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# FEMP SITE PROCEDURE, RADIOLOGICAL CONTAMINATION SURVEYS - (USED AS A REFERENCE IN OU3 RI/FS/PP - APPENDIX F)

01/22/92

SP-P-35-023
FEMP FEMP
12
PROCEDURE

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Control Number _____

| | | |
|---|---|---|
| Westinghouse Environmental Management Company of Ohio | Page 1 of 12 | Revision: 2 |
| Safety Procedures | Title: Radiological Contamination Surveys. | SP-P-35-023 |
| | | Department: IRS&T<br>Section: RS |
| Authorization: [signature] | | Supersedes: None<br>Revision Date: 1/22/92 |

## 1.0 PURPOSE

Assign responsibilities and establish the procedure for performing radiological contamination surveys.

## 2.0 SCOPE

This procedure defines the method to schedule, perform, and document contamination surveys.

## 3.0 DEFINITIONS

3.1 Contamination - Radioactive material that is not contained or is present where it is unwanted. Classified as:

3.1.1 Removable - Loose contamination that readily transfers to a smear with moderate pressure.

3.1.2 Fixed - Contamination that does not readily transfer to a smear.

3.2 Frequency - The time frame in which a scheduled survey shall be completed.

3.2.1 Daily - Shall be completed each calendar day, with the exception of weekends and holidays.

3.2.2 Weekly - Shall be completed between 0000 hours Monday and 2400 hours the following Sunday.

3.2.3 Monthly - Shall be completed during the calendar month.

* These procedures have been superceded by Site procedure. These procedure ARE NOT VALID. DO NOT PERFORM WORK TO THEM.

3.0 DEFINITIONS (continued)

3.2.4 Quarterly - Shall be completed four times per year, once in each calendar quarter. The calendar quarters are:

1st - January 1 to March 31.
2nd - April 1 to June 30
3rd - July 1 to September 30
4th - October 1 to December 31

3.2.5 Semi-Annual - Shall be completed two times per year; once between January 1 and June 30, and the other between July 1 and December 31 each calendar year.

3.2.6 Annual - Shall be completed during the calendar year.

3.3 Minimum Detectable Activity (MDA) - The amount of activity which must be surpassed for a sample to be considered above background.

3.3.1 The MDA for Geiger-Mueller (G-M) pancake probes is considered to be:

3.3.1.1 1000 dpm/100 $cm^2$ (100 cpm above background) for direct survey techniques.

3.3.1.2 400 dpm/probe area (100 cpm above background) for smear techniques.

3.3.2 The MDA for alpha-scintillator type probes is considered to be:

3.3.2.1 200 dpm/100 $cm^2$ (20 cpm above background) for direct survey techniques.

3.3.2.2 200 dpm/probe area (20 cpm above background) for smear techniques.

3.4 Gross Area Smears - Large area smears taken as an indication of the presence or absence of contamination.

4.0 RESPONSIBILITIES

4.1 The Manager(s) of personnel required to perform work per this procedure shall ensure that affected personnel are informed and/or trained to the extent necessary prior to initiation of that work.

4.0 RESPONSIBILITIES (continued)

4.2 RS Supervisor(s) shall be responsible for scheduling and reviewing all surveys as prescribed by this procedure.

4.3 The RSTs shall be responsible for performing and documenting surveys in accordance with the requirements of this procedure.

5.0 GENERAL

5.1 The purposes of contamination surveys are:

5.1.1 Characterize the levels of contamination in an area.

5.1.2 Provide documentation of radiological conditions.

5.1.3 Detect trends and build-up of contamination in areas.

5.1.4 Provide a base for contamination control.

5.2 Frequencies of surveys in areas not stated in this procedure shall be determined by the responsible RST Supervisor. Frequency is based on:

5.2.1 Changes in work routine.

5.2.2 Changes in the occupancy of the area.

5.2.3 Changes in personnel access to the area

5.2.4 Construction, demolition or decommissioning work that requires a Radiation Work Permit.

5.2.5 History of area contamination.

6.0 PROCEDURE

6.1 For fixed contamination surveys for depleted or natural uranium beta-gamma instruments alone may be used for activity determination.

