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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 OL4

The purpose of this letter is to submit for your review the attached FSS Report for Open Land Area OL4. One CD-ROM is included in this submission. The CD-ROM labeled: "FSS Report for Open Land Area OL4 – Publicly Available" contains the following 6 files:

Document Title	File Name	File Size (Mbytes)
Main Report	001 FSS Report – OL4.pdf	0.244
Appendix A (pages 1 to 8)	002 OL4 – Appendix A (1-8).pdf	39.5
Appendix A (attachments 1-1 to 5-1)	003 OL4 – Appendix A (attachments 1-1 to 5-1).pdf	17.3
Appendix A (attachment 6-1 to 6-8)	004 OL4 – Appendix A (attachments 6-1 to 6-8).pdf	14.0
Appendix A (attachment 7-1 to 9-1)	005 OL4 – Appendix A (attachments 7-1 to 9-1).pdf	20.9
Appendix B to Appendix G	006 OL4 – Appendix B to Appendix G.pdf	26.4

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 OL4



Prepared by GPU Nuclear, Inc.

June 2005

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Executive Summary

This report presents the results and conclusions of the final status survey (FSS) of the Class 1 open land areas around the Saxton Nuclear Experimental Corporation (SNEC) facility designated as OL4. This FSS includes surveys of open land areas northeast of the SNEC site and was conducted in May of 2005.

The FSS was performed in accordance with the SNEC License Termination Plan (LTP) (reference 9.3). The survey area (OL4) was divided into four survey units. Each unit consisted of relatively flat open land. Data was collected from each survey unit in accordance with the specific survey design data collection requirements. The following is a summary of the measurements performed:

- 1) Direct NaI(Tl) scans of all or part of forty-eight 100 square meter grids covering about 100% of the actual land area
- 2) Forty-four randomly located soil samples collected and then analyzed by laboratory gamma spectroscopy

Two alarm point areas were identified during scanning. Both were extensively sampled and were less than the DCGLw.

The collected FSS survey data demonstrate that the 4800 square meters of the OL4 survey area meets the radiological release criteria for unrestricted use specified in 10CFR20.1402. Therefore GPU Nuclear, Inc. concludes that the area meets the NRC requirements and may be released for unrestricted use.

1.0 Purpose and Scope

This report presents the results and conclusions of the final status survey of the open land area designated OL4 to the northeast of the SNEC facility. It provides the information required by 10CFR50.82(a)(11) and the SNEC license termination plan (LTP) to demonstrate that this area meets the radiological criteria for unrestricted use specified in 10CFR20.1402.

This report describes the radiological data collected in four Class 1 survey units of open land surface. This report only addresses the FSS performed on this specific land area designated as OL4 on reference 9.1. The format of this report follows the guidance contained in reference 9.2.

2.0 Survey Area Description

Survey Area OL4 is Class 1 impacted open land northeast of the SNEC area about 20 to 100 meters from the original SNEC plant area. The survey unit encompasses about 4800 square meters of open land. Because the area exceeds the size guidance in the SNEC LTP for Class 1 survey units (up to 2000 square meters recommended), the survey area was divided into four survey units. Layout of the survey area and individual units relative to the site layout are shown in Attachment 1-1 of Appendix A. The four survey units are discussed below. They are all Class 1 impacted survey units. The OL4 designation is taken from the drawing, reference 9.1.

Survey unit OL4-1 is an open land area in the north central section of the site. It is about 20 meters from the east edge of the original SNEC site. The survey unit is approximately 1100 square meters and is the southern section of the OL4 survey area. Appendix A contains drawings (Attachments 1-1 and 6-1) showing the layout of the survey unit.

Survey unit OL4-2 is an open land area in the north central section of the site. It is about 40 meters from the east edge of the original SNEC site and is the south-central portion of the OL4 survey area. The survey unit is approximately 1100 square meters. Appendix A contains drawings (Attachments 1-1 and 6-3) showing the layout of the survey unit.

