GPU NUCLEAR

GPU Nuclear, Inc.
Three Mile Island
Nuclear Station
Route 441 South
Post Office Box 480
Middletown, PA 17057-0480
Tel 717-948-8461

June 22, 2005
E910-05-025

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

Gentlemen,

Subject Saxton Nuclear Experimental Corporation (SNEC)
Operating License No., DPR-4
Docket No. 50-146
FSS Report for Open Land Area OL11

The purpose of this letter is to submit for your review the attached FSS Report for Open Land Area OL11. One CD-ROM is included in this submission. The CD-ROM labeled: "FSS Report for Open Land Area OL11 – Publicly Available" contains the following 5 files:

Document Title	File Name	File Size (Mbytes)
Main Report	001 FSS Report – OL11.pdf	1.05
Appendix A (pages 1 to 9)	002 OL11 – Appendix A (1-9).pdf	33.8
Appendix A (attachments 1-1 to 4-3)	003 OL11 – Appendix A (attachments 1-1 to 4-3).pdf	37.9
Appendix A (attachment 5-1 to 9-2)	004 OL11 – Appendix A (attachments 5-1 to 9-2).pdf	43.4
Appendix B to Appendix C	005 OL11 – Appendix B to Appendix C.pdf	20.8

If you have any questions on this information, please contact Mr. Art Paynter at (814) 635-4384.

Sincerely,

G. A. Kuehn

Program Director, SNEC

cc: NRC Project Manager
NRC Project Scientist, Region 1
Mr. Tim Bauer, ORISE Project Leader

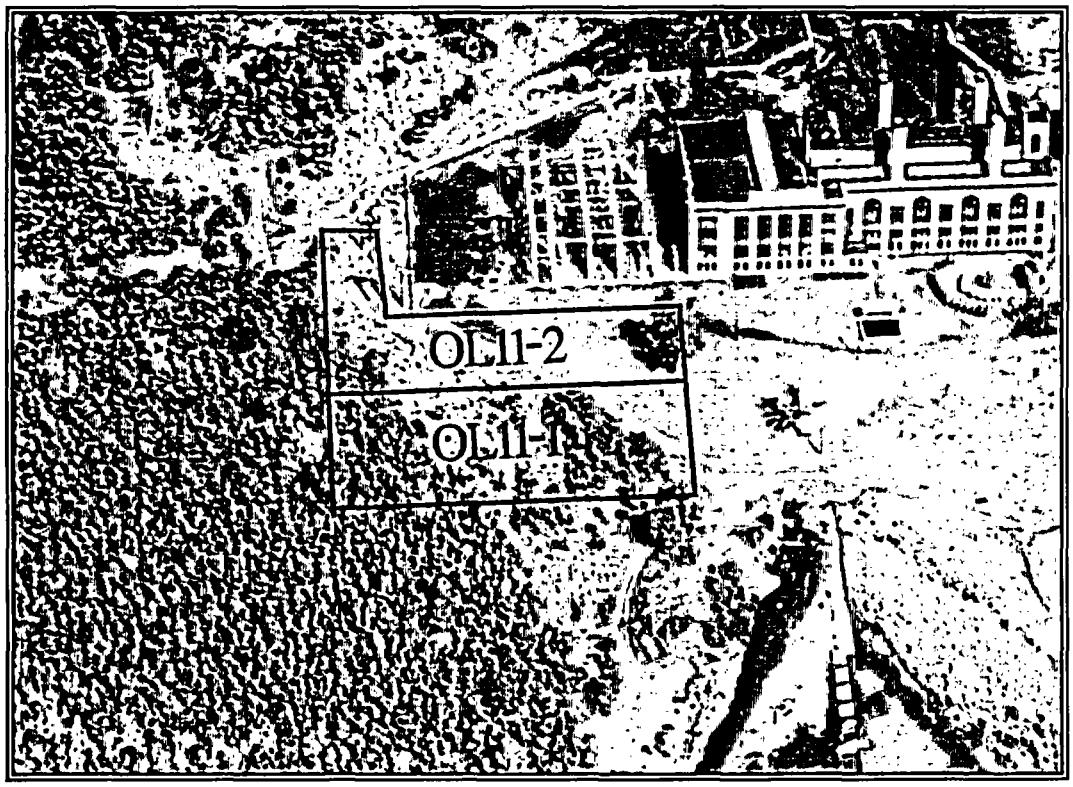
A020

Final Status Survey Report

For

Saxton Nuclear Experimental Corporation

Open Land Area Survey Units, OL11-1 and OL11-2



The Saxton Coal Fired Steam Generating Station - Photo from Operational Period Showing Approximate Location of the OL11-1 and OL11-2 Open Land Area Survey Units

Prepared by GPU Nuclear, Inc.

June 2005

Table of Contents

List of Figures

List of Tables

Executive Summary

This report presents the results and conclusions of the Final Status Survey (FSS) conducted by GPU Nuclear, Inc. within the SNEC facility OL11 open land area (survey units OL11-1 and OL11-2). This report provides summary results from volumetric scanning and sampling of soils within OL11. This survey work began April of 2005 and concluded May 2005. All survey work was performed in accordance with the SNEC License Termination Plan (LTP) **(Reference 9.1)**.

