main Mast	Terma Scanter 6002	2.62	1.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	D 1	-
IFF Transponder – Aft Mast Port Upper	Thales 400 IFF	.455	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	D 1
GMDSS Inmarsat-C – Bridge Top Port	Sailor 3027C	.354	-	-	-	D 1,2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vessel Tracking Unit – Aft Mast Port Upper	Skytrac ISAT-200	.527	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	D 1
RADAR																					
Nav Radar S-band – Fwd Mast Stbd	Sharpeye S-band	2.52	1.21	-	-	-	-	-	-	-	-	-	D 1(aft)	-	-	-	-	-	-	D	-
Surveillance Radar – Fwd Mast Top	Terma Scanter 6002	8.02	2.12	-	D 1	D 1	-	-	-	-	-	-	D 1	D 1	-	-	-	-	-	D1	-
Nav Radar X-band – Fwd Mast Port	Sharpeye X-band	7.87	1.77	-	D 1	D 1	-	-	-	-	-	-	D 1	D 1	-	-	-	-	-	D1	-
SATCOM																					
X-band SATCOM Stbd Fwd – 360 coverage	Norsat COM10 X-band	40.88	-	D	D	D	D	D	-	-	-	D	D	D	D	D	-	-	-	D	D
X-band SATCOM Stbd Fwd – 270 coverage	Norsat COM10 X-band	40.88	-	D	D	-	-	-	-	-	-	D	D	-	-	-	-	-	-	-	-
X-band SATCOM Port Aft – 360 coverage	Norsat COM10 X-band	40.88	-	-	-	D	D	D	-	D	D	-	-	D	D	D	-	D	D	D	D

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

X-band SATCOM Port Aft – 270 coverage	Norsat COM10 X-band	40.88	-	-	-	-	-	D	-	D	D	-	-	-	-	D	-	D	D	-	D
Ku-band SATCOM Port Fwd- 360 coverage	Norsat COM10	65	-	D	D	D	D	D	-	-	-	D	D	D	D	D	-	-	-	D	D
Ku-band SATCOM Port Fwd- 360 coverage	Norsat COM10	65	-	D	D	-	-	-	-	-	-	D	D	-	-		-	-	-	-	-
Ku-band SATCOM Stbd Aft - 360 coverage	Norsat COM10	65	-	-	-	D	D	D	-	D	D	-	-	D	D	D	-	D	D	D	D
Ku-band SATCOM Stbd Aft - 360 coverage	Norsat COM10	65	-	-	-	-	-	D	-	D	D	-	-	-	-	D	-	D	D	-	D
SATCOM Internet		65	-	-	D	D	D	D	-	D	D	-	D	D	D	D	-	D	D	D	D

[NA] Not Applicable, [-] Unrestricted Occupancy, [D] Denied Occupancy, [NL] No Lingering Occupancy, [D>W] Denied when W watts or more are applied to this emitter

NOTES:

1) Within the Minimum Safe Distance.
2) Personnel shall not touch the antenna pedestal.
3) Coverage in the horizon azimuth plane.
4) Angle range used in elevation is -20° to +105°.
5) Grey cells are based on assumptions.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

APPENDIX SOP-S09B2

ALONGSIDE PERSONNEL ALOFT, RADIATE, ROTATE PRECAUTIONS AND CRANE OPERATION

1. The Senior Watchkeeper must have constant awareness and control of what RF equipment is operating and what restrictions are to be applied. Under normal conditions, the Senior Watchkeeper shall maintain control of the RF emitter keys at all times to permit personnel to proceed aloft as required. A DND 2145 Person Aloft/RF Radiate/ Antenna Rotate Control Chit shall be used to ensure that the applicable people are aware of the activity aloft, and that the applicable hazards and safety measures applied are recorded for the people involved and others working aloft.

Alongside Personnel Aloft Precautions

2. The following table lists the procedures to be followed, in conjunction with the personnel aloft portion of the DND 2145, prior to permitting personnel to go aloft:

Responsible	**Actions**
Ship's Staff Supervisor	The Ship's Staff Supervisor shall: a. be a member of the ship's company that is familiar with the work being performed; b. remain onboard for the duration of the evolution; c. initiate the DND 2145 on behalf of non-ship's staff; and d. act as a liaison between the Senior Watchkeeper and On-site Contact.
On-site Contact	The On-site Contact shall: a. identify the requirement for access, the action to be performed and the estimated span of time for which access is required; b. secure the emitter keyboard with a padlock and id tag; c. receive safety brief from Senior Watchkeeper; d. sign the Person Aloft section of the DND 2145; e. ensure that the ship's staff supervisor knows his whereabouts at all times and have a method to contact him; f. inform ship's staff supervisor immediately upon completing the aloft action and remove his padlock; and g. report to the Senior Watchkeeper and sign the completed section of the DND 2145. Note: Personnel working with the On-site Contact may secure the emitter keyboard with their own padlock and id tag, if required.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Responsible	**Actions**
ET/MSE Dept	The ET/MSE Dept shall: a. be responsible for complying with the applicable Formation policy concerning lock-out/tag-out requirements for whistles and exhaust emitting equipment; and b. sign the person aloft section of the DND 2145.
URFSO	The URFSO (or designated alternate) shall: a. identify all special circumstances for the aloft activity; b. sign the special circumstances section of the DND 2145; and c. provide guidance and expertise to the Senior Watchkeeper.
Senior Watchkeeper	The Senior Watchkeeper must maintain control of the RF emitters for the duration of the evolution and shall: a. ensure that the pertinent RF emitter keys are secured in the keyboard by lock and, where applicable, a multi-lock device; b. ensure that locks are appropriately identified with contact details as identified IAW SOP; c. inform the QHM and adjacent ships of the personnel aloft; d. ensure that Flag KILO is close-up; e. ensure that DND 2145 is filled out correctly; f. give safety brief to on site contact and provide them with the yellow copy of the DND 2145; g. monitor weather conditions for the duration of the personnel aloft and modify safety precautions as required; h. complete the DND 2145 once all the personnel have reported down from aloft; i. inform QHM and adjacent ships when the evolution is completed; j. be responsible for ensuring Formation Lockout/Tagout requirements for whistles and exhaust emitting equipment are implemented; and, k. lower flag KILO (if all aloft evolutions are completed). Notes: 1. Personnel shall wear approved fall arrest equipment IAW reference H; and 2. In foreign ports, the appropriate harbour control organisation shall be notified.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Responsible	Actions
OOD(s) of Adjacent Ships or Chief Mate/Master of auxiliary vessels	When notified of personnel aloft on an adjacent ships the OOD shall: a. ensure keys are secured in the emitter keyboard by lock and, where applicable, a multi-lock device, for RF emitters with MEL distances that could present a hazard to personnel aloft on adjacent ship(s); b. ensure any locks on the emitter keyboard are appropriately identified with contact details as identified IAW SOP; and c. ensure that Formation Lockout/Tagout requirements for whistles and exhaust emitting equipment are implemented.

Exhaust/Noises

3. Equipment which exhausts in the immediate vicinity of the personnel aloft location are inhibited and locked and tagged out by the ET/MSE Dept . Several factors can play a roatle in the decision for appropriate precautions required, such as weather, proximity to adjacent ships, vulnerability of the ship during the lockout, and the ability for personnel to leave the work area.

4. As a minimum, the following precautions are to be taken for personnel aloft evolutions while alongside:

Aloft Area	Equipment to Lockout/Tagout
Bridge Top	
Exterior Funnel Top	
Hangar Top	
Helicopter Rotor Head	

5. The The ET/MSE Dept Shall ensure all Lockout/Tagout requirements are implemented IAW SOP-S04.

RF Radiate and/or Antenna Rotation Precautions

6. The following table lists the standard ship procedures when radiating with or without rotation while alongside:

Responsible	Actions
Ship's Staff Supervisor	The Ship's Staff Supervisor shall: a. be a member of the ship's company that is familiar with the work being performed; b. remain onboard for the duration of the RF evolution; c. initiate the DND 2145 on behalf of non-ship's staff; and d. act as a liaison between the Senior Watchkeeper and On-site Contact.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Responsible	**Actions**
On-site Contact	The On-site Contact shall: a. identify the requirement for RF radiation, the action to be performed and the estimated span of time for the evolution; b. perform a visual inspection of jetty and the ship's upper deck to ensure that the antenna rotation does not interfere with any object; c. sign the Radiate section of the DND 2145; d. ensure that the ship's staff supervisor knows his whereabouts at all times and have a method to contact him; e. inform ship's staff supervisor immediately upon completion; and f. report to the Senior Watchkeeper and sign the completed section of the DND 2145.
URFSO	The URFSO shall: a. identify all special circumstances for the activity; b. sign the special circumstances section of the DND 2145; c. identify the MEL distance of each applicable RF emitter, and; d. provide guidance and expertise to the Senior Watchkeeper.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Responsible	Actions
Senior Watchkeeper	The Senior Watchkeeper shall: a. perform a visual inspection of the jetty and the ship's upper deck to ensure that RF Radiation/Antenna Rotation does not interfere with any object; b. ensure that temporary warning signs indicating RF radiation hazard are placed in appropriate locations; c. inform the QHM and adjacent ships of the RF emission and/or antenna rotation; d. issue the key to the On-site Contact; e. affix a blue RF Radiate/Antenna Rotate Warning Tag IAW SOP to the key and the keyboard; f. annotate the key log; g. ensure that Flag LIMA is close up; h. ensure that DND 2145 is properly filled out; i. ensure that Warning Pipes are made, if a non-aloft area is affected; j. complete the DND 2145 once the evolution is completed; k. inform QHM and adjacent ships; and l. lower flag LIMA (once all radiate evolutions are completed). m. Notes: n. In foreign ports, the appropriate harbour control organisation shall be notified; and o. For RF emissions that include rotation, only the radiate portion of the DND 2145 shall be filled out.

Antenna Rotation Only Precautions

7. The following table lists the standard ship procedures involving RF antenna rotation only while alongside:

Responsible	Actions
Ship's Staff Supervisor	The Ship's Staff Supervisor shall: a. be a member of the ship's company that is familiar with the work being performed; b. remain onboard for the duration of the RF evolution; c. initiate the DND 2145 on behalf of non-ship's staff; and d. act as a liaison between the Senior Watchkeeper and On-site Contact.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Responsible	Actions
On-site Contact	The on-site contact shall: a. identify the requirement for rotation, the action to be performed and the estimated span of time for the evolution; b. perform a visual inspection of the jetty and the ship's upper deck to ensure that the antenna rotation does not interfere with any object; c. sign the Rotate section of the DND 2145; d. ensure that the ship's staff supervisor knows his whereabouts at all times and have a method to contact him; e. inform ship's staff supervisor immediately upon completion; and f. report to the Senior Watchkeeper and sign the completed section of the DND 2145.
URFSO	The URFSO shall: a. identify all special circumstances for the activity; b. sign the special circumstances section of the DND 2145; and c. provide guidance and expertise to the Senior Watchkeeper.
Senior Watchkeeper	The Senior Watchkeeper shall: a. perform a visual inspection of the jetty and the ship's upper deck to ensure that the Antenna Rotation does not interfere with any object; b. inform the QHM and adjacent ships of the Antenna Rotation; c. issue the key to the On-site Contact; d. affix a yellow Antenna Rotate Warning Tag IAW SOP to the key and the keyboard; e. annotate the key log; f. ensure that Flag ECHO is close up; g. ensure that DND 2145 is properly filled out; h. complete the DND 2145 once the evolution is completed; i. inform QHM and adjacent ships; and j. lower Flag ECHO (once all rotate evolutions are completed).

Precautions for RF Emitter Maintenance Requiring Personnel Aloft While Alongside

8. When an RF emitter key is issued for maintenance, there shall be "**NO RF radiation and NO antenna rotation**". Uncontrolled Environment MEL distances shall apply for all ships when alongside.

9. The following table lists the procedures to be followed for Personnel Aloft Procedures For RF Emitter Maintenance When Alongside:

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Responsible	**Actions**
Ship's Staff Supervisor	The Ship's Staff Supervisor shall: a. be a member of the ship's company that is familiar with the work being performed; b. remain onboard for the duration of the RF evolution; c. initiate the DND 2145 on behalf of non-ship's staff; and d. act as a liaison between the Senior Watchkeeper and On-site Contact.
On-site Contact	The on-site contact shall: a. identify the requirement for maintenance, the action to be performed and the estimated span of time for the evolution; b. ensure that the ship's staff supervisor knows his whereabouts at all times and have a method to contact him; c. inform ship's staff supervisor immediately upon completion; and d. report to the Senior Watchkeeper and sign the completed section of the DND 2145.
Senior Watchkeeper	The Senior Watchkeeper shall: a. issue the key to the On-site Contact b. affix a red Maintenance Warning Tag IAW SOP to the RF Emitter key and the keyboard; c. annotate the key log; d. ensure that DND 2145 is filled out correctly; e. give safety brief to the On-site Contact; and f. complete the DND 2145 once maintenance is completed; Notes: 1. For maintenance activities that do not require RF transmission, antenna rotation or personnel aloft, the corresponding sections are to be crossed out and initialled. 2. For evolutions requiring dummy load usage, the precautions required IAW Annex SOP-S09C shall be complied with prior to issuing the RF emitter key. 3. Special circumstances shall include a clear statement describing the maintenance activity.
URFSO	The URFSO shall: a. identify all special circumstances for the activity; b. sign the special circumstances section of the DND 2145; and c. provide guidance and expertise to the Senior Watchkeeper.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Crane Operation Procedures When Alongside

10. Crane operations within RCN Dockyards require adequate notice and co-ordination so that conflicts can be avoided. This co-ordination is best achieved between QHMs, crane supervisors and ships. General HF restrictions as previously described in this order shall apply to all crane ops. For crane operations not involving personnel aloft, the DND 2145 is not required.

11. The following table lists the procedures to be followed for RF Safety Precautions involving Crane Operations in RCN Dockyards

Responsible	**Actions**
Crane Operator	Prior to commencing Jetty or Mobile crane work near a ship, a rigger or crane worker shall: a. visually verify in the RF Emitter Keyboard that: i. All HF keys are cited that represent transmitters that could be within 100m of the crane operations where persons will be in direct contact with potential re-radiators. ii. the keys for any RF emitters, which due to their radius of rotation and the location of the crane work, could cause injury or property damage; and iii. the keys for any RF emitters where the crane work or any person participating in the crane operation are within its MEL distance, unless where mitigated by procedures contained in Annex SOP-S09C; and b. request permission from the Senior Watchkeeper to place padlocks and ID tags on the RF Emitter Keyboards in accordance with the applicable situation in point a. (above). Notes: 1. The lock is to be identified with a tag, stating Name, Shop, and Phone Number. Once the crane operator or rigger is satisfied that all precautions have been taken for all adjacent ships, the work may commence. 2. No Crane operation shall occur in close proximity to rotating/moving equipment on vessel which work is being carried out.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Responsible	Actions
Senior Watchkeeper	In addition, for crane operations involving HMC Ships, the Senior Watchkeeper shall: a. perform a visual inspection of the ship's upper decks to ensure antenna rotation/radiation will not interfere with crane operations; b. be responsible for ensuring that Formation Lockout/Tagout requirements for whistles and exhaust emitting equipment are implemented; Note: 1. This does not apply to mobile cranes where the operator is not located in an elevated position. c. maintain close liaison with adjacent ships (as required) to ensure external factors do not impact crane operations; d. ensure that the HF keys are secured; e. ensure that locks are appropriately identified with contact details as identified in IAW SOP; f. inform the QHM and adjacent ships of the crane ops; g. give safety brief to the crane operator/rigger; and h. inform QHM and adjacent ships when the evolution is completed. Note 2. For crane operations where personnel are required to be aloft (e.g., bucket evolutions, personnel in aloft areas, etc.) personnel aloft procedures are required.
OOD(s) of Adjacent Ships or Chief Mate/Master of auxiliary vessels	When notified of personnel aloft on an adjacent ships the OOD shall: a. ensure that any locks on the emitter keyboard are appropriately identified with contact details as identified in IAW SOP; and b. For jetty cranes, ensure Formation Lockout/Tagout requirements for whistles and exhaust emitting equipment are implemented.

Personnel Aloft Procedures at Sea

12. In general, personnel aloft activities at sea will employ the same precautions as those applied alongside with the exception of contacting adjacent ships and QHM, and lockouts.

13. Normal personnel aloft safety procedures are to be applied where operational circumstances allow in order to apply the highest safety precautions for personnel proceeding aloft. A DND 2145 chit shall be filled out for every aloft evolution. Keys must be retrieved by the most expedient means possible and delivered to the OOW. In order to expedite the retrieval of keys, the OpsO and On Watch NAV COMM will each assign personnel to assist technicians to retrieve keys after being given permission to start the personnel aloft procedures from the OpsO/OOW. Once the appropriate keys have been retrieved, the OOW places the keys in the RF Emitter Keyboard and completes the DND 2145 Control Chit before permission is granted for personnel to go aloft.

14. The following table lists the procedures to be followed for Personnel Aloft Procedures at Sea

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Responsible	**Actions**
Senior Technician of the Watch (STOW)	The STOW is the Ship's Staff Supervisor at sea. The STOW is responsible for liaising with the OpsO/OOW to determine the appropriate time in the ship's operational schedule to proceed aloft. The STOW will provide the OpsO/OOW an assessment of the impact (what emitters are to be secured and for how long) of proceeding aloft.
On-site Contact	On direction from the Ship's Staff Supervisor, the On-site Contact shall: a. initiate the DND 2145; b. receive safety brief from OOW; c. sign the Person Aloft section of the DND 2145; d. ensure that the OOW knows his whereabouts at all times and has a method to contact him; e. inform OOW immediately upon completion of specified aloft activity; and f. sign the "Completed" section of the DND 2145.
MCR Engineering OOW (EOOW)	The MCR EOOW shall: a. brief On-site Contact and annotate in the special circumstances as to which Diesel Generator (DG) is on; and b. cross out safe exhaust / whistles and sign the person aloft section of the DND 2145.
OpsO/OOW	The Operations Officer (OpsO/OOW) shall: a. ensure that the operational situation allows for the removal of necessary RF emitter keys; and b. ensure that all necessary RF emitter keys are removed and brought to the OOW.
URFSO	The URFSO (or designated alternate) shall: a. identify all special circumstances for the aloft activity; b. sign the "Special Circumstances" section of the DND 2145; and c. provide guidance and expertise to the OOW.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Responsible	**Actions**
OOW	The OOW must maintain control of the RF emitters for the duration of the evolution and shall: a. ensure that the pertinent RF emitter keys are secured in the keyboard by lock; b. ensure that DND 2145 is filled out correctly; c. ensure that safety brief is provided to on-site contact (usually by the STOW) and provided with the yellow copy of the DND 2145; d. monitor weather conditions for the duration of the personnel aloft and modify safety precautions as required; e. request permission from the CO to send personnel aloft; and f. complete the DND 2145 once all the aloft personnel have reported back. Note: Personnel shall wear approved fall arrest equipment IAW reference I of SOP.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

APPENDIX SOP-S09B3

PERSONNEL ALOFT PRECAUTIONS USING POSITIVE CONTROL

1. Positive Control of RF Emitters is normally only applied at sea. It is an expedited administrative procedure to inhibit RF emissions and/or transmitter/receiver rotation with the specific purpose of preventing HERP, HERO, HERF, EMI and rotation hazards to personnel without the removal of a system's safe-to-transmit key, or with the removal of the key, without its return to the RF Emitter Keyboard. It must be emphasized that Positive Control procedures are only applicable to ship's staff and applied as an operational necessity and not as a matter of convenience. As such, Positive Control procedures may be authorized when:

a. The operational situation dictates (this would normally occur when in the 2nd Degree of Readiness as promulgated in Battle/Mission Orders, or in other ship's directives promulgated by the CO), which will normally have the intent of minimizing the time required to restore emitters to operations, including but not limited to:

(1) Fault finding(minimize emitter downtime);

(2) Helo Ops (rotor checks, take off, final approach, operation in close proximity);

(3) RAS;

(4) Launch and recover boats; and

(5) Upper deck access for maintenance and rounds.

b. Emergency situations which necessitate the rapid implementation of precautions, including;

(1) Fires in aloft areas;

(2) Evacuation of casualties from aloft areas;

(3) Saving of equipment;

(4) Man overboard; and

(5) Bomb threat.

c. On a case-by-case basis, and only as authorized by the CO, any other situation where rapid application of precautions are required to deal with unforeseen events in order to meet critical timings; and

d. In support of training requirements authorized by the CO.

Procedure for Positive Control

2. The procedure in the following table shall be used to assume positive control:

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Responsible	**Actions**
STOW	The STOW will normally be the one to identify a requirement to proceed aloft and will: a. designate an On-site Contact to proceed to the Bridge to brief the OOW and receive any operational restrictions from the OOW, and then b. proceed to the Ops Room to brief the OpsO on the need to proceed aloft with any restrictions received from the OOW (the STOW may pre-arrange an aloft window with the OpsO/OOW.
OpsO	The OpsO is responsible to determine if there is an operational requirement to assume positive control. If the OpsO/OOW does not have control of weapons and sensors, the OpsO/OWW must request permission to secure the affected systems and will then: a. tell the OOW to assume positive control for access to the aloft area; b. inhibit affected systems on the RCU tab or EMCON panel; c. review the positive control checklist with the OpsO to ensure all precautions have been taken; and, d. inform the OOW that all precautions have been taken.
OpsO	The OpsO shall: a. inform the operators of the affected systems to assume positive control; b. inform the SHOW in the CCR of the COMM system restrictions; c. verify that all affected systems are in standby, flagged and manned; and, d. Report to the OpsO/OOW.
On Watch NAV COMM	The On Watch NAV COMM will take all precautions ordered by the OpsO/OOW and report back to the OpsO when complete
OOW	The OOW shall: a. record that positive control was used in the OOW note book; b. take all precautions prescribed in the checklist for emitters controlled on the bridge; c. brief the On-Site Contact of the emitters that will not be inhibited along with their associated MEL; d. brief the On-Site Contact of the safety precautions (5 point harness/winds etc.); e. review the positive control checklist with the OpsO/OOW to ensure all precautions have been taken; f. request permission to send personnel aloft using positive control from the CO; g. notify the OpsO immediately upon return of the on-site contact that positive control precautions can be removed; and

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Responsible	Actions
	h. complete the DND 2145 with the on-site contact and attach the positive control checklist to the form.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

RF POSITIVE CONTROL CHECKLIST FOR HDW CLASS SHIPS

POSITIVE CONTROL CHECKLIST FOR AOPV CLASS SHIPS Port Side			
EMITTER	POSITIVE CONTROL ACTIONS REQUIRED	OPI	CHECKED

DATE _____

DND 2145 # _____

URFSO SIGNATURE _____

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

POSITIVE CONTROL CHECKLIST FOR HDW CLASS SHIPS Starboard Side			
EMITTER	POSITIVE CONTROL ACTIONS REQUIRED	OPI	CHECKED

*

DATE _____

DND 2145 # _____

URFSO SIGNATURE _____

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

POSITIVE CONTROL CHECKLIST FOR HDW CLASS SHIPS ON HELO			
EMITTER	POSITIVE CONTROL ACTIONS REQUIRED	OPI	CHECKED

DATE _____

DND 2145 # _____

URFSO SIGNATURE _____

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

POSITIVE CONTROL CHECKLIST FOR HDW CLASS SHIPS MAST			
EMITTER	POSITIVE CONTROL ACTIONS REQUIRED	OPI	CHECKED

DATE _____

DND 2145 # _____

URFSO SIGNATURE _____

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

POSITIVE CONTROL CHECKLIST FOR HDW CLASS SHIPS FUNNEL TOP			
EMITTER	POSITIVE CONTROL ACTIONS REQUIRED	OPI	CHECKED

DATE _____

DND 2145 # _____

URFSO SIGNATURE _____

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

POSITIVE CONTROL CHECKLIST FOR HDW CLASS SHIPS RAS			
EMITTER	POSITIVE CONTROL ACTIONS REQUIRED	OPI	CHECKED

DATE _____

DND 2145 # _____
3.

4. URFSO SIGNATURE _____

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

APPENDIX SOP-S09B4

HERO RESTRICTIONS FOR HDW CLASS SHIPS

1. While alongside or at sea, all vessels within 100 m of the ship(s) involved in an ammunition evolution shall follow the applicable HERO restrictions. In addition, local regulations shall be followed when they are more restrictive.

Table SOP-S09B4.1 - HERO Emitter Precautions for HDW Class Ships

RF emitter	25mm Rounds	Electrical Detonator	LMDE Device	Misc[1]
UHF	HS	H3	H3	HS
VHF (incl. AIS)	HS	H3	H3	HS
S Band Radar	HS	H3	H3	HS
X Band Radar	HS	H3	H3	HS
HF	HS	H3	H3	HS
SATCOM X & Ku	HS	H3	H3	HS
Portable Communication Devices	H8	H6	H7	H8

Note: (1) Miscellaneous A&E includes explosives used in demolition and demolition exercises (e.g., C4 and percussion-initiated small arms ammunition) which do not contain electrically-initiated devices (EIDs) such as electrical detonators.

DEFINITIONS:

H1 Cease RF transmission during handling and loading when the rounds are outside their CF approved packaging and off-mount, or when in a HERO UNSAFE state.

H2 If in a HERO SUSCEPTIBLE or HERO UNSAFE state do not bring within 5 m of an antenna.

H3 If in a HERO SUSCEPTIBLE or HERO UNSAFE state do not bring within 20 m of an antenna.

H4 HERO SAFE when enclosed in CAF-approved RF shielded metal container; otherwise treat as H1.

H6 This applies to the following devices:

- Portable (hand-held) VHF/UHF 2-way radios with short omni-directional antennas (<20cm) transmitting up to 5W operating at any approved frequency
- Portable devices using IEEE 802.11a/b/g/n Wi-Fi
- Portable 2G, 3G, or 4G devices, such as cell phones, smart phones, tablets and laptop computers, which use transmission protocols such as GSM, GPRS, CDMA, LTE, etc to communicate over cellular networks
- Bluetooth devices

For these devices, the following HERO safe separation distance must be maintained:

- 1.5 m from HERO SAFE ammunition, and;
- 20m from HERO SUSCEPTIBLE or HERO UNSAFE rounds, including disassembled, misfired, or damaged rounds.

H7 Cease transmission during clearing of misfires or when the bare round is handled.

H8 For percussion-initiated HERO SAFE ammunition that does not contain electrically-initiated devices (EIDs) including electro-explosive devices (EEDs), there is no minimum separation distance from portable communication devices, as long as the antenna is not permitted to touch any type of ammunition or weapon. For all other ammunition H6 applies.

HS HERO SAFE

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

APPENDIX SOP-S09B5

RF WARNING SIGN PLACEMENT FOR HDW CLASS SHIPS

1. RF warning signs are available for areas of Restricted Occupancy and areas of Denied Occupancy.

2. Permanent warning signs shall be fixed to structures in a highly visible manner that clearly marks access to the restricted or denied area. Temporary warning signs shall only be in place when the hazard exists.

3. The following tables outline the signage requirement for HDW Class ships.

Table SOP-S09B5.1 – Permanent RF Warning Sign Locations for HDW Class Ships

Sign Location	**Sign Type**
Port and STBD ladders leading to bridge top	Check with Command
Port and STBD Machine Gun Deck	Check with Command Burn Hazard
Port and STBD RAS station	Fuelling Operations
Main Mast door leading to bridge top	Check with Command
Aft Mast door leading to bridge top	Check with Command
Ladder from Bridge top to Main Mast	Check with Command
Ladder from Bridge top to After Mast	Check with Command
Port and STBD MRRB Crane	Burn Hazard
STBD RHIB Crane	Burn Hazard
Port Rescue Boat Crane	Burn Hazard
Quarterdeck Small Utility Crane	Burn Hazard
20MT Crane	Burn Hazard
Quarterdeck Port and STBD Gasoline Storage Tanl	Fuelling Operations

Table SOP-S09B5.2 – Temporary RF Warning Sign Locations for AOPV Class Ships

Sign Location	**Sign Type**
PORT and Stbd Bridge Wing doors Leading to Aft Bridge Wings	TBP
P&S MRRB decks, 01 deck	TBP
P&S Auxiliary Boat decks, 02 deck	TBP
Flight deck	TBP
Mezzanine deck	TBP
Quarter deck	TBP

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S09C

HARBOUR RF EMITTER RADIATE PROCEDURES

1. This Harbour RF Emitter Radiate Procedure (HARP) shall be used in harbour to test the operation of the following RF emitters:

   a. HDW SATCOM;

2. Procedures for enforcement of RF restrictions for visiting ships shall be promulgated in Formation Harbour Control Instructions (HCI).

Personnel and Responsibilities

3. The following precautions shall be taken when conducting RF Radiate evolutions:

Responsible	**Actions**
URFSO	Prior to the start of the evolution, the URFSO shall: a. conduct a visual inspection of the jetty area and the bearing down which RF emissions will take place, ensuring that the affected areas are clear of personnel and objects; b. brief Senior Watchkeeper, Sentry and Console Operator on the RF Radiate evolution and their respective duties; c. show the Sentry the bearing down which RF emission will occur; d. ensure that the console operator is qualified to operate the equipment in use; and e. record the relative bearings of the RF Zone in the Special Circumstances section of the Control Chit.
Console Operator	Prior to the start of the evolution, the Console Operator shall: a. be positioned at the Control Console; b. establish direct communication with the Sentry; and c. position the antenna (or input sector blanking settings) at the bearing and elevation as directed by the URFSO. During a RF Radiation evolution, the Console Operator shall: a. cause the radar to begin RF radiation when the Sentry indicates the RF Zone is clear of personnel and objects; b. cause the radar to cease RF radiation when: i. personnel and/or any vehicle or vessel has entered, or is about to enter, the RF Zone; ii. directed by the Safety Person; or

Responsible	Actions
	iii. if at any time the RF beam goes into a restricted bearing or elevation; and c. ensure that the antenna controller/joystick is not moved or adjust the sector blanking settings during radiation. d. If the ship blacks out during a RF radiation evolution the Console Operator shall ensure that the sector blanking settings are still valid prior to restarting the evolution.
Sentry	The Sentry shall be familiar with the operation of the equipment; a. be familiar with the operation of the equipment; b. prior to the start of the evolution the Sentry shall: i. visually inspect the antenna to ensure that it is pointing on the desired bearing and elevation; ii. be located in such a position so as to have an unobstructed view of the RF Danger Zones; iii. establish and maintain at least two methods of communication with the Console Operator; and iv. when the antenna is properly positioned and the RF Danger Zone is free of personnel and objects, send an all clear signal to the Console Operator indicating that it is safe to commence RF Radiation; and c. during the evolution, the Sentry shall direct the Console Operator to cease RF radiation when any personnel or object enters or is about to enter the RF Danger Zone.
Senior Watchkeeper	Prior to the start of the evolution, the Senior Watchkeeper shall: a. ensure that the RF Radiate and Antenna Rotate Procedures have been completed; b. ensure that the name and rank of the Sentry and the Console Operator have been inserted into the Special Circumstances section of the Control Chit; c. report the relative bearings recorded in the Special Circumstances of the Control Chit to QHM; d. ensure appropriate Flags are raised; e. when all the above are completed, may grant permission to commence RF Radiation; and f. direct radiation to cease in any event as required.

Dummy Load Radiation

4. Dummy load radiation in harbour is permitted and can be divided as follows:

a. Mechanically Initiated Dummy Loads. Dummy loads are initiated mechanically when:

(1) a physical switch is manually operated which directs the RF energy to the dummy load; or

(2) the wave guide is disconnected from the antenna and an approved dummy load is attached to the energy source.

b. Electrically Initiated Dummy Loads. Any system with a built in dummy load that automatically defaults to antenna, an approved low power safety device that prevents radiation from the antenna, or equipment that prevents systems from defaulting to antennas shall be used. Under these circumstances, the evolution shall be treated as Antenna Rotation (where applicable). Consequently, a DND 2145 shall be used and Flag Echo shall be raised.

5. Flag ECHO shall be raised when a dummy load is used. In all cases the by-pass shall be measured with an approved RF metre to ensure no leakage.

6. If an approved low power safety device is not installed and electrically initiated dummy load radiation is necessary, then the HARP described in this annex shall be followed.

7. When alongside, an RF safety device shall be installed and locked in place whenever a Dummy load is being used on HARP RF systems when concurrent man aloft operations are occurring. The associated key for the RF safety device and key tag shall be placed in the RF Emitter Keyboard.

RF Danger Zones

8. The RF Danger Zone is:

a. The volume of space into which no personnel or object shall be present during RF radiation.

b. Be over open water and directed away from EMI sensitive areas such as residential, business, institutional and industrial sites; and

c. Inclusive of a buffer away from any object with human occupants or sensitive electronic equipment dependent upon the transmission profile peripheral energy gradient.

HDW SATCOM

9. Transmission of the X, KU and Internet SATCOM in-harbour should be minimized. If the X, KU and Internet SATCOM must transmit in harbour, Figure SOP-S09C.1 (below) and reference D shall be followed. The 5° buffer zone is applied conically about the main beam. No person or object shall be present in the resultant volume of space created within the MEL distance during RF radiation.

10. Additionally, the X, KU and Internet SATCOM shall not radiate in any area where crane operations may require the crane to come within 10 m of the RF Radiation Zone in Figure SOP-S09C.1.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

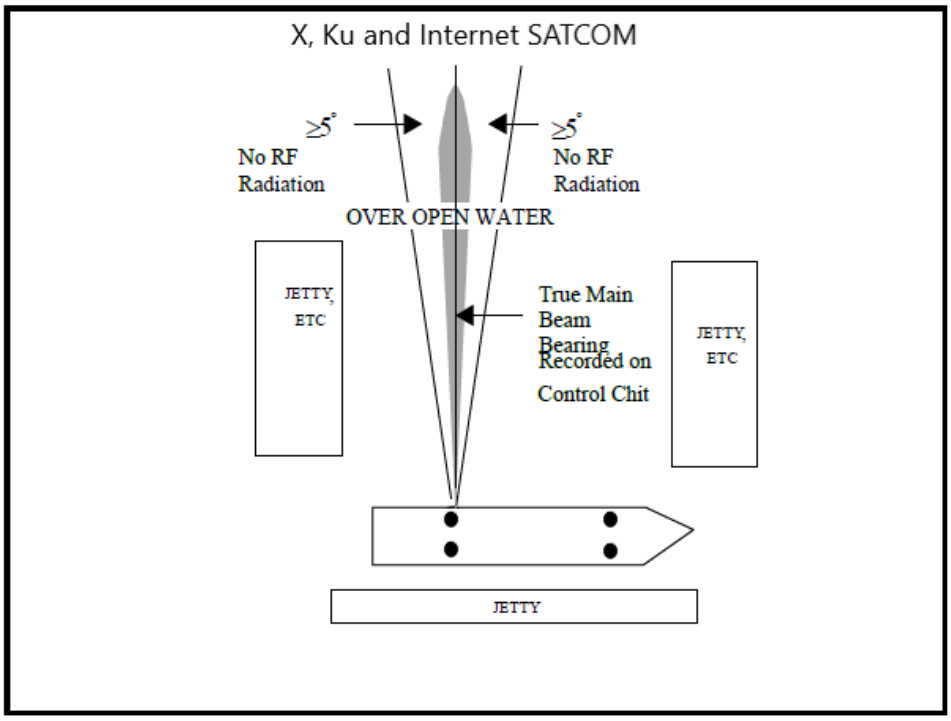


Figure SOP-S09C.1 - SATCOM Harbour RF Policy and Procedures

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S09D

AIRCRAFT RF SAFETY PROCEDURES

Military Aircraft Operations

1. Aircraft are to ensure that they have permission from the ship prior to entering the Air Control Zone. The permission from the ship includes the confirmation that all appropriate RF safety precautions have been observed as detailed in the appropriate class of ship annex. For air contacts, the range for RF safety purposes is slant range. In the event that communications are not established, the aircraft shall not close within the Air Control Zone unless it is essential to do so. Ships shall ensure that all Aircraft RF Safety Distances are maintained when radiating RF energy towards an aircraft. If the Aircraft RF Safety Distance cannot be maintained then the RF emitter shall be secured or have positive control exercised over it.

2. During an air defence exercise, the Air Safety Control Cell may clear attacking aircraft to close the Force and, unless otherwise stated, this authorization includes entering inside the Air Control Zones of ships in the Force. When such authorization is given, ships shall ensure that aircraft are not radiated on while inside the Aircraft RF Safety Distance of its RF emitters. Due to design characteristics, aircraft systems are susceptible to EMI, and in some cases the distance from the emitter where EMI may occur is greater than the MEL distance. Therefore, the Aircraft RF Safety Distance is the greater of either the MEL distance or the HELO system susceptibility to each ship's emitter.

3. Prior any evolution not covered in this Annex, the aircraft Captain and Ship's Command Team shall apply the safety principles contained in this directive and agree upon appropriate RF restrictions.

Helicopter Operations

4. This annex describes the procedures to be used by foreign and CF helicopters operating within the Air Control Zone. HERP precautions shall be met when conducting flying operations (FLYOPS). This is most critical during operations in close proximity of the ship, particularly during arrival and departure. In addition, the lack of complete data of the EMI effects on equipment in the CF helicopters operating in close proximity of ships requires specific direction.

5. Helicopter technicians must be aware that RF safety restrictions apply to personnel working on helicopter engines, transmission platform and tail rotors. RF safety precautions must be implemented before proceeding aloft on these areas.

6. During flying stations, there is a requirement for maintenance personnel to perform checks on the gearbox. For those checks, pre-initiated DND 2145 Control Chit and the Positive Control Chit will be available in advance on the bridge for the OOW to use. If the ship is not conducting flying stations or operations, and the Helo is simply ranged on deck for planned maintenance, positive control procedures and pre-initiated chits are not authorized. To ensure personnel safety, the following steps shall be followed:

a. LSO will request HELICOPTER RF SAFE precautions from the OOW;

b. OOW will contact OpsO, who will bring the <TBD> under positive control;

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

c. Once the RF safety precautions are taken, the OOW will initiate the DND 2145 Control Chit and make the report "HELICOPTER RF SAFE" to the LSO;

d. Personnel can proceed aloft and perform their duties;

e. Once the aloft duties have been completed, the LSO will contact the OOW who will contact the OpsO informing him/her that Positive Control can be ceased; and

f. The On-site Contact must ensure that he/she completes the DND 2145 Man aloft Chit upon completion of Flying Stations.

Approach Procedures

7. In accordance with Reference K, all aircraft shall remain outside the Air Control Zone until clearance to enter has been received. Clearance to enter the Air Control Zone may only be given as follows:

a. HELO RF SAFE. When the <TBD> have been placed in standby. This condition shall be indicated to the aircraft by reporting, "Clear to close, RF SAFE"; or

b. HELO RF SAFE PORT/STARBOARD. When conducting operations, which preclude the switching of radars to standby, sector blanking of the <TBD> shall be used to provide a RF safe corridor to launch/recover helicopters. The sector-blanked area shall be based upon the ships head and shall consist of the entire Port/Starboard side plus 30 Deg off the stern (see figure SOP-S09D.1 and SOP-S09D.2). In addition, measures for the <TBD> shall be taken to ensure that the helicopter will not be illuminated. This condition shall be indicated to the aircraft by the report.

"Clear to close, RF SAFE PORT/ STARBOARD".

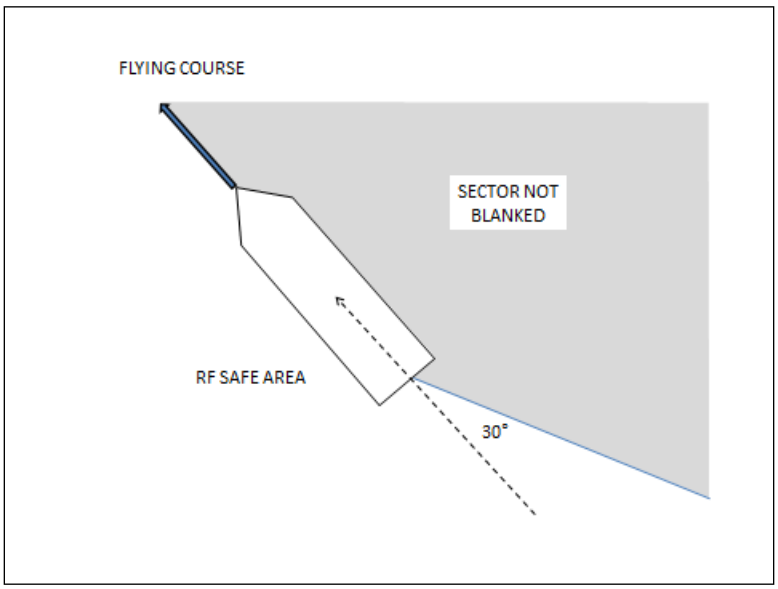


Figure SOP-S09D.1 - RF SAFE PORT

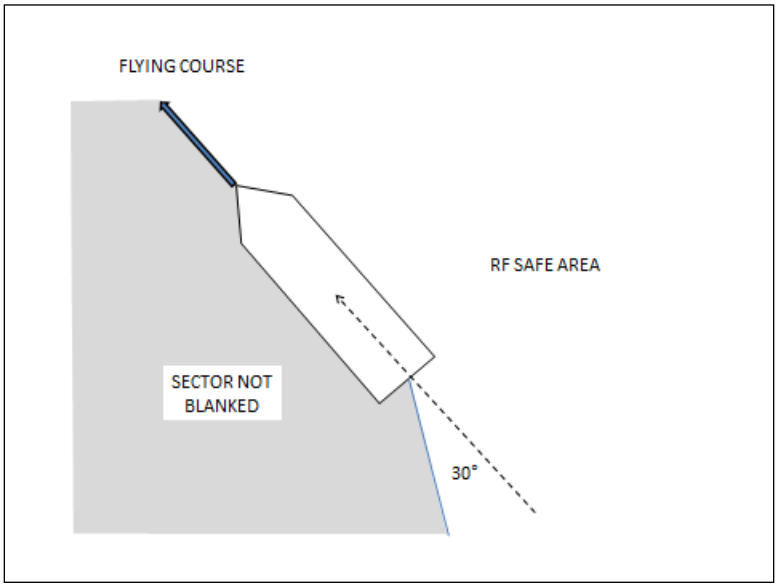


Figure SOP-S09D.2 - RF SAFE STARBOARD

NOTE: If the radar has been sector blanked using true bearings, the ship must inform the aircraft of the bearings and when it has the clearance to close the ship.

Take-off Procedures

8. Before clearing an aircraft to launch, the LSO shall ensure that the appropriate RF condition is met and understood by both the helicopter and Command. Normally, the RF status will be passed at the same time as Flying Course information.

9. Once the helicopter is airborne and has cleared the ship beyond the aircraft's RF safety distance shipboard search radar transmissions may resume. <TBD> must remain in standby or under positive control until the aircraft is outside 1/2 nautical mile.

Operations in Close Proximity

10. For flight operations requiring freedom to manoeuvre around the ship and requiring extended periods of over deck time (HIFR, Hoist, VERTREP, Deck Landing Training, etc.), "HELO RF SAFE" conditions should be set. When there is a requirement to sustain RF transmissions (e.g., for AAW surveillance), the following procedures shall apply:

a. Where mutual support can be provided by another unit (e.g. ship, AEW aircraft, etc.), the ship shall co-ordinate with AAWC for coverage and conduct FLYOPS under "HELO RF SAFE" procedures; and

b. Where mutual AAW support cannot be provided:

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

(1) deck evolutions not requiring a circuit (Deck landing training, HIFR, Hoist) shall be conducted under "HELO RF SAFE AFT" where sector blanking is from GREEN 150° to RED 90° (see Figure SOP-S09D.3); or

(2) forecastle work (Hoist, VERTREP) shall be conducted under "HELO RF SAFE FORWARD" where sector blanking is from RED 45° to GREEN 135° (see Figure SOP-S09D.4).

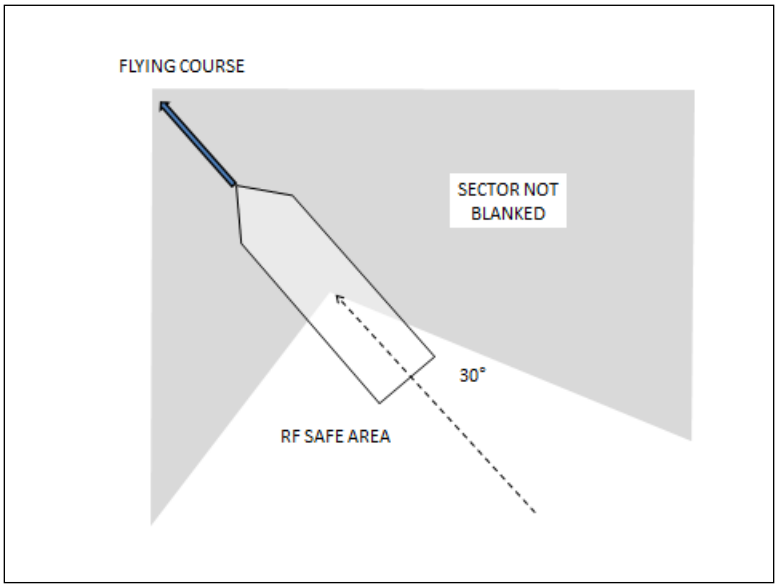


Figure SOP-S09D.1: HELO RADHAZ Safe Aft

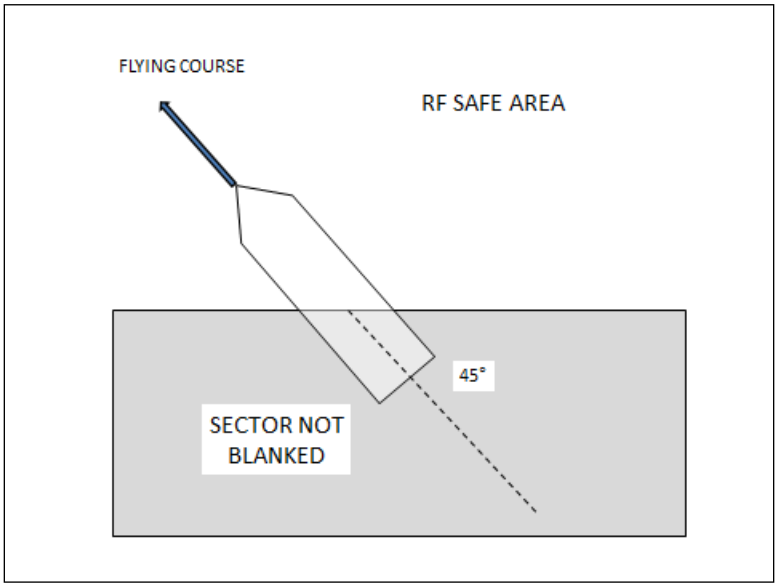


Figure SOP-S09D.2: HELO RADHAZ Safe Forward

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Foreign Helicopters

11. When flight operations are conducted with foreign helicopters, only "HELO RF SAFE" procedures shall be used. RF safety precautions shall remain in place until the aircraft is secured on deck or departs the Air Control Zone. When foreign aircrew have been briefed on Canadian helicopter procedures, and have received appropriate authority from their own command, foreign helicopters may conduct operations in accordance with Canadian procedures.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S09E

CF FUELS AND LIQUIDS WITH FLASH POINTS BELOW 60°C

Liquid	Other Names or Use	Flash Point	Comments
Acetone	Solvent for many plastics	-18°C	Vapours can be explosive
Ethyl Alcohol	Ethanol (solvent, shellac thinner, active ingredient of alcoholic beverages, etc.)	13°C	Medium RF Hazard
F-34 (NATO)	Aviation Kerosene 'NATO Single Fuel Concept' Helicopter Fuel JP-8 (US DoD) JET-A (Commercial Grade) JET-A1 (Commercial Grade) CAN-CGSB-3.23 (Canadian)	38°C	Low Hazard Some of these fuels only differ in their freezing point.
F-40 (NATO)	Aviation Fuel: JP-4 (US DoD) CAN-CGSB-3.22 (Canadian)	-12°C	High RF Explosion Hazard From Vapours
F-54 (NATO)	Diesel Fuel, Trucks CAN-CGSB-3.6 (Canadian)	40°C	Low RF Hazard
Fuel Oil #1	Kerosene	38°-78°C	Low RF Hazard
Fuel Oil #2	Diesel Oil	38°C	Low RF Hazard
Fuel Oil #4		54°C	Low RF Hazard
Fuel Oil #5		54°C	Low RF Hazard
Gasoline		- 46°C	Extremely high fire or explosion hazard from vapours
Isopropyl Alcohol	Isopropanol (rubbing alcohol, cleaner for magnetic tape heads, etc.)	12°C	Medium Hazard
Methyl Alcohol	Methanol (solvent, gas line antifreeze)	11°C	Medium Hazard
Methyl Ethyl-Ketone	Common Solvent	-6°C	Vapours can be Explosive
Mineral Spirits	Paint Thinner, Brush Cleaner, Etc.	43°-52°C	Low RF Hazard
Naphtha	Mixture of Benzene, Xylene, Toluene, and/or other Petroleum Based Liquids	-7°-43°C	Vapours can be explosive depending upon the exact mixture
Turpentine	Brush Cleaner, Paint Remover	33°C	Low RF Hazard
Varsol	Brush Cleaner, Paint Remover	42°C	Low RF Hazard

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Specific Requirements for Flammables with Flash Points < 60°C

1. The following procedures should be observed for flammable materials with a flash point less than 60°C when exposed to RF signals. These procedures apply during fuelling, de-fuelling, fuel handling operations and platform-to-platform replenishments. The same procedures also apply when there is a leakage of flammable materials with a flash point greater than 60°C from a damaged container:

   a. Radar and Satellite Communications - radar main beams and RF radiation from other directional aerials of own or other platforms must not illuminate fuelling points, fuelling rigs, aircraft, vehicles or craft being fuelled, de-fuelled or replenished within 300 m for radars of average power greater than 500 W and within 100 m at lower powers; and

   b. Radio Communication (Omni-directional);

      (1) no transmissions at all from own or other platforms are authorized within 10 m of fuelling point, fuelling rig or nearest point of aircraft platform being fuelled or replenished;

      (2) limited transmissions are allowed from own and other platforms up to 250W per transmitter if between 10 m and 30 m from fuelling point, (no limit to the number of transmitters); and

      (3) no restriction if greater than 30 m from fuelling point.

2. Transmitters connected to a dummy load do not cause HERF risks and are not restricted by the above precautions.

3. Consumer RF devices, such as handheld cellular and other unlicensed wireless communication RF devices, shall be switched OFF within 10 m of any fuelling source. Units shall adhere to local regulations where local regulations are more restrictive.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S09F

RF ENERGY LEAK CHECK RECORD SHEET

SECTION A – IDENTIFYING INFORMATION

Ship Name / Unit / Building Number: _____ Date: _____

Purpose of Check: _____
Type: Pre-maintenance leak check Post maintenance leak check

System: _____Compartment(s) Checked: _____

SECTION B – AREAS CHECKED AND RESULTS (attach sketch if necessary)

_____
_____
_____
_____

SECTION C –SUMMARY AND RECOMMENDATION

☐ No RF leakage detected, no action required.
☐ RF leakage detected, below SC6 limits for HERP, no action required.
☐ RF leakage detected, above SC6 limits for HERP, rectification required.

Omitted areas are:
☐ Nil
☐ To be checked by Unit's Staff as soon as practical
☐ Other (insert details):

_____
_____
_____
_____

SECTION D – UNIT SIGN OFF:

RF Check Conducted by (Print): _____

Signature: _____

Date: _____

Unit RFSO: _____

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S09G

RF SIGNAGE NATO STOCK NUMBERS

(See http://admmat.mil.ca/dglepm/qete/en/radio_frequency_safety_program_e.asp)

NSN Number	Text	Material	Size (mm)
7690-20-003-8797	WARNING RADIO FREQUENCY HAZARD PERSONNEL HAZARD EXISTS IN THIS AREA KEEP MOVING	LABEL: 3M 220 SERIES VINYL WHITE GLOSS PERMANENT ADHESIVE	240 x 240
7690-20-003-8799	WARNING RADIO FREQUENCY HAZARD PERSONNEL HAZARD EXISTS IN THIS AREA KEEP MOVING	PVC WITH 4 MOUNTING HOLES	240 x 240
7690-20-003-8801	WARNING RADIO FREQUENCY HAZARD CHECK WITH COMMAND AUTHORITY BEFORE PROCEEDING BEYOND THIS POINT	PVC WITH 4 MOUNTING HOLES	240 x 240
7690-20-003-8802	WARNING RADIO FREQUENCY HAZARD CHECK WITH COMMAND AUTHORITY BEFORE PROCEEDING BEYOND THIS POINT	LABEL: 3M 220 SERIES VINYL WHITE GLOSS PERMANENT ADHESIVE	240 x 240
7690-20-003-8803	ATTENTION DANGER DE FRÉQUENCE RADIO RISQUE POUR LE PERSONNEL DANS CETTE ZONE CIRCULEZ	LABEL: 3M 220 SERIES VINYL WHITE GLOSS PERMANENT ADHESIVE	240 x 240
7690-20-003-8804	ATTENTION DANGER DE FRÉQUENCE RADIO RISQUE POUR LE PERSONNEL DANS CETTE ZONE CIRCULEZ	PVC WITH 4 MOUNTING HOLES	240 x 240
7690-20-003-8806	WARNING RADIO FREQUENCY HAZARD BURN HAZARD MAY EXIST ON METALLIC OBJECTS IN THIS AREA	LABEL: 3M 220 SERIES VINYL WHITE GLOSS PERMANENT ADHESIVE	240 x 240
7690-20-003-8808	WARNING RADIO FREQUENCY HAZARD BURN HAZARD MAY EXIST ON METALLIC OBJECTS IN THIS AREA	PVC WITH 4 MOUNTING HOLES	240 x 240
7690-20-003-8809	ATTENTION DANGER DE FRÉQUENCE RADIO RISQUE DE BRÛLURES SUR LES OBJETS MÉTALLIQUES DANS CETTE ZONE	LABEL: 3M 220 SERIES VINYL WHITE GLOSS PERMANENT ADHESIVE	240 x 240
7690-20-003-8810	ATTENTION DANGER DE FRÉQUENCE RADIO RISQUE DE BRÛLURES SUR LES OBJETS MÉTALLIQUES DANS CETTE ZONE	PVC WITH 4 MOUNTING HOLES	240 x 240
7690-20-003-8811	ATTENTION DANGER DE FRÉQUENCE RADIO ACCÈS INTERDIT SANS AUTORISATION	PVC WITH 4 MOUNTING HOLES	240 x 240
7690-20-003-8812	ATTENTION DANGER DE FRÉQUENCE RADIO ACCÈS INTERDIT SANS AUTORISATION	LABEL: 3M 220 SERIES VINYL WHITE GLOSS PERMANENT ADHESIVE	240 x 240
7690-20-003-8849	ATTENTION RADIO FREQUENCY HAZARD DANGER DE FREQUENCE RADIO	LABEL: BLACK SYMBOL AND INSPECTION ON LIGHT GREEN BACKGROUND	64 x 64
7690-20-003-8851	ATTENTION RADIO FREQUENCY HAZARD DANGER DE FREQUENCE RADIO	LABEL: BLACK SYMBOL AND INSCRIPTION ON WHITE BACKGROUND YELLOW; BLACK AND RED INKS STOCK	64 X 64

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

NSN Number	Text	Material	Size (mm)
9905-21-909-0092	WARNING RADIO FREQUENCY HAZARD PERSONNEL HAZARD EXISTS IN THIS AREA KEEP MOVING	ALUMINUM WITH 3M ADHESIVE	127 X 127
9905-21-909-0093	ATTENTION DANGER DE FRÉQUENCE RADIO RISQUE POUR LE PERSONNEL DANS CETTE ZONE CIRCULEZ	ALUMINUM WITH 3M ADHESIVE	127 X 127
9905-21-909-0094	WARNING RADIO FREQUENCY HAZARD PRIOR TO FUELING OPERATIONS CHECK WITH COMMAND AUTHORITY	ALUMINUM WITH 3M ADHESIVE	127 X 127
9905-21-909-0095	PRUDENCE RISQUE DE FRÉQUENCE RADIOÉLECTRIQUE AVANT TOUTE OPÉRATIONS DE RAVITAILLEMENT EN COMBUSTIBLE CONSULTEZ L'AUTORITÉ DU COMMANDEMENT	3 mm PVC WITH 3M ADHESIVE	127 X 127
9905-21-909-0096	WARNING RADIO FREQUENCY HAZARD BURN HAZARD MAY EXIST ON METALLIC OBJECTS IN THIS AREA	ALUMINUM WITH 3M ADHESIVE	127 X 127
9905-21-909-0097	ATTENTION DANGER DE FRÉQUENCE RADIO RISQUE DE BRÛLURES SUR LES OBJECTS MÉTALLIQUES DANS CETTE ZONE	ALUMINUM WITH 3M ADHESIVE	127 X 127
9905-21-909-0098	WARNING RADIO FREQUENCY HAZARD ORDNANCE HAZARD CHECK WITH COMMAND AUTHORITY BEFORE PROCEEDING BEYOND THIS POINT	ALUMINUM WITH 3M ADHESIVE	127 X 127
9905-21-909-0099	ATTENTION DANGER DE FRÉQUENCE RADIO MUNITIONS DANGEREUSES ACCÈS INTERDIT SANS AUTORISATION	ALUMINUM WITH 3M ADHESIVE	127 X 127
9905-21-909-0100	WARNING RADIO FREQUENCY HAZARD CHECK WITH COMMAND AUTHORITY BEFORE PROCEEDING BEYOND THIS POINT	3 mm PVC WITH 3M ADHESIVE	127 X 127
9905-21-909-0101	ATTENTION DANGER DE FRÉQUENCE RADIO ACCÈS INTERDIT SANS AUTORISATION	ALUMINUM WITH 3M ADHESIVE	127 X 127
9905-20-002-9299	WARNING RADIO FREQUENCY HAZARD CHECK WITH COMMAND AUTHORITY BEFORE PROCEEDING BEYOND THIS POINT	6 mm PVC WITH 4 MOUNTING HOLES	600 X 600
9905-20-002-9154	PRUDENCE RISQUE DE FRÉQUENCE RADIOÉLECTRIQUE ACCÈS INTERDIT SANS AUTORISATION	6 mm PVC WITH 4 MOUNTING HOLES	600 X 600

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S09H

MONTHLY AND QUARTERLY AUDIT CHECKLISTS

MONTHLY RFSP AUDIT CHECKLIST **MONTH OF**

TO BE COMPLETED WITHIN 5 CALENDAR DAYS OF THE LAST DAY OF THE MONTH

REQUIREMENT		DATE	SIGNATURE
Verify the condition and location of the Emitter Keyboard, ensuring sufficient key tags and DND 2145 chits are available			
Verify that the completed DND 2145 chits are being completed correctly. Check for accuracy and completeness. Store in an envelope and label. Deficiencies in completion of the chit are to be addressed through training.			
Verify that RF training log is current	Courses - URFSO		
	Qualifications – Fall Arrest		
	Lectures - NETP, In-routine, Senior Watchkeeper 's, OOW's, CRR's		
RF Incident Log up to date			
Verify the condition of the RF Leak Check Log			
Ensure RF Measuring equipment is calibrated as per TEMMIS requirements			
RF Binder is up to date			

Conducted By		
URFSO Signature		

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

QUARTERLY RFSP AUDIT CHECKLIST

REQUIREMENT	DATE	SIGNATURE
Ensure Monthly Audit Checklists are completed		
Verify Senior Watchkeeper Pack is current		
Verify Bridge Pack is current		
Verify CCR Pack is current		
Verify Bomb Threat Pack (Zone and Master)		
Verify CRR's are current		
Verify/Update RF emitter diagrams		
Ensure Permanent RF signs are posted in accordance with RCN SEMS Directive S2 and are in good repair		
Review RF documentation.		
Submit entry for Routine Orders		
Review training plan and forecast		

Conducted By		
URFSO Signature		

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S09I

RFSP AUDIT ASSESSMENT MATRIX: SHIPS

Introduction

1. The RF Safety Program (RFSP) verification is performed by the Formation Safety and Environment Officer's staff (MARL/MARP SEO) to ensure that RF safety procedures are being followed.

2. In general, the safety program components are:

   a. Program policy;

   b. Program planning;

   c. Program implementation;

   d. Program measurement and evaluation; and

   e. Program review and improvement.

Verification Protocol

3. The RFSP shipboard verification protocol is specific to shipboard RF safety, and greatly assists in identifying and concentrating on areas relevant to shipboard RFSP.

4. The verification protocol and the verification assessment criteria, which are used to evaluate the RFSP elements, are in the form of a "checklist". This checklist, or Assessment Matrix, is divided into five program categories, which are sub-divided into the program verification elements. These specific elements are associated with areas of shipboard RF Safety, and constitute a practical and applicable checklist for determining program effectiveness/efficiency, and whether the ship has an effective RFSP. The protocol is a useful tool for evaluating the RFSP, and will be used by Formation in RFSP assessments. The Verification Assessment Matrix is provided below.

5. There are five program categories each containing elements pertaining to the shipboard RFSP. Element assessment is verified by:

   a. Personnel Interviews (PI);

   b. Documentation Check (DC);

   c. Site Inspection (SI); and

   d. General Verification (GV).

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

GENERAL

1.1 Is there a Captain's Standing Order (CSO) for RF safety? Is it current and relevant?
Verification Notes: The CSO must include reference E and RCN SEMS Directive S2. CSOs should reflect current CO's expectations; for example, CSOs should elaborate sensor control for man aloft/ positive control in fourth degree of readiness (DC)

1.2 Does the Senior Watchkeeper Pack and RF File contain applicable portions of RCN SEMS Directive S2, along with any necessary amplifying information and instructions?
Verification Notes: Review Senior Watchkeeper pack and RF File: The Senior Watchkeeper Pack should contain Senior Watchkeeper material specific to the class of ship, amplifying information to RCN SEMS Directive S2 as customized to the CO's standard, and RCN SEMS Directive S2 in its entirety. The RF Binder should contain a list of fitted RF emitters, ship survey reports, RF training log, RF incident log and actions taken, and an RF leak check log. (DC)

1.3 Does the Bridge Tactical Pack contain applicable HERP, HERF, and HERO tables?
Verification Notes: Review the Bridge Tactical Pack: The Bridge Tactical Pack should have OOW material specific to the class of ship (i.e. HERP/HERO/HERF tables) and all info pertaining to at-sea Ops, such as; RAS, VIPs, ammunitioning, Rescue Stations, etc. (DC)

1.4 Do the orders clearly state the responsibilities and duties of each member involved with the RFSP, including: URFSO; Alternate URFSO (if appointed); Ops Team (OpsO , OOW, FC Sup); Senior Watchkeeper s/OOWs; and MSEO.
Verification Notes: They should state their responsibilities and duties with respect to the RFSP: (DC)

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

RF INCIDENT INVESTIGATION AND REPORTING

2.1 Are RF incidents investigated and promptly actioned IAW Ref G and this Directive?
Verification Notes: Review DND 663s, SIs, Tis and UCRs. (GV/DC)

2.2 Have there been many RF deficiencies/incidents? If so, was follow-up action taken to ensure deficiencies/incidents were rectified/eliminated?
Verification Notes: Review DND 663s. The action plan to rectify the deficiency must be stated in the DND 663: (DC/GV)

RF MEASURING EQUIPMENT

3.1 Is the URFSO aware of the onboard RADMAN equipment? Is the equipment calibrated? Is there someone trained on the use of this equipment?
Verification Notes: Check RADMAN equipment. The equipment must be calibrated every 3 years *IAW TEMMIS regulations*: (DC/GV/SI)

3.2 Are EC Part 1, Notifications, UCRS, etc. submitted to rectify RF deficiencies? Are there examples?
Verification Notes: Review documentation and general verification. Deficiencies noted during inspections may require ECPs or UCRs to rectify. The department discovering the deficiency is responsible for liaising with the URFSO to ensure the administration is completed: (GV/DC)

PROMOTION AND MOTIVATION

4.1 Are periodic RFSP temporary instructions promulgated?
Verification Notes: Review TIs/TMs. Temporary memorandums should be promulgated if there is a specific RFSP issue that requires more clarification: (DC/GV)

4.2 Is all RFSP documentation available?
Verification Notes: Check document availability. Documents should be available in one accessible central location: (GV/SI)

4.3 Are personnel aware of the documentation location?
Verification Notes: General verification and personnel interviews: (PI/GV) Documentation require in RF binder: Health Canada Safety Code 6, DAOD 3026-0, 3026-1, C-56-040-001/TS-002, Directive S9, Any RF advisory messages, incident message, Quarterly and Monthly Checklist

GUARDS AND BARRIERS

5.1 Are RF warning signs posted in the appropriate locations IAW the class-of-ship RF warning sign location report (Appendices)
Verification Notes: Verify by site inspection.

5.2 Are there sufficient portable warning signs, and are they readily available?
Verification Notes: There should be enough portable signs to meet the requirements of the sign the requirements of RCN SEMS Directive S9 Sign Placement details.(SI)

5.3 Is the RF emitter keyboard and RF key tag system adequate, including: a. key tags for every emitter; b. locks for RF emitter keyboard; c. RF emitter keyboard that clearly displays all keys; d. RF incident board; e. DND 2145 chit log; f. key sign-out log; and g. sufficient extra key tags
Verification Notes: Inspect RF emitter keyboard/key system: (SI/GV)

TRAINING

6.1 Is there a RFSP training plan, and are personnel who require training identified and loaded on courses if available? Is it documented who is taking the training?
Verification Notes: Training should be provided to all new members: (DC)

6.2 Are new personnel who join the ship provided with a general RFSP brief (In-Routine)?
Verification Notes: Interview personnel. New personnel should receive a RFSP brief from the URFSO or alternate upon joining the ship.: (PI/GV)

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

RFSP EVALUATION AND PERFORMANCE MEASUREMENT

7.1 Were self-verifications being conducted during the last year?
Verification Notes: Review to see if self-verifications were conducted: (DC)

RFSP REVIEW AND IMPROVEMENT

8.1 Is there a plan to improve the RFSP based upon a self-verification or the recent Formation verification results?
Verification Notes: Verify if an action plan was created: (DC)

8.2 How much progress has been made on the last action plan?
Verification Notes: Review the plan and assess how much progress has been made in implementing the plan: (DC/GV)

8.3 Are RFSP status and progress included in annual reports?
Verification Notes: This is essentially an indication of how much progress has been made in improving the RFSP: (DC)

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

STANDARD OPERATING PROCEDURE SOP-S10

LASER SAFETY

Purpose

1. To provide direction and assign responsibility for implementing the Laser Safety Program to maximize the safety of all civilian and military personnel involved in the operation of laser systems. Additionally, this SOP serves as a repository for safety information on Maritime laser systems.

