

POGUE INDUSTRIES INCORPORATED

5200 Manchester
St. Louis, Mo. 63110

Radiation Safety and Control Procedure

10.4.A

Operating and Emergency System Procedure

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CONTROL NO. 7 9368

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OPERATING AND EMERGENCY SYSTEM PROCEDURE

1.0 OBJECTIVE

- 1.1 Present the administration system for normal operations and handling radiation emergency actions to be taken by the Radiation Safety Officer (RSO) are also included in this procedure.

2.0 APPLICATION

- 2.1 PII operations that control, handle and/or store sealed sources used in the performance of industrial radiography.

3.0 PROCEDURE

3.1 Operating and Emergency Procedures (O & EP)

The O & EP is the Radiographer's and Assistant Radiographer's controlling document for routine operations and handling radiation emergencies. The O & EP will be used during all radiographic operations.

- 3.1.1 Assistant Radiographer and Radiographers shall have O & EP available whenever he/she is working with or around a sealed source.
- 3.1.2 Operating personnel are directed by the O & EP to report all radiation emergencies, as defined under paragraph 3.2.1, first to the NDE Supervisor. Emergencies shall also be reported to the RSO or the Assistant RSO.
- 3.1.3 Radiation safety requirements of Agreement States, which vary from the O & EP, will be issued as addendums to Procedure 10.4.B. Field personnel working in Agreement States will be furnished the proper addendums.

3.2 Radiation Hazard Severity

The degree of radiation hazard are arbitrarily identified as Emergency Class A Incident and Class B Incident.

The definitions for these terms are as follows:

- 3.2.1 Emergency - A condition which may have caused or threatens to cause one of the following to occur:

3.2.1.1 Exposure:

- (a) Whole body - 3 REM or more.
- (b) Hands, forearms, ankles and feet 45 REM or more.

3.2.1.2 Contamination - Any release of radioactive material.

3.2.1.3 Work Loss - The loss of 4 hours or more in any facility.

3.2.1.4 Damage - Damage of property in excess of \$500.00.

NOTE: An emergency includes all Class A and Class B incidents.

3.2.2 Class B incident - A condition which may have caused or threatens to cause one of the following to occur:

3.2.2.1 Exposure:

- a) Whole Body - 5 REM or more.
- b) Hands, forearms, feet and ankles - 75 REM or more.

3.2.2.2 Contamination - Any release of radioactive material.

3.2.2.3 Work Loss - The loss of one day or more of the operation of any facility affected.

3.2.2.4 Damage of property in excess of \$2,000.00.

3.2.3 Class A Incident - A condition which may have caused or threatens to cause one of the following to occur:

3.2.3.1 Exposure:

- (a) Whole body - 25 REM or more.
- (b) Hands, forearms, feet and ankles - 375 REM or more.

- 3.2.3.2 Contamination - Any release of radioactive material.
- 3.2.3.3 Work Loss - The loss of one work week or more of the operation of any facility affected.
- 3.2.3.4 Damage - Damage of property in excess of \$200,000.00.

3.3 Handling an Emergency

- 3.3.1 Radiation emergency reports will be handled by the RSO or the approved alternates identified in the Program Plan.
- 3.3.2 The reporting Radiographer will be asked to answer the following questions and provide information covered in paragraph 3.3.3.
 - (a) Have all personnel been removed from the radiation area?
 - (b) Has the radiation area been posted?
 - (c) Is the area being controlled by a responsible person?
 - (d) Is there any immediate danger of personnel receiving further radiation exposure?
 - (e) Were there any personnel injured?
 - (f) What is the nature of the incident?
- 3.3.3 Three Emergency Action Guidelines are included in this paragraph. The Radiation Safety Monitor shall select and use the appropriate guideline to plant the emergency action. Supplemental actions may be imposed by the RSO.

