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POSTAL SERVICE CENTER BOX 8003
CHERRY POINT, NORTH CAROLINA 28533-0003
AND
2D MARINE AIRCRAFT WING
POSTAL SERVICE CENTER BOX 8050
CHERRY POINT, NORTH CAROLINA 28533-5050

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AIR STATION ORDER 5104.1C

From: Commanding Officer, Marine Corps Air Station, Cherry Point
Commanding General, 2d Marine Aircraft Wing

To: Distribution List

Subj: RADIATION SAFETY PROGRAM STANDARD OPERATING PROCEDURES
(SHORT TITLE: RSP SOP)

Ref: (a) MCO 5104.3B
(b) Title 10 Code of Federal Regulations
(c) Title 49 Code of Federal Regulations
(d) NAVSEA Technical Manual S0410-00-RAD-010 (NOTAL)
(e) NAVMED P-5055
(f) NRC Regulatory Guide 8.13

Encl: (1) Radiation Safety Program SOP

1. Situation. To provide guidance for the safe use, handling, transportation, storage, and disposal of radioactive material (RAM) and machine sources onboard Marine Corps Air Station (MCAS) Cherry Point per references (a) through (e).

2. Cancellation. AirStaO 5104.1B. This revision contains significant changes and should be reviewed in its entirety.

3. Mission. Establish policy and standard operating procedures (SOP) to comply with the Marine Corps Radiation Safety Program (RSP), and to minimize risk of injury to personnel and general public, contamination of personnel and facilities, and loss of control of ionizing radiation sources and devices.

4. Execution

a. Commander's Intent and Concept of Operations

(1) Commander's Intent

(a) To protect military and civilian personnel from the harmful effects of ionizing radiation. All exposures to ionizing radiation will be kept As Low As Reasonably Achievable (ALARA) per references (a) through (e).

(b) To implement a comprehensive RSP consistent with references (a) through (e).

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(2) Concept of Operations. This Order provides guidance for the safe use, handling, transportation, storage and disposal of RAM. All RAM and sources shall be considered hazardous. Any use, possession, storage, transfer, or disposal activities, which involve such items is prohibited until appropriate safety precautions have been established. No personnel shall be permitted to participate in any of the above activities until appropriately trained and until the provisions of this Order have been met.

b. Subordinate Element Missions

- (1) Comply with the intent and content of this Order.
- (2) Take positive and continuous action to implement this program.
- (3) Provide sufficient documentation to demonstrate compliance.
- (4) Ensure that local SOPs for radiation safety are developed and followed.
- (5) Coordinate all aspects of the RSP with the Installation Radiation Safety Manager.

5. Administration and Logistics

a. Director of Safety and Standardization (DSS). The DSS shall maintain overall cognizance of the Installation Radiation Safety Program.

b. Installation Radiation Safety Manager (IRSM). The IRSM, with the help of the Assistant Installation Radiation Safety Manager (AIRSM) and Wing Radiation Safety Manager (Wing RSM), shall oversee compliance of the RSP as outlined in Chapter 1 of this Order.

c. Commanding Officers. Commanding Officers (CO) having cognizance of RAM, X-ray machines, and personnel who, in the performance of their duties, may come in contact with ionizing radiation will appoint, in writing, Radiation Safety Officers (RSO) and Radiation Protection Assistants (RPA) as needed to ensure compliance with the references.

6. Command and Signal

a. Command. This Order is applicable to MCAS Cherry Point and its subordinate and tenant commands.

b. Signal. This Order is effective the date signed.


M. T. PALMER
Chief of Staff


C. PAPPAS III
Commanding Officer

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ASO 5104.1C
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LOCATOR SHEET

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(SHORT TITLE: RSP SOP)

Location: _____
(Indicate location(s) of copy(ies) of this Order.)

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Chapter 1

Radiation Safety Program Elements

1. Purpose. The RSP is designed to prevent the unnecessary exposure of personnel to ionizing radiation, to include contamination of equipment; to identify the requirements for compliance with Nuclear Regulation Commission (NRC) licenses and Naval Radioactive Material Permits (NRMPs); and to establish procedures for meeting those requirements. Procedures include provisions for storage, use, possession, transportation and disposal of radioactive material (RAM) and training required for personnel involved in any of those activities.

2. Background

a. Safety standards for ionizing radiation from RAM and other radiation sources are derived from a variety of federal regulations. The NRC has primary responsibility for regulating RAM and it grants permission to receive, possess, distribute, use, transport, transfer, and dispose of RAM under special conditions established in individual licenses.

b. Naval Radiation Safety Committee (NRSC). The NRSC has administrative control of all RAM used in the Navy and Marine Corps except for nuclear propulsion, nuclear weapons, and certain components of nuclear weapons delivery systems. The NRSC issues NRMPs to exercise control.

c. Radiological Affairs Support Office (RASO). The Commander, Naval Sea Systems Command (COMNAVSEASYS COM) Detachment RASO, Yorktown, VA, provides guidance and has delegated authority, in coordination with the Senior Marine Corps Health Physicist, to control the Marine Corps Radiation Safety Program (MCRSP) to include all aspects of radiation safety and control of radiation from licensable and non-licensable RAM, including radioactive waste, but excluding radioactive sources used for medical treatment or diagnosis, radioactivity associated with naval nuclear propulsion, and nuclear weapons. The RASO also oversees NRMPs issued to Navy and Marine Corps units by the NRSC to ensure compliance with NRC's licenses of RAM.