Scope

2. This SOP applies to all ships of this class under the jurisdiction of the Commander Maritime Forces Atlantic and Commander Maritime Forces Pacific.

Definitions

3. The following definitions are used within this SOP:

Term	Definition
AEL	The maximum accessible emission level permitted within a particular class of laser.
Diffuse Reflection	The reflection from an irregular surface where the reflected rays are scattered in a multi-directional manner.
Extended Nominal Ocular Hazard Distance (ENOHD)	This Distance takes into account the use of binoculars/big eyes.
Nominal Ocular Hazard Distance (NOHD).	The distance along the axis of the beam within which the exposure level is greater than the appropriate MPE.
Nominal Hazard Zone (NHZ)	The space within which the level of direct, reflected or scattered laser radiation exceeds the level of the applicable MPE.
Maximum Permissible Exposure (MPE)	The maximum level of laser radiation to which a person may be exposed without adverse effect.
Optical Density (OD)	Logarithmic expression for the attenuation produced by a filter such as Laser Eye Protection.
Specular Reflection	Mirror like reflection.

Responsibilities

4. <u>Commanding Officer (CO)</u>:

a. Responsible to ensure that laser emissions are under strict control at all times when operated.

5. Formation Laser Systems Safety Officer (FLSSO):

a. Responsible for policy and program implementation within the Formation as directed by CMS. The term Laser Systems Safety Officer (LSSO) vice Laser Safety Officer is used within the RCN to differentiate it from the Landing Safety Officer (LSO).

6. Unit LSSO (ULSSO):

a. The ULSSO duty shall be conducted by the W Eng Manager and is responsible for training and co-ordination of the laser safety organization. The ULSSO shall be a member of the Ship's Safety and Environment Committee.

7. Alternate ULSSO:

a. The Alternate ULSSO shall a Junior W Eng Tech and is responsible to the ULSSO for the daily implementation of the procedures in this SOP.

Procedure

BACKGROUND

8. DND civilian personnel are subject to the Canada Labour Code Part II and the Canadian Occupational Health and Safety Regulations. Although military personnel are not directly protected by the code, the CDS and the Minister of National Defence have decreed that military personnel will follow the Canada Labour Code in their day-to-day routine unless a sound operational reason dictates otherwise. The provisions and all of the references apply to all DND civilian and Canadian Forces personnel.

9. In the years since their development, lasers have found application in a wide range of areas. It also became apparent that there are hazards, particularly the potential for eye damage, associated with the use of lasers. Although higher-powered lasers can cause skin burns, it is the eye, with its concentrating lens system, which is most susceptible to damage.

10. What makes a laser hazardous is that its energy is concentrated in a collimated, coherent beam of light (for purposes of this publication "light includes the visible and invisible infrared and ultraviolet portions of the spectrum). Unlike a light bulb, which emits light of multiple wavelengths in all directions, a laser produces monochromatic (single wavelength) light in a parallel (collimated) beam with the peaks and troughs of the waves being synchronized (coherent). This difference results in a one-watt visible laser delivering far more power per unit area (irradiance) than a 100-watt light bulb.

GENERAL

11. Lasers are divided into classes, in accordance with reference F, as listed below:

a. Class 1. The lowest powered lasers are called Class 1 lasers. This group is normally limited to very low power semi-conductor lasers or enclosed laser systems and is not hazardous, even if the output beam is collected by 50 mm collecting optics and concentrated into the pupil of the eye;

b. Class 1M. Class 1M lasers are safe for unaided viewing but may be hazardous if magnifying optics are employed within the beam;

c. Class 2. Class 2 lasers operate in the visible part of the spectrum. Deliberate ocular exposure for longer than 0.25 seconds may be hazardous, but protection is afforded by the eyes' natural aversion response to bright light even when 50 mm collecting optics are used;

d. Class 2M. Class 2M lasers operate in the visible part of the spectrum. Deliberate ocular exposure for longer than 0.25 s may be hazardous, but protection is normally afforded by the eyes' natural aversion response to bright light. This group may be hazardous if magnifying optics are employed within the beam;

e. Class 3R. Class 3R lasers have an accessible output power or radiant energy within 5 times the Accessible Emission Limit (AEL) of Class 2 within the wavelength range from 400 to 700 nanometres, or within five (5) times the AEL of Class 1 for other wavelengths. Direct ocular exposure of Class 3R lasers may be hazardous, but the risk is lower than for Class 3B lasers. Class 3R lasers are not capable of causing injury to skin and cannot produce a hazardous diffuse reflection;

f. Class 3B. Class 3B lasers are of all wavelengths. Direct ocular exposure of Class 3B lasers is normally hazardous, but viewing of diffuse reflections is generally safe. There is unlikely to be a skin hazard; and

g. Class 4. Class 4 lasers are capable of causing serious injury to both eye and skin; and may also produce diffuse reflections that are hazardous to the eye. They can also cause combustion of flammable materials.

AREA CONTROL

12. Alongside and at sea, the OOD/OOW shall maintain control at all times of all laser system firing keys classified as Class 3B and 4. The laser inventory can be found at Annex SOP-S10B.

13. In order to exercise control over all on board laser emitters, the Laser Safety Program includes.

a. all key and area control measures that are to be used;

b. the type of PPE to be worn;

c. the safety precautions (Warning Signs and Pipes) that are to be used; and

d. training requirements of those personnel who are required to work with lasers.

14. The area where the laser will be operated shall be well defined. In many situations, it will be appropriate to use laser warning signs.

15. Optical viewing devices (such as binoculars, big eyes, or telescopes) shall not be carried or used in any controlled area without prior approval of the ULSSO. If laser operations are to be viewed with such devices, appropriate attenuating filters must be used in the optical viewing device.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

16. For Class 3 and 4 lasers, even momentary exposure can be hazardous. Personnel will not look into the beam or any specular reflection of the beam.

USE OF LASERS AT SEA

17. The CO will suspend the laser activity immediately, if:

a. unauthorized vessels enter the NHZ;

b. safety distances cannot be satisfied; or

c. sea conditions will not allow stabilization of the laser system on target to take place.

18. The CO must ensure that the laser only irradiates authorized targets. The laser system must be switched off if the laser pointing cannot be stabilized.

DIRECTION

19. Direction regarding laser systems can be found in all of the references. Direction for fitted laser systems can be found in Annex SOP-S10C, Ranger 25B LRF, Annex SOP-S10D, Vaisala Ceilometer CL31 and SOP-S10E VIGY Observer.

TRAINING

20. FLSSO will coordinate the ULSSO Course in the Formation. This course is provided through DLN and coordinated by Gagetown. Successful candidate are granted the AEWF - LSO qualification.

21. Laser Safety Awareness training is also available at any time from the FLSSO or from a ULSSO with the AEWF qualification.

LASER VERIFICATIONS

22. Laser system verifications shall be performed on an annual basis by the ULSSO and by the FLSSO every 36 months. Results of the self-verification are to be forwarded to FLSSO upon completion. Direction for self-verifications can be found in Annex SOP-S10F.

Procedure Performance Criteria and Records

23. All units and sections shall maintain an inventory of all laser equipment and devices. The unit shall keep copies of inspections, test results, operating logs, verifications, maintenance records and individual training records (PERs file with AEWF qualification). The ship shall maintain the following records:

a. Laser Inventory;

b. Laser Firing Log;

c. Verifications; and

d. Training Records.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

24. Inventory, Firing Log and Verification records shall be held on board for one year after which records are to be archived by forwarding to the FLSSO.

Attachments

Annex SOP-S10A - Laser Safety References
Annex SOP-S10B - Laser Inventory
Annex SOP-S10C - Ranger 25B LFR of the MK 38 Mod 2A 25mm Gun
Annex SOP-S10D - Vaisala Ceilometer CL31 Subsystem
Annex SOP-S10E - Vigy Observer EO/IR Subsystem
Annex SOP-S10F - Laser Safety Program Self Verification
Annex SOP-S10G - Laser Warning Signs

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S10A

LASER SAFETY REFERENCES

A. STANAG 3606 Annex C, International Exchange of Laser Safety Information
B. ANSI Standard Z136.1-2000, American National Standard for Safe Use of Lasers
C. ANSI Standard Z136.6-2005, American National Standard for Safe Use of Lasers Outdoors
D. Canadian Occupational Health and Safety Regulations, Part X Hazardous Substances
E. DAOD 2050-0 Laser Safety and 2050-1 Laser Safety Program
F. C-02-040-002/TS-001, Laser Safety
G. CFTO C-02-040-002/AA-000 Safe Use of Lasers
H. RCN Directive S9
I. CF H Svcs Gp Instruction 4440-16, Physical Hazards Surveillance Program
J. A012619 Ranger 25B – Laser hazard Safety Assessment
K. E-9853 Technical Manual Description, Operation, and Maintenance 25mm Machine Gun System Mk 38 Mod 3A

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S10B

LASER INVENTORY

Laser System	**Laser Class**	**NHD Skin (metres)**	**NOHD[1] (metres)**	**ENOHD[2] (metres)**	**ENOHD Basis**	**Personnel Protective Equipment (PPE)**
Ranger 25B LRF	1	NIL	NIL	NIL		No PPE Require Personnel shall not look directly into the LRF apparatus
Vaisala Ceilometer CL31	1M	NIL	NIL	NIL		No PPE Require Personnel shall not look directly into the LRF apparatus
Vigy Observer	1M	NIL	NIL	NIL		No PPE Require Personnel shall not look directly into the LRF apparatus

Notes:

1. Nominal Ocular Hazard Distance (NOHD)
2. Extended Nominal Ocular Hazard Distance (ENOHD)

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S10C

RANGER 25B LRF OF THE MK 38 MOD 2A 25 MM GUN

1. The Ranger 25B subsystem provides the ship with a way to accurately measure distance of targets in order to complete the fire control solution.

Personal Protective Equipment (PPE)

2. NIL PPE Require

Laser Operations

3. References D and E directs that written Standard Operating Procedures (SOPs) shall be implemented by units holding Class 3B and Class 4 Laser equipment and devices.

4. As the Ranger 25B contains a Class 1 laser range finder these SOP, Control measures and engineering controls are not necessary. However, the system's operation and maintenance will be in accordance with applicable DND and RCN policies.

5. Personnel shall not look directly into the Laser Range Finder (LRF) apparatus. There shall be a sign indicating that it is a Class 1 laser directly on the mount the system.

6. During operation of the system, the ship staff shall indicate that the area around the mount is out of bounds. This will be done with in accordance with annex H warning signs and warning pipes.

7. Should the Ship Staff find it necessary to conduct maintenance, the system shall be locked out in accordance with HDW SOP-S04 lock out/tag out procedures.

8. The ship's Naval Technical Officer is responsible for the maintenance of the system.

Laser Cut-Outs

9. Left blank intentionally.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S10D

VAISALA CEILOMETER CL31 SUBSYSTEM

1. The Vaisala Ceilometer CL31 subsystem provides the ship with a pulsed diode laser light detection and ranging technology to provide a fast measurement of the cloud base height and vertical visibility.

Personal Protective Equipment (PPE)

2. NIL PPE Require

Laser Operations

3. References D and E directs that written Standard Operating Procedures (SOPs) shall be implemented by units holding Class 3B and Class 4 Laser equipment and devices.

4. As the Vaisala Ceilometer contains a Class 1 laser range finder these SOP, Control measures and engineering controls are not necessary. However, the system's operation and maintenance will be in accordance with applicable DND and RCN policies.

5. Personnel shall not look directly into the Laser Range Finder (LRF) apparatus. There shall be a sign indicating that it is a Class 1 laser directly on the mount the system.

6. During operation of the system, the ship staff shall indicate that the area around the mount is out of bounds. This will be done with in accordance with annex H warning signs and warning pipes.

7. Should the Ship Staff find it necessary to conduct maintenance, the system shall be locked out in accordance with HDW SOP-S04 lock out/tag out procedures.

8. The ship's Naval Technical Officer is responsible for the maintenance of the system.

Laser Cut-Outs

9. Left blank intentionally.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S10E

VIGY OBSERVER ELECTRO-OPTICAL AND INFRARED (EO/IR) SUBSYSTEM

1. The VIGY observer EO/IR subsystem provides the ship with thermal imaging and low light TV system to support safe boat operations and provides security when boarding operations such as observing on-deck movement of personnel on a vessel of interest are being conducted.

Personal Protective Equipment (PPE)

2. NIL PPE Require

Laser Operations

3. References D and E directs that written Standard Operating Procedures (SOPs) shall be implemented by units holding Class 3B and Class 4 Laser equipment and devices.

4. As the VIGY observer contains a Class 1 laser range finder these SOP, Control measures and engineering controls are not necessary. However, the system's operation and maintenance will be in accordance with applicable DND and RCN policies.

5. Personnel shall not look directly into the Laser Range Finder (LRF) apparatus. There shall be a sign indicating that it is a Class 1 laser directly on the mount the system.

6. During operation of the system, the ship staff shall indicate that the area around the mount is out of bounds. This will be done with in accordance with annex H warning signs and warning pipes.

7. Should the Ship Staff find it necessary to conduct maintenance, the system shall be locked out in accordance with HDW SOP S04 lock out/tag out procedures.

8. The ship's Naval Technical Officer is responsible for the maintenance of the system.

Laser Cut-Outs

9. Left blank intentionally.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S10F

LASER SAFETY PROGRAM SELF VERIFICATION

Part I - Policy

Action Item	**Observation**	**Corrective Action**
Review all documentation containing Laser Safety guidelines to ensure currency and availability to the crew.		
Verify that the Laser Inventory is current.		

Part II - Planning

Action Item	**Observation**	**Corrective Action**
Verify that laser training records are current. (to include qualified persons with AEWF qualification, ULSSO & A/ULSSO, Laser Safety Awareness Briefings attendance).		

Part III - Implementation

Action Item	**Observation**	**Corrective Action**
Verify that Laser Warning signs are posted correctly.		
Verify the Captain's Ship Book contains current policy information.		

Part IV - Measurement and Evaluation

Action Item	Observation	Corrective Action
Review and modify Self Verification plan IAW Formation verifications.		

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Part V - Review and Improvement

Action Item	Observation	Corrective Action
Formulate action plan in response to observations from Formation verifications.		

Conducted By: _____ Date: _____
(name & rank)

ULSSO Signature: _____ Date: _____

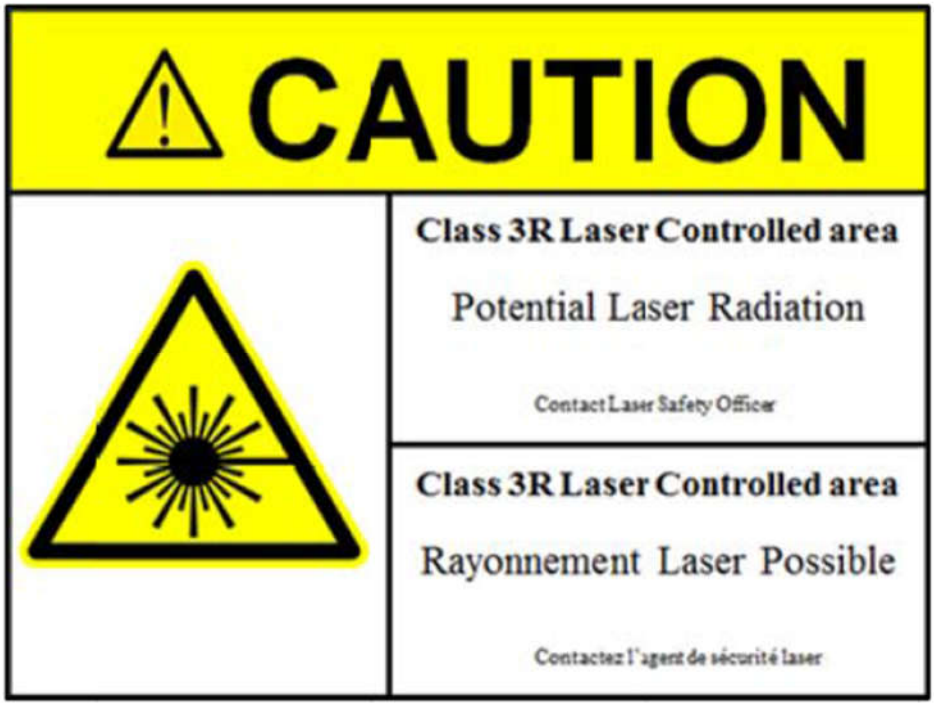
Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S10G

LASER WARNING SIGNS

Below is an example of the laser warning sign, which meets the CFTO requirements:

Below is an example of the laser warning sign, which meets the CFTO requirements:



Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

STANDARD OPERATING PROCEDURE SOP-S11

RADIATION SAFETY

Purpose

1. To provide direction and assign responsibility for implementing the Radiation Safety Program to ensure the safety of all civilian and military personnel.

Scope

2. This SOP applies to all ships of this class under the jurisdiction of the Commander Maritime Forces Atlantic and Commander Maritime Forces Pacific. In addition to the Custodian Poster, this SOP will set the general conditions and requirements for the radiation safety/security management

Definitions

3. Detailed definitions can be found in reference D, NSI - Series 0 (General and Administration).

Responsibilities

4. Director Nuclear Safety (DNS):

   a. Within DND/CF, DNS is the regulating authority for all Ionizing Radiation Sources (IRS) and nuclear activities, while Commands and Units are responsible for the development and maintenance of Unit safety programs.

5. RCN Radiation Safety Officer (RCN RadSO):

   a. The RCN RadSO oversees the Navy's ionizing radiation safety program.

6. Formation Radiation Safety Officer (FRadSO):

   a. The FRadSO oversees the Formation Units' programs. The FRadSO is responsible for policy and program implementation within the Formation. Further details with respect to FRadSO's TOR can be found at reference A.

7. Formation Health Services Officer:

   a. The Formation Health Services Officer is responsible for the health aspects of ionizing radiation exposure and for implementing the ionizing radiation safety program for medical and dental X-ray facilities. Further details are contained in DAOD 4002-1.

8. Commanding Officer (CO):

   a. The CO is the accountable authority and holds the authorization for the Unit's ionizing radiation safety program;

   b. The CO shall formally appoint the Logistics Chief by signing the 'Custodian Poster'. The poster is the Unit's official ionizing radiation safety authorization;

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

9. Logistics Chief

a. Ships with IRS must have a formally trained Logistics Chief and Alternate RadSC. The Logistics Chief and qualified Alternate RadSC duties are normally conducted by members of the Logistics Department. The functional chain of command for ionizing radiation safety matters allows the Custodian direct access to the CO. The Logistics Chief responsibilities include:

(1) Responsible to the CO for all aspects of Radiation Safety;

(2) Maintain an IRS register, which shall include NSN, device name, isotope contained, radioactive activity, device location, quantity held and Storage Location (SLoc). Annex SOP-S11B contains an example table. Although this information is contained in the DRMIS account, the Chief shall maintain an up-to-date hard copy because access to the DRMIS system, especially at sea, is not always available. When devices are not stored in their normal location, Temporary Loan Cards shall be used for inventory tracking purposes;

(3) DRMIS contains the inventory lists and warning signs are prominently displayed in the proper locations as per NSI 4-110;

(4) Ensure proper handling and storage of IRS as per NSI 4-130;

(5) Prepare IRS for return and disposal as per Custodian poster;

(6) Ensure that all IRS are accounted for at all times;

(7) Carry out any other duties pertaining to Radiation Safety

(8) Authorized storage capacity of UREA tanks while in harbour is 95% of its total

(9) ; and

(10) Submit the Unit annual report and a copy of the CO's signed validation of permit conditions to the FRadSO (both documents can be printed directly from DRMIS).

Procedure

BACKGROUND

10. Ionizing Radiation Sources (IRS) are any items capable of emitting ionizing radiation, whether they are radioactive or not. Examples include radioactive nuclear substances found in equipment such as, weapon sights, and ionizing radiation from other sources such as x-ray machines when switched on.

11. IRS onboard HMC Ships are relatively benign if the equipment is contained, properly handled, and maintained. The typical inventory of IRS containing equipment for a HARRY DEWOLF Class ship is listed in Annex SOP-S11B.

12. The exposure to radiation is unperceivable on the human body. Thus, safe handling procedures and detection instruments are necessary to ensure personnel are not exposed to radiation or contaminated by radioactive material.

13. Radioactive contamination, if ingested, can remain for years and increase the risk of delayed health effects.

GENERAL HANDLING, STORAGE AND SECURITY REQUIREMENTS

14. The IRS held onboard in various equipment and storage locations are to be in accordance with NSI 4-130. The Custodian Poster, paragraphs 32-35, provides specific direction on storage requirements/limitations.

15. These items may be kept in a locker, filing cabinet or any other area where they are appropriately secure. The Logistics Chief is responsible for ensuring the proper storage of IRS in accordance with NSI Series 4, Use, Handling, Storage, Maintenance of Radiation Sources.

16. To prevent the possibility of contamination in storage areas, items should be either contained in plastic bags or be placed on a plastic shelf liner, which can be replaced and disposed of occasionally in accordance with: NSI 7-500, Clean Workspace Ethic.

Radioactive Material Control

17. The procedures for reporting IRS are contained in NSI Series 6. The Logistics Chief is to log into DRMIS when they have a change in their inventory to ensure the accuracy of the ship's inventory registered with DNS. When a helicopter detachment is attach-posted to the ship, ensure procedures in the section titled 'Action when a Helicopter is Attached to a Ship', starting at paragraph 27, are followed.

Safety and Accident Procedures

18. Due to the nature of IRS, the following safety procedures shall be put in place when handling/using IRS equipment:

a. do not eat, drink or smoke in the storage area;

b. properly stow IRS when not in use;

c. items containing IRS will not be issued from stores for permanent retention by individuals. It will only be issued on temporary loan and must be returned to stores when no longer in use;

d. all personnel drawing IRS from stores will receive a verbal safety briefing from the Logistics Chief, or representative, on procedures in the event of a breakage; and

e. personnel drawing Gaseous Tritium Light Sources (GTLS) will read and sign a hard copy of the "Warning and Emergency Procedures for Gaseous Tritium" enclosed as Annex SOP-S11C.

19. Breakage of items containing luminous paint will not necessarily result in the release of IRS but items containing a GTLS must be regarded as having released radioactive gas. In case of an incident

resulting in the release or suspected release of a GTLS, follow the procedures described in Annex SOP-S11C.

20. If an incident results in individuals being cut by items containing IRS, the wound must be immediately flushed with water, bandaged and medical attention sought. Medical authorities must be alerted to the possibility of radioactive contamination.

21. Items containing luminous paint must be inspected periodically for flaking, separation or damage. GTLS must be inspected and compared for luminosity. Any items losing luminosity faster than the others must be regarded as leaking and dealt with in accordance with NSI 4-210.

22. Radiological Hazardous Occurrence (RHO) refers to any occurrence involving ionizing radiation sources that are outside the scope of normal operating procedures. RHOs must be reported to the Logistics Chief, FRadSO and DNS in accordance with NSI 6-100. RHO categories are classified as:

a. Security Infractions;

b. Exposure Device Occurrences;

c. Overexposure Occurrences;

d. Contamination Occurrences;

e. Transportation/Handling Occurrences;

f. Criminal Acts; and

g. Miscellaneous.

23. If a hazardous occurrence does occur, the Logistics Chiefwill contact the FRadSO and follow procedures in SOP S01 for investigating the incident and completing the required paperwork as necessary.

Transportation/Shipping

24. Shipping IRS must meet the packaging and labelling requirements contained within NSI Series 5. All appropriate communication must be completed in advance of shipping the component.

25. Ships taking IRS on exercise or deployment and who will be retaining items in their custody for transportation, will not be required to inform DNS of the intended time of departure or return of these items. If items are to be shipped through the Central Materiel Traffic Terminal (CMTT) then the appropriate communication is to be completed prior to shipping. FRadSO shall be contacted for guidance as required.

Ships Entering Refit/DWP

26. During an HMC Ship DWP/refit where there is a requirement to land all naval stores, the ship's Logistics Chief is to ensure that the entire ship's non-fitted IRS inventory is safely stored in a common authorized radiation storage facility at CFB Esquimalt/CFB Halifax as per NSI 4-130 (i.e., all IRS shall be stored in same location). The Logistics Chief is to contact the FRadSO and coordinate the movement

of the ship's IRS inventory. DNS is to be informed through the chain-of-command of the temporary location of the inventory and the date it was transferred.

Action when a Helicopter is Attached to a Ship

27. When a helicoper is attached to a ship, the ship's Logistics Chief shall:

a. obtain an inventory list of IRS carried onboard the helicopter and in the pack up kit (i.e. helicopter spare parts); and

b. ensure IRS brought onboard is properly stored.

28. Annex SOP-S11E indicates the typical IRS inventory for a Cyclone helicopter when an Air Detachment is attached to ship. A current copy of the helicopter's IRS shall be retained by the Logistics Chief but is not to be added to the ship's inventory list in DRMIS.

29. In the unlikely event of a helicopter crash on deck, the risk from IRS contamination to personnel is assessed as extremely low. Only after emergency actions have ceased and the crash site is under control, should consideration be paid to dealing with any IRS that may still be located at the crash site. Advice should be sought from the FRadSO, or any of the other contacts listed at Annex SOP-S11D, for potential follow-on actions related to IRS contamination.

Disposal and Decommissioning

30. Disposal of IRS shall be coordinated through the FRadSO. Ensure all packaging requirements are met in accordance with NSI - Series 8 (Decommissioning and Disposal). The required paperwork shall accompany the material to the Flog/BLog - R & D Section.

31. Decommissioning shall be coordinated through the FRadSO. Annex SOP-S11F shall be completed by the Logistics Chief with assistance from the FRadSO. A copy of the swipe results shall be included with the completed annex. NSI 8-300 provides further detail.

ALTERNATE POINT OF CONTACT

32. If for any reason, the FRadSO cannot be reached, the Logistics Chief is to contact the Alternate FRadSO also known as the Base Nuclear Emergency Response Officer (BNERO MARPAC) or the Base Logistics Radiation Safety Office (BLog RadSO MARLANT). See Annex SOP-S11D for contact numbers.

KEY NSIs

33. The following are key NSIs that Custodians should be familiar with:

a. NSI 1-100 Ionizing Radiation Fundamentals;

b. NSI 1-410 Immediate Actions in Case of Radiological Hazardous Occurrences;

c. NSI 4-100 NAIRS – Nuclear Activities and Ionizing Radiation Sources;

d. NSI 4-110 Markings, Labelling and Signs;

e. NSI 4-130 Storage of Ionizing Radiation Sources;

f. NSI 4-210 Tritium;

g. NSI 4-212 Nickel-63;

h. NSI 5-100 Nuclear Substance Transport Regulations;

i. NSI 5-200 Nuclear Substance Transport Packaging;

j. NSI 5-300 Excepted Packages;

k. NSI 6-600 Radiological Hazardous Occurrence Investigations; and

l. NSI 7-500 Clean Workspace Ethic.

AWARENESS TRAINING

34. Awareness training is required for personnel that will handle, work with, or may encounter IRS. Awareness training should include but not be restricted to the following:

a. identification of the Logistics Chief and his/her Alternate;

b. general duties of the Logistics Chief;

c. who should be contacted in the event of an incident/accident involving IRS;

d. locations where IRS is held and their hazards;

e. awareness videos on ionizing radiation safety; and

f. helicopter IRS (when attached to ship).

Procedure Performance Criteria and Records

35. The unit shall maintain copies of inspections, test results, operating logs, maintenance records and individual training records in accordance with the reference NSI 6-100. After three years, records are to be archived by forwarding to the FRadSO.

Attachments

Annex SOP-S11A - Radiation Safety References
Annex SOP-S11B - Sample Ship's IRS Inventory List
Annex SOP-S11C - Warning and Emergency Procedures for Gaseous Tritium
Annex SOP-S11D - Contact Numbers
Annex SOP-S11E - Helicopter Typical Holdings
Annex SOP-S11F - Radiological Compliance Certificate

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S11A

RADIATION SAFETY REFERENCES

A. DAOD 4002-0, Nuclear Technology, Regulation and Control
B. DAOD 4002-1, Nuclear and Ionizing Radiation Safety
C. Nuclear Safety Orders & Directives (NSOD)
D. Nuclear Safety Instructions (NSI)
F. MARLANT SEMS Directive S19 – Ionizing Radiation, Annex A – CFB Halifax Ionizing Radiation Safety SOPs
G. MARPAC SEMS Directive S8 – Ionizing Radiation

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S11B

SAMPLE SHIP'S IRS INVENTORY LIST

Note: The table is an example of the information required to account for the radioactive inventory held in ship. The Logistics Chief is responsible for maintaining the currency of this information through (DRMIS) account. The inventory listed is typical of that held in HARRY DEWOLF Class ships.

Unit Name: _____

Supply Customer Account #: _____

NSN	Device	Isotope	Activity	Location	Holdings
1005-12-340-7950	Submachine Gun, 9 MIL	H-3	0.74 GBq		
1005-21-907-1475	Pistol, 9 MIL P225 (Sig Sauer)	H-3	1.98 GBq		
1240-21-906-8151	Sight Assembly, Optical, Small Arms	H-3	0.148 GBq		
6350-01-362-1921	Alarm, Smoke, Automated	Am-241	29.6 KBq		
6660-25-120-8979	Cloud Height Indicator	H-3	18 GBq		
6665-99-420-3628	Detector Kit, Chemical Agent Monitor	Ni-63	370 MBq		

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S11C

WARNING AND EMERGENCY PROCEDURES FOR GASEOUS TRITIUM

THE EQUIPMENT THAT YOU ARE DRAWING CONTAINS THE RADIOACTIVE ISOTOPE TRITIUM (H3) IN ITS GASEOUS STATE

1. Before being issued this equipment, be sure that you are briefed on the emergency procedure outlined below. Examples of items containing Gaseous Tritium Light Source (GTLS) are the 9mm Sig Sauer pistol, submachine gun and C7 sight.

2. All equipment should be thoroughly inspected for damage before and after issue.

3. At any time, if damage is noted, inform the Logistics Chief and/or stores personnel and do not use.

4. Note that the quantity of Tritium contained in this equipment is considered extremely small, however, to avoid internal exposure to this isotope, caution is to be exercised.

5. In the event of breakage of a GTLS, the On-Scene Commander shall IMMEDIATELY ADVISE THOSE PRESENT TO:

   a. stop breathing;

   b. evacuate the area;

   c. ventilate if in a confined space and cordon off (do not re-enter for at least a ½ hour);

   d. contact the Logistics Chief for follow-up action; and

   e. seek medical advice regarding potential exposure.

I, the undersigned, have been briefed and read the procedures with respect to the warning and emergency procedures for Gaseous Tritium:

_____ _____
(insert: Rank & Name) (insert: contact #)

The above person has been briefed with respect to Gaseous Tritium:

Logistics Chief:_____ _____
(insert: Rank & Name) (insert: contact #)

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S11D

CONTACT NUMBERS

Appointment	Phone
Logistics Chief: _____ (insert: Rank & Name)	(*insert: contact #s*)
Alternate Logistic Department: _____ (insert: Rank & Name)	(*insert: contact #s*)
Formation RadSOs:	
MARPAC	(250) 363-7979 (w) (250) 893-5675 (cel)
MARLANT	(902) 427-1571 (w) (902) 483-9757 (cel)
Alternate Formation RadSOs:	
MARPAC (FRadSO)	(250) 363-7861 (w) (250) 213-1653 (cel)
MARLANT (BLog RadSO)	(902) 722-7953 (w) (902) 452-0215 (cel)
RCN RadSO	(613) 971-7675 (w) (613) 698-7865 (cel)
DNS Desk Officer	(613) 992-6908 (w)

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S11E

HELICOPTER TYPICAL HOLDINGS

CYCLONE – To be determined

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S11F

RADIOLOGICAL COMPLIANCE CERTIFICATE

Unit/Ship: _____ Date: _____ (When was the decommissioning conducted)
Decommissioning conducted by:
Location: (Brief description of site or object decommissioned)
Isotope/Equipment Storage History: (What was present in the site to be decommissioned i.e. 6 - CAMs Ni63, 20 - C7 scopes H3)
Reason for decommissioning: (Brief explanation i.e. move to another identified location, no longer needed, replaced by new storage container. UradSO/Logistics Chief should contact FRadSO for direction.)
Swipe documentation: (all paperwork to be attached to this document for future reference i.e. forms, swipe maps etc.)
Swipe batch # from RMC: (Attach copy of results)
Formation RadSO notified on: (Date)
Signature URadSO/Logistics Chief: _____ Date: _____

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

STANDARD OPERATING PROCEDURE SOP-S12

SURFACE PREPARATION

Purpose

1. To provide direction to ensure that personnel conducting surface preparation activities effectively mitigate any hazards associated with lead contained in the primer coating of internally painted surfaces.

Scope

2. This SOP applies to all ships of this class under the jurisdiction of the Commander Maritime Forces Atlantic and Commander Maritime Forces Pacific. This SOP applies to all personnel who remove paint from interior surfaces of HMC Ships in preparation for burning, welding and/or painting. This SOP also applies to personnel who conduct work while replacing and disturbing cabling through shipboard wire ways.

Definitions

3. The following definitions are used within this SOP:

Term	Definition
High Efficiency Particle Air (HEPA)	Type of Filter media for the removal of particulate contaminants.
Respiratory Protective Device (RPD)	A device that is worn by the user to reduce or eliminate exposure to harmful contaminants through the inhalation of those contaminants.

Responsibilities

4. NTO:

   a. The NTO shall be consulted prior to conducting any surface preparation activities onboard HMC ships to ensure the provisions of this SOP are understood and followed.

5. <u>Supervisors</u>:

   a. Responsible for initiating a hazard assessment prior to the commencement of work;

   b. ensuring all required PPE is in place prior to the commencement of work; and

   c. all PPE is used during surface preparation.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Procedure

BACKGROUND

6. Until 1998, DND utilized a 'Lead based primer' to treat interior steel surfaces of HMC Ships. During surface preparation activities in support of HCM FELEX, concentrations of lead were found to be present in paint chips and dust present during the removal process. This SOP provides instruction regarding mitigating the risk of lead exposure to personnel.

7. The main exposure pathways associated with lead are inhalation and ingestion. Lead exposure can be managed effectively by reducing the amount of dust being generated when preparing surfaces, utilizing recommended personal protective equipment, and by following hygiene practices.

8. In all cases, the worksite must be prepared to prevent generated dust from migrating outside of the work zone where personnel may not be wearing adequate respiratory protection.

9. For the purposes of this SOP, all interior painted surfaces are to be treated as containing lead unless confirmation is received through testing.

DIRECTION

10. Personnel who are likely to experience exposure to leaded paint and/or leaded paint dust shall receive training and instruction in this SOP. UGSOs are to incorporate this hazard into their indoctrination brief to new personnel. Emphasis must be placed on educating women who may become pregnant.

PAINTED SURFACE PREPARATION

11. If the surface (top coat) of the interior paint is treated for minor touch ups, only hand sanding equipment is used. Testing has shown that lead is present within the surface coating, but only in very small quantities.

12. Prior to sanding, personnel traffic transiting the area is to be minimized where possible. Areas that may collect dust are to be covered as much as practicable to prevent dust from remaining on nearby surfaces, and to facilitate cleanup. Signage must be posted advising personnel that lead laden paint dust may be present and personnel are to remain clear of the area. Personnel are to be briefed on the hazard of lead dust. A HEPA vacuum should be present to capture any dust generated by sanding to prevent the dust from becoming entrained in the air.

13. Personnel conducting surface preparation shall wear PPE appropriate to the task. Personnel will wear a properly fitted P100 RPD to prevent their exposure to dust. PPE may also include:

a. nitrile gloves;

b. paper coveralls; and

c. boots covers.

14. Once all of the painted surfaces in the area have been prepared, the entire area shall be wet wiped to ensure all dust is removed from the area.

15. The HEPA filter is to be treated as Hazwaste and disposed of IAW Reference G.

ISOLATION OF VENTILATION SYSTEM

16. Supply or exhaust openings within the work area/enclosure, shall be covered with polyethylene sheeting and the ship's ventilation system in the work area shall be shut down or isolated. Ship staff should refrain from using forced air units, such as KU Units and FCU units in the work zone as they may have enough force to blow dust particles out of the immediate work area or keep dust particles airborne.

PORTABLE VENTILATION EXHAUST UNITS

17. Portable ventilation units' intakes shall be placed as close as possible to the point of dust generation to maximize capture velocity and removal of dust generated by surface preparation. This may be accomplished by using hangers or ropes, attached near the air inlet, to allow the inlet to be suspended from overhead objects. Position the intake opening to draw the dust away from the worker's breathing zone (not through it). The air discharge from the unit will need to be fitted with HEPA filtration. HEPA filter boxes shall be continually monitored to ensure that the filters are not reducing the flow of air. The end of the vent line shall run to the upper deck and be draped over the side of the ship, approximately one metre above the water line.

REMOVAL TO BARE STEEL

18. Prior to the commencement of any surface paint removal, the area should be tested for the presence of lead. FMF can test the area for the presence of lead. If testing is not practicable, samples should be taken for analysis or the area should be considered as containing lead.

19. The supervisor, as part of the hazard assessment, decides the most effective way to remove the paint, based on the surface area to be removed/prepared. Options for removal are as follows:

a. **Chemical Removal:** This is the preferred method of lead paint removal due to the negligible amount of dust it generates during the stripping process. This method can take more time, as the material must be applied and then a pre-set amount of time must be allowed to elapse before it is scraped/wiped off. There is the hazard of chemical vapours from the strippers which can lead to a poisonous/toxic, corrosive or flammable environment. Extra care needs to be taken by the worker to ensure that proper PPE is worn to protect against this and that the ventilation system is properly configured to provide adequate protection. Disposal methods need to be properly understood. Caustic materials may be reactive with other materials;

b. **Needle-gunning:** The preferred mechanical method of lead paint removal is to use a needle-gun. This method generates large particles that are less hazardous to workers. Paint removed via a needle gun tends to be more prone to drop quickly to the ground, rather than floating in the air. Unfortunately, this method does not completely remove the substrate coating and other means for completely removing the substrate may be necessary; and

c. **Grinding/Sanding/Buffing:** This type of operation removes the surface coating through fine abrasion and creates small particles of material which easily become suspended in the air and present a hazard for inhalation. This method tends to disperse the material over a larger area which means a larger area of contamination, resulting in more clean-up.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

20. When conducting mechanical surface preparation, consideration should be given to enclosing the area to contain any dust potentially generated by mechanical removal.

21. To greatly reduce the quantity of airborne contaminants, all tools are to be equipped with a connected HEPA vacuum system. Note: Using these tools does not negate the respiratory hazard. Respiratory protection is still required.

22. Prior to tools leaving the work area, tools must be de-contaminated by vacuuming them off with a HEPA vacuum and then wiping them down thoroughly with a wet cloth (or approved wipes). Tools should never leave the work area without being cleaned and they should never be "blown down" as this will generate a dust cloud which will disperse the contaminants, rather than contain them. All cloths/waste water is to be properly disposed of.

HOT WORK

23. When hot work is required on an area which has tested positive for lead, the area six inches beyond the heat effected zone, all around, must be scaled away to the bare metal. The exclusion zone is to prevent the production of lead fume when temperatures exceed the melting point of lead (330° C or 620° F). Ventilation is required to exhaust fumes to the upper deck and over the side. The fire sentry on the opposite side of the hot work must wear the same Respiratory Protective Device (RPD) as the person working in the hot zone.

PERSONAL PROTECTIVE EQUIPMENT CONSIDERATIONS

24. Workers performing surface preparation work with leaded paints are required to wear a properly fitted non-disposable half-face respirator with P100 HEPA cartridges. For greater protection, and to preclude contamination into the eyes, full-face masks with P100 HEPA cartridges could also be used. RPDs should be worn in the work zone from the time of commencement of grinding/needle gunning until the final completion of clean-up of the settled dusts.

25. Disposable Tyvek coveralls (with attached booties and hood) should be used, when performing grinding or needle gunning paint removal work on leaded paint systems. Cloth coveralls shall not be worn by workers.

26. If Tyvek boot covers are not available for use, soles and uppers of footwear shall be thoroughly wiped down with dampened clean disposable paper towels after completion of surface preparation work on leaded paints. Wipe down shall be performed each time before leaving the work area after lead paint dust generation or dust contact, and before removing the footwear. Contaminated wipes shall be disposed of as hazardous waste. Footwear decontaminated in this manner shall be stored in a manner that prevents potential transfer of residual contaminants from the footwear to other surfaces or clothing.

27. Gloves should be washable, re-usable rubber gloves or single-use impervious disposable gloves. Leather type gloves should not be used as they would be easily contaminated and could end up contaminating other workers.

28. Contaminated clothing must not be taken out of the work area other than for disposal and shall be placed in properly sealed/labeled containers iaw with SOP-SE01.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

HYGIENE

29. While working, lead dust can get on the clothes, hands or hair, leaving the opportunity for the dust to be ingested or inhaled. For this reason, good hygiene practices are critical. Under no circumstances must coveralls be worn into common use areas such as canteens and personal service rooms.

30. The following are considered good hygiene practices after working with lead containing paint. Supervisors are to brief their personnel on these precautions:

a. workers must wash their hands and face prior to eating, drinking, smoking, or using washroom facilities;

b. when working, avoid putting hands near the mouth, lips, or nostrils;

c. avoid rubbing sleeve against face;

d. never put any object in the mouth;

e. do not eat, drink, chew gum or apply cosmetics anywhere lead materials are being handled or accumulate;

f. HEPA vacuuming can be used to remove loose lead dust from clothing and hair; and

g. rinse mouth before eating.

31. Ship's staff shall ensure they follow appropriate hygiene practices to prevent the inadvertent ingesting/inhaling of lead dust. Supervisors are to monitor these actions and if there are any questions, liaise with the Ship's PA for further direction. Bilge/Oily Water Pumping Alongside.

32. As with any dust, individuals should wear the minimum of an N95 Filtration Mask to provide respiratory protection and employ mitigation measures to reduce or eliminate making the dust airborne. They should advise personnel within the work area that significant dust may be generated, cover equipment, clean the work area and follow proper personal hygiene practices. The employment of the following mitigation methods for control of this type of dust will limit exposure:

a. wipe the area, wire or cable bundle as well as possible with a wet cloth prior to work commencement;

b. use a vacuum cleaner equipped with a HEPA filter on the wire or cable bundle where possible prior to work commencement;

c. use of a light misting spray, from a spray bottle, on the wire or cable bundle will further prevent dust from becoming entrained (airborne) into air currents and possibly spreading;

d. a wet cloth wrapped around the cable as it is released from the cable bundle will remove dust;

e. personnel employed in the removal of cable should wear gloves as a barrier to facilitate a higher level of personal hygiene; and

f. the dust will drop directly below the work area; surfaces below the work are to be covered with a drop sheet to capture all falling debris and disposed of. The remaining surfaces are to be HEPA vacuumed and wet wiped to capture all remaining dust.

33. When working with materials that may have been contaminated from lead, materials shall be segregated for the purposes of disposal. Disposing similar materials together greatly reduces cost. Waste materials shall generally be separated and disposed of into one of the four categories described below:

a. paint chips;

b. contaminated debris (i.e. sanding enclosures, coveralls, gloves, etc.);

c. chemical strippers and debris contaminated with the product (i.e. brushes, rags, etc.). If different name brands are being used, then they shall be stored in their own container; and

d. sandblast grit (if applicable).

DISPOSAL

34. All waste material must be properly packaged and labeled prior to sending for disposal. Prop. Proper labelling will help eliminate possible exposure to personnel handling the waste and ensure the material is disposed in a manner to limit releases to the environment. The following procedure shall be followed for the disposal of lead waste material:

a. material must be placed in a SEALED poly drum liner within a steel open top drum (available through Blog/HazMat);

b. each drum requires a Hazardous Waste label attached IAW SOP-SE01; and

c. whenever possible the waste should be accompanied by an SDS sheet, either attached to the drum or to the email when the waste pick-up request is submitted.

Procedure Performance Criteria and Records

N/A

Attachments

Annex SOP-S12A - Surface Preparation References

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S12A

SURFACE PREPARATION REFERENCES

A. Canada Labor Code Pt II, 125 (1)(s)
B. Canadian Occupational Health and Safety Regulations, Part X, Hazardous Substances
C. C-02-040-009/AG-001, General Safety Standards, Chapter 13 – Hazardous Substances Safety Standard
D. D-23-003-005/SF-002 Specification for Maintenance Painting of HMC Ships
E. HARRY DEWOLF Class Shipboard Hazardous Materials Portfolio (DNPS 2)
F. HARRY DEWOLF Class SEMS SOP-S03
G. HARRY DEWLF Class SEMS SOP-SE01

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

STANDARD OPERATING PROCEDURE SOP-S13

HIGH VOLTAGE SWITCHING PROGRAM

Purpose

1. The purpose of this Standard Operating Procedure (SOP) is to prevent accidental or unexpected energizing of High Voltage (HV) equipment by applying HV Switching Program (HVSP) procedures in accordance with the HV Safe System of Work (SSOW). This SOP provides safety procedures and HVSP information to protect personnel from injury and equipment from damage.

Scope

2. This SOP applies to all ships of this class under the jurisdiction of the Commander Maritime Forces Atlantic and Commander Maritime Forces Pacific. This includes all DND military and civilian personnel and contractors working on the ship's behalf. All safety concerns should be brought to the attention of the HV Authorized Person in Control (APC), HV Authorizing Engineer (AE) and/or Unit General Safety Officer (UGSO).

Definitions

3. The following definitions are used within this SOP:

Term	Definition
Authorized Person (AP)	Authorized Person (AP) qualified personnel are fully conversant with HV Systems and possess in-depth knowledge of electrical safety rules and has been endorsed by the Authorizing Engineer in the Switchboard Register. The AP shall issue Permits to Work (PTW), Sanctions for Test (SFT), Limitations of Access (LOA) and HV Switching Schedules (HVSS) while acting as an Authorized Person in Control (APC). AP qualified personnel may enter any HV compartments and Limited Approach Boundaries without supervision. AP qualified personnel may conduct work on live HV equipment.
Authorized Person in Control (APC)	Authorized Person in Control (APC) is a HV position within Control the Naval Technical Department. Personnel with AP qualification may act as the APC to devise and conduct HV equipment isolation in accordance with the approved HV Switching Schedule (HVSS). Only one person may act as APC at any given time. APC is the only person who may issue HV PTW, SFT, Limitation of Access (LOA) and HVSS. APCs are solely responsible for maintaining the Switchboard Register.
Authorizing Engineer (AE)	Authorizing Engineer (AE) qualified personnel are technically trained and qualified engineers, who are fully conversant with HV systems and possess in-depth knowledge of electrical safety rules and regulations. AEs are responsible for the enforcement and audit of HV operating procedures, and may also recommend deviations from HV policies. AEs may enter HV compartments and Limited Approach Boundaries without supervision.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Circuit Main Earth (CME)	Circuit Main Earth (CME) is an earth, which is positively applied and locked secure in position, before a Permit to Work or Sanction for Test is issued.
Competent Person (CP)	Competent Person (CP) qualified personnel have sufficient technical knowledge or experience to avoid danger from electrical hazard while working in a HV compartment. They are authorized to enter HV Compartments without supervision. CP qualified personnel may act as a Person in Charge (PIC) to conduct work on dead HV equipment..
Danger	Any hazard, condition, or activity that could reasonably be expected to be an imminent or serious threat to the life or health of a person exposed to it before the hazard or condition can be corrected or the activity altered.
Dead	When at or about zero voltage, and isolated from any source of electrical energy.
Decay Time	The time required for an equipment to fully dissipate its stored voltage.
Disconnected	Power source removed but may not be physically secured.
Earth (Marine)	In a naval context, earth refers to a low resistance connection to the ship's hull to ensure discharge of electrical energy that will not cause danger.
Electrical Equipment	Anything used, intended to be used, or installed for use to generate, provide, transmit, transform, rectify, convert, conduct, distribute, control, store, measure, or use electrical energy.
High Voltage (Marine)	High Voltage (HV) is where working voltage measured between any two circuit conductors exceeds 1000V AC or 1500V DC. HV is also when working voltage measured between a phase conductor and earth exceeds 600V AC or 900V DC.
HV Aware	HV Aware trained personnel are familiar with the HV warning labels and HV administrative structure. HV Aware personnel may not enter HV compartments when the ship is HV LIVE unless accompanied by an AP/CP, or be in receipt of a Limitation of Access (LOA).
HV Compartment	Any areas that contain HV equipment is considered a HV compartment. Areas with transiting HV cables without connections or terminations are not normally considered HV compartments. However an area with only HV cable transiting may be considered a HV compartment in the event of damage, potential damage, or other incident in which the safety of personnel inside the compartment could be compromised.
HV DEAD	HV DEAD is the state used to inform personnel that the ship is no longer capable of generating HV and all sources of HV supply have been disconnected and isolated with Circuit Main Earths (CMEs) applied.
HV Equipment	Any electrical equipment that operates at High Voltage (Marine).

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

HV LIVE	HV LIVE is the state used to inform personnel that the ship is either generating or is capable of generating HV power, or is connected to an external HV shore supply.
HVSP Locking Device	A mechanical mean (individually keyed lock) to hold an energy-isolating device in a position that prevents energization of HV equipment or system. (see chapter HVSP Locking and Tagging devices for amplifying details).
HV Switching Schedule (HVSS)	HV Switching Schedule (HVSS) is a form raised and issued Schedule by an APC and checked by another AP which shows the order of actions required to be completed to achieve the isolation and earthing necessary for the PTW/SFT to become valid. It should cover restoration on completion of the work/test as necessary.
HVSP Tags	Tags that are placed on equipment, system or locking devices that identifies them as inoperable. (see chapter HVSP Locking and Tagging devices for amplifying details).
Isolation	Isolation is the disconnection and physical separation of the electrical equipment from the source of electrical energy, in such a way that the disconnection and physical separation is secured by a locking device.
Live	When above zero voltage, and directly connected to a source of electrical energy.
Limitation of Access (LOA)	Limitation of Access (LOA) is a form issued and cancelled by an APC defining the limits and nature of work which may be carried out in the vicinity of but not on live HV equipment. A LOA may be issued when a Permit to Work or Sanction for Test is not applicable and when verbal instructions are not considered sufficient. Control of contractors working in HV compartments will be by LOA with PIC receiving appropriate training/briefings and ensuring that they exercise control of their workers. One copy is to be held by the PIC and the master copy is to be held in the Switchboard Register.
Multi-Lock Device	A multi-lock device is used to secure the HVSP Key Safe when multiple padlocks are in use. Multiple padlocks can be applied to the multi-lock device such that the key safe can only be opened when all padlocks have been removed.
Permit to Work (PTW)	HV Permit To Work (PTW) is a form of declaration signed and given by the APC, to a Person in Charge (PIC) of work to be carried out on any earthed, HV equipment, for the purpose of making known to such person exactly what equipment is dead, isolated from all live conductors, has been discharged, is connected to earth and on which it is safe to work. A PTW contains details of what work is to be carried out on HV equipment. An APC cannot issue a PTW to himself/herself.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Person in Charge (PIC)	Person in charge (PIC) is any person deemed competent by the APC to carry out the work designated on the PTW. For SFT the PIC needs to be minimum AP qualified.
Safe System of Work	The HV Safe System of Work (SSOW) is a set of policies, standard operating procedures, HV specific trainings, and HV technical documents which provides personnel with sets of safety procedures to control or mitigate risks while working in HV compartments.
Sanction for Test (SFT)	Sanction for Test (SFT) is a form of declaration signed and given by an APC to an AP, acting as a PIC, for the testing of HV Equipment with the purpose of making known to such person exactly what equipment is to be tested and the condition under which the testing is to be carried out. An APC cannot issue a SFT to himself/herself.
Secure	An equipment is secure when it is immobilized, such that the state of the equipment cannot be changed, with the use of safety locks and/or physical interlocking devices.
Switchboard Register	A record that contains all HV safety documents and forms, and lists all qualified AEs, APs, and CPs amongst ships staff..
Temporary Earth	Is an earth connection applied to electrical equipment after the application of a CME. It is used as an additional safety device to provide protection against an accidental return of power during repair or maintenance operation. The temporary earth device shall be applied by the APC upon request from the PIC and shall be formally recorded on the PTW. The APC shall inspect all temporary earths being applied to ensure they are in good repair and designed for their intended purpose.
Unqualified Personnel	An Unqualified Personnel is not familiar with HV SSOW. Unqualified Personnel shall not be permitted to enter HV compartments when the ship is HV LIVE..

Responsibilities

4. MARLANT/MARPAC Safety and Environment (MARL/MARP SE):

   a. MARL/MARP SE is responsible to administer the contents of the HV Switching Program SOP and update the SEMS through collaborative effort with shore agencies and the fleet.

5. Major Surface Combatants 3-5 (MSC 3-5):

   a. MSC 3-5, as the technical authority, is responsible to maintain NAVORD 11100-1, to provide the technical and electrical safety expertise for HV work and to ensure this SOP is technically accurate and complete.

6. Commanding Officer (CO):

   a. The CO is responsible for the following:

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

(1) Ensuring the safety for all personnel, military or civilians, on board ship;

(2) Conduct quarterly reviews of the HV switching program;

(3) Order the removal of HV switching program locking devices during an emergency; and

(4) Review and approves HV switching program procedure deviations.

7. Unit General Safety Officer (UGSO):

a. The UGSO is responsible for the following:

(1) Ensure the HV switching program is being followed IAW regulations in place;

(2) Conduct and record a quarterly review of the HV switching program, using Annex SOP-S13N, to ensure correct documentation and conformance with procedures included in this SOP;

(3) Conduct an assessment of the HV switching program, which shall be included as part of the annual Safety Program Development and Evaluation Technique (SPDET) submission. Annex SOP-S13O shall be used to complete the HV switching program SPDET element; and

(4) Address any safety infractions IAW reference G.

8. Authorizing Engineer (AE):

a. Normally the ship's Naval Technical Officer (NTO) holding the AP and AE qualifications, the AE is responsible for the following:

(1) Ensuring all personnel in the Naval Technical Department have received their required level of HV training IAW NAVORD 11100-1 and receive subsequent refresher training to ensure personnel are fully informed of current practices and developments;

(2) Authorizing and initialing all HVSS prior to being conducted;

(3) Endorsing APCs, APs and CPs in accordance with this SOP;

(4) Ensuring HV switching program procedures are followed by all personnel in accordance with this SOP;

(5) Conducting periodic inspection of the HV switching program Personal Protective Equipment (PPE) and testing equipment maintenance records;

(6) Conducting a monthly review of the HV switching program ensuring the documentation is correct and in agreement with the information of this SOP. On completion of review, signing switchboard register Vol.1 and 2;

(7) Ensure switchboard register Volume 1 & 2 are forwarded to the CO for quarterly review and signature;

(8) Conducting on-site safety audits to ensure that standards of competency are being maintained;

(9) Ensuring all incidents and near misses conform with the instructions included in this SOP;

(10) Ensuring amendments or deviations to the approved safety rules are communicated to, and understood by, all personnel involved with ship HV equipment;

(11) Be the arbiter of all interpretations of the safety rules and recommend any required deviations or amendments to the appropriate authorities;

(12) Recommending the emergency removal of HV switching program locking devices in accordance with this SOP;

(13) Authorizing, supervising and confirming the APC handover certificate process; and

(14) Approving and signing the Master key register.

9. Senior Electrical Propulsion Manager (SEPM):

a. Normally the ship's senior Marine Technician – electrical division holding the AP and AE qualifications, the SEPM is directly responsible for the following:

(1) Ensuring all HV related documents and policies are up to date within the switchboard register;

(2) Endorsing APCs, APs and CPs in accordance with this SOP;

(3) Managing all equipment, devices and accessories used in the performance of all HVSP activities; and

(4) Conducting a HVSP handover (Annex SOP-S13G) with the oncoming Senior Electrical Propulsion Manager as stated in this SOP.

10. Authorized Person (AP):

a. Personnel with the AP qualification, and endorsed by the AE (for RCN personnel only), may act as APs, and are responsible for the following:

(1) Acting as APC when endorsed by the AE;

(2) Being fully conversant and strictly follow the documentation and safety procedures included in NAVORD 11101-1, this SOP and HV SSOW;

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

(3) Conducting work on dead HV equipment, for which the AP is specifically endorsed and appointed for, as the PIC through issuance of a PTW;

(4) Conducting tests on live HV equipment, for which the AP is specifically endorsed and appointed for, as the PIC through issuance of a SFT;

(5) Reviewing, accepting and counter-signing the HVSS completed by the APC in accordance with the approved procedures;

(6) Inspecting and testing PPE and electrical test equipment in accordance with this SOP and the HV SSOW; and

(7) Be trained and current in standard first aid.

11. Authorized Person in Control (APC):

a. RCN personnel with the AP qualification and endorsed by the AE may act as APCs, and are responsible for the following:

(1) Controlling and updating the Shipwide HV Stateboard and Equipment HV Stateboard;

(2) Inspecting and testing PPE for which he/she is responsible for prior to use, to ensure it is in a working and safe condition;

(3) Inspecting and testing electrical test equipment prior to and immediately after each use;

(4) Verifying that the PIC has the correct required PPE for the work being conducted;

(5) Inspecting any temporary earth supplied by the PIC, ensuring suitable manufacturing and design for their intended purpose and applying the temporary earth as requested by the PIC;

(6) Informing the AE of any issues or dangerous conditions discovered;

(7) Conducting HV equipment isolation and restoration, through a HVSS in accordance with this SOP;

(8) Issuing, closing and cancelling HVSS, PTW, SFT and LOA in accordance with this SOP;

(9) Controlling all equipment, devices and accessories used in the performance of all HVSP activities;

(10) Controlling the switchboard register by ensuring HVSP forms are correctly documented and completed in accordance with this SOP;

(11) Be trained and current in standard first aid; and

(12) Conducting a handover with the oncoming APC as stated in this SOP.

12. Competent Person (CP):

a. Personnel with a CP qualification, and endorsed by the AE or APC (for RCN personnel only), may act as CPs, and are responsible for the following:

(1) Conducting work on dead HV equipment, for which the CP is specifically endorsed and appointed for, as the PIC through issuance of a PTW;

(2) Having sufficient technical knowledge to prevent any danger from the work to be undertaken;

(3) Being aware of the extent and limits of the work to be undertaken;

(4) Inspecting and testing PPE for which he/she is responsible for prior to use, to ensure it is in a working and safe condition;

(5) Inspecting and testing electrical test equipment, for which he/she is responsible for, prior to and immediately after each use; and

(6) Be trained and current in standard first aid.

13. Person in Charge (PIC):

a. The PIC is any person deemed competent by the APC in accordance with this SOP to carry out the designated work. A PIC may only be responsible for one PTW or SFT for a single job at a time. Having signed Part 2 of a PTW, SFT or LOA, the PIC is responsible for the following:

(1) Having sufficient technical knowledge to prevent any danger from the work to be undertaken;

(2) Be fully aware of the extent of the work to be carried out and limits of the work to be undertaken;

(3) Conduct no work other than what is detailed in part 1 of PTW, SFT or LOA (if applicable);

(4) Holding their HV key safe padlock key during all work activities;

(5) Retaining a copy of all relevant documents while the work activity is in progress;

(6) Ensure the point of work is not left unattended or otherwise ensuring appropriate safety measures are taken to secure the work area if work is to be suspended, until work is resumed;

(7) Remove all tools, instruments, temporary earths and persons on completion/suspension of work;

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

(8) Remaining in the vicinity, but not necessarily at the point of work at all times; and

(9) Remain on board for the duration of the work for which the PTW or SFT is open.

14. Contractors and DND Employees:

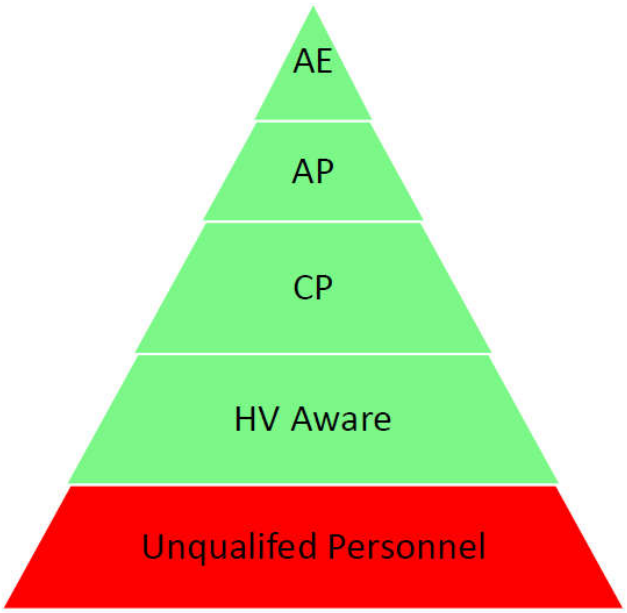
a. Once on board, before any HV work commences, contractors and DND employees shall immediately report to the APC. The APC shall complete the HVSS and PTW or SFT to allow a qualified contractor/employee to conduct work on HV equipment. The APC shall complete an LOA if required by a contractor/employee to allow work in an HV compartment but not on HV equipment when the ship is HV LIVE. In this instance the contractor/employee shall be at a minimum HV Aware. The contractor/employee shall provide the names of the PIC and other workers associated with the job, their HV qualifications, name of the company, and a contact phone number for the HVSS, PTW, SFT or LOA forms.

HV Qualifications and Training Requirements

15. HV Qualification and Training Hierchary:

a. The minimum HV SSOW qualification requirement to be on board an HV LIVE ship is HV Aware. To be qualified as HV Aware, all personnel (as per chart below) must receive the HV Awareness Briefing. The minimum qualification requirement for personnel to enter HV compartments unescorted while the ship is HV LIVE shall be CP;

b. The minimum HV SSOW qualification requirement for qualified personnel (AP and above including civilian technician equivalent) to access and work on HV systems and/or equipment are personnel who have received the HVSP Procedural Awareness Briefing.



Authorizing Engineer (AE)
- Naval Technical Officer
- Senior Electrical Propulsion Manager

Authorized Person (AP)
- Leading Seaman and above Marine Technicians - Electrician

Competent Person (CP)
- All members of the Naval Technical Department, and other personnel where appropriate may also hold this qualification

HV Aware
- Entire ship's company, DND employees, regular contractors, and routine visitors

Unqualified Personnel
- All other visitors

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Procedure

HVSP PREPARATION

16. Prior to commencing work on HV equipment/system, the APC shall obtain approval from the AE to conduct the HV Switching procedure on the equipment of interest. HV Switching procedure should be, when possible, coordinated with the ship's APC, at a minimum, 48 hours in advance in order to ensure HV work qualification requirements are met, no scheduling conflict exist, and a safe and prompt isolation of the equipment/system can be provided.

17. The APC shall inform the Officer of the Day/Senior Watchkeeper (OOD/SWK) and Duty Technician (DTech) while the ship is alongside, and the Officer of the Watch (OOW) and Engineering Watchkeeper (Eng WK) when at sea, of the work or test being performed, the equipment/system affected and all equipment restrictions resulting from the isolation.

18. In addition, all other persons likely to be affected by the disconnection and isolation of the HV equipment shall be informed. When necessary, an informative pipe is to be broadcasted for the awareness of all personnel onboard ship.

19. The APC shall generate or use one of the pre-approved HVSS detailing the isolation procedures to be performed to make the equipment safe for the execution of work or test to be carried out. The HVSS shall be reviewed and counter-signed by another AP to validate its methodology, completeness and overall safety.

20. Two copies of the HVSS shall be made under the same serial number. The original copy shall be used by the APC to conduct the isolation procedure and placed in the switchboard register on completion. A duplicate copy shall be given to the PIC.

HVSS ISOLATION PROCEDURE

21. During the equipment isolation process, the APC shall wear appropriate PPE in accordance with the arc flash and shock approach boundaries regulations stated in this SOP. These arc flash and shock approach boundary safety requirements are waived once the HV equipment/system is isolated and proven dead.

22. The APC shall complete the isolation procedures detailed in the HVSS. The APC shall initial every steps as it is completed prior to commencing the following step. No deviations to the written isolation procedures is permitted, if changes are needed a new HVSS is to be written by the APC and reviewed by another AP.

23. The APC shall communicate with the Lockout/Tagout (LOTO) coordinator whenever there is a requirement for a LOTO, such as low voltage, mechanical, fluid or gas isolation. The LOTO shall be completed in coordination with but necessarily by the APC. The LOTO form and lock box number shall be included in the HVSS for reference.

24. The APC shall complete the HV switching procedure with ship supplied padlocks, tags and HV switching program lockable devices found in the equipment key safes. The colour and serial numbers of the ship supplied HV padlocks and tags shall be recorded in the HVSS. The APC shall affix the appropriate HVSP tag to each HVSP padlock. All applicable keys, including trapped key system keys

(Kirk and Fortress keys), equipment control keys and HVSP padlock keys removed as part of the HV isolation procedure shall also be recorded on the HVSS form.

25. The APC shall ensure the equipment specific decay time has been observed to permit for any energy remaining in the equipment/cable to dissipate. The time at which the associated breaker is opened and power is removed from the equipment shall be recorded on the HVSS form as well as the equipment specific decay time. The CME can only be applied after the prescribed decay time has elapsed, the time at which the CME was applied shall be recorded on the HVSS form.

