

## NAVSEA STANDARD ITEM

FY-28

ITEM NO: 009-112  
DATE: 01 OCT 2024  
CATEGORY: II

### 1. SCOPE:

1.1 Title: Prevention of Radiographic-Inspection Ionizing-Radiation Hazard; accomplish

### 2. REFERENCES:

2.1 NAVMED P-5055, Radiation Health Protection Manual

2.2 10 CFR Part 20, Standards for Protection Against Radiation

2.3 10 CFR Part 34, Licenses for Industrial Radiography and Radiation Safety Requirements for Industrial Radiographic Operations

### 3. REQUIREMENTS:

3.1 This item applies to all contracts that utilize radiographic inspection as part of their work. "Foreign contractor" refers to a contractor that is contracted from the U.S. Navy host country in which U.S. Navy contracts may be executed onboard U.S. Government property and/or vessels.

3.2 Each foreign contractor must comply with the regulatory standards of the host country when conducting radiographic inspections on U.S. Government property and/or vessels.

3.3 Submit one legible copy, in hard copy or approved transferrable media, of completed Radiography Operations Planning Work Sheet, Attachment A, to the SUPERVISOR fourteen days prior to start of work (unless otherwise approved by the SUPERVISOR) and obtain approval prior to commencement of radiography operations.

3.4 Submit one legible copy, in hard copy or approved transferrable media, of a diagram illustrating the boundary where the exposure rate must not exceed 2 mr/hr (0.02 mSv/hr) or under special circumstances the dose to an individual in any unrestricted area would not exceed 2 mrem (0.02mSv) in any one hour, to the SUPERVISOR no later than 14 days prior to start of work. In addition, the boundary must meet the requirement that no individual member of the public will receive a dose in excess of 100 mrem (1mSv) in a calendar year from the radiographic work, exclusive of background radiation in accordance with 2.1 and 2.2.

3.4.1 In addition to the boundary requirements of 3.4, the foreign contractor must also illustrate the foreign radiation-boundary requirements.

3.5 Establish a physical boundary where the exposure rate is 2mr/hr or less. In some circumstances the boundary may be established at a point where the dose to an individual in any unrestricted area would not exceed 2 mrem in any one hour. The perimeter of the radiation area must be a physical barrier established by an enclosure or by stanchions and rope, as necessary. Post this boundary with tri-foil radiation warning symbol, "Radiation Area", "Radiography in Progress", and "Keep Out" signs written in English and host-country language. The signs must be visible to any person approaching the radiation area barrier from any accessible direction.

3.5.1 Radiographer must maintain constant surveillance of the entire area boundary through direct observation or Radiation Safety Officer (RSO)/Radiation Safety Oversight Manager (RSOM) approved positive communication with boundary monitor who is in a position to provide visual surveillance in accordance with 2.3.

3.5.2 Monitor the entire boundary using radiation detection equipment appropriate for the source of radiation during the first radiation exposure of the day. If the beam's orientation, kVp, mA, collimation, or shielding is changed between exposures, the boundary must be re-surveyed and re-established in accordance with 3.5, if necessary.

3.5.2.1 Submit one legible copy, in hard copy or approved transferrable media, of a report listing results of the requirements of 3.5.2 to the SUPERVISOR, within one day. The report must include Attachment A diagram identifying survey locations, time, date and location of the survey, the highest radiation level recorded, the kVp, mA, and beam direction of the x-ray machine or, if using gamma source material, the half value of the collimator and beam direction at the time of exposure.

3.6 If an unauthorized individual crosses the boundary, the boundary monitor must immediately notify the radiographer who will immediately stop radiography operations.

3.6.1 Report any boundary violation immediately to the SUPERVISOR, using the most expeditious form of communication. Submit one legible copy, in hard copy or approved transferrable media, of a follow-up report, to the SUPERVISOR, within 4 hours of the violation, using Boundary Violation Report, Attachment B.

3.7 Upon discovery of loss or theft of radioactive material or x-ray producing devices or any deviation from the Operations Planning Worksheet (Attachment A), the radiographer must cease and make safe all radiographic operations and immediately notify the SUPERVISOR.

3.7.1 Report verbally each incident immediately to the SUPERVISOR.

3.7.1.1 Submit one legible copy, in approved transferrable media, of a formal written report of the incident within one day to the SUPERVISOR.

#### 4. NOTES:

4.1 The SUPERVISOR must perform oversight and surveillance of all radiography operations on U.S. Government property and/or vessels associated with contracted work.

4.2 The technical point of contact for the requirements contained in this NAVSEA Standard Item is SUPERVISOR's RSO or RSOM for radiographic inspections conducted in the host-country and any U.S. Government Detachment.

4.3 This NAVSEA Standard Item complies with 10 CFR Parts 19, 20, and 34 and 29 CFR 1910.1096.

ATTACHMENT A  
RADIOGRAPHY OPERATIONS PLANNING WORK SHEET

**A. General Information**

1. Prime Contractor Name: \_\_\_\_\_
2. Subcontractor Name (if applicable): \_\_\_\_\_
3. Proposed Date(s) and Time(s) of Planned Radiography: \_\_\_\_\_
4. Purpose of Radiographic Operation: \_\_\_\_\_
5. Host country regulatory standards applicable to radiographic inspections preferably translated to English.