d. Senior Marine Corps Health Physicist (CMC (SD)). Responsible for overseeing compliance with NRMPs issued to Marine Corps Commands by the NRC and applicable RSP orders and directives, and is a member of the NRSC.

e. Command RSM (CRSM). The individual appointed in writing at the Marine Expeditionary Force (MEF) or Major Subordinate Command (MSC) level who is responsible for coordinating the RSP for sources of ionizing radiation under the control of that MEF or MSC. Whenever possible, assignment of the CRSM should be from the command safety office. At MCAS Cherry Point, the CRSM is also referred as the Wing RSM.

f. IRSM. The individual appointed in writing by the Commanding General (CG), Commander, or Commanding Officer (CO) at the installation, base, air station, combat center, or other fixed activity, who is responsible for coordinating the RSP for sources of ionizing radiation under the control of that installation, as well as maintenance of an inventory of all RAM physically located on the installation. Whenever possible, assignment of the

IRSM should be from the Installation Safety Office. At MCAS Cherry Point, the IRSM is part of the Installation Safety Staff located in building 294.

g. Command Radiation Safety Officer (CRSO). The individual directly responsible for NRMPs or X-ray radiography radiation safety programs. The command may have one or more CRSOs.

h. RPA. A unit-level, collateral duty radiation safety professional, and is appointed to assist the RSO or RSM in the administration of command radiation safety programs. Commands may have one or more RPAs.

i. Responsible Officer (RO). Any unit personnel responsible for the custody of RAM and/or X-ray machine sources.

3. Policy. To protect military and civilian personnel from the harmful effects of ionizing radiation, such that all exposures to ionizing radiation will be kept ALARA. This is accomplished through the RSP which is consistent with applicable standards.

4. Responsibilities

a. IRSM/Wing RSM:

(1) Develop and implement the appropriate-level radiation safety SOPs, and publish and distribute applicable messages or notices, as required.

(2) In coordination with the Installation Defense Logistics Agency (DLA) and the Installation Logistics Office, develop and implement procedures for shipping RAM.

(3) Maintain inventories and storage locations of RAM and commodities located on the Installation and provide locations of that material to the Installation Fire Department, custodian, and emergency response personnel. As applicable, provide periodic training to these organizations on emergency response procedures involving radiation sources.

(4) Coordinate the procurement of any generally licensed or license-exempt radioactive devices with CMC (SD).

(5) Establish local procedures and maintain close liaison with DLA Disposition Services and other base organizations to prevent the unauthorized transfer or delivery of any RAM to DLA Disposition Services. This includes license-exempt devices.

(6) Maintain liaison with RSOs and RSMs within the Installation or Command that have been appointed oversight of specific RSP (e.g., Radiation Detection Indication and Computation Calibration Laboratory, X-ray radiography, etc.).

(7) Coordinate and/or direct the training and actions of RPAs in the administration of the RSP.

(8) Coordinate the disposal or transfer of any unwanted RAM from the Command with CMC (SD) via their chain of command and request disposition

instructions from the Marine Corps Logistics Command (MARCORLOGCOM) Item Manager for any materials controlled under a MARCORLOGCOM NRMP.

(9) Successfully complete RSM training provided by CMC (SD) within three months of assuming duties as RSM.

(10) Perform or coordinate radiation surveys/leak tests to ensure compliance with the references and NRMPs.

(11) Coordinate or conduct radiation safety training. Training will be conducted and evaluated annually or more frequently as required.

(12) Promptly report to the CO, MCAS Cherry Point, the CG, 2d Marine Aircraft Wing, and the Naval Sea Systems Command Detachment, Radiological Affairs Support Office (NAVSEADET RASO) any violation of specific NRMPs, naval directives, or federal requirements, or any mishap, significant incident, personnel injury, suspected overexposure, spread of contamination, or internal deposition involving RAM sources.

b. Assistant Installation Radiation Safety Manager (AIRSM). Assist the IRSM in maintaining an effective RSP and act as the IRSM in the absence of the IRSM.

c. IRSM/AIRSM. Assist the Wing RSM as needed.

d. CRSOs

(1) Successfully complete the applicable RSO Course(s) provided by the NAVSEADET RASO and USMC Radiation Safety Program Management course provided by CMC (SD) prior to assuming duties.

(2) Sign NRMP amendments when applicable

(3) Be appointed in writing by the CG, Commander, or CO directly (i.e., not "By direction") and document in writing their acceptance of the responsibilities and position of CRSO.

(4) Have independent authority to stop operations associated with their NRMP or X-ray program that they consider unsafe.

(5) Have sufficient time and commitment from management to fulfill their duties and responsibilities as outlined in their specific NRMP and all radiation safety directives/local SOPs to ensure that RAM and/or sources of ionizing radiation are used in a safe manner.

(6) Have direct access to the CG, Commander, or CO for all matters concerning radiation safety.

(7) When required by an NRMP or as needed, recommend to the CG, Commander, or CO to assign an Assistant Radiation Safety Officer (ARSO) with the same training and qualifications as the RSO.

(8) Ensure that a radiation safety review, audit, and inspection program is implemented and results are forwarded to the CG, Commander, or CO

via the chain of command and that program deficiencies are corrected expeditiously.

(9) Conduct internal audits and inspections as follows:

(a) Quarterly - Radiological Controls Procedures and Practices (observation of operations when possible), NRMP compliance, and transportation of RAM shall be inspected.

