

GENERAL SECTION

Survey Area No.: OOL-12

Survey Unit No.: 01

Survey Unit Name: Railroad Spur at Warehouse

FSSP No.: YNPS-FSSP-OOL-12-01-01

This revision addresses changes made associated with the southern boundary along a ledge outcropping. Revised text is bolded.

The original boundary omitted a strip of ground at the base of the ledge up to 1 meter wide (25 m²). As this portion of the boundary was adjusted to coincide with the base of the ledge outcropping, it was found that an additional soil sample is required to be collected. Field inspections conclude that the ISOCS scan surveys performed under the original issuance of the survey plan adequately covered the additional surface area. Because the surface area has increased, changes to the length between sample points (i.e. L) is not necessary; the original value yields a conservative sampling protocol. However, the new boundary encompasses one additional sample point as the grid is extended into the additional area. This sample number has been assigned a designation of OOL-12-01-023-F.

It is necessary to note that during the process of modifying the boundary two biased samples had been collected under the direction of the cognizant Radiological Engineer. These samples were designated OOL-12-01-021 & OOL-12-01-022. After the boundary modification was finalized, the location of these biased samples fell outside of the survey unit and therefore are disassociated from this survey package. This note is intended to explain the apparent break in numbering sequence.

PREPARATION FOR FSS ACTIVITIES

Check marks in the boxes below signify affirmative responses and completion of the action.

- 1.1 Files have been established for survey unit FSS records. X
- 1.2 ALARA review has been completed for the survey unit. X
- 1.3 The survey unit has been turned over for final status survey. X
- 1.4 An initial DP-5554 walk down has been performed and a copy of the completed Survey Unit Walk down Evaluation is in the survey area file. X
- 1.5 Activities conducted within area since turnover for FSS have been reviewed. X
 Based on reviewed information, subsequent walk down: X not warranted warranted
 If warranted, subsequent walk down has been performed and documented per DP-8854.
 OR
 The basis has been provided to and accepted by the FSS Project Manager for not performing a subsequent walk down.
- 1.6 A final classification has been performed. X
 Classification: Class 1

DATA QUALITY OBJECTIVES (DQO)

1.0 State the problem:

Define the problem so that the focus of the survey will be unambiguous.

- Members of the planning team:* FSS Project manager, Radiological Engineer, Field Supervisor, and Technicians.
- Primary decision maker/method:* FSS Radiological Engineer with concurrence of the FSS Project Manager.
- Available resources/deadlines:* N/A
- Concise description of problem:* Release of OOL-12-01 to demonstrate compliance with YNPS LTP release criterion.

2.0 Identify the decision:

Define the question that the survey will attempt to resolve and identify alternative actions that may be taken based on the outcome of the survey.

- Principal study question:* Is the residual radioactivity in OOL-12-01 below the 8.73 mr/yr release criterion?
- Alternative actions:* If residual radioactivity in OOL-12-01 exceeds the 8.73 mr/yr release criterion,