<u>TYPE OF EMERGENCY</u>	<u>REFERENCE PARAGRAPH</u>
Personnel Overexposure	3.3.3.1
Exposure Device	3.3.3.1
Source Out of Guide Tube	3.3.3.1
Loss of Source on the Jobsite	3.3.3.1
Other Condition Not Listed Below	3.3.3.1
Missing or Stolen Source	3.3.3.2
Plant or Area Fire	3.3.3.3

3.3.3.1 Emergency Action Guidelines for all conditions except plant or area fires, and a missing or stolen source.

- (a) Determine if the source is properly shielded.
- (b) Verify personnel are clear of the exposure area.
- (c) Verify the radiation area has been posted.
- (d) Verify the area is under surveillance.
- (e) Determine if personnel are in danger of receiving further exposure.
- (f) Determine if any personnel were injured.
- (g) Determine which personnel with radiation training are available at or near the site.
- (h) Determine the radiation exposure of personnel involved.
- (i) Determine the nuclide and S/N of the source to establish the field strength.
- (j) If the condition is a Class A incident and there is no immediate danger, interrupt the reporting at this point to perform the notification.
- (k) Class A incidents shall be reported immediately, and Class B incidents within 24 hours. Reporting shall be by telephone or telegraph to the following person:

Radiation Safety Officer
Pogue Industries Incorporated
5200 Manchester
St. Louis, MO. 63110

Telephone: (314) 892-4934

- (l) Verify the exact source location known, or direct the location determined by triangulation, as explained in Figure 4 of the O & EP.
- (m) Direct the radiation area posting be corrected, if necessary, and high radiation area be posted.
- (n) Determine what shielding is available which could be used to minimize exposure during recovery.
- (o) Determine the need for additional personnel including civil authorities and/or technical assistance during the planning stage and at the site. If extensive delays will occur, plan for continuous surveillance of the area.
- (p) Determine the method of recovery which will produce the minimum exposure to the personnel.
- (q) Review the radiation history of each trained person who is available to assist in recovery.
- (r) Establish a step-by-step procedure for recovery. Specify on the written procedure the maximum allowable time for each step (retreat time) which will take place within the radiation or high radiation area.
- (s) Calculate the personnel exposure expected for each step. Determine the need for new film badges prior to recovery.
- (t) Review the procedure in detail, with the person who will perform the recovery (recover). Assure the times will into require recalculation of the exposure. Have the Recover read the procedure to the Radiation Safety Monitor for proofing.
- (u) The procedure shall be followed exactly. Changes will be made only by the Radiation Safety Monitor.

- (v) The Timekeeper shall immediately notify the recover of the retreat time of a step has been reached. The Recoverer shall then immediately leave the radiation area and report to the Radiation Safety Monitor for further instructions.
- (w) Upon elimination of the emergency, proceed with Post Emergency Action per paragraph 3.4

3.3.3.2 Emergency Action Guidelines for Missing or Stolen Sources

- (a) Determine what nuclide and S/N is missing.
- (b) Determine if the exposure device, storage container or source changer containing the source is missing.
- (c) Determine if the source containing the equipment was locked. Is there any evidence the locking mechanisms were broken?
- (d) Determine if any personnel at the site have information as to the possible location of the source.
- (e) Direct the radiographer to immediately contact the supervisor of the company at the jobsite and make him aware of the hazard. Determine the need for clearing work areas until a survey is conducted.
- (f) Direct the Radiographer to rope off the area where the source was last seen to protect any evidence.
- (g) Interrupt the reporting at this point to perform the notifications.
- (h) Report immediately, by telephone or telegraph, to the following person:

Radiation Safety Officer
Pogue Industries Incorporated
5200 Manchester
St. Louis, MO 63110

Telephone (314) 892-4934

- (i) Determine the need for additional personnel and/or technical assistant during the planning stage and at the site. If extensive delays will occur, plan for continuous surveillance of the area.
- (j) Review the radiation history each trained person who is available to assist in recovery.
- (k) Establish a written step-by-step procedure for recovery.
- (l) Direct the Recover to write the procedure verbatim as given by the RSO. Have the Recover read the procedure to the RSO for proofing.
- (m) The procedure shall be followed exactly. Changes will be made only by the RSO.