(b) Semi-annually - Radiation medical examination (pre-placement, re-examinations, and terminations), occupational radiation exposure and personnel dosimeter records and logs, required records and reports, receipt, transfer, and disposal of RAM, and corrective actions for discrepancies identified during previous audits or inspections.

(c) Annually - RSP training, ALARA Compliance, emergency plans and exercises, inventories of equipment containing radiation sources shall be audited and an overall review of the RSP shall be submitted to the CO.

(10) Provide an annual commander's brief to the CG, Commander, or CO on the status of the RSP for which they are responsible, to include at a minimum, all inspections or assessments since the last commander's brief and any NRMP actions or correspondence.

(11) Ensure strict compliance with all applicable regulations, instructions, and orders that are germane to the RSP, to include any specific conditions associated with an NRMP.

(12) The RSO and, when applicable the ARSO, shall attend a minimum of three out of five annual RSO conferences provided by the NAVSEADDET RASO to maintain proficiency in radiation safety practices and to remain current with guiding regulations. If this requirement cannot be met, the RSO and ARSO shall successfully complete the RSO course again within the 5-year period after initial completion.

(13) Perform or coordinate radiation surveys/leak tests to ensure compliance with the references and NRMPs.

(14) Conduct radiation awareness safety training. Training will be conducted and evaluated annually or more frequently as required.

(15) Promptly report to the CO and the NAVSEADDET RASO any violation of specific NRMPs, naval directives, Federal requirements, any mishap, significant incident, personnel injury, suspected overexposure, spread of contamination, or internal deposition involving RAM sources.

e. RPA

(1) All RPAs shall successfully complete a radiation safety training program provided by the RSO or RSM within three months of assuming duties as RPA.

(2) All RPAs shall maintain an inventory of radioactive materials within the unit.

(3) Assist the cognizant RSM or RSO as needed.

f. Responsible Officer (RO)

(1) The RO shall receive radiation safety training that is commensurate with his duties and responsibilities from the RSO or RSM.

(2) Perform or ensure the conduct of RSP requirements for the receipt, handling, storing, physical inventory, packaging, and shipping of licensed sources of ionizing radiation.

(3) Perform or ensure that documentation and reporting requirements are fulfilled.

5. Contractors and Other Non-DoD Agencies

a. Contractors and other non-DoD agencies shall implement their own RSP that meets all pertinent radiation protection standards. The following provisions apply to contractors performing work aboard the Air Station:

(1) Directorates responsible for issuing contracts and/or having control of contractor oversight involving RSP type work must be authorized by NAVSEA 04N. A formal request signed by the CO shall be submitted to NAVSEA 04N via the NAVSEADET RASO.

(2) The contractor shall have an RSO to ensure compliance with RSP requirements and protection of contractor personnel. (Note: DLA contracted service provider functions involving Radiation Safety fall under the prevue of DLA Distribution RSP requirements).

(3) Marine Corps personnel shall not perform radiation services for contractor personnel as performance of such functions may involve assumption of liability.

b. Where Marine Corps and contractor personnel work together in areas where RAM or ionizing radiation may be present, the contractor shall provide a separate radiation survey for his personnel. The contractor shall be informed of Marine Corps survey findings, location of RAM and radiation areas, and local controls used. However, the contracting officer or Resident Officer in Charge of Construction (ROICC) shall also inform the contractor that the contractor retains legal obligation for the safety of contractor personnel.

c. The contractor will provide the IRSM with an inventory of all radioactive sources and commodities that will be brought aboard the Air Station and shall assure that transportation of all RAM is in compliance with all pertinent regulations. The inventory will contain:

- (1) Complete nomenclature of each source.
- (2) Serial number of each source.
- (3) Isotope.

(4) Activity in curies.

(5) Location.

(6) Date of the inventory.

(7) Contractor's NRC license number and the name and signature of the individual performing the inventory.

6. NRC

a. The NRC has the primary responsibility for regulating RAM. It grants permission to receive, possess, distribute, use, transport, transfer, and dispose of RAM under special conditions established in individual licenses.

b. The NRC has issued a Master Materials License to the DON to control the receipt, acquisition, possession, use, and transfer of NRC licensed RAM. The NRSC was established to oversee the NRMP program and to control the use of licensed material. The NRSC issues NRMPs to individual commands that have the authorization to use NRC regulated material as well as naturally occurring and accelerator produced materials. The NRSC, through RASO, maintains oversight of all RAM licenses for USMC commands issued by the NRC.

c. All conditions and requirements contained in permits and licenses issued must be met by commands possessing, storing, using, and disposing of RAM and using machines that produce ionizing radiation.

d. Should conflicting instructions or regulations exist between this Order and local orders/instructions, or Federal regulations, the more stringent requirement shall prevail. An exception to this requirement may be taken where the tenant unit represents a separate department of the Federal Government. DLA Distribution Cherry Point is a part of the DLA Distribution Activity which has been issued a NRC Radioactive Materials License, License No. 37-30062-01, for the radioactive isotopes contained in the commodities it is responsible for warehousing. Activities or procedures which require action to be performed under the DLA license are to be accomplished in accordance with DDCM 6055.20 (DLA's Radiation Safety Technical Manual, which is the equivalent to reference (d)).

7. General Requirements

a. Each unit RSO/RPA must maintain an updated inventory of RAM located in the work area. The inventory will include:

- (1) Item nomenclature.
- (2) National Stock Number (NSN).
- (3) Radioactive Source ID number.
- (4) Radioisotope.
- (5) Chemical and physical form.

- (6) Activity (in curies) and date determined.
- (7) Location.
- (8) Custodian's name.

b. Each operation involving RAM must have an SOP specifically tailored for the operation being conducted. At a minimum, the SOP will include:

- (1) The purpose and objective of the SOP.
- (2) Applicability.
- (3) Responsibilities.
- (4) Procurement.
- (5) Storage.
- (6) Inventory.
- (7) Surveillance.
- (8) References.

(9) Safety Procedures (including specifics for use and handling).
Safety procedures in the SOP will include:

- (a) Specific purpose.
- (b) Philosophy.
- (c) Safety rules.
- (d) Instruction to personnel.
- (e) Radiation protection standards.
- (f) Surveys.
- (g) Caution signs.
- (h) Labels and signals.
- (i) Radiological procedures and reporting.

c. All RAM, including radioactive commodities, requires special storage procedures. At a minimum, all storage areas containing RAM and the entrances to these areas shall be labeled with signs containing the radiation symbol and the words "Caution - Radioactive Material." Areas used for storage of RAM will be kept to a minimum to facilitate adequate control. Small radioactive sources containing more than one millicurie (mCi) of activity shall be stored in locked areas or cabinets, access to which is limited to authorized individuals. All losses of control of RAM will be reported to the

supervisor, CRSO, RPA, IRSM/Wing RSM as soon as they are noted. This includes temporary misplacement, loss, theft, or unauthorized access.

d. RAM will not be stored in the same warehouse section with flammables, explosives, photosensitive items, food products, or other incompatible goods. Proper selection of a fire resistant storage area for RAM will minimize release of radioactivity to the environment in the event of a fire. Whenever feasible, RAM shall be stored in fire resistant containers to minimize contamination spread. All RAM shall be stored so that they are protected from adverse weather or conditions which may deteriorate the packaging materials. Commodities that contain radioactive gases, tritium-containing devices, or radium shall be stored in ventilated structures. Smoking, eating, drinking, chewing, applying cosmetics, applying or removing contact lens, or storing consumables will not be permitted in RAM storage areas.

e. A current list of locations where RAM is stored shall be available to personnel who might be called to fight a fire in such areas. This list should identify any unusual problems which might be encountered.

f. Reasonable care shall be taken in packaging and storing contaminated items to prevent the spread of contamination to personnel or to other areas. Personnel entering potentially contaminated storage areas shall wear appropriate personal protective equipment/anti-contamination clothing.

g. A radiation emergency can occur where RAM or radiation-producing equipment is used, stored, or transported. Emergency plans are included in the NRMP application. Emergency plans include:

- (1) Procedures to identify conditions constituting an emergency.
- (2) A list by priority of cognizant individuals, departments, and regulatory officials (RADCON, RASO) to be notified.
- (3) Steps to control radiological exposure.
- (4) Actions necessary to abate the radiation hazards.

h. Emergency plans shall be reviewed annually, updated if necessary, and tested via drills/exercises under realistic conditions.

i. Per reference (b), each licensee shall post current copies of the regulations contained in part 19 and 20, operating procedures applicable to licensed activities, any notice of violation involving radiological working conditions, proposed imposition of civil penalty, or other actions by the NRC. If posting of a document is not practicable, a notice may be posted which describes the document and states where it may be examined.

j. The NRC Form 3, Notice to Employees, must be posted in all areas where RAM is used or stored. The required form can be acquired from the cognizant RSO or IRSM or at the RADCON website: (<http://www.logcom.marines.mil/Centers/GeneralStaff/LSMC/radcon/radconentersite/formsdocs.aspx>).

8. Medical Requirements

a. Per reference (e), all personnel who are being considered for routine assignments to duties or occupations which require exposure to ionizing radiation shall be given a medical examination prior to assignment or transfer to those duties.

b. Personnel who are not routinely exposed to ionizing radiation as a result of their normal duties or occupation and are not likely to exceed 0.5 rem (Roentgen Equivalent Man, a unit used to measure radiation exposure) per year are not required to have pre-placement medical examinations.

c. Pre-placement and subsequent medical examinations shall be provided to all x-ray and gamma radiographers and radiographers' assistants.

d. All personnel whose duties may require entry into a high radiation area 100 mrem (milli-rem, a unit indicating 1/1000 rem) or higher in one hour.

e. All personnel required by conditions of individual NRMPs.

f. All personnel who routinely work with unsealed radium sources containing greater than 0.1 micro curies of radium or with unsealed sources of RAM greater than the exempt quantity limits specified in Part 30, Schedule B of reference (b).

g. All personnel deemed necessary by the CO.

9. RSP Surveillance

a. The supervisor responsible for operations subject to RSP controls shall conduct and document a surveillance of operations at least quarterly. Each type of RSP operation at a command (e.g., industrial radiography, X-ray analyzer usage, radioactive material shipping) shall have a separate surveillance performed quarterly if operations are conducted. Surveillances should include observation of work in progress.

b. The CRSO shall review the findings of supervisor surveillances.

c. The RSO shall conduct and document surveillances of RSP operations at least quarterly.

d. Deficiencies or improvement noted during surveillances shall be documented on a RSP Deficiency Reports (RDR) per Section 2.11. of reference (d).

e. All RSP surveillance records shall be maintained per section 2.26.6. of reference (d).

10. RSP Audit

a. The purpose of the audit program is to improve RSP safety, reduce RSP program violations, and prevent mishaps and near misses from occurring. The

audit program shall encompass compliance and performance based reviews. This includes periodic observation of actual RSP operations and activities.

b. When deficiencies are found, the subordinate command/organization will be responsible for correcting the problems. For problems of a systemic or repetitive nature, subordinate commands shall perform a causal analysis, document the corrective actions taken for all findings and forward a copy of the documentation to the cognizant IRSM or Wing RSM.

c. The CRSO or Assistant Command Radiation Safety Officer (ACRSO) shall conduct a radiation protection audit at least every six months if the command has a NRMP or machine sources of radiation. Annual audits shall be conducted at commands possessing only generally licensed or exempt radioactive material. The audit shall verify that:

(1) Procedures, and the NRMP if applicable, are being properly maintained and are current.

(2) Appropriate radiological surveys are being conducted and reviewed in a timely manner.

(3) Required radiation medical examinations are properly conducted at required intervals.

(4) Records of occupational radiation exposure are accurate and complete.

(5) Exposure information is provided to workers.

(6) NRMP commitments are maintained by reconciling physical inventories, leak test records, and other items prescribed by the NRMP.

(7) Required records and reports are properly maintained and issued in a timely manner.

(8) RAM transportation, shipping, receipt, transfer, and disposal records are properly maintained.

(9) RSP related training is properly conducted and documented.

(10) Deficiencies identified during previous evaluations, inspections, reviews, audits, and RDRs have been corrected and that corrective actions are effective.

(11) Review of RDRs and analysis to detect any trends.

d. Audits shall be documented, command reviewed, and maintained per Section 2.26.6. of reference (d).

11. Annual RSP Review (APR)

a. The purpose of the APR is to evaluate command compliance with federal regulations, adherence to applicable Navy and Marine Corps directives, NRMP conditions, and management oversight of the RSP. The CRSO shall conduct the

APR. The requirement to conduct an APR shall be included in each command RSP instruction.

b. The APR shall include, as applicable:

(1) A review of the exposure control processes that are in place to ensure doses are maintained ALARA.

(2) A review of operating and emergency procedures to ensure compliance with governing regulations and that they are current. Include a list of the procedures and any identified discrepancies.

(3) Identification of any improvements to the RSP.

(4) A review of RSP operations with the highest personnel doses to identify opportunities to reduce these exposures.

(5) A review of personnel exposure records that includes the individuals with the five highest annual radiation doses, those individuals with annual doses above 100 mrem (1 mSv), and the cumulative radiation dose total for all radiation workers.

(6) A list of personnel who had their administrative control level (ACL) raised and their resulting radiation exposures.

(7) A review of all RSP related training.

(8) A demonstration of compliance with dose limits for individual members of the public.

(9) The results of the annual RDR trend report conducted by the RSO.

(10) A review of all incident and critique reports, associated corrective actions, and the effectiveness of those corrective actions.

(11) Summary of RSP operation surveillances and results.

(12) A review of audit findings, responses, and audit effectiveness.

c. Deficiencies and program improvement items discovered during the APR and not previously identified shall be entered into the RDR program per Section 2.11. of reference (d).

d. APRs shall be documented and maintained per Section 2.26.7. of reference (d).

12. RSP Deficiency Report (RDR) Program

a. The purpose of the RDR program at the command level is to identify and correct RSP deficiencies and abnormal conditions. RDRs are also used to document and track the completion of RSP improvements. Self-identification and correction of lower order deficiencies or abnormal conditions is an effective method to identify trends and address program weaknesses before they develop into violations.

b. Subordinate commands shall establish a RDR program or use an existing system that meets the requirements of Section 2.11.2. of reference (d).

c. The level of effort required for the RDR program should correspond to the complexity and scope of the RSP at the command.

d. RDR Requirements

(1) Personnel shall document all deficiencies, abnormal conditions, and improvement items associated with the command's RSP.

(2) Supervisors ensure the actions taken to correct the deficiencies and abnormal conditions are appropriate and documented.

(3) CRSO or ACRSO shall review each RSP deficiency or abnormal condition and corrective action.

(4) The RSO shall review RDRs and perform a trend analysis as part of the semiannual (or annual) audit.

(5) Each RDR is assigned a level of significance as defined in Section 2.11.1. of reference (d).

(6) The RDR documentation shall include the problem, date of discovery, serial number (two-digit year and sequential number), name and contact information for the person discovering the problem, immediate corrective action(s) taken, apparent cause for deficiencies if known, supervisory review and comment, and CRSO or ACRSO review and comment. A sample form may be obtained from the the NAVSEADET RASO.

(7) Maintain a log that records, at a minimum, the RDR serial number, date, short problem description, and date RDR reviewed and closed out by the CRSO or ACRSO.

13. Radiological Incident Reporting

a. A radiological incident can occur where RAM or radiation-producing equipment are used, stored, or transported. The magnitude of the incident and the severity of consequences will determine the level of response.

b. Per reference (d), the following conditions, situations and occurrences shall be considered as radiological incidents:

(1) External radiation exposure in excess of the limits of Table 2-1.

(2) External radiation exposure in excess of the ACLs in Table 2-1.

(3) Personnel contamination above the levels of Table 2-2.

(4) Exposure of personnel to airborne radioactivity above 10 percent of the derived airborne concentrations of Appendix B of 10 CFR 20 without respiratory protection.