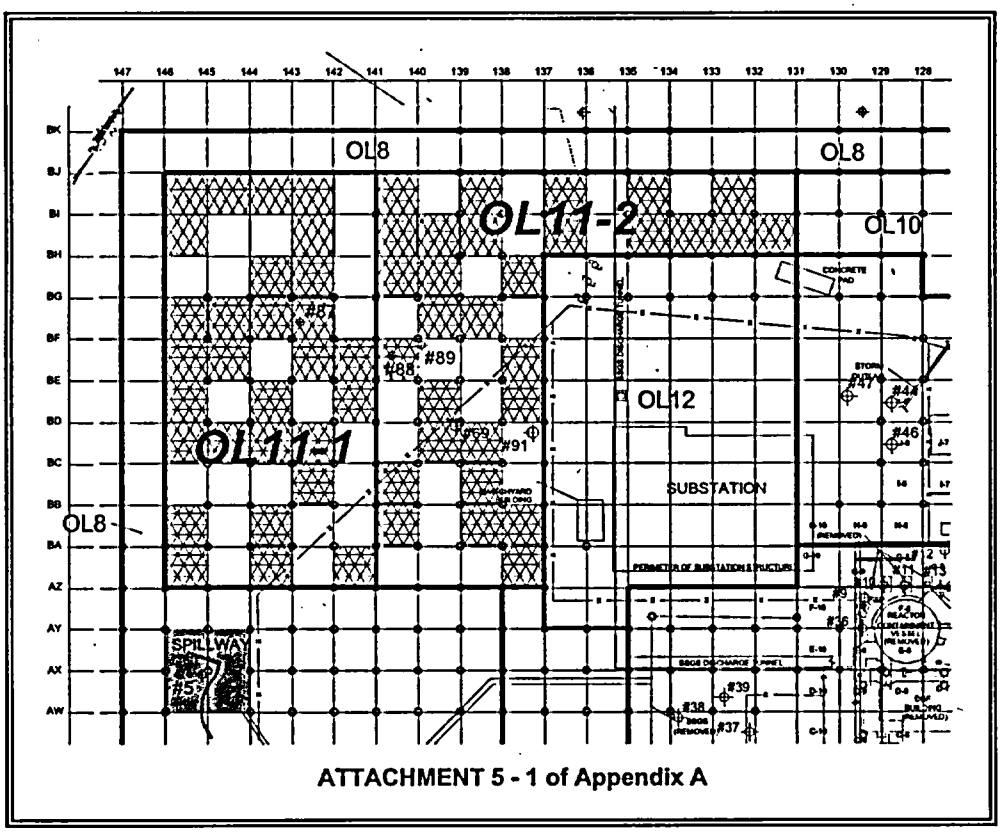


Figure 2, SNEC Facility site area grid map showing the location of survey units OL11-1 and OL11-2. Each shaded grid location was selected randomly for scanning (each grid is 100 m^2).

Survey data was collected from the OL11-1 and OL11-2 survey units according to data collection requirements specified in the OL11 survey design **(Reference 9.2** and **Appendix A)**. **Appendix A** also includes the survey design for the OL12-1 survey unit, which is not discussed in this report, but will be included in a report to follow.

During FSS activities, the following types of measurements were performed on materials found within the OL11 survey area.

1. NaI detector scanning measurements were performed in approximately 2,876 m^2 of the OL11-1 survey unit, and in about 2,986 m^2 of the OL11-2 survey unit. These survey units are Class 2 open land areas, which are required to have a scan coverage between 10 and 100% in accordance with **Reference 9.1**, Table 5-5.

2. A total of seventeen (17) soil/soil-like samples were obtained from each survey unit using the random start, triangular grid systematic spacing methodology. In addition, two (2) quality control samples were taken in each survey unit. These samples were analyzed by gamma-ray spectroscopy to determine the presence of radionuclides typical of the SNEC facility. Cs-137 is used as the surrogate radionuclide of interest.

FSS scan survey results were less than the action level for the applicable DCGLw in both survey units. All soil and soil-like material samples taken at all sampling depths were below the applicable DCGLw. Therefore, this collection of FSS data demonstrate that this survey unit meets the radiological criteria for unrestricted use specified in 10 CFR 20.1402 **(Reference 9.3)**.

Based on the results of this final status survey effort, GPU Nuclear, Inc. concludes that the OL11 open land area meets the NRC requirements for release to unrestricted use.

1.0 Purpose and Scope

This report presents the results and conclusions of the final status survey performed on the following area:

- Open Land Survey Units (OL11-1 and OL11-2) – Class 2 open land area

This survey effort provides the information required by 10 CFR 50.82(a)(11) **(Reference 9.4)** and SNEC's License Termination Plan (LTP), and demonstrate that this area meets the radiological criteria for unrestricted use specified in 10 CFR 20.1402.

2.0 Survey Area Description

The northwest open land area (OL11) is approximately 10,200 square meters in total area and is designated a Class 2-survey area because of location and early scoping and characterization survey results. OL11 is contained within the area enclosed by site grid markers AZ-146 and BJ-146 on the west, and on the east by grid markers AZ-137, BH-137, and BH-131 through BJ-131 **(Reference 9.5)**.

OL11 is divided into two- (2) survey units (OL11-1 and OL11-2) which are sparsely covered with grass, trees, and small shrubs. The area soil contains a significant quantity of Saxton Steam Generating Station (SSGS) fly ash and coal dirt. An unpaved road passes through OL11 and along the PENELEC property fence line. The roadway composition is the same as the surrounding soil/soil-like materials.

3.0 Operating History

3.1 OL11 Area Use

No significant historical facts are reported about the OL11 open land area in the SNEC Historical Site Assessment (HSA) **(Reference 9.6)**. However, old photographs of the area seem to show earth moving activities in or near the area, which may have been connected with the periodic dredging of the Spray Pond. This information is however, unconfirmed.

Scoping and characterization activities have identified low levels of Cs-137 contamination in soil samples from this area at or near background levels, but no significant levels of other SNEC related radionuclides have been found.

3.2 OL11 Open Land Area Remediation Status

Since all previous sample analysis results have been below the DCGLw, and no remediation has been performed in the area. The OL11 open land area meets the definition of a Class 2-survey area (from **Reference 9.1, Section 5.4.2**)

3.3 SNEC Facility Operating History

The Saxton Nuclear Experimental Corporation (SNEC) facility featured a pressurized water reactor (PWR), which was licensed to operate at 23.5 megawatts thermal (23.5 MWth). The facility is owned by the Saxton Nuclear Experimental Corporation and is licensed by GPU Nuclear, Inc. The SNEC facility is maintained under a Title 10 Part 50 license and associated Technical Specifications. In 1972, the license was amended to possess but not operate the SNEC reactor.

The facility was build from 1960 to 1962 and operated from 1962 to 1972, primarily as a research and training reactor. After shutdown in 1972, the facility was placed in a condition equivalent to the current SAFSTOR status. Since then, it has been maintained in a monitored storage condition. The fuel was removed in 1972 and shipped to a (now DOE) facility at Savannah River, South Carolina, who is now the owner of the fuel. As a result of this, neither SNEC nor GPU Nuclear, Inc. has any further responsibility for the spent fuel from the SNEC facility.

The reactor, containment vessel and support buildings have all been removed from the site. The building and structures that supported reactor operation were partially decontaminated by 1974. In the late 1980's and through the 1990's, additional decontamination, disassembly and removal of the containment vessel support buildings, large and small components and other miscellaneous support equipment was complete. By 1992 decontamination and dismantlement of the reactor support structures was complete. Large components such as the pressurizer, steam generator, and reactor vessel were removed in late 1998. The removal of the steel Containment Vessel (CV) (to ~ 4' below grade), and backfill was complete by late 2003. More recently, decontamination, disassembly and demolition of the remaining SNEC facility buildings including remnants of the coal fired Saxton Steam Generating Station (SSGS) has taken place. The SNEC facility is currently in the process of performing the Final Status Survey for unrestricted release leading to license termination.

4.0 Site Release Criteria

The site release criteria as applied to the OL11 open land area, corresponds to the radiological dose criteria for unrestricted use per 10 CFR 20.1402. The dose criteria is met "if the residual radioactivity that is distinguishable from background radiation results in a Total Effective Dose Equivalent (TEDE) to an average member of the critical group that does not exceed 25 mrem/yr, including that from groundwater sources of drinking water; and that the residual radioactivity has been reduced to levels that are as low as reasonably achievable (ALARA)."

Levels of residual radioactivity that correspond to the allowable dose and meet site or survey unit release criteria were derived by analyses using either the building occupancy (surface area) or resident farmer (volumetric) scenarios. The dose modeling for these scenarios is explained in Chapter 6 of the SNEC LTP, Revision 3. The derived concentration guideline levels (DCGLs) determined in the LTP form the basis for satisfying the site release criteria.

As described in Chapter 6 of the SNEC LTP (**Reference 9.1**), a correction to the gross activity DCGLw is made to address de-listed radionuclides and provide a reasonable SNEC established safety factor. The SNEC facility has instituted an administrative limit of 75% for the allowable dose (DCGL) for all measurement results. Thus the de-listed radionuclide dose is accounted for by using the 75% administrative limit.

4.1 OL11 Area Specific DCGLw Values

Not counting quality control samples (QC), at least eighty samples were taken in and near the OL11 area during the most recent characterization campaign. Most of these results were at or near background levels for Cs-137, exhibiting a mean concentration of 0.64 ± 0.47 pCi/g (see **Appendix A, Attachment 8-1**). The maximum concentration found in this area during this characterization effort was 2.0 pCi/g. Samples taken during an earlier but much more limited characterization effort were sent to an off-site laboratory for a more complete analysis. The highest concentration from this earlier sample group was reported to be 2.34 pCi/g Cs-137, which is below the DCGLw (SNEC Sample No. SXSL0087 was sent to Teledyne, October 1999). These early analyses include all SNEC facility related radionuclides (see **Appendix A, Attachment 2-1** to **2-3**). Off-site analysis results of samples taken from or near the OL11 area were pooled to create a conservative mix for this area. Since OL11 Cs-137 concentrations are at or near background levels, the relative

ratios between trace amounts of hard-to-detect radionuclides that include natural occurring radionuclides such as C-14, are not necessarily in their expected site-specific proportions. However, no effort was made to remove background levels from any radionuclide concentration, and therefore the effective DCGLw for the OL11 area is conservatively derived. The effective DCGLw values are provided in Table 1 below. See **Appendix A, Attachment 2-1** to **2-3** for the development of these effective DCGLw values.

Table 1, OL11 – DCGLw VALUES

Volumetric DCGLw (pCi/g) for Cs-137
3.22 (2.41 A.L.)

NOTE: A.L. is the site Administrative Limit (75% of the effective DCGLw for the area).

5.0 Final Status Survey Design/DQO Process

Survey Designs (SD's) (**Appendix A**) are developed IAW applicable sections of the SNEC License Termination Plan (LTP) and site procedures (**Reference 9.7**). During development, characterization activities are reviewed along with any post-remediation survey or sampling activities (as applicable). Survey unit variability is established from the best available or most representative measurement and/or sampling result. The Compass computer program (**Reference 9.8**) is then used to develop MDCscan parameters (for structural surfaces), the number of survey or sampling points in each survey unit, and other DQO design parameters. For open land areas, methodology from NUREG-1507 (**Reference 9.9**) is used to calculate MDCscan values that are then input to the Compass computer program. For structural surfaces, representative background values are extracted from previous measurements of non-impacted like-materials of similar age whenever possible. For open land areas, background concentrations of relevant SNEC radionuclides are not subtracted from sample data sets prior to developing individual survey unit surrogate levels (of Cs-137). Thus the effective DCGLw values for open land areas are conservatively biased.

For most survey units, the number of Compass calculated sample and/or survey locations are augmented to provide *"more than the minimum required coverage"*. Sample and/or survey point locations are plotted on drawings of individual survey areas using the Visual Sample Plan (VSP) computer code (**Reference 9.10**). Diagrams showing sample and/or survey point locations are clearly depicted on survey maps along with any necessary physical dimensions from known site area landmarks. Diagrams are then provided to

individual survey teams through the use of the Survey Request (SR's) procedure process (**Reference 9.11**). SR's are issued as field working guidance documents. All SD's and SR's are reviewed and approved by the SNEC RSO (or his representative) before implementation. Data Quality Objectives (DQO's) for the OL11 area are presented in the following table.

Table 2, DQO/Design Parameters/Results

Survey Unit	OL11
SNEC Design Calculation. No.	E900-05-021 (Appendix A)
SNEC Survey Request No. (for FSS work)	SR-0209 & SR-210
Survey Area Classification	2
Total Area Size (m^2)	10,200
Scanning Goal (m^2)	5,100 (50% of total area)
Actual Combined Area Scanned (m^2)	~5,822 (~57%)
Applicable Statistical Test	Sign
Type I Decision Error (α)	0.05
Type II Decision Error (β)	0.10
Effective Soil $DCGL_w$ (Cs-137 pCi/g)	2.41 (Administrative Limit)
LBGR (Cs-137 pCi/g)	1.7 (Appendix A, Attachment 6-2)
Estimated σ (Cs-137 pCi/g)	0.468
Δ/σ	1.52
Minimum No. of FSS Samples Required by Compass	14 (Appendix A, Attachment 6-2, OL11-1)
Minimum No. of FSS Samples Required by Compass	14 (Appendix A, Attachment 6-5, OL11-2)
No. of Sample Locations Specified by VSP***	17 (Appendix A, Attachment 7-1, OL11-1)
No. of Sample Locations Specified by VSP***	17 (Appendix A, Attachment 7-1, OL11-2)
No. of FSS Surface Samples taken to 1 meter depth	27 (OL11-1 & OL11-2 combined)
No. of FSS Surface Samples Taken to 6" depth (interference*)	7 (OL11-2)
Highest From Either Survey Unit During FSS (pCi/g Cs137)	0.87
Estimated Scan MDC - Soil/Soil-Like Materials (Cs-137 pCi/g)	~5.97 (Appendix A, Attachment 4-2 & 4-3)
Scan Speed for Soil and Soil-Like Materials (cm/sec)	25
NaI Action Level During Scanning (FSS)	> 350 gcpm = ~ 6 pCi/g Cs-137 at 200 cpm bkgnd
No. of Alarm Points During Scanning Process	One (1) in OL11-2
No. of Samples Taken During Characterization in or Near Area	> 80
Typical NaI Background Level (cpm)	~200 to 300
Survey Instrument Type (narrow window optimized for Cs-137)**	Ludlum 2350-1 w/44-10 NaI probe
Instrument Conversion Efficiency (cpm/mR/h)	≥ 209, 000 (Cs-137 window)
Measurement Protocol	2" by 2" NaI scans and samples

* Switch Yard grounding mat

** The narrow window detector setting improves the signal to noise ratio for Cs-137.

*** The VSP computer code is used to place sample locations on survey diagrams – extra points are added to ensure that losses due to obstructions, etc. can be compensated for early in the survey/sampling process.

5.1 Description of Survey Unit

Figure 2 shows that the OL11 area is approximately 10,200 square meters in total area. Native soil, cinders, coal ash, with some small quantities of building debris make up the composition of material in this area. The OL11 area borders the PENELEC Switch Yard on the west and northern sides and a dirt road, which runs along the perimeter of the PENELEC fence line passes through this area. The area is accurately depicted as a Class 2 survey unit.

5.2 Survey Design for the OL11 Open Land Area

The survey design for OL11 is provided as Appendix A. Since OL11 is a Class 2 open land area, the initial scanning goal was set at 50% of the total area. Therefore, fifty one (51) 100 m^2 grid areas were randomly chosen yielding 5,100 square meters scan area. Eight (8) additional randomly chosen grid areas were provided in the survey design in event one or more of the original set of fifty one (51) were not accessible because of existing obstructions. 100% of each grid was to be scanned. This assignment is in accordance with **Reference 9.1**, Table 5-5.

The number of random start, triangular grid, systematically spaced sample points were determined using the COMPASS computer program. The minimum number of sample points selected by Compass was fourteen (14) for each survey unit. Each sample was to be one meter in depth to match the site area dose model discussed in Chapter 6 of the SNEC LTP (**Reference 9.1**).

All sample points were placed on survey maps of the OL11 area using the Visual Sample Plan (VSP) computer code (**Reference 9.10**).

6.0 Final Status Survey Results

6.1 Summary of Survey Results for OL11

From **Appendix B** and **C**, approximately 57% of the total OL11 area was scanned during FSS activities. This scanning effort exceeded the requirements of the survey design, and since FSS scanning requirements for a Class 2 open land area are typically 10 to 100%, the total scanned area in OL11 is considered adequate. Instrument response above 350 gcpm was used as the action level during the FSS scanning effort. One (1) instrument alarm was encountered in grid BD-138 with a stationary count rate of about 370 gcpm. A sample at the alarm point yielded a Cs-137 concentration of 0.15 pCi/g. Three additional

samples taken to bound the approximately 0.1 m^2 area alarm point, yielded < 0.072, < 0.2 and 0.11 pCi/g Cs-137. These results show that the areas natural occurring radionuclides elevate background levels in the Cs-137 window setting of the survey instrument. Therefore, there was no sample analysis result from any sampling effort (scoping, characterization or FSS), that yielded a value above the DCGLw in either survey unit. Worth noting is that during characterization activities in this area, the action level was set at 300 gross counts per minute (gcpm), which is at or near background levels. This resulted in a number of samples being taken based on exceeding an alarm point driven solely by background levels. As expected, sample results from these alarm points were all below the applicable DCGLw, and alarms were attributed to elevated concentrations of naturally occurring radionuclides.

In all, well over one hundred (100) characterization and FSS samples have been taken in the OL11 area. During one early scoping survey result a Cs-137 concentration of 2.34 pCi/g was identified (SNEC sample SXSL0087, assayed by Teledyne, October 1999). However, all sample analysis results, including scoping, characterization and the current FSS sampling effort have been below the effective DCGLw for Cs-137.

FSS sample data are provided in Table 3 and 4 below. The variability of the samples identified in Table 3 and 4 are below the initial variability estimate used during the survey-planning phase (see Table 2 initial sigma value).

Table 3, Random Start, Triangular Grid, Systematically Spaced Soil Samples

OL11-1 Sample Results

	Sample No.	Grid No.	Sample Point	Cs-137 (pCi/g)	Sample Depth
1	SXSL10236	AZ-145	SP-1	0.08	1 meter
2	SXSL10237	BA-146	SP-3	[illegible]	1 meter
3	SXSL10238	BA-144	SP-4	0.10	1 meter
4	SXSL10239	AZ-143	SP-2	0.23	1 meter
5	SXSL10240	AZ-143	SP-2 (QC)	[illegible]	1 meter
6	SXSL10241	BA-142	SP-5	[illegible]	1 meter
7	SXSL10242	BC-145	SP-6	0.23	1 meter
8	SXSL10243	BC-143	SP-7	0.13	1 meter
9	SXSL10244	BD-146	SP-8	[illegible]	1 meter
10	SXSL10245	BD-144	SP-9	0.17	1 meter
11	SXSL10246	BD-142	SP-10	0.12	1 meter
12	SXSL10247	BF-145	SP-11	0.26	1 meter
13	SXSL10248	BF-143	SP-12	0.21	1 meter
14	SXSL10249	BH-146	SP-13	0.18	1 meter
15	SXSL10250	BH-144	SP-14	0.14	1 meter
16	SXSL10251	BH-142	SP-15	[illegible]	1 meter
17	SXSL10252	BI-145	SP-16	0.07	1 meter
18	SXSL10253	BI-143	SP-17	0.11	1 meter
19	SXSL10254	BI-143	SP-17 (QC)	0.24	1 meter
	[illegible]		Average⇒	0.15	[illegible]
			Sigma⇒	0.06	
			Maximum⇒	0.26	

Table 4, Random Start, Triangular Grid, Systematically Spaced Soil Samples

OL11-2 Sample Results

	Sample No.	Grid No.	Sample Point	Cs-137 (pCi/g)	Sample Depth
1	SXSL10191	BH-132	SP-17	0.19	6" Deep
2	SXSL10192	BI-133	SP-16	0.70	6" Deep
3	SXSL10193	BH-134	SP-15	0.28	6" Deep
4	SXSL10194	BI-136	SP-14	0.87	6" Deep
5	SXSL10195	BI-136	SP-14 QC	0.61	6" Deep
6	SXSL10196	BH-137	SP-13	0.19	6" Deep
7	SXSL10197	BI-138	SP-12	0.14	1 meter
8	SXSL10198	BI-140	SP-11	0.07	1 meter
9	SXSL10199	BH-139	SP-10	0.69	1 meter
10	SXSL10200	BH-141	SP-9	[illegible]	1 meter
11	SXSL10201	BF-138	SP-8	0.27	6" Deep
12	SXSL10202	BF-140	SP-7	0.18	1 meter
13	SXSL10203	BF-140	SP-7 QC	0.08	1 meter
14	SXSL10204	BD-141	SP-5	[illegible]	1 meter
15	SXSL10205	BD-139	SP-6	[illegible]	1 meter
16	SXSL10206	BB-138	SP-4	0.30	6" Deep
17	SXSL10207	BB-140	SP-3	0.86	1 meter
18	SXSL10208	AZ-139	SP-2	[illegible]	1 meter
19	SXSL10209	AZ-141	SP-1	0.13	1 meter
	[illegible]		Average⇒	0.32	[illegible]
			Sigma⇒	0.28	
			Maximum⇒	0.87	

Note: Shaded results were reported as "Less Than" values.

One alarm point was reached in the OL11-2 survey unit. The alarm was reported to be about 370 gcpm, which is only slightly above the alarm set-point of 350 gcpm. The alarm point was investigated by sampling the elevated area and several other locations at a one (1) meter radius around the alarm point. The sample results are provided below in Table 5.

Table 5, Alarm Point Investigation Results - Soil Samples

OL11-2 Alarm Point Investigation Results

Sample No.	Grid No.	Sample Point	Cs-137 (pCi/g)	Sample Depth
SXSL10492	BD-138	SP-1	0.11	1 meter
SXSL10493	BD-138	SP-2	0.21	1 meter
SXSL10494	BD-138	SP-3	0.07	1 meter
SXSL10495	BD-138	AP-1	0.15	1 meter

Note: Shaded results were reported as "Less Than" values.

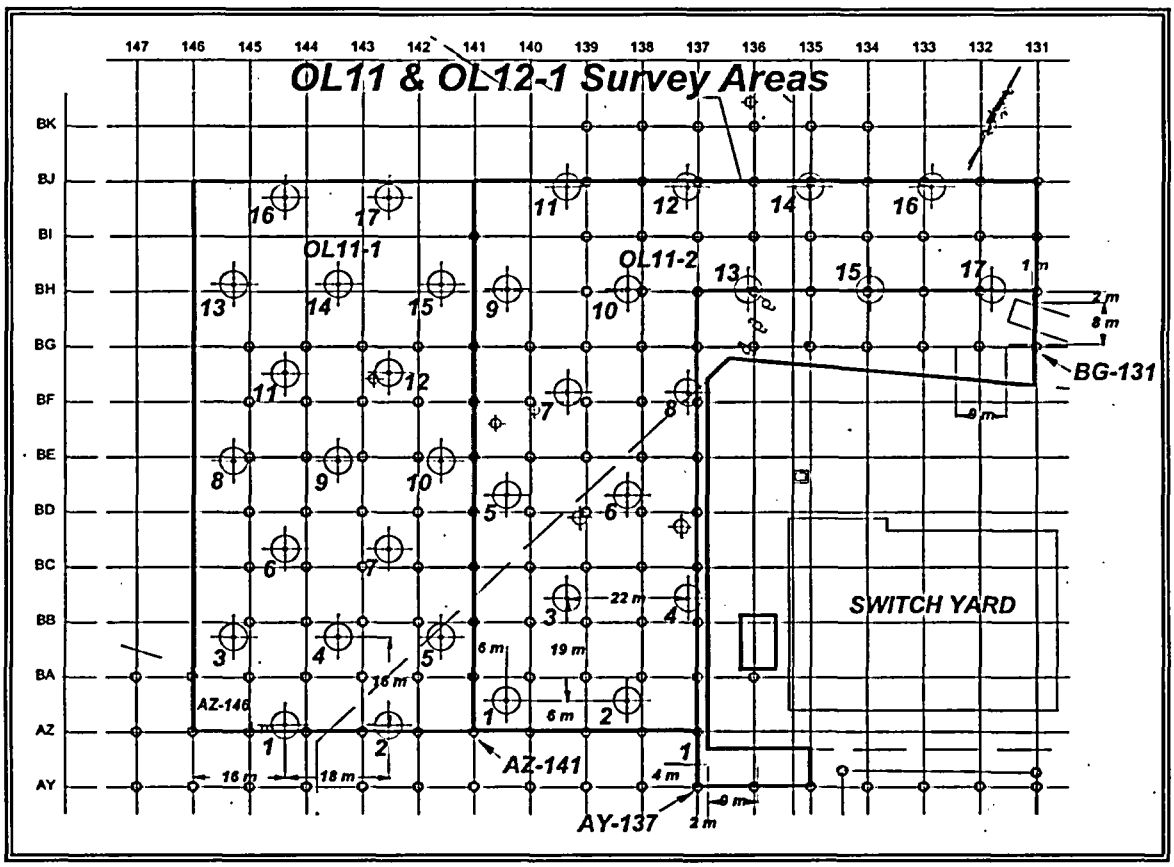
Since all analysis results for Cs-137 were below the DCGLw, and are more characteristic of typical background Cs-137 concentrations, no additional samples were taken.