26. Prior to proving the equipment is dead, the APC shall ensure the work area is roped off with proper signage and a trained safety member standing by outside the arc flash and shock approach boundaries. The APC shall use appropriate arc flash and electrical shock PPE and HV testing equipment to prove all energy has dissipated from the equipment/system and at the point of work. The HV testing equipment shall be inspected and tested by the APC prior to and immediately after each use.

27. HV equipment shall not be considered dead until the full duration of the equipment decay time(s) has elapsed, CMEs are in place and the APC has proven the equipment dead at the point of work with a HV potential indicator.

28. All keys used for the HVSS including all associated equipment interlock keys (trapped key system), equipment control keys and HVSP padlock keys, as applicable, shall be placed in a PTW/SFT Key Safe. The APC shall affix a serialized HVSP Padlock to the PTW/SFT key safe as well as an identification tag displaying his/her name and contact information. The PTW/SFT key safe number and location are to be documented in the HVSS.

29. On completion of the isolation procedures detailed in the HVSS, the original HVSS is to be placed in the PTW/SFT key safe and the copy issued to the PIC for the duration of the work. On completion of the work, the original HVSS is to be used to conduct the restoration of the equipment. All fully completed, isolation and restoration HVSS shall be held in the Switchboard Register for a period of 1 year.

30. Once the HVSS has been completed and the equipment proven dead the APC shall update the equipment HV stateboard and shipwide HV stateboard to reflect the current HV equipment and ship state.

31. The appropriate pipe "SHIP IS HV DEAD" or "SHIP IS HV LIVE" shall be made every time the shipwide HV state is changed.

PTW PROCEDURE

32. A PTW shall only be issued to persons CP or above whose qualification is current, the qualification shall be endorsed by the AE (for RCN personnel only) and specify the equipment the CP is trained to work on, as listed in his/her certificate of appointment. Under no circumstances shall a PTW be issued for a CP to work on equipment not listed in his/her certificate of appointment. The CP shall never work alone on the equipment and all personnel involved shall be current in standard (or above) first aid.

33. The PIC shall first report to the APC with their credentials, their personal key safe padlocks and padlock identification tags for verification and also to initiate the PTW procedures. With the help of the HVSS form and the isolation sketch (electrical single line diagram) the APC shall demonstrate to the PIC all steps taken to achieve the isolation, including showing all points of isolation, all earthing points, all

HVSP devices used and the safety arrangements at the point of work. Once fully satisfied with the isolation the PIC shall sign the HVSS under the isolation sketch.

34. The APC shall complete and sign Part 1 of PTW to document the completion of the isolation procedure as detailed in the HVSS. Part 1 of the PTW shall indicate, HVSS serial number, PTW safe number and location, the details on work to be done, specific points of isolation, specific points of earthing, details of documents or risk assessments related to the proposed work, completion of safety checks and any additional safety measures employed. Any identified safety risks, policy deviations and methods of mitigation addressed through a risk assessment shall be endorsed by the AE and detailed in the additional safety measures section of part 1 of the PTW.

35. All keys used for the HV switching procedure, identified in the HVSS, shall be placed in a PTW/SFT key safe. A multi-lock or similar device shall be affixed to the key safe, locked by the APC using a serialized HVSP padlock and by the PIC using their personal padlock. The APC shall retain his/her padlock key for the duration of the work. The PIC shall remove his/her personal padlock from the PTW/SFT key safe at the end of each day prior to proceeding ashore. The PIC's personal padlock shall be inscribed, labeled, or tagged with the PIC's name, his/her supervisor, company/shop name and telephone number. If more than one person is performing work on the HV equipment associated to that particular PTW/SFT key safe, then each person shall have their own PTW/HVSS and secure the key safe with his/her own padlock, and shall retain the associated key on their person while performing the work.

36. The APC shall ensure the appropriate category of arc flash and electrical shock PPE is employed within the arc flash and shock approach boundaries until the equipment has been proven dead to the PIC. The APC shall use the appropriate PPE and HV testing equipment to prove all energy has dissipated from the device at the point of work. Using the HV potential indicator, the APC shall prove the equipment dead at the point of work to the satisfaction of the PIC. The APC shall inspect and test the HV potential indicator prior to and immediately after each use. Upon request by the PIC, on completion of the HV potential indicator test, the APC may prove dead by applying a bare hand to the dead conductor.

37. Once the PIC is satisfied that all appropriate isolation and safety measures have been taken, as detailed in the HVSS and part 1 of the PTW, the APC shall issue the PTW to the PIC at the point of work. The PIC shall complete and sign part 2 of PTW to acknowledge acceptance of the APC's completion of the isolation procedures as detailed in the HVSS. The PTW is only valid after both part 1 and part 2 are completed. Any safety risks, deviations and/or mitigations detailed in part 1 must also be signed by the PIC. The original copy will be held in the PTW/SFT safe while the work is ongoing, a copy of the original is made and given to the PIC.

38. After accepting the PTW, the PIC is now responsible for personally supervising or undertaking the work defined. At no time is the scope of the PIC's work is to exceed that detailed in the PTW otherwise the original PTW is to be closed out and another opened that details the new scope of work to be performed. Should any technical or safety issues arise through the course of the work, the PIC is to immediately bring it to the attention of the APC.

39. The PIC shall not leave the vicinity of the place of work while the work described in the PTW is in progress. With the exception of ship emergencies, he/she shall remain on board at all times while the PTW is issued. Should the PIC need to leave the place of work temporarily, the work area shall be made safe and the work suspended by the APC until the PIC returns. Should the PIC need to leave and another PIC take over the work, the existing PTW must be cancelled and a new PTW issued.

40. The PIC shall remove his/her personal padlock from the PTW/SFT key safe at the end of each day. The PIC shall brief the APC and show the work area has been made safe prior to proceeding ashore.

41. At no time should the PTW/SFT key safe padlock keys or any other HVSP keys be taken off the ship without the authorization of the AE and APC.

PTW/SFT CLOSING AND HVSS RESTORATION PROCEDURES

42. On completion of work, the PIC shall clean and clear the work area of any personnel, tools, instruments, temporary earths and foreign objects. The APC is to inspect all equipment before closure. The PIC shall inform the APC that the work is complete prior to removing his/her lock from the PTW key safe. The PIC shall complete part 3 of PTW and return parts 1 and 2 to the APC.

43. The AE and APC have the authority to stop and cancel issued PTWs, SFTs and LOAs any time deemed necessary.

44. In the event the work is stopped (normally by PIC or AE/APC), all parties affected, AE/APC and PIC, are to be briefed and the reason for stopping the work entered in part 3 of the PTW, the PIC shall confirm that the equipment being worked on and area of work has been made safe, pending the issue of another PTW. The PIC shall ensure that all persons, tools and instruments under his/her control have been accounted for and withdrawn. The APC is then to cancel the PTW by completing and signing part 4. Upon completion of part 3 and 4 of the PTW, the permit is thereby cancelled and no longer valid.

45. Once the PIC's personal padlock is removed from the PTW/SFT key safe, after completion of the work, the APC shall initiate the restoration procedure detailed in the HVSS. The APC shall initial every step of the restoration procedure on the HVSS form as it is completed prior to commencing the following step. The APC shall also ensure that any LOTO measures that may have been applied have been removed and closed out.

46. On completion of the HVSS restoration procedure or earliest availability, the APC shall ensure that the effected HV system/equipment is functional. Upon restoration of the HV equipment/systems, the APC shall update the equipment HV stateboard and shipwide HV stateboard, as required, to reflect the new equipment state and shipwide state.

47. The PTW and HVSS being closed shall be dated and initialed by the APC in the switchboard register's serial number tracking list.

48. The original copies of HVSS and PTW shall be stored in the switchboard register and retained for a period of 1 year following the date of entry.

SFT PROCEDURE

49. A SFT shall be issued to a PIC prior to the commencement of any testing of HV equipment or any testing that involves the removal of any applied CMEs/temporary earths. A SFT may not be issued for HV equipment for which a PTW or SFT already exists, nor for HV equipment which is within an area for which a LOA exists.

50. A SFT may only be issued to AP qualified persons, the qualification shall be current and endorsed by the AE in the case of RCN personnel. Under no circumstances shall a SFT be issued for an

AP to test equipment not listed in his/her certificate of appointment. The AP shall never test the equipment alone.

51. The PIC shall first report to the APC with their credentials, their personal key safe padlock and padlock identification tag for verification and to initiate the SFT procedures. With the help of the HVSS form and the isolation sketch electrical single line diagram the APC shall demonstrate to the PIC all steps taken to achieve the isolation, including showing all points of isolation, all earthing points, all HVSP devices used, any HVSP devices used and the safety arrangement at the point of work, if required. Once fully satisfied with the isolation the PIC shall sign the HVSS under the isolation sketch.

52. The APC shall complete and sign part 1 of SFT to document the completion of the isolation procedure as detailed in the HVSS. Part 1 of the SFT shall indicate, HVSS serial number, PTW/SFT safe number and location, the location of the equipment and the tests to be performed, specific points of isolation, specific points of earthing, and earths which may be removed during testing. It also details documents or risk assessments related to the proposed test, completion of safety checks and any additional safety measures employed. Any identified safety risks, policy deviations and methods of mitigation addressed through a risk assessment shall be endorsed by the AE and detailed in the additional safety measures section of part 1 of the SFT.

53. All keys used for the HV switching procedure, identified in the HVSS, shall be placed in the PTW/SFT key safe and locked in the same method identified in the PTW procedure. Any keys that must remain out to conduct the test shall be annotated on the SFT part 1 in the special instructions and safety measures section and initialed by the PIC.

54. The APC shall ensure the appropriate category of arc flash and electrical shock PPE is employed within the arc flash and shock approach boundaries until the equipment has been proven dead to the PIC (as detailed in the PTW procedure) or for the duration of the test for which parts are exposed and not positively confirmed dead.

55. Once the PIC is satisfied that all appropriate isolation and safety measures have been taken, as detailed in the HVSS and part 1 of the SFT, the APC shall issue the SFT to the PIC at the point of work. The PIC shall complete and sign part 2 of SFT to acknowledge acceptance of the APC's completion of the isolation procedure as detailed in the HVSS. The SFT is only valid after both part 1 and part 2 are completed. Any safety risks, deviations and/or mitigations detailed in part 1 must also be signed by the PIC. The original copy will be held in the PTW/SFT safe while the work is ongoing, a copy of the original is made and given to the PIC.

56. After accepting the SFT, the PIC is now responsible for personally supervising or undertaking the test(s) defined in the SFT. The SFT is bound by the same regulations as the PTW with respect to scope of work, limitations, arising and work suspensions.

57. For cancellation and restoration procedures of a SFT see the PTW/SFT closing and HVSS restoration procedures from the section above.

58. The original copies of the HVSS and SFT shall be stored in the switchboard register and retained for a period of 1 year following the date of completion.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

LIMITATION OF ACCESS (LOA)

59. LOA request, when possible, should be coordinated with the ship's APC, at a minimum, 24 hours in advance in order to ensure minimum qualification requirements are met (HV Aware), no scheduling conflict exist with PTWs and SFTs and a safe work area can be provided.

60. For an LOA, the PIC may be of any discipline or specialization who is deemed competent to carry out the work prescribed in the LOA, or to supervise the execution of the work by others. A LOA may be issued for personnel who are HV Aware, to conduct work in HV compartments but not on HV equipment. LOAs are only issued while the ship state is HV LIVE.

61. A LOA is issued by the APC to a PIC. Prior to offering a LOA to the PIC, the APC shall confirm the extent of work to be carried out, show the PIC the area in which the work is to be carried out and indicate to the PIC, all items of live HV equipment in or adjacent to the area where the work is to be conducted, which are identified by electrical warning signs.

62. The LOA shall not be issued for any compartments or areas for which there is already a PTW or SFT issued. At no time should an LOA be issued for areas marked or known as arc flash blast venting areas while the equipment is live.

63. All items of live HV equipment in close proximity to the work area should be cordoned for the duration of the work. This is to be achieved by placing temporary barriers with "no entry/danger" warning signs, or equivalent, to define the area as a HV danger area. All HV equipment not already displaying permanent warning signs shall be fitted with temporary warning signs prominently displayed on the live HV equipment, including cabling, while the LOA is issued.

64. The APC shall complete and sign part 1 of LOA to document the location of work activity, the details of the work to be done and any special instructions and safety measures. Any identified safety risks, policy deviations and methods of mitigation addressed through a risk assessment shall be endorsed by the AE and detailed in the special instructions and safety measures section of part 1 of the LOA.

65. The LOAs are serialized by the APC using the HV switching program serial tracking list of the switchboard register. (see chapter on serial tracking instructions)

66. Once the PIC is satisfied with the scope and limitations of the work to be undertaken they shall complete part 2 of the LOA. The PIC must also sign as understanding and agreeing to any details specified in the special instructions and safety measures section of part 1 of the LOA. The LOA is only valid after both part 1 and part 2 are completed.

67. Two copies of the LOA shall be made, the original kept in the switchboard register and the other copy held by the PIC. When not in use, the PIC's LOA form shall be kept by the APC.

68. On accepting the LOA, the PIC is responsible for undertaking and/or supervising the work for which an LOA is required.

69. While the LOA is valid, the APC shall inspect the working area at the end of each working period or day to ensure:

a. Any flammable or hazardous materials introduced into the area during the work activities are removed when work ceases at the end of each day;

b. Access to essential equipment is not obstructed; and

c. General hazards, such as, open deck plates, suspended loads, tripping hazards, etc. introduced into the work area are made safe or corrected.

70. On completion of work, the PIC shall clean and clear the work area of any personnel, tools, instruments, and foreign objects. The work area shall be inspected by the APC prior to closing the LOA.

71. The PIC shall complete part 3 of LOA and return parts 1 and 2 to the APC. In the event the work is being stopped, the LOA is to be withdrawn and cancelled. The APC is to verify that the work area has been left in a clean condition and that the work area is safe. The APC is then to cancel the LOA by completing and signing part 4. The LOA is considered cancelled and no longer valid when both part 3 and 4 are completed and signed.

72. The issue and cancellation of every LOA is to be recorded by the APC in the switchboard register's serial number tracking list. The original copy of the LOA shall be kept in the switchboard register and retained for a period of 1 year following the date of entry.

73. In lieu of an LOA, a CP or above qualified person may act as an escort to the HV aware person for which an LOA would otherwise be required. The LOA requirements stated above are waived when the ship's HV state is HV DEAD for the duration of the work.

SWITCHBOARD REGISTER

74. The purpose of the switchboard register is to ensure close control and safe operation of all HV systems. The register is made up of two volume. Volume 1 contains information pertaining to the administrative aspects of the HVSP. Volume 2 is a working document in which HVSS and the issue of all PTW, SFT and LOA are recorded.

75. Switchboard register Volume 1 is to be read and signed by all members of the Naval Technical Department upon joining the ship. A sign off sheet is to be placed in switchboard register Vol.1.

76. Volume 1 shall contain, as a minimum, the following:

a. CO's signature sheet;

b. UGSO's signature sheet;

c. AE's signature sheet;

d. Memorandum of appointment of unit Authorizing Engineer (AE);

e. Naval Technical Department Vol 1 signature sheet;

f. Current version of this SOP (High Voltage Switching Program);

g. Current version of NAVORD 11100-1 – Qualifications and Access Requirements for High Voltage (HV) Ships;

h. Certificates of appointment for the unit's AEs, APs and CPs;

i. List of all ship personnel who have completed the HV Aware training;

j. Most recent handover certificate from the SEPM; and

k. Recent incident and near miss reports, deviation risk analysis and any official correspondence regarding the operation of any HV systems.

77. Volume 2 shall contain, as a minimum, the following:

a. CO's signature sheet;

b. UGSO's signature sheet;

c. AE's signature sheet;

d. Serial tracking list;

e. Permit to Work (PTW);

f. Sanction for Test (SFT);

g. Limitation of Access (LOA);

h. Pre-Approved HVSS;

i. Handover certificate from the APC;

j. High voltage system schematics;

k. Master key register, and

l. Blank forms.

SENIOR ELECTRICAL PROPULSION MANAGER HANDOVER CERTIFICATE

78. The Senior Electrical Propulsion Manager (SEPM) is responsible for managing the HVSP program switchboard register, equipment, devices and accessories. When the SEPM duties are to be handed over to another qualified person there is a requirement for a formal handover to be conducted between the SEPM and his/her AE endorsed replacement.

79. The SEPM handover certificate form (Annex SOP-S13G) must be completed and signed by the outgoing and incoming SEPM. The handover shall be completed under the direction of the AE, he/she must verify the Handover Certificate (HOC) is accurate and complete. The AE is to witness the signing of the HOC form.

80. The HOCs are serialized by the APC using the HVSP serial tracking list of the switchboard register. (see chapter on serial tracking instructions)

81. In the event a handover with a repair facility is required the AE must ensure the person taking over the SEPM responsibilities has been authorized by their employer as qualified and competent to carry out the duties.

82. It is important that all items handed over to the new SEPM or the repair facility be recorded on the HOC form including a muster of all the keys listed in the master key register.

83. The switchboard register shall never be handed over to a repair facility, it shall be kept by the SEPM until the ship is returned to the RCN.

APC HANDOVER CERTIFICATE

84. The APC is responsible for the daily operation of the HV Switching program, when the APC duties are to be handed over to another qualified person there is a requirement for a handover to be conducted between the APC and his/her AE endorsed replacement.

85. The APC handover certificate form (Annex SOP-S13H) must be completed and signed by the outgoing and incoming APC anytime the responsibilities are handed over, regardless of the duration.

86. The APC HOCs are serialized by the APC using the HVSP serial tracking list of the switchboard register. (see chapter on serial tracking instructions)

87. It is important that the status of all HV equipment listed on the form be recorded. Using (Annex SOP-S13M) the handover shall also include a muster of all keys listed in the master key register.

88. The completed forms must be kept in the switchboard register for 1 year after the handover date.

ENDORSEMENT, CERTIFICATE AND MEMORANDUM OF APPOINTMENT

89. Training will initially be received by completing a course in a recognised training establishment. The AE, AP and CP training received are not ship specific and RCN personnel will require endorsement from the joining ships SEPM and AE.

90. The endorsement process is formalized by the issuing of a certificate of appointment containing the details and limitations of the appointment. The certificate of appointment shall state the rank, name, training and their expiry date. The certificate shall also list all HV equipment/systems the member is endorsed to work on.

91. In addition to the endorsement process the AE requires a memorandum of appointment approved and signed by the CO. The memorandum of appointment shall be placed in the switchboard register.

92. The following table indicates the endorsement authority for each qualification levels.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Table SOP-S13.1 – Endorsement Authority

QUALIFICATION LEVELS	ENDORSEMENT AUTHORITY:	REMARKS
Authorizing Engineers (AE)	Outgoing AE	Endorsement shall be completed at supersession between incoming and outgoing AEs. For newly commissioned ships where there is no outgoing AE the incoming AE shall seek training confirmation/endorsement from an AE on another ship of the same class. The new AE shall receive a memorandum of appointment, approved and signed by the CO.
Authorized Persons in Control (APC)	AE and APC endorsed Senior Electrical Propulsion Manager	Endorsement and the issuing of a certificate of appointment shall be completed upon joining the ship. Updates to the certificate can be requested or made whenever a person's qualification and level of knowledge is deemed appropriate. In all cases the certificate shall be reviewed, at a minimum, once a year.
Authorized Persons (AP)	AE and APC endorsed Senior Electrical Propulsion Manager	Endorsement and the issuing of a certificate of appointment shall be completed upon joining the ship. Updates to the certificate can be requested or made whenever a person's qualification and level of knowledge is deemed appropriate. In all cases the certificate shall be reviewed, at a minimum, once a year.
Competent Persons (CP)	AE and APC endorsed Senior Electrical Propulsion Manager	Endorsement and the issuing of a certificate of appointment shall be completed upon joining the ship. Updates to the certificate can be requested or made whenever a person's qualification and level of knowledge is deemed appropriate. In all cases the certificate shall be reviewed, at a minimum, once a year.

93. The certificates of appointment (Annex SOP-S13I, Annex SOP-S13J and Annex SOP-S13K) for all AEs, APs and CPs shall be kept in the switchboard register. For HV Aware qualification the APC must keep a list (Annex SOP-S13L) in the switchboard register with the rank, name and qualification date of all HV Aware trained personnel (Ship personnel only).

94. Certificates of appointment should be updated to reflect upgrades and refreshers for applicable training and qualifications. All certificates of appointment should be reviewed by the AE and Senior Electrical Propulsion Manager, at a minimum, once a year.

95. The APC shall retain certificates of appointment for 1 year after the individual has been posted outside of the unit. The memorandum of appointment shall also be kept for 1 year after the APC has been relieved.

EMERGENCY REMOVAL OF HVSP PADLOCKS

96. Normally, only the PIC who applied the lock may remove the lock from the PTW/SFT key safe. In exceptional circumstances, such as in response to an emergency, it may be necessary to operate a HV system/equipment that is subject to HVSP. In this exceptional circumstance, the following procedures shall be followed:

a. Every effort should be made to contact the PIC to have them remove all lock(s) from the PTW/SFT key safe(s);

b. If the PIC is determined not to be on board and cannot be reached, the lock may be forcibly removed or the key safe may be accessed by breaking the protective cover;

c. The order to remove the HV locking device shall be recommended by AE, and ordered by the CO;

d. The APC shall remove all the necessary padlocks, tags, and locking devices in accordance with the HVSS restoration procedure, in order to respond to the exceptional circumstance. The APC shall ensure the system/equipment to be operated is inspected and verified safe to operate prior to operating;

e. The APC shall update the equipment HV stateboard and shipwide HV stateboard to reflect the new state and to indicate that the area is no longer safe for work;

f. A note shall be added to the HVSS, PTW and SFT to indicate which HVSP devices were removed, the date/time of the removal, and the reason for the removal and signed by the APC, AE and CO; and

g. The AE and APC shall ensure the PIC and his/her supervisor are informed of the emergency removal, that the area is no longer safe for work, and that the associated HVSS, PTW and SFT are hereby cancelled.

ARC FLASH AND SHOCK PROTECTION BOUNDARIES

97. The following requirements have been developed to reduce the risk of injury due to shock and arc flash hazards. For the purpose of proving the equipment is dead with respect to this HV SOP the APC is to be fully conversant with and strictly adhere to the arc flash and shock protection boundaries. Until an equipment is placed in a safe work condition (dead), and verified with the proper testing equipment, it is considered live.

98. The shock protection boundaries are divided in two categories, they are: the limited approach boundary and restricted approach boundary. These approach boundaries are applicable where approaching personnel are exposed to energized electrical conductors or circuit parts. These classifications are based on the voltage level of the energized equipment and are further defined as follow:

a. Limited approach boundary: is a shock protection boundary to be crossed by only qualified persons, which is not to be crossed by unqualified persons unless escorted by a qualified person. A qualified person must use the appropriate PPE and be trained to perform the required work to cross the limited approach boundary and enter the limited

space. The minimum qualification for personnel to enter the limited approach boundary is a qualified and endorsed CP.

b. Restricted approach boundary: is a shock protection boundary to be crossed by only qualified persons. Due to its proximity to the hazard, the use of electrical safety protection techniques and equipment are required (i.e. individual is insulated or guarded from conductive objects and electrical insulated tools are used). To cross the restricted approach boundary into the restricted space, the qualified person must wear appropriate PPE. Also, he must have a written approved SFT for the work to be performed. The minimum qualification required to enter the restricted approach boundary is a qualified and endorsed AP.

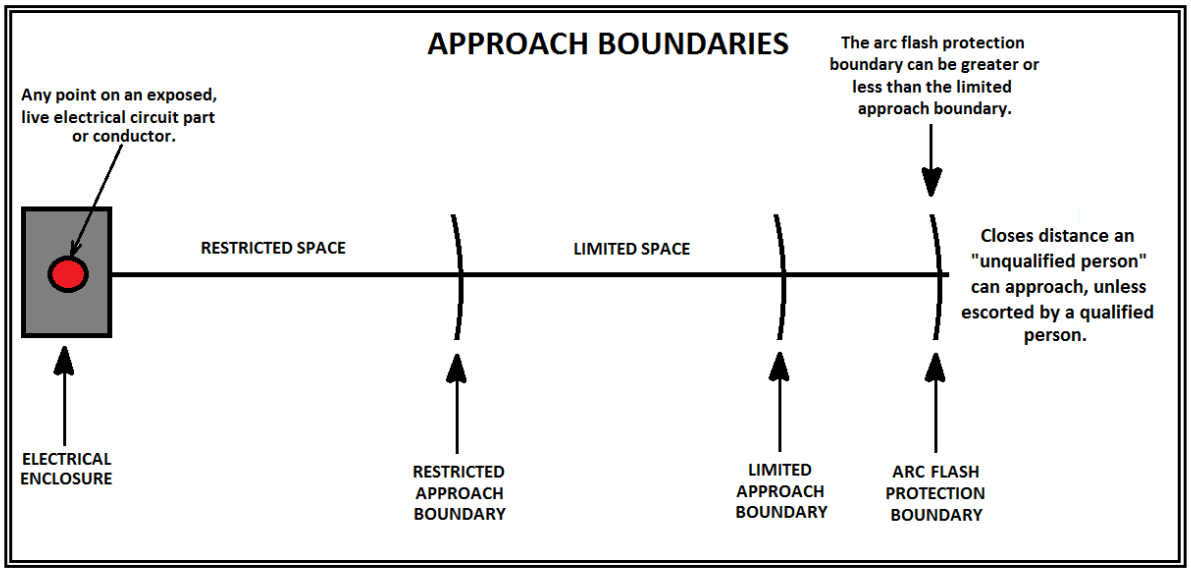
Table SOP-S13.2 - Shock Protection Boundaries for 751V to 15kV range

Nominal System Voltage Range	Limited Approach Boundary (Exposed fixed circuit parts)	Restricted Approach Boundary
751V to 15kV	5 feet 0 in (1.5m)	2 feet 2 in (0.7m)

99. The arc flash boundary is based on voltage, the available fault current and the time it takes for the upstream protective device to operate and clear the fault. Each equipment shall display its arc flash requirements based upon an arc flash and incident energy hazard analysis. The analysis shall also determine the level of personal protective equipment (PPE) that a person must wear when working on the live equipment.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Figure SOP-S13.1 – Approach Boundaries



COMPLIANCE CHECKS

100. Periodically, unscheduled compliance checks of unit HV switching program are conducted by representatives of FTA, MARL/MARP SE and /or FMF Safety. The intent of these compliance checks are to provide both positive and constructive feedback and to highlight areas for improving unit HV switching procedures. FTA forwards the results of each compliance check to unit CO's with copies to Sea Training and MARL/MARP SE.

101. The compliance check shall be recorded on the HV switching program compliance audit form located at Annex SOP-S13N of this SOP.

PRE-APPROVED HIGH VOLTAGE SWITCHING SCHEDULES

102. HARRY DEWOLF class ships have been provided with ship specific pre-approved HVSS forms as per reference K, these HVSS have been developed to include the most common HV isolation the ship could encounter.

103. Each pre-approved HVSS forms sets out the procedure for the isolation and restoration of a specific piece of HV equipment or system.

104. The pre-approved forms do not relieve the APC and AE of their responsibilities with regards to HVSS and power isolation. When a pre-approved HVSS does not exist for the work required the APC shall write a new set of procedures in accordance with this SEMS SOP for HVSP.

HVSP SERIAL TRACKING LIST INSTRUCTIONS

105. Annex SOP-S13F, HV Switching program serial tracking list entries, shall be dated and initiated by the APC whenever a PTW, SFT, LOA, HVSS, handover certificate (HOC) is authorized be the AE.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

106. The serial number shall start with the letters HV followed by a sequential, three digits number. The number shall be reset to 001 each calendar year.

107. Purpose and system/equipment column shall briefly state what type of work is being conducted and for what system and/or equipment. The Person in Charge's name and rank/position shall be sated in the next column.

108. The form type entry shall be one of the five forms used with the HV switching program. The forms used are PTW, SFT, LOA, HVSS and HOC.

109. The key safe column shall include the name/number of the key safe used for the impending work, when the serial number is issued for a HVSS, the key safe column should display the PTW or SFT form serial number the HVSS is conducted for. (See example in table below).

110. The entry shall be initialed and dated by the APC when the work is completed and the form closed.

111. For handover certificates, all entries are filled out except for the Person in Charge and key safe entries which should be stricken. The purpose and system/equipment entry shall state, as seen in example below, APC hand-over has been conducted with (insert name and rank of new APC). The new APC shall date and initial the entry once the hand-over is satisfactorily completed. All further serial numbers shall be issued by the newly appointed APC.

Table SOP-S13.3 – HV Switching Program Serial Tracking List Example

Date Issued	Serial Number	Form type (PTW,SFT, LOA, HVSS or HOC)	Purpose and System/Equipment	Person in Charge (PiC)	Key Safe	Date completed	APC Init.
8 Jan 19	HV-001	HVSS	HVSS for MV1 (Stbd) Main Swbd	PO2 Ampere	See PTW HV-002	10 Jan 19	A.R
8 Jan 19	HV-002	PTW	Maintenance on MV1 (Stbd) Swbd	PO2 Ampere	1	10 Jan 19	A.R
9 Jan 19	HV-003	HVSS	HVSS for Testing breaker MV1DG4	Mr. Thales	See SFT HV-004	9 Jan 19	A.R
9 Jan 19	HV-004	SFT	Testing Breaker MV1DG4	Mr. Thales	2	9 Jan 19	A.R
10 Jan	HV-005	LOA	Contractor Painting in FMMR	Mr. Painter		10 Jan 19	A.R
12 Jan	HV-006	HOC	APC handover has been conducted with PO2 Bloggins			12 Jan 19	J.B

INCIDENTS AND NEAR MISS REPORTING PROCEDURES

112. With respect to HVSP, incidents and near misses are classified as follow:

a. HVSP incidents includes those incidents that have resulted in, or had the potential for, personnel injury or damage to equipment; and

b. HVSP near miss include all other situations where there was a non-compliance of HVSP policies and procedures.

113. All HVSP incidents and near misses shall be reported immediately to the APC and the AE.

114. All HVSP incidents shall be reported via message within 48 hours to FTA and MARL/MARP SE using the message format in SEMS SOP – Hazardous Occurrence Investigation and Reporting.

115. The AE shall ensure:

a. The person(s) involved receive medical attention (if required);

b. The equipment/system involved is not returned to normal service until an initial investigation is completed; and

c. As appropriate, form DND 663-DND/CF General safety hazardous occurrence investigation report and form CF 98 – Report on injuries or exposure to toxic material, shall be completed and contain a record of the information specified above, an analysis of the causes of the incident and a statement of corrective actions taken.

116. An investigation is required for all HVSP Incidents. The CO shall convene a Technical Investigation (TI) and/or Summary Investigation (SI) as appropriate. The TI failure response checklist shall be provided to FTA to support recommendations as to whether a TI is required. TIs and SIs are conducted IAW NAVORD 1080-1 and DAOD 7002-2. FTA and MARL/MARP SE shall be provided with a copy of the TI or SI.

117. For HVSP near misses, which did not result in, or did not have the potential for, personnel injury or damage to equipment, the AE shall investigate and implement corrective action. Minor incidents will not normally result in a SI, but will require units to take remedial action to prevent a re-occurrence of the violation. A HVSP near miss report with pertinent details WRT the violation of policies and procedures, and corrective action, shall be completed using Annex SOP-S13P and a copy placed in the switchboard register binder.

HVSP LOCKING AND TAGGING DEVICES

118. HVSP Locking Devices: A mechanical means of locking (individually keyed lock) to secure an energy-isolating device in a position that prevents energization of HV equipment or system. HV Locking devices are also used, on HV platforms, as a positive means to hold CMEs in a safe and desired position (opened or closed).

119. The HV SSOW utilizes serialized, colour coded, safety padlocks with a unique purpose to lock HV system and equipment. Each padlocks shall have a unique key, no duplicates, and the key shall only open one padlock. The safety padlocks are given a unique ship/identification number (i.e. HDW-01, HDW-02, etc.) and should be used in conjunction with a HVSP Tagging device.

120. The colour codes are:

a. Red padlocks for switchboard shutters;

b. Yellow padlocks for breakers racking; and

c. Green padlocks for earthing devices.

121. All other HVSP locks required, not captured in the list above, shall use yellow padlocks.

122. Trapped Key interlocks: Trapped key system, also called Kirk, Castell or Fortress key system, is a system of mechanical locks and coded keys installed on hazardous equipment. The trapped key interlocks are used to control safety-critical operating procedures where a safe sequence of operations is enabled through transfer of keys that are either trapped or released in predetermined orders considered safe for personnel and the equipment.

123. HDW class is fitted with trapped keys on both main switchboards and both propulsion converter cabinets. The trapped keys are used in a safe and logical sequence for the racking in and out of HV main switchboard breakers, the opening and closing of CME switches and accessing certain switchboard and converter cabinets.

124. HVSP Tagging Devices: Tags that are placed on the equipment, system or locking device that identifies them as inoperable. The reusable tag shall conform to the following:

a. Be minimum of 7.5 cm x 12.5 cm (3'' x 5'' approximately), yellow background with black lettering, reusable, with a stain and mildew resistant plastic surface suitable for writing upon;

b. Provide the following information:

(1) "DANGER" at the top, with "LOCKED OUT DO NOT OPERATE" below;

(2) Permanently and clearly identified as High Voltage equipment tags;

(3) A place for writing the name of the APC who isolated the equipment; and

(4) A place for writing the HVSS serial number.

c. Be English on one side and French on the other.

KEY SAFES

125. In order to keep positive control over HVSP devices and keys the HDW class will employ small metal enclosures, called key safes, to lock HVSP accessories. On HDW Class, 3 types of key safe shall be installed, they are as follow:

a. Master key safe;

b. Switchboards key safe;

c. PTW/SFT key safes.

126. Master key safe: is a secure steel container that can be locked shut which will hold all HVSP key safe keys. The key to this safe will be held on board by the APC. The Master key safe may also hold other APC controlled keys when needed. The Master key safe should be located in the Engineering Office.

127. Switchboards key safes (P & S): are secure steel containers that can be locked shut. They will hold all keys, padlocks, tags and specialty tools used to perform the isolations. The key to each key safes will be held in the master key safe which is under the control of the APC. The key safes should be located inside or near the compartment of the equipment it serves.

128. PTW/SFT key safes: are secure containers that can be locked with either one or more keys. It will hold all HVSP padlock keys and switchboards trapped key system keys (Kirk and Fortress keys) used for the equipment isolation. In addition, the original copy of the PTW or SFT form shall be placed in the safe for the duration of the work. The PTW/SFT key safe will be controlled by the APC and locked by both the PIC and the APC.

129. The PTW/SFT key safe should have two separate compartments to allow for the HVSP keys to be locked separately from the PTW/SFT forms. The HVSP key should be in one compartment locked by both APC and PIC while the forms should be in the other compartment locked by the APC only. This configuration would allow for other PTW/SFT forms, for the same equipment, to be added to the key safe.

DEVIATIONS

130. In line with other HV policies, only the AE may recommend deviations to this SEMS. Deviations from HVSP standard operating procedures are to be carefully considered as they may have legal and safety implications. In order for the AE to recommend a deviation, a risk analysis is to be conducted in accordance with the requirements C-23-005-000/AG-002 and A-GG-040-010/AG-012. In accordance with both risk management references, as a minimum, the CO shall approve any deviations and all applicable shore agencies shall be made aware of deviations (including but not limited to Formation Safety, Formation Technical Authority and MSC 3-5).

HV STATEBOARDS

131. There are two types of HV stateboard onboard HV ships:

a. Shipwide HV stateboard; and

b. Equipment HV stateboard.

132. Shipwide HV Stateboard: The shipwide HV stateboard displays the current HV state of the platform and other pertinent HV information such as the name of the APC and identification of HV markings. The HV state of the platform displayed on the stateboard shall be either HV DEAD or HV LIVE.

a. The shipwide HV stateboard shall be located at the brow. The stateboard shall be visible for all personnel coming on board ship.

b. The shipwide HV stateboard shall be controlled and updated by the APC only.

c. When multiple brows are deployed a stateboard shall be placed at each one.

133. Equipment HV Stateboard: The equipment HV stateboard displays the current state of all HV equipment on board ship. The stateboard must show, at a minimum, if the equipment is live or dead.

a. The equipment HV stateboard shall be located in the Machinery Control Room (MCR).

b. The equipment HV stateboard shall be controlled and updated by the APC only.

MASTER KEY REGISTER

134. The master key register is a listing of all keys, their number and the equipment or device they unlock. The master key register shall be kept and maintained by the APC and placed in the switchboard register. The master key register shall include, but not be limited to, the following keys:

a. All equipment interlock keys (trapped key system)

b. All HV Switchboards/HV equipment control keys

c. HVSP Switchboards key safe keys

d. HVSP Master key safe keys

e. PTW/SFT key safes keys

f. All HVSP colour coded locks and keys

135. The APC shall populate the list using the template in Annex SOP-S13M. The ship specific key listing shall be verified and approved by the AE.

136. All keys not permanently engraved shall be fitted with an engraved tag displaying a unique key number/identifier.

137. The master key register shall be mustered, verified correct and signed by both the outgoing and incoming APC any time a handover is conducted. The form shall be kept with the handover certificate in the switchboard register for 1 year following their completion.

INSPECTION AND MAINTENANCE OF HV PPE

138. As outlined in reference F.

Procedure Performance Criteria and Records

139. The purpose of the record retention guide below is to assist the APC with which record to retain, and serves as a reminder for when certain records can be destroyed.

140. Older completed records, still within the retention period, may be moved out of the switchboard register and into a separate binder if room is required. The SEPM shall be responsible for the safe keeping of the binder until the retention period has expired and the documents are destroyed.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Table SOP-S13.4 – Record Retention Guide

RECORD	RETENTION
High Voltage Switching Schedules (HVSS)	1 year following the date of completion
Limitation of Access (LOA)	1 year following the date of completion
Permit to Work (PTW)	1 year following the date of completion
Sanction for Test (SFT)	1 year following the date of completion
SEPM Handover Certificates (HOC)	1 year following the incoming SEPM's posting out date.
APC Handover Certificates (HOC)	1 year following the handover certificate date of completion.
Certificates of Appointment	1 year following the individual's posting out date
Memorandum of Appointments	1 year after the appointment ended
Near Miss Report	1 year following the date of entry
Compliance Audit form	1 year following the date of entry
Serial tracking list	1 year following the last entry date of completion

Attachments

Annex SOP-S13A - High Voltage Switching Program References
Annex SOP-S13B - High Voltage Switching Schedule (HVSS) Form
Annex SOP-S13C - Permit to Work (PTW) Form
Annex SOP-S13D - Sanction for Test (SFT) Form
Annex SOP-S13E - Limitation of Access (LOA) Form
Annex SOP-S13F - Serial Tracking List
Annex SOP-S13G - SEPM Handover Certificate
Annex SOP-S13H - APC Handover Certificate
Annex SOP-S13I - Certificate of Appointment Authorizing Engineer (High Voltage)
Annex SOP-S13J - Certificate of Appointment Authorized Person (High Voltage)
Annex SOP-S13K - Certificate of Appointment Competent Person (High Voltage)
Annex SOP-S13L - HV Aware Trained Personnel List
Annex SOP-S13M - Master Key Register
Annex SOP-S13N - HV Switching Program Compliance Audit Form
Annex SOP-S13O - High Voltage Switching Program SPDET
Annex SOP-S13P - HV Near Miss Report Form

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S13A

HIGH VOLTAGE SWITCHING PROGRAM REFERENCES

A. BR 2000 (52) (1) – Operating Guidance for High Voltage Systems in HM Ships and the Royal Fleet Auxiliary
B. BR 2000 (52) (2) – Guidance to Testing and Maintenance for High Voltage Systems in HM Ships, Submarines, and the Royal Fleet Auxiliary
C. CSA Z462-18 Workplace Electrical Safety
D. DAOD-1000-8 – Policy Framework for Safety and Security Management
E. NAVORD 11100-1 – Qualification and Access Requirements for High Voltage Ships
F. Safety Bulletin: Arc Flash Hazard Precautions (applicable to Harry DeWolf (HDW) Class Ships), C-26-010-047/TS-002
G. OTT_LSTL-#4917749-v1– Switching Schedule Example Form
H. OTT_LSTL-#4917744-v1– Limitation of Access Example Form
I. OTT_LSTL-#4998306-v1– Permit to Work Example Form
J. NAVORD 1002-0 – RCN Safety and Environmental Program Management
K. DMEPM MSC 3-5 Marine High Voltage Program SharePoint – HV SSOW/HV Switching Schedules

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S13B

HIGH VOLTAGE SWITCHING SCHEDULE (HVSS) FORM

HMCS _____ Serial No. _____ Date: _____

HIGH VOLTAGE SWITCHING SCHEDULE (2 Copies required)
Complete precisely and legibly in ***BLOCK CAPITALS*** Form Originator: _____ (Authorized Person in Control) Checked by: _____ (Authorized Person) Issued to: _____(Person in Charge)/Phone #: _____
Purpose of Work/Test
HV Equipment Made Safe:

Isolation Sketch
Person in Charge (PIC) Signature _____

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

HMCS _____ Serial No. _____ Date: _____

Isolation Procedures				
Step	Location & Identity of Equipment	Operation and Reason	Key	Initials

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

HMCS _____ Serial No. _____ Date: _____

Isolation Procedures				
Step	Location & Identity of Equipment	Operation and Reason	Key	Initials

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

HMCS _____ Serial No. _____ Date: _____

Isolation Procedures				
Step	Location & Identity of Equipment	Operation and Reason	Key	Initials

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

HMCS _____ Serial No. _____ Date: _____

Restoration Procedures				
Step	Location & Identity of Equipment	Operation and Reason	Key	Initials

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

HMCS _____ Serial No. _____ Date: _____

Restoration Procedures				
Step	Location & Identity of Equipment	Operation and Reason	Key	Initials

We hereby declare that we have checked the above isolation procedures and are satisfied that it conforms to the HV Safe System of Work.

Originating Authorized Person in Control		Counter Signing Authorized Person	
Signature:	_____	Signature:	_____
Name:	_____	Name:	_____
Rank:	_____	Rank:	_____
Date:	_____	Date:	_____

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S13C

PERMIT TO WORK (PTW) FORM

HMCS_____ PERMIT TO WORK (2 copies required) Serial No._____

(Complete precisely and legibly in BLOCK CAPITALS)

Part 1 – To be completed by the originating Authorized Person in Control (APC)

(1) I declare it is safe to work on the HV equipment listed below, which has been made dead, isolated and earthed in accordance with SEMS policy, and I have physically identified the equipment and explained the extent of the work to the prospective Person in Charge who will be a Competent Person or above and is to be responsible for the work.

(2) I have shown the prospective Person in Charge the isolation sketch on the High Voltage Switching Schedule and the safety arrangements at the points of isolation and the places of work. I have also explained all the relevant safety procedures and precautions.

Switching Schedule Serial No. _____
PTW Safe No. and Location _____
Equipment to be worked on _____
_____
Location of Equipment _____
_____
Details of documents/ Risk Assessments that relates to the proposed work _____
_____
Details of work to be done _____
_____
Specific points where equipment is isolated _____
_____
Specific points where equipment is earthed _____
_____

SAFETY CHECKLIST: (tick the applicable boxes)

1.	Has permission for the intended work been confirmed?	Yes ☐	**6.**	Are Safety Locking devices secured at Circuits Main Earths?	Yes ☐
2.	Is equipment safely isolated from all forms of supply?	Yes ☐	**7.**	Are the conductors to be worked on earthed?	Yes ☐
3.	Are Caution/Danger tags affixed at all points of isolation?	Yes ☐	**8.**	Are Electrical Equipment Warning signs in place?	Yes ☐
4.	Are Safety Locking devices secured at all points of isolation?	Yes ☐	**9.**	Where work involves a cable, has it been positively identified?	Yes ☐
5.	Has the equipment been proven dead?	Yes ☐			

SPECIAL INSTRUCTIONS AND SAFETY MEASURES _____
_____PIC Init.( )

Signed _____ (APC) Time and Date _____

Name (Print) _____ Rank _____

PTW ONLY VALID IF PARTS 1 & 2 HAVE BEEN SIGNED

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

HMCS_____ PERMIT TO WORK (2 copies required) Serial No._____

(Complete precisely and legibly in BLOCK CAPITALS)

Part 2 – To be completed by the prospective Person in Charge (PIC)

1) I acknowledge receipt of this Permit and Key(s) _____ to the PTW Safe _____.

2) I understand and have initialed any special instructions and safety measures noted in Part 1 of this permit.

3) I have been shown the equipment to be worked on and the safety arrangements at the points of isolation and place of work.

4) I have been shown and I have signed the isolation sketch on the relevant High Voltage Switching Schedule.

5) The Authorized Person in Control has demonstrated to my satisfaction that the equipment is dead and safe to work on.

6) I accept responsibility for carrying out the work listed in Part 1 of this Permit.

7) No other work than that listed in Part 1 of this permit will be attempted by me or any person working under my control while this permit is in progress.

8) I will not leave the place of work while the work described in Part 1 of this permit is in progress.

9) If I have to leave the place of work temporarily, I will suspend the work, and ensure that suitable safety measures are taken until the work is resumed upon my return.

10) I understand that PTW keys shall, at no time, leave the Ship without the authorization of the AE and APC.

11) I will retain this Permit while the work described in Part 1 is in progress, and I will return it to the Authorized Person in Control when the work is completed or stopped.

Signed _____ (PIC) Time and Date _____

Name (Print) _____ Rank/Civ _____

Shop & Phone #: _____

PTW ONLY VALID IF PARTS 1 & 2 HAVE BEEN SIGNED

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

HMCS_____ PERMIT TO WORK Serial No._____
(2 copies required)

(Complete precisely and legibly in BLOCK CAPITALS)

Part 3 – To be completed by the Person in Charge (PIC)

1) I confirm the work described in Part 1 of this Permit has been: (*Strikethrough statement below that does not apply)

   a) *Satisfactorily completed and that all persons, tools, instruments and temporary earths under my control have been accounted for and withdrawn.

   OR

   b) *Stopped for the reasons given below, and that all persons, tools and instruments under my control have been accounted for and withdrawn.

2) I have handed back Key(s) _____ for the PTW key safe _____ and a copy of the PTW to the APC.

3) I have warned all persons under my control that it is no longer safe to work on the equipment.

   Reason for stopping the work and action taken (If applicable) _____
   _____
   _____

Signed _____ (PIC) Time and Date _____

Name (Print) _____ Rank/Civ _____

Part 4- To be completed by the Authorized Person in Control

1) I confirm the work described in Part 1 of this Permit has been: (*Strikethrough statement below that does not apply)

   a) *Satisfactorily completed;

   OR

   b) *Stopped and been made safe

2) I confirm the receipt of key(s) _____ for the PTW key safe _____ and copy of the PTW from the PIC.

3) This Permit is cancelled.

Signed _____ (APC) Time and Date _____

Name (Print) _____ Rank_____

PTW ONLY VALID IF PARTS 1 & 2 HAVE BEEN SIGNED

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S13D

SANCTION FOR TEST (SFT) FORM

HMCS_____ SANCTION FOR TEST (2 copies required) Serial No._____

(Complete precisely and legibly in BLOCK CAPITALS)

Part 1 – To be completed by the originating Authorized Person in Control (APC)

(1) I declare it is safe to work on the equipment listed below, which has been made dead, isolated and earthed in accordance with SEMS policy, and I have physically identified the equipment and explained the extent of the test to the prospective person in charge who will be an Authorized Person and is to be responsible for the testing.

(2) I have shown the prospective Person in Charge the isolation sketch on the High Voltage Switching Schedule and the safety arrangements at the points of isolation, at the place of the test and at other places affected by the test. I have also explained all the relevant safety procedures and precautions.

Switching Schedule Serial No. _____
PTW Safe No. and Location _____
Equipment to be tested _____
_____
Location of Equipment _____
_____
Details of documents/ Risk Assessments that relates to the Proposed Test _____
_____
Details of testing to be done _____
_____
Specific points where equipment is isolated _____
_____
Specific points where equipment is earthed _____
_____

SAFETY CHECKLIST: (tick the applicable boxes)

1.	Has permission for the intended test been confirmed?	Yes ☐	6.	Are Safety Locking devices secured at Circuits Main Earths?	Yes ☐
2.	Is equipment safely isolated from all forms of supply?	Yes ☐	7.	Are the conductors to be worked on earthed?	Yes ☐
3.	Are Caution/Danger tags affixed at all points of isolation?	Yes ☐	8.	Are Electrical Equipment Warning signs in place?	Yes ☐
4.	Are Safety Locking devices secured at all points of isolation?	Yes ☐	9.	Where testing involves a cable, has it been positively identified?	Yes ☐
5.	Has the equipment been proven dead?	Yes ☐			

SPECIAL INSTRUCTIONS AND SAFETY MEASURES _____

_____PIC init. ( )

Signed _____(APC) Time and Date _____

Name (Print) _____ Rank _____

SFT ONLY VALID IF PARTS 1 & 2 HAVE BEEN SIGNED

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

HMCS_____ SANCTION FOR TEST (2 copies required) Serial No._____

(Complete precisely and legibly in BLOCK CAPITALS)

Part 2 – To be completed by the prospective Person in Charge (PIC)

1) I acknowledge receipt of this Sanction and Key(s) _____ to the PTW Safe _____.

2) I understand and have initialed any special instructions and safety measures noted in Part 1 of this sanction.

3) I have been shown the equipment to be tested and understand the extent of the tests.

4) I have been shown and I have signed the isolation sketch on the relevant High Voltage Switching Schedule and the safety arrangements at the point of isolation, and at places affected by the testing.

5) The authorized Person in Control has demonstrated to my satisfaction that the equipment is safe to test.

6) I accept responsibility for carrying out the tests listed in Part 1 of this Sanction.

7) No test other than that listed in Part 1 of this sanction will be attempted by me or any person working under my control while this Sanction is in progress.

8) I will not leave the place of the test while the testing described in Part 1 is in progress.

9) If I have to leave the place of test temporarily, I will suspend the testing, and ensure that suitable safety measures are taken until the testing is resumed when I return.

10) I understand that SFT keys shall, at no time, leave the ship without the authorization of the AE and APC.

11) I will retain this sanction while the testing described in Part 1 is in progress, and I will return it to the Authorized Person in Control when the testing is completed or stopped.

Signed _____ (PIC) Time and Date _____

Name (Print) _____ Rank/Civ_____

Shop & Phone #:_____

SFT ONLY VALID IF PARTS 1 & 2 HAVE BEEN SIGNED

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

HMCS_____ SANCTION FOR TEST (2 copies required) Serial No._____

(Complete precisely and legibly in BLOCK CAPITALS)

Part 3 – To be completed by the Person in Charge (PIC)

I confirm the testing described in Part 1 of this Sanction has been: (*Strikethrough statement below that does not apply)

*Satisfactorily completed and that all persons, tools, instruments and temporary earths under my control have been accounted for and withdrawn.

OR

*Stopped for the reasons given below, and that all persons, tools and instruments under my control have been accounted for and withdrawn.

I have handed back Key(s) _____ for the PTW safe _____ and a copy of the SFT to the APC.

I have warned all persons under my control that it is no longer safe to test the equipment.

Reason for stopping the test and action taken (If applicable) _____
_____
_____

Signed _____ (PIC) Time and Date _____

Name (Print) _____ Rank/Civ _____

Part 4- To be completed by the Authorized Person in Control

1) I confirm the test described in Part 1 of this sanction has been: (Strikethrough statement below that does not apply)

   a) *Satisfactorily completed,

   OR

   b) *Stopped and been made safe.

2) I confirm the receipt of key(s) _____ for the PTW safe _____ and copy of the SFT from the PIC.

3) This Sanction is cancelled.

Signed _____ (APC) Time and Date _____

Name (Print) _____ Rank _____

SFT ONLY VALID IF PARTS 1 & 2 HAVE BEEN SIGNED

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S13E

LIMITATION OF ACCESS (LOA) FORM

HMCS_____ Limitation of Access (2 copies required) Serial No._____

(Complete precisely and legibly in BLOCK CAPITALS)

Part 1 – To be completed by the Authorized Person in Control

Name of prospective Person in Charge _____Rank/Civ _____

Location of work activity_____

Details of work to be done_____

_____

SPECIAL INSTRUCTIONS AND SAFETY MEASURES _____

_____

_____Signed _____ (PIC)

I confirm that permission for the intended work activities have been obtained.

I declare that at the above location I have verified with the prospective Person in Charge the extent and limits to the work activities declared above.

I have explained to the prospective Person in Charge any special instructions or safety measures indicated above.

I have shown the prospective Person in Charge the safety measures I have installed.

Signed _____ (APC) Time and Date _____

Name (Print) _____ Rank _____

Shop & Phone #:_____

Part 2 – To be completed by the prospective Person in Charge

1) I acknowledge receipt of this Authority and understand the scope and limits of the work activities detailed in Part 1.
2) I understand and have signed any special instructions and safety measures indicated in part 1.
3) I have been shown the location(s) of the work activity, I have been shown and am satisfied with the safety arrangements at the place(s) of work activities.
4) I accept responsibility for ensuring that the work activities detailed in Part 1 are undertaken safely.
5) No attempt will be made by myself, or any persons working under my control, to undertake any work activities other than those detailed in Part 1.
6) I understand that the Authorized Person in Control has the authority to stop the work activities.
7) I will not leave the location while the work activities are in progress.
8) If I have to leave the location temporarily, I will suspend the work activities and ensure safety measures are taken until the work activities are resumed upon my return.
9) I will retain this Limitation of Access while the work activity described in Part 1 is in progress, and **I will return this LOA** to the Authorized Person in Control when the work activities are satisfactorily completed or stopped and made safe.

Signed _____ (PIC) Time and Date_____

Name (Print) _____ Rank/Civ _____

THIS LOA IS NOT VALID UNTIL PARTS 1 & 2 HAVE BEEN SIGNED

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

HMCS_____ Limitation of Access (2 copies required) Serial No._____

(Complete precisely and legibly in BLOCK CAPITALS)

Part 3 – To be completed by the Person in Charge

1) I confirm that the work described in Part 1 of this Authority has been: (*Strikethrough the statement below that does not apply)

   a) *Satisfactorily completed and that all persons, tools and instruments under my control have been accounted for and withdrawn.

   OR

   b) *Stopped for the reasons given below, and that all persons, tools and instruments under my control have been accounted for and withdrawn, and that the location of the work activity has been made safe.

2) I have warned all persons under my control that it is no longer safe to work at the location stated in Part 1.

   Reasons for stopping the work and action taken (If applicable)_____
   _____
   _____
   _____

Signed _____ (PIC) Time and Date _____

Name (Print) _____ Rank/Civ _____

Part 4 – to be completed by the Authorized Person in Control

1) I confirm that the work described in Part 1 has been: (*Strikethrough the statement below that does not apply)

   a) *Satisfactorily completed;

   OR

   b) *Stopped and made safe.

2) The location has been secured and a final inspection conducted by the APC.

3) This Limitation of Access has been cancelled.

Signed _____ (APC) Time and Date _____

Name (Print) _____ Rank/Rate _____

THIS LOA IS NOT VALID UNTIL PARTS 1 & 2 HAVE BEEN SIGNED

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S13F

SERIAL TRACKING LIST

HV SWITCHING PROGRAM SERIAL NUMBER TRACKING LIST

Date Issued	Serial Number	Form type (PTW,SFT, LOA, HVSS or HOC)	Purpose and System/Equipment	Person in Charge (PiC)	Key Safe	Date completed	APC Init,
	HV-						
	HV-						
	HV-						
	HV-						
	HV-						
	HV-						
	HV-						
	HV-						
	HV-						
	HV-						
	HV-						
	HV-						
	HV-						
	HV-						
	HV-						
	HV-						
	HV-						
	HV-						
	HV-						
	HV-						
	HV-						
	HV-						
	HV-						
	HV-						

This form is to be retained 1 year after date of last entry.
May be reproduced locally.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S13G

SEPM HANDOVER CERTIFICATE

HMCS _____ Serial No _____

SENIOR ELECTRICAL PROPULSION MANAGER (SEPM) HANDOVER CERTIFICATE OF THE HIGH VOLTAGE SYSTEM TO AN ENDORSED AUTHORIZED PERSON IN CONTROL SEPM OR CIVILIAN EQUIVALENT.

PART 1 – PROCEDURES AND NOTES

ANY PERSONS UNDERTAKING THE DUTIES OF THE SENIOR ELECTRICAL PROPULSION MANAGER IS TO HAVE COMPLETED MANDATORY HV TRAINING COURSES AND BE ENDORSED BY THE AE OR FOR REPAIR FACILITIES BE AUTHORIZED BY THEIR EMPLOYER AS QUALIFIED AND COMPETENT TO CARRY OUT THESE DUTIES.

1) It is a requirement of the SEMS to formally hand over HV Systems between SEPMs.
2) At handover, the person handing over and the person taking over HV responsibilities are to:
   a) Inspect the positions (I/O) of all vacuum circuit breakers (VCB) and record the position in part 2.
   b) Inspect the VCB control mode (Local Manual, Local Auto or Remote) and record position in part 2.
   c) Inspect the condition of all breakers and record findings in Part 2.
   d) Muster all keys and record findings in Master Key Register form. Attach Master Key Register to Handover Certificate.
3) When the inspection above is complete and correct, the certificate at Part 3 is to be signed.
4) When the handover is from a repair facility/shipyard all work on HV systems and all certifications are to be completed before the HV system is handed back to the ship. Certification is to be given to the Authorizing Engineer.

PART 2 – CONDITION OF HV SYSTEMS AT HANDOVER

STBD 6.6 kV MAIN SWITCHBOARD

Description		I/O	Mode	Condition
MV1 BREAKERS	MV1BT			
	MV1PT			
	MV1DG4			
	MV1DG3			
	MV1ST			
	MV1BTT			
	MV1DT1			

PORT 6.6 kV MAIN SWITCHBOARD

Description		I/O	Mode	Condition
MV2 BREAKERS	MV2DT2			
	MV2BTT			
	MV2PT			
	MV2DG2			
	MV2DG1			
	MV2ST			
	MV2BT			
List all other items handed over below:				

TRANSFER NOT VALID WITHOUT PARTS 1, 2 & 3 COMPLETED.
1 of 2

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

HMCS _____ Serial No _____

PART 3 – CERTIFICATE OF TRANSFER

The High Voltage electrical systems onboard HMCS _____ were handed over in the state and condition and with the items/keys listed in Part 2.

Note: For Handover to an RCN SEPM the Switchboard Register shall be reviewed and handed over as well as all other HV lockout/Tagout articles.

Outgoing SEPM:	**Incoming SEPM:**
I confirm that ALL actions above have been completed and the responsibility for the vessels High Voltage System has been taken over by the incoming SEPM: Name (Print): Signature: Date: Rank/Company: Being the outgoing SEPM.	I confirm that all above has been completed and that I have taken receipt of the keys listed in Part 2. I assume full responsibility for all the vessels High Voltage Systems. Name (Print): Signature: Date: Rank/Company: Being the incoming SEPM.
Witnessed by the Platform AE: Name: Signature: Date: Being the Platform AE.	

TRANSFER NOT VALID WITHOUT PARTS 1, 2 & 3 COMPLETED.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S13H

APC HANDOVER CERTIFICATE

HMCS _____ Serial No _____

HANDOVER CERTIFICATE OF THE HIGH VOLTAGE SYSTEM TO AN HV AUTHORIZED PERSON

PART 1 – PROCEDURES AND NOTES

ANY PERSONS UNDERTAKING THE DUTIES OF AN AUTHORIZED PERSON IN CONTROL IS TO HAVE COMPLETED MANDATORY HV TRAINING COURSES AND BE ENDORSED BY THE AE.

1) It is a requirement of the SEMS to formally hand over HV Systems between HV Authorized Persons.
2) Before handing over the HV systems, the ship's existing High Voltage Authorized Person must cancel all HV electrical Permits to Work and Sanction for Test forms issued by him/her.
3) At handover, the person handing over and the person taking over HV responsibilities are to:
   a) Inspect the positions (I/O) of all vacuum circuit breakers (VCB) and record the position in part 2.
   b) Inspect the VCB control mode (Local Manual, Local Auto or Remote) and record position in part 2.
   c) Inspect the condition of all breakers and record findings in Part 2.
   d) Muster all keys and record findings in Master Key Register form. Attach Master Key Register to Handover Certificate. After handover, HV keys are to be handed to the person assuming responsibility.
4) When the inspection above is complete and correct, the certificate at Part 3 is to be signed.

PART 2 – CONDITION OF HV SYSTEMS AT HANDOVER

STBD 6.6 kV MAIN SWITCHBOARD

Description		I/O	Mode	Condition
MV1 BREAKERS	MV1BT			
	MV1PT			
	MV1DG4			
	MV1DG3			
	MV1ST			
	MV1BTT			
	MV1DT1			

PORT 6.6 kV MAIN SWITCHBOARD

Description		I/O	Mode	Condition
MV2 BREAKERS	MV2DT2			
	MV2BTT			
	MV2PT			
	MV2DG2			
	MV2DG1			
	MV2ST			
	MV2BT			

List all other items handed over below:

TRANSFER NOT VALID WITHOUT PARTS 1, 2 & 3 COMPLETED.

1 of 2

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

HMCS _____ Serial No _____

PART 3 – CERTIFICATE OF TRANSFER

The High Voltage electrical systems onboard HMCS _____ were handed over in the state and condition and with the items/keys listed in Part 2.

Note: The Switchboard Register shall be reviewed and handed over as well as all other HV lockout/Tagout articles.

Outgoing HV Authorized Person in Control:	**Incoming HV Authorized Person in Control:**
I confirm that ALL actions above have been completed and the responsibility for the vessels High Voltage System has been taken over by the incoming HV Authorized Person in Control. Name (Print): Signature: Date: Rank/Company: Being the outgoing HV Authorized Person in Control.	I confirm that all above has been completed and that I have taken receipt of the keys listed in Part 2. I assume full responsibility for all the vessels High Voltage Systems. Name (Print): Signature: Date: Rank/Company: Being the incoming HV Authorized Person in Control.
Approved by the Platform AE: Name: Signature: Date: Being the Platform AE.	

TRANSFER NOT VALID WITHOUT PARTS 1, 2 & 3 COMPLETED.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S13I

CERTIFICATE OF APPOINTMENT AUTHORIZING ENGINEER (HIGH VOLTAGE)

Certificate valid on HMCS _____

Certificate of Appointment as an Authorizing Engineer (High Voltage)

This certificate is valid until the expiry date, and relates only to the electrical systems and installations listed below.

_____
_____
_____
_____
_____
_____

This is to certify that:

Name (Print)_____

is appointed as an Authorizing Engineer (High Voltage) iaw the HV SSOW.

Signed_____ (Authorizing Engineer)

Issue Date _____ Expiry Date _____

Notes:

Training Record

Training on the following subjects was received on the dates indicated:

	Initial Training	Refresher training
High Voltage Equipment	_____	_____
Standard First Aid	_____	_____

Form 1 Certificate of Appointment as an Authorizing Engineer (High Voltage)

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S13J

CERTIFICATE OF APPOINTMENT AUTHORIZED PERSON (HIGH VOLTAGE)

Certificate valid on HMCS_____

Certificate of Appointment as an Authorized Person (High Voltage)

This certificate is valid until the expiry date, and relates only to the electrical systems and installations listed below.

_____
_____
_____
_____
_____
_____

This is to certify that:

Name (print)_____

is appointed as an Authorized Person (High Voltage) iaw the HV SSOW.

Signed _____ (Authorizing Engineer)

Issue Date _____ Expiry Date _____

Note: Appointment to be reviewed annually.

Notes:

Training Record

Training on the following subjects was received on the dates indicated:

	Initial Training	Refresher training
High Voltage Equipment	_____	_____
Standard First Aid	_____	_____

Form 2 Certificate of Appointment as an Authorized Person (High Voltage)

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S13K

CERTIFICATE OF APPOINTMENT COMPETENT PERSON (HIGH VOLTAGE)

Certificate valid on HMCS_____

Certificate of Appointment as a Competent Person (High Voltage)

This certificate is valid until the expiry date, and relates only to the electrical systems and installations listed below.

_____
_____
_____

This is to certify that (read in 6 columns):

Rank	Name	Expiry date	HV Training	First Aid Training	AE Signature

are appointed as Competent Persons (High Voltage) iaw the HV Safe System of Work.

Note: Appointments to be reviewed annually.

Notes:

Form 3 Certificate of Appointment as a Competent Person (High Voltage)

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S13L

HV AWARE TRAINED PERSONNEL LIST

training valid on HMCS_____

This is to certify that (read in 5 columns):

Dept.	Rank	Name	Training Date	Expiry date

are trained as HV Aware person iaw the HV Safe System of Work.

<u>Note: training to be reviewed annually.</u>

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S13M

MASTER KEY REGISTER

HMCS _____

Key No.	Sys./Equip./Device	✓

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S13N

HV SWITCHING PROGRAM COMPLIANCE AUDIT FORM

1. An HV Switching Program (HVSP) compliance audit was conducted on HMCS_____, on the (date) _____. The HV Switching Program was judged as (Sat/Un-Sat): _____.

