GENERAL SECTION

Survey Area No.: OOL-14 Survey Unit No.: 01

Survey Unit Name: Wheeler Brook Frontage

FSSP No.: YNPS-FSSP-OOL-14-01-02

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. Classification: Class 3	X

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-14-01 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-14-01 below the 8.73 mr/yr release criterion?

Alternative actions: If residual radioactivity in OOL-14-01 exceeds the 8.73 mr/yr release criterion, investigations will be performed, potentially resulting in remediation, reclassification or resurveys.

Decision statement: Determine whether or not OOL-14-01 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.

Sources of information: 26 samples from historical data was sufficient to develop the DQOs for OOL-14-01. 15 new data measurements will be acquired to support DQAs.

Direct measurement technique: Soil samples will be collected and analyzed on site for all ETD LTP listed radionucluides, 1 sample will be sent to an independent lab for analyses of all LTP listed radionuclides.

Scan measurement technique: Surfaces will be scanned via a SPA-3 probe.

Sample matrix: Soil

Radionuclide(s) of concern: Based on a review of YNPS historical data, the following radionuclides are the only facility related radionuclides of concern: Cs-137

Sample Quantity 15 (calculated) + 0 (added), for a total of 15 samples. (+1 QC)

Gridded Sample Area Size N/A (Class 3)

Sample Grid Spacing: No Grid

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Detection Limits: For direct measurements and sample analyses, Minimum Detectable Concentrations (MDCs) less than 10% of the DCGL are prefered (CMY 7/7/04) while MDCs up to 50% of the DCGL are acceptable (CMY 7/7/04). See Attachment 2 for MDC Table.

MDC (fDCGL): The accompanying MDCR/MDC table in Attachment 1 provides MDC values, as a fraction of DCGL, for various background levels.

MDCR(surveyor): The accompanying MDCR/MDC table in Attachment 1 provides MDCR values for various background levels.

Background Measurements: No reference area (background) measurements are required, the Sign Test will be used.

Release criteria DCGL based on: 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.

Temporal boundaries: 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.

Spatial Boundaries: 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-14, 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 3 area. Which has no restrictions as a surface area limit. The total surface area is 2163 m2, which is well within the no restrictions limit. The maximum length is 86m, and the maximum width is 47m. Soil is surveyed to a depth of 15 cm.

See included GPS coordinates and maps that demonstrate the measurement locations, the survey unit boundaries and unit relationship to site.

Detailed description of unit: Survey area OOL-14 (Wheeler Brook Frontage) consists of an open land area, approximately 2,163 m2 in size, owened by US Gen and located south of an upslope from the railroad track location in Class 1 area OOL-13. There are no sub-surface systems that traverse or connect within OOL-14. The problem at hand is to demonstrate that years of plant operation and stockpiling of thermally desorbed soil did not result in an accumulation of plant-related radioactivity that exceeds LTP release criteria.

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: > 50% DCGLw

Scan measurements: Detectable over background

Parameter of interest: If there are no investigation issues, and the the residual radioactivity in OOL-14-01 systematic samples is less than the DCGLw then the survey unit is in compliance with the release criterion (8.73 mr/yr).

Critical Value: If the average concentration is less than DCGLw, the sum of fractions is less than 1, and less than 4 of the 15 samples are above the DCGLw, the Survey Units passes.

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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 (H_0):	The residual radioactivity in the survey unit data is greater than the DCGLw
Alternative Hypothesis (H_a):	The residual radioactivity in the survey unit data is less than the DCGLw
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.)
DCGLw:	3 (pCi/g) (C_s-137)
LBGR:	2.9032 (Initial LBGR: 1.5)
Relative shift (Δ/σ):	2
Sigma (σ):	0.0484
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: 15 Soil samples will be collected at locations based on random and judgmental locatons (refer to accompanying DPF-8853.2). See map for specific locations.

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.
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-14-01.
8 All personnel participating in this survey shall be trained in accordance with DP-8868.

SPECIFIC INSTRUCTIONS

1 *SPA-3 Scans:*
- Move the SPA-3 in rate-meter mode at a speed of 0.25m 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.
- Scan the $1m^2$ area surrounding each sample point prior to collecting a sample.
- Perform 25 biased scans 1m wide by 10m long.

2 *Scan Investigations:*
Note: Detailed descriptions of investigation actions shall be recorded in the daily survey journal (DPF-8856.2) and
- 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.

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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 15 samples in accordance with DP-8120. 1 of the 15 samples will be analyzed as a QC split sample to fulfill the QC requirement of DP-8852. The same QC split sample will be analyzed for HTD nuclides in accordance with section 5.6.3.2.1 of the LTP and DP-8856.

Biased samples: Collect 4 biased samples in accordance with DP-8120. The radiological engineer assigned to this survey unit, or designee, will determine the locations of the biased samples.

5 *Sample Designation:*

FSS soil samples: OOL-14-01-001-F through OOL-14-01-015-F corresponding to FSS sample locations 001 through 015.