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	investigations will be performed, potentially resulting in remediation, reclassification or resurveys.
<i>Decision statement:</i>	Determine whether or not OOL-12-01 satisfies the 8.73 mr/yr release criterion.
3.0 Identify the inputs to the decision:	
Informational inputs needed to resolve the decision statement and environmental variables that will be measured.	
<i>Sources of information:</i>	26 samples from historical data were sufficient to develop the DQOs for OOL-12-01. 21 new data measurements will be acquired to support DQAs.
<i>Direct measurement technique:</i>	Soil samples will be collected and analyzed on site for all ETD LTP listed radionuclides, 2 samples will be sent to an independent lab for analyses of all LTP listed radionuclides.
<i>Scan measurement technique:</i>	Surfaces will be scanned via a SPA-3 probe, and/or ISOCS Assays.
<i>Sample matrix:</i>	Soil
<i>Radionuclide(s) of concern:</i>	Based on a review of YNPS historical data, the following radionuclides are the only facility related radionuclides of concern: Co-60, Cs-137
<i>Sample Quantity</i>	15 (calculated) ^{MR 6} + 5 (added), for a total of ^{MR 21} 20 samples. (+2 QC)
<i>Gridded Sample Area Size</i>	64.33 m ² (Survey Unit Area/N) ^{MR 10-11-06}
<i>Sample Grid Spacing:</i>	Triangular: 8.6m
<i>Detection Limits:</i>	For direct measurements and sample analyses, Minimum Detectable Concentrations (MDCs) less than 10% of the DCGL are preferred, while MDCs up to 50% of the DCGL are acceptable. See Attachment 2 for MDC Table.
<i>MDC (fDCGL_{emc}):</i>	The accompanying MDCR/MDC table in Attachment 1 provides MDC values, as a fraction of DCGL _{emc} , for various background levels.
<i>MDCR(surveyor):</i>	The accompanying MDCR/MDC table in Attachment 1 provides MDCR values for various background levels.
<i>Background Measurements:</i>	No reference area (background) measurements are required, the Sign Test will be used.
<i>Release criteria DCGL based on:</i>	8.73 mr/yr for Soil. See Attachment 2 for radionuclide specific breakdown of DCGLs.
4.0 Define the boundaries of the survey:	
Define the spatial and temporal boundaries that will be covered by the decision statement so data can be easily interpreted.	
<i>Temporal boundaries:</i>	The data are used to reflect the condition of radionuclides leaching into the ground water over a period of 1,000 years. The survey may be performed under appropriate weather conditions (as defined by instrument tolerance and personnel safety) on any shift of work.
<i>Spatial Boundaries:</i>	YNPS has been divided into multiple survey areas and units with relatively homogeneous characteristics based on information collected during the years of facility operation, the HSA, and post remediation activities. The area of interest has been named OOL-12, and the survey unit is 01. The medium of interest is described as Soil. The radiological characteristics of this unit classify it as a Class 1 area. Which has ≤ 2,000 m ² as a surface area guidance. The total surface area is 1,351 m² , which is in compliance with the Class 1 guidance. The maximum length is 103m, and the maximum width is 25.3m. Soil is surveyed to a depth of 15 cm.
<i>Detailed description of unit:</i>	See included GPS coordinates and maps that demonstrate the measurement locations, the survey unit boundaries and unit relationship to site. OOL-12-01 consists of open land area, a portion was once part of the RCA. The

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area was used for rail transportation of radioactive waste that included spent fuel and irradiated hardware (control rods). Personnel and material traffic into and out of the RCA may have impacted survey area OOL-12-01. Survey area OOL-12 is located down slope from the RCA therefore it is potentially impacted by surface water run-off. Sub-surface systems that traverse or connect within OOL-12 are Auxiliary Service Water System (ASWS) water and electrical, Fire Protection System water, electrical grounding cables and security lighting electrical conduits. ~~The southwest corner of the survey unit includes a ridge of exposed ledge. The area of ledge will be surveyed and "Free Released" in accordance with operational Radiation Protection procedures.~~

5.0 Develop a decision rule:

Define the parameter of interest, specify action levels, and the DCGL.

- Investigation Levels:* If an investigation level below is exceeded, then perform an investigation survey.
- Direct measurements:* > DCGL_{mc} or > DCGL_w + 3 Sigma
- Scan measurements:* > DCGL_{mc}
- Parameter of interest:* If there are no investigation issues, and the the residual radioactivity in OOL-12-01 systematic samples is less than the DCGL_w then the survey unit is in compliance with the release criterion (8.73 mr/yr).
- Critical Value:* If the average concentration is less than DCGL_w, the sum of fractions is less than 1, and less than 6 of the 21 samples are above the DCGL_w, the Survey Units passes

6.0 Specify limits on decision errors:

Specify the decision maker's limits on decision errors, used to establish performance goals for the data collection design.