	HV SWITCHING PROGRAM CHECKLIST	SAT	UNSAT	REMARKS
a.	**HVSP safety components**			
	Contains the following, as a minimum:			
	Shipwide HV Stateboards (Brow(s))			
	Equipment HV Stateboards (MCR)			
	Tags			
	Locking devices (incl. Multi-lock devices)			
	Padlocks and keys (incl. Swbd trapped keys)			
	Key safes			
	Temporary barriers and signage available			
	HV equipment labeling (arc flash, IP rating, danger signs)			
	HV PPE including arc flash PPE			
b.	**Switchboard Register VOL 1. Log care, custody and control:**			
	Contains the following, as a minimum:			
	CO and AE signature sheet			
	AE Memorandum of appointment			
	Naval Technical Department signature sheet			
	Current version of SEMS SOP for HV Switching Program			
	Current version of NAVORD 11100-1			
	Certificates of appointment for AEs, APs, APCs and CPs.			
	HVAP trained personnel list			
	Handover Certificate (SEPM Cert. only)			
	Official correspondence regarding HV (Including near miss)			
c.	**Switchboard Register VOL 2. Log care, custody and control:**			
	Contains the following, as a minimum:			
	CO and AE signature sheet			
	Serial tracking list			
	Permit to Work (PTW)			
	Sanction for Test (SFT)			
	Limitation of Access (LOA)			
	Pre-approved HVSS			
	Handover Certificate (APC Cert. only)			
	HV System schematics			
	Master Key Register			
	Blank forms available			
d.	**HV SEMS Standard Operating Procedure**			
	The following procedures are to be verified:			
	HVSS completed forms random verification			
	PTW completed forms random verification			
	SFT completed forms random verification			
	LOA completed forms random verification			
	Serial Tracking list entries verification			
	Handover certificate completed forms verification			
	Certificates of Appointment			
	Master Key Register key muster			
	Arc Flash PPE			
	Verify record retention iaw SEMS SOP for HVSP			
	Deviations			

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

	HV SWITCHING PROGRAM CHECKLIST	SAT	UNSAT	REMARKS
	Inspection and maintenance of HV equipment and PPE			

NOTES:

AUDITOR (PRINT): _____

SIGNATURE: _____

DATE: _____

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S13O

HIGH VOLTAGE SWITCHING PROGRAM SPDET

NATIONAL DEFENCE

SAFETY PROGRAM DEVELOPMENT AND EVALUATION TECHNIQUE PROFILE FORM

ORGANISATION EVALUATED	EVALUATOR (Print)	DIRECTING AUTHORITY	DATE

PROGRAM ELEMENT	REFERENCES
HIGH VOLTAGE SWITCHING PROGRAM (HVSP)	A. A-GG-040-001/AG-001 B. C-02-040-009/AG-001 C. Canada Labour Code Part II

REQUIREMENTS (See Evaluator's Guidelines)	VALUE FACTOR	RATING
XX.1 Has the CO designated, in writing, the Authorizing Engineer (AE) to be the Unit HVSP Authority. (10) And are assigned positions adequate to support the Units HVSP demands? (5)	15	
XX.2 Are individuals assigned responsibilities for the isolation of systems and equipment, adequately trained in HVSP requirements? (5) And meet the criteria of a Qualified Individual under the Code? (5)	10	
XX.3 Are officers and supervisors trained as to their responsibilities for the promotion and implementation of the HVSP? (10)	10	
XX.4 At Sea, is priority given to achieving balance between program and operational requirements? (5)	5	
XX.5 Is the available inventory of HVSP locking devices adequate to effectively render equipment and system inoperative? (5)	5	
XX.6 Are all individuals held accountable for compliance with HVSP requirements in their daily activities (10)? And are these efforts documented? (5)	15	
XX.7 Is the Authorized Person in Control (APC) aware of his/her responsibilities (5)	5	
XX.8 Do new and unique work procedures for equipment and systems reflect HVSP requirements? (5)	5	
XX.9 Has the HVSP been evaluated during the previous year meeting, as a minimum, Class SEMS HVSP SOP inspection requirement (10) and has corrective action progressed on identified weaknesses (5)?	15	
XX.10 Are hazardous occurrences involving the HVSP, reported, documented and investigated (10) and appropriate action taken to prevent future re-occurrences (5)?	15	
TOTAL	100	

NOTES ON REQUIREMENTS

XX.1 Verify memorandum of appointment in switchboard register Vol.1. Positions is normally filled by the Naval Technical Officer (NTO) with the Senior Electrical Propulsion Manager as the alternate. The AE and UGSO are both responsible for reporting safety matters to the CO and XO.
XX.2 Review training records. Qualified Individual, in respect of a specified duty, is a person who because of their knowledge, training, and experience is qualified to perform that duty safely and properly exercising due diligence.
XX.3 Verify by review of training records, safety indoctrination briefings, internal program reviews (i.e. quarterly UGSO review), proper signatures on HVSP forms, safety infractions are addressed in a timely manner and regular safety talks.
XX.4 Confirm by reviewing the policy statement and by questioning the CPs and APs. To get full marks respondents *must emphasise* that safety is a primary consideration in the performance of all tasks.
XX.5 Confirm by interviewing the APC and through inspection of locked out equipment.
XX.6 Confirm by interviewing senior ship staff as to the methods used to ensure personnel are held accountable, and by reviewing safety infraction follow-up corrective action.
XX.7 Verify by interviewing senior management, UGSO and LOTO Coordinator as to the methods used to ensure the Duty Tech is aware of his/her responsibilities.
XX.8 Confirm with the senior officer and verify by reviewing documents that SOPs and WIs are available and updated.
XX.9 Confirm by checking previous SPDET, UGSO quarterly reviews, LOTO Coordinator periodic verifications and external verification and inspection records (FTA and MARL/MARP SE), and verify that follow-up action is being actively pursued or has been completed on identified weaknesses.
XX.10 Confirm through Hazardous Occurrence reports, CO Investigations, TIs or SIs

GENERAL Evaluator comments to justify a rating over 90 or under 70 are required. Line authority comments on action that will improve upon any particular requirement or the program are to be recorded.

_____

_____

REMARKS: (SEE REVERSE FOR ADDITIONAL REMARKS AND LINE AUTHORITY COMMENTS)

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S13P

HV NEAR MISS REPORT FORM

Incident on HMCS:		Date of incident:	Time of Incident:
Compartment:		System/Equipment:	
Description of near miss: (Brief description of the events leading to the near miss)			
Policy or procedure violated: (Reference specific sections in SOP)			
Safety Suggestions:			
Reporting person:	Signature:	Date:	Department:
Authorizing Engineer:		Signature:	Date:
Recommended Action: (brief explanation of remedial action required to prevent re-occurrence) AE Signature:_____			

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

STANDARD OPERATING PROCEDURE SOP-S14

DIVE OPERATIONS SAFETY

Purpose

1. To provide direction to Ship's Staff to minimize hazards from machinery and systems when divers are conducting diving operations below, or in close proximity to Harry Dewolf class vessels.

Scope

2. This SOP applies to all ships of this class under the jurisdiction of the Commander Maritime Forces Atlantic and Commander Maritime Forces Pacific. This SOP applies to both CAF divers and civilian personnel conducting diving operations below or in the vicinity of HMC ships.

Definitions

3. The following definitions are used within this SOP:

Term	Definition
Canadian Armed Forces (CAF) Diver	A diver qualified in any sub-category of CAF diving, whether a member of a CAF diving team or a CF member who is maintaining currency and qualification through casual diving with a CAF diving team.
CAF Diving	Diving using underwater breathing apparatus, as well as the use by CAF divers of hyperbaric chambers and other forms of underwater intervention, including remotely operated underwater vehicles, submersibles, and related special sensors.
CAF Diving Team	An organizational sub-unit identified in command orders that is authorized to conduct CAF diving, meets the standards set out in the *Canadian Armed Forces Diving Manual*, and is recognized by D Dive S.
Diving Supervisor	A person trained and qualified to safely oversee all aspects of diving operations.

Responsibilities

4. <u>Senior Watchkeeper (SWK) (alongside) or Officer of the Watch (OOW) (at sea)</u>:

   a. The SWK/OOW is responsible to the Commanding Officer (CO) for ensuring that the ship's equipment and systems are configured properly or isolated so as to prevent the least risk for any divers in the water. These systems include, but are not limited to:

      (1) main propulsion systems including main engines, motors, shaft lines, and propellers;

      (2) underwater emitters (including sonars, depth sounders, EM Logs, and cathodic protection systems);

(3) hull suction and discharge openings;

(4) bow thruster;

(5) rudders and fin stabilizers;

(6) ancillary and auxiliary pumps and equipment (including fire pumps, ballast/bilge pumps, quality water package, etc.); and

(7) movable domes or other movable structures on the hull; and

b. Prior to the commencement of diving operations, the SWK/OOW shall ensure that:

(1) QHM has been informed of the diving operations, or an appropriate port authority when alongside in a foreign port;

(2) adjacent ships have been informed and have taken all necessary safety actions including lock-out for divers;

(3) all CAF vessels within 100m of the planned dive location have completed the applicable Diving Safety Checklist (DSC) and any non-CAF vessels within 100m have completed the generic form contained in references A and D;

(4) in non-naval ports, all relevant authorities (berth, dock, or port) have been informed and have taken all necessary precautions and safety actions;

(5) the ship has been locked-out for diving IAW Annex SOP-S14B of this SOP, that Parts 1 to 6 of the Annex have been completed, and that the Dive Supervisor has been apprised of any exceptions or discrepancies;

(6) appropriate dive signals (flag ALPHA during daylight hours, RAM lights at night, and shapes at sea) are displayed in prominent positions;

(7) a notice is placed at the brow when alongside stating 'NO GRINDING, NEEDLE GUNNING OR PNEUMATIC TOOL USE: DIVERS DOWN';

(8) the dive team has been fully briefed by the OOD/OOW, MSEO, or Dive O on the required tasks; and

(9) a warning pipe has been made to the ship's company prior to the commencement of diving operations and every 15 minutes while diving operations are taking place, 'DIVING PRECAUTIONS ARE IN EFFECT, DIVERS DOWN'.

5. <u>Duty Technician (alongside) or EOOW (at sea)</u>:

a. The Duty Technician/EOOW shall ensure that all applicable equipment is isolated, locked out, and tagged with a 'DO NOT OPERATE – DIVING OPERATIONS' tag; and

b. Signage is also to be prominently displayed in the Machinery Control Room indicating diving operations are in progress, and that any persons standing watch on the MCC, or likely to stand watch on the MCC during diving operations, are properly briefed on the

nature of the diving operations and the requirement to not change the machinery state until the completion of diving operations.

6. Diving Officer:

a. The Diving Officer is responsible to the Commanding Officer for:

(1) The proficiency of all diving personnel on the team;

(2) The organization and preparation of all diving operations carried out under the Diving Officer's direction;

(3) Scheduling of exercises and training for personnel in order to maintain proficiency;

(4) Maintenance of all diving records;

(5) Scheduling the maintenance of diving equipment in accordance with current technical instructions; and

(6) Briefing the Diving Supervisor(s).

Procedure

RESPONSIBILITIES OF THE DIVING TEAM

7. The Diving Supervisor shall be in full charge of the diving team. All diving operations shall be carried out under the direct supervision of a fully qualified and current Diving Supervisor who is trained in the equipment being used, except as described in Ref A. The Diving Supervisor must be continuously at the scene of the diving operation and must not enter the water or hyperbaric chamber unless properly relieved by another qualified Supervisor.

8. Ship's Dive Team is to follow all procedures as provided by Ref A. All techniques and procedures utilized by individual divers have been developed within the concept of a CAF diving team. The ship's diving team is the basic organizational element upon which safe and effective diving relies. Accordingly, CAF divers are to be exercised and operated as team members, since they are neither trained nor equipped to be deployed as self-sufficient individuals.

DIVING OPERATIONS WHILE AT SEA

9. While the sea bays on the HARRY DEWOLF Class have been designed to minimize or eliminate the effects created by sea-water pump suction, it is recommended that equipment required to be in an auto-start status (i.e.fire pumps, sea water cooling pumps, or ballast/bilge pumps) be selected from equipment that draws suction from the sea bay furthest from the diving operations site. This means that if diving operations are being conducted forward of Frame 34, then preferred auto-start standby equipment aft of Frame 34 should be selected. The Diving Supervisor must be informed when this is not possible due to work on board.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

RESPONSIBILITIES OF ADJACENT SHIP STAFF

10. The SWK/OOW on adjacent ships (within 100m of the ship conducting diving operations) is responsible for ensuring that the ship is locked-out in accordance with Annex SOP-S14B of this SOP, that parts one to seven are completed and signed as applicable, and that the Dive Supervisor has been apprised of any exceptions or discrepancies.

RESPONSIBILITIES OF FLEET TECHNICAL AUTHORITY

11. Fleet Technical Authority (FTA) is the technical authority for the implementation for Dive Operations Safety procedures, is responsible for the maintenance of this SOP. Periodically, unscheduled compliance checks of unit Dive Operations Safety procedures are conducted by representatives of FTA, MARL/MARP SE and/or ST(A)/(P). The intent of these compliance checks is to provide both positive and constructive feedback and to highlight areas for improvement. FTA forwards the results of each compliance check to unit COs, with copies to Sea Training and MARL/MARP SE.

Procedure Performance Criteria and Records

12. The completed form shall be retained by the Diving Supervisor until the completion of the diving operations. It shall then be forwarded to the unit Diving Officer and must be retained for one year after completion of the dive.

Attachments

Annex SOP-S14A – Dive Operations Safety References
Annex SOP-S14B – Diving Safety Checklist

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S14A

DIVE OPERATIONS SAFETY REFERENCES

A. B-GG-380-000/FP-002 (CAF Diving Manual Volume 2)
B. DAOD 8009-0 and DAOD 8009-1 – CAF Diving Policy and Instructions
C. VICTORIA Class Submarines Standard Operating Procedures (VCSOP) Volume 2, SOP 243
D. ADivP-1(A)

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-S14B

DIVING SAFETY CHECKLIST

HMCS _____

1. All Diving Operations that take place on any HARRY DEWOLF Class ships shall be planned in accordance with reference A and conducted in accordance with the following Diving Safety Checklist (DSC) which is promulgated in order to meet the requirements of reference A for CAF vessels. It must be completed before diving operations take place and shall be used as is and not modified in any way.

2. The SWK/OOD of the ship conducting the diving operations is responsible for ensuring that:

   a. QHM, or relevant authority, have been informed diving operations are about to commence;

   b. adjacent ships have been informed and have taken all necessary precautions and safety actions including lock-out for divers;

   c. CAF vessels within 100m of the planned location have completed the applicable DSC and non-CAF vessels completed the generic form from reference A or D;

   d. in non-naval ports, relevant authorities for the berth, dock, or port have been informed and have taken all necessary precautions and safety actions;

   e. the ship is locked-out for diving in accordance with this DSC, the form is completed and signed, and the Diving Supervisor advised of any exceptions or discrepancies;

   f. appropriate signals (flag ALPHA during the day, RAM lights at night, shapes at sea) are displayed in prominent locations;

   g. a notice is placed at the brow stating 'NO GRINDING, NEEDLE GUNNING OR PNEUMATIC TOOL USE: DIVERS DOWN';

   h. the diving team has been briefed by the OOD/MSEO/Dive O on the tasks required;

   i. a warning pipe is made to the Ship's company prior to Diving Operations commencing, and every 15 minutes that Diving Operations are taking place, 'DIVING PRECAUTIONS IN EFFECT, DIVERS DOWN'; and

   j. parts one to six of the DSC are complete.

3. The OOW/OOD/DWS/SWK of an adjacent ship (i.e., not conducting diving operations but within 100m of the planned dive location) is responsible to ensure that: the Ship is locked-out for diving in accordance with the DSC; parts one to six are completed and signed as applicable; and the Diving Supervisor is advised of any exceptions or discrepancies.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

PART 1 – DIVING OPERATIONS

Date:	Time:	Location:
Diving Team:		Supervisor:
Diving Operations Purpose:		
Planned Duration:		

PART 2 – SWK/OOW

No.	Requirement	Initials
1.	CO / XO Notified	
2.	NTO Notified	
3. *	QHM/Port Authority informed	
4. *	Adjacent ships informed / Diving Safety Checklist obtained as applicable	
5. *	Appropriate diving signals/lights displayed	
6.	Anchors secured	
7.	Warning pipe made	

* applicable for ship conducting the diving operation

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

PART 3 – EQUIPMENT LOCK-OUT

4. The Duty Tech / EOOW shall ensure that the following systems have been locked and tagged for Dive Ops:

Item No.	System	Instruction	Panel/ System	Circuit/ Valve No.	Compt. No.	Lock No.	DTech/ EWK Initials
1.	Bow Thruster	Bow Thruster starter to be isolated.	PP602P	02	3G-2		
			PP601S	07	3G-1		
2.	FLES	FLES to be isolated.	L1109S	04	2C-A3		
3.	Echo Sounders	50kHz depth senor to be isolated.	AS-420-0006-0001 Secondary Nav Workstation Section 02	Echo Sounder Lockout Switch	04D		
		200kHz depth sensor to be isolated.	AS-420-0006-0001 Secondary Nav Workstation Section 02	Echo Sounder Lockout Switch	04D		
4.	Doppler Speed Log	Doppler Speed Log to be isolated.	AS-420-0006-0001 Secondary Nav Workstation Section 02	Dopple Speed Log Lockout Switch	04D		
5.	Anchors	Port Anchor Devils Claw fitted and locked	N/A	N/A	01A		
		Port Anchor Guillotine closed and locked	N/A	N/A	01A		
		Port Anchor Band Brake applied and locked	N/A	N/A	01A		
		Stbd Anchor Devils Claw fitted and locked	N/A	N/A	01A		
		Stbd Anchor Guillotine closed and locked	N/A	N/A	01A		

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Item No.	System	Instruction	Panel/ System	Circuit/ Valve No.	Compt. No.	Lock No.	DTech/ EWK Initials
		Stbd Anchor Band Brake applied and locked	N/A	N/A	01A		
6.	Main Propulsion	Port Propulsion Motor isolated	PP602P	03	3G-2		
			PP601S	02	3G-1		
		Stbd Propulsion Motor isolated	PP602P	07	3G-2		
			PP601S	06	3G-1		
7.	Steering Gears	Port Steering Gear isolated	P42P	19	2H-2		
			EP43	03	04F-A3		
		Stbd Steering Gear isolated	P41S	19	2H-1		
			EP43	04	04F-A3		
8.	Fin Stabilizers	Port Fin Stabilizer isolated	P42P	16	2H-2		
			EP4332	06	3G-2		
		Stbd Fin Stabilizer isolated	P41S	16	2H-1		
			EP4333	06	3G-1		
9.	ICCP	System switched off and isolated	P4205P	08	3E-0		
		System switched off and isolated	P4105S	28	3F-0		
10.	Fwd SW Cooling	No. 1 Fwd SW Pump isolated	MCC4204P	04	3E-0		
		No. 2 Fwd SW Pump isolated	MCC4204P	15	3E-0		
11.	Aft SW Cooling	No.1 Aft SW Pump isolated	MCC4104S	02	3F-0		
		No. 2 Aft SW Pump isolated	MCC4104S	23	3F-0		
12.	Bilge System	Bilge Pump isolated	EP43	11	04F-A3		
13.	Ballast System	Fwd Ballast Pump isolated	MCC4209P	01	3C-0		
		Aft Ballast Pump isolated	MCC4104S	01	3F-0		
14.	RODs	RO FW Generator No. 1 isolated	P4208P	01	3C-0		
		RO FW Generator No. 2 isolated	P4108S	01	3C-0		
		Ion Exchange Filter isolated	L1109S	10	3C-0		
15.	B&GW System	Discharge shut and locked	AS-528-0100	V0023	2C-A3 (4C-Z)		
		Discharge shut and locked	AS-528-0100	V0055	2C-A3 (4C-Z)		

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Item No.	System	Instruction	Panel/ System	Circuit/ Valve No.	Compt. No.	Lock No.	DTech/ EWK Initials
16.	Propulsion Shaft Bearing Cooling	Stbd Water Quality Package isolated	P4107S	02	2H-1		
		Port Water Quality Package isolated	P4207P	02	2H-2		
17.	Oily Water System	Discharge shut and locked	AS-593-0200	V0174	3F-0 (4F-Z0)		
18.	SWS System	No. 1 Firemain Pump isolated	EP43	10	04F-A3		
		No. 2 Firemain Pump isolated	P42P	18	2H-2		
		No. 3 Firemain Pump isolated	EP43	37	04F-A3		
		Firemain Charge Pump isolated	EP43	09	04F-A3		
19.	Compressed Service Air System	Air supply to No. 1 Sea Chest and FMMR Sea Bay intakes shut and locked	AS-551-0200	V0026	3C		
		Air supply to AMMR Sea Bay intakes shut and locked	AS-551-0200	V0640	3F		

Exceptions: (any exceptions to the list above is to be listed below with justification.)

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Special Precautions: (Any special precautions that need to be followed due to exceptions listed above are to be listed below.)

Duty Tech (rank, name print): Date: _____

_____

Duty Tech (signature):

_____

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

PART 4 – MACHINERY STATUS

5. Completed by the EWK/Duty Technician. Only vital systems may operate during a dive, all other systems shall be isolated. The following legend shall be used: L (locked and tagged); ST (standby in the event of power failure); and US (unserviceable).

Frame/ Space	**Location**	**Machinery**				
Fr. 32 AMR	Sea Bay No. 1 ____	#1 Ballast/ Bilge Pump ____	Firemain Charge Pump ____	ROD Suction Valve ____	#1 Firemain Pump No. 2 ____	
Fr. 32 AMR	Sea Chest No. 1 ____	SW Cooling (FWD) ____	Sea Bay No. 1 Warm Water VV ____	Sea Chest No. 1 Warm Water VV ____		
Fr. 40 FMMR	Sea Chest No. 2 ____	SW Cooling Pumps (FWD) ___	Port Quality Water Pck ____	Firemain Pump No. 2 ____	Sea Chest No. 2 Warm Water VV ____	
Fr. 50 FMMR	Sea Chest No. 3 ___	SW Cooling Pumps (FWD) ____	Port Quality Water Pck ____	Firemain Pump No. 2 ____	Sea Chest No. 3 Warm Water VV ____	
Fr. 75 AMMR	Sea Chest No. 4 ___	SW Cooling Pumps (AFT) ____	Fire Pump No. 3 ____	Stbd Quality Water Pck ____	#2 Ballast/ Bilge Pump ____	Sea Chest No. 4 Warm Water VV ____
Fr. 78 AMMR	Sea Chest No. 5 ____	SW Cooling Pumps (AFT) ____ ____	Fire Pump No. 3 ____	Stbd Quality Water Pck ____	#2 Ballast/ Bilge Pump ____	Sea Chest No. 5 Warm Water VV _____

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

PART 5 – TAG OUT COMPLETE WITH THE FOLLOWING EXCEPTIONS

6. Prior to signing and accepting the Safe to Dive Statement, the SWK/OOW and the Dive Supervisor shall sight and verify the lock box containing the keys for the locks used to lock out the equipment identified above. The SWK/OOW and Dive Supervisor shall place their respective locks on the lock box and the lock box shall be kept at the machinery control position. The SWK/OOW and Dive Supervisor are to keep their respective keys with them until the box is unlocked on completion of diving operations.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

PART 6 – SIGNATURE BLOCKS

Duty Technician (alongside)/EOOW (at sea) certifies the systems listed in Parts 3 and 4 have been locked and tagged except as stated in Part 5. / /
Name & Rank (print) Signature Date & Time

SAFE TO DIVE STATEMENT (OOW/SWK) I _____ (SWK/OOW), confirm that _____ Name & Rank (print) Vessel Name (print) is safe for diving operations to proceed. Precautions listed have been taken and will remain in effect until notified by the Diving Supervisor, in person, that diving operations are complete. / /
Name & Rank (print) Signature Date & Time

SAFE TO DIVE STATEMENT ACCEPTED (DIVING SUPERVISOR) / /
Name & Rank (print) Signature Date & Time

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

PART 7 – POST DIVE SIGNATURE BLOCKS

DIVING OPERATIONS COMPLETE (OOW/SWK and DIVING SUPERVISOR)

_____,	_____,	_____
(Print Name & Rank)	(OOW/SWK Signature)	(Date and time)
_____,	_____,	_____
(Print Name & Rank)	(Dive Supervisor)	(Date and time)

Duty Technician/EOOW (at sea) certifies the above systems in Parts 3 and 4 have been returned to normal line-up.

_____,	_____,	_____
(Print Name & Rank)	(Signature)	(Date and time)

Note: The Diving Supervisor retains this completed form until the completion of diving operations. The Diving Officer keeps a record of completed Diving Safety Checklists for one year.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

STANDARD OPERATING PROCEDURE SOP-SE01

HAZARDOUS MATERIAL/HAZARDOUS WASTE MANAGEMENT

Purpose

1. To describe the procedures used to select, procure, handle, store, use, transport and dispose of hazardous materials.

2. These procedures do not address HazMat Spill Response Procedures, which are covered in Part 3 of this SEMS Manual, Spill Response Plan.

Scope

3. This SOP applies to all ships of this class under the jurisdiction of the Commander Maritime Forces Atlantic and Commander Maritime Forces Pacific. This SOP contains detailed procedures for HazMat/HazWaste Management excluding ammunition, explosives and radioactive substances in the areas of:

a. identification;

b. procurement;

c. storage;

d. handling;

e. disposal; and

f. training.

Definitions

4. The following definitions are used within this SOP:

Term	Definition
Asbestos	Generic name for six naturally occurring minerals that have been used in commercial products for their strength, flexibility, low electrical conductivity, and resistance to heat and chemicals. Asbestos is often mixed with cement or woven into fabric or mats for fire or heat resistance. It is used in brake shoes, gaskets and pipe lagging for its heat resistance and insulation, and in the past, was used for electrical insulation in some appliances, as well as in buildings for its flame-retardant and insulating properties. The inhalation of some kinds of asbestos fibres can cause a number of serious illnesses, including cancer.
Asbestos Containing Material (ACM)	a material that has greater than or equal to 1% asbestos concentration by volume.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Bio-hazardous Infectious Waste (BIW)	medical and dental wastes including: a. human anatomical waste such as tissues, organs and body parts, but excluding teeth, hair and nails; b. animal waste such as tissues, organs, body parts, carcasses, bedding, fluid blood and blood products, but excluding teeth, hair, nails, hooves and feathers; c. microbiology laboratory waste; d. human blood and body fluid waste such as fluid blood and blood products, items saturated or dripping with blood, body fluids contaminated with blood, and body fluids removed for diagnosis during surgery, treatment or autopsy, but not including urine or faeces; and e. waste sharps such as needles, syringes, blades or laboratory glass capable of causing punctures or cuts.
Friable Materials	materials that are easily crumbled and may readily release fibres such as asbestos.
Hazardous Materials (HazMat,)	dangerous substances, dangerous goods, hazardous commodities, products containing a hazardous ingredient, such as poisons, corrosive agents, flammable substances, or any other material that can endanger human health, wellbeing, the environment, or equipment if handled improperly.
Hazardous Waste (HazWaste)	materials which are no longer suitable for their intended use and which are potentially hazardous to human health or the environment. They may be inherently hazardous in themselves, or other HazMat may have contaminated them. These wastes require special disposal techniques to eliminate or reduce the risk. Every effort shall be made to prevent HazWaste from entering other waste streams. Some products may not be regulated when they are in use, but become regulated when they are wastes, e.g., crankcase oil.
Safety Data Sheet (SDS) (formerly Material Safety Data Sheets)	a document prepared by the supplier or the importer. It usually indicates, amongst others, the physical, chemical and hazardous data and properties of the constituent(s) of a hazardous ingredient or a Transportation of Dangerous Goods Regulations (TDGR) prescribed commodity and related classification, safe handling, storage, response, transportation and first-aid information.
Polychlorinated Biphenyls (PCBs)	the scientific name for synthetic liquid chemicals that have the unique characteristics of being highly stable, non-corroding, and very fire resistant. In the past, PCBs have been used in shipboard electrical and cabling.

Workplace Hazardous Material Information System (WHMIS)	information system designed to alert the worker to hazardous substances and provide advice relative to precautionary measures needed. This is accomplished through labelling, SDS and education of personnel.

Responsibilities

5. Unit Hazardous Materials Coordinator, (UHMC):

   a. Appointed by the CO, responsible for ensuring that the procedures contained in this SOP are implemented.

6. Unit General Safety Officer (UGSO):

   a. Ensures that HazMat related hazardous occurrences are reported IAW SOP-S01;

   b. Appropriate PPE is maintained and inspected when working with HazMat IAW SOP-S02; and

   c. Coordinates WHMIS training.

7. The Commandant Canadian Forces Health Services Centre (CF H Svcs C) through Preventative Medicine (PMed) provides medical supervision over the air quality for HMC Ships, and makes recommendations concerning the indoor air quality related to potential asbestos exposure. The UGSO or Physician Assistant shall contact MARL/MARP SE for further direction with respect to air quality testing.

8. MARL/MARP SE reports all potential occupational health hazards (such as air quality) from the ships to the appropriate agency (PMed or Health Canada) for further investigation.

9. Ship's Departmental Supervisors are responsible to ensure that all HazMat are adequately labelled, stored and disposed of within their department. They shall ensure that members of their department are aware of the procedures for the disposal of HazWaste. They are also responsible for ensuring that their subordinates, and outside contractors, are aware of the presence of HazMat prior to starting a job.

10. All ship staff are responsible for their own safety, and the safety of all personnel onboard. This involves the careful use, storage and disposal of any HazMat/HazWaste onboard by following the methods outlined in this SOP. They shall also ensure that they receive the appropriate training, and that records are kept of this training.

11. DND Civilian and Contracted Workers (who use HazMat on the ship), must comply with this SOP.

Procedure

HAZMAT

Procurement

12. When procuring any type of HazMat, the UHMC shall ensure that the product is:

a. the least hazardous and most cost effective product available;

b. procured in an amount to fulfil **only short term needs** when it is not feasible to provide a safer product; and

c. procured by Base/Formation Logistics for the ships if the product is subject to Transportation of Dangerous Goods (TDG) Act and Regulations, military specifications and/or contains substances identified as a potential high risk to the environment.

13. Whenever possible, ship staff should acquire HazMat from Base Logistics. If ship staff are unable to procure HazMat through Base Logistics, it may be purchased using the ship's acquisition cards (ACCs) if the product is considered a preferred product under the authority of the Director Land Equipment Program Staff (DLEPS). However, ACC holders shall seek approval from the UHMC prior to procuring any HazMat. Any products listed as DLEPS high-risk hazard materials cannot be purchased using the acquisition cards. If designated high-risk products are required, the unit shall procure the materials through the Base Logistics stores system.

14. For any HazMat not identified at reference G as well as for first-time purchases of a particular HazMat, the ship shall ensure it has the current SDS, which can be acquired from deployable compact disk version of Hazardous Material Reference Application (HMRA).

15. When purchasing any HazMat, the Departmental Stores Person shall:

a. follow and ensure that their Department adhere to HazMat procurement, use, storage and disposal requirements of this procedure;

b. provide the crew with the SDS for the product;

c. ensure that clean-up materials required for the newly purchased product is readily available, if required, in consultation with the NTO;

d. provide product information and its storage location to the UHMC to maintain the Ship's HazMat Inventory Log, using Annex SOP-SE01B, IAW HMRA requirements;

e. determine how the product will be used or applied, and PPE required for its use; and

f. inform the crew about their obligation to notify the Departmental Stores Person regarding HazMat purchased with ACC cards as well as their obligation to provide and maintain the respective product SDS.

16. All products that are regulated by the TDG Act and received for supply stock shall also contain appropriate TDG Class Shipping Labels on the outer shipping container before being accepted.

17. An SDS shall accompany all hazardous products received on board. When a HazMat product is received, it shall be immediately brought on board and stored in its proper location. If a product cannot be immediately brought on board and must remain on the jetty, it must be inspected daily.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Storage

18. Each Departmental Stores Person shall ensure that all HazMat is stored with compatible materials IAW the Compatibility Chart provided at reference C and that:

a. copies of the Compatibility Chart are affixed in clearly noticeable locations and on all storage cabinets where HazMat are stored/used;

b. a current SDS, not older than three years , must be readily available on the ship, and in a known location within a plastic envelope or SDS binder; and

c. every storage cabinet and space containing HazMat shall have appropriate WHMIS labels identifying materials

19. In addition, the UHMC shall check the SDSs throughout the ship monthly to ensure completeness and currency.

20. All HazWaste containers stored shall be checked daily and logged in the Night Rounds Book by the Duty Supply Technician. Compartments containing HazMat shall be inspected monthly by the Departmental Stores Person. Stored HazMat/HazWaste containers shall be properly labelled, and placed in spill containment trays if required. Rounds shall include a thorough check for:

a. proper labelling, content and compatibility. Storage rooms are labelled with TDG placards. WHMIS labels for workplaces and workshops;

b. signs of physical damage to the drums and lids such as holes or dents;

c. signs of corrosion, water pooling on the lids and/or in the containment trays and label deterioration. Particular attention shall be paid to the condition of the lids and the seam along the bottom of the drums as this is where corrosion is usually the worst;

d. the securing arrangements of the drums (e.g., Are the drums properly secured? Are all lids secured? Are cargo straps and eye-pads in good condition?); and

e. that empty drums are secure and not being used to store other material.

Handling

21. All Senior Heads of Departments (SHODs) and Heads of Departments (HODs) are to ensure that personnel are fully aware of the hazards involved with the material(s) used as well as the safe storage, handling, disposal and emergency instructions as given in the SDS in the form of product specific training. Personnel not familiar with the contents of the SDS shall seek clarification from their supervisor and shall not use the product until this is provided.

22. Hazardous occurrences that result from exposure to HazMat shall be raised to the UGSO's attention and reported IAW SOP-S01 of this manual.

23. All departments onboard ships use HazMat and thus the potential for discharge into the environment is high. Many of the actions taken to ensure individual safety also contribute to the

protection of the environment. Thus, all personnel who handle HazMat shall take the following precautions:

a. ensure that each container is clearly labelled with all pertinent information IAW WHMIS requirements, and is not subject to extreme temperatures;

b. ensure that each container used is in good condition with proper lids or caps, and the HazMat is compatible with the other materials stored;

c. ensure that all pans and pails used to drain HazMat are completely emptied into an appropriate container and cleaned before storage;

d. regularly inspect all bulk containers for leaking valves, seeping bungs or caps. Drip pans shall be utilised to catch small drips or spills;

e. ensure proper personnel safety precautions are taken; and

f. get approval from the UHMC prior to disposing of any HazWaste.

24. The UHMC shall ensure that no HazMat/HazWaste have been left on the jetty prior to sailing unless Base Logistics has been notified, and the HazMat/HazWaste is properly packaged and labelled.

25. All HazMat received onboard shall be recorded and this record shall be maintained until the HazMat/HazWaste is returned ashore for disposal. In addition, the UHMC shall maintain a complete and accurate inventory, in electronic and paper copy, of all HazMat onboard in each departmental space. The format of the inventory shall be IAW Annex SOP-SE01B.

26. The HazMat inventory and all SDS shall be kept in the ship's HazMat Inventory, which shall be divided into two parts:

a. Part 1 - a dated inventory of all HazMat by department and by departmental spaces, using the inventory report form attached at Annex SOP-SE01B; and

b. Part 2 - current SDS in alphabetical order for all HazMat in the inventory.

Note: The ship's HazMat Inventory shall be accessible at all times to the crew and for review. The Senior Watchkeeper (SWK) shall know where the HazMat Inventory is located, its content and how to retrieve the information. In addition, copies of the HazMat inventory shall be forwarded annually to MARL/MARP SE by 15 October. This inventory is reported through the chain of command using the HMRA. A deployable HMRA update is available to ships upon request.

Disposal

27. All HazWaste shall be disposed of IAW the following instructions:

a. **Homeport**: HazWaste is to be disposed of only through Base Logistics and IAW instructions at Annex SOP-SE01C;

b. **Away from Homeport:** HazWaste is not to be disposed of in a foreign port unless required due to safety of ship, personnel or environment. If required, HazWaste shall be

disposed based on more stringent of Canadian and local regulations. To dispose of HazWaste, the ship shall submit a LOGREQ to arrange the removal and disposal of HazWaste with a licensed waste hauler. Prior to disposal, all HazWaste generated by the ship must be recorded in the registry at Annex SOP-SE01C. Any disposal of HazWaste away from homeport shall be IAW local regulations, be approved by the CO, and reported to Base Logistics as soon as the ship returns to homeport; and

c. **At Sea:** HazMat disposal at sea is prohibited except:

i. when national security is threatened or when operating under the National Emergency Act; and

ii. for the purpose of saving life or preventing the immediate loss of the ship.

Note: Should it be necessary to dump HazWaste, a report shall be made to MARL/MARP SE IAW Part 3, Annex Plan-P01B.

28. Prior to disposal, all HazWaste generated by the ship must be recorded in the registry at Annex SOP-SE01B.

Training

29. Information on HazMat training can be obtained through MARL/MARP SE. Courses available include HazMat Team Training, TDG and ACC Holder Training. Computer based WHMIS training is available on the Defence Learning Network (DLN). The Ship's Safety and Environmental Committee (SSEC) shall review HazMat training needs and the adequacy of HazMat training annually and modify training accordingly. Current training includes:

a. all personnel receive:

i. DLN WHMIS training;

ii. product specific briefing before they carry out any job that involves controlled products; and

iii. product specific briefing when new/modified controlled products are introduced and/or procedures change;

b. supervisors are to provide their subordinates with product/workplace specific or second level WHMIS training as indicated above;

c. all persons involved with the shipping and receiving of dangerous goods shall complete TDG training; and

d. a record shall be kept of all training received as courses are completed using the military and civilian HazMat training record at Annex SOP-SE01C.

30. When on extended deployments, each ship should have an appropriately trained Supply Technician onboard, who has received current TDG training. The Supply Technician is responsible for

transport of dangerous goods while away from homeport, including confirming and signing the appropriate documentation.

BIOHAZARDOUS INFECTIOUS WASTE (BIW)

Storage

31. BIW is stored in accordance with the following direction:

a. BIW (predominantly waste sharps) shall be stored in a container with the "Biomedical Waste/Dechats Biomedicaux" label affixed to it for subsequent disposal. Do not recap, clip, cut, bend or otherwise mutilate needles or syringes to avoid causing accidental puncture wound. The container shall be capable of withstanding the weight of the biomedical waste without tearing, cracking or breaking;

b. the storage area shall be clearly marked as "Biomedical waste storage" and must be secure to prevent unauthorized entry;

c. the WHMIS biohazard symbol shall be prominently displayed on all containers designated for BIW;

d. no materials other than waste are to be placed in the same storage areas as BIW; and

e. whenever possible, BIW should be refrigerated at 4 degrees Celsius until final disposal.

Disposal

32. The overboard discharge of BIW is prohibited except for the purpose of saving life. All dumping or discharge of BIW shall be the subject of a pollution incident message (the Spill Message Format found in Part 3, Annex Plan-P01B, may be used).

33. In homeport, all BIW on board the ship must be transported IAW TDG to CF H Svcs C for proper disposal.

34. In foreign port, where practicable, BIW should be retained onboard for disposal upon return to Canada. If it becomes necessary to dispose of BIW, it must be disposed of at an accredited medical facility. Such disposal is not authorised except where appropriate local regulations apply and are in keeping with the intent of Canadian environmental legislation, guidelines and DND policy.

35. UREA

36. UREA is the primary component to reduce air emissions generated by the ship. As this is a potential hazardous substance the following operational controls are provide to limit personal exposre and spills.

37. Authorized storage capacity of UREA tanks while in harbour is 95% of its total capacity. This allows for the safe expansion and contraction of the liquid due to changes in climatic conditions.

38. UREA may be transferred into ship tanks via portable pump from barrels on the jetty or Flight deck RAS point. When filling UREA the storage tanks, the following precautions are observed:

a. spill kit and fire extinguisher (Class B or C minimum) at fuelling point ready for use;

b. all personnel shall wear personal protective equipment (PPE)(e.g. gloves and goggles);

c. identify all potential upper deck spill points (e.g. tank vents);

d. manually dip oil tanks being filled;

e. cover all nearby drains with spill pads or appropriate cover;

f. transport cans with lid and vent caps fitted to prevent spills;

g. use drip trays;

h. tanks shall not be filled past 95% to allow for expansion;

i. if there is a sign of leakage or spillage, stop pumping immediately and follow procedures found in Part 3 Spill Response Plan, and

j. when finished pumping, place contaminated spill pads in the plastic bags found in spill kit and treat same as HazWaste. Return all unsoiled spill pads to spill kit and restock kit as required.

PCBs

39. In the past, PCBs were found in a variety of ships tactical, electronic and electrical systems such as electrical cabling and sonar equipment. As this equipment continues to be updated and replaced, the likelihood it contains PCB diminishes. Considering, PCB components can be found in the supply system. As this material is relatively stable unless it is leaking, spilled or subjected to heat and/or fire, it poses a significant risk to the crew during emergency response situations. The ship's HazMat Spill Cleanup Team is trained and possesses the resources to contain and clean up these types of incidents. Procedures for HazMat spill response are provided in Part 3 of this manual. If an incident does occur on a vessel that requires decontamination beyond the capabilities of the SRT, additional trained personnel and resources will be secured to complete the cleanup.

40. Supervisors shall ensure that personnel occupationally exposed to PCBs are instructed in the job hazards involved with PCBs, proper handling, and clean-up methods, and proper use of protective clothing and equipment.

41. In the event that the ship generates PCB waste, ship staff shall notify MARL/MARP SE. The waste shall be packaged, labeled and retained for disposal in homeport through Base/Formation Logistics.

ASBESTOS

42. Reference F lists materials that have been approved for use instead of asbestos products. In addition, calcium oxide-based products are suitable and acceptable. Proposals for the use of other substitutes for asbestos shall be submitted through the UGSO to the appropriate Command Technical Authority for evaluation.

43. Threshold Limit Values (TLV) for asbestos have been established by the health authorities and are published in reference D. To ensure that these TLVs are not exceeded, air sampling shall be conducted by the appropriate agency (PMed). A report produced will outline the results indicating the percentage of asbestos by weight or volume and the type of asbestos present. A copy of the report will be sent to MARL/MARP SE and the CO for action as necessary.

44. If any asbestos material or material suspected to be asbestos is accidentally or unintentionally released, the supervisor shall order work to cease, immediately evacuate the area, and report the incident to the UGSO, who informs the CO, PMed and MARL/MARP SE.

45. Personnel engaged in the handling of materials known or suspected of containing asbestos fibres, or where it is not practical to control asbestos dust, must use appropriate PPE and equipment IAW Annex SOP-SE01D and SOP-S02 of this manual, to reduce/prevent the possibility of fibre inhalation.

46. Appropriate hot, warm and decontamination for changing into and out of protective work clothing and for clean storage of street clothes shall be provided for the use of personnel who work with asbestos. Protective clothing that has been exposed to asbestos shall not be taken away from the work place by the employee. Laundering of such protective clothing shall be arranged in a manner that does not expose any other person to the asbestos hazard.

47. All employees who have been exposed to an asbestos process, regardless of their duties or method of protection, shall be medically examined. Detailed records must be retained of all personnel whose health has been adversely affected through exposure to asbestos.

48. Personnel involved in an asbestos process shall be routinely informed by their management of all known asbestos hazards, and of the need to develop safe and healthy work and personal habits as part of an Asbestos Education Program. Advice and information concerning asbestos hazards may be obtained from the UGSO.

49. Further instructions for the handling and disposal of asbestos are provided at Annex SOP-SE01D.

BENZENE

50. Benzene is used commercially as a solvent. It is not normally used onboard ship and should be avoided whenever possible. Substitutes can be used in almost all activities where benzene is used. However, there may be a few operations where the use of benzene may be unavoidable. In these instances, meticulous care must be taken to prevent the escape of benzene vapour to reduce exposure of personnel to the lowest practicable level. If benzene is used, the workplace air should be tested periodically to ensure that precautions are adequate.

51. Personnel should be provided a product specific briefing of the hazards of exposure to benzene and advised of measures that should be taken to minimize such exposure. Operations and areas where benzene is used should be clearly identified and appropriate warnings displayed. Further direction is provided at reference D.

BERYLLIUM

52. Beryllium can be found in inertial navigation gyros, radar transmitter lubricant, electrical contacts, lasers and non-sparking/non-magnetic tools. Precautions to take when working with these items are detailed in reference D.

53. There is little danger from normal handling of materials containing beryllium. However, under some circumstances, beryllium salts, dust, mist, vapour or fumes may be hazardous to health if inhaled or comes in contact with the skin and/or the eyes.

54. General precautions to take when working with equipment suspected of containing beryllium include:

a. Drilling or machining beryllium metal and alloys can produce toxic dust or fume and, subsequently, protective measures outlined in reference D must be adhered to;

b. electronic and other devices suspected of containing beryllium oxide must not be crushed, ground, drilled or cut without NDHQ Life Cycle Materiel Manager (LCMM) approval, and stringent dust control measures must be adopted;

c. beryllium materials must not be acid etched or exposed to other;

d. corrosive chemicals as it will produce soluble beryllium salts, which are extremely toxic if inhaled and will cause dermatitis or conjunctivitis if contact is made with the skin and/or the eyes;

e. where practicable, labels should be employed to identify beryllium materials and equipment containing beryllium components. The nature and extent of such marking will vary with the type of situation concerned. The aim is to provide a practical warning of the presence of hazardous material; and

f. beryllium materials or spare components containing beryllium must be stored in well marked containers to avoid being mistaken for other materials. Small quantities of beryllium may be disposed of by burial in a plastic bag along with other refuse. Large quantities must be stored in a controlled access area, and NDHQ must be consulted for disposal action.

55. All persons working with beryllium in a hazardous form must be trained (OJT) to work in a hygienic manner, and must ensure appropriate PPE and equipment is used. Details are provided in reference D.

CARBON FIBRE

56. Carbon fibre composite material used in aircraft fuselage and parts. It consists of carbon fibres bonded with resins, epoxies and phenols to form an inert and harmless compound. Smoke and fumes from burning composite material are toxic and can cause respiratory illness if inhaled. As well, these fibres can cause irritation in the eyes, on the skin and in the respiratory tract and lungs. Fine carbon fibres have sharp ends and edges and can penetrate the skin. Medical assistance may be required for removal of splinters embedded in the skin.

CADMIUM

57. Cadmium connectors and fasteners are located throughout the ship and are typically considered safe, although when exposed to salt water or other corrosive environments, they will oxidize and turn white powdery in appearance. While these cadmium applications are typically in enclosures or away from general access, there is a concern for maintainers that any resultant disturbance of this cadmium

'bloom' may create airborne cadmium dust, which has the potential to be hazardous to health. Appropriate control measures, such as engineering and administrative controls and/or the use of personal protective equipment (PPE) (i.e. gloves, coveralls and respirators), must be implemented to reduce and control exposure to cadmium dust.

Safety Mitigations

58. Based on a workplace hazard assessment of cadmium, the following mitigations are to be applied when working on cadmium components:

a. Avoid generating dust when working with corroded cadmium equipment and material; i.e. grinding on parts/materials containing cadmium;

b. For regular maintenance procedures PPE shall include impermeable gloves which can be reused until visible wear is apparent or five (5) working days have elapsed, whichever comes first;

c. If dust generating activity is unavoidable or where the work has potential to generate cadmium dust, which can accumulate onto clothing, disposable coveralls and gloves shall be used. Contaminated clothing shall remain at the worksite and safely removed in plastic bags or other appropriate sealed container to prevent dispersal during transit for laundering and disposed of as hazardous waste;

d. A NIOSH approved N95 half-face air purifying respirator, with eye protection is to be worn, to prevent any ingestion or inhalation of the dust; and

e. Any dust generated or visible bloom should be captured via a high efficiency particulate air (HEPA) filter equipped vacuum and the equipment must be wiped down with a damp cloth to remove as much of the cadmium dust as possible in and around the work area.

59. The location of cadmium containing components can be found by consulting the Ships' Hazardous Materials Portfolio (SHMP). It shall be reviewed for the presence of any hazardous material, including cadmium, when developing or implementing Work Instructions; particularly where hot work (grinding, burning, chipping and welding) is involved.

LEADED COATINGS

60. Personnel who are likely to experience exposure to leaded paint/dusts shall receive training and instruction in this SOP. UGSO's are to incorporate this hazard into their indoctrination brief to new personnel. Emphasis must be placed on educating women who may become pregnant.

61. Further instructions for the use and disposal of coating containing lead are provided at SOP-S12 Surface Preparation.

Procedure Performance Criteria and Records

HazMat Inventory Logs (completed Annex SOP-SE01B)
Hazardous Waste Registry (complete SOP-SE01B1)
Completed Department Inspection Reports
SDS Binders

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Training Records (completed (Annex SOP-SE01D)
Medical surveillance
Air monitoring results
Asbestos inventory

Attachments

Annex SOP-SE01A - Hazardous Material/Hazardous Waste Management References
Annex SOP-SE01B - Hazardous Material Inventory Form
Annex SOP-SE01C - Hazardous Waste Disposal Instructions
Annex SOP-SE01D - Hazardous Material Training Qualification Record
Annex SOP-SE01E - Asbestos Handling Instructions

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-SE01A

HAZARDOUS MATERIAL/HAZARDOUS WASTE MANAGEMENT

REFERENCES

A. MARPOL 73/78 Annex II, 1997
B. DAOD 4003-1 Hazardous Materials Management
C. A-GG-040-004/AG-001, Hazardous Materials Safety and Management Manual
D. C-02-040-009/AG-001, General Safety Program, Vol 2, Chapters 13, 21, and 37
E. C-98-007-002/TP-001, Maintenance Asbestos Cement Products
F. CFTO D-03-011/SG-000, Restrictions on the use of Asbestos Containing Materials for Shipboard Applications
G. http://materiel.mil.ca/en/land-policies-procedures/hazardous-materials.page
H. MARCORD G-18, Shipboard Environmental Management
I. Ship Standing Orders (SSOs)
J. Canadian Forces Supply Manual, Chapter 18
K. Formation SEMS Manual
L. Hazardous Substances Directive, Treasury Board Directive, April 19 1999
M. C-02-040-009/AG-001, Chapter 37 - Workplace Safety Signs and Symbols Safety Standard

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-SE01B

HAZARDOUS MATERIAL INVENTORY FORM

Ship:		Inventory OPI:	
Department:		OPI Phone #:	

Storage Space	Trade Name (exact)	Product Code (Part #)	Manufacturer	Product Description	MSDS #	HMRA #	Quantity

Completed by: _____ Date: _____ Signature: _____
(Name, please print)

Notes:
1. When providing detailed information on a product it is IMPERATIVE that CORRECT and DETAILED information be supplied. Fill in columns for EACH entry.
2. Ensure the Storage Space remains consistent for that area. Clearly note a change in Storage Space by skipping a line.
3. This form is to be reproduced locally.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-SE01C

HAZARDOUS WASTE DISPOSAL INSTRUCTIONS

1. In homeport, ships are not registered as waste generators, and under no circumstances shall any member of the crew arrange with any agency or contractor other than Base/Formation Logistics for the disposal of HazWaste.

   a. **Liquids**: HazWaste is wiped up with rags and disposed of in proper flip top HazMat drums;

   b. **Solid and Semi-solids**: Solid or semi-solid HazWaste is to be placed into double plastic bags and sealed and labelled;

   c. **Oily rags and filters**: Oily rags or filters are packaged into double plastic bags, sealed and labelled;

   d. **Fluorescent Tubes**: Fluorescent tubes are packaged in an original container, labelled and returned to N41 for disposal; and

   e. **Aerosol Cans**: All aerosol cans are to be placed into double bags, sealed and labelled.

2. When filling double plastic bags, only one type of waste is to be placed into each bag, and care taken not to overfill the bag. If the original container is used to package the waste, then the original label shall be removed, erased or destroyed and a new label affixed to the container.

3. HazWaste is labelled for disposal IAW reference as follows:

   a. In MARLANT, one of the following HazWaste identification labels must be completed and affixed to the disposal container:

      i. **Inert** (green label);

      ii. **Slight Hazard** (yellow label), includes distillate, engine oil and oily rags;

      iii. **High Hazard** (orange label), includes paint, thinners and solvents; or

      iv. **Severe Hazard** (red label) includes caustics, corrosives and gasoline; and

   b. In MARPAC, a Transportation of Dangerous Goods (TDG) Act and Regulations Class shipping label must be completed and affixed to the disposal container. The BLog website provides guidance for classifying waste and completing this label correctly along with the BLog Internal Hazardous Waste Pick-up Request form.

4. Whichever HazWaste identification label is used, it shall contain the following information:

   a. the original name of the product prefixed with the word "WASTE";

   b. HMCS <ship name>;

c. the date of packaging; and

d. the name and phone number of the person packaging the material.

5. Due to the inherent risk to the environment and personnel, all batteries onboard the ship will be disposed of as follows:

a. Dry Cells: Used dry cell batteries are to have electrical tape placed over both terminals to prevent shorts and placed in the battery box in the motor room. Ship personnel shall notify BLog/FLog for disposal. They are not to be disposed of with regular garbage; and

b. Lead Acid: Ship personnel shall notify BLog/FLog prior to preparing lead acid batteries for pick-up and disposal.

6. A waste registry IAW the Table SE01C1 must be retained to track all the waste generated by the ship. The registry should include date, type of waste, approximate quantity and destination of wastes (e.g., BLog/FLog, local contractor facility in foreign ports)

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Table SE01C1: Hazardous Waste Registry

Date	Type Of HazWaste (e.g. aerosols, waste oil, , Fuel, etc)	Volume or Amount of HazWaste Sent for Disposal (e.g. 2 drums, 205 litres , 15 Kg or 200 lbs)		Comments or Location (Indicate other than BLog/FLog)	Initials
		Number	Unit		

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-SE01D

HAZARDOUS MATERIAL TRAINING QUALIFICATION RECORD

IDENTIFICATION			
Name:			MOC-GPM:
SN:			
QUALIFICATIONS			
Training	Administrator's Stamp/Initial	Date: DD/MM/YY	Training Location
WHMIS BASIC			
WHMIS Supervisors			
Specific Workplace Hazardous Material Training (to include following)			
Product Identification – Controls – Personal Protective Equipment (PPE) – Labels – Understanding MSDS – First Aid – Emergency Response – Workplace Procedures – Storage & Disposal - Quiz			
Material Specific Training to be recorded on Chart (see reverse)			
DISTRIBUTION			
Unit WHMIS Training File and Unit Employment Record (UER)			
ON POSTING/RELEASE			
Require			
Retention for three (3) years on Unit WHMIS training file. Member receives copy. Place copy on MIL – UER.			
Through complementary Federal/Provincial Legislation the Workplace Hazardous Material Information System (WHMIS) has become the Law in Canada. In accordance with the legislation, worker education assures that all personnel are trained to operate safely within their respective working environments. This document records hazardous material training that the subject named has attended.			

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Hazardous Material Training Record

Identification					
Name: _____ (Rank) (Last Name) (Initial)			SN/PRI: _____		
Product Name	**Manufacturer**	**Supervisor's Signature**	**Member's Initials**	**Training Location**	**Training Date**

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-SE01E

ASBESTOS HANDLING INSTRUCTIONS

REFERENCES

A. A-GG-040-004/AG-001 Hazardous Materials Safety and Management Manual
B. CFTO D-03-011/SG-000, Restrictions on the use of Asbestos Containing Materials for Shipboard Applications

Personal Protective Equipment (PPE)

1. Approved PPE to be used when working with asbestos include the following:

   a. Disposable Coveralls - Full-bodied, one-piece, poly-laminated type with permanently attached hood and having elasticized tight fitting sleeves and leg cuffs similar to Safety Supply Canada catalogue item 080D078 or equivalent. The wrist and ankle junctions of the coveralls may be taped if necessary to prevent contamination of skin and underclothing without restricting physical movement;

   b. Boot Covers - Boot covers are not practical as they are slippery and could be hazardous. Construction leather or laceless rubber boots are recommended;

   c. Rubber Gloves - Eleven inch disposable; and

   d. Respiratory Equipment - Suitable for the degree of respiratory protection required in the particular work area and as a minimum, equivalent to Mine Safety Applications (MSA) Comfo respirator fitted with a MSA type H filter canister. Single use disposable masks shall not be used.

Equipment

2. The following specific equipment should be used when working with asbestos:

   a. HEPA Vacuum Cleaners - Shall have filtered exhaust systems equal to Nifisk Model 81 Vacuum and shall contain High Efficiency Particulate Aerosol (HEPA) filters;

   b. Asbestos waste bags/containers - Two separate containers or which at least one shall consist of 6 mil (0.15 mm) minimum thickness sealable polyethylene bag. Second container may be a second 6 mil (0.15 mm) minimum thickness polyethylene bag or a rigid sealable container such as a metal or fiber drum or glove bag used in insulation removal. Second container shall be such to prevent any perforating rips and tears in the primary container during filling, transport and disposal. All bags shall be clearly labeled with yellow/black labels which state "CAUTION CONTAINS ASBESTOS FIBERS";

   c. Polyethylene Sheets - Polyethylene shall be at least 0.15 mm minimum thickness, in roll size to minimize joints;

   d. Tape - Reinforce type duct tape suitable for sealing polyethylene under both wet/dry conditions;

Note: Polyethylene must be lapped and mechanically secured as amended water causes the tape to fail.

e. Sprayer for Amended Water - Any garden reservoir type sprayer or airless spray suitable for producing a mist of fine spray of water will serve the purpose. In some cases where previously painted or encapsulated materials are to be saturated prior to removal, a hypodermic type nozzle that can be inserted through the outer coating may be required; and

f. Glove Bags - Poly-vinyl Chloride Bags with attached zipper and integral gloves. Zipper and shoulder straps attach bag on the pipe to form a sealed enclosure. Select appropriate style for use. Bags are available for horizontal and vertical pipes, tees, and valves. Sizes vary from less than 150 mm; 150 mm - 250 mm; and 250 mm - 350 mm.

Signage

3. Signs shall be displayed in all work areas where access to a sealed area is possible. Such signs shall read:

CAUTION
ASBESTOS HAZARD AREA
UNAUTHORIZED ENTRY PROHIBITED
WEAR PROTECTIVE EQUIPMENT

4. All containers used for disposal of asbestos shall be labeled:

CAUTION
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
BREATHING ASBESTOS MAY CAUSE SERIOUS BODILY HARM

Asbestos Handling and Disposal

5. The general guidelines for the handling and disposal of asbestos are outlined as follows:

a. <u>where possible, asbestos material must be handled and removed in a water saturated condition. Surfactant and wetting agents should be used with the water to assist in saturation or the asbestos materials;</u>

b. dry sweeping must not be used to clean-up waste materials. Compressed air must never be used to clean any surfaces or clothing;

c. exhaust air from ventilation units must be passed through a HEPA filter and discharged outdoors;

d. air is to be continuously misted with water in the vicinity of workers engaged in the cleaning and brushing of surfaces or the clean-up of waste material containing asbestos;

e. all work site surfaces and equipment exposed to asbestos contamination must be decontaminated by damp wiping and vacuum cleaning with a HEPA vacuum;

f. an effective sealant must be applied where an asbestos surface cannot be removed;

g. water streams and sealants or encapsulate applications must be controlled to prevent excessive asbestos fiber generation. Use of airless or controlled low pressure application systems is recommended;

h. a permanent enclosure of materials containing asbestos must have airtight seams. Where practicable electrical, plumbing and ventilation services should not be located within a permanent asbestos enclosure area;

i. warning signs denoting the presence of asbestos materials within a permanent enclosure shall be placed at all access points into the enclosed area. The signs shall identify the danger and the appropriate precautions to be used while working in the area;

j. during asbestos material repair work, disrupt the least possible amount of material containing asbestos. Ensure that surfaces, which will remain exposed after completion of the repair work, are to be wiped, vacuumed and treated with an effective sealant; and

k. friable materials must be wetted and double bagged in 6 mil plastic bags, tied and transported to BLog/FLog for proper disposal unless otherwise disposed of through a Construction Engineering or Defence Construction Canada (DCC) contract.

Classification of Work

6. The risk associated with working with asbestos is related to the duration and level of potential exposure. There are three levels of risk low (Type 1), medium (Type 2), or high hazard (Type 3). The assigned classification determines what provisions come into effect, such as notification requirements, work procedures, medical surveillance and record keeping. In evaluating the hazard, two considerations are of overriding concern; AIRBORNE CONCENTRATIONS of asbestos that will be generated by the work, and the DURATION of exposure. Factors that affect the level of airborne asbestos include the nature of the asbestos material, how the work is performed and the availability of controls to limit exposure. Ship staff should not conduct shipboard maintenance that would require Type 2 and 3 precautions. Only appropriately trained FMF staff or external contractors shall conduct these maintenance procedures. Further description of the three types of asbestos removal are provide below:

a. Type 1: This includes the installation or removal of non-friable asbestos in which the asbestos fibre is locked in a binder such as plaster, cement, vinyl or asphalt which holds the material together. Type 1 work will generally not involve significant breakage, abrasion or similar practices which might be expected to release fibres. Also included in Type 1 is cleaning up of minor amounts of asbestos-containing debris in which the clean up of the material is carried out in accord with the procedures outlined below;

b. Type 2: This includes work with friable asbestos that is of short duration in situations which create low levels of airborne asbestos and work with non-friable asbestos which could release small amounts of asbestos fibres. Type 2 work is carried out by either FMF staff or external contractors. Examples of Type 2 work include:

i. enclosure of friable asbestos;

ii. application of tape or sealant to asbestos-containing pipe insulation;

iii. removal or cleanup of small quantities of friable asbestos;

iv. repair or replacement of up to 3 square meters of vinyl asbestos tiles;

v. minor glove bag removal of friable or non-friable asbestos thermal insulation; and

vi. collection of samples of materials for asbestos determination; and

c. Type 3: This includes possible exposure to friable asbestos over long periods of time or work that generates high levels of asbestos. Included in Type 3 work are removal projects where relatively large amounts of asbestos are removed from a space including removal of friable asbestos from structural material, cleaning or removal of heating or air handling equipment that has been insulated with asbestos. Type 3 work is normally carried out by external contractors.

Instructions for Type 1 Activities

7. The precautions and procedures must be followed when working with Type 1 (Low Hazard) are:

Individual

a. wear disposable coveralls;

b. wash face and hands immediately upon leaving the work area;

c. although not required, the worker may wear a respirator. A non-powered air purifying respirator approved for asbestos fibres is acceptable;

Work Site Preparation

d. wear separate the work areas from the rest of the workplace by the use of warning barricade tape. In addition, signs are to be placed around the work area warning others of an asbestos procedure in progress. Entry into the work area is to be restricted to authorized personnel only;

e. remove all visible dust on work surfaces with a damp cloth or vacuum cleaner fitted with a HEPA filter;

f. where necessary, use plastic drop sheets, or similar materials to prevent the spread of asbestos dust to other work areas;

g. when hand powered tools are used to cut, shape or drill manufactured products containing asbestos, the products should be wetted whenever possible to minimize release of airborne asbestos fibers;

h. in areas where open grating is used on decks, plywood shall be placed over the grates, underneath a reinforced polyethylene drop sheet. This is to avoid tearing the drop sheet and subsequent asbestos contamination of the area below;

While conducting the work and immediately after the work is completed

i. clean up dust and waste by vacuuming and discharging the air through a HEPA filter, or damp mopping;

j. clean re-usable drop sheets with a damp cloth or vacuum cleaner fitted with a HEPA filter;

k. wet non-reusable drop sheets, fold to contain the dust, and dispose of as asbestos waste;

Disposal

l. compressed air is NOT to be used to clean up or remove asbestos dust from surfaces or from clothing;

m. before leaving the work area the worker shall remove the disposable coveralls and dispose of them as asbestos waste; and

n. all asbestos waste is to be inserted into a 6 mil polyethylene bag labeled asbestos. With a HEPA vacuum remove as much air as possible from the bag prior to sealing it. Repeat this procedure and double-bag into a second 6 mil polyethylene bag also labeled asbestos. This double-bagged waste shall then be placed in yellow dumpsters labeled "ASBESTOS" located as close as possible to the work area.

Gasket Repair and Replacement

8. Gasket repair is considered a Type 1 activity. The following procedures shall be adhered to by those employees who handle gaskets and packings containing asbestos:

a. when issued, tool crib personnel will ensure the material is labeled as containing asbestos and is placed in impermeable bags/ containers;

b. all asbestos gaskets/packing will be stored in impermeable labeled containers when not in use;

c. any visible accumulations of dust or debris are to be cleaned by wetting down with amended water or other suitable wetting agent and wiped or vacuumed. All garbage/debris shall be placed in an asbestos labeled scrap bag or container;

d. uncut sheet gasket is exempt; and

e. all suspect stocks of packings and gaskets shall be positively identified through lab analysis.

9. The following procedures shall be adhered to by those employees who cut, punch, or install asbestos gaskets and packings:

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

a. asbestos gaskets/packings will be thoroughly wetted on all sides with amended water or other suitable wetting agent prior to cutting, installing, or punching operations;

b. all visible debris and dust from this operation will be wiped with damp rags. Rags and debris will be deposited in approved asbestos garbage bags;

c. when drop cloths/sheets are practical, they should be used to aid in control of asbestos gasket debris; and

d. although respirators are not necessary for this operation, an employee may wear it as an extra precaution.

Records

Training Records (completed (SE1C)
Medical surveillance
Air monitoring results
Hazardous Waste Registry (complete SE1B1)
Asbestos inventory

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

STANDARD OPERATING PROCEDURE SOP-E01

FUELLING

Purpose

1. To describe the procedures in use to ensure that fuelling evolutions comply with all regulatory and policy requirements, and are conducted in a manner that will minimize hazards associated with fuelling.

2. These procedures do not address the response to fuel spills, which is covered in Part 3 of this SEMS Manual.

Scope

3. This SOP applies to all ships of this class under the jurisdiction of the Commander Maritime Forces Atlantic and Commander Maritime Forces Pacific. This SOP deals with the following fuelling evolutions:

a. fuelling alongside/at anchor;

b. replenishment at sea (RAS);

c. tactical fuelling (TACRAS);

d. transferring fuel;

e. de-fuelling;

f. helicopter fuelling; and

g. small craft and miscellaneous fuelling operations.

Definitions

4. The following definition(s) is/are used within this SOP:

Term	Definition
Aviation fuel	Aviation fuel specified by Canadian General Standards Board (CGSB) standard CGSB 3.24-2018 or North Atlantic Treaty Organization (NATO) Code F-44.
Naval Distillate	High flash point type of marine fuel specified by the CGSB 3.11-2017 or NATO Code F-75/-76.
Gasoline	Low flash point unleaded automotive fuel specified by the CGSB 3-5-99

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Responsibilities

5. NTO:

   a. NTO is responsible for implementation of this SOP.

6. NTO:

   a. NTO is responsible for implementation of procedures for fuelling small boats.

7. FlyCO

   a. FlyCO is responsible for deciding when it is safe after an incident involving a helicopter to take action to mitigate any resulting environmental impact.