Survey unit OL4-3 is an open land area in the north central section of the site. It is about 60 meters from the east edge of the original SNEC site. The survey unit is approximately 1200 square meters and is the north central portion of the OL4 survey area. Appendix A contains drawings (Attachments 1-1 and 6-5) showing the layout of the survey unit.

Survey unit OL4-4 is an open land area in the north central section of the site. It is about 100 meters from the east edge of the original SNEC site. The survey unit is approximately 1400 square meters and is the northeast portion of the OL4 survey area. Appendix A contains drawings (Attachments 1-1 and 6-7) showing the layout of the survey unit.

3.0 Operating History

3.1 Plant Operation

The Saxton Nuclear Experimental Corporation (SNEC) facility included a pressurized water reactor (PWR), which was licensed to operate at 23.5 megawatts thermal (23.5 MWTh). The reactor, containment vessel and support buildings have all been removed. 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 built from 1960 to 1962 and operated from 1962 to 1972 primarily as a research and training reactor. Steam from the SNEC reactor was directed to the adjacent Saxton Steam Generating Station (SSGS) to generate electricity. 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 condition. The fuel was removed in 1972 and shipped to a (now DOE) facility at Savannah River, SC, 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 building and structures that supported reactor operation were partially decontaminated by 1974.

In the late 1980s and through the 1990s, additional decontamination and disassembly of the containment vessel and support buildings and final equipment and large component removal was completed. Final decontamination and dismantlement of the reactor support structures and buildings was completed in 1992. Large component structures, pressurizer, steam generator, and reactor vessel were removed in late 1998. Containment vessel removal (to below grade) and backfill was completed in late 2003. Currently, decontamination, disassembly and demolition of the SNEC facility buildings and equipment has been completed and the facility is in the process of Final Status Survey for unrestricted release and license termination.

3.2 Survey Area Remediation Status

OL4 is an open land area that has been extensively excavated for remediation in several campaigns. Activity greater than the DCGLw was present in multiple locations throughout the survey area.

4.0 Site Release Criteria

The site release criteria applied to the open land areas of OL4 correspond to the radiological dose criteria for unrestricted use per 10CFR20.1402. 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 to meet the site or survey unit release criteria for open land were derived by analyses using a resident farmer family scenario. The dose modeling for this scenario is explained in the SNEC LTP (reference 9.3). The derived concentration guideline levels (DCGL) shown in Table 5-1 of the SNEC LTP form the basis for satisfying the site release criteria.

Residual radioactivity sample results for the soils were used to calculate a surrogate Cs137 DCGL. The adjusted surrogate DCGL was developed using the methodology described in the SNEC LTP section 5.2.3.2.3 based on nuclide specific DCGLs from Table 5-1 of the LTP.

An adjustment was made to the surrogate Cs137 DCGL to address the de-listed radionuclides as described in the LTP section 6.2.2.3. SNEC has instituted an administrative limit of 75% of the DCGL for all measurement results. The de-listed radionuclides are conservatively accounted for in this 25% reduction since the de-listed radionuclides were only 4.7% of the dose contribution. These adjustment factors are discussed in section 6 of the SNEC LTP.

5.0 Final Status Survey Design and DQO

The SNEC calculation providing the design of the survey for these survey units is provided in Appendix A. Since all of the survey units were Class 1, scan measurements were conducted over approximately 100% of the surface of each survey unit. The number of sample points was determined by using the COMPASS computer program (reference 9.6 and attachment 7 of appendix A). These points were located on survey maps using the Visual Sample Plan program (reference 9.7 and attachment 6 of appendix A).

The survey design uses a surrogate Cs137 effective DCGL developed from radionuclide mix analyses from soil samples collected before the Final Status Survey in the vicinity of the survey unit. For all of survey area OL4 the mix was

based on radionuclide mix data (including the hard-to-detects listed in Table 5-1 of the LTP) from samples obtained from OL4-3 (attachment 2 of appendix A).