3.3.3.3 Emergency Procedure for Plant or Area Fire:

- (a) Determine if the source is exposed. If it is exposed, can it be safely secured and removed from the danger area.
- (b) Determine the location of the fire with relation to the source.
- (c) Determine if personnel are clear of the exposure area.
- (d) Determine if personnel are in danger of receiving further exposure.
- (e) Assure the fire crew and plant supervision have been warned of the radiation hazard.
- (f) Determine if the radiation area is posted.
- (g) Determine if the radiation area can be maintained under surveillance.
- (h) Determine if any personnel were injured.
- (i) Determine which personnel with radiation training are available at or near the site.

- (j) Determine the radiation exposure of personnel involved.
- (k) Determine the dosimeter reading for each person involved.
- (l) Determine the nuclide and S/N of the source to establish the field strength.
- (m) If the condition is a Class A Incident.
- (n) Class A Incident shall be reported immediately and Class B Incidents within 24 hours by telephone or telegraph to:

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St. Louis, MO 63110

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- (o) Verify the source location is known, or direct the location by triangulation explained in Figure 4 of the O & EP.
- (p) Direct the radiation area posting be corrected, if necessary, and high radiation area be posted.
- (q) Determine what shielding is available which could be used to minimize exposure during recovery.
- (r) Determine the need for additional personnel and/or technical assistant during the planning stage and at the site. If extensive delays will occur, plan for continuous surveillance of the area.
- (s) Determine the method of recovery which will produce the minimum exposure to the personnel.
- (t) Review the radiation history of each trained person who is available to assist in recovery.

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- (u) Established a step-by-step procedure for recovery. Specify in the written procedure, the maximum allowable time for each step (Retreat Time) which will take place within the radiation of high radiation area.
- (v) Calculate the personnel exposure for each step and determine the need for new film badges prior to recovery.
- (w) Review the procedure, in detail, with the person who will perform the recovery (Recoverer). Assure the times are realistic. Any changes in these times will require recalculation of the expose.
- (x) Direct the Recoverer to write the procedure verbatim as given by the RSO. Have the Recoverer read the procedure to the RSO for proofing.
- (y) The Recoverer shall assign a responsible person as Timekeeper. The RSO shall verify that the Timekeeper understands each step of the procedure and the importance of the "Retreat Time".
- (z) The RSO shall maintain telephone contact throughout the recovery, if at all possible.
- (aa) The procedure shall be followed exactly. The Timekeeper shall immediately notify the recoverer if the Retreat Time of a step has been reached. The Recoverer shall then immediately leave the radiation area and report to the RSO for further instructions.
- (bb) Upon elimination of the emergency, proceed with Post Emergency Action per paragraph 3.4.

3.4 Post Emergency Action

- 3.4.1 Film (or TLD) badges of all personnel involved shall be processed on an expedited basis. Exposed personnel are barred from potential radiation exposure

assignments until the results of the film badges are available and the employee is released by the RSO.

- 3.4.2 Equipment that may have been damaged during the incident shall be removed from service until an inspection, maintenance, and calibration (if required) has been performed to the satisfaction of the RSO.
- 3.4.3 Notify the management personnel of PII status.
- 3.4.4 Obtain and implement formal corrective action for all radiation emergencies.
- 3.4.5 Prepare and submit to the RSO a complete written report of safety incidents within five working days.

3.5 Personnel History Records

- 3.5.1 NDE Supervisor shall make reasonable effort to obtain the previous radiation history of each new employee.
- 3.5.2 NDE Supervisor shall maintain Form RSC 1 (when used) in accordance with 10 CFR 20.
- 3.5.3 NDE Supervisor shall maintain individual's accumulated whole body dose records (comparable to NRC-5).
- 3.5.4 The RSO shall report to the NRC and to each terminated employee their accumulated whole body dose information during employment within 30 days after the exposure has been determined on Form RSC 2 (10 CFR 19.13 (c) 10 CFR 20.409 (b)).
- 3.5.5 The RSO shall submit an annual report to the NRC, stating the total number of persons monitored as required by 10 CFR 20.407.