(5) A mishap resulting in the inhalation or ingestion of a measurable quantity of RAM.

(6) Unauthorized or accidental entry of personnel into a high radiation area or unauthorized or accidental entry into a radiation area and the person(s) receives an estimated unmonitored exposure of greater than two mrem.

(7) Entry into a high radiation area without the required dosimeter and exposure of one mrem or more.

(8) Spills of RAM outside controlled areas.

(9) Theft or loss of RAM or machines that produce ionizing radiation.

(10) Release of RAM into the environment above the effluent limits of Appendix B of 10 CFR 20.

(11) Receipt of packages with contamination or radiation levels in excess of 10 CFR 71 limits.

(12) Failure of safety devices to function properly such as an interlock not terminating exposure.

(13) Leaking sealed radioactive source.

(14) Discharges or spills of material or fluids that might be considered pollutants which endanger critical water areas, have the potential to generate public concern, become the focus of enforcement action, have domestic or international implications, or pose a threat to public health or welfare.

(15) Unauthorized disposal of RAM.

(16) Any gamma radiography reportable events specified in Section 5.17.1. of reference (d).

(17) Any X-ray radiography reportable events specified in Section 11.16.1.

c. Each command shall, upon discovery of the event, immediately report to the NAVSEADET RASO and the chain of command any event listed in paragraph 13b above.

d. Initial notification to the NAVSEADET RASO shall be made by telephone at (757) 887-4692. If after normal work hours, contact the emergency number provided on the NAVSEADET RASO's after-hours voice message.

e. An initial follow-up written report shall be made within 10 days with update reports to be determined by the the NAVSEADET RASO. The written report shall include:

(1) A description of the operation, date, time, individual(s) involved, doses received, etc.

(2) A description of the circumstances under which the accident or incident occurred.

(3) Exposures of individuals to radiation, circumstances under which the exposures occurred, and the possible total effective dose equivalent to persons in unrestricted areas.

(4) A determination of the cause(s), immediate actions taken, long-term corrective actions planned to prevent recurrence, and the 'Plan of Actions and Milestones'.

(5) An assessment of the radiological significance of the event.

(6) Signature of the Commander, CO, or Officer in Charge (OIC).

Chapter 2

Radiation Safety Training Requirements

1. Purpose

a. Develop worker awareness of RSP that permits the performance of tasks with greater efficiency and confidence. When individuals are aware that there is some risk associated with their exposure, they can become active participants in the decision to accept and, where possible, reduce the risk as part of their job.

b. The number and seriousness of accidents and incidents can be reduced through training.

2. Responsibility. All COs have the responsibility to ensure that occupationally exposed personnel under their jurisdiction maintain exposure to ionizing radiation ALARA. A part of ALARA is the assurance that each person has received radiation safety training commensurate with their potential for occupational exposure to ionizing radiation. All training must be documented.

3. Training Requirements

a. Prior to assuming the duties of RSO, the prospective appointee shall successfully complete initial qualification training at the NAVSEADET RASO. Courses offered and required by RASO can be found in reference (d), Section II. Additionally, RSOs shall attend radiation safety program training provided by the USMC Senior Health Officer (RHO). RSMs shall only attend radiation safety program training provided by the USMC Senior Health Officer (RHO). All RPAs shall be trained annually by the responsible RSO/RSM.

b. Each military gamma radiographer and radiographer's assistant shall successfully complete the Radiographic Operator Course (A-701-0032) at Service Schools Command, San Diego, CA.

c. Civilian radiographers shall successfully complete the radiation safety training specified in their individual application for a NRMP to conduct gamma radiography.

d. All gamma radiographers will receive formal training on local command operating and emergency procedures and annual refresher training in radiation safety procedures and regulations specified and described in their individual application for a NRMP to conduct gamma radiography.

e. Initial training for X-ray radiographers shall consist of the successful completion of one of the courses specified in reference (d), Section 11.8.4.

f. Annual refresher training including the topics listed in reference (d), Section 11.8.3.2.b, shall be provided by the command.

g. Completion of refresher training shall be documented via a written exam on which students must attain a score of 80 percent or better.

h. Additional training shall be conducted each time there is a substantial change in equipment or operating procedures.

i. Periodic training shall be conducted by the RSO, designated representative, or both.

j. Radiography radiation barrier monitors shall receive initial training consisting of the topics listed in reference (d), Section 11.8.7.1. A score of 80 percent or better on a written examination is required for documentation of successful completion of initial training. Annual refresher training shall be conducted by the RSO or a designated representative.

k. Radiation workers are personnel who are occupationally exposed to ionizing radiation. They work in controlled areas and are required to have a physical examination. Initial training for radiation workers consists of a minimum of:

(1) Eight hours covering the subjects in reference (d), Section 2.8.4.3, with a final written examination (must attain a score of 80 percent or better.)

(2) Annual refresher training will be conducted consisting of topics listed in reference (d), Section 2.8.4.5.