- Null Hypothesis (H₀):* The residual radioactivity in the survey unit data is greater than the DCGL_w
- Alternative Hypothesis (H_a):* The residual radioactivity in the survey unit data is less than the DCGL_w
- Tolerance for Error:* Type I Error: 0.05 (probability of rejecting the null hypothesis when it is true.)
Type II Error: 0.05 (probability of accepting the null hypothesis when it is false.)
- DCGL_w (Unity):* 1
- LBGR:* 0.5 (Initial LBGR: 0.5)
- Relative shift (Δ/σ):* 2.86
- Sigma (σ):* 0.175
- Power of survey design:* See attachment for prospective power curve.

7.0 Optimize Design:

Type of statistical test: WRS Test _____ Sign Test X
(background will not be subtracted)

Design optimization is included in the DQO process, and reflected in the data published in this plan.

Number & Location of Samples: 21 Soil samples will be collected at locations based on a random start, systematic Triangular grid (refer to accompanying DPF-8853.2). See map for specific

GENERAL INSTRUCTIONS

- 1 Where possible, measurement locations will be identified using GPS in accordance with DP-8859. Each location will be marked to assist in identifying the location.
- 2 Soil samples will be collected in accordance with DP-8120.
- 3 Chain of Custody form will be used in accordance with DP-8123 for all soil samples sent to an off-site laboratory.
- 4 All soil samples will be received and prepared in accordance with DP-8813. Note: Split samples to be sent to an off-site lab will not be dried prior to counting on site or shipping.
- 5 Survey instrument: Operation of the E-600 w/SPA-3 will be in accordance with DP-8535 with QC checks performed in accordance with DP-8504. The instrument response checks shall be performed before issue and after use.

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- 6 All SPA-3 scans will be performed with the audible feature activated. Listen for upscale readings and respond by slowing down or stopping the probe to distinguish between random fluctuations in the background and greater than background readings. Investigate any reproducible upscale readings as described in the specific instructions.
- 7 The job hazards associated with the survey described in this package are addressed in the accompanying Job Hazard Assessment (JHA) for OOL-12-01.
- 8 All personnel participating in this survey shall be trained in accordance with DP-8868.
- 9 Collect ISOCS measurements in accordance with DP-8871 to provide 100% scan coverage of the survey unit.

SPECIFIC INSTRUCTIONS

1 *SPA-3 Scans:*

- Move the SPA-3 in rate-meter mode at a speed of 0.2m or less per second, keeping the probe at a distance of ≤ 3 " from the surface and following a serpentine path that includes at least 3 passes across each square meter. The maximum background a SPA-3 may be used in is 11000 cpm.
- Perform supplemental/judgmental scans with SPA-3 in addition to ISOCS scans, as needed.

2 *Scan Investigations:*

Note: Detailed descriptions of investigation actions shall be recorded in the daily survey journal (DPF-8856.2) and locations marked on a map.

- Scan a 1m radius footprint around the investigation location in accordance with the scan requirements above. The area of scan should be increased as necessary to bound any areas of elevated activity identified. Perform a sample investigation as noted below.

3 *Sample Locations:*

All designated measurement locations will be identified by GPS per DP-8859 or by use of reference points, tape measure and compass as necessary. If a designated sample location is obstructed for any reason, the FSS Radiological Engineer or the FSS Field Supervisor will select an alternate location in accordance with DP-8856. A detailed description of the alternate location will be recorded on form DPF-8856.2, the survey unit map will be annotated appropriately, and the alternate location will be conspicuously marked to facilitate re-visiting to identify and record the coordinates with GPS in accordance with DP-8859 or by measurement from a known reference point when a GPS is not available.

4 *Sample Requirements:*

Collect **21** samples in accordance with DP-8120. 2 of the **21** samples will be analyzed as a QC split sample to fulfill the QC requirement of DP-8852. The same QC split samples will be analyzed for HTD nuclides in accordance with section 5.6.3.2.1 of the LTP and DP-8856.