3.6 Emergency Records

Complete records of radiation emergencies will be maintained by the RSO and applicable NDE Supervisor.

3.7 Posting Requirements

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- 3.7.1 The NDE Supervisor shall be responsible for assuring Form NRC-3 or Agreement State Notice to employee, if applicable, is posted at his/her location.
- 3.7.2 The NDE Supervisor shall be responsible for posting a "NOTICE" (conspicuously located) to comply with the requirements of 10 CFR 19 paragraph 19.11 (b) 10 CFR 21 Paragraph 21.6 (sample 3.7.2.1) or Agreement States Rules and Regulations (sample 3.7.2.2).

3.7.2.1 Sample

NOTICE

This notice is published to comply with the requirements of 10 CFR 19 paragraph 19.11 and 10 CFR 21 paragraph 21.6.

A COPY OF 10 CFR 19, 10 CFR 20, 10 CFR 21, (PII) RADIOACTIVE MATERIAL LICENSE, AND POGUE INDUSTRIES INCORPORATED OPERATING PROCEDURES ARE AVAILABLE IN THIS OFFICE AND MAY BE EXAMINED BY CONTACTING THE NDE SUPERVISOR OR RADIATION SAFETY MONITOR.

3.7.2.2 Sample

NOTICE

This notice is published to comply with the requirements of Agreement States Rules and Regulations.

A COPY OF THE AGREEMENT STATES RULES AND REGULATIONS, POGUE INDUSTRIES INCORPORATED STATE RADIOACTIVE MATERIAL LICENSE AND POGUE INDUSTRIES INCORPORATED OPERATING PROCEDURES, ARE AVAILABLE IN THIS OFFICE AND MAY BE EXAMINED BY CONTACTING THE NDE SUPERVISOR OR THE RADIATION SAFETY MONITOR.

- 3.7.3 The Lab/Project NDE Supervisor shall be responsible for posting a copy of Section 206 of the Energy Reorganization Act of 1974.

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RADIATION SAFETY AND CONTROL PROGRAM

OCCUPATIONAL EXTERNAL RADIATION EXPOSURE HISTORY

1. Name: _____ 2. Social Security No. _____
 (Print Last First Middle)

3. Date of Birth: _____ 4. Age in Full Years (N) _____
 (Month Day Year)

Occupational Exposure - Previous History

5. Previous Employments involving Radiation exposure-List name & address of employer	6. Dates of employment (From - To)	7. Periods of Exposure	8. Whole Body (rem)	9.		10. Remarks
				Record	Cal.	

Accumulated Occupational Dose - Totals 11.

Calculations - Permissible Dose

12. Whole Body:

a - Permissible Accu. Dose = 5 (N-18) = _____ rem
 b - Total Exposure to Date (from item 11) = _____ rem
 c - Permissible Dose..... = _____ rem

13. Certification: I certify that the exposure history listed above is correct and complete to the best of my knowledge and belief.

Employee's Signature _____ Date _____
 RSC Monitor Signature _____ Date _____

Note: Attach copies of correspondence to employees previous employer requesting exposure history as required in item 5.

POGUE INDUSTRIES INCORPORATED

DATE OF THIS REPORT: _____

NAME: _____

DATE OF BIRTH: _____

SOCIAL SECURITY NUMBER: _____

DATE OF EMPLOYMENT: From _____ To _____

Our records indicate your accumulated radiation dose to be _____
millirems during your period of employment with Pogue Industries
Incorporated.

This report is furnished to you under the provision of the
Nuclear Regulatory Commission regulations entitled "Standards for
Protection against Radiation" (10-CFR Part 20). You should
preserve this report for future reference.

Radiation Safety Monitor

cc: