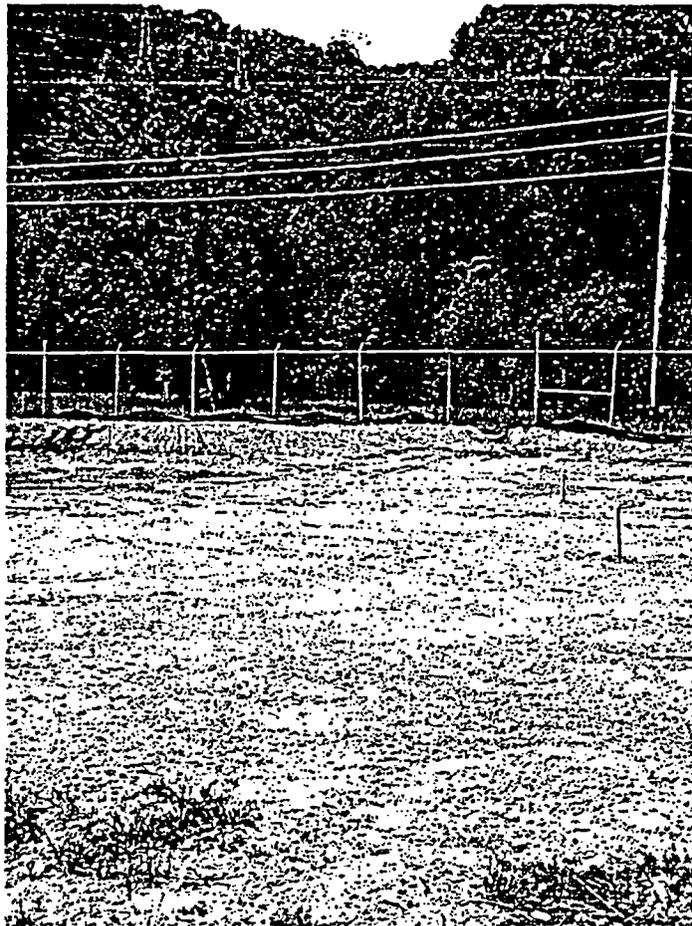


# Final Status Survey Report

For

Saxton Nuclear Experimental Corporation  
Open Land Area OL2



Prepared by GPU Nuclear, Inc.

July 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 OL2 and the Class 3 concrete structural surface within the OL2 area designated MA8-5. This FSS includes surveys of open land areas and residual concrete north 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 (OL2) was divided into three survey units. Two units (OL2-1 and OL2-2) consisted of relatively flat open land and the third was residual concrete surfaces (MA8-5) within the open land area. 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 thirty-eight 100 square meter grids covering about 100% of the actual land area
- 2) Twenty-two randomly located soil samples collected and then analyzed by laboratory gamma spectroscopy plus one additional sub-surface sample
- 3) Concrete surface scan with a Gas Flow Proportional Counter consisting of approximately 85% of the surface area
- 4) Eleven fixed point Gas Flow Proportional Counter measurements

One alarm point area was identified during NaI soil scanning. It was extensively sampled and all sample results were less than the DCGLw.

The collected FSS survey data demonstrate that the 3700 square meters of soil of the OL2 survey area and the 70 square meters of concrete meet 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 OL2 and the residual concrete designated MA8-5 to the north 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 two Class 1 survey units of open land surface and one Class 3 residual concrete surface. This report only addresses the FSS performed on these specific areas designated as OL2 on reference 9.1, with the exception of 1500 square meters within the switchyard fence, and MA8-5 derived from reference 9.3 table 5-2. The exception area was surveyed with the switchyard area (Reference 9.13) as part of PS4-1. The format of this report follows the guidance contained in reference 9.2.