6.2 Direct frisk with a G-M pancake probe

6.2.1 If the background exceeds 300 cpm, the item being surveyed should be moved to an area where the background is <300 cpm if possible. If this is not possible the background should be noted on the survey form.

6.0 PROCEDURE (continued)

6.2.2 The probe shall not be moved faster than 3 inches per second to detect 100 cpm above background.

6.2.3 Beta-gamma probes shall be within 1/2" of the surface that is being monitored.

6.2.4 Frisk desired area, determine average reading in cpm, subtract background cpm, and multiply result by four to determine dpm per probe area.

6.2.5 To determine dpm per 100 $cm^2$ using a G-M pancake probe, multiply cpm above background times ten.

6.2.6 Record the contamination level in the "Fixed Plus Removable" column of the Radiological Survey Report (Attachment A).

6.2.7 Dry smears shall be taken whenever direct frisk indicates activity exceeding applicable limits for removable activity.

6.3 Direct frisk with an alpha instrument

6.3.1 If the background exceeds 20 cpm, the item being surveyed should be moved to an area where the background is < 20 cpm if possible. If this is not possible the background should be noted on the survey form.

6.3.2 The probe shall be held stationary for 5 seconds. If an audible signal or meter movement is detected, hold the probe stationary for an additional 15 seconds.

6.3.3 Alpha probes must be within 1/8" of the surface being frisked.

6.3.4 Frisk the desired area and determine the average reading in cpm.

6.3.5 Subtract the background cpm, and multiply the result by ten to determine dpm per probe area. For alpha scintillator probes dpm per 100 $cm^2$ shall be considered equal to dpm per probe area.

6.3.6 Record the contamination level on the Radiological Survey Report (Attachment A).

6.3.7 Dry smears shall be taken whenever direct frisk indicates activity exceeding applicable limits for removable activity.

6.4 Smears

6.4.1 Protective gloves should be worn when taking smears.

6.0 PROCEDURE (continued)

6.4.2 Dry Smooth Surface Smears

6.4.2.1 Using dry paper or cloth smears, trace approximately a 40 cm (16") long "s" figure or approximately a 100 $cm^2$ area unless otherwise required by a specific procedure.

6.4.2.2 Apply moderate pressure with at least two fingers.

6.4.2.3 Analyze smears as outlined in step 6.4.5.

6.4.2.4 Record analysis data for the area smeared in the "Removable" column of the Radiological Survey Report (Attachment A). For areas where it is not feasible to smear 100 $cm^2$ a comment shall be included indicating the approximate area smeared.

6.4.3 Gross-area Smears

6.4.3.1 Wipe a large area, several hundred square centimeters or greater, with a standard smear or a large absorbent cloth, such as masslin.

6.4.3.2 Frisk the smear directly with a portable alpha or beta/gamma survey instrument for indication of the presence of contamination. Removable contamination detected should be averaged over the area smeared.

6.4.3.3 Gross-area smears that indicate no detectable contamination can be used to confirm that removable contamination is less than the MDA of the instrument used to count the smear divided by the area smeared.

6.4.3.4 Gross-area smear results shall be reported in the "Removable" column of the Radiological Survey Report (Attachment A). A comment shall be included indicating that a large area smear was used and the approximate area smeared.

6.4.4 Smears on other surfaces

6.4.4.1 Conduct surveys as described in step 6.4.2, except cloth smears shall be used when the material to be smeared is too coarse to adhere to smear paper, the surface is rough and porous, or the contamination loosely adheres to the surface.

6.4.4.2 It is permitted to smear wet areas, inside spill-area boundaries, or areas where loose surface contamination is expected but is not detectable using dry smears. Wet smears shall be allowed to dry before counting.

6.0 PROCEDURE (continued)

6.4.5 Smear Sample Analysis

6.4.5.1 Smears taken to detect activities above the portable instrument MDA should be counted with field survey instruments as outlined in procedure SP-P-35-046 "Counting Smears with Field Survey Instruments".