Procedure

PERSONNEL

8. The following personnel are required for fuelling vessels of the Class:

   a. NTO;

   b. Fuelling IC/Event Recorder – Senior Mechanical Propulsion Manager, or a person that holds a legacy CERT 3 or personnel that have completed USQ-PO2 Mechanical Supervisors course;

   c. UDER;

   d. Station Supervisor (RAS/TACRAS) - P2/MS Bos'n 6a Qualified;

   e. Dump IC/Upperdeck Communicator - No less than Engineering Watchkeeper (for fuelling/de-fuelling alongside) (MITE XXXXXX)

   f. Dump Position - OS-LS Engineering Roundsman qualified (MITE XXXXXX);

   g. Upper Deck Sentries – minimum two (2) NETP qualified personnel (alongside only);

   h. Tank Sentries - at a minimum posted at every tank where fuel tank sensors are suspect or defective - OS-LS Engineering Roundsman qualified (MITE XXXXXX);

   i. Valve Sentries - for every valve that is suspect or cannot operate remotely from the IPMS - OS-LS Engineering Roundsman qualified (MITE XXXXXX);

   j. Aviation Specialist Technician – LS Engineering Watchkeeper with the Helo Hauldown System and Shipboard JP5 Maintainer Qualification (only for fuelling F-44); and

9. Specific assignments are detailed in the Fuelling Party lists that are attached as an appendix to the Fuelling Order relevant to the planned evolution.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

DUTIES OF FUELLING PERSONNEL

10. The responsibilities of the fuelling party are as follows:

a. **NTO** - the NTO is responsible to ensure the overall safety, environmental elements and control of fuelling operations are met. The NTO can delegate responsibility to either the D/NTO (HOD qualified), A/NTO, or Senior Mechanical Propulsion Manager . The NTO is responsible to:

(1) complete an applicable fuelling order as described in Annexes SOP-E01B-E01E, that provides the date and time of fuelling, type and quantities of fuel to be embarked, the duties and responsibilities of fuelling party, actions and precautions to be taken prior to embarking fuel, fuelling and on completion of fuelling.

Note: In the event of a change in the fuelling schedule or the state of the ship's fuelling system, a new Fuelling Order must be re-issued along with the completed checklists prior to commencing fuelling;

(2) ensure fuelling reports are completed;

(3) ensure the appropriate pre-fuelling checklist contained at Appendix SOP-E01F2 has been completed and signed off by the UDER and Fuelling I/C; and

(4) ensure fuel system deficiencies are noted prior to the fuelling and advise Command accordingly, especially, if fuelling operations are atypical;

b. **Fuelling IC/Event Recorder** - the Fuelling I/C shall have a complete understanding of the F-76 and F-44 and F-67 filling systems and its cross connects, and shall ensure that the systems are properly configured to embark fuel and that all environmental and safety concerns are met. Using the form provided at Appendix SOP-E01F7, monitor the communications amongst the Fuelling Party and record required information detailed below. They shall be responsible to:

(1) personally inspect the fuel systems and upper deck equipment and fittings prior to the fuelling;

(2) confirm that all system deficiencies are noted and reported to the NTO prior to fuelling;

(3) brief all personnel and verify all personnel are familiar and competent in fuelling operations and are aware of all safety hazards and applicable PPE.;

(4) confirm communications function normally and a back-up is in place;

(5) ensure that the appropriate pre-fuelling checklist, contained in Appendix SOP-E01F2, is completed and signed;

(6) confirm, through the Senior Watchkeeper, that the ship is in condition "Y" when fuelling alongside and Flag Bravo is raised;

(7) ensure that smoking, electronic emissions, burning and welding restrictions are in place when fuelling alongside;

(8) verify that a boom is placed around the ship and the fuelling barge/ship while in homeport. This measure should also be exercised in all other ports where available and practical, and always when required by local regulations. If fuelling boom is not available away from home port, the portable boom system can be used ;

(9) verify that access to locked compartments containing valves and sounding tubes is made available during fuelling operations;

(10) identify all active overboard discharge outlet, which will be operational during the fuelling evolution and brief the Senior Watchkeeper and all sentries. Any changes to the overboard discharge previously identified, must first be authorized by the Senior Watchkeeper.

(11) calculate flow rates, pumping times and 5, 3 and one minute warning times.; and

(12) ensure there is enough room in the F-44, F-67 and F-76 system for draining fuel hoses after fuelling is finished.

c. **Station Supervisor (RAS/TACRAS only)** - from a fuelling perspective and further to the requirements of CFCD 105, the Station Supervisor must be knowledgeable of the fuelling evolution. The Station Supervisor must be ready to safely perform an emergency breakaway, order "Stop Pumping" and work in co-operation with the Dump personnel;

d. **UDER** - the UDER under the direction of the Fuelling I/C fuels the vessel, maintains the list and trim of the vessel through fuel management and performs maintenance on the Fuel Oil Systems. They are responsible to:

(1) consolidate fuel, when required, such that the minimum number of tanks are fuelled and ensure that the day and settling tanks are topped up;

(2) conduct a Fuel Oil System check to ensure that:

(a) system configuration for fuelling is correct;

(b) all valves operate correctly;

(c) system leaks have been repaired;

(d) deficiencies have been noted on the pre-fuelling checklist; and

(e) IPMS tank readings are compared to manual tank dips and recorded if fuel tank sensors are suspect or defective;

(3) inspect all upper deck equipment for deficiencies including hoses, gaskets, flanges, receiver and that it is connected properly;

(4) complete pre-fuelling and post fuelling reports and submit them to the NTO through the Fuelling I/C;

(5) complete and sign the appropriate pre-fuelling checklist contained at Annex SOP-E01F and submit it to the Fuelling I/C;

(6) ensure spill response equipment such as approved absorbent pads, absorbent booms/socks, rags and appropriate storage containers are available on the upper deck near the fuel dump position;

(7) ensure scuppers in the areas of sounding tubes of tanks being filled are shut;

(8) operate the IPMS during fuelling operations;

(9) attend pre-fuelling brief and provide information to fuelling team on system deficiencies or extra system requirements;

(10) complete the post-fuelling checklist upon completion of the fuelling operation; and

(11) to act as I/C during fuel transfers;

e. **Dump Position** - the Dump Position personnel must have a comprehensive knowledge of fuelling operations on the upper deck during RAS and alongside fuelling. Personnel must be dressed with appropriate PPE such as goggles, gloves, helmet, etc. They are responsible to:

(1) connect and disconnect the fuelling fittings (bell and probe connecting/disconnecting is the responsibility of the Station Supervisor);

(2) ensure the drip tray is placed under the connecting flanges or probe and receiver and F-44 connection before pumping or placed anywhere in the fuelling dump where a leak may develop;

(3) ensure quick connect couplings are taped/wired or locked in the shut position;

(4) ensure that a grounding wire is fitted from supplier vessel/vehicle to ship;

(5) respond to and clean up any fuel spills in the dump area; and

(6) clean up and stow equipment after fuelling;

f. **Dump IC/Upper Deck Communicator (fuelling and de-fuelling alongside)** - the Dump IC/Upper Deck Communicator, from a fuelling perspective, is responsible to direct fuelling dump personnel when it is safe to connect fuelling flanges, order stop pumping should a fuel spill occur, direct the clean up of the fuel spill when it is safe to do so, until relieved and disconnect fuelling fittings when safe to do so. They will also be responsible for passing information about fuelling operations in the dump area/jetty to the Fuelling Position (HQ1/MCR). They shall also receive information from the Fuelling Position to be passed on to the Upper Deck I/C during RAS or fuelling barge/truck while alongside.

They shall be knowledgeable of the methods of communication such as VOIP SUT,PRC and sound powered telephones. Anytime communications are disrupted and cannot be readily restored, they shall give the order **"STOP PUMPING"** and ensure fuelling has ceased;

g. **Fire Sentries** - the Fuelling Fire Sentry duties shall be assigned as a secondary duty to either Upper Deck Sentries or Line Handlers by the Fuelling I/C. The assigned personnel must attend the fuelling brief. They shall rig two 1 ½ inch fire hoses equipped with AFFF from hydrants in the hangar (N02-07 and N02-08). Under no circumstances is spilled fuel to be hosed into the water or AFFF used to clean up fuel spills. Fire hoses are to be charged before the eductor pickup is placed in the AFFF container. After fuelling operations are complete, the AFFF eductor pickup is to be removed from the can before the hoses are discharged. In the event of a fire or spill, the Fuelling Fire Sentries shall immediately pick up the charged upper deck hose, insert the AFFF educator into the AFFF container, and be ready to on water. (Note: For a RAS the duty to respond as a hose handler shall be delegated to two members of the fuelling/RAS party that are NETP qualified.);

h. **Upper Deck Sentries (alongside and at anchor)** - the ship is divided into PORT and STBD components, and each side manned by a sentry. The sentries shall be in constant communication with the Fuelling Position and are to watch for fuel issuing from fuel tank vents and any overboard discharges. Should there be any discharge detected from these outlets, the sentries shall order **"STOP PUMPING"** and fuelling is to cease immediately and investigated by the Fuelling I/C. Sentries shall assist with the cleanup of any spills during fuelling;

i. **Jetty Sentry (alongside only)** - The sentries shall be in constant communication with the dump I/C and are to watch the ship's side for fuel issuing from fuel tank vents and any overboard discharges. Should there be any discharge detected from these outlets, the sentries shall order "**STOP PUMPING**" and fuelling is to cease immediately and investigated by the Fuelling I/C. Sentries shall assist with the cleanup of any spills during fuelling;

j. **Tank Sentries** - the Tank Sentries are used when the sensors in fuel tanks are suspect or defective. Their primary responsibility when required (suspect or defective tank sensor) is to manually dip the fuel tanks and report the levels to the Fuelling Position. Tank Sentries are in constant communication with the Fuelling Position. When tank sounding tubes are open during fuelling operations, spill response kits are to be available and scuppers in the area shut;

k. **Valve Sentries** - the Valve Sentries are to be used when remotely operated valves are suspect or cannot be operated from the IPMS. Valve Sentries shall on the direction from the Fuelling I/C open and shut valves as required. Valve Sentries shall be in constant contact with the Fuelling Position for the duration of the fuelling. In some cases, Tank Sentries will also be Valve Sentries;

l. **Aviation Specialist Technician** - the Avn Spec Tech is responsible for the management of F-44 on board ship. They are responsible for:

(1) consolidation of F-44 fuel so that the minimum number of tanks are fuelled. If possible, the service tank should be topped up first prior to fuelling;

(2) checking the F-44 filling system for leaks, valve operation and system configuration prior to fuelling;

(3) reporting to the I/C Fuelling that the F-44 system checks have been completed; and

(4) re-circulating F-44 IAW reference C after it has been embarked.

ALONGSIDE/AT ANCHOR FUELLING

Tank Capacity and Rotation

11. The authorized storage capacity of fuel per tank while in harbour is 95% of its total capacity. This allows for the safe expansion and contraction of the fuel due to changes in climatic conditions. HDW Class vessels are fitted with a multi-purpose tank named DFO-9. This tank can be utilized for DFO F-76 or F-44. In the event that the tank will be utilized for F-44, the tank requires cleaning from DFO F-76 residue.

12. DFO Tank 9 is dual purpose in that it can be filled with either F-44, F75 or F-76.

13. The AOPS is fitted with overflow tanks to capture fuel in the event a storage tank is overfilled or if the pressure relief valve on the fuel downcomer lifts. If an overflow tank is filled beyond capacity, a fuel spill will occur. Overflow Tank #1 has a capacity of 9.8 m^3 and Overflow Tank #2 has a capacity of 10.5 m^3. These overflow tanks can not be used to hold extra fuel are not to be included in the total fuel capacity calculations. To prevent a fuel spill from occurring, both Overflow Tanks shall be confirmed as empty prior to start pumping. During the fuelling, any indication of fuel in either Overflow Tank shall result in the immediate order to **"STOP PUMPING, STOP PUMPING"** until the cause of the overflow can be determined and rectified, and the overflow tank(s) emptied.

Alongside Fuelling Order

14. A fuelling order, in memorandum form, is drafted by the NTO as described at Annex SOP-E01B and associated appendices. The fuelling order is issued a minimum of 24 hours prior to fuelling.

15. Prior to fuelling, a message (LOGREQ) is prepared by the LogO and sent to QHM or the local port authority requesting a berth at the fuelling facility IAW Harbour Control Instructions (HCIs). QHM, or the local port authority, communicate directly with the fuelling facility to confirm the necessary arrangements.

16. If after-dark fuelling is required, then the ship's side and the full waterline must be illuminated to ensure that all sides of the vessel are sufficiently lit enabling sentries to detect any fuel spill. Furthermore, both upper deck and jetty sentries shall be posted.

17. Fuelling and transfer operations in homeport require that the ship and fuelling barge be boomed. When conducting fuel transfer operations at anchor a boom is not required. QHM is responsible for the placement of boom around vessels for fuelling operations. When away from homeport, the ship is

boomed during fuelling operations if possible. A request for a boom is included in the LOGREQ message, in the event that a boom is not available the ship is to deploy the inflatable boom.

18. Should the control of operations be in doubt at any time during fuelling, pumping is halted and the problem(s) corrected. Control must re-established before fuelling re-commences.

REPLENISHMENT AT SEA (RAS)/TACTICAL REPLENISHMENT AT SEA (TACRAS) OPERATIONS

RAS/TACRAS order

19. A standing RAS/TACRAS Fuelling Order and associated appendices are located at Annex SOP-E01C. This must be prepared by the NTO and issued by the CO prior to the ship's leaving port. The order remains in effect while the ship is at sea. Separate RAS orders may have to be made up when fuelling from foreign navy tankers during long deployments. Once the ship returns to home or a foreign port, a new RAS/TACRAS order must be prepared for the next period at sea.

Capacity

20. Authorized storage capacity of fuel per tank at sea (during a RAS/TACRAS) is 90% of its total capacity.

21. The AOPS is fitted with overflow tanks to capture fuel in the event a storage tank is overfilled or if the pressure relief valve on the fuel downcomer lifts. If an overflow tank is filled beyond capacity, a fuel spill will occur. Overflow Tank #1 has a capacity of 9.8 m^3 and Overflow Tank #2 has a capacity of 10.5 m^3. To prevent a fuel spill from occurring, both Overflow Tanks shall be confirmed as empty prior to start pumping. During the fuelling, any indication of fuel in either Overflow Tank shall result in the immediate order to **"STOP PUMPING, STOP PUMPING"** until the cause of the overflow can be determined and rectified, and the overflow tank(s) emptied.

RAS/TACRAS Restrictions

22. RCN Ships operating within 12 nm from land in Canadian territorial waters will not conduct a RAS unless explicitly authorized in the Environmental Effect Determination (EED), task directive, or higher order. Outside of Canada, RCN ships operating within 12 nm from land or within territorial waters of a foreign country (whichever is less) will not conduct a RAS unless authorized through the diplomatic clearance process.

23. Ships in MARPOL restricted waters as defined in reference A, are to RAS as far from land as practicable. RAS shall not take place in the Bay of Fundy or west of the western most point of Anticosti Island, namely the St. Lawrence River, Great Lakes, any other inland waterways, designated whale sanctuaries or proposed marine protected areas. If a RAS is required as a part of an Arctic exercise or operation, consult MARL/MARP SE for direction prior to deployment.

FUEL TRANSFERRING OPERATIONS

Alongside and at Anchor Fuel Transfer

24. The Fuel Transfer Order memorandum, and associated appendices are attached as Annex SOP-E01D. This must be prepared and issued by the NTO prior to the evolution.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

25. When alongside or at anchor, fuel transfers should be conducted during daylight hours, and when in homeport should be completed during working hours. This will allow QHM/POESB to be on hand in a more efficient and cost effective manner in the event of a fuel spill.

26. After Fuel Transfer Order has been completed the UDER/Engineering Watchkeeper shall conduct the following:

a. prior to starting, the UDER/Engineering Watchkeeper shall inform the Senior Mechanical Propulsion Manager (or his/her delegate);

b. tank levels are verified against the IPMS reading (only if tank level indicators are suspect). Any discrepancies are to be brought to the attention of the Senior Mechanical Propulsion Manager (or his/her delegate);

c. prior to opening the tank filling valves, the UDER/Engineering Watchkeeper shall inform the Senior Mechanical Propulsion Manager (or his/her delegate) and Duty Tech;

d. if filling a ready use tank that only has a manual filling valve for isolation, the UDER/Engineering Watchkeeper shall have someone stand by in the compartment with means of comms to the UDER with the ready use tank until the filling has been completed;

e. confirm all valves IAW the Valve Check-off List included at Appendix SOP-E01F4 and record in their logbook; and

f. advise the Senior Mechanical Propulsion Manager (or his/her delegate) and Duty Tech upon completion.

27. Authorized capacity of fuel per tank when transferring at alongside/at anchor is 95% of its total capacity.

<u>At Sea Fuel Transfers</u>

24. Although a Fuel Transfer Order is not required for transferring fuel at sea, the UDER shall conduct the following:

a. manual dips are required only if the fuel tank sensors are suspect or defective, complete and recorded the tank levels in the Manual Tank Dip Verification List included at Appendix SOP-E01F3

b. tank levels are verified against the IPMS digital reading. Any discrepancies are to be brought to the attention of the NTO;

c. cycle all FOT system valves IAW the Valve Check-off List included at Appendix SOP-E01F4; and

d. Report to the Senior Mechanical Propulsion Manager (SMPM) iot request permission.

25. Authorized capacity of fuel per tank when transferring at sea is 95% of its total capacity.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Topping Off Tanks/Polishing

26. The UDER and/or Engineering Watchkeeper are responsible for topping off all tanks as required. They shall monitor these tanks throughout the day, and fill them as required. The Engineering Watchkeeper is responsible for conducting polishing evolutions from settling tanks to day tanks through the use of the centrifuge. This will be accomplished by re-circulating fuel oil in the settling tanks to the day tanks via the centrifuge and allowing the day tanks to overflow back to the settling tanks. This will maintain the day tanks at full or near full capacity. The settling tanks will be topped up using the fuel transfer pumps as required from the fuel oil storage tanks.

27. Although a Fuel Transfer Order is not required for minor transfers such as: topping off tanks/polishing the UDER/Engineering Watchkeeper shall conduct the following:

a. prior to starting, the UDER/Engineering Watchkeeper shall inform the Senior Engineering Watchkeeper (at sea) or Duty Tech (alongside);

b. tank levels are verified against the IPMS reading. Any discrepancies are to be brought to the attention of the Senior Enginering Watchkeeper;

c. prior to opening the tank filling valves, the UDER/Engineering Watchkeeper shall inform the Senior Engineering Watchkeeper (at sea) or Duty Tech (alongside);

d. the UDER/Engineering Watchkeeper is to remain in the compartment with the ready use tank until the filling has been completed;

e. confirm all valves IAW the Valve Check-off List included at Appendix SOP-E01F4 and record in their logbook; and

f. advise the Senior Engineering Watchkeeper (at sea) or Duty Tech (alongside) upon completion.

F-44 Transfers

28. Although a Fuel Transfer Order is not required for transferring fuel at sea, the Aviation Specialist Technician shall conduct the following:

a. manual dips are required only if the fuel tank sensors are suspect or defective, complete and recorded the tank levels in their log book similar to Manual Tank Dip Verification List at Annex SOP-E01F;

b. tank levels are verified against the IPMS reading. Any discrepancies are to be brought to the attention of the NTO; and

c. cycle all F-44 system valves IAW the Valve Check-off List and recorded their logbook similar at Annex SOP-E01F.

29. Authorized storage capacity of fuel per tank at sea is 95% of its total capacity. F-44 must be re-circulated IAW reference C.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

DE-FUELLING OPERATIONS

De-fuelling Organization

30. The roles and responsibilities of the de-fuelling party for preparations and precautions before and during the evolution are the same as those for embarking fuel with the exception of the personnel identified at Appendix SOP-E01F1.

De-fuelling Order

31. The De-fuelling memorandum form, and associated appendices, is attached as Annex SOP-E01E. This must be prepared by the NTO and issued by the CO 24hrs prior to the evolution. De-fuelling of the ship or individual tanks occurs when the ship is alongside and is preparing to go into dock or work is to be conducted on a fuel tank or adjacent compartments.

SMALL CRAFT AND MISCELLANEOUS FUELLING OPERATIONS

Gasoline Engines (F-67)

32. IAW SOP-SE01, only ULC approved containers (NSN 7240-21-550-0022) and jettisonable tanks shall be used to transport and store gasoline aboard ships.Gasoline shall be stored in fitted upper deck tanks and racks. When fuelling or transferring fuel between outboard motor tanks the following precautions shall be observed:

a. shut off engine and battery switch;

b. fuelling to be conducted on the upper deck only;

c. not to be conducted near upper deck drains or scuppers;

d. no smoking, naked lights, burning, welding or ferrous tools within seven (7) meters of the fuelling operation;

e. no electronic transmitters within 10 metres;

f. spill kit and fire extinguisher (Class B or C minimum) at fuelling point ready for use;

g. all personnel shall wear personal protective equipment (PPE) (e.g. gloves and goggles);

h. when the boat is in the water, completely surround the boat with a containment boom;

i. when the boat is in the water, completely surround the boat with a containment boom;

j. when the boat is out of the water, cover all nearby drains with spill pads or appropriate cover;

k. funnel, hose nozzle, or jerry can with spout shall be used and appropriately bonded to the boat, when applicable;

l. tanks shall not be filled past 95% to allow for fuel expansion;

m. if there is a sign of leakage or spillage, **stop fuelling** immediately and follow procedures found in Part 3 Spill Response Plan; and

n. when finished fuelling, place contaminated spill pads in the plastic bags found in spill kit and treat same as HazWaste. Return all unsoiled spill pads to spill kit and restock kit as required.

Diesel Engines (F-75/-76)

33. RIBS, Landing Craft and MRBs use distillate fuel from the ships DFO tanks. When fuelling/de-fuelling RIBs the following precautions must be observed:

a. shut off engine and battery switch;

b. no smoking, naked lights, burning, welding within seven (7) meters of the fuelling operation;

c. no electronic transmitters within 10 metres;

d. spill kit and fire extinguisher (Class B or C minimum) at fuelling point ready for use;

e. all personnel shall wear personal protective equipment (PPE)(e.g. gloves and goggles);

f. when the boat is in the water, completely surround the boat with a containment boom;

g. when the boat is out of the water, cover all nearby drains with spill pads or appropriate cover;

h. tanks shall not be filled past 95% to allow for fuel expansion;

i. absorbent pads around fill pipes;

j. switch the bilge pump to manual;

k. bilge plugs fitted or drains plugged;

l. ensure fuelling hose is properly drained and secured on completion;

m. if there is a sign of leakage or spillage, **stop fuelling** immediately and follow procedures found in Part 3 Spill Response Plan;

n. when finished fuelling, place contaminated spill pads in the plastic bags found in spill kit and treat same as HazWaste. Return all unsoiled spill pads to spill kit; and

o. switch the bilge pump back to automatic and remove bilge or drain plugs.

Portable Auxiliary Equipment

34. At times it is necessary to operate and fuel portable auxiliary equipment on the jetty or ship's upper decks (i.e., Flight Deck, Top Part Ship). Only ULC approved containers shall be used to transfer fuel from the storage area to the equipment location IAW SOP-SE01. At no time shall any fuel be left

unattended at the equipment location. When fuelling portable auxiliary units, the following precautions are observed:

a. no smoking, naked lights, burning, welding within seven (7) meters of the fuelling operation;

b. equipment shut down and left to cool for ½ hour prior to fuelling unless required immediately at which a sentry with a fire extinguisher at the ready should be standing by;

c. no electronic transmitters within 10 metres;

d. spill kit and fire extinguisher (Class B or C minimum) at fuelling point ready for use;

e. all personnel shall wear personal protective equipment (PPE)(e.g. gloves and goggles);

f. cover all nearby drains with spill pads or appropriate cover;

g. funnel, hose nozzle, or jerry can with spout shall be used and appropriately groinded or bonded to the equipment, when applicable;

h. transport cans with lid and vent caps fitted to prevent spills;

i. use drip trays;

j. tanks shall not be filled past 95% to allow for fuel expansion;

k. if there is a sign of leakage or spillage, **stop fuelling** immediately and follow procedures found in Part 3 Spill Response Plan; and

l. when finished fuelling, place contaminated spill pads in the plastic bags found in spill kit and treat same as HazWaste. Return all unsoiled spill pads to spill kit and restock kit as required.

<u>Lubricating Oil/Hyraulic Oil</u>

35. Authorized storage capacity of lubricating oil tanks while in harbour is 95% of its total capacity. This allows for the safe expansion and contraction of the oil due to changes in climatic conditions.

36. Oil may be transferred into ship tanks via portable pump from barrels on the jetty or flight deck RAS points. When filling the storage tanks, the following precautions are observed:

a. spill kit and fire extinguisher (Class B or C minimum) at fuelling point ready for use;

b. all personnel shall wear personal protective equipment (PPE)(e.g. gloves and goggles);

c. identify all potential upper deck spill points (e.g. tank vents);

d. manually dip oil tanks being filled;

e. cover all nearby drains with spill pads or appropriate cover;

f. transport cans with lid and vent caps fitted to prevent spills;

g. use drip trays;

h. tanks shall not be filled past 95% to allow for expansion;

i. if there is a sign of leakage or spillage, **stop pumping** immediately and follow procedures found in Part 3 Spill Response Plan, and

j. when finished pumping, place contaminated spill pads in the plastic bags found in spill kit and treat same as HazWaste. Return all unsoiled spill pads to spill kit and restock kit as required.

37. If the ship goes into a "dry-dock" and the lubricating oil tanks must be emptied, the oil can be transferred into a portable tank. The oil is normally transferred from the ship's system with the portable tank on board the ship (e.g. the flight deck). It is usually not transferred overboard except when the temporary tank is lifted onto or off the ship.

AIRCRAFT FUELLING

38. The procedures for Aircraft Re-fuelling/Helicopter In Flight Refuelling (HIFR) are documented in reference C. Should a fuel spill occur on the flight deck the priority is to secure the aircraft and protect the Aircrew. Once the FlyCO says it is safe then all reasonable action must be taken to minimize the environmental impact by confining the spill and cleaning it up as per applicable emergency plans in the Ship Class SEMS. Part 3 Plan-P01 of this manual provides specific information on fuel spill response.

FUEL REPORTING

41. At the end of each month MARLANT ships are required to submit an end of month fuel report using the template in Annex SOP-E01G. This data is required by MARL SE to track fuel consumption in the Fleet for greenhouse gas reporting and to help quantify fuel spills. MARPAC ships are not required to send this message to MARP SE as the information is provided by MARPAC HQ.

PROCEDURE PERFORMANCE CRITERIA AND RECORDS

42. All completed fuelling documentation is to be maintained on file IAW Chapter 5 Annex 5C.

Attachments

Annex SOP-E01A – Fuelling References
Annex SOP-E01B - Alongside/At Anchor Fuelling Orders
Annex SOP-E01C - Standing RAS/TACRAS Fuelling Orders
Annex SOP-E01D - Alongside and at Anchor Fuel Transferring Orders
Annex SOP-E01E - De-fuelling Orders
Annex SOP-E01F - Documentation Requirements
- Appendix SOP-E01F1 - Fuelling Party
- Appendix SOP-E01F2 - Pre-Fuelling Checklist
- Appendix SOP-E01F3 - Manual Tank Dip Verification
- Appendix SOP-E01F4 - Valve Checklist
- Appendix SOP-E01F5 - Post Fuelling Checklist

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Appendix SOP-E01F6 - Fuelling Report
Appendix SOP-E01F7 - Chronological Register of Events (Registry)
Annex SOP-E01G - Monthly Fuel Report Message Format

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E01A

FUELLING REFERENCES

A. A-LM –188-001/JS-001, Supply Manual for POL/Fuel Handling
B. C-03-005-033/AA-000, Naval Engineering Manual
C. C-12-124-A00/MB-002, Shipboard Helo Operations Procedures (SHOPs)
D. MARCORD G18, Environmental Management of Shipboard Discharges
E. Ships Standing Orders (SSOs)
F. Harbour Control Instructions

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E01B

ALONGSIDE/AT ANCHOR FUELLING ORDERS

Memorandum (example)

(Ship name): 3350-1 (NTO)

Date

Distribution List

ALONGSIDE FUELLING ORDERS – DATE

Ref: SEMS SOP-E01 Fuelling

1. (Ship name) will fuel to 95% (F-76) ,(F-67), (F-44) capacity from (IOL, Jetty) commencing at (Time) hrs on (Date). Approximately (Amount) m^3 of DFO and (Amount) m^3 of F-44 and (Amount) m3 of F-67 will be embarked from the (starboard/port) side fuelling station or the quarter deck. The duration of fuelling is approximately ("x" hour). The ship shall be ready in all respects to receive fuel 15 minutes after the ship is secured (IOL, Jetty). The NTO shall report to the CO when ready to receive fuel.

2. The following actions and policies are to be strictly adhered to:

   a. Fuelling Party. This party will consist of the personnel identified on the Fuelling Party list at appendix 1. All Fuelling Party personnel shall acknowledge their understanding of the above ref and their fuelling position by signing this list. Particular attention shall be given to ref as it provides specific instructions for the response and reporting of fuel spills, fuel management, and embarking fuel. The Fuelling Party will muster in the MCR at (Time) hrs to attend the pre-fuelling brief; and

   b. Fuelling I/C. The Fuelling I/C is in overall charge of the fuel embarkation. The Fuelling I/C shall complete and provide the annexes to the NTO.

3. Any person who knows of an error or defect, which may cause a fuel spill or jeopardize safety, shall report this information to the Fuelling I/C and/or NTO. Furthermore, any time a fuel spill is observed or suspected during fuelling, any member will order **"STOP PUMPING, STOP PUMPING, STOP PUMPING."** If a fuel spill is observed anywhere other than the fueling position, initiate the fuel spill response if required. Upon hearing this, the Fuelling I/C will immediately cease pumping until satisfied that the problem is rectified.

4. Embarking fuel alongside requires significant personnel resources and attention to detail to ensure timely completion of the evolution in an environmentally responsible manner. This requires good communications, thorough checks of systems and equipment prior to fuelling and requisite knowledge of all aspects of the fuelling operation by personnel involved.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

CO Signature Block

Attachments

Appendix 1 - Fuelling Party
Appendix 2 - Pre-Fuelling Checklist
Appendix 3 - Manual Tank Dip Verification
Appendix 4 - Valve Checklist
Appendix 5 - Post Fuelling Checklist
Appendix 6 - Fuelling Report
Appendix 7 - Chronological Register of Events

Dist List

Action

Senior Watchkeeper/OOW (w/o attachments)
Fuelling I/C

Info

XO (w/o attachments)
HODs (w/o attachments)

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E01C

STANDING RAS/TACRAS FUELLING ORDERS

Memorandum (example)

(Ship name): 3350-1 (NTO)

Date

Dist List

STANDING RAS/TACRAS FUELLING ORDERS – Date to Date

Ref: SEMS SOP-E01 Fuelling

1. As required the (Ship name) will fuel to no more than 95% (F-76) and/ or (F-44) from (Ship name) during the duration of the deployment between (Time and Date). The ship shall be ready in all respects to receive fuel 30 minutes after the executive pipe close up for RAS/TACRAS is made. The NTO shall report to the CO when ready to receive fuel.

2. In order to reduce the risk of a fuel spill, and the fire and safety hazards associated with fuelling, the following actions and policies are to be strictly adhered to:

a. Fuelling Party. This party will consist of the personnel identified on the Fuelling Party list at Appendix 1. All Fuelling Party personnel shall acknowledge their understanding of the above references and their fuelling position by signing this list. Particular attention shall be given to ref as it provides specific instructions for the response and reporting of fuel spills, fuel management, and embarking fuel. The Fuelling Party will muster in the MCR at the Fuelling I/Cs discretion to attend the Pre-Fuelling brief; and

b. Fuelling I/C. The Fuelling I/C is in overall charge of the fuel embarkation. The Fuelling I/C shall complete and provide the appendices to the NTO. The completed annexes must be held as environmental records.

3. Any person who knows of an error or defect, which may cause a fuel spill or jeopardize safety, shall report this information to the Fuelling I/C and/or NTO. Furthermore, any time a fuel spill is observed or suspected during fuelling, any member will order **"STOP PUMPING, STOP PUMPING, STOP PUMPING."** If a fuel spill is observed anywhere other than the fueling position, initiate the fuel spill response if required. Upon hearing this, the Fuelling I/C will immediately cease pumping until satisfied that the problem is rectified.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

4. Conducting a RAS/TACRAS requires significant personnel resources and attention to detail to ensure timely completion of the evolution in an environmentally responsible manner. This requires good communications, thorough checks of systems and equipment prior to fuelling and requisite knowledge of all aspects of the fuelling operation by personnel involved.

CO Signature Block

Attachments:

Appendix 1 - Fuelling Party *(required for every RAS/TACRAS event)*
Appendix 2 - Pre-Fuelling Checklist (*required for every RAS/TACRAS event)*
Appendix 3 - Manual Tank Dip Verification (*required for every RAS/TACRAS event*)
Appendix 4 - Valve Checklist *required for every RAS/TACRAS event)*
Appendix 5 - Post Fuelling Checklist *(required for every RAS/TACRAS event)*
Appendix 6 - Fuelling Report *(required for every RAS/TACRAS event)*
Appendix 7 - Chronological Register of Events *(required for every RAS/TACRAS event)*

Dist List

Action

OOW (w/o attachments)
DECKO (w/o attachments)
Fuelling I/C

Info

XO (w/o attachments)
HODs (w/o attachments)

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E01D

ALONGSIDE AND AT ANCHOR FUEL TRANSFERRING ORDERS

Memorandum (example)

(Ship name): 3350-1 (NTO)

Date

Dist List

ALONGSIDE OR AT ANCHOR FUEL TRANSFERRING ORDERS - Date

Ref: SEMS SOP-E01 - Fuelling

1. (Ship name) will internally transfer fuel at (Time) on (Date). The total amount is approx. (quantity) not to exceed 95% of tank capacity. The tanks affected are listed in appendix 2 of this order.

2. Along with the associated environmental risk, fuel transfers constitute a safety hazard for the ship, therefore, the following requirements are to be met:

   a. the UDER/Engineering Watchkeeper is to ensure that the enclosed transferring checklist is completed; and

   b. the Fuel Transfer Party will consist of the personnel identified in the enclosed list. All personnel are to acknowledge their duty by initialling the list. The Fuelling I/C will conduct a pre-transfer brief prior to the start of transferring. In addition, the Fuel Transfer Party is to familiarize themselves with the reference.

3. Any person who knows of an error or defect, which may cause a fuel spill or jeopardize safety, shall report this information to the UDER. Furthermore, any time a fuel spill is observed or suspected during fuelling, any member will order "**STOP PUMPING, STOP PUMPING, STOP PUMPING**." and initiate fuel spill response if required. Upon hearing this, the UDER/Enginering Watchkeeper will immediately cease pumping until satisfied that the problem is rectified.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

4. When relieving fuelling party personnel, the Fuelling I/C must first be informed and the incoming member must be briefed by the Fuelling I/C, prior to relieving the outgoing member. As well, an entry must be made in the registry (Appendix 7) stating; the name of the incoming member, location and time where the change in personnel occurred.

NTO Signature Block

Attachments:

Appendix 1 - Fuelling Party
Appendix 2 - Pre-fuelling Checklist
Appendix 3 - Manual Tank Dip Verification
Appendix 4 - Valve Checklist
Appendix 5 - Post Fuelling Checklist
Appendix 6 - Fuelling Report
Appendix 7 - Registry

Dist List

Action

UDER/Engineering Watchkeeper

Info

Senior Watchkeeper

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E01E

DE-FUELLING ORDERS

Memorandum (example)

(Ship name): 3350-1 (NTO)

Date

DE-FUELLING ORDERS – Date

Ref: SEMS SOP-E01 Fuelling

1. (Ship name) will de-fuel from tanks (as outlined in the pre-fuelling checklist) to (Jetty ?, barge, another ship, etc.) commencing at (Time) hrs on (Date). Approximately (Amount) m3 of (F-76) and (Amount) m3 of (F-44) and (Amount) m3 of (F-67)will be de-fuelled from the (starboard/port) side station. This evolution will take approximately ("x" hour). The NTO shall report to the CO when ready to de-fuel.

2. The following actions and policies are to be strictly adhered to:

   a. Fuelling Party. This party will consist of the personnel identified on the Fuelling Party list at Appendix 1. All Fuelling Party personnel shall acknowledge their understanding of the above ref and their fuelling position by signing this list. Particular attention shall be given to ref as it provides specific instructions for the response and reporting of fuel spills, fuel management, and the de-fuelling evolution. The Fuelling Party will muster in the MCR at (time) hrs to attend the Pre-Fuelling brief; and

   b. Fuelling I/C. The Fuelling I/C is in overall charge of the de-fueling. The Fuelling I/C shall complete and provide the annexes to the NTO.

3. Any person who knows of an error or defect, which may cause a fuel spill or jeopardize safety, shall report this information to the Fuelling I/C and NTO. Furthermore, any time a fuel spill is observed or suspected during fuelling, any member will order "STOP PUMPING, STOP PUMPING, STOP PUMPING." and initiate fuel spill response if required. Upon hearing this, the Fuelling I/C will immediately cease pumping until satisfied that the problem is rectified.

4. When relieving fuelling party personnel, the Fuelling I/C must first be informed and the incoming member must be briefed by the Fuelling I/C, prior to relieving the outgoing member. As well, an entry must be made in the registry (Appendix 7) stating; the name of the incoming member, location and time where the change in personnel occurred.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

5. De-fuel alongside requires significant personnel resources and attention to detail to ensure timely completion of the evolution in an environmentally responsible manner. This requires good communications, thorough checks of systems and equipment prior to fuelling and requisite knowledge of all aspects of the fuelling operation by personnel involved.

CO Signature Block

Attachments

Appendix 1 - Fuelling Party
Appendix 2 - Pre-Fuelling Checklist
Appendix 3 - Manual Tank Dip Verification
Appendix 4 - Valve Checklist
Appendix 5 - Post Fuelling Checklist
Appendix 6 - Fuelling Report
Appendix 7 - Registry

Dist List

Action

Senior Watchkeeper/OOW (w/o attachments)
Fuelling I/C

Info

XO (w/o attachments)
HODs (w/o attachments)

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E01F

DOCUMENTATION REQUIREMENTS

1. The following appendices must be attached to the appropriate annex to make a complete fuelling order. The documentation requirements for each evolution are shown in Table E01F.1.

2. The NTO will issue an appropriate fuelling order as described in Annexes SOP-E01B-E01E. The orders shall include the attachments consistent with Table E01F.1. Upon completion of the fuelling evolution, the order (including completed appendices) will be retained as an environmental record for the period of one year IAW Part 1, Annex 5C - Records' Master List.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

APPENDIX SOP-E01F1

FUELLING PARTY

(Ship name): 3350-1 (NTO)

Date

FUELLING PARTY

Ref: SEMS SOP-E01 Fuelling

Consistent with the evolution described in the order, the fuelling party will comprise of the personnel listed below. Signing this appendix indicates that the member has read and understood the order and reference pertaining to their position, general procedures and safety.

Position – Location	Fuelling Evolution				Rank/Name	Signature
	Alongside/At Anchor	RAS/TACRAS*	Transfer**	De-fuelling		
NTO	√	√	-	√		
Fuelling I/C- MCR	√	√	-	√		
A/NTO (Bridge Wing Comms)	-	√	-	-		
UDER	√	√	√	√		
Dump I/C	√	-	-	√		
Dump Position	√	√	-	√		
Mar El Winch Operator	-	√	-	-		
Station Supervisor	-	√	-	-		
Aviation Specialist Technician (F-44 only)	√	√	√	√		
Upper Deck Sentry #1 – roaming	√	-	Hbr/Anchor	√		
Upper Deck Sentry #2 – roaming	√	-	Hbr/Anchor	√		
Jetty Sentry (not required at anchor)	√	-	√	√		
Restricted Access Key Provider	√	√	-	√		
Personnel Required when Valve or LLMS Sensors Suspect or Defective						
Valve Sentries (as required)						
Tank Sentries (as required)						

* Fuelling Party Checklist required prior to every RAS/TACRAS
** Alongside/At Anchor/At Sea Transfers

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

APPENDIX SOP-E01F2

PRE-FUELLING CHECKLIST

(Ship name): 3350-1 (NTO)

Date

PRE-FUELLING CHECKLIST

This checklist will be completed and signed by the personnel identified below before fuelling occurs. The Fuelling I/C (UDER for Internal Transfers) will coordinate the timely completion of this checklist.

	ITEM	FUELLING EVOLUTION				POSITION	SIGNATURE
		Alongside/ At Anchor	RAS/ TACRAS	Transfer	De-fuelling		
1	Completion of Fuelling Party list, Appendix SOP-E01F1	√	√	√	√	Fuelling I/C (UDER for Transfers)	
2	Completion of Valve Checklist , Appendix SOP-E01F4	√	√	√	√	Fuelling I/C (UDER for Transfers)	
3	Pre-Fuelling Brief completed for all members of fuelling party	√	√	-	√	Fuelling I/C	
4	All upper deck potential spill points and Overboard discharges identified (and mitigated), and sentries briefed.	√	√	√	√	Fuelling I/C	
5	Fuel boom deployed and anchored away from ship's hull (local regs apply for at anchor)	√	-	√	√	Fuelling I/C	
6	All doors, vents and mechanical ventilation inlet points within 6 meters of the fuelling point or tank vent shall be closed (F-44 only)	√	-	√	√	Fuelling I/C	
7	Mutual Aid Agency, BOPS and adjacent vessels notified and on standby for fuelling from bowser/fueller (F-44/F-76).	√	-	√	√	Fuelling I/C	
8	Fuelling of F-44 to be conducted at authorized jetties only.	√	-	-	√	Fuelling I/C	
9	Ship's fuelling point is more than 6 meters from other ships or buildings (F-44 only).	√	-	√	√	Fuelling I/C	
10	No internal combustion engine except fueller and Fire Engines within 6 meters of fuelling point (F-44 only).	√	-	√	√	Fuelling I/C	
11	Fueller must be positioned for rapid egress of area (F-44 Only).	√	-	√	√	Fuelling I/C	
12	Controlled jetty access established IAW HCI 804 (F-44 Only).	√	-	√	√	Fuelling I/C	
13	Burning and welding restrictions are in place	√	√	√	√	Fuelling I/C	

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

	Item	Fuelling Evolution				Position	Signature
		Alongside/ At Anchor	RAS/ TACRAS	Transfer	De-fuelling		
14	Fuelling party personnel closed up and dressed appropriately for weather conditions and safety	√	√	-	√	Fuelling I/C	
15	Reliable communications are established and checked	√	√	√	√	Fuelling I/C (Snr ET/Comm Tech)	
16	**Night fuelling** - Ship's side and full water line is illuminated.	√	√	√	√	Fuelling I/C (UDER for Transfers)	
17	Confirm and ensure contractor run fuelling facility's procedures are completed and understood by those involved	√	-	-	-	Fuelling I/C	
18	Verify all overflow tanks are empty	√	√	√	-	Fuelling I/C (UDER for Transfers; Aviation Specialist Technicianfor for F44)	
19	Get emergency contact number of fuelling facility, in the event of a spill once fuelling is complete.	√	-	-	-	OOD/OOW	
20	Jetty Sentry are briefed and posted.	√	-	-	-	Fuelling I/C	
21	Upper Deck Personnel e.g., lookouts and life buoy sentry are briefed (Transfers at sea)	-	√	√	-	OOW	
22	Bosun's Mate/Quartermaster ordered to make pipes IAW SSOs	√	√	√	√	OOD/OOW	
23	No naked lights, open flame, burning, grinding or welding throughout ship	√	√	√	√	OOD/OOW	
24	Ship is in DC condition "Y"	√	√	√	√	OOD/OOW	
25	Appropriate safe to transmit keys are in the personnel aloft keyboard	√	√	-	√	OOD/OOW	
26	Zodiac, RIB, or MRRB available with absorbent pads and required personnel on standby (not including transfers at sea)	√	-	-	√	OOD/OOW	
27	Flag "BRAVO" raised at commencement of fuelling	√	√	√	√	OOD/OOW	
28	Winch available and serviced	-	√	-	-	SEPM	
29	2 fire hoses from separate upper deck hydrants faked out, charged with AFFF	√	√	-	√	Upper Deck Sentries or Line Handlers, as designated by Fuelling I/C	
20	Completion of Manual Dip Verification form, Appendix SOP-E01F3 (if required)	√	-	√	√	UDER	
31	DFO storage / settling tanks consolidated	√	√	√	√	UDER	

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

	Item	Fuelling Evolution				Position	Signature
		Alongside/ At Anchor	RAS/ TACRAS	Transfer	De-fuelling		
32	Fuel spill response kits in position and correct	√	√	√	√	UDER	
33	Drip trays at the fuelling position	√	√	-	√	UDER	
34	Ensure all checklists have been completed and signed as appropriate to the evolution	√	√	√	√	NTO	
35	Senior Watchkeeper/OOW informed of readiness transfer.	√	√	√	√	NTO (UDER for Transfers)	

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Tanks to be fuelled, de-fuelled or transferred in the following order:

Sequence	Tank*	Amount (m^3)	Time (min)
1			
2			
3			
4			
5			
etc.			
UDER: _____ Date and Time: _____			

**Tanks identified for fuelling and de-fuelling. Additionally, for internal fuel transfers the UDER shall indicate the supplying and receiving tanks in these columns.*

It is the responsibility of all members of the Fuelling Party to identify any defects or discrepancies with the fuelling system that may jeopardize safety or lead to a fuel spill. Any defects or discrepancies not contained in the Fuelling Orders or any items indicated as "Not Applicable" (N/A) in the checklist, are to be explained in detail below stating the necessary precautions to be taken. This information must then be brought to the attention of the NTO, Senior Watchkeeper and Fuelling I/C prior to the commencement of fuelling.

Notes: _____

_____

_____

_____

_____

_____

_____

_____

By signing this form, the undersigned is confident that all necessary precautions have been taken to prevent a fuel spill and conduct a safe fuelling.

Fuelling I/C: _____ **Date and Time:** _____

NTO: _____ **Date and Time:** _____

Senior Watchkeeper/OOW: _____ **Date and Time:** _____

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

APPENDIX SOP-E01F3

MANUAL TANK DIP VERIFICATION

(Ship name): 3350-1 (NTO)

Date

MANUAL TANK DIP VERIFICATION

The UDER shall manually dip all DFO tanks, F-44 tanks and SWB tanks being fuelled within 24 hours prior to fuelling and verify all tank levels against the IPMS reading. Any discrepancies will be brought to the attention of the NTO and Fuelling I/C immediately. The UDER is to complete the table below:

TANK	MANUAL DIP HEIGHT (feet)	TANK VOLUME FROM DIP (m^3)	TANK VOLUME FROM IPMS (m^3)	DISCREPANCY IN TANK VOLUME (m^3)
DFO TANKS				
DFO #1				
DFO #2				
DFO #3				
DFO #4				
DFO #5				
DFO #6				
DFO #7				
DFO #8				
DFO #9				
DAY #1				
DAY #2				
SET #1				
SET #2				
OVR#1				
OVR #2				
F-44 TANKS				
F-44 #1				
F-44 #2				
F-44 SVC				
F-44 OVR				
DFO #9				

Note: This form must be completed prior to every RAS/TACRAS, as stated above.

UDER Signature: _____ Date and Time: _____

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

APPENDIX SOP-E01F4

VALVE CHECKLIST

(Ship name): 3350-1 (NTO)

Date

VALVE CHECKLIST

The Fuelling I/C (or the UDER for internal transfers) will ensure all remotely operated valves are cycled and the DFO and F-44 systems are properly configured to fuel, de-fuel and transfer as required.

Feuling/Transfer DFO

TANK VALVE	ID.	CYCLED
DFO #1 filling	FOT RV 012	
DFO #2 filling	FOT RV 010	
DFO #3 filling	FOT RV 008	
DFO #4 filling	FOT RV 006	
DFO #5 filling	FOT RV 023	
DFO #6 filling	FOT RV 025	
DFO #7 filling	FOT RV 029	
DFO #8 filling	FOT RV 021	
DFO #9 filling	FOT RV 027	
DFO #1 Settling filling	FOT RV 004	
DFO #2 Settling filling	FOT RV 019	
DFO #1 Day Tank filling	FOT RV 002	
DFO #2 Day Tank filling	FOT RV 017	
DFO Aux filling Fwd	FOT RV 014	
DFO Aux filling Aft	FOT RV 015	
DFO #1 suction	FOT RV 011	
DFO #2 suction	FOT RV 009	
DFO #3 suction	FOT RV 007	
DFO #4 suction	FOT RV 005	
DFO #5 suction	FOT RV 022	
DFO #6 suction	FOT RV 024	
DFO #7 suction	FOT RV 030	
DFO #8 suction	FOT RV 020	
DFO #9 suction	FOT RV 026	
DFO #1 Settling suction	FOT RV 003	
DFO #2 Settling suction	FOT RV 018	

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

TANK VALVE	ID.	CYCLED
DFO #1 Day Tank suction	FOT RV 001	
DFO #2 Day Tank suction	FOT RV 016	
DFO #1 OVR suction	FOT RV 013	
DFO #2 OVR suction	FOT RV 028	
F-44 #1 tank fill	AFS RV714	
F-44 #2 tank fill	AFS RV711	
F-44 Service tank fill	AFS RV712	
F-44 #9 DFO fill	AFS RV715	
F-44 Drain/Overflow tank fill	AFS RV713	

DFO Manual Valves

FOT VALVE	ID.	LOCATION	STATUS
Stbd fuelling Station	FOT V0002	FD STBD side	
Port fuelling Station	FOT V0001	FD PORT side	
Fwd Transfer Pump Suction	FOT V0011	FMMR 3 DK FWD Port side by FOT Manifold	
Fwd Transfer Pump discharge	FOT V0012	FMMR 3 DK FWD Port side by FOT Manifold	
Aft transfer pump suction	FOT V0022	AMMR 3 DK Port side before FOT Manifold	
Aft transfer pump discharge	FOT V0023	AMMR 3 DK Port side before FOT Manifold	
Before Strainer isolation	FOT V0006	AMMR 3 DK Aft under Port side staircase	
Aft Strainer isolation	FOT V0008	AMMR 3 DK Aft under Port side staircase	
Strainer Bypass	FOT V0009	AMMR 3 DK Aft under Port side staircase	
Before Flow meter isolation	FOT V0003	AMMR 3 DK Aft under Port side staircase	
Aft Flow Meter isolation 1	FOT V0004	AMMR 3 DK Aft under Port side staircase	
Aft Flow Meter isolation 2	FOT V0007	AMMR 3 DK Aft under Port side staircase	

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

FOT VALVE	ID.	LOCATION	STATUS
Flow Meter Bypass	FOT V0005	AMMR 3 DK Aft under Port side staircase	
Filling BLKD iso. AMMR	FOT V0027	FWD AMMR 3 DK on Port side	
Filling BLKD iso. FMMR	FOT V0028	AFT FMMR 3 DK on Port side	
Suction BLKD iso. AMMR	FOT V0097	FWD AMMR 3 DK on Port side	
Suction BLKD iso. FMMR	FOT V0098	AFT FMMR 3 DK on Port side	
DFO #1 Quick Closing v/v	FOT V0030	FMMR 3DK FWD BK STBD side.	
DFO #1 filling sample	FOT V0075	FMMR 3DK FWD BK STBD side.	
DFO #2 Quick Closing v/v	FOT V0029	FMMR 3DK FWD BK Port side.	
DFO #2 filling sample	FOT V0073	FMMR 3DK FWD BK Port side.	
DFO #3 Quick Closing v/v	FOT V0031	FMMR Port side FWD corner on 3DK	
DFO #3 filling sample	FOT V0077	FMMR Port side FWD corner on 3DK	
DFO #4 Quick Closing v/v	FOT V0035	FMMR 2DK STBD side FWD	
DFO #4 filling sample	FOT V0083	FMMR 2DK STBD side FWD	
DFO #5 Quick Closing v/v	FOT V0037	AMMR 3DK Stbd side Fwd	
DFO #5 filling sample	FOT V0087	AMMR 3DK Stbd side Fwd	
DFO #6 Quick Closing v/v	FOT V0036	AMMR 3DK Port side above FOT manifold	
DFO #6 filling sample	FOT V0085	AMMR 3DK Port side above FOT manifold	
DFO #7 Quick Closing v/v	FOT V0038	AMMR 3DK Port side above FOT manifold	
DFO #7 filling sample	FOT V0089	AMMR 3DK Port side above FOT manifold	
DFO #8 Quick Closing v/v	FOT V0117	STBD LV Equipment room 3DK	
DFO #8 filling sample	FOT V0122	STBD LV Equipment room 3DK	
DFO #9 Quick Closing v/v	FOT V0042	PORT LV Equipment room 3DK	
DFO #9 filling sample	FOT V0095	PORT LV Equipment room 3DK	

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

FOT VALVE	ID.	LOCATION	STATUS
DFO #1 Day Tank Quick Closing v/v	FOT V0033	FMMR 2DK Stbd side FWD	
DFO #1 Day Tank filling sample	FOT V0079	FMMR 2DK Stbd side FWD	
DFO #2 Day Tank Quick Closing v/v	FOT V0039	AMMR 3DK Stbd side Aft	
DFO #2 Day Tank filling sample	FOT V0091	AMMR 3DK Stbd side Aft	
DFO #2 OVR Quick Closing v/v	FOT V0041	AMMR 3DK AFT STBD side	
Aux Filling Drain	FOT V0123	Under EHDG Fuel tank on 4DK	
Incinerator Fuel Tank Drain	FOT V0024	Located beside Incinerator fuel tank on 1DK, Solid Waste Handling & treatment	
DFO #9 Set Up			**JP5 or DFO**

*****JP5 Still required to be added once manual is delivered*****

Note: *This form must be completed prior to every RAS/TACRAS event.*

UDER: _____ Aviation Specialist Technician: _____

Fuelling I/C: _____

Date and Time: _____

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

APPENDIX SOP-E01F5

POST FUELLING CHECKLIST

(Ship name): 3350-1 (NTO)

Date

POST FUELLING CHECKLIST

This checklist will be completed and signed by the personnel identified below immediately after fuelling is completed. The Fuelling I/C (or the UDER for Fuel Transfers) will coordinate the timely completion of this checklist and verify the items have been completed.

Item	**POSITION**		**SIGNATURE**
	Fuel Transfers	All other Fuelling Evolutions*	
Clean up fuel position	UDER	UDER	
Ensure jetty service hoses/cables are neatly flaked out on the jetty upon departure, so it does not become a tripping hazard (MARPAC only)	N/A	Fuelling I/C	
Secure fuelling gear and locker	UDER	UDER	
Down comers closed	N/A	Fuelling I/C	
Comm equipment secured	UDER	Fuelling I/C	
Tank filling valves closed	UDER	Fuelling I/C	
Adjacent compartment rounds complete	UDER	Fuelling I/C	
Secure fuelling party	UDER	Fuelling I/C	
Complete fuelling report and submit to NTO	UDER	Fuelling I/C	

**All other fuelling evolutions includes Alongside Fuelling, RAS, TACRAS and De-fuelling.*

Fuelling I/C or UDER: _____

Date and Time: _____

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

APPENDIX SOP-E01F6

FUELLING REPORT

(Ship name): 3350-1 (NTO)

FUELLING REPORT

Date

LOCATION: _____

SUPPLIER: _____

FUELLING OF TANKS:

ORDER TANKS FILLED	TANK	TIME STARTED	TIME STOPPED	VOLUME BEFORE FUELLING (m^3)	VOLUME AFTER FUELLING (m^3)	VOLUME OF FUEL EMBARKED (m^3)
	DFO #1					
	DFO #2					
	DFO #3					
	DFO #4					
	DFO #5					
	DFO #6					
	DFO #7					
	DFO #8					
	DFO #9					
	DAY #1					
	DAY #2					
	SET #1					
	SET #2					
	OVR#1					
	OVR #2					
	F-44 #1					
	F-44 #2					
	F-44 SVC					
	F-44 OVR					
	DFO #9 (F-44)					
	F-67 P					
	F67 S					
TOTAL DFO EMBARKED: _____				TOTAL F-44 EMBARKED: _____		
AVERAGE FLOW RATE: _____				AVERAGE FLOW RATE: _____		

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

UDER: _____

FUELLING I/C: _____

NTO: _____

Dist List
LogO
NavO

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

APPENDIX SOP-E01F7

REGISTRY

(Ship name): 3350-1 (NTO)

Date

CHRONOLOGICAL REGISTER OF EVENTS*		Page: of
Time	**Orders/Events**	**Comments**

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E01G

MONTHLY FUEL REPORT MESSAGE FORMAT

The message format for the monthly fuel report is as follows:

FROM: HMCS (SHIP)

For East Coast Units
TO: MARLANTHQ HALIFAX//N48//
INFO: MARLANTHQ HALIFAX//MCC/ F4 ENG//

For West Coast Units
TO: CFB ESQUIMALT//FSE//
INFO: MARPACHQ ESQUIMALT//J3/ F4 ENG//

SIC: ESL/P2D/LAT
SUBJ: END OF (MONTH) FUEL REPORT
(References are not required)

1. FUEL TRANSACTIONS TO BE READ IN 5 COLUMNS (FUEL ISS OR REC/DATE/TYPE/QTY (CUMS)/SUPPLIER)
2. FUEL CONSUMPTION, READ IN 2 COLUMNS (FUEL TYPE/QTY (CUMS))
3. CURRENT HOLDINGS TO BE READ IN 2 COLUMNS (FUEL TYPE/QTY (CUMS))
4. NO. DAYS AT SEA

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

STANDARD OPERATING PROCEDURE SOP-E02

LIQUID EFFLUENT MANAGEMENT

Purpose

1. To describe the procedures used to ensure that shipboard liquid effluent is managed IAW all regulatory and policy requirements.

Scope

2. This SOP applies to all ships of this class under the jurisdiction of the Commander Maritime Forces Atlantic and Commander Maritime Forces Pacific. This SOP discusses the management of liquid effluent, which includes:

   a. black and grey water;

   b. oily and bilge water;

   c. ballast and sediment; and

   d. miscellaneous materials and sources.

3. When the ship is:

   a. alongside in home port;

   b. at sea;

   c. at anchor, or at a buoy; and

   d. away from homeport.

Definitions

4. The following definitions are used within this SOP:

Term	Definition
Deleterious substance	a. Any substance that, if added to any water, would degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water, or b. Any water that contains a substance in such quantity or concentration, or that has been so treated, processed or changed, by heat or other means, from a natural state that it would, if added to any other water, degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is

rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water.".

Ballast Water	Water taken on or released from the tank(s) used to maintain the trim and stability of the ship.
Black Water	Term used to describe water containing fecal matter and urine. It is also referred to as brown water, foul water, sanitary waste or sewage. On board HMC Ships black water is the drainage from toilets, urinals and medical facilities (including wash basins and scuppers).
Bilge Water	Wastewater that collects in the lowest internal portions of the ship's hull. Bilge water is usually contaminated with oil and other substances associated with ship's normal operations.
Effluent	Any liquid emerging from a pipe or similar outlet, usually refers to waste products from ships' activities.
Exclusive Economic Zone (Canadian)	Area of the sea beyond and adjacent to the territorial sea of Canada where: a. its inner limit is the outer limit of the territorial sea of Canada; and b. its outer limit is the line, which is at a distance of 200 nautical miles from the nearest point of the baselines of the territorial sea of Canada, or as specified in the Oceans Act.
Grey Water	Wastewater that is generated from domestic processes such as culinary activities, bathing, laundry, deck drains, and other waste drains. May also be known as sullage.
Inland Waters	All rivers and lakes and other navigable fresh waters in Canada and includes the St Lawrence Seaway as far seaward as a straight line drawn: a. from Cap-des-Rosiers to the westernmost point of Anticosti Island; and b. from Anticosti Island to the North Shore of the St Lawrence River along the meridian of longitude sixty-three degrees west.
MARPOL Special Areas	Sea areas, where for recognized technical reasons in relation to its oceanographical and ecological condition, and to the particular character of its traffic, the adoption of special mandatory methods for the prevention of sea pollution is required. The current list of Special Areas with their respective restrictions is located at Annex SOP-E02G. Contact MARL/MARP SE for more information regarding the location of these areas.
Oily Water	Wastewater that has oil content.

Sewage Treatment Plant (STP)	Also referred to as a marine sanitation device (MSD) is designed to pump and treat black water. The STP fitted on board HARRY DEWOLF Class ships meets the requirements of paragraph 124 (1) of the Regulations for the Prevention of Pollution from Ships and for Dangerous Chemicals from the Canada Shipping Act, IMO RESOLUTION MEPC 107(49), 159(55) and 227(64). The restrictions provided in this SOP take this fact into consideration.
Waters Under Canadian Jurisdiction	All internal waters of Canada, the territorial sea of Canada and waters in the exclusive economic zone of Canada, including the shipping safety control zones prescribed pursuant to the Arctic Waters Pollution Prevention Act.

Responsibilities

5. NTO:

   a. The NTO is responsible for implementation of this SOP.

6. Senior Mechanical Propulsion Manager:

   a. The Senior Mechanical Propulsion Manager is responsible for the correct operation and maintenance of the reverse osmosis desalinator (ROD) and oily water separator (OWS). Also the Senior Mechanical Propulsion Manager is to ensure that the appropriate records are completed (such as the Oily Water Separator Log, Bilge Log and maintenance records).

7. Senior Mechanical Propulsion Manager:

   a. The Senior Mechanical Propulsion Manager is responsible for the correct operation of the black water treatment system and for maintaining the Ballast and Black Water Logs.

Procedure

BLACK/GREY WATER

8. Ships of the Class are fitted with an STP that can process both black and grey water. It is normal to combine the grey water with black water and the LCMM has recommended that the STP be continuously operated when the ships are at sea. As a minimum, to ensure that the environmental effects of black water discharge are minimized, the restrictions detailed in Table E02.1 shall be adhered to.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Table E02.1 – Black Water Discharge Restrictions

Location	Restrictions
At sea	Within 12 nm discharge is permitted from the STP only. Beyond 12 nm discharge of untreated black water is permitted only when discharged at a moderate rate while the ship is underway and proceeding at a speed of 4 knots or greater.
Homeport	The sea heads are locked shut. Discharge is directed to the jetty services. If jetty services are not available, discharge from the STP directly overboard may be permitted. MARL/MARP SE must be notified prior to discharging any sewage (treated or untreated) overboard.
Away from homeport	Unless local regulations state otherwise, sea heads are locked shut and discharge is to suitable shore facilities or if permitted from the STP directly overboard.
At anchor/buoy	Within 12 nm discharge is permitted from the STP only. The sea heads are locked shut. Consider holding all overboard discharges and shutting down STP when making potable water.

9. In addition to those restrictions, prior to starting/stopping of the STP, the Senior Engineering Watchkeeper consults the OOW for distances from shore and makes a log entry as appropriate. Finally, if the ship is drifting and must make potable water, discharge is permitted only from the STP.

Sewage Treatment Plant Log

10. A log is provided at Annex SOP-E02B for the operation of the STP, which is similar to the log provided at reference G, but has been altered to meet environmental considerations.

Operation and Maintenance of STP

11. In harbour, the correct operation of the STP is the responsibility of the Duty Tech. Should the system become inoperable at any time, then the Senior Mechanical Propulsion Manager and the NTO shall be informed immediately. The operation and maintenance of the STP shall be maintained IAW reference G operation/maintenance instructions and NTO Technical Instructions in special circumstances.

12. Personnel required to work on the black water treatment system and may come in contact with sewage should have up to date immunizations. For more information consult with Canadian Forces Health Services Canada (CF H Svcs C).

Hooking up Black Water Hoses

1. When hooking up black water hoses, personnel are at risk of bacterial infection particularly if they have open cuts or sores. This risk can be minimized through the use of proper Personal Protective Equipment (PPE) and good personal hygiene. Black water hose connections are not to span over the water. While pumping black water to a barge or pumper truck, ensure an upper deck sentry is posted and a person is at the shut off point to shut down the system when the receiving vessel is full or in the event of an incident.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Cold Weather

13. In extremely cold weather the black water hoses are at risk of freezing, one method of keeping them clear is to continuously run water through them. If the hoses have frozen, MARL/MARP SE must be notified prior to discharging any sewage overboard.

Cleaning Sanitary Tanks/Systems

14. Personnel required to enter sanitary tanks or work on sanitary systems may encounter conditions that are detrimental to their health. There is a danger of bacterial infection under these conditions, particularly in the presence of open cuts or sores. This danger can be minimized by good personal hygiene, the proper wearing of PPE, and by following the direction in this SOP. For ships in MARLANT the procedures at MARLANTORD 66-7 provide further direction.

15. All ships must ensure onboard tanks and associated systems that contain superchlorinated water are properly de-chlorinated prior to discharge overboard.

16. All requests to superchlorinate tanks shall trigger the requirement for FMF Metal Finishing Shop to de-chlorinate. Advance notice of at least two weeks shall be given to FMF for all requests to de-chlorinate effluent volumes greater than 100 m^3 to allow for acquisition of sufficient quantities of de-chlorinating agent.

17. Ships shall complete the worksheet provided at Annex SOP-E02F and forward completed copies to FMF and MARL/MARP SE for all de-chlorination evolutions.

18. If a release of superchlorinated water occurs, immediate steps must be taken to notify local authorities. QHM is the point of immediate contact for spills in homeport or nearby coastal waters. Due to the nature of superchlorinated water there is no method of recovery once it is discharged into the harbour.

19. While away from homeport, the wastewater from cleaning tanks must be disposed of IAW with local restrictions.

20. When discharged overboard, the chemicals used to clean the Biomass Separation Unit (BMSU) unit can have a significant environmental impact. To clarify confusion related to these chemicals, the approved chemicals and their functions are provided at Table E02.2. To ensure that the appropriate materials are used to clean and maintain the BMSU, these chemicals shall be procured through Base/Formation Logistics HazMat.