**B. If conducting gamma radiography complete the following:**

1. Radioisotope: \_\_\_\_\_ Serial Number: \_\_\_\_\_
2. Activity: \_\_\_\_\_ Date of Determination of Activity: \_\_\_\_\_
3. Collimator Serial Number (If Applicable) : \_\_\_\_\_
4. Half Value Layers / Thickness:
5. Total number of Exposures (estimated): \_\_\_\_\_
6. Direction of the Beam: \_\_\_\_\_
7. Transportation and vehicle information:
  - a. Manufacturer: \_\_\_\_\_
  - b. Model: \_\_\_\_\_
  - c. License Plate Number: \_\_\_\_\_
  - d. Sign on Vehicle: \_\_\_\_\_
  - e. Driver's Name: \_\_\_\_\_
  - f. Passengers: \_\_\_\_\_
- g. Location of radiography operation site (ship, submarine, building, pier):  
\_\_\_\_\_

h. Transportation route to be taken to and from work site while on Government activity:

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C. If conducting x-ray radiography complete the following:

1. Machine Manufacturer: \_\_\_\_\_

2. Serial Number: \_\_\_\_\_

3. Maximum kVp: \_\_\_\_\_

4. Maximum mA: \_\_\_\_\_

5. Total Number of Exposures (estimated): \_\_\_\_\_

6. Direction of Beam: \_\_\_\_\_

D. Provide a diagram of each work site that illustrates:

1. Each location of the radiography, including major features such as walls, bulkheads, tanks, walkways or passageways that may provide shielding or difficulty in controlling the area.

2. The location of the exposure device drive cable, guide tube, and end stop if using gamma radiography equipment, or the location of the tube head and control panel if conducting x-ray radiography.

3. The location of the 2 mr/hr (0.02 mSv/hr) controlled boundary.

E. Provide the calculations for the 2 mr/hr (0.02 mSv/hr) controlled boundary from the distance from the gamma radiography source, or the x-ray machine tube head, to the location where the boundary must be established.

F. Review/Approval:

Contractor's Radiographer: \_\_\_\_\_

Name (Printed)

\_\_\_\_\_  
Signature

Date:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

RSO/RSOM (SUPERVISOR's) Approval: \_\_\_\_\_

Name (Printed)

\_\_\_\_\_  
Signature

Date:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

ATTACHMENT B  
FOR OFFICIAL USE ONLY

<b>BOUNDARY VIOLATION REPORT</b>
Report #

<u>NAME OF REPORTING INDIVIDUAL:</u>
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<u>TIME/DATE OF THE VIOLATION:</u>	<u>COMPANY:</u>
<u>LOCATION OF THE VIOLATION:</u>	<u>SUPERVISOR:</u>
<u>EQUIPMENT INVOLVED</u>	
<u>FOR GAMMA RADIOGRAPHY:</u>  <u>ISOTOPE:</u> <u>ACTIVITY:</u> <u>HALF VALUE OF THE COLLIMATOR:</u> <u>DURATION OF EXPOSURE:</u>	<u>FOR X-RAY RADIOGRAPHY</u>  <u>mA:</u> <u>kVp:</u> <u>DURATION OF EXPOSURE:</u>
<u>WORK ITEM NUMBER:</u>	<u>CONTRACT NUMBER:</u>