Biased samples:

Originally, no biased samples were prescribed. During the process of modifying the boundary, two biased samples had been collected under the direction of the cognizant Radiological Engineer. These samples were designated OOL-12-01-021-F-B & OOL-12-01-022-F-B. After the boundary modification was finalized, the location of these biased samples fell outside of the survey unit and therefore are disassociated from this survey package.

5 *Sample Designation:*

FSS soil samples:

^{020 7/10/06}
OOL-12-01-001-F through OOL-12-01-~~021~~-F & OOL-12-01-023-F corresponding to FSS sample locations 001 through ~~021~~ and 023. Note that during the process of modifying the boundary, two biased samples had been collected under the direction of the cognizant Radiological Engineer. These samples were designated OOL-12-01-021 & OOL-12-01-022. After the boundary modification was finalized, the location of these biased samples fell outside of the survey unit and therefore are disassociated from this survey package.

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Originally, no biased samples were prescribed. During the process of

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	<p>modifying the boundary, two biased samples had been collected under the direction of the cognizant Radiological Engineer. These samples were designated OOL-12-01-021-F-B & OOL-12-01-022-F-B. After the boundary modification was finalized, the location of these biased samples fell outside of the survey unit and therefore are disassociated from this survey package.</p>
<i>QC split samples:</i>	OOL-12-01-008-F-S and OOL-12-01-016-F-S are to be designated as QC split samples. These samples will be sent to the off-site laboratory (do not dry).
<i>Recount samples:</i>	OOL-12-01-018-F-RC will be counted twice on site. The results will be compared in accordance with DP-8864.
6 <i>Sample Analysis:</i>	
	<ul style="list-style-type: none"> Gamma analysis will be performed on all soil samples. If any of the gamma analyses show that an investigation level has been exceeded an investigation survey will be conducted at that sample location as directed by the radiological engineer. YNPS Chemistry will analyze OOL-12-01-001-F through OOL-12-01-021-F^{020 F101466} and OOL-12-01-023 for gamma-emitting nuclides. YNPS Chemistry will analyze OOL-12-01-018-F as a sample recount. The recounted sample will possess the naming convention OOL-12-01-018-F-RC.. YNPS Chemistry will analyze OOL-12-01-008-F-S and OOL-12-01-016-F-S for gamma-emitting nuclides prior to being sent to the off-site laboratory. These samples will be analyzed for gamma-emitting nuclides and HTD at the off-site lab. All gamma analysis of the FSS samples shall achieve the MDC values stated in the DQO section of this plan. The MDC's will be communicated to the laboratory using an attachment to the Chain-of- Custody form.
7 <i>ISOCS Assays:</i>	
	<ul style="list-style-type: none"> Collect sufficient ISOCS measurements (estimated to be 97 measurements) in accordance with DP-8871 to provide 100% scan coverage of the survey unit. ISOCS assays are designated as OOL-12-01-xxx -F-G where "xxx" continues sequentially from the last number assigned to an FSS measurement. QC checks shall be performed at least once per shift in accordance with DP-8869 and DP-8871. Resolve flags encountered prior to survey. ISOCS assays to be performed with 180° collimator at 1m unless otherwise directed by the FSS Engineer. Make note on the daily survey journal (DPF-8856.2) if other geometries are used. For ISOCS assay locations shown on map titles "ISOCS Scans", position the detector downward facing keeping the detector perpendicular to the ground. Designate additional assay locations in continuing sequence from the last number assigned to an FSS measurement. Record detailed information about additional assay locations on the daily survey journal. Remove standing water prior to performance of ISOCS assays. Contact the FSS Engineer for directions if conditions are such that standing water cannot be removed. Record in the daily survey journal when material other than soil is within the ISOCS field of view (e.g. 10% ledge in field of view). If the results on any ISOCS assay exceed an investigation level, investigate the area within the field of view (7m diameter, 38.5 m2 area) for that assay. Investigations will typically be performed using the SPA-3, however, the FSSE may direct use of ISOCS with the 1m height, 90° collimator geometry. Record detailed information for scan investigations in the daily survey journal.

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