Table E02.2 – Chemicals and their Functions

Chemical Name	Description	NSN	Unit of Issue (container)	Comments
Osmotech 2691 or Osmotech 2610				Osmotech 2691 (or similar) is used during the BSMU Cleaning In Place (CIP) manual cleaning program for the BSMU membranes.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

GREY WATER

21. The environmental impact of grey water is minimal, provided that no hazardous waste or chemicals have been mixed with it. To reduce the effect of grey water discharge on the environment:

a. use of the garburator is prohibited within 3 nm of land. All garburators are shut down and tagged out by the Senior Mechanical Propulsion Manager until the ship proceeds to sea again. The OOW is to be consulted as to when and where garburators are to be tagged out or untagged. In most MARPOL special areas it is prohibited to discharge food waste within 12 nm of land unless it is treated through the sewage treatment/black water system. While alongside the solid/compostable waste will be disposed of IAW SOP-E04;

b. dumping of HazMat into ship's drains is prohibited. This includes paint, paint thinners, toxic or caustic cleaning agents and bleach;

c. the use of detergents and cleaning agents during general cleaning stations is restricted to Canadian Forces Supply System approved products. The Supply Officer ensures that products used, e.g., in the ship's laundry, are procured IAW SOP-SE01; and

d. Aqueous Film Forming Foam (AFFF) shall not be discharged overboard except in emergency situations. In cases where AFFF must be discharged under conditions not considered to be an emergency, the resulting wastewater must be captured, collected and disposed as hazardous waste IAW with SOP-SE01.

OILY WATER/BILGE MANAGEMENT

22. The Naval Technical Department shall be careful to ensure that oil and water accumulation in bilges is kept to a minimum. The following limitations apply to any discharge of oily water:

a. the ship must be underway;

b. the discharge is processed through the oily water separator (OWS) and the undiluted effluent:

(1) has an oil content of less than 5 ppm in inland waters;

(2) has an oil content of less than 15 ppm outside inland waters; and

(3) triggers an alarm and a discharge-stopping device as soon as the oil content in the effluent exceeds the above criteria; and

c. the safety of the ship and personnel overrule any environmental concerns. If the safety of the ship and/or personnel is at risk, oily water may be discharged with the CO's permission.

Bilge Contamination

23. Every effort shall be made to minimize bilge contamination with hazardous materials. Personnel are not to use the bilge as a repository for oily wastes, hazardous wastes, detergent solutions, cleaning

chemicals, solvents, engine coolant inhibitors, boiler cleaning/treatment compounds, etc as these substances can limit the effectiveness or damage the OWS as well as posing a significant safety hazard with respect to Hydrogen Sulphide (H2S) gas. Personnel are to make every effort to stop leaks at the source in equipment/systems and to prevent contamination of the bilge.

Bilge/Oily Water Separator (OWS) Logs

24. The Bilge/Oily Water log (Annex SOP-E02D) shall be maintained in the MCR for all bilges in the ship and entries shall be made whenever liquids other than water are introduced to the bilge or when the bilges are pumped down. Records shall be maintained by the Engineering Roundsperson hourly on the Oily Water Separator (OWS) log (Annex SOP-E02C) anytime the OWS is being used to process bilge water.

Cleaning Bilge

25. Chemical dispersants, including AFFF, and emulsifying agents must not be used for the cleaning and flushing of bilge. Products for this application must be obtained IAW SOP-SE01.

Oily Water Separator (OWS) Maintenance

26. The OWS shall be fully serviceable at all times and will be maintained and operated IAW the CFTOs for the equipment operation and maintenance. Should it become unserviceable, the NTO is to be notified immediately and an OPDEF raised. Maintenance records are retained by the Departmental Maintenance Co-ordinator.

Bilge/Oily Water Pumping Alongside

27. When in home port, contractors are frequently used to remove oily waste water from bilges or the Oily Waste Recovery Tank for treatment and disposal ashore. The contract is administered by the FMF (MARLANT) or BLog (MARPAC) on behalf of the ships. To assist in the administration process of any bilge-pumping contract, NTD personnel will comply with the direction provided in this SOP.

28. Approval to pump bilges must first be sought from the NTO and CO. In MARLANT, the NTD representative contacts FMF to request bilge pumping. The details of the call are to include the ship's contact, normally the duty technician, the locations (bilges/tanks) to be pumped, the amount and the time of the pumping and whether flushing is required. In MARPAC, the NTD representative contacts the oily waste water treatment plant (OWWTP), to inform the operator that the ship requires bilge pumping. When the OWWTP can accept the bilge water, the NTD representative contacts FMF Temporary Jetty Services for hook-up to the jetty kiosk. If the OWWTP cannot accept the bilge water because it does not have capacity or the bilge water is contaminated, the NTD representative shall contact BLog to arrange pumping by vacuum truck.

29. A pollution boom must be in place around the ship for all bilge pumping activities. The NTD representative shall liaise with the Senior Watchkeeper to ensure that a pollution boom will be in place. If a boom is not already in place the Senior Watchkeeper shall submit a request to QHM.

30. Prior to pumping bilges while alongside, the NTD representative must:

a. review the accuracy of the request for pumping (amounts and locations to be pumped, and the names of personnel in the work party);

b. ensure that the hose connections do not span the water between the ship and the jetty, truck or tank;

c. place drip trays under all connections on the upper deck of the ship and have a supply of absorbent pads available;

d. ensure the waterline is illuminated at night in the area where the bilge pumping hoses pass over the water;

e. post a sentry (not from the duty watch) on the jetty in the vicinity of the hoses and ensure the sentry is able to stop the pumping operation in an emergency if required. The sentry must watch the waterline, ship's side and upper deck for signs of leakage;

f. verify the amount in the truck's tank prior to pumping. Verify the amount in the tank prior to the truck's departure. Verify that the tank is empty on return should the contractor have to interrupt bilge pumping to empty the tank. On completion, the NTD representative shall verify that all info on the contractor's invoice is correct, (especially the quantity and type of product removed) print their service number, rank and name and sign the invoice;

g. if pumping to the oily waste water treatment plant, ship's staff are to verify the amount of oily waste water and to ensure the system has been properly isolated; and

h. retain a copy of the invoice/work order on file (in the bilge pumping folder/binder) and forward a copy of the invoice to the LogO and FMF/BLog, if applicable. Also using the information on the invoice/work order the bilge/oily water log at Annex SOP-E02D shall be completed.

31. When away from homeport, the ship should be boomed during bilge pumping operations if possible. A request for a boom is usually included in the LOGREQ message.

SHIP'S REVERSE OSMOSIS DESALINATION UNIT

32. When discharged overboard, the chemicals used to preserve and clean the ROD units can have a significant environmental impact. To clarify confusion related to these chemicals, the approved chemicals and their functions are provided at Table E2.3. To ensure that the appropriate materials are used to clean and maintain the ROD units, these chemicals shall be procured through Base/Formation Logistics HazMat.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Table E02.3 – Chemicals and their Functions

Chemical Name	Description	NSN	Unit of Issue (container)	Comments
MC-1	Citric Acid	6850-21-904-7432	2.2 Kg	MC-1 is used to clean the SROD membranes under normal operating conditions and just prior to a shutdown longer than 72 hours.
MC-4L	Sodium Hydroxide and other caustics	6859-21-921-0683	20 litres	MC4L should only be used to restore membrane permeation rates when cleaning with MC-1 is ineffective.
MP-4	Sodium Metabisulphite	6850-21-912-4554	2 Kg	MP-4 is a sanitizing agent and is most effective after the system has been cleaned.

33. To ensure that the impact of these chemicals on the environment is minimized, the following direction is provided:

a. overboard discharge of these chemical solutions shall only occur beyond 12 nm from nearest land, at a depth greater than 25 metres and at a speed greater than 7 knots; and

b. if the ship is not required to make water with the ROD for an extended period of time, the unit must be preserved. The preservative must be changed IAW the CFTO.

BALLAST WATER AND SEDIMENT DISCHARGE

Ballast Water Management

34. When ballasting or de-ballasting the safety of the ship and personnel holds priority over environmental concerns. Ballast Water Management shall follow the ship's Manual of Trim and Stability, and the CO's permission sought prior to ballast and de-ballast activities. In addition the OOW/Senior Watchkeeper shall be informed and the event recorded by the Senior Mechanical Propulsion Manager (SMPM) IAW the format at Annex SOP-E02E.

35. When ballasting and de-ballasting, every effort shall be taken to prevent the introduction of unwanted and potentially harmful aquatic organisms and pathogens from the ship's ballast water into other ecosystems. This is accomplished by adhering to the following provisions:

a. ballast water taken on in deep ocean, at least 200 nm from land and in 2,000 m of water or greater, is considered clean and does not have discharge restrictions providing the tank only contained that water since being cleaned;

b. ballast water can be taken on in foreign territorial waters and discharged to the same foreign territorial waters provided that the tank has only contained those waters since the last time it was cleaned;

c. when the ship transits between foreign countries, ballast taken on in territorial waters of the departure country shall not be discharged in the waters of the destination country;

d. if ballast water is taken on in foreign territorial waters and the ship's destination is homeport or other waters under Canadian jurisdiction:

(1) ballast exchange shall occur outside of waters under Canadian jurisdiction in a water depth of 2,000 metres in depth or greater; or

(2) for ships that have not left the North American Continental shelf on their inbound voyage ballast exchange can occur in the internal waters of Canada within the Laurentian Channel in water depths exceeding 300 metres, but restricted to the area southeast of 63 degrees west Longitude. A record of the salinity of the ballast water to be discharged into the Great Lakes/St. Lawrence River west of 63 degrees west Longitude shall be entered in the Ship's Log book; or

(3) for ships proceeding to Hudson's Bay ports, ballast water exchange may be made in Hudson Strait in depths exceeding 300 metres restricted to the areas southeast of 70 degrees west Longitude; or

(4) for ships proceeding to Higher Arctic Ports, ballast water exchange may be made in Lancaster Sound in depths exceeding 300 metres restricted to the areas southeast of 80 degrees west Longitude; or

(5) ballast water may be retained onboard; or

(6) ballast water may be treated as a deleterious substance and discharged to on-shore reception facilities IAW with MARL/MARP SE direction;

e. ballast water can be taken on and discharged in waters under Canadian jurisdiction providing the tank has contained only waters under Canadian jurisdiction, since the tank was last cleaned (which includes fresh water from shore); and

f. in extenuating circumstances when the ship can not comply to the above procedures, the ship shall contact MARL/MARP SE for further direction.

Note: Ballast water exchange shall attain an efficiency of at least 95 per cent volumetric exchange, which can be achieved by pumping through three times the volume of each ballast tank.

<u>Sediment Disposal</u>

36. Disposal of ballast tank sediment resulting from routine cleaning of ballast tanks should be carried out in mid ocean outside of Canada's exclusive economic zone. In waters under Canadian jurisdiction, sediments from the ballast tanks that have contained ballast from foreign sources should be disposed of in land dumpsites approved for this purpose or at sea.

37. Records shall be maintained by the Senior Mechanical Propulsion Manager of the amount and date of sediment removal and the disposal method used on the ballast water log (Annex SOP-E02E).

Procedure Performance Criteria and Records

Ballast Log
Bilge Logs

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Black/Grey Water Treatment System Log
Oily Water Separator Log
Release messages

Attachments

Annex SOP-E02A - Liquid Effluent Management References
Annex SOP-E02B - Sewage Treatment Plant Log
Annex SOP-E02C - Oily Water Separator Rounds Sheet
Annex SOP-E02D - Bilge/Oily Water Log
Annex SOP-E02E - Ballast Water Log
Annex SOP-E02F - Chlorination/Dechlorination of Tanks
Annex SOP-E02G - MARPOL Special Area Pollution Matrix

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E02A

LIQUID EFFLUENT MANAGEMENT REFERENCES

A. International Marine Organization, MARPOL 73/78
B. International Marine Organization, Resolution A.774, (18), 26 November 1993
C. International Marine Organization, Resolution A.868 (20): Guidelines for the Control and Management of Ship's Ballast Water to Minimize the Transfer of Harmful Aquatic Organisms and Pathogens
D. Canada Shipping Act - Ballast Water Control and Management Regulations
E. Canada Shipping Act - Pollutant Discharge Reporting Regulations, 1995
F. Canada Shipping Act - Regulations for the Prevention of Pollution from Ships and for Dangerous Chemicals SOR/2007-86
G. CFTO C-27-890-000/MS-002, Installation, Operation, and Maintenance Instructions for Sewage Treatment Plant
H. MARCORD G-18, Environmental Management of Shipboard Waste

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E02B

SEWAGE TREATMENT PLANT LOG

Date and Time	Location (lat/long/ alongside)	Black Water Discharge	Grey Water Discharge	Garburator Discharge		Cell train selected	Overboard Discharge Pumps	Cell Train Hours	Operating Cells		Macerator Oil Levels
									Amps	Volts	
					Cell 1						
					Cell 2						
					Cell 3						
					Cell 1						
					Cell 2						
					Cell 3						
					Cell 1						
					Cell 2						
					Cell 3						
					Cell 1						
					Cell 2						
					Cell 3						
					Cell 1						
					Cell 2						
					Cell 3						
					Cell 1						
					Cell 2						
					Cell 3						
					Cell 1						
					Cell 2						
					Cell 3						

Notes: The log is to be completed any time there is a change in state and daily on an operating STP.

Black water system discharges
shore hook-up (SH)
-treated overboard (TO)
-untreated overboard (UO)
-hold (H)

Grey water discharges
black water (BW)
-untreated overboard (UO)
-hold (H)

Garburator discharges
-via grey water (GW)
-direct overboard (DO)
-shut down (SD)
-locked-out (LO)

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E02C

OILY WATER SEPARATOR ROUNDS SHEET

Date	Time	Latitude (Start & Stop)	Longitude (Start & Stop)	Mode Recirc/ Discharge	Pump Discharge Pressure	PPM Of Oil Detected	Tank/Bilge (Suction Taken)	Tank/Bilge Level	Quantity Discharged	Rounds Initials

Note:

1. Just prior to start of OWS, Senior Engineering Watchkeeper contact OOW for approval and ship's Lat and Long, which is to be recorded.
2. The log is to be recorded hourly.
3. Upon secure of the OWS, again Senior Engineering Watchkeeper contact OOW to advise of completion with the OWS and ship's Lat and Long. Also, quantity of overboard discharge to be determined and recorded. This information is then to be provided to the Senior Engineering Watchkeeper who shall ensure the Bilge/Oily Water Log (Annex SOP-E03D) is completed

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E02D

BILGE/OILY WATER LOG

DATE	TIME	TANK/SPACE	TREATED (Y/N)	PPM OF OVERBOARD DISCHARGE (15/5 PPM)	VOLUME REMOVED	LAT/ LONG	PLACE	EOOW/ D TECH INITIALS

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E02E

BALLAST WATER LOG

DATE	TIME	TANK	VOLUME TAKEN ON	VOLUME DISCHARGED	TREATED (Y/N)	LAT/LONG	PLACE*	INITIALS

**** Location the ballast water was taken onboard or discharged in Canadian waters (i.e., Maritime Training Area A), foreign waters (i.e. Mediterranean Sea) and deep ocean waters.***

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E02F

CHLORINATION/DE-CHLORINATION OF TANKS

Reference: Canadian Council of Ministers for the Environment (CCME) Guidelines; Canadian Water Quality Guidelines for the Protection of Marine Aquatic Life, Updated - December 2007

UNIT

UNIT: _____

TANK: _____

TANK VOLUME: (MAX) _____ m^3 (ACTUAL) _____ m^3

PMED
FMF

CHLORINATION: (THEORETICAL) _____ ppm

ADDED BY: _____ DATE: _____

CHLORINATION

FMF

DECHLORINATION AGENT:

☐ **H_2O_2** concentration _____ %	☐ **SODIUM METABISULPHITE**
INITIAL CHLORINE: _____ ppm	INITIAL CHLORINE: _____ ppm
VOLUME ADDED: _____ Litres	AMOUNT ADDED: _____ kg
AGITATION TIME: ____ hrs	AGITATION TIME: ____ hrs
FREE CHLORINE: _____ ppm	FREE CHLORINE: _____ ppm
pH: _____	pH: _____

TARGETS for safe discharge (at ref): 0.5 ppm Free Chlorine
Note: The lowest reliable limit of detection is higher than the guideline. "Therefore, any detection of reactive chlorine species in aquatic systems is an indication that aquatic life is potentially being negatively affected."

NOTES:_____

_____

DECHLORINATION

CERTIFIED SAFE FOR OVERBOARD DISCHARGE

Signature: _____ Date: _____
FMF Only

NTO: _____ Date: _____

CO: _____ Date: _____

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E02G

MARPOL SPECIAL AREA POLLUTION MATRIX

MARPOL Special Area	Navigational Boundaries	Regulations	
		Oil Pollution	Garbage
Antarctic area	The **Antarctic area** means the sea area south of latitude 60° S.	**X**	**X**
Baltic Sea	The **Baltic Sea** area means the Baltic Sea proper with the Gulf of Bothnia, Gulf of Finland and the entrance to the Baltic Sea bounded by the parallel of the Skaw in the Skagerrak at 57°044.8' N.	**X**	**X**
Black Sea	The **Black Sea** area means the Black Sea proper with the boundary between the Mediterranean and the Black Sea constituted by the parallel 41° N.	**X**	**X**
Gulfs area	The **Gulfs area** means the sea area located north-west of the rhumb line between Ras al Hadd (22°30' N, 059°48' E) and Ras al Fasteh (25°04' N, 061°25' E).	**X**	**X**
Gulf of Aden	The **Gulf of Aden** area means that part of the Gulf of Aden between the Red Sea and the Arabian Sea bounded to the west by the rhumb line between Ras si Ane (12°28.5' N, 043°19.6' E) and Husn Murad (12°40.4' N, 043°30.2'E) and to the east by the rhumb line between Ras Asir (11°50' N, 051°16.9' E) and the Ras Fartak (15°35' N, 052°13.8' E).	**X**	
Mediterranean Sea	The **Mediterranean Sea** area means the Mediterranean Sea proper including the gulfs and seas therein with the boundary between the Mediterranean and the Black Sea constituted by the 41° N parallel and bounded to the west by the Straits of Gibraltar at the meridian of 005°36' W.	**X**	**X**
Nearest Land Definition for north-eastern coast of Australia	Defined as a line drawn from a point on the coast of Australia in latitude 11°00' S, longitude 142°08' E; to a point in latitude 10°35' S, longitude 141°55' E; thence to a point latitude 10°00' S, longitude 142°00' E; thence to a point latitude 9°10' S, longitude 143°52' E; thence to a point latitude 9°00' S, longitude 144°30' E; thence to a point latitude 10°41' S, longitude 145°00' E; thence to a point latitude 13°00' S, longitude 145°00' E; thence to a point latitude 15°00' S, longitude 146°00' E; thence to a point latitude 17°30' S, longitude 147°00' E; thence to a point latitude 21°00' S, longitude 152°55' E; thence to a point latitude 24°30' S, longitude 154°00' E; thence to a point on the coast of Australia in latitude 24°42' S, longitude 153°15' E.	**X**	**X**
North Sea	The **North Sea** area means the North Sea proper including seas therein with the boundary between: - the North Sea southwards of latitude 62° N and eastwards of longitude 004° W: - the Skagerrak, the southern limit of which is determined east of the Skaw by latitude 57°44.8' N; and - the English Channel and its approaches eastwards of longitude 005° W and northwards of latitude 48°30' N.		**X**
North West European Waters	The **North West European Waters** include the North Sea and its approaches, the Irish Sea and its approaches, the Celtic Sea, the English Channel and its approaches and part of the North East Atlantic iimediately to the west of Ireland. The area is bounded by lines joining the following points 48°27′ N on the French coast; 48°27′ N, 006°25′ W; 49°52′ N, 007°44′ W; 50°30′ N, 012° W; 56°30′ N, 012° W; 62° N, 003° W; 62° N on the Norwegian coast; and 57°44.8′ N on the Danish and Swedish coasts.	**X**	

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

MARPOL Special Area	Navigational Boundaries	Regulations	
		Oil Pollution	Garbage
Oman Area of the Arabian Sea	The **Oman Area of the Arabian Sea** means the sea area enclosed by the following co-ordinates 22°30.00′ N, 059°48′ E; 23°47.27′ N, 060°35.73′ E; 22°40.62′ N, 062°25.29′ E; 21°47.40′ N, 063°22.22′ E; 20°30.37′ N, 062°52.41′ E; 19°45.90′ N, 062°25.97′ E; 18°49.92′ N, 062°02.94′ E; 17°44.36′ N, 061°05.53′ E; 16°43.71′ N, 060°25.62′ E; 16°03.90′ N, 059°32.24′ E; 15°15.20′ N, 058°58.52′ E; 14°36.93′ N, 058°10.23′ E; 14°18.93′ N, 057°27.03′ E; 14°11.53′ N, 056°53.75′ E; 13°53.80′ N, 056°19.24′ E; 13°45.86′ N, 055°54.53′ E; 14°27.38′ N, 054°51.42′ E; 14°40.10′ N, 054°27.35′ E; 14°46.21′ N, 054°08.56′ E; 15°20.74′ N, 053°38.33′ E; 15°48.69′ N, 053°32.07′ E; 16°23.02′ N, 053°14.82′ E; and 16°39.06′ N, 053°06.52′ E.	**X**	
Red Sea	The **Red Sea** area means the Red Sea proper including the Gulfs Suez and Aqaba bounded at the south by the rhumb line between Ras si Ane (12°28.5' N, 043°19.6' E) and Husn Murad (12°40.4' N, 043°30.2' E).	**X**	**X**
Southern South African Waters	The **Southern South African Waters** as a special area will provide measures to protect wildlife and the marine environment in an ecologically important region used intensively by shipping	**X**	
Wider Caribbean Region	The **Wider Caribbean Region**, as defined in article 2, paragraph 1, of the Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region (Cartagena de Indias, 1983), means the Gulf of Mexico and Caribbean Sea proper including bays and seas therein and that portion of the Atlantic Ocean within the boundary constituted by the 30° N parallel from Florida eastward to 077°30' W meridian, thence a rhumb line to the intersection of 20° N parallel and 059° W meridian, thence a rhumb line to the intersection of 7°20' N parallel and 050° W meridian, thence a rhumb line drawn south-westerly to the eastern boundary of French Guiana.		**X**

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

STANDARD OPERATING PROCEDURE SOP-E03

HALOCARBON MANAGEMENT

Purpose

1. To describe the procedures used to ensure that shipboard halocarbons are managed IAW all regulatory and policy requirements.

Scope

2. This SOP applies to all ships of this class under the jurisdiction of the Commander Maritime Forces Atlantic and Commander Maritime Forces Pacific. This SOP deals with managing halocarbons in HMC Ships IAW the references and the mandates for ships:

a. appropriate training for technicians working on systems containing halocarbons;

b. eliminating unnecessary release of halocarbons;

c. timely reporting of all halocarbon releases;

d. the recovery and recycling of halocarbons; and

e. the maintenance of all records, reports and notices identified at reference I for at least five years.

Definitions

3. The following definitions are used within this SOP:

Term	Definition
Halocarbons	Organic compounds whose molecular structure includes one or more halides (chlorine, bromine or fluorine). Halocarbon emissions can impact the environment by contributing to climate change as a green-house gas; and/or by destroying ozone in the stratosphere.
Ozone Depleting Substances (ODS)	Chlorofluorocarbon (CFC) or any other substance that has the potential to destroy ozone in the stratosphere.

Responsibilities

4. <u>NTO</u>:

a. The NTO is responsible for implementation of this SOP.

5. <u>Unit Environment Officer (UEnvO)</u>:

a. The UEnvO is responsible for the Halocarbon Management Program. They act as the liaison with MARL/MARP SE on all halocarbon related issues, and works with the NTO to ensure implementation of the SOP including personnel training.

Procedure

PREVENTION OF UNNECESSARY HALOCARBON RELEASES

6. The labelling, storage and transportation of refrigerant containers is done IAW reference G. In addition, the following handling practices are followed:

a. refrigerant containers are stored in a cool place, away from the risk of fire and sources of heat;

b. containers must be handled carefully to prevent mechanical and/or physical damage to the container and its valve;

c. when not in use or in preparation for transporting, container valves are closed, valve outlet cover nuts are screwed on and the valve protection covers are replaced;

d. the piping system connecting a container to a refrigeration system is leak tested before fully opening the container valve;

e. refrigerant transferred to a sealed system is metered either by weight or volume and the amount transferred is recorded;

f. all refrigerant containers shall be weighed and recorded on a Halocarbon Service Log Sheet (Annex SOP-E03B) prior to embarkation and after disembarkation; and

g. all refrigerant containers containing halocarbons shall be leak tested and visually inspected for leakage on a monthly basis, and recorded on a Halocarbon Service Log Sheet (Annex SOP-E03B).

7. Chillers and refrigeration compressors shall be run monthly, as a minimum. Consideration should be given to share running time by switching over compressors on a regular basis. In this manner, mechanical seals will remain lubricated thus preventing potential leaks via dry seal faces.

8. The Rigid-hulled Inflatable Boats (RIBs) use FM200 as a fire fighting agent to protect the engine compartment. FM 200 (HFC-227ea) is a greenhouse gas which has now been designated a controlled substance. Thus FM200 cylinders must be leak tested and visually inspected monthly IAW this SOP and recorded on a Halocarbon Service Log Sheet (Annex SOP-E03B).

9. The Multi Role Rescue Boat (MRRB) and Landing Craft use NOVEC 1230 as a fire fighting agent to protect the engine compartment. NOVEC 1230 is not classified as a controlled substance; however, it is still a halocarbon. Therefore, NOVEC 1230 cylinders must be leak tested and visually inspected monthly IAW this SOP and recorded on a Halocarbon Service Log Sheet (Annex SOP-E03B).

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

HANDLING OF HALOCARBONS

10. Ship's staff must ensure that DND technicians and contractors observe the following practices and procedures for regulated halocarbon used in refrigeration and air conditioning systems:

a. Halocarbon Service Log Sheet (Annex SOP-E03B), shall be maintained for all equipment and system/cylinders containing halocarbons. For maintenance or repairs done to a halocarbon system, by contractors or FMF personnel, a written report (ie, FMF12 form), detailing the work done, is to be provided to Ship's staff on completion. Ship's staff shall then transfer the information contained in the report to the Halocarbon Service Log Sheet (Annex SOP-E03B) and update the Halocarbon management within DRMIS;

b. venting of controlled refrigerants to the atmosphere is prohibited;

c. a refrigeration or air conditioning system is not to be charged with refrigerant until such time as it has successfully passed a system leak test. All leak tests shall be recorded on a Halocarbon Service Log Sheet (Annex SOP-E03B), which is kept as an environmental record;

d. leak tests must be conducted on air conditioning and refrigeration systems monthly as per preventive maintenance schedule. All leak tests and maintenance (corrective and preventive) shall be recorded on a Halocarbon Service Log Sheet (Annex SOP-E03B);

e. charging of refrigeration and air conditioning systems with the halocarbons for the purpose of leak testing is prohibited;

f. personnel responsible for the maintenance of refrigeration and air conditioning systems must be qualified technicians and Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI) certified; and

g. leaking systems must be repaired, the damaged component isolated, and/or the halocarbon recovered as quickly as possible. This must occur within seven days of discovering the leak.

STORAGE OF HALOCARBON CYLINDERS

11. In the event that a Fleet Unit stores halocarbon cylinders (other than halon cylinders) at a Shore Unit facility for more than a month, each cylinder shall be weighed upon receipt and when they are returned to the responsible Fleet Unit. The Shore Unit is not responsible to leak test halocarbon cylinders in storage. It is recommended that the responsible Fleet Unit conduct periodic leak tests of the cylinders. Both the Shore Unit and the responsible Fleet Unit shall keep a record of cylinder weights for five years after the cylinders have been returned. Records shall be signed and dated by personnel from both units. The Fleet Unit must report any gas lost from cylinders during storage to MARL/MARP SE using Annex SOP-E03D.

STORAGE OF HALOCARBON ONBOARD DURING DEPLOYMENT

12. Minimum required halocarbon for refrigeration/air conditioning systems should be stored on-board while at sea. These cylinders shall be leak tested monthly and a log shall be maintained to record the leak test.

13. When alongside in MARLANT, all cylinders containing halocarbon for refrigeration/air conditioning systems use shall be returned to the Formation Logistics HazMat facility. As MARPAC has no dedicated HazMat facility where the ship can store the cylinders while alongside, they must be stored onboard. During a refit, ships in MARPAC can arrange for storage with Base Logistics as per paragraph 14 of this SOP.

HALOCARBON RELEASE REPORTING

14. All halocarbon releases, regardless of amount, must be reported through the chain of command to MARL/MARP SE within 24 hours of the discovery of the release, by most appropriate means. However, MARL/MARP SE must be contacted immediately for releases over 100 kg. The reporting format included at Annex SOP-E3C must be completed to inform MARL/MARP SE of the release. Multiple releases cannot be combined into one release message; a separate release message must be generated for each individual release. The ship is responsible for keeping all release records for a period of five years.

15. An investigation is required for significant halocarbon releases (e.g. releases greater than 10 kg, multiple releases on a common system). For releases resulting from a straightforward equipment failure, the CO may use a UCR to report the results and recommendations. A message must be sent to MARL/MARP SE on conclusion of the UCR indicating the corrective measures taken, UCR date and reference number. However, if the circumstances merit more comprehensive attention with the expectation of a more complex finding, the CO, FTA and/or MARL/MARP SE may require either a Technical Investigation (TI) or Summary Investigation (SI) as appropriate. TIs and SIs are conducted IAW DAODs 7002-2, MARCORD 21-2 and for MARLANT units, MARLANTORD 21-1, or for MARPAC units, MARPACORD 21-1 respectively.

HALOCARBON MANAGEMENT

16. The installation, servicing, leak testing, recharging and disposal of equipment containing regulated halocarbons must be monitored and logged.

17. The Leak Detection System (R-134A on condensing units, alarm 300 ppm) provides an area specific aspirated infra-red detector of refrigerant leaks on various air conditioning and refrigeration systems (ref B/C). It is also fitted with an oxygen monitor which will give visual and audible alarms should the level of oxygen go below the safe to enter limits for personnel.

18. This system is not intended to specifically pinpoint leaks but rather the general area where the leak has been detected. Further investigation on the system by hand held Bacharach portable leak detector or soap test are required to follow up and specifically identify the leak.

19. Ship staff must take the following action if the leak detector indicates a leak:

a. Identify the sensor that has indicted the leak and to what level in PPM;

b. Check oxygen monitor and prove that the space is safe to enter. (Min 19.5 percent);

c. Confirm the actual location of the leak by soap testing and/or by using the Bacharach portable leak detector provided to the ships;

d. Report the leak immediately to the NTO and immediately initiate corrective action to prevent further halocarbon release;

e. In accordance with reference A, the ship is mandated to carry out repairs within seven days of the discovery of the leak;

f. Leaks above 30 PPM are considered major leaks and the equipment is to be shut down and the refrigerant recovered immediately until repairs can be carried out; and

g. Report the release to MARL/MARP SE and investigate in accordance with this SOP.

Halocarbon Service Log

Table E03.1 - Halocarbon Service Log Description

DESCRIPTION	COMMENTS	RETENTION TIME
- Sample Log form at Annex SOP-E03B. - Record all maintenance including preventive maintenance (i.e. 12 months, 24 months etc.), leak tests, corresponding records of notices and cylinder/system transfers. - Completed logs shall be kept as an environmental record in either hard copy or in electronic form.	- Separate Log required for each system/cylinder containing halocarbons. - The Halocarbon Service Log Sheet shall accompany each system/cylinder at all times. - All technicians conducting work on the system shall complete the log. - The Halocarbon Service Log Sheet shall be reviewed and signed quarterly by the CO.	- Retained by the NTO for five years after completion. - During refits logs are to be held by the NTO until after ship's acceptance from the yard.

Leak Testing

20. The objective of halocarbon leak testing is to minimize halocarbon emissions to the atmosphere. Shipboard refrigeration and air conditioning systems containing a halocarbon with a cooling capacity in excess of 19 kW (charge of 3 kg or greater) and all fire-fighting systems containing FM200 shall be leak tested each month as part of the preventive maintenance program. To avoid duplication, the results of one month's test can be used as the federally mandated annual test.

21. Immediately following any repair work completed on equipment or systems containing halocarbon (regardless of charge), a leak test shall be conducted and a leak test sticker shall be placed on the system. The leak test must be performed prior to system recharge and a leak test must also be conducted any time a defect is suspected.

22. All halocarbon containing system/cylinders (refrigerant, NOVEC 1230 or FM200) shall have a current leak test notice affixed to the system/cylinder. Leak test notices shall not be removed unless replaced with another notice. An updated leak test notice shall be affixed following any work completed on a halocarbon containing system/cylinder.

23. The primary leak detection instrument used in the program is the Electronic Leak Detector. The leak detection equipment shall be properly maintained, and TEMMIS registered.

24. Any leak found shall be reported immediately to the NTO, and corrective action initiated to prevent further halocarbon release.

25. If the atmosphere within a space is in question, it must be certified safe to enter by a qualified person before proceeding with response and repairs.

Halocarbon Recovery Unit/Cylinders

26. A halocarbon recovery unit and cylinders shall be on site at all times in case of emergency. Halocarbon recovery cylinders containing halocarbon shall be leak tested monthly and a leak test notice shall be affixed on cylinders. Halocarbon recovery cylinders shall be re-certified every five years.

Notices

27. There are two types of notices, the leak test and the dismantling/decommissioning notice. Both notices are available from MARL/MARP SE and renderings of the notices are provided for info at Annex SOP-E03D and Annex SOP-E03E, respectively. A message is sent out to all units annually in November with respect to number of leak test notices required by each unit. Dismantling/decommissioning notices can be obtained from MARL/MARP SE as required.

28. A dismantling/decommissioning notice shall be placed on the equipment if the halocarbon charge is removed and expected to be out of service for more than a month. This notice shall not be removed until after the system is leak tested and back in service. An updated leak test notice shall be placed on the system.

29. Any time a notice is placed on a halocarbon system/equipment the corresponding info shall also be recorded on a Halocarbon Service Log Sheet.

Inventory

30. An inventory must be maintained for systems, equipment and cylinders containing regulated halocarbons. Completed inventories shall be kept in the Halocarbon Log. All cylinders containing FM200 and any refrigerant systems or equipment containing halocarbon with a cooling capacity in excess of 19 kW (charge of 3 kg or greater) shall be inventoried. The tables provided at Annex SOP-E03F provide the typical holdings on a HARRY DEWOLF Class ship for the FM200 cylinder and the refrigerant systems that contain a halocarbon charge with a cooling capacity in excess of 19 kW (charge of 3 kg or greater). At a minimum, ship's staff are required to record the type of equipment, manufacturer of the equipment, the equipment model, serial number, type of halocarbon contained within the equipment or cylinder, date of last leak test, date of last hydrostatic test, expected charge or mass of the halocarbon within the equipment and the location/space of the equipment or cylinder onboard the ship. The forms provided at Annexes SOP-E03G and SOP-E03H can be used to record inventories

31. By 15 December annually, ships shall confirm and report through the chain of command to MARL/MARP SE their halocarbon holdings.

Procedure Performance Criteria and Records

32. It is recommended that two separate Halocarbon Logs be retained one for the Fire Fighting Systems (NOVEC 1230 and FM 2000) and the other for the Refrigeration and Air Conditioning Systems. The following records and references should be in the logs as appropriate:

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

a. Commanding Officer's Review Sheet

b. List of technicians and their HRAI number (as applicable);

c. Halocarbon Inventory (Annex SOP-E03G or SOP-E03H as appropriate);

d. Current SEMS SOP;

e. Environment Canada's Code of Practice for Elimination of Fluorocarbon Emissions from Refrigeration and Air Conditioning Systems;

f. Current preventive maintenance routine;

g. Halocarbon Service Log Sheets (Annex SOP-E03B);

h. Corresponding records of notices (as a line entry in the Halocarbon Service Log Sheet); and

i. Halocarbon Release Messages.

33. Halocarbon records shall be retained for five years after completion. It is suggested that the working logs hold the current year records and the remaining four years are appropriately filed. Results of any UCRs or investigations with respect to environmental issues shall be retained in the ship's 1262-1 file indefinitely.

Attachments

Annex SOP-E03A - Halocarbon Management References
Annex SOP-E03B - Halocarbon Service Log Sheet
Annex SOP-E03C - Halocarbon Release Message
Annex SOP-E03D - Leak Test Notice
Annex SOP-E03E - Dismantling/Decommissioning Notice
Annex SOP-E03F - Typical Holdings
Annex SOP-E03G - Halocarbon System Inventory
Annex SOP-E03H - Halocarbon Cylinder Inventory

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E03A

HALOCARBON MANAGEMENT REFERENCES

A. Canadian Environmental Protection Act: Federal Halocarbon Regulations, 2003
B. Environment Canada's Code of Practice For Elimination of Fluorocarbon Emissions from Refrigeration and Air Conditioning Systems
C. Codes of Practice for Halon Systems
D. ULC/ORD-C1058.18-2004, The Servicing of Halon and Clean Agent Extinguishing Systems
E. ULC/ORD-C1058.5-2004, Halon and Halocarbon Clean Agent Recovery and Reconditioning Equipment
F. DAOD 4003-0, Environmental Protection and Stewardship
G. A-GG-040-004/AG-001, Hazardous Materials Safety and Management Manual
H. C-03-005-036/AG-001, Management of ODS within the Canadian Navy
I. MARCORD G-19, Halocarbon Management
J. ADM (IE) Instruction 01/03, Halon Management Policy - 2003
K. ADM (IE) ED 4003-01/2003, Spill Reporting
L. ADM (IE) ED 4003-05, (January 2004) Halocarbon Management
M. CSA B52 Mechanical Refrigeration Code

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E03B

HALOCARBON SERVICE LOG SHEET

Unit Name		Serial Number		Cylinder/ System	Storage Location	
Cylinder/System		Halocarbon Type			Maximum Capacity	kg
				Starting Balance		**kg**

Date	Job/DRMIS Notification Number	Activity	Amount (kg)			Technician Name	HRAI	Actions/Remarks
			Charged	Recovered	Balance			

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E03C

HALOCARBON RELEASE MESSAGE

*** The following message format shall be used for all Halocarbon Releases ***

FROM: HMCS (SHIP)

For East Coast Units	For West Coast Units
TO: MARLANTHQ HALIFAX//N48//	TO: MARPACHQ ESQUIMALT//FSE//
INFO: MARLANTHQ HALIFAX//N42//	INFO: MARPACHQ ESQUIMALT//N42 DCOS FTA//
COMCANFLTLANT	COMCANFLTPAC
	CANFLTPAC HQ ESQUIMALT//CCD//F3/F4 ENG//
NDHQ DGMEPM OTTAWA//DNPS 3-4//	NDHQ DGMEPM OTTAWA//DNPS 3-4//

SIC: P2D
SUBJ: HALOCARBON RELEASE REPORT

A. DTG OF OCCURRENCE / DTG OF DISCOVERY
B. TYPE OF HALOCARBON RELEASED
C. QUANTITY RELEASED (KG) / QUANTITY RECOVERED (KG)
D. RELEASE SOURCE (TYPE, DESCRIPTION AND/OR SERIAL NUMBER OF SYSTEM/CONTAINER)
E. LOCATION OF RELEASE (NAME OF PLACE, OR LAT AND LONG)
F. CIRCUMSTANCES LEADING TO AND CAUSE OF THE RELEASE
G. CORRECTIVE ACTION TAKEN AND ACTION PLAN TO PREVENT A SUBSEQUENT RELEASE (PROVIDE DETAILS)
H. UNITS OR AGENCIES NOTIFIED (INCLUDE DATE / REPORTED BY / PERSON SPOKEN TO)
I. RELEASE RELATED EVACUATIONS OR CASUALTIES
J. INVESTIGATION REPORT REFERENCE (E.G., UCR/INVESTIGATION REFERENCE NUMBER)
K. ADDITIONAL COMMENTS
L. COMMANDING OFFICER (NAME / RANK / PHONE NUMBER)

*** If a Halocarbon release of 100kg or greater occurs MARL/MARP SEO must report it to Environment Canada within 24 hours of the release. Therefore, units must provide the following minimum info to MARL/MARP SEO, by the most expedient means possible in order to meet the 24 hr deadline:

A. type of halocarbon;
B. type of system;
C. how much was released; and
D. date and time occurred.

*** Questions regarding Halocarbon Release reporting can be addressed to MARL/MARP SEO***
Note: Messages shall be unclassified unless attached to, or containing classified information (e.g. OPDEF).

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E03D

LEAK TEST NOTICE

Below is a rendering of the leak test notice that is available from MARL/MARP SE:

LEAK TEST NOTICE		
Notice Number	**##/YY**	
Owner/Employer		
Owner's Address		
Unit		
System Description		
Equipment Location		
Technician's Name		
HRAI No.		
Leak Test Date (dd/mm/yy)		
Last 2 Annual (12 months) Leak Test Dates (dd/mm/yy)		
Leak Test:	Passed	Failed
Refrigerant Type		
System Design Charge		kg

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E03E

DISMANTLING/DECOMMISSIONING NOTICE

Below is a rendering of the dismantling/decommissioning notice that is available from MARL/MARP SE:

DISMANTLING/DECOMMISSIONING NOTICE	
Notice Number	
Owner/Employer	
Owner's Address	
Unit	
System Description	
Equipment Location	
Technician's Name	
HRAI No.	
Refrigerant Type	
Quantity of Halocarbon Removed	Kg
Date of Halocarbon Removed (dd/mm/yy)	
System Charging Capacity	Kg
Final Destination of System	

Note: Anytime a dismantling/decommissioning notice is used, ship is to provide the information electronically to MARL/MARP SE and again when the notice is removed and system is returned to service.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E03F

TYPICAL HOLDINGS

The table below represents the systems on a typical HARRY DEWOLF Class ship with a cooling capacity in excess of 19 Kw/hr (charge of 3 Kg or greater).

System	Space/Location	Manufacturer	Model	Refrigerant	Quantity
#1 Chiller	FMMR			R-134a	220kg
#2 Chiller	AMMR			R-134a	220kg
#1 Main Fridge	Domestic Machinery Room			R-134a	TBC
#2 Main Fridge	Domestic Machinery Room			R-134a	TBC

The table below represents the typical cylinder holdings on a HARRY DEWOLF Class ship:

Space/Location	Cylinders	Halocarbon Type	Cylinder Size (Kg)	Weight of Halocarbon (Kg)
RIB	Cyl 1	FM 200 (HFC-227ea)		4.9
Landing Craft (if embarked)		NOVEC 1230		
MRRB		NOVEC 1230		

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E03G

HALOCARBON SYSTEM INVENTORY

Note - this includes all systems with a cooling capacity in excess of 19 Kw/hr (charge of 3 Kg or greater)

Unit: Date:

System Description	Location	Manufacturer	Model #	Serial #	System Capacity (Kw/hr)	Last Leak Test	Halocarbon Type	Maximum Charge (Kg)	Current Charge (Kg)

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E03H

HALOCARBON CYLINDER INVENTORY

Note - this includes all cylinders containing halocarbon cylinders containing greater than 3 kg

Unit: Date:

Location	Cylinder ID #	Halocarbon Type	Cylinder Capacity (kg)	Last Leak Test	Last Hydrostatic Test	Current Charge (kg)

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

STANDARD OPERATING PROCEDURE SOP-E04

SOLID WASTE MANAGEMENT

Purpose

1. To describe the procedures used to ensure that solid waste is managed in a manner that will minimize the impact on the environment, and is in compliance with regulatory and policy requirements including record keeping.

Scope

2. This SOP applies to all ships of this class under the jurisdiction of the Commander Maritime Forces Atlantic and Commander Maritime Forces Pacific. This SOP deals with the collection, processing, storage and disposal of solid waste when the ship is:

a. in homeport;

b. at sea;

c. at a buoy or at anchor; and

d. away from homeport.

Definitions

3. The following definitions are used within this SOP:

Term	Definition
Bio-hazardous Infectious Waste (BIW)	Considered a type of HazWaste and is disposed of IAW SOP-SE01. The following items are not considered biomedical waste, they are solid waste and shall be bagged separately and disposed IAW this SOP: a. contaminated clothing; b. sponges; c. surgery drapes; d. lavage tubes; e. disposable pads and gloves; f. specimen containers; and g. towels, feminine sanitary products and disposable sheets.
Garburated Waste	Limited to food waste that is processed using the Ship's garburators in the galleys and sculleries throughout the ship. Certain foods cannot be garburated such as chicken bones and rice.
MARPOL Special Areas	Sea area where for recognized technical reasons in relation to its oceanographical and ecological condition, and to the particular character of its traffic, the adoption of special mandatory methods for the

prevention of sea pollution is required. The MARPOL special areas are listed at Annex SOP-E02G.

Arctic Waters

Arctic Waters means those waters which are located north of a line from:

a. latitude 58º00´.0 N and longitude 042º00´.0 W;
b. thence to a point latitude 64º 37'.0N; longitude 35º 27'.0W;
c. thence to a point latitude 67º 03'.9N; longitude 26º 33'.4W;
d. thence to a point latitude 70º 49'.56N; longitude 8º 59'61W (Sorkapp, Jan Mayen);
e. thence to a point latitude 73º 31'.6N; longitude 19º 01'.0E (by the island of Bjornoya);
f. latitude 68º 38'.29N; longitude 43º 23'.08E (Cap Kanin Nos);
g. thence by the northern shore of the Asian Continent eastward to the Bering Strait;
h. thence from the Bering Strait westward to latitude 60º N as far as Il'pyrskiy and following the 60th North parallel eastward as far as and including Etolin Strait;
i. thence by the northern shore of the North American continent as far south as latitude 60º N;
j. thence eastward along parallel of latitude 60º N, to longitude 056º37´.1 W; and
k. thence to the latitude 58º00´.0 N, longitude 042º00´.0 W.

Note: although much of the regions of Hudson Bay, James Bay and Ungava Bay are south of 60º N, due to their restricted waters and almost pristine environment, these areas should be considered Arctic Waters and the direction provided in this SOP shall be adhered to.

Maritime Environmental Protection Project (MEPP)

Project to address the operational requirements for waste management in the HDW Class vessels. For the HDW Class, the package of equipment for solid waste management includes a Waste Compactor, Glass Crusher and Incinerator.

Waste Compactor

The Waste Compactor processes solid waste items such as food waste, cardboard and paper waste, plastic, light metal cans and tins.

Glass Crusher

The Glass Crusher pulverises empty glass bottles and jars for storage and recycling.

Incinerator

The Incinerator is a compact plant designed to burn solid waste, sludge oil from the OWS and sewage sludge from the black water system.

Solid Waste

any unwanted or discarded material that is not a liquid or gas. Includes organic wastes, paper products, metals, glass, plastics (includes biodegradable plastic), cloth, leather, rubber, and wood, but does not include sewage and hazardous materials.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Responsibilities

4. UEnvO:

   a. Responsible for ensuring that Solid Waste Management is included in the General Environmental Awareness Briefing (GEAB).

5. Solid Waste Coordinator:

   a. Responsible for ensuring the Solid Waste Management Program detailed in this SOP is implemented.

   b. Ensuring that solid waste handling is performed in a hygienic manner.

   c. Maintaining control of the Garbage Disposal Book and ensure that it is completed by the Solid Waste Handling Supervisors as required.

6. Solid Waste Handling Supervisor:

   a. At sea, musters the Solid Waste Handlers and proceed with the processing and disposal of all waste upon approval from the OOW or as directed for emergency reasons.

   b. Alongside, follows the local regulations for the disposal of waste, or the regulations contained in this SOP, whichever are more stringent.

   c. Notifies the Solid Waste Coordinator of any defects with the solid waste equipment who will in turn notify the NTO to have the problem rectified.

7. Solid Waste Handlers:

   a. Responsible for the implementation of the relevant sections of this SOP.

8. All ship's personnel:

   a. Responsible for doing their part to minimize solid waste, separating it at source and identifying ways to improve solid waste management.

Procedure

SOLID WASTE MANAGEMENT ALONGSIDE (HOMEPORT)

9. Resources available in homeport include, but are not limited to, MARLANT/MARPAC Safety and Environment (MARL/MARP SE), Base Logistics, Real Property Operations Section and QHM.

Solid Waste Collection and Separation

10. To ensure consistency and make it easier to follow recycling procedures, solid waste is separated the same way alongside and at sea with the exception of glass containers which shall be separated for processing in the glass crusher. Annex SOP-E04B provides 'Source Separation Guidelines' for solid

waste, while the locations of suggested 'Recycling Collection Points' on board ships of the Class are provided at Annex SOP-E04C.

Preparation, Processing and Disposal of Solid Waste

11. In homeport, waste is separated and disposed of as follows:

a. **plastic waste** is disposed of as recyclable or garbage depending on the type of plastic. All plastic containers are recyclable as well as plastic bags including: grocery, retail, bread, bubble wrap, dry cleaning, and frozen food bags. Soiled plastic as well as potato chip bags are to be placed in the regular garbage;

b. **cardboard** is recyclable. This material shall be emptied, broken down, kept dry and disposed of in the recycling bins located on the jetty;

- In MARPAC corrugated cardboard should be flattened and placed in the cardboard recycling bin. All other clean cardboard, including clean pizza boxes and cardboard with a waxed coating, shall be placed in the paper recycling bin. Cardboard contaminated with food (e.g. take-out containers) shall be placed in the organics bin. All other spoiled cardboard shall be placed in the garbage;

- In MARLANT corrugated cardboard should be flattened and placed in the cardboard recycling bin (including clean pizza boxes). Cardboard contaminated with food (e.g. take-out containers) shall be placed in the organics bin. All other spoiled cardboard shall be placed in the garbage including waxed cardboard. Boxboard, (i.e. cereal and cracker boxes), is placed with mixed paper for recycling;

c. recyclable **mixed paper** includes writing and computer paper, coloured paper and envelopes with or without windows, newspapers, flyers, glossy magazines, catalogues, egg cartons, paperbacks and phone books. Recyclable paper is placed in the recycling bin located on the jetty. Pre-shredded papers are also to be placed in the recycling bin in clear bags;

d. the tops from **glass bottles and jars** are removed and discarded, and the bottles and jars are rinsed clean. There is no need to remove labels. The cleaned bottles and jars are placed in the recycling bin located on the jetty. Items such as window panes, light bulbs, etc. are not recyclable and are placed with regular waste but labelled and/or packaged so as to ensure the safety of personnel handling this type of waste;

e. **tin/steel cans** are rinsed clean and placed in the recyclable bin located on the jetty;

f. refundable **aluminum pop/beer** cans are rinsed and placed in appropriate recycling bins located throughout the ship. These can be disposed of in the recyclable bin on the jetty;

g. **compostable waste** consists of all leftover food that would normally be garburated at sea including tea bags, coffee grounds and eggshells, as well as items referred to as wet waste, such as food-contaminated waste and foods that would not be garburated. Bulk expired food, once past its expiry date, is treated as compostable waste. Food napkins and kitchen paper towels are also composted;

h. **milk cartons** are rinsed and placed in clear bags with recyclable material. Twenty-litre milk containers are broken down into their separate components, i.e., cardboard box and plastic liner and handled accordingly

- For MARPAC ships, large volumes of expired milk is considered a controlled waste and MARP SE is to be contacted for direction.

- For MARLANT ships, locally purchased milk which has expired may be returned to the manufacturer at no cost. The Formation Solid Waste Manager is to be contacted for disposal of milk purchased outside the local area;

i. **industrial waste**, such as large pieces of metal, scrap wood and pallets are placed in the appropriate bins on the jetty, or in a tri-wall on a pallet on the jetty. Empty tri-walls can be broken down and placed on a pallet on the jetty;

j. grease and fat from the galley, free of bones and other debris, are collected in plastic pails with lids, and transferred to the small bins on the jetty; and

k. garbage is bagged and placed in the garbage bin located on the jetty.

Solid Waste Storage

12. To prevent the inadvertent disposal of recyclable products along with other solid wastes, all recyclables shall be stored in clear bags and placed in the appropriately marked containers located on the jetty. The waste containers on the jetty are not to be over-filled. Compostable material is to be collected in bins or plastic bags that are emptied into the jetty green bins and the bags discarded as garbage. No plastic bags, including biodegradable bags, shall be discarded with compostable material.

13. Cabins and workspaces are equipped with the desk-side colour-coded containers:

a. Blue: recyclable material; and
b. Black: non-recyclable material (garbage).

14. All personnel are responsible for the stowage and proper separation of waste generated in their spaces. Occupants of offices shall place recyclable paper in the common collection containers.

15. The jetty garbage bins are marked "Garbage Only". The recycling bins are marked "Cardboard - Mixed Paper - Refundables/Recyclables Only". The compost bins are green and marked "Compost Only". Personnel are to ensure that the lids on the jetty bins are closed after use to prevent birds and rain from entering. Bins in need of repair or re-labelling are to be reported to the UEnvO for forwarding to Formation Logistics Integrated Waste Management in MARLANT, or Real Property Operations Section (Esquimalt) in MARPAC.

Disposal of Large Amounts of Waste (MARLANT)

16. In the event large amounts of waste must be disposed during one event (e.g. a large quantity of expired food must be disposed), and the appropriate type and/or quantity of waste bins are not available or in close proximity to the ship, Base Logistics Integrated Waste Manager can be contacted to request waste bins be temporally placed adjacent to the ship.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Controlled Waste (MARPAC)

17. Large volumes of food wastes from ships returning to homeport are the most common types of controlled wastes that necessitate disposal at CFB Esquimalt. Although this issue does not arise frequently, situations have occurred which have required controlled waste permits in the past, and which may occur in the future. For example, if a ship returns from deployment and has a large quantity of food to dispose of, or if one of the refrigerators breaks down and the food stores need to be disposed of, a controlled waste permit and designated bin is required. If unsure, ships shall contact MARP SE to confirm whether or not a substance is to be considered a controlled waste.

SOLID WASTE MANAGEMENT AT SEA

18. The major differences between solid waste management at sea and alongside is the processing, storing and emergency disposal procedures that are used to manage solid waste.

Solid Waste Collection and Storage

19. While the ship is at sea, recyclable material is collected in the various containers in the recycle stations located throughout the ship. The solid waste generated by the ship is separated at the source into the following categories:

a. all **plastic** items must be rinsed clean, have no paper products attached (removed as much as possible) and have no food residue in them. Plastic items include plastic garbage bags, plastic milk containers, synthetic rope (nylon, polypropylene), plastic wrap, yogurt containers, etc.;

b. once a **corrugated cardboard** box is empty, any tape, staples or plastic wrap are removed and the box is to be flattened and either stored for disposal at the next available port or compressed in the waste compactor;

c. **recyclable paper**, photo copy paper, note pads, boxboard (eg cereal and cracker boxes), etc. are to be collected in the paper recycle bins and stored in the original box or clear plastic bags;

d. **glass food containers** are rinsed clean and have the lids/caps removed;

e. **steel cans** from fruit and coffee, etc., are rinsed, and have the labels removed;

f. **aluminum pop/beer cans** are deposited in the appropriate recycle containers;

g. all **food waste** must be disposed of IAW Table E04.1. Ships operating in special areas that prevent the overboard discharge of food waste must store waste onboard until such a time the waste can be discharged or offloaded to a shore facility;

h. **grease and fat** are not garburated, but collected for disposal alongside;

i. all workshop **industrial waste** such as; metal, wood and hazardous wastes (as detailed in SOP-SE01), must be processed, stored and disposed of alongside; and

j. for MARPAC Units, waste liquids such as spoiled or unwanted milk shall be disposed of through the Real Property Operations Section . For MARLANT Units, waste liquids such as spoiled or unwanted milk should be returned in the original containers to the dairy. If the milk is purchased outside the country, once it is landed, it must be disposed as international waste.

Solid Waste Management at Sea – Operation of Incinerator

20. The purpose of the Incinerator System is to dispose of combustible solid waste and the contents of the ship's oily sludge system. Under normal conditions, the incineration plant can operate indefinitely and has ben constructed in accordance with MEPC.24(66). The incineration plant is fully automatic and capable of burning solid waste and oil sludge simultaneously.

21. The incinerator must be used while at sea and its use is prohibited while in port, at offshore terminals, estuaries and inland waters. The incinerator shall not be operated during flying stations, upper deck evolutions and boat operations. If operation of the incinerator alongside home port is required for maintenance ship staff are to first contact MARL/MARP SE. Sewage sludge or sludge oil generated during the normal operation of a vessel may be incinerated in the main or auxiliary power plant or the boilers on the vessel if the incineration does not take place inside ports, harbours or estuaries.

22. The following material is not to be incinerated:

a. glass, metals, ceramics, electronic equipment, batteries, aerosols and explosive material;

b. plastics containing polychlorinated biphenyls (PCBs);

c. garbage containing more than trace amounts of heavy metals;

d. refined petroleum products containing halogen compounds;

e. oil cargo residues, noxious liquid substance cargo residues and marine pollutants;

f. sewage sludge and sludge oil that are not generated on board the vessel; and

g. exhaust gas cleaning system residues.

23. The incinerator fotted on HDW is designed to meet MEPC.244(66) operating standards and burn Class 2 Solid Waste mixture provided in the table below. This mixture will have up to 50% moisture and 7% incombustible solid material. Refuse collection consists evenly of rubbish and garbage by weight. This type of waste is common on passenger ships. Heating value for this mixture is approximately 2400 kcal / kg (10MJ / kg) as fired.

Class 2 Solid Waste		
Food Waste		50%
Rubbish	Paper	15%
	Cardboard	20%
	Rags	5%
	Plastic	10%

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

24. Ash and residue from shipboard incinerators are considered as operational waste and, therefore, as garbage that is not eligible for discharge into the sea. All ash and residue must be disposed ashore using proper facilities. All personnel removing ash and residue from the incinerator must use appropriate PPE

25. A person must not incinerate polyvinyl chlorides on a vessel unless the incineration is in a shipboard incinerator that meets the requirements of regulation 16.6.1 of Annex VI to MARPOL.

26. The NTO must ensure that the personnel responsible for the operation of a shipboard incinerator are trained and capable of implementing the guidance provided in the manufacturer's operating manual and that when batch loading the incinerator

27. The NTO must ensure that:

a. the combustion flue gas outlet temperature of a shipboard incinerator is monitored at all times; and

b. waste or other matter is not fed into a continuous-feed shipboard incinerator when the temperature is below 850°C.

28. The authorized representative of a vessel on which a batch-loaded shipboard incinerator is installed must ensure that it is designed so that the temperature in the combustion chamber reaches 600°C within five minutes after start-up and stabilizes at not less than 850°C.

<u>Solid Waste Management at Sea - Exceptions</u>

29. Para 19 shall not apply when:

a. The discharge of garbage from a ship is necessary for the purpose of securing the safety of a ship and those on board, saving life at sea, or when doing so can have adverse effects on operations. These can include but are not limited to:

(1) Foreign object damage/flying operations risks resulting from upper deck storage of solid waste (such as the attraction of waterfowl, etc.);

(2) Health or infectious risks from waste stored for extended periods;

(3) Combustible risks to equipment resulting from solid waste stored in the immediate vicinity; and

(4) Operation/maintenance risks to equipment or crew resulting from inaccessible equipment due to excessive solid waste storage.

b. The accidental loss of garbage resulting from damage to a ship or its equipment, provided that all reasonable precautions have been taken before and after the occurrence of the damage, to prevent or minimize the accidental loss.

30. If it is necessary to dispose of solid waste while at sea, ships are to ensure priority is given to disposing of items that have minimal environmental impact and the greatest impact on health and safety

such as food waste, paper products and glass. These items should be broken down to the smallest size possible prior to disposal. Plastics are not to be discharged at any time.

31. Any disposal of garbage at sea shall be recorded in the Garbage Disposal book (Annex SOP-E04D), and the OOW notebook.

Solid Waste Processing

32. Ships of the Class have been fitted with a Solid Waste Handling System (as part of the MEPP) located in the Solid Waste Handling Compartment. This consists of the following:

a. **Waste Compactor:** can process solid waste items such as food waste, cardboard and paper waste, plastic, light metal cans and tins. Solid waste is compressed and sealed in bags specific to the operation of the equipment for increased storage space.

b. **Glass Crusher:** processes empty glass bottles and jars. The glass is crushed into small bits for increased storage.

c. **Incinerator:** the incinerator is a compact plant designed to burn solid waste and sludge oil.

d. **Storage Racks**: are fitted to store not less than three days of untreated waste or the treated residue of all processed solid and plastic waste generated over a 120 day period.

33. As designated by the ship, the Solid Waste Handling Supervisor will muster the Solid Waste Handlers and proceed with the processing and storage of all waste.

34. As a minimum, a solid waste handling party of no fewer than two personnel (taken from a department on a rotational basis) with at least an LS supervisor will be employed.

35. To safeguard hygiene, all food waste must be separated from paper plates and napkins after each meal and disposed of as per Table E04.1.

Solid Waste Disposal

36. Food waste disposal at sea must be very tightly controlled to prevent an incident that may have serious legal repercussions. Before using garburators (IAW SOP-E02), permission must be obtained from the OOW. The OOW must note the commencement and termination of waste disposal in the OOW notebook.

37. When, for safety reasons, garbage disposal at sea is required, the Solid Waste Coordinator shall brief the OOW who will seek the Commanding Officer's permission to dispose garbage at sea. The OOW will evaluate the situation taking into account the ship's location and safety concerns, and if conditions permit, allows the waste dumping to proceed. The Solid Waste Handlers, and spare hands of the watch as necessary, will be overseen by the Solid Waste Handling Supervisor when dumping garbage.

38. The Solid Waste Handling Supervisor shall record the necessary information in the Garbage Disposal Book. He/she must clearly explain and justify the reasons for disposing garbage at sea along with the ship's coordinates at the time of disposal in Annex SOP-E04D. The Solid Waste Coordinator is

to ensure the Garbage Disposal Book is maintained at all times should it be needed for investigation purposes.

Food Waste

39. The garburators can be operated in two modes; discharge directly over the side, or discharge to the ship's black/grey water system. When disposing food waste, the normal operating mode to be used shall be to discharge directly over the side. The Senior Mechanical Propulsion Manager and Senior Cook shall confirm with the OOW that the ship is outside restricted waters before disposing food waste over the side. Disposal of food waste shall be made as far as practicable from land, but in any case not less than three nautical miles from the nearest land. It should be noted stricter regulations apply for MARPOL Special Areas, the Great Lakes and the Arctic.

40. Other restrictions on solid waste disposal are shown in Table E04.1.

Table E04.1 - Solid Waste Disposal Restrictions (IAW Annex SOP-E02G)

SOLID WASTE TYPE	RESTRICTIONS
Plastics*	Zero discharge
Garbage	Zero discharge
Garburated food waste	>3 nm from any coastline >3 nm from any coastline within the Wider Caribbean Region >12 nm in MARPOL Special Areas** Zero discharge Arctic waters
Non-Garburated food waste	>12nm from any coastline Zero discharge in MARPOL Special Areas** Zero discharge Arctic waters

* *Includes biodegradable plastics*
***MARPOL Special Areas are listed in SOP-E02 Annex SOP-E02G.*

Exceptions

41. Garbage disposal at sea may be allowed if:

a. the disposal of garbage from a ship is necessary for the purpose of securing the safety of a ship and those on board or saving life at sea; or

b. The escape of garbage is the result from damage to a ship or its equipment provided all reasonable precautions have been taken before and after the occurrence of the damage, for the purpose of preventing or minimizing the escape.

42. The CO is the only person who may grant permission if required and any discharge using these exceptions must be recorded in the OOW Logbook and Garbage Disposal Book. Discharge is to be managed to minimize the environmental impact to the greatest extent practicable, with due consideration to mitigation factors such as maximizing the distance from environmentally sensitive areas and minimizing the rate of discharge. Ships may consult MARL/MARP SE as required for mitigation guidance.

43. Where operational requirements conflict with the vessel's ability to comply with this order, the Maritime Component Commander (MCC) is to be informed to obtain resolution.

SOLID WASTE DISPOSAL AT A BUOY OR AT ANCHOR

44. When ships are secured to buoys for extended periods of time, arrangements must be made for landing of separated waste. These services are normally provided by QHM in homeport and will have to be addressed in LOGREQs for ports other than homeport.

WASTE DISPOSAL ALONGSIDE (AWAY FROM HOMEPORT)

45. Depending on the restrictions and cost for waste disposal, the Solid Waste Coordinator/UEnvO determines whether the waste handling system is used in foreign ports or if waste is directly landed ashore. The ship's company is informed prior to securing alongside.

INTERNATIONAL WASTE

46. When a ship arrives in homeport from a foreign deployment, other than the United States, stores and food materials may be considered international waste. The appropriate handling and disposal of international waste is the responsibility of the Solid Waste Coordinator, with advice provided by the Logistics Officer (LogO). Improper practices could result in the introduction of an exotic pathogen, disease, pest, or toxic substance into Canada.

47. Initially the ship must determine if their stores or food materials are considered international; if there are questions regarding this designation the ship is to contact MARL/MARP SE as early as possible. International waste from a foreign location may include:

a. refuse that contains, or is suspected to contain, animal products or an animal by-product;

b. wood packaging materials such as dunnage, pallets or crating; and

c. fresh fruit and vegetables.

48. If international waste is identified, the ship will make arrangements with QHM (through a LOGREQ prior to arrival) requesting international waste bins. International waste is placed in a bin specifically labeled international waste. This bin will be used until all stores of international waste are depleted. To assist with the appropriate disposal of international waste, it must be separated from domestic waste during deployment.

49. If the ship retains international food stores for consumption onboard following return to homeport, the resulting food waste is considered international waste and must be handled as such. As a quality assurance check, the Canadian Food Inspection Agency may on occasion board a ship, in conjunction with Canada Customs, to determine that proper waste handling requirements are being met.

GARBAGE DISPOSAL BOOK

50. The Solid Waste Coordinator shall:

a. ensure that each disposal or discharge is recorded in the Garbage Disposal book without delay each time the disposal or discharge takes place;

b. ensure that each recorded entry is signed by the Solid Waste Handling Supervisor of the disposal or discharge; and

c. sign each completed page of the Garbage Disposal book as part of the quarterly review.