6.2 Survey and Sample Locations

Scanning was conducted in randomly selected grid locations. A goal of 50% of the total area was assigned in the survey design, and additional grid locations were provided in the event that some or parts of other grid areas were not accessible to survey team personnel. Figure 2 provides the randomly selected grid locations for OL11.

From the VSP computer code output **(Reference 9.10)**, seventeen sample points were placed in each survey unit as shown on the diagram of Figure 3. Each location, with the exception of four (4), eight (8), and sample point thirteen (13) through five (17) in OL11-2, were sampled to a depth of one (1) meter. However, the PENELEC Switch Yard area contains a grounding mat at an original depth of about sixteen (16") inches below the surface (over time this depth has changed up or down in some areas). SNEC personnel were not permitted to disrupt or damage this important component of the Switch Yard grounding circuit. Therefore, sampling in the region of the grounding mat was limited to the upper few inches of sample material available. Figure 3 on the following page provides the locations selected for sampling using a triangular grid systematic spacing methodology.

Figure 3, Random Start, Triangular Grid, Systematic Spacing Sample Points



7.0 Data Assessment

7.1 Assessment Criteria

Final status survey data has been reviewed to verify authenticity, appropriate documentation, quality, and technical acceptability. The review criteria for data acceptability are:

1) The instruments used to collect the data were capable of detecting the radiation of the radionuclide of interest at or below the investigation levels.

2) The calibration of the instruments used to collect the data was current and radioactive sources used for calibration were traceable to recognized standards or calibration organizations.

3) Instrument response was checked before, and when required, after instrument use each day data was collected.

4) Survey team personnel were properly trained in the applicable survey techniques and training was documented.

5) MDC values and the assumptions used to develop them were appropriate for the instruments and the survey methods used to collect the data.

6) The survey methods used to collect the data were appropriate for the media and types of radiation being measured.

7) Special instrument methods used to collect data were applied as warranted by survey conditions, and were documented in accordance with an approved site Survey Request procedure.

8) The custody of samples that were sent for off-site analysis was tracked from the point of collection until final results were provided.

9) Final status survey data consists of qualified measurement results representative of current facility status and were collected in accordance with the applicable survey design package.

If a discrepancy existed where one or more criteria were not met, the discrepancy was reviewed and corrective action taken (as appropriate) in accordance with site procedures.

7.2 Survey Variations (Design, Survey Request, LTP)

7.2.1 5,100 square meters of the OL11 area were randomly selected for scanning. About 400 square meters of survey area were inaccessible in the randomly selected primary grid areas. However, supplemental randomly selected grid locations were provided in the survey design and in some cases, these supplemental grid areas were included in the scan coverage for the area. Therefore, about 57% of the OL11 open land area was scanned, which is well within coverage requirements for a Class 2-survey unit in accordance with the SNEC LTP, Table 5-5 **(Reference 9.1)**.

7.2.2 The following Table provides a list of grid numbers that were partially scanned.

Table 6, OL11 Grid Areas Unavailable for Scanning Survey (m^2)

Grid No. (OL11-1)	Approximate Area Size	Obstruction
AZ-142	1.2 m^2	Standing Trees
AZ-144	0.8 m^2	Standing Trees
AZ-146	0.5 m^2	Standing Trees
BA-146	1 m^2	Standing Trees
BA-143	3 m^2	Standing Trees
BE-145	1.1 m^2	Standing Trees
BE-146	1 m^2	Standing Trees
BF-143	0.3 m^2	Standing Trees
BF-144	0.6 m^2	Standing Trees
BF-145	0.8 m^2	Standing Trees, Brush
BF-146	1.9 m^2	Standing Trees, Fallen Trees, Brush & Stones
BG-143	2 m^2	Standing Trees
BG-144	0.2 m^2	Standing Trees & Brush
BH-143	2.1 m^2	Standing Trees & Brush
BH-146	1.8 m^2	Standing Trees, Fallen Trees, Brush & Stones
BI-143	2 m^2	Standing Trees, Brush & Stones
BI-144	0.2 m^2	Trees & Brush
BI-145	2.8 m^2	Standing Trees, Fallen Trees, Brush & Stones
BI-146	0.7 m^2	Trees & Brush
Grid No. (OL11-2)	**Approximate Area Size**	**Obstruction**
BA-139	1 m^2	Standing Trees
BA-141	1.8 m^2	Standing Trees
BC-139	0.4 m^2	Standing Trees
BG-138	1 m^2	Rocks
BG-141	1.5 m^2	Standing Trees
BH-139	1 m^2	Standing Trees
BH-140	1.8 m^2	Standing Trees
BH-141	1.2 m^2	Standing Trees
BI-133	0.01 m^2	Standing Trees
BI-135	0.04 m^2	Concrete Wall
BI-137	0.4 m^2	Standing Trees
BI-139	3.1 m^2	Standing Trees
BI-141	1.2 m^2	Standing Trees

NOTE: Each grid is 100 m^2 in total area.