## **2.0 Survey Area Description**

With the exception of the area within the switchyard fence as discussed above, Survey Area OL2 consists of three survey units adjacent to and just north of the original SNEC plant area. The remaining portion of the survey unit as discussed here, encompasses about 3800 square meters of open land and residual concrete. Because the area exceeds the size guidance in the SNEC LTP for Class 1 soil survey units (up to 2000 square meters recommended), the survey area was divided into two open land survey units. The survey area also includes an approximately 70 square meter area of Class 3 residual concrete mostly within the OL2-1 area. This concrete extends slightly into the OL12 survey area, but is included in its entirety in this survey. Layout of the survey area and individual units relative to the site layout are shown in Attachment 1-1 of Appendix A. The three survey units are discussed below. The two soil units are Class 1 impacted survey units and the concrete unit is a Class 3 impacted survey unit. Approximately 1500 square meters of the OL2 area defined on reference 9.1 and within the switchyard fence was surveyed with the switchyard survey area and is reported with the switchyard area survey as PS4-1. The OL2 designation is taken from the drawing, reference 9.1.

Survey unit OL2-1 is an open land area in the north central section of the site. It is immediately adjacent to the original SNEC site area at the southeast end of the survey unit and is the north border of the OL2-2 unit. The survey unit is the north and east portion of the survey area and is approximately 1945 square meters based on estimates from the survey. The original design estimated 1955 square meters. Appendix A contains drawings (Attachments 1-1 and 6-1) showing the layout of the survey unit.

Survey unit OL2-2 is an open land area in the north central section of the site. It is immediately adjacent to and immediately north of the original SNEC site. The survey unit is the south and west portion of the survey area and is approximately 1750 square meters based on estimates from the survey. The original design estimated 1711 square meters. Appendix A contains drawings (Attachments 1-1 and 6-3) showing the layout of the survey unit.

Survey unit MA8-5 is a residual concrete surface area in the north central section of the site. It is about 60 meters from the north edge of the original SNEC site. The survey unit is approximately 70 square meters and is in the north west corner of the OL2-1 survey unit. A portion of the concrete pad extends into survey area OL12, but the entire pad is included in this survey report. Appendix B contains drawings (Attachments 1-1 and 6-1) 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**

OL2 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. No known remediation occurred on the small residual concrete surfaces.

## **4.0 Site Release Criteria**

The site release criteria applied to the open land and residual concrete areas of OL2 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 were derived by analyses using a resident farmer family scenario for the open land surfaces and a building re-use scenario for the residual concrete. The dose modeling for these scenarios 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 for soil concentrations and concrete surface activity. The adjusted surrogate DCGLs were 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 DCGLs 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 calculations providing the design of the survey for these survey units are provided in Appendix A and Appendix B. Since both of the soil survey units were Class 1, scan measurements were conducted over approximately 100% of the surface of each of the soil survey units. Since the concrete surface was Class 3, scan measurements were conducted over approximately 85% of the area of the residual concrete. The number of sample points was determined by using the COMPASS computer program (reference 9.6 and attachment 7 of appendices A and B). These points were located on survey maps using the Visual Sample Plan program (reference 9.7 and attachment 6 of appendices A and B).

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 OL2 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 OL1 and OL2 (attachment 2 of appendix A).

Cs137, Co60, H3, 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**

<b>DQO/Design Parameter</b>	<b>OL2-1</b>	<b>OL2-2</b>	<b>MA8-5</b>
SNEC Design Calc. #	E900-05-009	E900-05-009	E900-05-011
MARSSIM Classification	1	1	3
Survey Unit Area (m <sup>2</sup> )	1945.9*	1748.4*	70
Statistical Test	Sign	Sign	Sign
Type 1 decision error ( $\alpha$ )	0.05	0.05	0.05
Type 2 decision error ( $\beta$ )	0.1	0.1	0.1
LBGR (pCi/gm)	3.58	2.35	N/A
Estimated $\sigma$ (pCi/gm)	0.24	0.65	N/A
LBGR (cpm)	N/A	N/A	3350
Estimated $\sigma$ (cpm)	N/A	N/A	51
Relative Shift ( $\Delta/\sigma$ )**	3.0	3.0	2.9
Number of static points	11	11	11
DCGLw (Cs137 pCi/gm)	5.73	5.73	N/A
75% Admin Limit(pCi/gm)	4.3	4.3	N/A
Scan MDC (pCi/gm)	6.2	6.2	N/A
DCGLw (dpm/100cm <sup>2</sup> )	N/A	N/A	26445
75% Admin Limit(dpm/100cm <sup>2</sup> )	N/A	N/A	19834
Scan MDC (dpm/100cm <sup>2</sup> )	N/A	N/A	2969
SNEC Survey Request #	SR231	SR232	SR230
Scan Survey Instrument	L2350-1 w/ 44-10	L2350-1 w/ 44-10	L2350-1 w/ 4368