Cs137, Co60, Pu238, Pu239, and Sr90 were positively detected and are accounted for in the adjusted surrogate DCGL. The following table (Table 1) presents the Data Quality Objectives (DQO) and other relevant information from the survey design package.

Table 1 – DQO/Design

DQO/Design Parameter	OL4-1	OL4-2	OL4-3	OL4-4
SNEC Design Calc. #	E900-05-019	E900-05-019	E900-05-019	E900-05-019
MARSSIM Classification	1	1	1	1
Survey Unit Area (m ²)	1100	1100	1200	1400
Statistical Test	Sign	Sign	Sign	Sign
Type 1 decision error (α)	0.05	0.05	0.05	0.05
Type 2 decision error (β)	0.1	0.1	0.1	0.1
LBGR (pCi/gm)	3.84	3.84	3.84	3.84
Estimated σ (pCi/gm)	0.32	0.32	0.32	0.32
Relative Shift (Δ/σ)	3.0	3.0	3.0	3.0
Number of static points	11	11	11	11
DCGLw (Cs137 pCi/gm)	6.46	6.46	6.46	6.46
75% Action Level(pCi/gm)	4.8	4.8	4.8	4.8
Scan MDC (pCi/gm)	6.2	6.2	6.2	6.2
SNEC Survey Request #	SR226	SR227	SR228	SR229
Scan Survey Instrument	L2350-1 w/ 44-10	L2350-1 w/ 44-10	L2350-1 w/ 44-10	L2350-1 w/ 44-10

6.0 Final Status Survey Results

The following sections provide the survey summary results for each survey unit as required by the respective design. Summary data was taken from references 9.10, 9.11, 9.12, and 9.13 which are filed in the SNEC history files.

6.1 Survey Unit OL4-1

6.1.1 Scan survey

Scan measurements were made in 11 grids using a 2 inch by 2 inch NaI detector with an MDCscan of 6.2 pCi/gm (attachment 4 of appendix A). The Action Level was 4.8 pCi/gm and the adjusted surrogate Cs137 DCGLw for this survey unit was 6.46 pCi/gm (table 1, page 2 of appendix A). The area factor can be used to compare the MDCscan to the DCGLw. In this case, the MDCscan was below the DCGLw (but above the Action Level) so no sample number adjustment was needed.

Of the 11 grids in the survey unit, all the area was scanned. This results in approximately 1100 square meters actually scanned in the 1100 square meter survey unit, or 100 percent.

The scans conducted in all 11 grids did not identify any activity in the soils greater than the MDCscan. The action level was >175 net cpm (table 2, page 2 of appendix A). No area greater than 175 net cpm was found in OL4-1.

6.1.2 Fixed point soil samples

Eleven soil sample locations were defined for the survey unit, based on a conservative relative shift of about 3.0.

None of the design fixed point soil samples in OL4-1 had results in excess of the adjusted surrogate DCGLw. The table below (Table 2) shows the Cs137 results (no other licensed isotopes were detected) for each sample, along with the mean, standard deviation and range of the soil sample data. Results that are less than MDA are assumed to be positive at the MDA value for the statistics in the table. This will overestimate the mean.

The standard deviation of the samples collected from the survey unit was less than the variability assumed in the survey design. Therefore, the assessment of variability, relative shift, and number of samples required is consistent between the survey design and the survey results. Based on this, no changes to the survey design or additional samples are required.

Table 2 - Soil sample results for OL4-1

Sample Number	Cs137 pCi/gm
1	<0.11
2	<0.13
3	0.33
4	0.16
5	0.29
6	0.22
7	<0.10
8	0.14
9	0.10
10	0.28
11	0.10
Mean	0.18
Std Dev	0.09
Min	<0.10
Max	0.33

6.2 Survey Unit OL4-2

6.2.1 Scan survey

Scan measurements were made in 11 grids using a 2 inch by 2 inch NaI detector with an MDCscan of 6.2 pCi/gm (attachment 4 of appendix A). The Action Level was 4.8 pCi/gm and the adjusted surrogate Cs137 DCGLw for this survey unit was 6.46 pCi/gm (table 1, page 2 of appendix A). The area factor can be used to compare the MDCscan to the DCGLw. In this case, the MDCscan was below the DCGLw (but above the Action Level) so no sample number adjustment was needed.

Of the 11 grids in the survey unit, all the area was scanned. This results in approximately 1100 square meters actually scanned in the 1100 square meter survey unit, or 100 percent.

The scans conducted in one of the eleven grids (BC122) did identify activity in the soils greater than the action level. The action level was >175 net cpm. One alarm point was found which measured about 1880 cpm. This exceeded the background plus the action level. The remainder of the survey unit was less than the action level.

6.2.2 Fixed point soil samples

Eleven soil sample locations were defined for the survey unit, based on a conservative relative shift of about 3.0.

None of the design fixed point soil samples in OL4-2 had results in excess of the adjusted surrogate DCGLw. The table below (Table 3) shows the Cs137 results (no other licensed isotopes were detected) for each sample, along with the mean, standard deviation and range of the soil sample data. Results that are less than MDA are assumed to be positive at the MDA value for the statistics in the table. This will overestimate the mean.

The standard deviation of the samples collected from the survey unit was less than the variability assumed in the survey design. Therefore, the assessment of variability, relative shift, and number of samples required is consistent between the survey design and the survey results. Based on this, no changes to the survey design or additional samples are required.

Table 3 - Soil sample results for OL4-2

Sample Number	Cs137 pCi/gm
1	0.68
2	0.13
3	0.12
4	<0.15
5	<0.17
6	0.1
7	0.08
8	0.27
9	<0.12
10	0.2
11	<0.17
Mean	0.20
Std Dev	0.17
Min	0.08
Max	0.68

6.2.3 Elevated measurement investigation

During scan measurements in OL4-2 grid BC122, one alarm point (in excess of the action level of 175 net cpm) was identified. The bounded area was about 1 meter in diameter. An area of about 1 square meter was defined around the alarm points to the edge where the count rate was back down to normal background. This 1 square meter, therefore is not all at the elevated activity of the alarm points (APs) but represent the area needed for the count rate to be unaffected by the elevated spots.

In order to assess the residual radioactivity in the elevated measurement areas, a sample was collected exactly at each AP location. In addition, in order to

demonstrate that the elevated area was adequately bounded by the 1 square meter area, three samples were collected at the edge of the area boundary and three about 1 meter outside of the boundary. An additional sample was collected inside of the bounded area at a point that had slightly higher count rates but did not exceed the action level. The table below (Table 4) shows the Cs137 results (no other licensed isotopes were detected) of these samples.

Table 4 – OL4-2 elevated area investigation sampling

Sample location	Activity (pCi/gm)
East AP	0.82
Boundary	1.00
Boundary	0.17
Boundary	0.43
Boundary	0.45
Boundary	<0.15
Boundary	0.37
Inside area	0.95

The AP soil sample result was well below the DCGLw and the boundary samples show that the elevated area would not extent past the defined boundary. The edge sample results are also consistent with the range of the random start fixed point samples from the survey unit. Although the SNEC dose model uses a 1 meter thick soil zone, a follow-up investigation sample was collected of approximately the top 6 inches of the soils in the immediate location of the alarm point. This sample result was also less than the DCGLw at 5.1 pCi/gm. Since the range of results of the boundary and 1 meter thick soil sampling (Table 4, <0.15 to 1.0 pCi/gm) are consistent with the survey unit sample range from Table 3 of 0.08 to 0.68 pCi/g and do not exceed the DCGLw, no elevated measurement comparison test is required.

6.3 Survey Unit OL4-3

6.3.1 Scan survey

Scan measurements were made in 12 grids using a 2 inch by 2 inch NaI detector with an MDCscan of 6.2 pCi/gm (attachment 4 of appendix A). The Action Level was 4.8 pCi/gm and the adjusted surrogate Cs137 DCGLw for this survey unit was 6.46 pCi/gm (table 1, page 2 of appendix A). The area factor can be used to compare the MDCscan to the DCGLw. In this case, the MDCscan was below the DCGLw (but above the Action Level) so no sample number adjustment was needed.

Of the 12 grids scanned, a small portion was inaccessible due to trees growing in the survey unit. Of the 12 grids, a total of about 1.25 square meters was not

scanned due to interferences. This results in approximately 1199 square meters actually scanned in the 1200 square meter survey unit, or about 99.9 percent.

The scans conducted in all 12 grids did not identify any activity in the soils greater than the MDCscan. The action level was >175 net cpm. No area greater than 175 net cpm was found in OL4-3.

6.3.2 Fixed point soil samples

Eleven soil sample locations were defined for the survey unit, based on a conservative relative shift of about 3.0.

None of the design fixed point soil samples in OL4-3 had results in excess of the adjusted surrogate DCGLw. The table below (Table 5) shows the Cs137 results (no other licensed isotopes were detected) for each sample, along with the mean, standard deviation and range of the soil sample data. Results that are less than MDA are assumed to be positive at the MDA value for the statistics in the table. This will overestimate the mean.

The standard deviation of the samples collected from the survey unit was less than the variability assumed in the survey design. Therefore, the assessment of variability, relative shift, and number of samples required is consistent between the survey design and the survey results. Based on this, no changes to the survey design or additional samples are required.

Table 5 - Soil sample results for OL4-3

Sample Number	Cs137 pCi/gm
1	<0.13
2	0.21
3	<0.12
4	0.24
5	0.16
6	0.2
7	0.26
8	0.25
9	<0.21
10	<0.19
11	0.16
Mean	0.19
Std Dev	0.05
Min	<0.12
Max	0.26

6.4 Survey Unit OL4-4

6.4.1 Scan survey

Scan measurements were made in 14 grids using a 2 inch by 2 inch NaI detector with an MDCscan of 6.2 pCi/gm (attachment 4 of appendix A). The Action Level was 4.8 pCi/gm and the adjusted surrogate Cs137 DCGLw for this survey unit was 6.46 pCi/gm (table 1, page 2 of appendix A). The area factor can be used to compare the MDCscan to the DCGLw. In this case, the MDCscan was below the DCGLw (but above the Action Level) so no sample number adjustment was needed.

Of the 14 grids in the survey unit, all the area was scanned. This results in approximately 1400 square meters actually scanned in the 1400 square meter survey unit, or 100 percent.

The scans conducted in one of the fourteen grids (BF114) did identify activity in the soils greater than the action level. The action level was >175 net cpm. Two alarm points about 2 feet apart were found. They measured about 433 and 583 cpm. This exceeded the background plus the action level. The remainder of the survey unit was less than the action level.

6.4.2 Fixed point soil samples

Eleven soil sample locations were defined for the survey unit, based on a conservative relative shift of about 3.0.

None of the design fixed point soil samples in OL4-4 had results in excess of the adjusted surrogate DCGLw. The table below (Table 6) shows the Cs137 results (no other licensed isotopes were detected) for each sample, along with the mean, standard deviation and range of the soil sample data. Results that are less than MDA are assumed to be positive at the MDA value for the statistics in the table. This will overestimate the mean.

The standard deviation of the samples collected from the survey unit was less than the variability assumed in the survey design. Therefore, the assessment of variability, relative shift, and number of samples required is consistent between the survey design and the survey results. Based on this, no changes to the survey design or additional samples are required.