Biased soil samples: OOL-14-01-016-F-B through OOL-14-01-019-F-B corresponding to biased sample location 016 through 019.

QC split samples: OOL-14-01-005-F-S is to be designated as QC split sample. This sample will be sent to the off-site laboratory (do not dry).

Recount samples: OOL-14-01-004-F-RC will be counted twice on site. The results will be compared in accordance with DP-8864.

6 *Sample Analysis:*

- 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-14-01-001-F through OOL-14-01-015-F and OOL-14-01-016-F-B through OOL-14-01-019-F-B for gamma-emitting nuclides.
- YNPS Chemistry will analyze OOL-14-01-004-F as a sample recount. The recounted sample will possess the naming convention OOL-14-01-004-F-RC.
- YNPS Chemistry will analyze OOL-14-01-005-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 laboratory.
- 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.

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Prepared by Nancy Tozzie — FSS Radiological Engineer — Date July 6, 2006

Reviewed by — FSS Radiological Engineer — Date 7-7-06

Approved by Martin Erickson — FSS Project Manager — Date 7-7-06

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Attachment 1
SPA-3 Scan Tables

Max Background

BKG(cpm)	MDCR	MDC(fDCGL)
4,000	639	1.13E+00
5,000	715	1.27E+00
6,000	783	1.39E+00
7,000	845	1.50E+00
8,000	904	1.60E+00
9,000	959	1.70E+00
10,000	1,011	1.79E+00
11,000	1,060	1.88E+00
12,000	1,107	1.96E+00
13,000	1,152	2.04E+00
14,000	1,196	2.12E+00
15,000	1,238	2.19E+00
16,000	1,278	2.27E+00
17,000	1,318	2.34E+00
18,000	1,356	2.40E+00
19,000	1,393	2.47E+00
20,000	1,429	2.53E+00
21,000	1,464	2.60E+00
22,000	1,499	2.66E+00
23,000	1,533	2.72E+00
24,000	1,565	2.78E+00
25,000	1,598	2.83E+00
26,000	1,629	2.89E+00
27,000	1,660	2.94E+00
28,000	1,691	3.00E+00
30,000	1,750	3.10E+00
32,000	1,808	3.21E+00
34,000	1,863	3.30E+00
36,000	1,917	3.40E+00
38,000	1,970	3.49E+00
40,000	2,021	3.58E+00

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Attachment 2

DCGL MDC Table

Nuclide	Soil 8.73 mrem/yr (pCi/g)	10% MDC DCGL	50% MDC DCGL	Easy to Detect?
Co-60	1.4E+00	1.4E-01	7.0E-01	ETD
Nb-94	2.5E+00	2.5E-01	1.3E+00	ETD
Ag-108m	2.5E+00	2.5E-01	1.3E+00	ETD
Sb-125	1.1E+01	1.1E+00	5.6E+00	ETD
Cs-134	1.7E+00	1.7E-01	8.7E-01	ETD
Cs-137	3.0E+00	3.0E-01	1.5E+00	ETD
Eu-152	3.6E+00	3.6E-01	1.8E+00	ETD
Eu-154	3.3E+00	3.3E-01	1.7E+00	ETD
Eu-155	1.4E+02	1.4E+01	6.9E+01	ETD
Am-241	1.0E+01	1.0E+00	5.1E+00	ETD
H-3	1.3E+02	1.3E+01	6.4E+01	HTD
C-14	1.9E+00	1.9E-01	9.7E-01	HTD
Fe-55	1.0E+04	1.0E+03	5.1E+03	HTD
Ni-63	2.8E+02	2.8E+01	1.4E+02	HTD
Sr-90	6.0E-01	6.0E-02	3.0E-01	HTD
Tc-99	5.0E+00	5.0E-01	2.5E+00	HTD
Pu-238	1.2E+01	1.2E+00	5.8E+00	HTD
Pu-239	1.1E+01	1.1E+00	5.3E+00	HTD
Pu-241	3.4E+02	3.4E+01	1.7E+02	HTD
Cm-243	1.1E+01	1.1E+00	5.6E+00	HTD

To: YNPS-FSSP-OOL-14-01 **Date:** 11 October 2006
From: R. Tozzie
Subject: Sample Relocation

The FSS survey team working survey unit OOL-14-01 reported that sample locations OOL-14-01-002-F, OOL-14-01-009-F and OOL-14-01-015-F were not accessible for survey. In accordance with DP-8856 "Preparation of Survey Plans", when a sample location within a Class 3 survey unit is inaccessible, an alternate sample location is determined by use the random selection process to select a replacement point anywhere within the survey unit. Using the guidance in DP-8856, alternate sample locations were designed. Three new locations were located and used to replace the samples that could not be accessed. The three new sample locations were designated as OOL-14-01-020-F, OOL-14-01-021-F and OOL-14-01-022-F.