(3) Training will be conducted by the RSO or a designated representative.

l. Non-radiation workers are personnel who are not exposed to ionizing on a routine basis and do not require a physical exam (i.e., emergency response personnel, firefighters, medical personnel, etc.) Their sporadic exposure is not monitored. Non-radiation workers will receive initial and annual refresher training on the topics listed in reference (d), Section 2.8.6.3. Training will be conducted by the RSO or designated representative. The RSO will determine the duration.

m. Prior to being issued dosimetry equipment, all personnel authorized to receive radiation exposure shall be given specific instruction about radiation hazards including prenatal exposure risks to a developing embryo or fetus. All reasonable efforts shall be made to keep ionizing radiation exposure to unborn children to the very lowest practical level. The radiation exposure control level for personnel physically capable of bearing children shall not be extended beyond 0.5 rem per year whenever the "declaration of pregnancy" in Appendix A of reference (f) has been signed. This declaration will be kept in the individual's training record and a copy provided to the responsible RSO. Instruction concerning prenatal exposure to unborn children shall also be given to personnel who supervise female workers authorized for radiation exposure as the amount of radiation exposure a pregnant female worker receives shall be limited in accordance with regulations. Instruction concerning prenatal exposure to the unborn child shall be given by the responsible RSO or designated representative during initial and annual training. The U.S. NRC Regulatory Guide 8.13 shall be available and a copy given to individuals receiving the training. No examinations are required as part of the training, however, the training shall be documented.

n. Other organization personnel who routinely work in or frequent areas adjacent to radiation areas and RAM storage areas shall receive awareness training per reference (d), Section 2.8.7.4. Training shall:

(1) be commensurate with the size and complexity of the command's RSP.

(2) be provided through a self-study presentation. A written examination is not required to demonstrate successful completion.

(3) be documented and maintained per reference (d), Section 2.26.5.

Chapter 3

Transportation of Radioactive Material

1. General. Transportation of RAM is generally considered very complicated because it is regulated by more than one agency posing requirements in pertinent agency regulations. Transportation of RAM must comply with military, NRC, and Department of Transportation (DOT) regulations. The shipper of record is ultimately responsible for compliance. Personnel assigned to duties related to transportation of RAM must be appropriately trained per reference (c). Radioactive commodities or RAM shall not be transferred to any DLA Disposition Services.

2. RAM Movement Form. The Marine Corps Logistics Command RADCON RAM Movement Form, or an equivalent, will be used to maintain an accurate record of change in location or custody of RAM, sources, commodities, or items containing RAM. This form will be completed in addition to any other required documents, whenever transfers or changes of custody of items involving ionizing radiation take place. One copy will be retained by the unit transferring the item, one copy will be given to the receiving unit, one copy will be given to the appropriate supply activity, and one copy will be sent to the responsible IRSM or Wing RSM. RAM Movement Forms are available for download from the RADCON website at: (<http://www.logcom.marines.mil/Centers/GeneralStaff/LSMC/radcon/Radconentersite/formsdocs.aspx>).

3. Disposition

a. Disposition instructions for excess, defective, or serviceable radioactive items will be requested via electronic communication (i.e., email, or message) or formal letter from the responsible IRSM, Wing RSM, USMC RHO, and/or RASO as applicable. The quantity, NSN, serial number, condition codes, applicable NRC license or NRMP numbers, and any other identifying or amplifying information must be provided in the correspondence

b. When applicable, information copies of disposition instructions should be sent to the Logistics Radiation Safety Officer (LRSO) at Marine Corps Logistics Base, Albany, GA who will initiate tracer actions on shipments not received within 120 days. Copies of disposition instructions for local transfers should be kept by the IRSM, MCAS Cherry Point along with a RAM Movement Form.

4. DLA Distribution, Cherry Point

a. The RSO of DLA Distribution Cherry Point shall be consulted to determine, based on the form and quantity of the material, the type of labeling and packaging required in accordance with DOT shipping regulations, Title 49 CFR 173.422, with individual packaging data sheets (PDS), or with special packaging instructions (SPI).

b. RAM, to be shipped by commercial carrier, shall be taken to DLA Distribution Cherry Point for shipping. The RSO of DLA Distribution Cherry Point or a qualified representative will inspect and apply required shipping labels and certify the shipping package for the appropriate mode of transportation.

c. Unless otherwise specified by the RSO of DLA Distribution Cherry Point, intact Marine Corps radioactive commodities shall be shipped using the Proper Shipping Name: "Radioactive Material, Excepted Package-Instruments or Articles" under the provisions of DOT regulations, Title 49 CFR 173.422. Items under the cognizance of other services or commercial activities may require the use of other shipping names or procedures.

5. Shipping and Carriage

a. RAM will not be transported in a privately-owned vehicle.

b. When transporting RAM on or off MCAS Cherry Point via Government vehicle, compliance with applicable DOT regulations is still required even though the RAM or item is not being transported for "commerce" purposes.

c. All movement, transfer, or change of custody of RAM other than routine use or operation, on or off MCAS Cherry Point must be accompanied by a completed RAM Movement Form for documenting the disposition, transfer, movement, and storage of RAM.

d. Except for local transport aboard the installation or removal of RAM from the Low-Level Radioactive Waste (LLRW) by the contractor as designated by RASO, all RAM to be shipped off the installation via commercial carrier will be taken to the DLA Distribution Cherry Point to ensure proper inspection, packaging, labeling, and certification.

6. Receipt

a. Arrangements to receive a package containing RAM must be made when the carrier offers it for delivery or when notified of the arrival of the package at the carrier's terminal.

b. Packages known to contain RAM must be monitored for radioactive contamination and radiation levels not later than three hours after receipt:

(1) When the package is labeled as containing RAM.

(2) The package has evidence of potential contamination, such as packages that are wet, crushed, or damaged.

c. If the external radiation levels exceed 200 mrem per hour at the surface, 10 mrem per hour at one meter from the surface, or two mrem per hour in any occupied positions of the vehicle, the receiver will immediately notify the IRSM.

d. A record of the required surveys must be maintained by the receiving unit.