7.2.3 Sample points four (4), eight (8), and thirteen (13) through seventeen (17) were sampled to a depth of only six (6) inches because of the presence of the PENELEC Switch Yard grounding mat. These sample locations were not relocated because there was no other reasonable points of relief in the area, away from the grounding mat. However, the OL11 survey units did not show any indications of Cs-137 contamination above the DCGLw, and the actual sample depth for these samples is considered representative of deeper soil

and soil-like materials at their selected locations. Thus the sampling effort is adequate.

7.3 Quality Control Measurements

7.3.1 Two (2) Quality Control (QC) samples were taken in each OL11 survey unit. The SNEC LTP requires gamma-ray spectrometry scans of sample splits at a minimum frequency of at least 1 QC sample for every 20 samples collected (5%). Results for the two- (2) samples collected per survey unit are in reasonably good agreement, and represent normal background variations between sample volumes from the site. All QC sample results are below the assigned OL11 DCGLw. See Table 7 below.

Table 7, OL11 QC Sample Comparison (Cs-137)

Grid No.	Survey Unit	Sample	Location ID	Initial pCi/g	QC Sample	QC Location ID	QC pCi/g
AZ-143	OL11-1	SXSL10239	SP-2	0.23	SXSL10240	SP-2 QC	< 0.17
BI-143	OL11-1	SXSL10253	SP-17	0.11	SXSL10254	SP-17 QC	0.24
BI-136	OL11-2	SXSL10194	SP-14	0.87	SXSL10195	SP-14 QC	0.61
BF-140	OL11-2	SXSL10202	SP-7	0.18	SXSL10195	SP-7 QC	0.08

7.3.2 Sections of sixteen (16) grids were re-scanned in OL11-1, and seventeen (17) grid sections were re-scanned in OL11-2 as QC duplicates. In all, QC scanning covered approximately 330 m^2 of the OL11 area. All scan results were below the alarm point assigned by the survey design. Since the total amount of scanned area in OL11 in about 5,862 m^2, the percent of re-scanned QC area was greater than 5% (330 m^2/5,862 m^2 x 100%). Therefore, the amount of re-scanned area is adequate and meets the requirements of the SNEC LTP (> 5% of the area re-surveyed/re-sampled).

7.4 Assessment Summary

Statistical testing of the data does not need to be performed for this final status survey since the data clearly show that the survey unit(s) meet the site release criteria. These survey units clearly meet the criterion because of the following:

1. ☒ All measurements in the survey units are less than or equal to the DCGLW, or
2. ☐ A background reference area was used, and the difference between the maximum survey unit measurement and the lowest background reference area measurement are less than or equal to the DCGL.

8.0 Final Status Survey Conclusions

The FSS for the OL11 open land area (OL11) was performed in accordance with Revision 3 of the SNEC LTP and site implementing procedures. Final status survey data were collected to meet and/or exceed the quantity and quality specified for this survey unit as prescribed by the applicable survey design. The survey data for each survey unit met the following conditions:

1. The average residual radioactivity within the OL11 area is less than the assigned DCGLw.

2. Since all measurements were less than the DCGLw, no $DCGL_{EMC}$ criteria need be applied.

3. No remediation was performed to reduce levels of residual radioactivity below concentrations necessary to meet DCGLw values.

These conditions satisfy the release criteria established in the SNEC LTP and the radiological criteria for unrestricted use given in 10 CFR 20.1402. Therefore, it is concluded that the SNEC OL11 Area (OL11) as described in this report is suitable for unrestricted release.

9.0 References

9.1 SNEC License Termination Plan

9.2 SNEC Calculation E900-05-021, "OL11 & Remaining OL12 Open Land Area – Survey Design".

9.3 Code of Federal Regulations, 10 CFR 20.1402.

9.4 Code of Federal Regulations, 10 CFR 50.82(a)(11).

9.5 SNEC Facility Site Area Grid Map - Drawing Number SNECRM-020.

9.6 SNEC Facility Historical Site Assessment Report, March 2000.

9.7 SNEC Procedure E900-IMP-4500.59, "Final Site Survey Planning and DQA"

9.8 COMPASS computer program, Version 1.0.0, Oak Ridge Institute for Science and Education.

9.9 NUREG-1507, "Minimum Detectable Concentrations with Typical Radiation Survey Instruments for Various Contaminants and Field Conditions".

9.10 Visual Sample Plan computer program, Version 3.0, Battelle Memorial Institute.

9.11 SNEC Procedure E900-IMP-4520.04, "Survey Methodology to Support SNEC License Termination"

9.12 SNEC Procedure E900-ADM-4500.60 "Final Status Survey Report".

9.13 NUREG 1575 "Multi-Agency Radiation Survey and Site Investigation Manual" (MARSSIM), revision 1 August 2000