Table 6 - Soil sample results for OL4-4

Sample Number	Cs137 pCi/gm
1	<0.12
2	0.12
3	0.63
4	0.10
5	<0.08
6	0.23
7	<0.08
8	<0.14
9	<0.16
10	<0.13
11	<0.11
Mean	0.17
Std Dev	0.16
Min	<0.08
Max	0.63

6.4.3 Elevated measurement investigation

During scan measurements in OL4-4 grid BF114, two alarm points (in excess of the action level of 175 net cpm) were identified. The two APs were about a 2 feet apart in grid BF 114, close to the 113 grid line. The bounded area was about 2 meters in diameter with fixed sample point SP4 on the northeast edge of the boundary. An area of about 3 square meters was defined around the alarm points to the edge where the count rate was back down to normal background. This 3 square meters, therefore is not all at the elevated activity of the alarm points (APs) but represent the area needed for the count rate to be unaffected by the elevated spots.

In order to assess the residual radioactivity in the elevated measurement areas, a sample was collected exactly at each AP location. In addition, in order to demonstrate that the elevated area was adequately bounded by the 3 square meter area, three samples were collected at the edge of the area boundary. The table below (Table 7) shows the Cs137 results (no other licensed isotopes were detected) of these samples.

Table 7 – OL4-4 elevated area investigation sampling

Sample location	Activity (pCi/gm)
East AP	<0.13
West AP	<0.13
Boundary	<0.12
Boundary	0.38
Boundary	0.11

The edge samples show that the elevated area is clearly delineated by the defined boundary. The edge sample results are also consistent with the survey unit mean. Since the results of the sampling are consistent with the survey unit mean and do not exceed the DCGLw, no elevated measurements comparison test is required.

7.0 Data Assessment

7.1 Assessment Criteria

The 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) The MDCs 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 were tracked from the point of collection until final results were provided.
- 9) The 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.

The statistical test does not need to be performed for this final status survey since the data clearly show that the survey unit meets the release criteria because all measurements in the survey units are less than or equal to the DCGLw.

7.2 Summary of Overall Results

OL4-1 had no alarm points during scan surveys of 100% of the surface. Scan MDCs were adequate. Eleven triangular grid random start soil samples were all less than the DCGLw. Scan fraction and number of soil samples meets LTP and MARSSIM requirements.

OL4-2 had one alarm point in grid BC122. The alarm point area was extensively sampled and shown to be less than the DCGLw, therefore, no elevated measurement test is required. The OL4-2 survey unit area had scan surveys of 100% of the surface. Scan MDCs were adequate. Eleven triangular grid random start soil samples were all less than the DCGLw. Scan fraction and number of soil samples meets LTP and MARSSIM requirements.

OL4-3 had no alarm points during scan surveys of 99.9% of the surface. Scan MDCs were adequate. Eleven triangular grid random start soil samples were all less than the DCGLw. Scan fraction and number of soil samples meets LTP and MARSSIM requirements.

OL4-4 had two alarm points about 1 foot apart in in grid BF114. The alarm point area was extensively sampled and shown to be less than the DCGLw, therefore, no elevated measurement test is required. The OL4-4 survey unit area had scan surveys of 100% of the surface. Scan MDCs were adequate. Eleven triangular grid random start soil samples were all less than the DCGLw. Scan fraction and number of soil samples meets LTP and MARSSIM requirements.

7.3 Survey Variations

7.3.1 Approximately 1.25 square meters total of the grids scanned for OL4-3 were inaccessible. The remaining scanned portion constituted 99.9 percent of the survey unit area and 100 percent of the accessible area.

7.4 QC comparisons

7.4.1 Scan surveys

Numerous areas were partially rescanned as QC duplicates. The QC rescans were consistent with the primary scans. Approximately 260 square meters were QC scanned out of the 4799 square meters in the primary scans. This represents 5.4 percent of the area scanned. This exceeds the minimum 5% QC requirement.