INDIVIDUALS WHO VIOLATED THE BOUNDARY

NAME(S)	DEPT.	ORGANIZATION/COMPANY

NAMES OF THE RADIOGRAPHY CREW MEMBERS,  
INCLUDING NAMES OF BOUNDARY MONITORS

NAME(S)	DEPT.	COMPANY

ATTACHMENT B  
FOR OFFICIAL USE ONLY

DESCRIPTION OF BOUNDARY VIOLATION

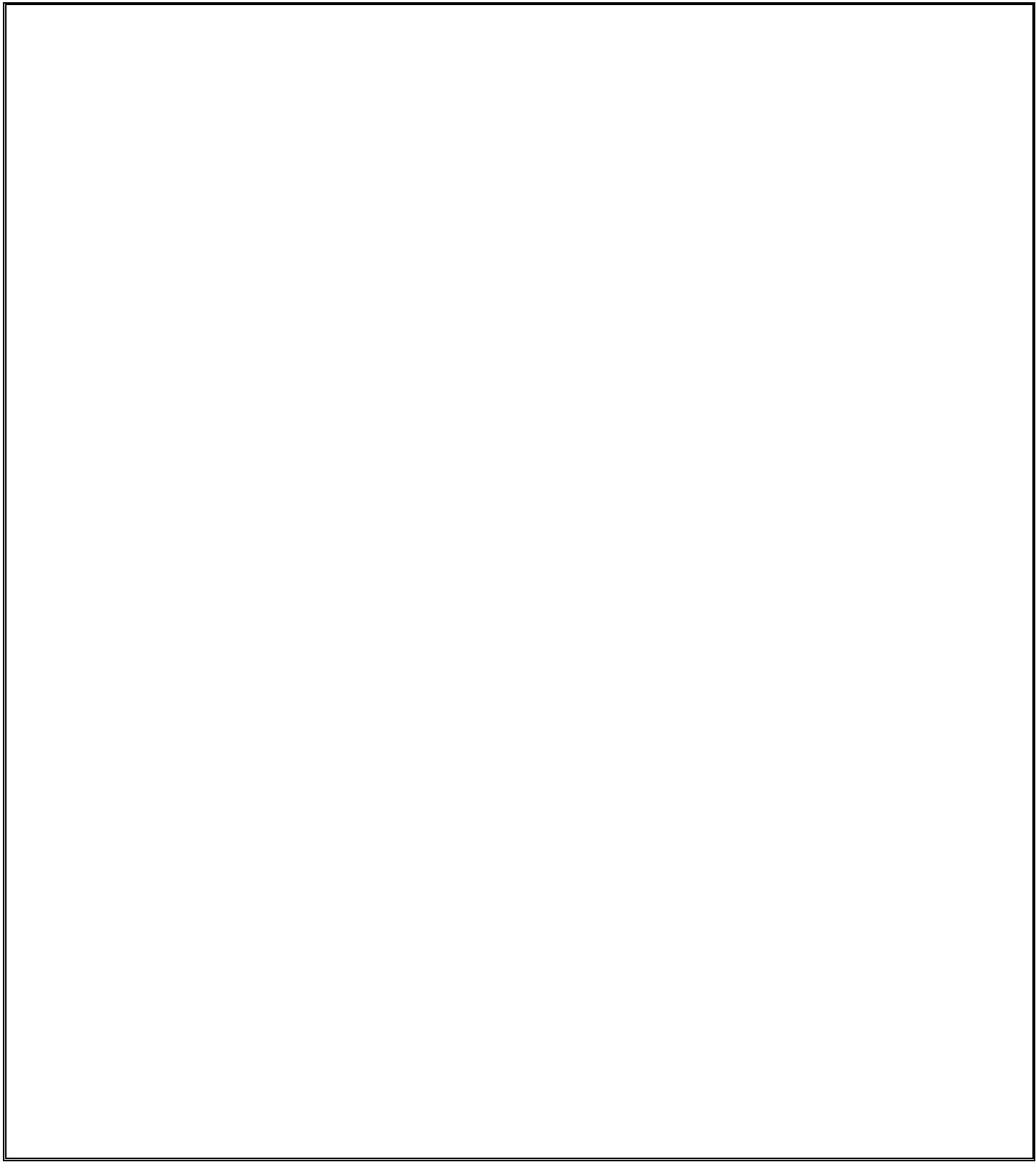


DIAGRAM SHOWING THE LOCATION OF THE VIOLATION AND THE EGRESS PATH IN RELATION  
TO THE SOURCE

ATTACHMENT B  
FOR OFFICIAL USE ONLY

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SIGNATURE OF REPORTING INDIVIDUAL:

DATE:

Incident Report Instructions

REPORT NUMBER- Unique tracking number created by contractor

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ATTACHMENT B  
FOR OFFICIAL USE ONLY

NAME OF REPORTING INDIVIDUAL: – Self Explanatory

DATE/TIME OF THE VIOLATION: – Self Explanatory

LOCATION OF THE VIOLATION: – Base/Yard, Ship name and hull number, space number and compartment name

COMPANY: – Prime and subcontractors involved

SUPERVISOR – Supervisor of employee(s) involved

EQUIPMENT INVOLVED – Self Explanatory

WORK ITEM NUMBER – Work Item being accomplished when incident occurred

CONTRACT NUMBER: – Contract Number assigned by government agency i.e. RMC, AIT Sponsor.

INDIVIDUALS WHO VIOLATED THE BOUNDARY: – Name, Department and Organization/Company of individuals that violated the boundary.

NAMES OF THE RADIOGRAPHY CREW MEMBERS, INCLUDING NAMES OF BOUNDARY

MONITORS: – Name, Department and Company of the members of the radiography crew, including names of boundary monitors.

DESCRIPTION OF BOUNDARY VIOLATION: – Narrative description of the boundary violation including the sequence of events, time line, estimated exposures to individuals who violated the boundary, the immediate corrective actions taken to secure operations and emergency notifications that were made.

DIAGRAM SHOWING THE LOCATION OF THE VIOLATION AND THE EGRESS PATH IN RELATION TO THE SOURCE: – A diagram of the location of the boundary violation showing the egress path and location of the individual(s) that violated the boundary, location of the source, beam direction (for x-ray machine radiography or gamma radiography if collimator was used) and the location of any barriers, walls, or equipment that would provide shielding.

SIGNATURE OF REPORTING INDIVIDUAL: – Self Explanatory.

TITLE – Self Explanatory.

DATE – Self Explanatory.