6.4.5.2 Smears taken to detect activities less than the MDA of the portable survey instrument shall be counted on a low background counting system per SP-P-35-37,"Operation of the Tennelec Automatic Low Background Counting Systems (LB5100 Series II/III and LB5100/5500.)".

6.5 Documentation

6.5.1 Radiological contamination surveys shall be documented using the Radiological Survey Report (Attachments A and B) or equivalent.

6.5.2 Any unusual events or conditions that may influence the survey results shall be noted on the survey form (i.e., porous surface, wet smears).

6.5.3 All reported readings shall be clearly specified as dpm/probe area, dpm/100 $cm^2$ or dpm/area smeared for gross-area smears.

6.5.4 All instruments used in performing the survey shall be recorded on the Radiological Survey Report. Documentation of the inspection and performance test of the instruments may be recorded on the survey report in accordance with procedure SP-P-35-028 "Inspection and Performance Testing of Portable Radiation Survey Instruments."

6.5.5 Maps should be used wherever possible so that survey locations can be accurately documented. Each map page shall be included in the total pages of the survey report.

6.5.6 Readings less than MDA shall be recorded as "< MDA". The value(s) for MDA for each instrument used shall be recorded on the survey report.

6.5.7 When information is to be entered into the Flow Gemini Database, grid coordinates shall be used to identify the survey location.

6.5.8 All analysis data printouts shall be attached to the survey report.

6.5.9 All survey forms shall be signed and dated by the RST(s) performing the survey.

6.0 PROCEDURE (continued)

6.5.10 Completed Radiological Survey Reports shall be reviewed, dated and initialed in the provided box by the responsible RST supervisor.

6.5.10.1 The RST Supervisor shall inform the RST of follow-up requirements and/or surveys when required.

6.5.10.2 The RST shall notify the facility supervisor, radiological safety technician supervisor, and Radiological Assessment promptly of any areas requiring decontamination.

6.5.11 A copy of all survey reports shall be on file for one quarter in the custody of the RST Supervisor. All reports exceeding one quarter of date of the survey shall be removed from the files and prepared for long term storage in the vault.

6.5.12 Copies of the completed Radiological Survey Report shall be distributed as required per the distribution list at the bottom of the form.

6.6 Schedule

6.6.1 Unless otherwise specified by this procedure, all scheduled surveys shall be for loose contamination only. More frequent surveys or performing fixed plus removable surveys may be specified by the responsible RST supervisor or Radiological Engineer through the RST supervisor.

6.6.2 Controlled Areas

6.6.2.1 At least quarterly.

6.6.2.2 Break rooms, offices, and drinking areas within controlled areas shall be surveyed at least weekly. Fixed plus removable surveys shall be performed at least annually.

6.6.2.3 Approved eating areas within controlled areas shall be surveyed at least daily. Fixed plus removable surveys shall be performed at least annually.

6.6.3 Regulated Areas

6.6.3.1 At least monthly. Fixed plus removable surveys shall be performed at least annually.

6.6.3.2 Drinking fountains and water coolers within Radiological Areas shall be surveyed daily.

6.0 PROCEDURE (continued)

6.6.4 Contamination Areas

6.6.4.1 At least annually.

6.6.5 Radiation Areas

6.6.5.1 At least semi-annually. Fixed plus removable surveys shall be performed at least annually.

6.6.6 High Radiation Areas

6.6.6.1 At least annually. Surveys shall be performed prior to work being performed in the area.

6.6.7 Control Points (from contamination areas)

6.6.7.1 Based on usage. Control points used on a daily basis shall be surveyed daily.

6.6.8 Control Points (from regulated areas)

6.6.8.1 At least weekly.

6.6.9 Control Points (from controlled areas)

6.6.9.1 At least daily

NOTE: In cases that two classifications apply, such as an areas that is a contamination area and a radiation area, the more frequent survey requirements of the two classifications apply.