7.4.2 Soil Samples

Two samples each from the OL4-1, OL4-2, OL4-3, and OL4-4 survey designs received QC split gamma spectroscopy analyses on the soil samples. These duplicates had good agreement as shown in the table below (Table 8). Eight QC splits out of forty-four samples far exceeds the 5% minimum criterion.

Table 8 – OL4 QC Split comparison

Sample Point	Sample Result (pCi/gm)	QC Result (pCi/gm)
OL4-1 03	0.33	0.25
OL4-1 11	0.10	<0.24
OL4-2 04	<0.15	<0.17
OL4-2 11	<0.17	<0.15
OL4-3 03	<0.12	<0.14
OL4-3 11	0.16	<0.10
OL4-4 03	0.63	0.43
OL4-4 10	<0.13	<0.09

8.0 Final Survey Conclusions

The Open Land Areas OL4-1, OL4-2, OL4-3, and OL4-4 final status survey was performed in accordance with the LTP, site procedures, design calculations, and Survey Request requirements. FSS data was collected to meet and/or exceed

the quantity specified or required for each survey unit design. The survey data for each survey unit meets the following conditions:

- 1) The average residual radioactivity in the soils is less than the derived surrogate DCGLw in all four survey units.
- 2) All measurements were less than the DCGLw in all four of the survey units.
- 3) Samples collected for investigation of alarm points in two survey units were all less than the DCGLw.

These conditions satisfy the release criteria established in the SNEC LTP and the radiological criteria for unrestricted use given in 10CFR20.1402. Therefore it is concluded that the SNEC Open Land Area designated OL4 is suitable for unrestricted release.

9.0 References

- 9.1 SNEC Facility Site area grid map Drawing number SNECRM-020
- 9.2 SNEC procedure E900-ADM-4500.60 "Final Status Survey Report"
- 9.3 SNEC License Termination Plan
- 9.4 NUREG 1575 "Multi-Agency Radiation Survey and Site Investigation Manual" (MARSSIM), revision 1 August 2000
- 9.5 SNEC Calculation E900-05-019 "First Energy – Penelec Site NE Open Land Area OL4 – Survey Design"
- 9.6 COMPASS computer program, Version 1.0.0, Oak Ridge Institute for Science and Education
- 9.7 VISUAL SAMPLE PLAN computer program, Version 3.0, Battelle Memorial Institute
- 9.8 SNEC procedure E900-IMP-4500.59, "Final Site Survey Planning and DQA"
- 9.9 SNEC procedure E900-IMP-4520.04, "Survey Methodology to Support SNEC License Termination"
- 9.10 SNEC Survey Request (SR) # SR226 for FSS of OL4-1
- 9.11 SNEC Survey Request (SR) # SR227 for FSS of OL4-2
- 9.12 SNEC Survey Request (SR) # SR228 for FSS of OL4-3
- 9.13 SNEC Survey Request (SR) # SR229 for FSS of OL4-4
- 9.14 SNEC Calculation E900-05-019 revision 1 "First Energy – Penelec Site NE Open Land Area OL4 – Survey Design"
- 9.15 SNEC Calculation E900-05-019 revision 2 "First Energy – Penelec Site NE Open Land Area OL4 – Survey Design"

10.0 Appendices

- Appendix A - SNEC Calculation E900-05-019 "First Energy - Penelec Site NE Open Land Area OL4 –Survey Design" (8 pages plus numerous attachments up to attachment 9)
- Appendix B - COMPASS DQA report for OL4-1 (2 pages)
- Appendix C - COMPASS DQA report for OL4-2 (2 pages)
- Appendix D - COMPASS DQA report for OL4-3 (2 pages)
- Appendix E - COMPASS DQA report for OL4-4 (2 pages)
- Appendix F - SNEC Calculation E900-05-019 revision 1 "First Energy – Penelec Site NE Open Land Area OL4 –Survey Design" (2 pages)
- Appendix G - SNEC Calculation E900-05-019 revision 2 "First Energy – Penelec Site NE Open Land Area OL4 –Survey Design" (2 pages)