\* Area based on estimates from actual survey. Design areas were 1955 and 1711 m<sup>2</sup>

\*\* Uses the 75% admin limit rather than the DCGLw

## **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, and 9.12 which are filed in the SNEC history files.

### **6.1 Survey Unit OL2-1**

#### **6.1.1 Scan survey**

Scan measurements were made in all or part (the fence which was used as the dividing line between OL2-1 and OL2-2 transected some grids) of 25 grids using a 2 inch by 2 inch NaI detector with an MDCscan of 6.2 pCi/gm (attachment 4 of

appendix A). The 75% administrative limit was 4.3 pCi/gm and the adjusted surrogate Cs137 DCGLw for this survey unit was 5.73 pCi/gm (table 1, page 2 of appendix A). The area factor can be used to compare the MDCscan to the 75% administrative limit. In this case, the MDCscan was below the 75% administrative limit times the limiting area factor so no sample number adjustment was needed.

Of the 25 full or partial grids in the survey unit, all the area was scanned except for about 7.4 square meters due to interferences from a concrete pad and trees. This results in approximately 1939 square meters actually scanned in the 1946 square meter survey unit. This represents 99.6 percent scan coverage and 100 percent of the accessible area.

The scans conducted in all 25 grids did not identify any activity in the soils greater than the MDCscan. The action level was >175 net cpm (table 2, page 3 of appendix A). No area greater than 175 net cpm was found in OL2-1.

#### 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 OL2-1 had results in excess of the adjusted surrogate 75% administrative limit. 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 OL2-1**

Sample Number	Cs137 pCi/gm
1	0.08
2	<0.07
3	0.32
4	0.28
5	0.22
6	<0.10
7	0.38
8	0.49
9	0.10
10	<0.12
11	0.31
Mean	0.22
Std Dev	0.14
Min	<0.07
Max	0.49

## **6.2 Survey Unit OL2-2**

### **6.2.1 Scan survey**

Scan measurements were made in all or part of (the fence which was used as the dividing line between OL2-2 and OL2-1 and PS4-1 transected some grids) 24 grids using a 2 inch by 2 inch NaI detector with an MDCscan of 6.2 pCi/gm (attachment 4 of appendix A). The 75% administrative limit was 4.3 pCi/gm and the adjusted surrogate Cs137 DCGLw for this survey unit was 5.73 pCi/gm (table 1, page 2 of appendix A). The area factor can be used to compare the MDCscan to the 75% administrative limit. In this case, the MDCscan was below the 75% administrative limit times the limiting area factor so no sample number adjustment was needed.

Of the 24 full or partial grids in the survey unit, all the area was scanned. This results in approximately 1748 square meters actually scanned in the 1748 square meter survey unit, or 100 percent. In addition, approximately 356 square meters of the survey unit was scanned twice. This area had an overburden of crushed stone up to about 6 inches thick left over from recent use of the area as a dewatering pond for the east yard tank excavation. Because of this overburden, the stone was 100 percent scanned and sampled. Scans of the stone were all less than the action level. The stone was then removed and the resulting exposed surface was scanned and sampled with the rest of the survey unit area. NaI scans were also conducted inside of two drainage pipes. These scans did not indicate any activity in excess of the action level.

The scans conducted in one of the grids (BB128) 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 428 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. At fixed point 5, two samples were collected, one at the typical surface to 1 meter depth and the second from 1 meter to 2 meters deep. This was because of historical information that indicated previous remediation to a depth of about 4 feet. Two samples of the stone overburden were collected prior to removing the stone. These were collected at the design random fixed point locations 1 and 6.

None of the design fixed point soil samples in OL2-2 had results in excess of the adjusted surrogate 75% administrative limit. 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. Results from the two stone samples and the 1 to 2 meter deep sample at point 5 are not included in the statistics, but as shown in table 3 below, are all much less than the DCGLw.

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 OL2-2**

Sample Number	Cs137 pCi/gm
1	0.05
2	<0.08
3	<0.07
4	0.35
5 @0to1 m	1.09
6	0.20
7	0.07
8	<0.06
9	<0.12
10	<0.17
11	0.08
Mean	0.21
Std Dev	0.30
Min	0.05
Max	1.09
Stone 1	<0.03
Stone 6	<0.04
5 @1to2 m	0.14

**6.2.3 Elevated measurement investigation**

During scan measurements in OL2-2 grid BB128, one alarm point (in excess of the action level of 175 net cpm) was identified. The bounded area was small. An area of about 0.1 square meter was defined around the alarm point to the edge where the count rate was back down to normal background. This 0.1 square meter, therefore is not all at the elevated activity of the alarm point (AP) but represent the area needed for the count rate to be unaffected by the elevated spot.

In order to assess the residual radioactivity in the elevated measurement areas, a sample was collected exactly at the AP location. In addition, in order to demonstrate that the elevated area was adequately bounded by the 0.1 square meter area, three samples were collected at the edge of the area boundary. The table below (Table 4) shows the Cs137 results (no other licensed isotopes were detected) of these samples.

**Table 4 – OL2-2 elevated area investigation sampling**

Sample location	Activity (pCi/gm)
AP	0.65
Boundary	0.42
Boundary	0.45
Boundary	0.55

The AP soil sample result was well below the 75% administrative limit and the boundary samples show that the elevated area would not extend past the defined boundary. Since the range of results of the boundary and AP soil sampling (Table 4, 0.42 to 0.65 pCi/gm) are consistent with the survey unit sample range from Table 3 of 0.05 to 1.09 pCi/g and do not exceed the 75% administrative limit, no elevated measurement comparison test is required.

### **6.3 Survey Unit MA8-5**

#### **6.3.1 Scan survey**

Scan measurements were made on the top of the “Transformer Repair Pad” in 2 grids using a Gas Flow Proportional Counter (GFPC) detector with an MDCscan of 2969 dpm/100cm<sup>2</sup> (attachment 4 of appendix B). The 75% administrative limit was 19834 dpm/100cm<sup>2</sup> and the adjusted surrogate Cs137 DCGLw for this survey unit was 26445 dpm/100cm<sup>2</sup> (table 1, page 2 of appendix B). In this case, the MDCscan was below the 75% administrative limit so no sample number adjustment was needed.

Of the 70 square meters of concrete, the top of the pad was about 59 square meters. All of the top of the pad was scanned. This results in approximately 59 square meters actually scanned in the 70 square meter survey unit, or about 85 percent which is consistent with coverage requirements in Class 3 areas.

The scans conducted on top of the pad did not identify any activity on the concrete greater than the action level. The action level was >3400 net cpm. No area greater than 3400 net cpm was found in MA8-5.

#### **6.3.2 Fixed point concrete measurements**

Eleven fixed point static measurement locations were defined for the survey unit, based on a conservative relative shift of about 2.9.

None of the design fixed point measurements in MA8-5 had results in excess of the adjusted surrogate DCGLw. The table below (Table 5) shows the count rate results for each measurement, along with the mean, standard deviation and

range of the measurement data. For reference, the average shielded (background) count rate in the survey unit was 283 cpm. 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 – Concrete static measurement results for MA8-5**

Sample Number	Gross unshielded cpm
1	378
2	366
3	358
4	360
5	332
6	439
7	446
8	341
9	405
10	456
11	359
Mean	385
Std Dev	43.9
Min	332
Max	446

## **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**

OL2-1 had no alarm points during scan surveys of 99.6% 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.

OL2-2 had one alarm point in grid BB128. The alarm point area was extensively sampled and shown to be less than the DCGLw, therefore, no elevated measurement test is required. The OL2-2 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.

MA8-5 had no alarm points during scan surveys of 85% of the surface. Scan MDCs were adequate. Eleven triangular grid random start concrete static measurements were all less than the DCGLw. Scan fraction and number of measurements meets LTP and MARSSIM requirements.

### **7.3 Survey Variations**

7.3.1 Approximately 7.4 square meters total of the grids scanned for OL2-1 were inaccessible. The remaining scanned portion constituted 99.6 percent of the survey unit area and 100 percent of the accessible area.