51. For the purposes of the Garbage Disposal book, garbage is grouped into the following categories:

1 - Plastics;
2 - Floating dunnage, lining, or packing materials;
3 - Ground paper products, rags, glass, metal, bottles, crockery, etc;
4 - Paper products, rags, glass, metal, bottles, crockery, etc; or
5 - Non garburated food waste.

52. Garbage that is discharged into the sea shall be categorized as Category 2, 3, 4 or 5 garbage.

53. Garbage that is transferred to a reception facility shall be categorized as either Category 1 garbage or grouped together as "other garbage" in the case of Category 2, 3, 4, or 5 garbage.

54. A receipt or certificate shall be obtained from the owner or operator of a reception facility receiving garbage that sets out the date, time, and estimated amount of garbage transferred to the reception facility.

55. Records associated with the Garbage Disposal Book and all receipts or certificates shall be retained for a period of two years. The CO shall review the book quarterly.

Procedure Performance Criteria and Records

Garbage Disposal Book
OOW Notebook

Attachments

Annex SOP-E04A - Solid Waste Management References
Annex SOP-E04B - Source Separation Guidelines
Annex SOP-E04C - Suggested Recycling Station Collection Points
Annex SOP-E04D - Record of Solid Waste Disposal at Sea

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E04A

SOLID WASTE MANAGEMENT REFERENCES

A. MARPOL 73/78
B. Canada Shipping Act
C. MARCORD G-18, Environmental Management of Shipboard Waste
D. International Code for Ships Operating in Polar Waters (Polar Code)
E. C-27-G39-000/MS-002 – Incinerator Equipment

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E04B

SOURCE SEPARATION GUIDELINES

MIXED PAPER

1. Place the following items in a "BLUE DESK-SIDE" or "RECYCLING CENTER" container marked "MIXED PAPER ONLY":

- Adhesive labels
- Bond stock paper
- Computer print-out paper
- Egg cartons
- Envelopes
- Fax paper
- Flyers
- Glossy flyers
- Glue edged reports
- Junk mail
- Paper coffee cups
- Sugar, flour and potato bags
- Laser print-outs
- Letterhead
- Newspaper
- Photocopier paper
- Post it notes
- Reports (plastic bindings and tabs removed)
- Stationery
- Telephone books
- Window envelopes
- Boxboard such as cereal, tissue, cracker, etc MARPAC only

2. The following products, often associated with paper products, are not recyclable and DO NOT belong with Mixed Paper:

- Carbon paper
- Food soiled paper
- Paper coffee cups (MARLANT only)
- Plastic/metal spines
- Styrofoam

CORRUGATED CARDBOARD

3. Corrugated cardboard must be broken down and placed in the recycling containers on the jetties.

REFUNDABLE/RECYCLABLE

4. Note the type of recyclable plastic is identified by the recycling logo and a number on the bottom of the container, or on the film or bag as follows:

where:

1 - PETE (polyethylene terephthalate, used for soft drink and squeeze bottles);
2 - HDPE (high density polyethylene, used for rigid containers);

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

3 - PVC (polyvinyl chloride, generally phased out);
4 - LDPE (low density polyethylene, used for film and bags);
5 - PP (polypropylene);
6 - PS (polystyrene, used for food or beverage containers); and
7 - Other (miscellaneous category).

5. The following is a list of acceptable items that can be placed in the REFUNDABLE/RECYCLABLE containers:

- All beverage containers such as soft drink bottles (#1 PETE), cans, alcoholic beverage containers, juice containers, water bottles, tetra packs and gable tops
- Glass bottles and jars (keep separate at sea for processing in the Glass Crusher)
- Milk cartons
- PETE (1), HDPE (2) or LDPE (4) Rigid plastic bottles and containers such as Javex, shampoo, pop, yogurt, ice cream, margarine containers
- Plastic grocery and bread bags (MARLANT only)
- Tin and steel cans

Note: All containers aforementioned shall be rinsed clean. There is no need to remove the container labels. Tin and steel cans as well as milk cartons shall be flattened out. Glass bottles and jars shall be free of lids and plastic grocery and bread bags shall be clean.

Exceptions

6. The following items are not recyclable and must go in the regular garbage:

- Styrofoam; and
- Bottle caps, toys, dvd cases, plastic cutlery, coffee/pop cups and lids, cereal box liners, straws, pipe, and packaging that is made of a combination of plastic plus paper.

7. While at sea glass waste must be separated for processing in glass crusher.

COMPOSTABLE ORGANIC MATERIALS

Food Waste
- Bread, rice and pasta
- Coffee grounds and filters
- Dairy products
- Egg shells
- Fruit and vegetable peelings
- Meat, chicken, fish, bones
- Shellfish
- Sugar, flour and potato paper bags (MARLANT only)
- Table scraps
- Tea bags

Other Compostable Waste
- Uncoated paper take-out containers
- Damp/soiled, non-recyclable paper
- Soiled food napkins and paper towels
- Paper plates and cups
- Other material such as sawdust and wood shavings

Note: Avoid putting excess liquids in the compost bags. Remove liners and other plastics/metals from box-board materials. Boxboard may be used to wrap wet food waste

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E04C

SUGGESTED RECYCLING STATION COLLECTION POINTS

1. The table below lists suggested positions for containers to collect the types of recyclables detailed:

Table E04C.1 - Suggested Recycling Station Collection Points

LOCATION	NUMBER OF CONTAINERS	TYPE OF WASTE/MATERIAL COLLECTED
Canteen Flats	3	Paper/drink containers/plastic
Ship's Office	2	Paper/drink containers
MSE Tech Office	3	Paper/drink containers/dry garbage
CCR	2	Paper/drink containers
OPS ROOM	3	Paper/drink containers/dry garbage
Galley	5	Glass and tin cans/plastic/wet garbage/dry garbage/cardboard
MS&Below Scullery	4	Wet garbage/plastic/dry garbage/cardboard
C&POs Scullery	4	Food contaminated waste/plastic/dry garbage/cardboard
Wardroom Pantry	5	Glass and tin cans/plastic/wet garbage/dry garbage/cardboard
Port Breezeway	3	Dry garbage/drink containers/plastic
C&POs Lounge	3	Dry garbage/drink containers/paper
MS&Below Lounge	2	Dry garbage/pop cans
Wardroom	2	Dry garbage/drink containers/paper
Hangar	5	Glass/dry garbage/plastics/drink containers/cardboard
ADR	3	Paper/drink containers/dry garbage
Fridge Flats	1	Cardboard
MCR	4	Paper/dry garbage/wet garbage/drink containers
Shipwright's Shop	4	Paper/dry garbage/wood/ metal
Officer's & Coxn's Cabins	2	Paper/dry garbage/wet garbage/
Messes	2	Paper/dry garbage/wet garbage/
Deck Office (Gunner's Store)	2	Paper/dry garbage/wet garbage/
HQ2	2	Paper/dry garbage/wet garbage/

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E04D

RECORD OF SOLID WASTE DISPOSAL AT SEA

Date	Time	Ship's Position	Category	Quantity (m^3)	Rationale for Emergency Disposal of Solid Waste at Sea	Responsible Person

Examples of disposal rationale which would constitute due diligence:

- To enable staff to gain safe access to critical electrical equipment within compartment X, category 2 waste was disposed which could not be stored in any other compartment without impeding the safety of personnel.
- Bags containing mixed paper and non-garburated food were disposed due to a strong odour creating an OHS concern for personnel.
- Paper and cardboard were disposed of as storage areas were at extremely high levels creating a major fire hazard.
- Category 3 wastes were disposed of as the increased amount of stored glass and metal became a safety hazard to personnel who need access to the storage spaces.

Waste categories:

1 - Plastic
2 - Floating dunnage, lining, or packing materials
3 - Ground paper products, rags, glass, metal, bottles, crockery, etc
4 - Paper products, rags, glass, metal, bottles, crockery, etc
5 - Food waste (non garburated)

NOTE: Disposal of solid waste shall only be done when necessary for the purpose of securing the safety of a ship and those on board or saving life at sea. All disposal of solid waste must be recorded in the table above stating the rationale for disposing solid waste at sea.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

STANDARD OPERATING PROCEDURE SOP-E05

MARINE MAMMAL IMPACT MITIGATION PROCEDURES

Purpose

1. To provide mitigation procedures to minimize the disturbance, harassment or harm of marine mammals when conducting operations, exercises or training.

Scope

2. This SOP applies to all ships of this class under the jurisdiction of the Commander Maritime Forces Atlantic and Commander Maritime Forces Pacific. This SOP also applies to all FMF CB/FMF CS personnel and/or contractors conducting alongside trials and/or maintenance on HARRY DEWOLF Class vessels.

Definitions

3. The following definitions are used within this SOP:

Term	Definition
Area with restrictions (AWR)	An area with restrictions due to environmental sensitivities. Restrictions may be on military activities, and may be seasonal or year round. AWRs may include but are not limited to Marine Protected Areas (MPAs), proposed MPAs, National Marine Wildlife Areas, Species at Risk Critical Habitat, and International Marine Organization (IMO) Areas To Be Avoided. RCN or Coastal Commands may promulgate other environmentally sensitive areas where it has been decided to impose additional operational restrictions.
Distress	Any marine wildlife behaviour that would appear to be abnormal and indicative of suffering or fear, this may include but is not limited to beaching, entanglement, injury and fleeing.
Marine Mammals (MM)	For the purpose of this document, Marine Mammals are restricted to whales, dolphins and porpoises.
Marine Species Awareness Training (MSAT)	Training that provides information on MM sighting cues, visual observation tools and techniques, and sighting notification procedures.
Mitigation Avoidance Zone (MAZ)	The underwater region surrounding a sound source where marine mammals may be disturbed, harassed or harmed. MAZ size has been calculated for normal Canadian operating areas using a sound exposure level that minimizes adverse impacts on marine mammals.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Responsibilities

5. Commanding Officer (CO):

   a. Responsible for ensuring personnel under their command are aware of the policies and procedures in this SOP and have access to training aids including identification materials provided by MARL/MARP SE Offices.

6. Navigating Officer (NavO)

   a. The NavO is responsible for assessing the risk of encountering MM and sensitive ecosystems during transit planning;

   b. Avoiding those areas if possible; and

   c. Reporting detections of MM. The NavO will ensure the CO is appropriately briefed on AWR.

7. Lookouts

   a. Responsible for maintaining a visual search for MM when the vessel is underway and during all exercises.

8. Officer of the Watch (OOW)

   a. Responsible to ensure that required records are completed IAW this SOP; and

   b. The ORO is informed when MM are observed.

9. Operations Room Officer (ORO)

   a. Coordinate all activities while within an AWR; and

   b. Work with the Heads of Department (HODs) to ensure activities are controlled IAW this SOP.

Procedure

TRAINING REQUIREMENTS

10. All bridge watch personnel and helicopter aircrews must complete MSAT annually in MARPAC. In MARLANT, this training is available upon request.

11. Marine mammal identification tools are provided to the ships through coastal MARL/MARP SE offices. They are to be available on the bridge and the OOWs and Lookouts shall be briefed on their use.

AREA WITH RESTRICTIONS

12. The geographic location of AWRs and their associated military limitations are detailed in Reference L.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

13. Exercise planners, command teams, and NavOs shall consult these References (noted in paragraph 11) to ensure that proposed military activities do no conflict with AWRs.

14. AWR information is kept as current as possible; however MARL/MARP SE offices shall be engaged to provide exercise planners, command teams and NavOs with situational awareness and mitigation measures/advice pertaining to seasonal fluctuations in marine species concentration areas.

15. OOW shall conduct the following prior to entering and upon exit of an AWR:

a. Inform CO;

b. Brief the watch on AWR and applicable military limitations within it; and

c. Record date/time in OOW notebook.

16. The ORO shall ensure all activities are in compliance with this SOP and Reference J.

MITIGATION PROCEDURES

Active Sonar Use

17. HDW is not fitted with active sonar systems.

Marine Mammal Recording and Reporting

18. Mitigation procedures for marine mammal recording and reporting are detailed in Annex SOP-E05C.

Risk Management

19. If operating outside the direction in this SOP, risk management direction as per Reference K, shall be applied.

Procedure Performance Criteria and Records

20. Records generated from each mitigation measure are provided in their applicable annex.

Attachments

Annex SOP-E05A - Marine Mammal Impact Mitigation Procedures References
Annex SOP-E05B - Marine Mammal Impact Mitigation Procedures for Active Sonar Use
Annex SOP-E05C - Marine Mammal Recording and Reporting
Appendix SOP-E05C1 - Marine Mammal Sighting Record
Appendix SOP-E05C2 - Marine Mammal Report Message

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E05A

MARINE MAMMAL IMPACT MITIGATION PROCEDURES REFERENCES

A. Species at Risk Act, Environment Canada 2002
B. Tamara Eder, Whales and Other Marine Mammals of Atlantic Canada – Feb 2012
C. 2006 Annual Notices To Mariners: A.2 Marine Mammal Guidelines and Marine Protected Areas
D. MARLANT SEMS Manual, Directive E12 Range and Training Area Management
E. MARLANT Marine Mammal Identification Tool – Posters (Identifying Whales, Dolphins, Seals and Sea Turtles Atlantic Coast)
F. MARLANT OP Area Management Plan (MOAMP)
G. MARPAC Marine Mammal Identification Tool – Whales, Dolphins & Porpoises of British Columbia
H. SANDS (Sea Animal Noise database System), UK MOD ADAC, 1999
I. NAVORD 4003-6 Marine Mammal Mitigation Procedures for Active Sonar Use
J. NAVORD 4995-0 Safety Firing Orders For Ships & Submarines
K. NAVORD 3001-1 In-Service Naval Material Risk Management – Process
L. SHINNADS Ecosystem Additional Military Layer
M. Richardson, WJ, et al. 1995. Marine Mammals and Noise. Academic Press, Inc.
N. Theriault, JA. 2005. Proposed Ramp-Up Protocol for AN/SQS-510 Active Sonar (U), DRDC Atlantic TM 2005-206. Classified.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E05B

MARINE MAMMAL IMPACT MITIGATION PROCEDURES FOR ACTIVE SONAR USE

21. This annex provides direction for conducting exercises, trials, maintenance and operations that involve the use of Active Sonar Systems that may disturb, harass or harm marine mammals.

22. For the purpose of this SOP, the following are considered sources of active sonar generated during naval activities:

a. SSQ-62 DICASS Buoys.

Procedure

23. General mitigation measures to be employed by the ship during activities involving active sonar include the following:

a. OOW and Lookouts to conduct and maintain visual search for MM for at least 30 minutes prior to activity commencement and throughout duration of activity;

b. At a minimum of 10 minutes prior to commencing ramp-up procedures, start watch on passive systems to include Under Water Telephone, passive sonobuoys (if deployed), CANTASS (if deployed), and Hull Mounted Sonar in passive to detect MM; and

c. When available make use of aircraft to locate and monitor MM.

24. MAZ procedures to be employed by the ship during activities involving active sonar include the following:

a. Sound intensity underwater decreases with range due primarily to attenuation and geometric spreading losses. For vessels fitted with an acoustic range prediction system, a minimum of one hour prior to event start, launch an expendable probe to calculate current sound velocity profile and compare with acoustic range prediction systems to assess potential for changes to the established MAZ, which is based on an impact criteria of 160 dB re 1 μPa (at the receptor/MM), as per Table E05B.1;

b. If MM are detected, the approximate locations and numbers shall be reported to the bridge and recorded in accordance with SOP E05C;

c. Consorts in the area shall be alerted to the presence of MM;

d. Helos conducting dipped sonar transducer operations are to suspend transmissions until MM moves outside MAZ of sonar transducer or break dip and relocate outside MAZ;

e. Activity will not commence, or will cease, if MM are detected within the MAZ, as defined in Table E05B.1 or as determined through sound velocity profile, whichever is more stringent;

f. Activity will re-commence if any of the following conditions are met:

(1) MM is observed exiting the MAZ;

(2) MM is believed to have exited the MAZ based on its course and speed; or

(3) MAZ has been clear from any additional MM sightings for a period of 10 minutes.

Table E05B.1 – Recommended MAZ for Active Sonar

Source	Recommended MAZ
SSQ-62 DICASS Buoys	300 yards

RAMP-UP MITIGATION

25. Prior to any activity associated with active sonar, ramp up procedures are to be followed. "A common mitigation measure (known as ramp up or soft start) is to slowly increase the sonar's source level (Ref M) under the assumption that it will allow animals to leave the area before an adverse effect occurs." Because the SQS-510 sonar was not designed with a ramp-up mode capability, the ramp-up procedure described below provides what is achievable based on the current SQS-510 hardware configuration. Furthermore, the range of vocalization frequencies for a variety of MM species indicates that little is gained in varying between the 3 selectable SQS-510 frequencies. As a result, the SQS-510 sonar is to be employed in the 7.2 kHz, Mine Avoidance Linear Period (LPM) waveform mode, for the majority of the ramp-up period. This mode emits the least amount of energy for a given transmission mode. The 700 Hz sweep width is to be used as it minimizes the possibility of exciting any MM cavity resonance.

a. **Phase 1: 0 to 5 minutes**:

(1) Directional Transmission Wide (DTW);

(2) Low power;

(3) One emission in manual mode, in the exercise grid direction or, if already in the grid, in the direction of least MM encounters probability; and

(4) Ships are to listen for any MM feedback.

b. **Phase 2: 5 to 10 minutes:**

(1) DTW;

Low power;

Range scale at maximum, in the exercise grid direction or, if already in the grid, in the direction of least MM encounters probability; and

Operators are to maintain passive attention for MM feedback and direction of source.

Phase 3: 10 to 15 minutes:

Omni;

Low power;

Range scale at maximum, and

Operators are to maintain passive attention for MM feedback and direction of source.

Phase 4: 15 to 17 minutes:

DTW;

High power;

Range scale at maximum, and

Operators are to maintain passive attention for MM feedback and direction of source.

Phase 5: 18 to 20 minutes:

Emit one transmission in Omni;

High power;

Range scale at maximum, and

Operators are to maintain passive attention for MM feedback and direction of source.

26. If a unit joins a ship that has commenced or completed Ramp-Up Procedures, the joining unit may commence under water sound transmissions at a phase equal to or less than that of the former unit provided the joining unit is within the MAZ of the former unit.

ACTIVE SONAR USE ALONGSIDE IN HARBOUR AND AT A FOUR-POINT MOORING

27. Alongside:

a. The OOD to ensure an MM lookout is posted in a position to view the seaward side of the ship and have immediate access to communications with the HMS testing/trials personnel;

b. The MM lookout is to maintain a continuous visual scan for MM activity, 30 minutes prior to activity commencement and throughout duration of activity;

c. The active portion of the HMS ramp-up procedure shall be conducted prior to transmitting continuously on the SONAR;

d. If an MM is detected, the lookout shall immediately report the detection to the testing/trials personnel, then report the detection to the OOD;

e. The testing/trials personnel shall immediately cease transmissions on the HMS; and

f. If no MM are detected after 10 minutes, permission is to be obtained from the OOD to re-commence transmitting.

28. At a Four-Point Mooring:

a. The OOW and Boatswain's Mate (BM) are to carry out the duties of MM lookout and have immediate access to communications with the HMS operator and trials personnel;

b. The OOW and BM to maintain a continuous visual scan for MM activity, 30 minutes prior to activity commencement and throughout duration of activity;

c. The active portion of the HMS ramp-up procedure shall be conducted prior to transmitting continuously on the SONAR;

d. If an MM is detected, the OOW shall immediately report the detection to the HMS Operator and trials personnel;

e. The HMS Operator shall immediately cease transmissions on the HMS; and

f. If no MM are detected after 10 minutes, permission is to be obtained from the OOW to re-commence transmitting.

29. Prior to the use of any technology not detailed in Table E05B.1, coastal MARL/MARP SE offices shall be engaged to assist in determining appropriate mitigation measures to be employed.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E05C

MARINE MAMMAL RECORDING AND REPORTING

1. This annex provides direction for recording and reporting Marine Mammal (MM) sightings when in Canadian waters.

Procedure

RECORDING AND REPORTING

2. When in Canadian waters, record all MM sighting/interactions in SDM VDR, ship's log, ops room log, sonar logs, and other exercise/operational reporting formats. The following shall occur:

a. OOW shall maintain the sighting log on the bridge IAW the format at Appendix SOP-E05C1 (whether transiting an AWR, detecting MM within the MAZ, or sightings during routine operations whether or not active sonar is being operated). A copy of this log is to be forwarded to the coastal MARL/MARP SE office upon return to home port;

b. Convey MM sightings to consorts; and

c. When possible, be prepared to video record and/or photograph MM sightings.

REPORTING PROCEDURES FOR MARINE MAMMALS IN DISTRESS

3. Upon sighting MM in distress, the CO is responsible to report the information to JOC and MARL/MARP SE using the Marine Mammal Report message at Appendix SOP-E05C2. If EMCON policy or other restrictions make reporting problematic, units are to report this information as soon as practicable. The OOW must record the following information related to the incident in the OOW notebook:

a. Type of MM;

b. Latitude and Longitude;

c. Contact reference information (Agency contacted and DTG notified); and

d. Brief details of the incident.

4. In Canadian waters, the CO or delegated authority is responsible to contact DFO or the Coast Guard through the respective Emergency Network as soon as possible:

(MARPAC)
1-800-465-4336

(MARLANT)
1-800-565-1633

Or Coast Guard VHF CH. 16

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

5. Do not attempt to rescue or disentangle the MM unless asked for assistance by the regulatory agencies.

Procedure Performance Criteria and Records

Marine Mammal Sighting Record
Marine Mammal Report Message

Attachments

Appendix SOP-E05C1 – Marine Mammal Sighting Record
Appendix SOP-E05C2 – Marine Mammal Report Message

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version

APPENDIX SOP-E05C1

MARINE MAMMAL SIGHTING RECORD

Vessel/Platform_____

Date (DD/MM/YY) Time (ATL, 24hr)	Location (name) Latitude/Longitude (decimal minutes)	Sea State Visibility (miles)	Species (common name)	Conf. Level (1-5)	Observations	Observer (name)

NOTES FOR COMPLETION:

Please use as many lines as needed for each sighting.

Vessel/Platform: The **name of the vessel or place** the sighting was observed from.

Location: Note the name of the place where the sighting occurred.

Sea State: Describe the kind or size of wind, waves and swells (e.g. Ripple, chop, 3ft, moderate, etc)

Visibility: Estimate **maximum visibility in miles** and note any unusual conditions that may have affected observations (e.g. Sun, glare).

Species: Record the **common name** of the whale, dolphin, or porpoise you are observing. If uncertain of species identity, please include detailed description in Observations.

Conf: State how confident you are that your identification of the species is correct. Use a scale of 1-5 where 1 = very low and 5 = 100% confidence

Observations: Please include the **number of individuals** seen, the **approximate size of** the animal (length/width), and their **behaviors,** including their **direction of movement** and **speed (or stationary).** Please note if photographs or videos were taken of the encounter. Any other interesting information about the sighting is welcome.

Observer: This column is used to identify the observer. Please print your name

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version

APPENDIX SOP-E05C2

MARINE MAMMAL REPORT MESSAGE

Action: I
Info: R
Addresses:
FM: SHIP

For MARLANT Units	*For MARPAC Units*
TO: MARLANTHQ HALIFAX//N31/N48//	TO: MARPACHQ ESQUIMALT//FSE// MARPACHQ ESQUIMALT//J3//
INFO: COMCANFLTLANT	INFO: COMCANFLTPAC
	CANFLTPAC HQ ESQUIMALT//CCD/F3/F4 ENG//
AIG 1878 (ships at sea only)	AIG 1878 (ships at sea only)
CTG (as applicable, ships in company)	CTG (as applicable, ships in company)

SIC: ESE
SUBJECT: MARINE MAMMAL REPORT

A. DTG OF THE SIGHTING OR COLLISION
B. TYPE OF MARINE MAMMAL IN DISTRESS
C. APPROXIMATE SIZE (LENGTH AND WIDTH)
D. CONFIDENCE LEVEL*
E. LAT/LONG
F. SEA STATE/VISIBILITY
G. DIRECTION MAMMAL IS TRAVELLING
H. APPROXIMATE SPEED OF MAMMAL (KNOTS)
I. REMARKS

In case of emergency rescue operations of a marine mammal, the following information shall also be provided:

J. EMERGENCY NETWORK CONTACTED (Y/N)
K. BRIEF INCIDENT DETAILS
L. REMARKS

If JIOC was contacted due to ship(s) mission or operational concerns, the following information shall also be provided:

M. JIOC CONTACTED (INDIVIDUAL CONTACTED AND DTG NOTIFIED)
N. BRIEF MISSION OR OPERATIONAL IMPACT (ALTERED, ENDED OR NO ACTION REQUIRED)
O. REMARKS

***Confidence level:** State how confident you are that your identification of species is correct. Use a scale of 1-5 where 1=very low and 5=100% confident.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

STANDARD OPERATING PROCEDURE SOP-E06

EXTERNAL SHIP'S HUSBANDRY

Purpose

1. To describe the procedures used to ensure external ship's husbandry activities are conducted IAW all regulatory and policy requirements in a manner that will minimize environmental impacts. Specific safety conditions, paint, equipment, and application of paint types (detailed at reference A) are not covered in this procedure.

Scope

2. This SOP applies to all ships of this class under the jurisdiction of the Commander Maritime Forces Atlantic and Commander Maritime Forces Pacific. This SOP deals with external ship's husbandry activities when the ship is:

a. in homeport;

b. at sea;

c. at a buoy or anchor; and

d. in ports other than homeport.

Definitions

3. The following definitions are used within this SOP:

Term	**Definition**
Ship's Husbandry	Exterior surface maintenance activities that include fresh water scrubdown, hull, deck and superstructure cleaning, rust stain management, paint removal and surface preparation, and coating application
Deleterious substance	a) Any substance that, if added to any water, would degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water, or b) Any water that contains a substance in such quantity or concentration, or that has been so treated, processed or changed, by heat or other means, from a natural state that it would, if added to any other water, degrade or alter or form part of a process of degradation or alteration of the quality of that water so that it is rendered or is likely to be rendered deleterious to fish or fish habitat or to the use by man of fish that frequent that water.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Responsibilities

4. Deck Officer (DeckO):

   a. Responsible for ensuring that the importance of following this direction is communicated to their department.

5. Unit Environmental Officer (UEnvO):

   a. Responsible to report to the CO any activities that deviate from this SOP that could harm the environment.

6. Chief Bos'n Mate (CBM):

   a. Responsible for ensuring that ship's husbandry direction outlined in the SOP is implemented and adhered to; and

   b. Report to the DeckO any activities that deviate from this SOP that could harm the environment.

7. Contractors are expected to meet the standards outlined in this SOP. Environmental provisions shall be written into their contract.

8. Ship staff must follow environmental policies and procedures related to ship's husbandry. Ship staff that witness a contractor or another member not complying with the ship's environmental policies and procedures are obligated to inform the UEnvO or the CBM immediately.

Procedure

SHIP'S HUSBANDRY AND POTENTIAL POLLUTANTS

9. All vessels must be kept clean and free of rust however, such activities have the potential to introduce contaminants into the environment. Pollutants associated with ship's husbandry include cleaning products, paint solids, heavy metals, solvents and rust. Ship's husbandry activities must be conducted in a manner that reduces the risk to the environment.

Direction

10. The following summarizes precautions and procedures to be employed while conducting ship's husbandry activities:

Note: Refer to SOP-S05 - Fall Protection for further safety precautions.

   a. Freshwater Scrubdown:

      (1) rinsing the ship is permitted as long as it does not result in paint removal. Power washing areas that do not contain anti-fouling paint is acceptable at low pressure as long as paint is not removed. Adjust/decrease the pressure output for this purpose;

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

(2) ensure that all cleaning products and oily residue are wiped clean from the vessel prior to rinsing;

(3) sweep/clean accessible areas of the upper decks to remove as much loose dirt and other debris as possible; remove loose and flaking paint. Collect and appropriately dispose of sweepings and paint flakes prior to rinsing; and

(4) if cleaning products are used to assist in cleaning, ensure that the minimum amount is used. A phosphate free or citrus based cleaner is preferred;

b. Vessel Hull, Deck and Superstructure Cleaning:

(1) to reduce the risk of anti-fouling paint being dislodged, the pressure washing of anti-fouling paint over the marine environment in an uncollected manner is not permitted; wash water from pressure washing that results in paint removal must be contained, collected, and disposed of appropriately;

(2) aggressive scrubbing/cleaning of the hull below the waterline may result in a plume of anti-fouling paint to be released; these activities must be avoided. In extenuating circumstances specific safety requirements may necessitate this activity. Anti-fouling, and other paint residues/chips must be collected. Contact MARL/MARP SE for guidance, prior to this activity taking place; and

(3) gentle cleaning of the hull below the waterline, to remove marine growth, may be conducted as long as it does not result in paint removal. Activities to prepare the vessel for trials, i.e. full power and sound range trials, which involve gentle cleaning of the propeller and underwater hull and do not remove paint are permitted;

c. Rust Stain Maintenance:

(1) use rust stain remover sparingly, apply the minimum amount required to remove staining; and

(2) efforts must be made to ensure that minimal product enters the marine environment;

d. Paint Removal and Surface Preparation:

(1) proper surface preparation procedures, detailed at reference A, will help to ensure maximum life of the coating and minimize the necessity for touch-ups;

(2) do not allow paint chips or dust generated during paint removal to enter the water. Use shrouding, tarps and drop cloths to capture paint scrapings and sanding residues, dispose of these appropriately;

(3) do not proceed with surface preparation work if conditions prevent effective capture of paint materials; and

(4) paint or solvent soaked materials, i.e. rags, that are completely dried out can be bagged and disposed of as regular garbage; otherwise they should be treated as HazWaste;

e. Coating Application:

(1) painting shall not occur in rainy and/or adverse weather conditions;

(2) use rollers and/or paint brushes, versus spray applicators, to reduce VOC emissions and prevent over-spray into the water, except where topsides are fully shrouded;

(3) if a paint cat is required it should be placed within a pollution boom;

(4) personnel applying the material must receive product specific training regarding the substance IAW SOP-SE01 - HazMat/ HazWaste Management;

(5) cover ventilation openings to prevent fumes from entering the vessel;

(6) prevent ship's effluents from removing wet paint; and

(7) spill response kits for first level intervention should be available on site while conducting work.

AIRCRAFT CLEANING

Engine Wash - Aircraft Corrosion Control

11. Fresh water aircraft and engine washes are carried out at sea on the last flight of each day to displace salt deposits. The procedures for carrying out these checks are documented in reference B. Although the fresh water wash causes minimal environmental risk, some of the contaminants on the surface of the aircraft such as engine oil are of concern. To minimize the environmental impact, when possible, the aircraft should be wiped down to remove any surface pollutants, such as oil, prior to washing the aircraft. The contaminated rags are disposed of as hazardous waste as directed in SOP-SE01.

Performance Recovery Wash

12. Performance recovery washes are carried out on aircraft engines between 180 and 220 flying hours. The procedures for these washes are documented in reference B. The environmental risk is minimal due to the fact that only a small amount of TC 100 is used and most is burned or evaporated to the atmosphere during engine run-ups. While performing this procedure, some TC 100 does run out on to the flight deck. Every effort must be made to collect this compound and dispose of it as hazardous waste as directed in Part 2, SOP-SE01, using absorbent pads to assist in clean up

Corrosion Control # 2 - Aircraft Wash

13. As part of a proactive Corrosion Control Program the aircraft are washed with a cleaning detergent as per reference B on a 14-day cycle. Prior to carrying out the wash procedure any surface pollutant on the airframe, such as engine oil, is wiped down to minimize the environment impact. The aircraft detergent used is biodegradable and poses minimum environmental risks; however, during the

wash procedure the detergent will displace contaminants such as engine carbon deposits etc. that would pose a slight risk to the environment.

ADDITIONAL MITIGATION MEASURES

14. Depending on routine maintenance activities and vessel berthing, or other physical constraints, ship's staff can identify and develop additional practical measures to minimize releases to the environment. Contact MARL/MARP SE if more direction is required related to this matter.

SHIP'S HUSBANDRY ACTIVITIES: AWAY FROM HOMEPORT

15. Along with the aforementioned considerations, ship's husbandry activities conducted in ports other than homeport shall be conducted following this procedure or local harbour authority direction, whichever is more stringent.

Procedure Performance Criteria and Records

Nil

Attachments

Annex SOP-E06A - External Ship's Husbandry References

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E06A

REFERENCES

A. C-23-050-044/PT-001, Ship's Staff Painting Manual
B. C-12-124-A00/MB-002, Shipboard Helicopter Operating Procedures (SHOPS)

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

STANDARD OPERATING PROCEDURE SOP-E07

ENVIRONMENTAL IMPACT ASSESSMENT

Purpose

1. This SOP provides guidance for the application of Environmental Effects Determinations (EEDs) and the EED Checklist for ship operations.

Scope

2. This SOP applies to all ships of this class under the jurisdiction of the Commander Maritime Forces Atlantic and Commander Maritime Forces Pacific. All ship's operations not addressed in the Class SEMS require an EED, those operations noted in Reference G require an EED Checklist (Annex SOP-E07B).

3. MARLANT ships generally conduct Due Diligence EEDs for activities that have the potential to cause an adverse effect on the environment, but are not legally required under the *CEAA, 2012*. This demonstrates that DND has shown consideration (due diligence) for any potential environmental impacts of its activities and addressed them through mitigation.

Definitions

4. The following definitions are used within this SOP:

Term	Definition
Environmental Effects Determination (EED)	Departmental process for determining the likelihood of significant adverse environmental effects of a physical activity as a requirement of s.67 or 68 of the *CEAA, 2012* or as an exercise of due diligence.
EED Checklist	Form requiring completion for each exercise activity located at Reference H, also Annex SOP-E07A.
Environmental Impact Assessment (EIA)	An analytical process that systematically examines the possible environmental consequences of the implementation of activities, programs, plans and policies.
Environmental Specialist Staff (ESS)	MARLANT/MARPAC Safety and Environment (MARL/MARP SE) staff who have been appointed with EIA responsibilities.
Office of Primary Interest (OPI)	The authority responsible for the implementation of a physical activity or exercise.

Responsibilities

5. <u>MARL/MARP SE ESS:</u>

a. Responsible for:

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

(1) Assisting in implementation of the EIA process;

(2) Ensuring compliance of requirements in this directive for all EIA processes being conducted at MARLANT;

(3) Providing procedural and technical advice and guidance to decision-makers to ensure that the EIA process is implemented for applicable MARLANT projects and physical activities;

(4) Assessing projects and physical activities and advising OPIs on legal restrictions/requirements and appropriate types of EEDs to be completed;

(5) Providing OPIs with background information, including historical environmental reports, to assist in the completion of the EED;

(6) Determining and coordinating other federal departments' involvement;

(7) Assisting in the determination of appropriate mitigation measures; and

(8) Conducting inspections to ensure mitigation measures and monitoring plans are being implemented as detailed in the EEDs.

6. OPI:

a. Responsible for engaging MARL/MARP SE ESS to determine the EED requirements associated with a physical activity or exercise. If an EED is required the OPI is responsible for:

(1) Ensuring the EED is completed as directed by MARL/MARP SE ESS;

(2) Ensuring the EED has been sent to MARL/MARP SE ESS for review and approval;

(3) Ensuring the EED has been approved and signed off by the appropriate authority (Unit CO);

(4) Establishing and maintaining the EIA project file;

(5) Implementing the mitigation measures identified in the EED; and

(6) Ensuring all monitoring programs detailed in the EED are completed.

7. Unit CO:

a. Responsible for:

(1) Complying with the *CEAA, 2012* and conforming to this directive;

(2) Signing off the EED or EED Checklist; and

(3) Ensuring operations are conducted in conformance with the EEDs by following mitigation measures detailed in the EED.

8. Unit Environmental Officer (UEnvO):

a. Responsible as the CO's advisor for EEDs;

b. Assists the CO in developing and implementing procedures that include mitigation measures to eliminate, reduce or control any adverse environmental effects that have been evaluated for physical activities or exercises; and

c. Assists the CO with completing the EED.

Procedure

9. The OPI is responsible for determining, in conjunction with MARL/MARP SE ESS, if a physical activity or exercise requires an EED or an EED Checklist. EED applies to activities and exercises that are not addressed in the Class Manual or at References G and H. EED Checklists are conducted when activities have been assessed at Reference G. When required, the OPI conducts an EED Checklist IAW Annex SOP-E07A.

10. Completed EEDs and EED Checklists (Annex SOP-E07A) are to be forwarded to MARL/MARP SE.

Procedure Performance Criteria and Records

Approved EEDs and EED Checklists, and supporting documents as appropriate
OOW Notebook
Firing Orders
Rounds Books
Engineering Daily Logs
Post Deployment Reports

Attachments

Annex SOP-E07A - Environmental Impact Assessment References
Annex SOP-E07B - Environmental Effects Determination (EED) Checklist

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E07A

ENVIRONMENTAL IMPACT ASSESSMENT REFERENCES

A. Canadian Environmental Assessment Act (CEAA) (2012) and Regulations
B. DAOD 4003-2 Environmental Assessment
C. Directive Regarding Environmental Impact Assessment. ADMIE, 2016
D. EIA Manual. ADMIE, 2017
E. Abbreviated Report Criteria. ADMIE, 2016
F. Cabinet Directive on the Environmental Assessment of Policy, Plan and Program Proposals. Privy Council Office and Canadian Environmental Assessment Agency, 2010
G. MARLOAs Exercise EED Update, 2018
H. MARPAC Environmental Assessment of Maritime Ranges and Training Areas

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E07B

ENVIRONMENTAL EFFECTS DETERMINATION (EED) CHECKLIST

Item	**Information/Notes**
Name of Exercise:	
Date of Exercise:	
Location (s):	
Units Involved:	
OPI:	
Contact Information:	Name:
	Unit:
	Tel:
	Cell:
	Email:
MARL/MARP SE File Number:	
EXERCISE ACTIVITIES	**NOTES ON ACTIVITIES:** **It is expected that Mitigation Measures from MARLOAs EED, 2017 (Annex E) have been reviewed.**
Vessel and Submarine Movement (including Underwater)	Mitigation measures include (note sheets in Annex E of MARLOAs Exercise EED Update (WSP 2017)) Ship Class SEMS Names of activities and locations (or locations where such activities will not be conducted)
Aircraft Movement – Low Flying/Hovering	Mitigation measures include (note sheets in Annex E of MARLOAs Exercise EED Update (WSP 2017)) Ship Class SEMS Names of activities and locations (or locations where such activities will not be conducted)
Replenishment at Sea (Fueling and Resupply)	Mitigation measures include (note sheets in Annex E of MARLOAs Exercise EED Update (WSP 2017)) Ship Class SEMS

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Item	**Information/Notes**
	Names of activities and locations (or locations where such activities will not be conducted)
Bottoming/Anchoring (Bottom Interaction)	Mitigation measures include (note sheets in Annex E of MARLOAs Exercise EED Update (WSP 2017)) Ship Class SEMS Names of activities and locations (or locations where such activities will not be conducted)
Single/Multiple tow (Stream Torpedo Decoy, Side Scan, CATAS, ROV, or Ship)	Mitigation measures include (note sheets in Annex E of MARLOAs Exercise EED Update (WSP 2017)) Ship Class SEMS Names of activities and locations (or locations where such activities will not be conducted)
Active Sonar (Including Oceanographic Observations)	Mitigation measures include (note sheets in Annex E of MARLOAs Exercise EED Update (WSP 2017)) Ship Class SEMS Names of activities and locations (or locations where such activities will not be conducted)
RADAR Use and Laser (Fire Control Only)	Mitigation measures include (note sheets in Annex E of MARLOAs Exercise EED Update (WSP 2017)) Ship Class SEMS Names of activities and locations (or locations where such activities will not be conducted)
Missile Fire (ESSM and SM2)	Mitigation measures include (note sheets in Annex E of MARLOAs Exercise EED Update (WSP 2017)) Ship Class SEMS Names of activities and locations (or locations where such activities will not be conducted)

Item	**Information/Notes**
Inert Torpedo Fire	Mitigation measures include (note sheets in Annex E of MARLOAs Exercise EED Update (WSP 2017)) Ship Class SEMS Names of activities and locations (or locations where such activities will not be conducted)
Surface Fire (Including Smoke, Flare, Decoy Rockets and Inert Missile or Above Water Inert Torpedo Fire)	Mitigation measures include (note sheets in Annex E of MARLOAs Exercise EED Update (WSP 2017)) Ship Class SEMS Names of activities and locations (or locations where such activities will not be conducted)
Underwater Explosion	Mitigation measures include (note sheets in Annex E of MARLOAs Exercise EED Update (WSP 2017)) Ship Class SEMS Names of activities and locations (or locations where such activities will not be conducted)
Air to Air Fire and Other Air Noise	Mitigation measures include (note sheets in Annex E of MARLOAs Exercise EED Update (WSP 2017)) Ship Class SEMS Names of activities and locations (or locations where such activities will not be conducted)
LFA Sonar	Mitigation measures include (note sheets in Annex E of MARLOAs Exercise EED Update (WSP 2017)) Ship Class SEMS Names of activities and locations (or locations where such activities will not be conducted)

<u>ACCE (A) will issue NOTAM, NOSHIPS</u>

<u>Cumulative Effects</u>

Cumulative effects from sonobouys and active sonar (in the form of debris and underwater noise) was assessed by LGL (2005) and re-assessed by Dillon (2012), Stantec (2016) and WSP (2017).

Debris should be minimized, picked up, or caused to sink to the bottom quickly (normally sonobouys are set to sink to the bottom in 3 hours). Underwater noise caused by active and passive sonar and sonobouys should be limited, adherence to SEMS SOPs and Mitigation Sheets M1 and M6 in Annex E of MARLOAs Exercise EED (WSP 2017) should decrease cumulative effects substantially.

To demonstrate due diligence during this exercise, units will be directed to follow the procedures outlined in NAVORD 4003-6 and associated SEMS SOPs.

The number of sonobouys to be expended during this exercise is unknown at this time. Ships will keep a detailed log of sonobouy expenditures including time of day, latitude/longitude and life setting. Ships will also record expenditures for their respective organic helicopters as well as bathythermograph/sound velocity probe drops to provide an idea of debris entering the ocean and sinking to the bottom. Ships will report their expenditures to N48 via their Daily SITREP message.

All RCN units are to maintain a Marine Mammal Sighting Record and submit Marine Mammal and Reptile Report messages in accordance with applicable class SEMS SOP E5.

Aboriginal Community Engagement

Not applicable as RCN vessels will not be in contact with any Aboriginal fishing vessels or fishery equipment.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Checklist Recommendation and Sign-off

Signature on this document shall indicate review and agreement to implement the mitigation measures of the original and updated EA.

Checklist Prepared by:

Name, Title Date (dd-mm-yy)

Checklist Reviewed by:

Safety and Environment Officer, MARL/MARP SE Date (dd-mm-yy)

Checklist Accepted and Approved by:

The undersigned accepts the determination and recommendations of this environmental screening report. The undersigned also accepts the responsibility to incorporate the recommendations of the report into the project design and implementation.

OPI Date (dd-mm-yy)

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

STANDARD OPERATING PROCEDURE SOP-E08

SMALL BOAT OPERATIONS

Purpose

1. This SOP is focused on the environmental aspects of Small Boat Operations, with the intent of lessening the negative effect these operations have on the environment

Scope

2. This SOP applies to all ships of this class under the jurisdiction of the Commander Maritime Forces Atlantic and Commander Maritime Forces Pacific. Small boating activities are common among all Naval units. Due diligence in ensuring these activities have little impact on the natural environment is vital. To ensure due diligence is exercised and that mitigation measures are in place, planners and operators shall be familiar with some basic rules to reduce the impact such operations can have on the natural environment and its inhabitants

Definitions

3. The following definitions are used within this SOP:

Term	Definition
Zodiac	A small maneuverable boat with an outboard motor used for Man Overboard Rescue, Diving Operations and general seamanship activities.
Landing Craft	A specially designed vessel that is mission fit onboard HDW Class and intended to transfer cargo and personnel from the ship to a beach or shoreline.
Life Boat	Totally enclosed lifeboat used for abandoning ship.
Multi-Role Rescue Boat (MRRB)	A purpose designed boat for HDW Class intended primarily for rescue and personnel transfers at sea.
Rigid-hulled Inflatable Boat (RIB)	A small maneuverable boat with an inboard motor used for personnel and equipment transfers and general seamanship activities.

Responsibilities

4. <u>DeckO</u>:

   a. Responsible for implementation of this SOP;

5. <u>Boat Operators</u>:

   a. Boat operators are to avoid wildlife whenever possible. Under no circumstances are operators to knowingly disturb, chase, or harass wildlife (birds, sea mammals, etc).

Ensure you are aware of any sensitive areas/species in the area(s) of operation. Wherever possible, stay at least 100 yards away from marine mammals (500 yards if they are an endangered species). Never cut off the path of a marine mammal and remember that many marine mammals (i.e. whales) travel in numbers so others are likely in the area. Maintain a vigilant lookout at all times;

b. Reduce wake. Operators are to reduce wake whenever possible. This is especially important in shallow areas, narrow channels, and when approaching the shoreline. In shallow waters, wakes have the potential to stir up sediments thereby disturbing the habitat of benthic creatures. As well, the increased sedimentation may cause problems to propellers and /or engines. A high wake in a narrow channel has the potential of causing erosion on the shore bank. As well, boat operators should consider the possible effect of the vessel's wake prior to acceleration;

c. Check the vessel prior to and during the operation to ensure it is operating properly. Ensure no fuel or oil is being discharged;

d. Minimize disturbance to sensitive areas. Avoid anchoring/landing in sensitive areas such as kelp beds. Potential landing sites are to be evaluated to ensure environmentally fragile areas are avoided;

e. Keep all garbage onboard. Under no circumstances is waste to be thrown into the marine environment; and

f. Ensure operators are familiar with the vessels equipment and accessories (i.e. radar, GPS, charts). These are valuable resources, which can provide important information regarding the area of operation.

6. Maintainers are responsible to ensure the boats are properly maintained to operate in a safe and environmentally efficient manner.

Procedure

GENERAL

7. Over the last few years a number of incidents have occurred where petroleum products have been released into the environment from RIBs. Most of these have been due to inattention on behalf of the operator or maintainer involved.

8. There are numerous RIB/small boat activities that may negatively impact the environment. Operators and maintainers must be aware of their responsibility and act duly diligent.

HABITAT PROTECTION - PLANNING

9. During the planning of boating operations, the planners must ensure they are familiar with the area(s) of operation and briefings must include a section on 'Habitat Protection'. Research is to be conducted to ensure information regarding all possible sensitivities in the area are well known to the boat operators. Besides internal resources, MARL/MARP SE can provide information. Such information (on fish, marine mammals, birds, etc) can include:

a. presence of endangered, threatened, or species of concern;

b. protected areas (i.e. Conservation Areas, Ecological Reserves, Marine Parks, Marine Protected Areas); and

c. Sensitive Areas – unofficial (i.e. migratory routes, feeding areas, calving areas, areas with a high erosion rate, wetlands, estuaries, aquaculture sites, spawning area).

10. For major exercises/operations, planners of boating operations are encouraged to site visit potential area(s) of operation prior to boat operations to identify any possible environmental concerns.

11. For major exercises/operations, post operation site visits are to be considered to ensure boat operations did not result in detrimental effects.

OPERATIONS

12. Operators are to ensure unnecessary noise is kept to a minimum. Especially important when operating in sensitive or populated areas.

13. Extra diligence is to be exercised during launching and recovery of vessels to reduce possibility of petroleum discharge due to mechanical damage and sedimentation disturbance. Except in emergencies, bilge water shall be removed from boats and disposed of as HazWaste.

MAINTENANCE

14. Commanding Officers are to ensure that vessels are thoroughly cleaned (especially hulls and bilges) prior to a vessel being utilized in a new area (lake, ponds, harbours, ocean area, etc). This is to ensure aquatic species from one ecosystem are not introduced to a new ecosystem where they can cause significant damage (i.e. Zebra mussels in the Great Lakes).

15. During post operation cleaning, operators are to ensure that harmful cleaning agents do not enter the environment. Non-toxic or 'phosphate-free' cleaning agents should be used whenever possible.

16. Fuelling is only to be done as per SOP-E01.

17. Maintainers must be aware of the significance of their actions be it a Preventive Maintenance routine such as an oil change, or Corrective Maintenance such as replacing a fuel pump. If POL enters the bilge, then proper bilge pumping / cleaning must be conducted before resetting the bilge pump and/or operating the boat.

18. Anytime maintenance is conducted where POL may enter the bilge, the automatic bilge pump is to be turned off. Once the task is completed ensure the pump is turned back to automatic, especially if the boat is in the water. Numerous boats have had engines ruined because the bilge pump remained turned off when the boat was in the water.

19. Water used in outboard test tanks shall be considered contaminated and therefore shall not be released untreated into the environment. Water from an outboard test tank shall be held for disposal. Facilities with oil/water separator systems may release the water providing the oil content falls within acceptable limits. The UEnvO/UHMC shall dispose of the effluent. Transferring this liquid requires the same procedures as the pumping of a closed bilge, listed in SOP-E02.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

FM200

20. The RIBs use FM200 as a fire fighting agent to protect the engine compartment. FM 200 (HFC-227ea) is a greenhouse gas, which has been designated a controlled substance. It must be leak tested regularly and reported when leaks occur. SOP-E03 gives details on Halocarbon Management. There is one cylinder holding 4.9 kg (9.9 lbs) of FM200 in each RIB.

NOVEC 1230

21. The Landing Craft and Multi-role Rescue Boat (MRRB) use NOVEC 1230 as a fire fighting agent to protect the engine compartments. When embarked, the cylinders on the boats must be leak tested regularly and reported when leaks occur. SOP-E03 gives details on Halocarbon Management.

OPEN BILGE PUMPING (SMALL BOATS)

22. The bilge shall be checked for contaminants prior to pumping. If the bilge contains contaminated water (contaminated with POL, cargo, or other source) it shall not be released directly into the environment. All efforts shall be taken to contain the contamination within the hull and pumped to a suitable container ashore. If it is uncontaminated water, it may be released to the environment. If there is any doubt while the boat is in the water, then place a spill containment boom around the entire boat prior to bilge pumping. Upon completion of bilge pumping, remove spill containment boom only when all contaminants have been removed from surface of water.

Procedure Performance Criteria and Records

Fuelling Records IAW SOP-E01 - Fuelling
Halocarbon Records IAW SOP-E03 - Halocarbon Management

Attachments

Annex SOP-E08A - Small Boat Operations References

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E08A

SMALL BOAT OPERATIONS REFERENCES

A. Fuelling Records IAW SOP-E01 - Fuelling
B. Halocarbon Records IAW SOP-E03 - Halocarbon Management

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

STANDARD OPERATING PROCEDURE SOP-E09

NOT APPLICABLE TO THE HARRY DEWOLF CLASS

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

STANDARD OPERATING PROCEDURE SOP-E10

ARCTIC WATERS CONSIDERATIONS

Purpose

1. To describe the procedures used to ensure that ship activities conducted in Arctic Waters are IAW all regulatory and policy requirements.

Scope

2. This SOP applies to all ships of this class under the jurisdiction of the Commander Maritime Forces Atlantic and the Commander Maritime Forces Pacific. The intent of this SOP is to provide enhanced direction to reduce the environmental impact while operating a ship in Arctic Waters.

Definitions

3. The following definition is used within this SOP:

Term	Definition
Arctic Waters	Arctic Waters means those waters which are located north of a line from: a. latitude 58º00´.0 N and longitude 042º00´.0 W; b. thence to a point latitude 64º 37'.0N; longitude 35º 27'.0W; c. thence to a point latitude 67º 03'.9N; longitude 26º 33'.4W; d. thence to a point latitude 70º 49'.56N; longitude 8º 59'61W (Sorkapp, Jan Mayen); e. thence to a point latitude 73º 31'.6N; longitude 19º 01'.0E (by the island of Bjornoya); f. latitude 68º 38'.29N; longitude 43º 23'.08E (Cap Kanin Nos); g. thence by the northern shore of the Asian Continent eastward to the Bering Strait; h. thence from the Bering Strait westward to latitude 60º N as far as Il'pyrskiy and following the 60th North parallel eastward as far as and including Etolin Strait; i. thence by the northern shore of the North American continent as far south as latitude 60º N; j. thence eastward along parallel of latitude 60º N, to longitude 056º37´.1 W; and k. thence to the latitude 58º00´.0 N, longitude 042º00´.0 W. **Note:** although much of the regions of Hudson Bay, James Bay and Ungava Bay are south of 60º N, due to their restricted waters and almost pristine environment, these areas will be considered Arctic Waters and the direction provided in this SOP shall be adhered to.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Responsibilities

4. XO:

   a. Overall responsible for implementation of this SOP. It encompasses many facets of ship operations and will mean the whole crew will have to be advised of the increased restrictions while operating in Arctic Waters.

5. NTO:

   a. Is responsible for implementation of this SOP; and

   b. Is responsible for implementation of procedures for fuelling small boats.

6. UEnvO:

   a. Responsible for providing the crew with the details of the enhanced restrictions placed on many of the normal operations while operating in Arctic Waters.

7. Senior Mechanical Propulsion Manager:

   a. Responsible for the correct operation and maintenance of the black water treatment system, ballast water treatment system and for maintaining the Ballast and Black Water Logs.

8. Solid Waste Coordinator:

   a. Responsible for implementation of the solid waste restrictions and proper operation in the Waste Handling and Treatment Room and the Waste Storage Room

Procedure

GENERAL

9. Arctic Waters are special due to their almost pristine environment as there has been relatively little human impact. The greatest adverse environmental impact that might occur is a fuel spill. This could be caused by either a breach in the ship's hull while transiting or during refueling operations. There are many other environmental aspects including disposing of solid waste and liquid effluent, disturbing animal habitats and endangered species.

10. The threat of impacting the environment can be mitigated by conforming to standard operating procedures, enhancing some procedures with due regard to the unique circumstances of the Arctic environment, as well as remaining diligently aware of the sensitivity of the Arctic environment throughout those phases whilst operating in Northern waters.

FUELLING

11. If there is a requirement to fuel while at anchor, a pollution boom is to be placed around the receiving and supplying vessels. A pollution boom is available from Queens Harbour Master (QHM) – Marine Environment Emergency Response Organization (MEERO). There is also a portable pollution boom that will be carried onboard the HDW which can be employed if no other boom is available. By

adhering to the direction provided in SOP-E01 – Fuelling, all regulatory requirements will be met while conducting fuelling operations in Arctic Waters.

12. Prior to departing, the ship should ensure the portable pollution boom is tested and that the Deck Department has had the opportunity to train in setting the pollution boom with the QHM – MEERO team.

BLACK AND GREY WATER

13. To ensure that the environmental effects of black and grey water discharge are minimized, discharge is permitted from the sewage treatment plant only. It is normal to combine the grey water with black water and the LCMM has recommended that the sewage treatment plant be continuously operated.

14. Besides the normal restriction of items not to be discharged as grey water as indicated in SOP-E02, while operating in Arctic Waters, the garburator shall be directed to the grey water system so that it may be treated through the sewage treatment plant. If the garburator is not available, all food waste collected shall be disposed ashore as solid waste in a northern port or as compost in home port.

15. The normal operating/maintenance and record keeping procedures for black water are to be maintained as described in SOP-E02.

16. It should be noted, while operating in the north, the ship will have to anchor off many ports. Consideration must be given to instituting water restrictions or when making potable water that no overboard discharge of black and grey water is occurring.

OILY WATER/BILGE MANAGEMENT

17. There is a zero discharge policy of oily water in Arctic Waters and no known shore facilities in the Arctic to pump the bilge water ashore. Based on previous operations, HDW Class ships can operate for approximately three weeks before the accumulation of bilge water impacts ship safety. Thus, this needs to be considered during the operation-planning phase.

18. If it becomes necessary to process bilge water due to an over accumulation, the initial processed bilge water shall be stored in the "Clean Bilge Water Storage" tanks until such a time that it can be safely discharged overboard. The incinerator is capable of burning the sludge that is removed by the OWS.

19. If the safety of the ship or its personnel come into question they will overrule any environmental concerns. Thus for the purposes of life saving or preventing the immediate loss of a ship, oily water may be discharged with the CO's permission. The oily water separator should be operated to attempt to attain the lowest ppm of oil content possible for effluent discharge. The Oily Water Log is to be signed by the CO for any discharge of oily water/bilge into Arctic Waters. The CO should issue a release message and consider issuing a significant incident report (SIR).

BALLAST WATER AND SEDIMENT MANAGEMENT

20. Every effort shall be taken to prevent the introduction of unwanted aquatic organisms and pathogens from ship's ballast water into the Arctic Water ecosystem. The use of the Ballast Water Treatment system shall be employed at every opportunity to prevent this from occurring.

21. As per SOP-E02, Liquid Effluent Management, when ballasting or de-ballasting, the safety of the ship and personnel holds priority over environmental concerns. Ballast Water Management shall follow

the Ship's Manual of Trim and Stability and the procedures laid out on SOP-E02. The CO's permission must be sought prior to ballast and de-ballast activities. In addition, the OOW/Senior Watchkeeper shall be informed and the event recorded by the Senior Mechanical Maintainer IAW the format at Annex SOP-E02E.

SOLID WASTE

22. There is to be zero discharge of solid waste of any type into Arctic Waters. Ship staff are to be briefed with regards to the regulations prohibiting the jettisoning of trash overboard and these regulations are to be strictly enforced. There may be the opportunity to offload solid waste at some northern ports of call; this should be confirmed as part of the operation-planning phase.

23. Organic waste will be stored onboard ship but will be landed as required if permitted at any Arctic community that has suitable disposal facilities to mitigate the potential health hazard of retaining food waste on board. As a further mitigation measure, ships will ensure foods that generate large quantities of waste, such as steak with bones, are avoided or served just prior to a scheduled opportunity for transferring garbage ashore. Consideration should be given to reduce packaging when provisioning for a northern deployment, thus reducing the garbage created during the deployment.

24. Prior to leaving home port for any deployment, the disposal of packaging material is critical. For deployments where restrictions regarding the use of solid waste processing equipment is anticipated, breaking down containers and removing packing material must be conducted so it can be disposed alongside thereby extending the vessel's endurance at sea.

25. Collecting food waste in boxes lined with plastic bags works well and enables the ship to increase its carrying capacity while operating in Arctic Waters. By diligently separating the food waste it actually improves the processes in the Waste Handling and Treatment Room, especially with respect to dealing with plastics and by utilizing the incinerator and compacting equipment.

26. The overboard disposal of organic garbage may occur if the retention of the waste creates health risk for the crew and only with the approval of the CO. In this case, organic garbage will be discharged either through the marine sanitation device or dead astern in the prop wash at the farthest practical point from land as operationally viable. Should overboard discharge occur, the latitude, longitude, course, speed and local weather conditions shall be recorded in the OOW Notebook and reported to MARL/MARP SE by message. The amount and type of solid waste discharged shall also be recorded in the Garbage Book (Record Of Solid Waste Disposal at Sea - Annex SOP-E04D).

AQUATIC ANIMALS

27. The presence of ships in the Arctic may disturb aquatic animals and in the case of a collision between a ship and animal there will likely result in injury or death to the animal.

28. Ships shall maintain a vigilant lookout at all times and avoid concentrations of wildlife subject to navigational safety. Ships should avoid ice and wild life sanctuaries, such as walrus breeding grounds and haul outs for obvious reasons, but also as birds, animals and marine mammals are likely to be encountered near the surface. Ship's personnel are to be briefed on wildlife that could be encountered, with emphasis on marine mammals and endangered/threatened species.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

29. Ships are to operate systems at the minimum power necessary to meet mission requirements to reduce emissions and ambient effects of their passage. While operating near shore, ships will operate echo sounders but if marine mammals are sighted echo sounders should be operated at low power.

30. Marine mammal sightings shall be reported as per the direction provided at SOP-E05 - Marine Mammals and Reptiles.

COLD WEATHER PRECAUTIONS

31. While operating in the Arctic it is normal to experience sea and air temperatures near the freezing point even in summer. Thus, the ship may need to implement normal cold weather precautions. Additional precautions to be considered prior to Arctic deployment include:

a. Ensure de-icing systems and their components are fully operational (electrical de-icing, hot water de-icing and steam de-icing);

b. verify manual de-icing storage lockers are properly outfitted;

c. ensure stability charts and graphs are readily accessible in the event of major ice build-up on the upper decks as well as the "GLM" package software must be updated daily to maintain constant monitoring of the stability of the ship;

d. monitor and clean seawater inlet strainers;

e. verify that sea bay de-icing/recirculation valves are operational;

f. thermal oil system, heat exchangers, recirculation louvers, inlet and exhaust valves to all machinery spaces, hangar and vehicle bay are proven;

g. sufficient portable heaters should be obtained prior to sailing for those spaces that do not have space heaters fitted;

h. equipment on the upper deck is fitted with canvas covers; and

i. small boats are winterized. To this end, batteries shall be kept fully charged and heated, antifreeze (or other approved substance IAW CFTOs) must be used for cooling systems and bilges must be kept dry.

32. The cranes and davits fitted on a HARRY DEWOLF Class ship have weight limits associated with their respective equipment. To ensure weight limits are adhered to, it is vital to ensure that the boats, cranes and davits remain clear of any ice build-up.

33. The NTO (with aid from Senior Mechanical Propulsion Manager and NTC) should prepare a presentation for all OOWs, Senior Engineering Watchkeeper's, CO, XO and cover the following:

a. the effect of upper deck icing on the ship's stability;

b. period of roll calculations with respect to GM;

c. free surface effect and the need for tank consolidation; and

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

d. any other stability concerns the ship may have with respect to Arctic deployment.

Procedure Performance Criteria and Records

Fuelling Reports – Appendix SOP-E01F6
Sewage Treatment Plant Log – Annex SOP-E02B
Oily Water Separator Rounds Sheet – Annex SOP-E02C
Ballast Water Log – Annex SOP-E02E
Record of Solid Waste Disposal at Sea – Annex SOP-E04D
Marine Mammal Sighting Record – Appendix SOP-E05C1
OOW Notebook
Operational Planning EAs

Attachments

Annex SOP-E10A - Arctic Waters Considerations References
Annex SOP-E10B - Artic Waters Boundaries

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E10A

ARCTIC WATERS CONSIDERATIONS REFERENCES

A. Canada Shipping Act - Ballast Water Control and Management Regulations
B. Canada Shipping Act - Pollutant Discharge Reporting Regulations, 1995
C. Canada Shipping Act - Regulations for the Prevention of Pollution from Ships and for Dangerous Chemicals SOR/2007-86
D. Arctic Waters Pollution Prevention Act
E. Arctic Shipping Pollution Prevention Regulations
F. Federal Guidelines for Control of Ballast Water Discharge from Ships in Waters under Canadian Jurisdiction, 01 Sept 2000
G. MARCORD G-18, Environmental Management of Shipboard Waste
H. C-03-005-033/AA-000 Naval Engineering Manual (NEM)
I. International Code for Ships Operating in Polar Waters (Polar Code)

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E10B

ARCTIC WATERS BOUNDARIES

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

STANDARD OPERATING PROCEDURE SOP-E11

CANADIAN INLAND AND INTERNAL WATERS CONSIDERATIONS

Purpose

1. To describe the procedures used to ensure that ship activities conducted in the Canadian inland and internal waters are IAW all regulatory and policy requirements.

Scope

2. This SOP applies to all ships of this class under the jurisdiction of the Commander Maritime Forces Atlantic and the Commander Maritime Forces Pacific. The intent of this SOP is to provide enhanced direction to reduce the environmental impact while operating in Canadian inland and internal waters.

Definitions

3. The following definitions are used within this SOP:

Term	Definition
Designated Sewage Area (DSA)	Means an area where discharge requirements are more restrictive, these areas are described in Schedule 24 of reference A
Exclusive Economic Zone (EEZ)	Starts at the coastal baseline and extends 200 nm out into the sea, perpendicular to the baseline. The EEZ overlaps territorial waters. The exception to this rule occurs when EEZs overlap; that is, state coastal baselines are less than 400 nautical miles apart as in the case of the French Islands, Saint-Pierre et Miquelon. When an overlap occurs, it is up to the states to delineate the actual boundary.
Emission Control Area (ECA)	These are sea areas in which stricter controls were established to minimize airborne emissions from ships as defined by the 1997 MARPOL Protocol. These emissions include Nitric Oxides (NOx), Sulfur Oxides (SOx), Ozone Depleting Substances (ODS), and Volatile Organic Compounds (VOCs).
Great Lakes Basin	The waters of the Great Lakes, their connecting and tributary waters and the St. Lawrence River as far as the lower exit of the St. Lambert Lock at Montréal in the Province of Quebec.
Inland Waters of Canada	Means all rivers, lakes and other navigable fresh waters within Canada, and includes the St. Lawrence River as far seaward as a straight line drawn from Pointe-au-Père to Pointe Orient.
Internal Waters	Any areas of the sea that are on the landward side of the baselines of the territorial sea and any areas of the sea, other than the territorial sea, in respect of which Canada has a historic or other title of sovereignty, i.e. the Canadian Internal Arctic waters.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Section I Waters	Waters that are any portion of the territorial sea or of fishing zone 4 (an area of the sea adjacent to the Atlantic Coast), fishing zone 5 (an area of the sea adjacent to the Pacific coast) and/or fishing zone 6 (an area of the sea adjacent to the coast of the mainland and islands of the Canadian Arctic that is not within a SSCZ). Fishing zone 6 includes the Beaufort Sea, the Lincoln Sea, the Nares Strait and the Baffin Bay areas between the outer limit of the SSCZ and the EEZ).
Shipping Safety Control Zones (SSCZ)	Areas in the Arctic Waters described in schedule I and II of the Shipping Safety Control Zones Order of the Arctic Waters Pollution Prevention Act. There are currently 16 SSCZs.

Annex SOP-E11B provides a chart indicating the EEZ, Fishing Zones and SSCZs.

Responsibilities

4. XO:

   a. Overall responsible for implementation of this SOP. It encompasses many facets of ship operations and will mean the whole crew will have to be advised of the increased restrictions while operating in the Canadian inland and internal waters.