Chapter 4

Disposal of Radioactive Material

1. Definitions

a. Low-Level Radioactive Waste (LLRW) includes:

(1) Surplus, unwanted, or unserviceable devices that are identified as containing RAM.

(2) Commodities that are identified as containing RAM.

(3) Instruments or articles that are identified as containing RAM.

(4) RAM for which there is no longer a useful purpose or property contaminated with RAM to the extent that decontamination is economically unfeasible. The item manager will advise users if the item may be turned in for reconditioning rather than disposal.

b. Mixed radioactive waste includes materials that contain both RAM and other hazardous materials regulated by the Environmental Protection Agency.

2. Turn-In Procedures

a. LLRW cannot be disposed of as ordinary waste or hazardous waste. Thus, under no circumstances will any RAM be turned in to DLA Disposition Services.

b. An inventory of LLRW for transfer and disposal must be forwarded to the cognizant IRSM or Wing RSM as soon as the prospective waste is identified. A RAM Movement Form may be used as a temporary inventory to show possession of RAM for transfer purposes. RAM Movement Forms may be acquired from cognizant IRSM/Wing RSM or at the RADCON website.

c. All 2d MAW subordinate units disposing of LLRW will provide a copy of the turn-in document/RAM Movement Form to the unit's supply facility and to the cognizant RSO prior to moving the LLRW to the designated storage site.

d. Prior to disposal of any mixed radioactive waste, the Director of Environmental Affairs of the Facilities Directorate and the cognizant RSO at RASO shall be consulted for a disposition of the waste in question.

3. RSO/RPA Responsibilities Involving Disposal of LLRW

a. Upon notification by a unit that LLRW needs to be turned in for disposal, the responsible IRSM/AIRSM or Wing RSM will arrange for the LLRW to be moved to the LLRW storage site where it will be secured until the LLRW can be picked up by a disposal contractor designated by the RASO. All RAM Movement Forms will be completed by the CRSO/RPA who shall provide copies to all parties concerned including the IRSM/AIRSM or Wing RSM as appropriate.

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b. The IRSM/AIRSM or Wing RSM will notify the appropriate point of contact at RASO who will arrange for LLRW to be picked up by a designated contractor that is licensed by the NRC to transport and dispose of RAM.

c. When the LLRW is picked up for disposal by the designated contractor, the IRSM/AIRSM or Wing RSM will assure copies of all documentation showing transfer of the LLRW are acquired and distributed to all parties concerned for recordkeeping purposes. These records shall be retained for audits and inspections involving the disposition of RAM and LLRW.

Chapter 5

General Emergency Guidelines

1. Introduction

a. Each unit handling, storing, using, transporting, receiving, or disposing sources of ionizing radiation, RAM, or commodities containing RAM shall provide specific guidance as outlined in Chapter 1 and training as described in Chapter 2 of this Order.

b. The emergency guidelines in this chapter are general in nature. They will be used when an incident involving breakage, or other exposure of personnel to RAM (or radioactivity produced from any source), is discovered by personnel whose positions are not covered by a radiation SOP.

2. Emergency Guidelines

a. In the case of an incident involving RAM, the senior person present shall take immediate steps to control the emergency and request assistance from the responsible RSO and emergency personnel as required.

b. The initial objective of any accident response involving RAM is to regain control over the event and prevent further spread of any radioactive contamination produced.

c. Actions to save life, aid the injured, fight fires, or control further spread of damage take precedence over concerns for radiological contamination that may arise from fielded Marine Corps equipment.

3. General Steps

a. In order to minimize personnel exposure from possible internal contamination, notify personnel in the immediate area to evacuate and activate the emergency alarm system.

b. In the case of tritium gas, vacate the immediate area and remain upwind for at least 30 minutes or until directed by the emergency personnel and/or cognizant IRSM or Wing RSM to reenter.

c. In case of fire, stay upwind from any smoke at a minimum of 100 meters or more as directed by emergency personnel. The self-contained breathing apparatus worn by firefighters will provide short-term protection against inhalation of airborne radioactive contamination.

d. As soon as possible, notify the IRSM or Wing RSM to ensure proper follow-up actions.

4. Contamination Control

a. Devices with broken sources and any resulting debris should only be handled while wearing rubber or plastic gloves.

b. Devices with broken sources and any resulting debris should be doubly wrapped by inserting them into two plastic bags and sealing each bag with tape. Clearly label the package as containing a radioactive contaminated device or materials. Retain all broken or non-illuminative devices for disposal as radioactive waste.

c. Personnel who may have received contamination on bare skin should wash with a mild soap and plenty of tepid water. Care should be taken not to irritate or abrade skin. The NAVMEDCOM Instruction 6470.10, available at Navy medical commands, offers useful technical guidance for handling radioactively contaminated personnel and monitoring procedures for various radioisotopes. All personnel suspected of exposure to radiation should be evaluated by a health professional.

d. Based on radiological measurements and the circumstances of the incident, contamination of the immediate area and equipment should be considered a possibility. Until determined by the RSO and/or emergency personnel that radioactive contamination did not occur, or contamination levels have been reduced to allowable limits, potentially contaminated areas are not to be accessed by unauthorized personnel. Likewise, equipment that may be contaminated shall not be returned to service until surveyed by persons trained and qualified for competently measuring and evaluating radioactive contamination.