7.3.2 Approximately 356 square meters in OL2-2 had an overburden of recently placed crushed stone. This stone was scanned and sampled, and then removed. The area was then resurveyed and resampled with the rest of the survey unit survey. This was in accordance with the original design.

7.3.3 Fixed point 5 in OL2-2 had a second, 1 to 2 meter depth sample collected due to historical information that remediation had been conducted to 4 feet deep. This was in accordance with the original design.

7.3.4 An Alarm Point was found In grid BB128 in OL2-2. Samples at the AP and at the boundary of the elevated area were all less than the DCGLw.

### **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 242.5 square meters were QC scanned out of the 3687 square meters in the primary scans of the two soil survey units. This represents 6.6 percent of the area scanned. This exceeds the minimum 5% QC requirement.

Approximately 3 square meters were QC scanned out of the 59 square meters in the primary scans of the concrete pad survey unit. The QC rescans were consistent with the primary scans. This represents 5.1 percent of the area scanned. This exceeds the minimum 5% QC requirement.

A QC rescan was conducted on the Alarm Point (AP) in OL2-2. There was good agreement between the two scan results as shown in table 6 below because the

conclusion that the survey unit passes is supported by both the initial and QC results (reference 9.9).

**Table 6 – OL2 Soil QC Scan comparison**

Sample Point	Scan Result (cpm)	QC Result (cpm)
OL2-2 AP	428	487

**7.4.2 Soil Samples**

One sample from OL2-1 and two samples from the OL2-2 survey designs received QC split gamma spectroscopy analyses on the soil samples. These duplicates had good agreement as shown in the table below (Table 7) because the conclusion that the survey unit passes is supported by both the initial and QC results (reference 9.9). Three QC splits out of 25 samples (22 points plus second, subsurface sample at OL2-2 point 5, plus two rock samples) represents 12% of the samples. This exceeds the 5% minimum criterion.

**Table 7 – OL2 Soil QC Split comparison**

Sample Point	Sample Result (pCi/gm)	QC Result (pCi/gm)
OL2-1 11	0.31	0.26
OL2-2 04	0.35	0.31
OL2-2 07	0.07	<0.13

**7.4.3 Concrete Static Measurements**

One concrete static measurement from MA8-5 received a QC duplicate measurement. This duplicate had good agreement as shown in table 8 below because the conclusion that the survey unit passes is supported by both the initial and QC results (reference 9.9). One QC re-measurement out of 11 measurements represents 9.1% of the measurements. This exceeds the 5% minimum criterion.

**Table 8 – MA8-5 Static Measurement QC Comparison**

Sample Point	Result (cpm)	QC Result (cpm)
MA8-5 02	366	407

## **8.0 Final Survey Conclusions**

The Open Land Areas OL2-1, OL2-2, and concrete surface MA8-5 final status surveys were 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 both survey units
- 2) The average residual radioactivity on the concrete is less than the derived surrogate DCGLw
- 3) All measurements were less than the DCGLw in all three of the survey units.
- 4) Samples collected for investigation of the alarm point in the OL2-2 survey unit 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 OL2 with residual concrete area MA8-5 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 Left intentionally blank
- 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) # SR231 for FSS of OL2-1
- 9.11 SNEC Survey Request (SR) # SR232 for FSS of OL2-2
- 9.12 SNEC Survey Request (SR) # SR230 for FSS of MA8-5
- 9.13 GPU Nuclear Letter E910-05-030 date July 8, 2005

## **10.0 Appendices**

- Appendix A - SNEC Calculation E900-05-009 "Westinghouse and Adjacent Areas open land OL2 – Survey Design"  
(9 pages plus numerous attachments up to attachment 9)
- Appendix B - SNEC Calculation E900-05-011 "Westinghouse and Adjacent Areas MA8-5 concrete pads in OL2 – Survey Design"  
(9 pages plus numerous attachments up to attachment 9)
- Appendix C - COMPASS DQA report for OL2-1 (2 pages)
- Appendix D - COMPASS DQA report for OL2-2 (2 pages)
- Appendix E - COMPASS DQA report for MA8-5 (2 pages)
- Appendix F - SNEC Calculation E900-05-011 Revision 1 "Westinghouse and Adjacent Areas MA8-5 concrete pads in OL2 – Survey Design"

## Appendix A

### Open Land Survey Design