5. NTO:

   a. Responsible for the correct operation of the sewage treatment plant, incinerator, Selective Catalytic Reduction (SCR) system and oily water separator;

   b. Implementing the ballast water controls; and ECA

   c. Ensuring the logs for black, grey, oily and ballast water are appropriately completed.

6. UEnvO:

   a. Responsible for providing the crew with the details of the enhanced restrictions placed on many of the normal operations while operating in the Canadian inland and internal waters.

7. Solid Waste Coordinator:

   a. Responsible for implementation of the solid waste restrictions and proper operation in the Solid Waste Handling Compartment.

8. MARL/MARP SEO:

   a. Responsible for the administration of this SOP including review, revision and issue of revised procedures. MARL/MARP SE can be called upon to provide further guidance as necessary.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Procedure

BLACK/GREY WATER

9. In Canadian territorial waters there are special areas known as designated sewage areas (DSA) where discharge requirements are too strict for the current fitted sewage treatment plant (the effluent must have a fecal coliform count that is equal to or less than 14/100 mL). In these areas, sewage must be held onboard for discharge at an appropriate facility or until a vessel is in an area where discharge is permissible.

10. HARRY DEWOLF Class sewage treatment plants meet the regulatory requirement to allow them to operate in the Canadian inland and internal waters in areas other than a DSA (the effluent has a fecal coliform count that is equal to or less than 250/100 mL).

11. Grey water is not regulated under the Canada Shipping Act and may be discharged with minimal restriction; however, ships should process grey water through the sewage treatment plant whenever possible. The STP onboard HDW is rated to treat all black and grey water produced by Ship's Company. It is not suitable for the treatment of galley and garburator waste or wastewater containing acids, lyes and oils. Besides the normal restriction of items not to be discharged as grey water as indicated in SOP-E02, while operating in the Great Lakes and inland and internal waters, garburators shall be shut down. All food waste collected shall be disposed ashore as compost if facilities are available, or as solid waste.

12. While in the locks and the waters of the Welland Canal, ships are not to discharge black or grey water unless authorized by the Manager or the Corporation.

13. The normal operating/maintenance and record keeping procedures for black and grey water are to be maintained as described in SOP-E02.

OILY WATER/BILGE MANAGEMENT

14. Any discharge of oily water to the sea must be processed through oil filtering equipment and the vessel must be underway at a speed greater than 4 knots at the furthest practicable point from land, while operating in Canadian inland waters the discharge shall be of <5 ppm oil-in-water content. When discharged in fishing zone 1, 2 or 3 or in those internal waters of Canada that do not include inland waters of Canada; the discharge shall be of <15 ppm oil-in-water content.

EMISSION CONTROL

15. Canadian Inland and Internal Waters are considered to be ECAs; therefore, every effort shall be taken when possible/feasible to adhere to the IMO/Transport Canada Regulations of 0.10% m/m of SOx. This can be achieved through the use of low sulphur content Diesel Fuel Oil and/or the use of the Selective Catalytic Reduction system that is fitted on the HDW Class vessels.

BALLAST WATER AND SEDIMENT MANAGEMENT

16. As per SOP-E02, Liquid Effluent Management, when ballasting or de-ballasting, the safety of the ship and personnel holds priority over environmental concerns. Ballast Water Management shall follow the Ship's Manual of Trim and Stability and the procedures laid out on SOP-E02. The CO's permission must be sought prior to ballast and de-ballast activities. In addition, the OOW/Senior Watchkeeper shall

be informed and the event recorded by the Senior Mechanical Maintainer IAW the format at Annex SOP-E02E.

SOLID WASTE

17. There is to be zero discharge of solid waste of any type into Great Lakes, Inland Waters and Section I waters. Ship staff is to be briefed with regards to the regulations prohibiting the jettisoning of trash overboard and these regulations are to be strictly enforced. There are normally opportunities to offload solid waste at ports of call. Consideration should be given to conduct recycling and solid waste separation IAW port of call standard practices and should be confirmed as part of the operation-planning phase or through the LogReq message.

18. Prior to leaving home port for any deployment, the disposal of packaging material is critical. For deployments where there are restrictions regarding the use of solid waste processing equipment, breaking down containers and removing packing material must be conducted so it can be disposed of alongside, thereby extending the vessel's endurance at sea.

19. Diligently separating the food waste greatly improves the processes of dry garbage, especially with respect to dealing with plastics for incineration and compaction. Collecting food waste using milk boxes lined with a plastic bag at source may assist in the separating process and increase storage capability while reducing the health risk.

20. The overboard disposal of organic garbage may occur if the retention of the waste creates health risks for the crew and only with the approval of the CO. In this case, organic garbage will be discharged either through the marine sanitation device or dead astern in the prop wash at the farthest practical point from land as operationally viable. Should overboard discharge occur, the latitude, longitude, course, speed and local weather conditions shall be recorded in the OOW Notebook and reported to MARL/MARP SE by message. The amount and type of solid waste discharged shall also be recorded in the Garbage Book (Record of Solid Waste Disposal at Sea - Annex SOP-E04D).

Procedure Performance Criteria and Records

Sewage Treatment Plant Log – Annex SOP-E02B
Oily Water Separator Rounds Sheet- Annex SOP-E02C
Ballast Water Log - Annex SOP-E02E
Record of Solid Waste Disposal at Sea - Annex SOP-E04D
OOW Notebook
Operational Planning EEDs

Attachments

Annex SOP-E11A - Canadian Inland and Internal Waters Considerations References
Annex SOP-E11B – Maritime Zones

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E11A

CANADIAN INLAND AND INTERNAL WATERS CONSIDERATIONS REFERENCES

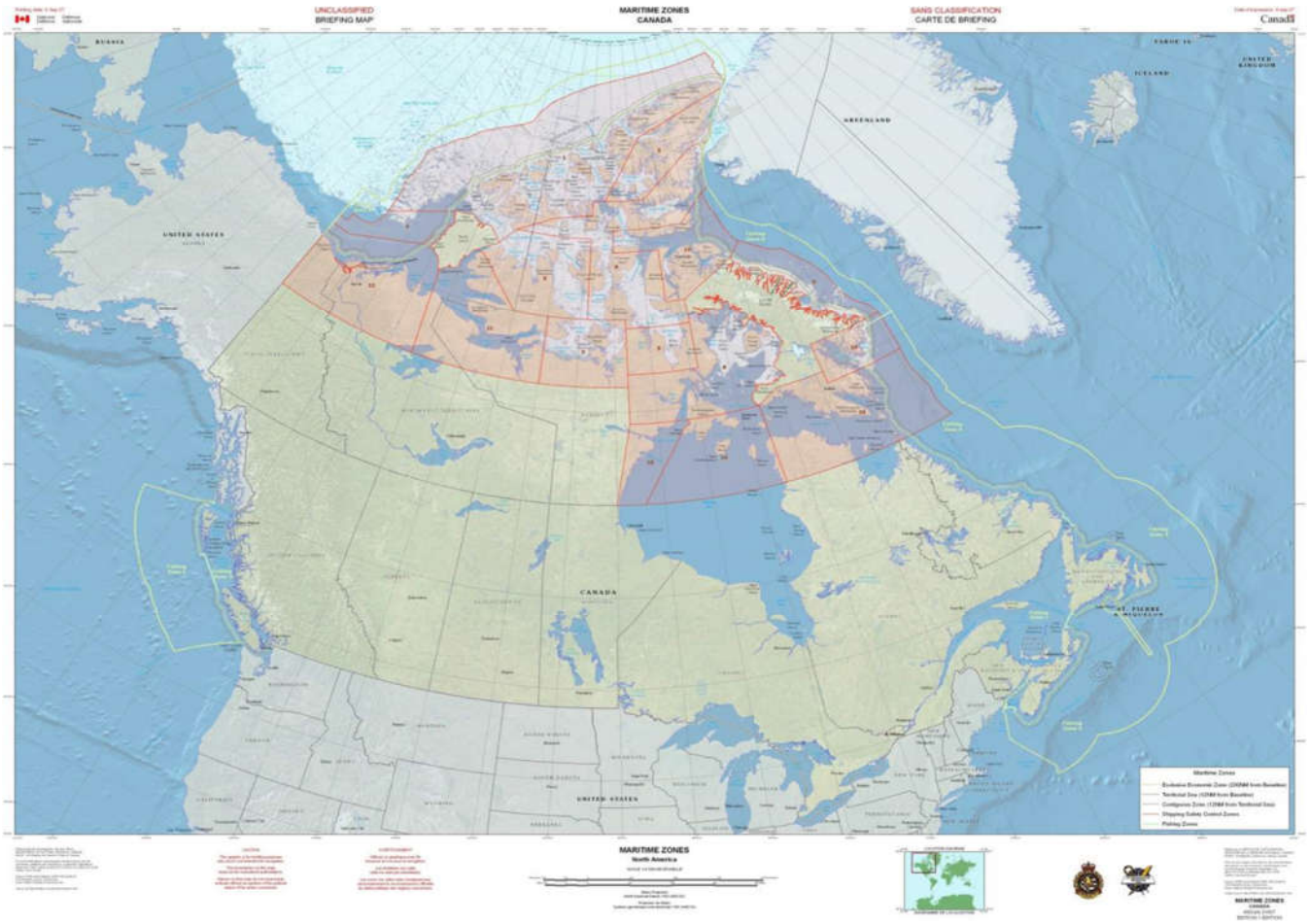
A. Canada Shipping Act – Vessel Pollution and Dangerous Chemicals Regulations (SOR/2012-69)
B. Canada Shipping Act - Ballast Water Control and Management Regulations (SOR/2006-129)
C. Canada Shipping Act - Pollutant Discharge Reporting Regulations, 1995
D. Federal Guidelines for Control of Ballast Water Discharge from Ships in Waters under Canadian Jurisdiction, 01 Sept 2000
E. Seaway Handbook - Seaway Practices and Procedures (February 2009) - Joint Practices and Procedures Respecting the Transit of Ships on the St. Lawrence Seaway
F. United States Coast Guard Ballast Water Management (BWM) Program
G. The Shipping Federation of Canada - Code of Best Practices for Ballast Water Management
H. C-03-005-033/AA-000 Naval Engineering Manual (NEM)
I. MARCORD G-18, Environmental Management of Shipboard Waste

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX SOP-E11B

MARITIME ZONES

EEZ, Fishing Zones and SSCZs



Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

PLAN-P01

SPILL RESPONSE PLAN

Purpose

1. To minimize the risks to the ship's company, the ship, and the environment from the explosive, corrosive, flammable and toxic effects of a fuel or HazMat spill.

Scope

2. This plan applies to all ships of this class under the jurisdiction of the Commander Maritime Forces Atlantic and Commander Maritime Forces Pacific. This plan covers the response and cleanup procedures for fuel or HazMat spills when the ship is:

a. at sea;

b. alongside in homeport; and

c. alongside away from homeport.

Definitions

3. The following definitions are used within this plan:

Term	Definition
Decontamination Team	The Decontamination Team is responsible for setting up the decontamination site, conducting decontamination including gross decontamination if required, and assisting with casualty first aid and transport within the Warm Zone. The Decontamination Team members are drawn from the Casualty Clearing Team (CCT).
Dressing Area	Normally located at the HazMat locker in the 02 deck forward lobby, outside the Weapons Workshop, the Dressing Area is the muster area for all NTD personnel (all on watch personnel when at sea) at the PO2 rank and below.
Fuel	Materials used to provide the motive power for the ship, auxiliary vessels, aircraft and boats. These are generally gasoline, aviation and diesel fuels as appropriate for equipment requirements.
Hazard Control Zones	The following zone designations apply to the affected areas of the vessel: a. Hot Zone (HZ) - any space, compartment or room that is directly contaminated by a spill; b. Warm Zone (WZ) - the area adjacent to the HZ from which the HZ is entered and actions are managed to remove casualties, clean up the spill and decontaminate personnel and/or casualties.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

When all personnel leave the WZ, they are fully decontaminated; and

c. Cold Zone (CZ) - the area of the ship that is not used as the WZ and is not in any way contaminated by the spill. All other areas outside of the WZ and HZ.

Hazardous Material (HazMat)	Dangerous substances (e.g. poisons, corrosive agents, flammable materials, ammunition, explosives, radioactive materials), or any other material that if handled improperly, can endanger human health and well-being, the environment or equipment. For the purposes of this plan, HazWaste is considered to be HazMat.
Officer In Charge (OIC)	The individual responsible for directing and coordinating the response to a spill. That person shall assume the management function of the spill response, and may delegate some control to coordinate and implement the response.
On Scene Supervisor (OSS)	The individual is responsible for directing and coordinating the spill response at the scene of the spill and directly reports to the OIC.
Initial Investigation Team (IIT)/Rapid Attack Team (RAT)	The IIT, comprised of four designated NTD personnel dressed in appropriate PPE, and RAT are responsible for removing any casualties, stopping and containing the spill, collecting spilled material information, and completing zone confinement that the discoverer was not able to perform.
Mutual Aid Agency	Any outside organization, which has a prior agreement to be part of the response organization, such as QHM and the Fire Department.
Nuisance Spill	A minor release of a substance that can be safely cleaned up and does not impose an immediate threat to personnel and environment.
Safety Data Sheets (SDS)	Documents prepared by the manufacturer and/or supplier containing detailed hazard and safe handling information relative to a specific product.
Size-Up	Assessment of the situation to determine the appropriate level of response. Performed by the SRT, the size-up consists of making a risk and hazard assessment of the known and suspected characteristics of the spill. This process determines the type of spill and response level required: Fuel, HazMat, or Nuisance.
Spill	Any unplanned and uncontrolled release of a substance that may present a hazard to personnel, the workplace, or the natural environment.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Responsibilities

4. Discoverer:

   a. The discoverer is the first person on the scene of a spill and is responsible for first response and cleanup. If cleanup is beyond the capability of the discoverer, they shall raise the alarm IAW SSOs.

5. OIC:

   a. The OIC controls the response and cleanup activities in order to limit damage to equipment, personnel, and the environment.

   b. The OIC (NTO if QHM or Fire Department acts as OIC) is responsible to provide recommendations to the Commanding Officer as to whether or not a formal investigation should be convened, IAW reference E.

6. Spill Response Team (SRT):

   a. The Spill Response Team performs rapid response and assesses the scene of the spill.

7. Spill Cleanup Teams (SCT):

   a. The ship's SCT shall respond and cleanup a spill if it is not assessed as a nuisance spill by the SRT.

   b. The specific membership of the teams and response activities are defined further in this plan.

8. Commanding Officer:

   a. The Commanding Officer is responsible for ensuring any required investigation is conducted and sending spill reports in support of data analytics and future prevention.

9. UEnvO/UHMC/NTO:

   a. The Unit Environmental Officer (UEnvO), Unit Hazardous Material Coordinator (UHMC) or NTO prepares the spill report message (for spills both external and internal to the ship) IAW Annex Plan-P01B and provides recommendations for corrective actions or mitigation measures to prevent future spills.

Spills Response

10. The ship's crew must be prepared to respond to spills at all times. When responding to spills, the safety of personnel overrides any environmental impacts or damage.

11. While conducting a Replenishment at Sea (RAS) the spill alarm is not to be raised if the source of the spill is located at the fuelling position. This is due to the extensive mitigation measures in place for the dangers associated with a tensioned span wire and the nature of fuelling while underway. This does not negate the requirement that any time a spill is observed or suspected during fuelling, any member can

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

order **"STOP PUMPING, STOP PUMPING, STOP PUMPING"** or for personnel in the dump position to commence with cleaning up of the spill.

12. The steps required to respond to a spill, both external and internal, are summarized in order of priority in Table P01.1. The specific roles and responsibilities for the potential spill situations are described in the following sections.

Table P01.1 - Spill Response Steps

Step	Action
1.	Raise the alarm, stop and/or contain the release if possible
2.	Sound appropriate pipe in accordance with SSOs
3.	SRT takes action, performs Size-Up, conducts O Group, and, if required, transitions to a full response with the required cleanup team
4.	Spill is cleaned up, including decontamination procedures as required
5.	Terminating the incident: – Conduct investigation as required – Report spill as required – Review response plan – Disposal of waste

SPILL RESPONSE AT SEA

13. Initial spill response procedures at sea are led by the NTO as the OIC.

14. Personnel involved with initial spill response and their specific response actions are detailed in Table P01.2.

Table P01.2 - Spill Response at Sea Procedures

Personnel	Actions
Discoverer	(1) Raises the alarm in accordance with SSOs; (2) Attempts to identify released substance; (3) If safe to do so: a. extracts any casualties if applicable; b. stops and contains release; and c. confines area. (4) Acts as a sentry until relieved; (5) Briefs the SRT on: a. type of substance spilled (if known); b. the quantity of substance spilled; c. the cause of the spill; d. what has already been done to stop and confine the spill; e. what equipment was involved and status of that equipment; and f. if there are any casualties; (6) Assists the SRT as required.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Personnel	Actions
Bos'n's Mate	(1) Makes the appropriate pipe IAW SSOs; (2) Assists the OOW as needed; (3) Keeps the following records of events: a. time the spill alert was raised; b. the location of the spill; c. the type of spill (once known), e.g. distillate fuel, JP5, etc.; d. time spill cleanup began; e. time spill cleanup ended; f. time personnel and equipment were secured; and g. any other information as directed by the OOW.
Engineering Watchkeeper	(1) Crash stops ventilation and ensures the ship is in Smoke Control condition. (2) Instruct the Engineering Roundsperson to shut down, or remotely shutdown, RODS
OOW	(1) Initiates the pipe and ensures that the correct pipes are made; (2) Considers ship's motion and its effect on the spill response and minimizes if practicable; (3) Acts as liaison with the OIC for OOW considerations as the situation dictates; (4) Fixes the ship's position; and (5) If spill enters water: a. marks the chart and maneuvers the ship to a position of safety to ascertain the extent of the slick/spill. Weather conditions such as wind, drift, temperature, and other environmental factors must be carefully noted; b. considers launching one or more boats if practicable; c. informs appropriate agencies. If in Canadian waters, this should include the Coastal Maritime Operations Center; and d. considers notifying the Regional Manager of Emergency Operations from the Canadian Coast Guard. If in foreign waters, the vessel traffic management authority is contacted.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Personnel	Actions
SRT	(1) The following personnel comprise the SRT and proceed immediately to the piped spill location: a. NTO; b. Snr Mech Propulsion Manager; c. W Eng Manager; d. Petty Officer of the Watch (POOW); e. RAT; f. IIT; g. Engineering Roundsman; and h. PA (closes up in Sickbay or proceeds to the scene if the casualty pipe is made). (2) The following personnel are also part of the SRT and will proceed immediately to the MCR: a. UDER – Monitors liquid levels and ensures appropriate valves are opened or closed; b. Aviation Tech Specialist (If not at flying stations) – Provides advice to the On Scene Supervisor (OSS) on JP5 spills and ensures appropriate valves are opened/closed; and c. Snr Mech Propulsion Manager – provides advice to OSS and ensures power is isolated as required. (3) The SRT proceeds to the scene, performs a size-up to assess the type of spill, makes the affected area safe, attempts to minimize the risk of the substance from entering the water or spreading from the affected area, and conducts an O Group for an initial plan for the cleanup of the spill.
POOW	(1) Controls access to the affected area by posting sentries at access points; (2) Assists with confinement and clears mess decks as required; and (3) Resumes POOW duties unless otherwise directed.
NTO (SRT OIC)	(1) Proceeds immediately to the location of the spill as the OIC; (2) Leads Size-Up and determines the type of spill, location and cause; (3) Ensures all pumping and transfer of fuel has stopped through MSE Dept Coord if the spilled substance is fuel; (4) Extracts any casualties if possible; (5) Establishes scene control as the OIC, and directs spill and cleanup activities until the arrival of the NTD Dept Coord/W Eng Manager who will take over as OSS; and (6) Conducts O Group to delegate tasks and provide initial plan; (7) Proceeds to MCR and establishes communications on Meet-Me Net (MMN) 52 with OSS; and (8) Makes informative pipes and closes up cleanup teams as required.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Personnel	Actions
Snr Mech Prop Manager (OSS for fuel)	(1) First reports to the MCR to confirm that no fuel is being transferred or pumped and if so, orders stop pumping; (2) Obtains gas testing equipment from MCR and conducts air quality and gas testing on scene; (3) Ceases all fueling evolutions immediately, redirects remaining fuel to an empty tank if necessary; (4) Proceeds to scene to aid rapid response, size-up, and O Group; (5) Takes over as OSS (if fuel spill) and performs duties in accordance with Annex Plan-P01C; and (6) Confirms ship is in Smoke Control.
W Eng Manager (OSS for HazMat)	(1) Proceeds to the scene to aid rapid response, size-up, and O Group; and (2) Takes over as OSS (if HazMat spill), and performs duties in accordance with Annex Plan-P01F.
RAT/IIT	(1) If available, RAT shall dress in PPE and proceed to the scene to act as IIT; (2) 4 NTD personnel shall proceed to designated dressing area(s), dress in PPE, and proceed to the scene to act as IIT and backup IIT; (3) The RAT/IIT under the direction of OIC/OSS shall: a. Attempt to identify the type of material and quantity of the spill and assess the flammable and toxic risks with an air monitoring device; b. Perform gross decontamination (if possible) and extract casualties; c. Contain the spill; d. Confine area; e. Rig two hoses (if required), to disperse any substance that is a threat to ship safety. If a fuel spill, fuel is not dispersed unless there is an imminent fire hazard, in which case AFFF may be used to provide a blanket of foam; and f. Assist with cleanup.
UEnvO	(1) Makes an assessment of immediate and potential environmental impact; (2) Makes recommendations WRT additional clean-up, if required, to the NTO; (3) Advises OOW of agencies to notify; and (4) Drafts initial Spill Report IAW SEMS Annex Plan-P01B (UEnvO drafts message for fuel spill, NTO or delegate drafts message for HazMat spill). Amplifying messages are raised when more details can be added and the spill is entirely cleaned up.
PA	(1) Responds in accordance with Annex Plan-P01H.

Note 1: The SRT OIC and OSS will determine if a cleanup team is required based on the nature of the spill. In order to transition to a full response, the following pipe will be repeated twice: **"SPILL**

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

CLEANUP TEAM, CLOSE UP." This pipe is the order for all required components of the appropriate spill cleanup team to close up.

Note 2: If some components are not essential, the OSS will make recommendations to the OIC to stand them down through a follow up informative pipe **(e.g., "STAND DOWN THE DECONTAMINATION TEAM")**.

SPILL RESPONSE ALONGSIDE

15. Personnel response and cleanup procedures for a spill while alongside are led by the SWK acting as OIC, assisted by applicable at sea organization and supernumerary personnel when available. For spills on water or land, the applicable agency will direct the overall response as OIC (QHM for spills in the water and the Fire Department for spills on land).

16. It is important to note that if the spill occurs after hours or during a period when there are few personnel on board (leave period, training, etc.), the response remains the same, but there will likely not be as many personnel from the SRT to support. The Duty Watch normally does not contain enough personnel to handle larger spills and a recall of cleanup team personnel or external support from other ships or agencies will be required.

17. Specific response actions are detailed in Table P01.3.

Table P01.3 - Spill Response Alongside Procedures

Personnel	Actions
Discoverer	(1) Raises the alarm in accordance with SSOs; (2) Attempts to identify released substance; (3) If safe to do so: a. extracts any casualties if applicable; b. stops and contains release; and c. confines area. (4) Acts as a sentry until relieved; (5) Briefs the RRT on: a. type of substance spilled (if known); b. the quantity of substance spilled; c. the cause of the spill; d. what has already been done to stop and confine the spill; e. what equipment was involved and status of that equipment; and f. if there are any casualties; (6) Assists the RRT as required.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Personnel	Actions
Quarter Master	(1) Makes the appropriate pipe IAW SSOs; (2) Assists the SWK as needed; (3) Plots events on BDCS IAW Annex Plan-P01D or Plan-P01G; (4) Establishes communications with the Duty Tech on MMN 52; and (5) Keeps the following records of events: a. time the spill alert was raised; b. the location of the spill; c. the type of spill(once known), e.g. distillate fuel, JP5, etc.; d. time spill cleanup began; e. time spill cleanup ended; f. time personnel and equipment were secured; and g. any other information as directed by the SWK.
Duty Tech	(1) Crash stops ventilation and ensures ship is in smoke control condition; and (2) Isolate power as required.
RRT	(1) The following personnel comprise the RRT and proceed immediately to the piped spill location: a. Discoverer; b. Senior Watchkeeper/OOD; c. Duty Engineer; d. Off Watch Brow Watchkeeper; and e. Any available members of SRT. (2) The RRT proceeds to the scene, performs a size-up to assess the type of spill, makes the affected area safe, attempts to minimize the risk of the substance from entering the water or spreading from the affected area, and conducts an O Group for an initial plan for the cleanup of the spill. (3) Based on the outcome of the size-up, further cleanup response may be transferred to the appropriate OIC and cleanup team when they arrive.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

SWK (RRT OIC)

(1) Proceeds immediately to the location of the spill as the OIC and uses SRT expertise when available;
(2) Conducts Size-Up and determines the type of spill, location, and cause;
(3) Ensures all pumping and transfer of fuel has stopped through Duty Tech if the spilled substance is fuel;
(4) Extracts any casualties if possible;
(5) Conducts O Group to delegate tasks and provide initial plan;
(6) Proceeds to command position (normally the hangar) to coordinate personnel responding to the spill and establishes communications on MMN52 with OSS;.
(7)
(8) If required, sentries are assigned

(9) Ensures personnel involved in the clean-up are properly dressed;

(10) Makes informative pipes and notifies relevant external agencies and adjacent ships (normally contacting external agencies is delegated to UEnvO if available);
(11) Consults with NTO, informs CO of spill, and recalls personnel for cleanup as required;
(12) Ensures personnel involved in the clean-up are properly dressed;
(13) Acts as OIC and directs cleanup until transferred to appropriate OIC.
(14) Details escort for Mutual Aid Agency as required;
(15) Disposes of waste in appropriate drums; and
(16) Directs launching of boat with Boat Cox'n and engineering personnel as directed.

Note 1: The table below provides contact information for home port external agencies:

External Agency	MARLANT	MARPAC
QHM Watch	427-3199	363-2160 Cell 889-0444
QHM Pollution Control Officer	427-5830 Cell 499-4961	363-2425 or 363-5848
DND Fire Dept	427-3333	363-2224
OPS Duty Officer	427-2501	363-5848
MARL/MARP SEO	427-1419	363-5220

Note 2: When informing QHM, Fire Department, or equivalent harbour authority, the following information must be provided:
(1) Name and contact # of the OIC;
(2) location of the spill;
(3) type of pollutant involved;
(4) quantity of pollutant involved;
(5) whether the pollutant is still flowing into the area of spill; and
(6) direction of slick movement (if any).

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Personnel	Actions
Duty Tech (OSS)	(1) Proceeds to the scene to aid rapid response, size-up, and O Group; (2) Advises SWK on hazards, drains, and ventilation; (3) Establishes communications on MMN 52 with OIC; and Acts as OSS and coordinates cleanup at the scene until transferred to appropriate OSS.
Duty Watch	(1) Emergency Party musters in the hangar; and (2) Two personnel from the Duty Watch dress in the standby position in the event casualty extraction is required. (3) Remaining duty watch and any supernumerary personnel are available for use as sentries and to carry out other miscellaneous duties as directed.
QHM/Fire Dept	(1) Upon arrival, QHM representative becomes the OIC of the operation for activities in the water and SWK becomes the ship coordinator under the OIC's direction. (2) Upon arrival, the Fire Dept shall meet the SWK at the command position, be briefed, and provides assistance as requested by the SWK for spills internal to the ship and becomes the OIC for activities on land.

Note: Absorbent pads are only to be used for very small spills in the water. For larger spills in the water, QHM will utilize skimmers that can get clogged by the absorbent pads.

SPILLS IN FOREIGN PORTS

18. Away from homeport, the availability of the local Harbour Authorities or Fire Department to assist in the identification and confinement of a spill is not guaranteed. Therefore, after hours the SWK must initiate a recall of the appropriate cleanup team immediately and use any personnel onboard such as SRT, SCT, or SCT members to provide the initial response in lieu of the local authorities. Local authorities must still be notified and supported in their policies and procedures.

SPILLS DURING FLYING STATIONS

19. The Air Department is responsible for fuelling aircraft. Fuelling times are short and the procedure requires a high degree of attention. Spill response materials are available in the vicinity; however, it is not practical to cleanup an F-44 spill in the vicinity of the helicopter while helicopter engines are operating or the rotor head is engaged. The Air Department and Fire Fighters shall only attempt spill response when the rotors are disengaged and engines shut down. If quantities totalling 5 litres or less of F-44 enter the water from the Flight Deck drains, the spill is allowed to evaporate.

20. In the event of a spill elsewhere in the ship, the FDER shall ensure that all F-44 pumping operations have ceased and the fuelling hose is disconnected from the helicopter. The Aviation Tech Specialist will then seek permission from the Landing Safety Officer or FLYCO (in the case of SWOAD operations) to be absent from Flying Stations prior to responding as part of the SRT.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

SPILLS FROM SMALL BOATS

21. In the event of a fuel spill during fuelling of a small boat, the Boat Cox'n will be responsible for the confinement and cleanup of the spill. If the spill is outside the capability of the Boat Cox'n's ability to control and or clean up, assistance from the SRT will be sought.

SPILLS WITHIN THE SHIP

22. In the event that a fuel spill occurs inside the ship, the discoverer must raise the alarm IAW SSOs, and it must be treated in the same manner as any other fuel spill. However, NTO shall consider confinement requirements and HazMat zoning.

AQUEOUS FILM FORMING FOAM (AFFF)

23. AFFF shall not be discharged overboard except in emergency situations. In the event of a release, by nature, this material is very difficult to confine, collect, and cleanup. Ship's staff shall take every effort to contain the AFFF spill to the vessel and arrange for contracted resources to facilitate cleanup. For more information regarding available contract resources for disposal, contact BLog HazMat Section, MARPAC SE or MARL SE.

SPILL REPORTING

24. All self-generated, or observed pollution incidents at sea or in harbour, regardless of the perceived environmental implications, are to be reported by message IAW the format at Annex Plan-P01B - Spill Message Format. In general, the precedence of a spill message shall be "ROUTINE" unless the volume of spill substance is greater than one cubic meter, in which case it will be "PRIORITY." Messages shall be unclassified unless attached to, or containing classified information.

25. Where possible, the ship shall alert shore authorities by a more direct and immediate means. However, in all cases, the incident shall be followed up as soon as possible with a message.

26. If the spill occurs in foreign waters or ports, immediate steps must be taken to notify appropriate foreign national and/or local authorities. In the case of a spill incident in foreign waters, it is the responsibility of the Formation to provide details through the RCN to NDHQ for forwarding to Canadian Diplomatic and Military missions in the affected country.

27. In Canadian ports other than Halifax, Esquimalt, Nanoose or Nanisivik, when reporting spill incidents, the ship shall, in addition to the above, take immediate steps to inform Canadian Coast Guard Regional Manager of Emergency Operations (CCG RMEO). Points of contact are provided by appropriate Coastal Maritime Operations Centres (CMOC). Direct liaison with CCG RMEO is to be noted in the message under "REMARKS". The ship is responsible for cleaning up all self-generated spills.

HAZARDOUS OCCURRENCES

28. In the event that shipboard personnel (either involved in the initial incident or the spill response) are exposed to a hazardous material, the unit must ensure workplace hazardous occurrences investigation and generation of DND 663(s) and CF 98(s) occurs. Supervisors are responsible for safety of their staff and must initiate required hazardous occurrence investigations. The subsequent reports must be retained

on file and forward copies of the DND 663 and CF 98 to MARL/MARP SE and NDHQ/DCSM, respectively.

SPILL INVESTIGATION

29. A formal Technical Investigation (TI) or Summary Investigation (SI) is conducted following some spills, as directed by Command or Formation authorities. As a minimum, the effectiveness of the Spill Response Plan must be reviewed, and any recommendations for changes to the plan are sent to the MARL/MARP SEO, with an information copy to the FTA.

Records

Relevant Summary and Technical Investigations
Fuel Spill Messages

Attachments

Annex Plan-P01A - Spill Response Plan References
Annex Plan-P01B - Spill Message Format
Annex Plan-P01C - Fuel Spill Cleanup Team Procedures
Annex Plan-P01D - Fuel Spill Plotting and Milestones
Annex Plan-P01E - Fuel Spill Cleanup Material Requirements
Annex Plan-P01F - HazMat Spill Cleanup Team Procedures
Annex Plan-P01G - HazMat Spill Plotting and Milestones
Annex Plan-P01H - Medical Response and Decontamination Team Procedures
Annex Plan-P01I - HazMat Spill Cleanup Material Requirements

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX PLAN-P01A

SPILL RESPONSE PLAN REFERENCES

A. Transportation of Dangerous Goods Act, 1992
B. DAOD 4003-1, Hazardous Materials Management
C. DAOD 7002-2, Summary Investigations
D. C-03-005-033/AA-000, Naval Engineering Manual
E. NAVORD 1080-1, Technical Investigations - Process
F. MARCORD G-18, Environmental Management of Shipboard Waste
G. Royal Canadian Navy Ship's Standing Orders (SSOs)
H. QHM Harbour Control Instructions
I. QHM Pollution Contingency Plan (Part III of QHM SEMS)
J. NIOSH Pocket Guide to Chemical Hazards, Department of Health and Human Services, Centers for Disease Control and Prevention, (current version)
K. Emergency Response Guidebook - A Guidebook for First Responders During the Initial Phase of a Dangerous Goods/Hazardous Materials Transportation Incident (current version)
L. National Joint Council Directives Occupational Health and Safety Directive - Part XI - Hazardous Substances
M. A-GG-040-004/AG-001, General Safety Program - Hazardous Materials Safety and Management Manual
N. C-87-040-000/MS-001, DND Respiratory Protection Program
O. A-GG-040-001/AG-001, General Safety Program, Volume 1 - Policy and Program
P. WHMIS 2015

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX PLAN-P01B

SPILL MESSAGE FORMAT

The message format for spill reporting is as follows:

FROM: HMCS (SHIP)

For East Coast Units
TO: MARLANTHQ HALIFAX//N48//
INFO: MARLANTHQ HALIFAX//N4
MAT/N3/N42/N49/N02PA//

COMCANFLTLANT
NDHQ DGMEPM OTTAWA//DNPS 3-4//

For West Coast Units
TO: MARPACHQ ESQUIMALT//FSE//
INFO: MARPACHQ ESQUIMALT//J3/J42
DCOS FTA/J02PA//
CFB ESQUIMALT//POESB//
COMCANFLTPAC
CANFLTPAC HQ ESQUIMALT//CCD/F3/F4
ENG//
NDHQ DGMEPM OTTAWA//DNPS 3-4//

SIC: ESL/P2D
SUBJ: SPILL REPORT
(References are not required. Identify as UPDATE if required.)

A. DTG OF SPILL (OR OBSERVATION OF A SPILL)/DTG SPILL CLEANED UP
B. LOCATION (PLACE NAME OR LAT/LONG)
C. SELF-GENERATED/OBSERVED
D. TYPE OF SUBSTANCE
E. QUANTITY OF SUBSTANCE SPILLED/AMOUNT CAPTURED (KG/L)
F. ORIGIN AND CAUSE OF SPILL
G. ACTIONS TAKEN
H. TI OR SI REQUIRED
I. CASUALTIES
J. WEATHER AT THE TIME OF THE SPILL/SEA STATE
K. OBSERVED ENVIRONMENTAL IMPACT
L. ESTIMATED SPEED AND DIRECTION OF POLLUTANT DRIFT
M. AGENCIES/AUTHORITIES ADVISED OR INVOLVED (both internal and external)
N. REMARKS
O. COMMANDING OFFICER (Name/Rank/Contact Number)

NOTES:

1. In MARLANT, QHM is the point of contact for spills in homeport or coastal areas while in MARPAC it is POESB EPO.
2. Messages should be unclassified unless attached to, or containing classified information.
3. For spills that occur internally to the ship, Sections J to M can be filled with "NA". Section N (Remarks) start with "INTERNAL SPILL", then state where the spill occurred and any impact this might have on ship operational capabilities.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX PLAN-P01C

FUEL SPILL CLEANUP PROCEDURES

Introduction

1. Based on the Size-Up during the initial spill response, the Spill Cleanup Team (SCT) may be tasked to conduct cleanup. The SCT will close up on order from the OIC following the pipe: **"SPILL CLEANUP TEAM, CLOSE UP"**.

Fuel Spill Cleanup at Sea

2. Fuel spill cleanup procedures for a spill at sea are led by the NTO as the OIC.

3. In extreme circumstances, if the spill is deemed an immediate threat to the ship's safety, the NTO may recommend to the CO that the residual fuel be hosed over the side.

4. Personnel comprising the SCT and their specific response actions are detailed in Table P01C.1.

Table P01C.1 – Fuel Spill at Sea

Personnel	Actions
SCT	(1) The following positions comprise the SCT: a. OIC (NTO); b. OSS (NTD Coord); c. DCPO; d. Dressing Area IC; e. Cleanup Personnel (available NTD personnel); and f. Plotter. (2) The SCT closes up on order from the pipe, dresses in the PPE directed by the OIC, and proceeds to the scene to conduct the cleanup.
OIC (NTO)	(1) Proceeds to command position (normally the MCR); (2) Establishes communication with the OSS and Dressing Area IC on MMN52; (3) Directs SCT throughout spill cleanup; (4) Makes informative pipes on status of spill cleanup; (5) Once satisfied with the cleanup, recommends termination of incident to CO; and (6) Conducts incident debrief and reviews response plan.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

OSS (NTD Coord)	(1) Establishes scene control as the OSS and directs cleanup activities; (2) Establishes communications with OIC and Dressing Area IC on MMN52; (3) Ensures that personnel are dressed in proper PPE (oil resistant gloves, goggles, and some internal spills may require personnel to wear FF boots); (4) Ensures cleanup and decontamination material has arrived on scene (see Annex Plan-P01E); (5) Ensures proper cleanup and decontamination procedures are carried out, to include: a. Gross cleanup of spill; b. Sanitizing the area thoroughly with warm soapy water; and c. Ensuring all reusable materials, especially the ship's craft are thoroughly decontaminated and wiped free of any solvents used; and d. Ensures HazWaste is properly labeled and stored in appropriate drums until it can be disposed of at an appropriate depot alongside; and (6) Briefs OIC on progress as required.
DCPO	(1) Advises OIC and OSS on the ship's systems (drain locations, waterways, overboard discharges, power outlets, etc.); and (2) Assists with cleanup and gas free as required.
Dressing Area IC	(1) Proceeds to Dressing Area and directs cleanup personnel; (2) Establishes communications on MMN52 with OIC and OSS and reports when closed up; (3) Ensures SDS is provided to the OSS; (4) Dresses the cleanup personnel in accordance with SDS and OIC direction; (5) Briefs and dispatches cleanup personnel and equipment to the scene; (6) Briefs and dispatches additional personnel for tasks such as isolating ventilation/power as required; (7) Assists and advises the OSS on technical issues with respect to the spill; (8) Briefs OIC/OSS as required; and (9) Ensures depleted supplies are restocked.
Cleanup Personnel (available NTD personnel)	(1) Muster in designated Dressing Area and dress in ordered level of PPE; (2) Assists as directed by the Dressing Area IC.
Plotter	(1) Proceeds to the command position and begins plotting spill IAW Annex Plan-P01D.

Fuel Spill Cleanup Alongside

5. If the SCT is required for a spill alongside, the NTO is to be consulted and the at sea organization will be recalled as required.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

6. Duty watch personnel may act as the SCT at sea positions until the appropriate personnel arrive as follows:

a. OIC - SWK;

b. OSS – DTech;

c. DCPO – DTech;

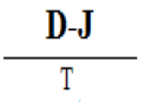
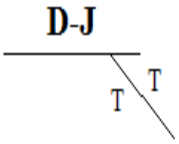
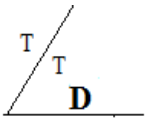
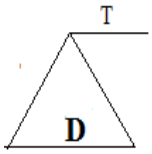
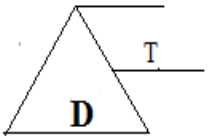
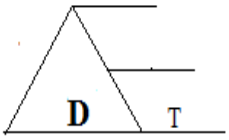
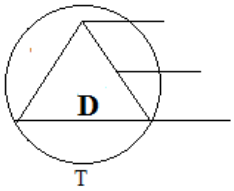
d. Dressing Area IC – DCox'n; and

e. Cleanup Personnel – Supernumerary personnel.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX PLAN-P01D

FUEL SPILL PLOTTING AND MILESTONES

MARKING	DESCRIPTION
	**Spill Response Initiated** Time that the spill was reported with letter indicating type (D for DFO, J for JP5, G for gasoline).
	**IRT On Scene** Time is inputted when power has been isolated isolated (if required) and ventilation crashed.
	**Substance Contained** Time is inputted when sentries have been briefed and posted and clean up has commenced.
	**Commence Clean-up** Time is inputted when cleanup is 25% complete.
	**50% Clean-up** Time is inputted when cleanup is 50% complete.
	**100% Clean-up** Time is inputted when cleanup is 100% complete and all contaminated materials have been placed in appropriate containers for disposal.
	**Area Gas Free** Time is inputted when all affected areas and ventilation routes have been verified gas free by a qualified MAR TECH or by MARL/MARP SE (alongside).

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX PLAN-P01E

FUEL SPILL CLEANUP MATERIAL REQUIREMENTS

1. Detailed below are the fuel spill cleanup materials required for each ship. For more information regarding fuel spill cleanup materials contact QHM in MARLANT or POESB EPO in MARPAC. A completed copy of the applicable table from this annex should be placed inside each spill kit.

SHIP CLASS	LARGE KIT	SMALL KIT
HDW	2	4

Table P01E.1 – Large Fuel Spill Kit

ITEM DESCRIPTION	RECOMMENDED HOLDINGS	CURRENT HOLDINGS	COMMENTS
Overpac Drum	1		
Absorbent Roll (19"x144')	2		
Absorbent Pads*	100		
Mini Booms (5"x10')	4		
Disposal Bags	10		
Coveralls (Level C) - Must provide 8 hrs protection from petroleum products.	6 pair		
Respirator (Medium)	2		
Respirator (Large)	1		
Respirator (Small)	1		
Respirator Cartridge (Organic Vapours)	4		
Goggles	6		
Gloves	6 pair		
Drain Blockers	4		

Table P01E.2 – Small Fuel Spill Kit

ITEM DESCRIPTION	RECOMMENDED HOLDINGS	CURRENT HOLDINGS	COMMENTS
Carry Bag	1		
Absorbent Pads*	10		
Mini Booms (5"x10')	2		
Disposal Bags	4		
Coveralls (Level C) - Must provide 8 hrs protection from petroleum products.	1 pair		
Goggles	1		
Gloves	1 pair		

*Sonic bonded oil pads are not to be used to clean up oil/fuel on water. Air laid oil-only absorbent pads are the only pads authorized for this use.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX PLAN-P01F

HAZMAT SPILL CLEANUP PROCEDURES

Introduction

1. Based on the Size-Up during the initial spill response, the Spill Cleanup Team (SCT) may be tasked to conduct cleanup. SCT personnel will close up on order from the OIC following the pipe: **"HAZMAT SPILL CLEANUP TEAM, CLOSE UP."**

2. To minimize the area of the ship affected by the spill, the OIC, in consultation with the OSS, designates the contaminated area as the Hot Zone (HZ) and the decontamination area around it as the Warm Zone (WZ).

Hazmat Spill Cleanup at Sea

3. HazMat spill cleanup procedures for a spill at sea are led by the CSEO as the OIC.

4. Personnel comprising the SCT and their specific response actions are detailed in Table P0F.1.

Table P01F.1 – HazMat Spill Cleanup at Sea

Personnel	Actions
SCT	(1) The following positions comprise the SCT: a. OIC (NTO); b. OSS (W Eng Manager); c. CSEC; d. DCPO; e. Dressing Area IC; f. Cleanup Personnel (available NTD personnel); g. Decontamination Team; h. Casualty Clearing Team (CCT); i. Casualty Data Coordinator (CDC); j. PA; k. Supply HMRA Support Team; and l. Plotter. (2) The SCT closes up on order from the pipe, dresses in the PPE directed by the OIC, and proceeds to the scene to conduct the cleanup and decontamination.
OIC (NTO)	(1) Proceeds to command position (normally the Chart Room); (2) Establishes communication with the OSS and Dressing Area IC on MMN52; (3) Directs SCT throughout spill cleanup; (4) Makes informative pipes on status of spill cleanup; (5) Once satisfied with the cleanup, recommends termination of incident to CO; and (6) Conducts incident debrief and reviews response plan.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Personnel	Actions
OSS (W Eng Manager	(1) Establishes scene control as the OSS and directs cleanup activities; (2) Establishes communications with OIC and Dressing Area IC on MMN52; (3) Positions himself/herself in an area that is free from contaminants (i.e. the Cold Zone), and establishes the Hot/Warm/Cold zones, with a warm zone large enough to accommodate casualties and the decontamination requirements; (4) Controls access in and out of Hot/Warm/Cold zones; (5) Ensures personnel entering the scene use proper PPE; (6) Controls the scene with respect to casualty evacuation through consultation with PA and Annex Plan-P01H; (7) Ensures cleanup and decontamination material has arrived on scene (see Annex Plan-P01I); (8) Ensures proper cleanup and decontamination procedures are carried out; and (9) Briefs OIC as required. (10)Obtains SDS from the Supply HMRA Support Team and distributes them as required; (11)Consults the SDS or technical references as applicable regarding the clean-up procedures for the HazMat release; (12)Proceeds to dressing area and briefs the Dressing Area IC on situation; (13)Acts as liaison between all SCT components as required; and (14)Ensures OIC is informed of progress.
DCPO	(1) Ensures MCR performs crash stop of ventilation to the space, as required; (2) Ensures MCR isolates power in compartment based on the results of the testing of the atmosphere at the spill location, as required; (3) Advises OIC/OSS on the ship's systems (drain locations, power outlets, etc.); (4) Provides temporary ventilation with the support of Dressing Area, if required; and (5) Conducts air quality/gas testing.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Personnel	Actions
Dressing Area IC	(1) Proceeds to Dressing Area and directs cleanup personnel; (2) Establishes communications on MMN 52 with OIC and OSS and reports when closed up; (3) Immediately dispatches ready-use cleanup kit and PRC to OSS; (4) Briefs and dispatches communications number/messenger to the scene; (5) Dresses the cleanup personnel in accordance with SDS and OIC direction; (6) Checks PPE for proper operation; (7) Briefs personnel proceeding to the scene on the route to be taken; (8) Establishes a SCBA bottle replacement/recharging plan as required; (9) Briefs OIC/OSS/CSEC as required; and (10)Ensures depleted supplies are restocked.
Cleanup Personnel (available NTD personnel)	(1) Muster in designated Dressing Area and dress in ordered level of PPE; (2) Once briefed and dispatched by Dressing Area IC, proceeds in teams to scene and conducts cleanup under direction of OSS; and (3) Assists as directed by the Dressing Area IC.
Decontamination Team	(1) Responds in accordance with Annex Plan-P01H; (2) Conducts decontamination of personnel and equipment in Warm Zone as required; and (3) Conducts cleanup and sanitization of Warm Zone as required.
CCT	(1) Responds in accordance with Annex Plan-P01H.
CDC	(1) Responds in accordance with Annex Plan-P01H; (2) When closed up: a. Establishes communication with OSS and Dressing Area on MMN 52; b. Confirms routes with OSS; and c. Assists in dressing casualty clearers.
PA	(1) Responds in accordance with Annex Plan-P01H.
Supply HMRA Support Team	(1) Assists in disposal of contaminated materials and prepares appropriate labelling for HazWaste containers; (2) Provides HazWaste container(s) to the scene then stores HazWaste until it can be properly disposed; (3) Provides relevant SDS; (4) If required, establish communication on MMN52; and (5) Arranges for HazMat disposal.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Personnel	Actions
Plotter	(1) Proceeds to the command position and begins plotting spill IAW Annex Plan-P01G.

HazMat Spill Cleanup Alongside

5. If the SCT is required for a spill alongside, the NTOis to be consulted and the at sea organization will be recalled as required.

6. Duty watch personnel may act as the SCT at sea positions until the appropriate personnel arrive as follows:

a. OIC – SWK;

b. OSS – DTech;

c. DCPO – DTech;

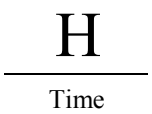
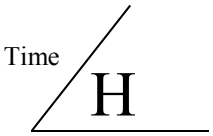
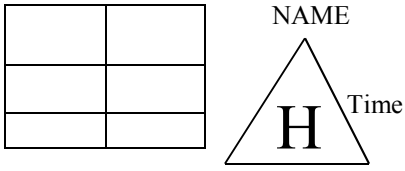
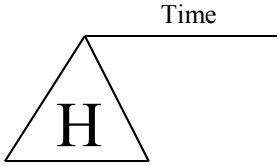
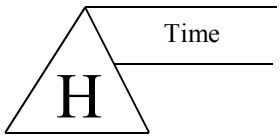
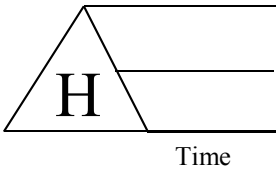
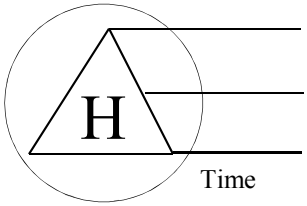
d. Dressing Area IC – DCox'n; and

e. Cleanup Personnel – Supernumerary personnel.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX PLAN-P01G

HAZMAT SPILL PLOTTING AND MILESTONES

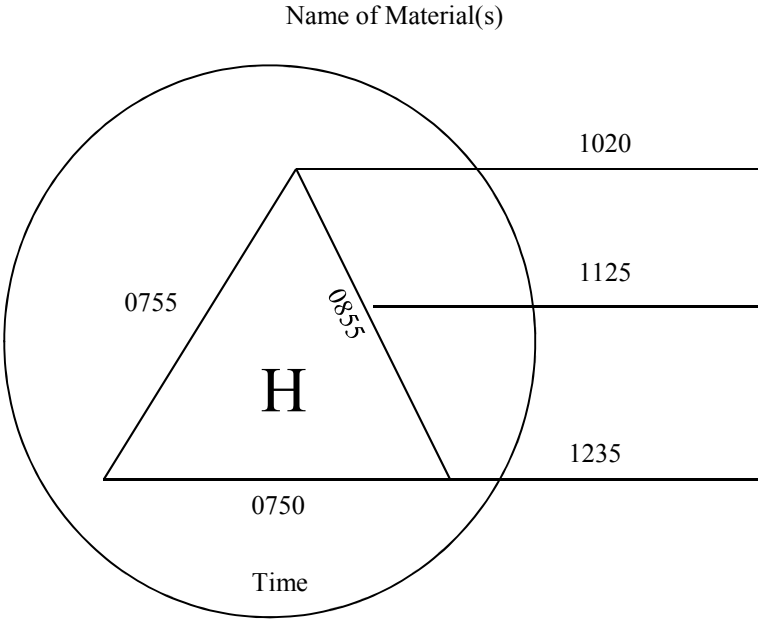
MARKING	DESCRIPTION
	**Spill Response Initiated** Time that the spill was reported.
	**IRT On Scene** Time is inputted when all casualties are confirmed to be extracted out of the Hot Zone, contamination control zones are cleared of ship's personnel not involved in the spill, and sentries reported to be in place and briefed.
	**Substance Contained** Time is inputted when substance has been contained, confined, identified and atmospheric readings are brought to normal conditions (may require ventilation to achieve). Input NAME of material when identified (draw chart to note atmospheric readings and timings if applicable before achieving the benchmark time).
	**Commence Clean-up** Time is inputted when the total amount of substance including absorbent pads and cleaning materials are double bagged and removed from the Hot Zone for disposal.
	**50% Clean-up** Time is inputted when Hot Zone is sanitized with soap and water (normally) followed by a second bucket of water to eliminate all residues, to include drains and/or scuppers in the area. Thorough atmospheric checks are done to ensure all readings are normal.
	**100% Clean-up** Time is inputted when Warm Zone is cleaned and sanitized by the Decontamination Team, all contaminated materials are double bagged and taped and sent for disposal. Re-usable items are taken to an appropriate area for final cleaning.
	**Area Gas Free** Time is inputted when Warm, Hot Zones, and all areas used as ventilation route are verified gas free by a qualified MAR TECH accompanied by CSEC (at sea) or by MARL/MARP SE (alongside).

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

The completed plot should resemble the following:

Example Chart

ATM	TIME
O2 = 19.5%	0800
LEL = 5%	0800
O2 = 20%	0815
LEL = 0%	0830
O2 = 20.9%	0830



Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX PLAN-P01H

MEDICAL RESPONSE AND DECONTAMINATION TEAM PROCEDURES

Introduction

1. The following is a general guideline for the Physician Assistant (PA), Casualty Clearing Team (CCT), Decontamination Team, and Duty Watch when a confirmed HazMat spill has been piped at sea, or alongside.

Spill Response at Sea

2. Medical personnel involved with initial spill response and their specific response actions are determined by whether or not a casualty pipe is made in conjunction with the spill pipe as detailed in Tables P01H.1 and P01H.2.

Table P01H.1 - Spill Without Casualty at Sea Procedures

Personnel	Actions
PA	(1) Proceeds to the scene and reports to the OSS; and (2) Reviews SDS, when available, to determine medical implications to responding personnel; and (3) Advises OIC/OSS on medical implications.

Note: The CCT, Decontamination Team, CDC, and Sickbay Plotter are not required to respond for a spill that doesn't include a casualty.

Table P01H.2 - Spill With Casualty at Sea Procedures

Personnel	Actions
PA	(1) Proceeds to the scene and reports to the OSS; (2) Ensures that any casualties are appropriately grossly decontaminated as required and moved to Warm Zone; (3) Once casualties are decontaminated, addresses immediate life threatening issues; (4) Establishes treatment plan and informs Command; (5) Guides Med Tech through established treatment plan; (6) Examines SDS, when available, to determine medical implications to casualty and responding personnel; and (7) Advises OIC/OSS on medical implications; and (8) Briefs the CCT members on the situation and stands by to provide direction as required.
MED TECH	(1) Proceeds to the scene and reports to the PA; and (2) Carries out established treatment plan under direction of the PA.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Personnel	Actions
CDC	(1) Proceeds to Sickbay; (2) Establishes communication with OSS and Dressing Area on MMN52 as required; (3) Confirms routes with OSS/PA; and (4) Assists in dressing casualty clearers.
CCT	(1) Muster in Sickbay; (2) The first two members will dress in Level C PPE and proceed to the scene for casualty treatment and decontamination; and (3) Once on scene, reports to the PA and assists as directed.
Sickbay Plotter	(1) Plot casualties per standard casualty plotting protocols.

Note: In all instances, when a casualty results from a HazMat spill, a PA, Medical Officer, or civilian doctor must examine the casualty before they can return to duty.

Spill Response Alongside

3. Personnel response and cleanup procedures for a spill while alongside are led by the SWK acting as OIC, assisted by applicable at sea organization and supernumerary personnel when available. If it is after working hours or during a period when there are few personnel to support, the duty watch personnel must work with external agencies in order to compensate for the lack of an immediately available IIT and CCT. If the injuries permit, the casualty must still be decontaminated as much as possible during extraction to limit the spread of the spill.

SCT Response

4. Based on the Size-Up during the initial spill response, the Spill Cleanup Team (SCT) may be tasked to conduct cleanup and decontamination.

5. Specific medical and decontamination response actions are detailed in Table P0H.3.

Table P01H.3 – Response

Personnel	Actions
PA	(1) On arrival of the Decontamination Team members, briefs them on any medical/casualty considerations; (2) Aids OSS in setting up decontamination area; and (3) Returns to sickbay with the discoverer to provide medical assistance, as required.
Med Tech	(1) Proceeds to Sickbay; and (2) Ensures CCT personnel are quickly and appropriately dressed and equipped.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

Personnel	Actions
CDC	(1) Proceeds to Sickbay; (2) Establishes communication with OSS and Dressing Area IC on MMN52; (3) Confirms routes with OSS; (4) Assists in dressing personnel; and (5) Briefs and dispatches Decontamination Teams.
Decontamination Team (CCT)	(1) Muster in Sickbay; (2) Two members will dress in PPE as ordered by OIC as first Decontamination Team; (3) Proceeds via the route identified by the CDC to the established Cold Zone (CZ); (4) Once on scene, reports to the OSS and PA and sets up decontamination area as directed; and (5) CCT personnel shall secure when the SCT has been secured or when ordered to do so.

Note: Any personnel who were in the HZ or exposed to the HazMat spill must be examined by the PA.

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ANNEX PLAN-P01I

HAZMAT SPILL CLEANUP MATERIAL REQUIREMENTS

1. Detailed below are the HazMat spill cleanup materials required for each ship. For more information regarding HazMat spill cleanup materials contact MARL SE in MARLANT or POESB EPO in MARPAC. A completed copy of the applicable table from this annex should be placed inside each spill kit.

2. If specialized equipment is required to respond to or clean up a release, ship staff may contract the equipment through BLog or ship's chandler.

Table P01I.1 - Dressing Area Kit

ITEM DESCRIPTION	RECOMMENDED	CURRENT	COMMENTS
SCBA Kits	5		Complete with regulators, face pieces and carry boxes
SCBA, spare bottles	5		
Responder level "B" suits	12		Sizes: 2 (XXL) 5 (XL), 5 (L), non-encapsulated (e.g., Kappler First Responder)
Responder level "C" suits	16		Sizes: 2 (XXL) 7 (XL), 7 (L), laminated coveralls (e.g., Tychem SL)
Suit Permeation/Degradation Chart	1 (or more)		Chart suitable for manufacturer's suit used (e.g., Kappler and Dupont suits). (Software version may be available)
Aprons	6		Chemical & Hydrocarbon protection (e.g., North Silver Shield aprons)
Chemical resistant outer glove	12		Laminated Film Barrier glove. (e.g., Ansell Laminated Film Barrier glove or North Silver Shield glove)
Chemical/Hydrocarbon resistant outer/inner glove	12		Multi-purpose outer or inner glove see chart for specifics. (e.g., Nitrile Sol-Vex glove, from Ansell)
Nitrile inner gloves	2 boxes		Disposable nitrile surgical gloves.
Gloves Permeation/Degradation Chart	1 (or more)		Chart suitable for manufacturer's gloves used (e.g., North and Ansell gloves). (Software version may be available)
Air-purifying respirators with full face, dual cartridge.	12		Sizes: 3L, 6M and 3S (e.g., MSA)
Air purifying combination cartridges	36		Air purifying combination cartridge
Dust Masks (N-95)	12		Particulate respirator
Respirator Cartridge Chart	1		MSA respirator chart. (All companies in North America match the same color codes for each cartridge)
Face Shields (head gear type)	6		Splash protection
Chemical Splash proof Safety Goggles	16		Chemical Splash protection
Chemical Resistant Boots	12 pair		Sizes: 5XL, 5L and 2M (e.g., Tingly)
Rubber boots (Fire Fighters)	6 pair		Sizes: 3 size 11 and 3 size 9
Chemical Resistant Tape (2.5" to 3" wide)	4 rolls		

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ITEM DESCRIPTION	RECOMMENDED	CURRENT	COMMENTS
Duct Tape (2' wide)	3 rolls		Not for use with direct chemical contact
Packing Tape	3 rolls		Not for use with direct chemical contact
Yellow Hazard Perimeter tape	1 roll		200m roll
Flashlights (C-cells)	5 (optional)		Chemical/Explosive environment proof (e.g., Pelican or Super Saberlite P2000)
Head Lamp for Safety Helmet	4		Chemical/Explosive environment proof
Safety Helmets	4		Fitted with chinstraps
Batteries			Sufficient to meet the required numbers for the Flashlights and Head lamps
Portable Incident Board	1		Ship to Supply this item.
Log Book	1		Ship to Supply this item.
Grease pencils (black and red)	2 ea		Ship to Supply this item.
Sample Bottles (Plastic or Glass)	4 (optional)		125ml bottles

Table P01I.2 – Spill Identification and Information Kit

ITEM DESCRIPTION	RECOMMENDED	CURRENT	COMMENTS
Multi Gas Detector	1		Held by the HT Dept.
OTTO Fuel Monitoring Kit	1		Complete Kit to include the monitor, charger and log book. OTTO fuel detector to be calibrated every 3 years.
Chemical Detector Test Strips	minimum of 20 strips		e.g. Spilfyter Chemical Classifier
PH Paper Test Strip	1 roll		
Emergency Response Guide Book	4		Current Edition
NIOSH Pocket Book	2		Current Edition
Hazardous Materials Injuries handbook	1		Handbook for Pre-Hospital care, fourth edition. ISBN 0-913019-05-4

Table P01I.3 – Absorbents Materials / Spill Control

ITEM DESCRIPTION	RECOMMENDED	CURRENT	COMMENTS
Chemical Sorbent pads, (bundle of 100 sheets)	1		e.g., Spill Tech YPB-12or 3M C-PD914DD
Universal Absorbent Socks	12		3" x 4 Ft (e.g. Spill Tech # YS 04-30)
Hydrocarbon Sorbent pads, (bundle of 100 sheets)	1		e.g., Spill Tech WPA 100 H or 3M HP-156
Bag of loose sorbent material, for hydrocarbons	2		e.g., FASTSORB by Devcon
Dry (powder/granular) **Base** Neutralizer (1kg shaker bottle)	1		e.g., VYTAC CS, from Cartier Chem.
Dry (powder/granular) **Acid** Neutralizer (1kg shaker bottle)	1		e.g., VYTAC ACX, from Cartier Chem.
Absorbent towels (12")	4		
Wipes (box of 50)	2		
Pad drain (scupper) blocker (reusable polyurethane, 1m x 1m)	1		To be sectioned into smaller squares/pieces for convenience
Plug N'Dike (Ready to Use bucket)	1		Non-granular, already mixed

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ITEM DESCRIPTION	RECOMMENDED	CURRENT	COMMENTS
Epoxy Repair putty tube	1		e.g., Waterweld #8277, from JB Weld cie
Single use analysis bags	6		For the analysis of suspicious containers /envelopes. Bag has hand/arm inserts

Table P P01I.4 - Mercury Spill Cleanup Kit

ITEM DESCRIPTION	RECOMMENDED	CURRENT	COMMENTS
Mercury spill kits	1		NSN 4230-21-884-1305

Table P01I.5 - Decontamination Equipment – Clean Up

ITEM DESCRIPTION	RECOMMENDED	CURRENT	COMMENTS
Isopropanol (4L bottle)	1		Used for Otto fuel Spills
Liquid Detergent (4L bottle)	1		Common Spill cleaning product
Sodium Bicarbonate 20 %	4		Common Spill cleaning product
Hazwaste bung drum	1		Liquid Chemical Waste
Hazwaste flip-top drum	3		Solid Chemical Waste
Garden sprayers, pump type	2		2 for decon stages
Plastic bags clear, large	50		Thick plastic, puncture resistant
Plastic bucket,	6		3 (10L) for decon and 3 (5L) for cleanup
Scrub brushes	6		2 for decon, 2 for Clean-up and 2 for the gross decon of boots inside the deep plastic tray
2'x3' Plastic 4"-6" deep tray	1		Rubbermaid box, for gross hand decon
2'x3' Plastic 12" deep tray with boot brushes	1		Rubbermaid box, for gross boot decon. At bottom a piece of wood with 2 scrub brushes fixed to it
42" Ultra PopUp Decon pool	1		66 gal. decon pool, with self-stand up sides. (e.g. Ultra Tech International # 8068, supplier Quatrex Environment Inc, P.Q.)
Plastic Storage Container for Decon Pool	1		Store PopUp Pool on blkd or cabinet. (e.g. Ultra Tech International # 8155, supplier Quatrex Environment Inc, P.Q.)
3'x150' Roll of absorbent padding	1 roll		Universal Sonic Bonded Absorbent 38" x 144' material (e.g., Spill Tech # YRB12), used for the covering of the deck at the decon area
3' wide Roll of Plastic material	1 roll		For the covering of bulkheads surrounding the decon Area and as required
Long handle soft bristled scrub brushes	2		For decon
Clean rags	1 box		NSN 7920-21-554-2301
Sterilization Towelettes (box of single use applicators)	1		To sterilize and clean respirator masks and other PPE between uses. (e.g., Towelletes MSA, 220 ea in one canister # 697382)
Respirator Mask Germicidal Cleaner	1 bottle		Used to disinfect once a month or as required (e.g. MSA Germicidal 32oz bottle #10009971)

Printed copies may not be current. Verify by comparing 'Date of Issue' with current on-line version.

ITEM DESCRIPTION	RECOMMENDED	CURRENT	COMMENTS
Plastic Shovel	1		3 piece plastic shovel
Plastic dust pans	4		Used for cleanup
Banister brushes	2		Used for cleanup
Spray Bottles, 1 liter	2		Used for cleanup
Stools, approx 20" high	2 (optional)		For seating at decon
Coveralls, disposable	4		For use by contaminated personnel requiring a clothing change. 2XL and 2L
Disposal Stickers	60		Types: Inert 5; Slight 20; Med 20; Severe 15; to be applied to the disposal bags and drums for identification of contents

Table P P01I.6 – Acid Spill Kit

ITEM DESCRIPTION	RECOMMENDED	CURRENT	COMMENTS
Universal Absorbent Socks	8		3" x 4 Ft (e.g. Spill Tech # YS 04-30)
Absorbent Pads	40		
Repair Epoxy	1		
Bag Particulate-Multisorb	1		
Responder level "C" suits	2		Sizes: 2 (XXL) 7 (XL), 7 (L), laminated coveralls (e.g. Tychem SL)
Chemical Splash proof Safety Goggles	2 pair		Chemical splash protection
Nitrile inner gloves	2 pair		Disposable nitrile surgical gloves
Heavy Disposal Bags	4		
Acid Neutralizer	1		
Pad drain (scupper) blocker (reusable polyurethane, 1m x 1m)	1		To be sectioned into smaller squares/pieces for convenience