7.0 APPLICABLE DOCUMENTS

7.1 SP-P-35-046, "Counting Smears with Field Survey Instruments".

7.2 SP-P-35-028, "Inspection and Performance Testing of Portable Radiation Survey Instruments".

7.3 SP-P-35-37, "Operation of the Tennelec Automatic Low Background Counting Systems (LB5100 Series II/III and LB5100/5500.)".

8.0 FORMS USED

8.1 FS-F-1993-1, Radiological Survey Report

8.2 FS-F-1993-2, Radiological Survey Report (Continuation Sheet)

9.0 ATTACHMENTS

9.1 Attachment A, Radiological Survey Report

9.2 Attachment B, Radiological Survey Report (Continuation Sheet)

# ATTACHMENT A

# RADIOLOGICAL SURVEY REPORT

Fernald Site
IRS&T - RADIOLOGICAL SAFETY
**RADIOLOGICAL SURVEY REPORT**

| DATE: | LOCATION: | PRINT NAME: | PAGE: |
|---|---|---|---|
| TIME: | LEVEL | SIGNATURE: | 1 of ___ |
| REASON FOR SURVEY | | | |

**INSTRUMENTS**

| MODEL | SERIAL NUMBER | TYPE ($\alpha, \beta, \gamma$) | CALIBRATION-DUE DATE | BKGD. (cpm) | EFF./CF | MDA (dpm) | INSP./PERFORMANCE TEST SAT? YES | NO |
|---|---|---|---|---|---|---|---|---|
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| ITEM NUMBER | LOCATION AND/OR DESCRIPTION | DPM/100cm² ALPHA REMOVABLE | DPM/100cm² ALPHA FIXED PLUS REMOVABLE | DPM/100cm² BETA-GAMMA REMOVABLE | DPM/100cm² BETA-GAMMA FIXED PLUS REMOVABLE | CORRECTED DOSE RATE (MREM/HR) $\gamma$ CONTACT | $\beta/\gamma$ CONTACT | $\gamma$ AT ___ FT. | $\beta/\gamma$ AT ___ FT. |
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| NO. | DISTRIBUTION OF COPIES |
|---|---|
| 1 | Radiological Safety Supervisor |
| 2 | Facility Supervisor |
| 3 | Operable Unit Manager |

**NOTIFICATION OF SURVEY RESULTS**

| SUPERVISOR NOTIFIED | TIME | DATE | NOTIFIED BY | REVIEWED BY | DATE |
|---|---|---|---|---|---|
| | | | | | |

FS-F-1993-1 (REV. 11/7/91)

# ATTACHMENT B

## RADIOLOGICAL SURVEY REPORT (CONTINUATION SHEET)

Fernald Site
IRS&T - RADIOLOGICAL SAFETY

**RADIOLOGICAL SURVEY REPORT - CONTINUATION SHEET** Page _____ of _____

| ITEM NUMBER | LOCATION AND/OR DESCRIPTION | DPM/100cm² ALPHA | | DPM/100cm² BETA-GAMMA | | CORRECTED DOSE RATE (MREM/HR) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | γ | β/γ | γ | β/γ |
| | | REMOVABLE | FIXED PLUS REMOVABLE | REMOVABLE | FIXED PLUS REMOVABLE | CONTACT | CONTACT | AT ____ FT. | AT ____ FT. |
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FS-F-1993-2 (REV. 11/7/91)

ISSUE AND REVISION RECORD

| DATE OF CHANGE | REVISION NUMBER | AFFECTED PAGES | REASON FOR REVISION |
|---|---|---|---|
| 01/02/91 | 0 | ALL | Original issue of procedure |
| 06/21/91 | 1 | ALL | To include procedure for performing Gross-area smears and to recommend field counting smears wherever applicable. |
| 01/22/92 | 2 | ALL | To denote that the MDA for direct frisk is different than the MDA of smear counting when using portable instrumentation, to allow direct frisks in higher background provided it is documented, to reformat schedule to be based on area classification, and to update Radiological Survey Report Form. |