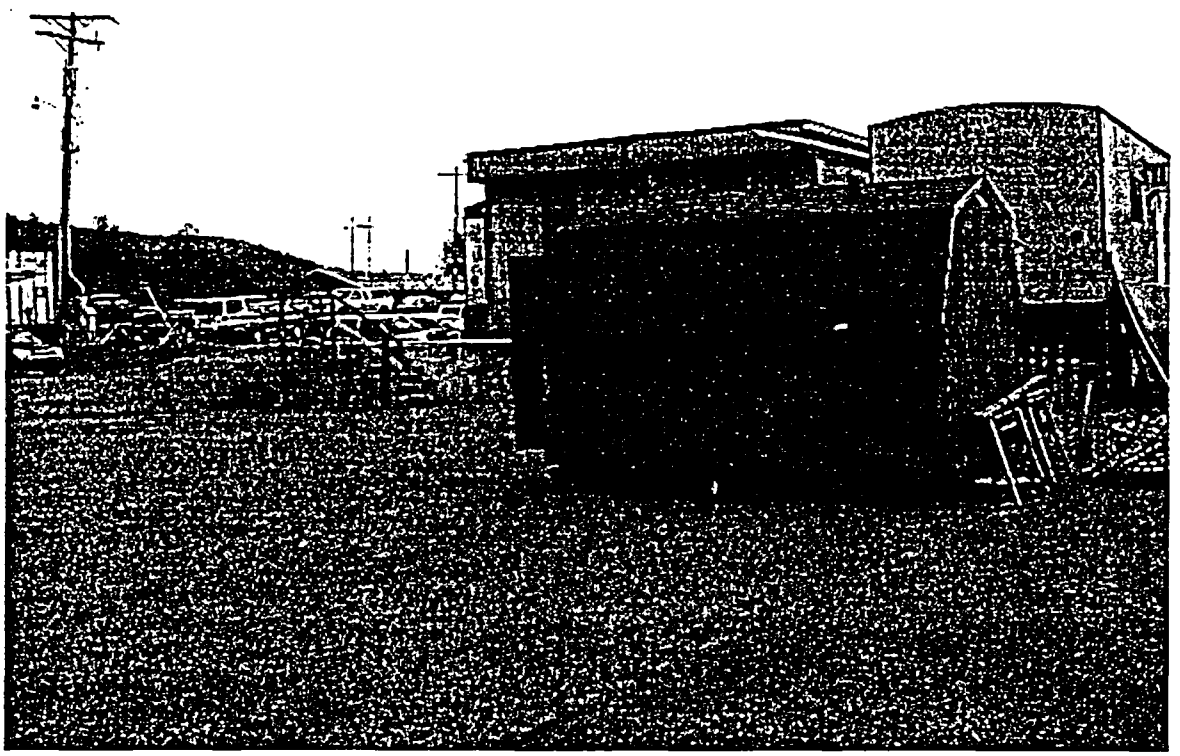
Final Status Survey Report

For

Saxton Nuclear Experimental Corporation
OL7 Paved Surfaces and Concrete



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Executive Summary

This report presents the results and conclusions of the final status survey (FSS) of the Class 2 paved surfaces and concrete structures around the south and south central portion of the Saxton Nuclear Experimental Corporation (SNEC) facility designated as OL7. This FSS survey was conducted in May and June of 2005.

The FSS was performed in accordance with the SNEC License Termination Plan (LTP). The survey area (OL7) was divided into three survey units. Two of the three survey units had asphalt paving and one of the survey units also contained concrete structures. Soils will be covered in a separate OL7 FSS Report.

Data were collected from each of two survey units in accordance with the specific survey design data collection requirements. The following is a summary of the asphalt-paved surface measurements:

1) Direct NaI(Tl) scan of all or part of 32 100-square meter grids, covering about 51% of the asphalt-paved area
2) 44 static NaI(Tl) measurements collected

The following is a summary of the concrete structure measurements:

1) Direct Gas Flow Proportional Counter (GFPC) scan of all or parts of 15 100-square meter grids, covering about 30% of the concrete structures
2) 11 static GFPC measurements collected

The collected FSS survey data demonstrate that the 3,942 square meters of paved surfaces and concrete in the OL7 survey area meets the radiological release criteria for unrestricted use specified in 10CFR20.1402. Therefore, GPU Nuclear, Inc. concludes that the paved surfaces and concrete portions of the survey area meet 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 asphalt-paved surfaces and concrete structures designated OL7 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 2 survey units of paved surfaces and concrete structures. This report only addresses the FSS performed on the specific area designated as OL7 on reference 9.1. The format of this report follows the guidance contained in reference 9.2.

2.0 Survey Area Description

Survey Area OL7 is a Class 2 impacted area encompassing the south and south-central portions of the SNEC Site. The survey area contains about 17,900 square meters of horizontal surface area: divided into either open land or paved surfaces and concrete. Because the area exceeds the size guidance in the SNEC LTP for Class 2 survey areas (10,000 square meters recommended maximum), the survey area was divided into three smaller 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 three survey units are discussed below. The OL7 designation is taken from the drawing, reference 9.1. Variations in unit designations from those listed in the LTP are discussed in section 7.3 of this report.

Survey Unit OL7-1 is located in the south-central portion of the site with OL3 to the north and both OL8-3 and OL8-4 to the south. The survey unit is approximately 6,200 square meters of which 3,761 square meters is soil, 1,556 square meters is asphalt, and 882 square meters is concrete. There are an additional 121 square meters of concrete due to vertical surfaces of the warehouse pad, stairs, sump, ramp, and concrete pillars. Class 2 structures are limited in size to 1,000 square meters, so OL7-1 asphalt was further divided into MA8-18 (795 square meters) and MA8-19 (761 square meters).

Survey Unit OL7-2 extends from the south-central to the southern portion of the site almost completely bisecting OL8-3. The survey unit is approximately 4,200 square meters of which 2,697 square meters is soil and 1,503 square meters is asphalt. Class 2 structures are limited in size to 1,000 square meters, so OL7-2 asphalt was further divided into MA8-20 (792 square meters) and MA8-21 (711 square meters). There are no concrete structures in this survey unit.

Survey Unit OL7-3 extends from the south to the south-central portion of the site with OL8-4 to the west and OL8-5 to the east. The survey unit is approximately 7,500 square meters. Neither asphalt nor concrete structures is present in this survey unit so it, the survey unit, is not addressed further in this FSS Report.

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 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. 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 action, 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. Decontamination, disassembly, and demolition of the SNEC facility buildings and equipment have 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

No remediation has been performed in OL7.

4.0 Site Release Criteria

The site release criteria applied to both paved surfaces and concrete structures in OL7 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. 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 soils were used to calculate a surrogate Cs-137 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 Cs-137 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 / DQO Process

The SNEC calculation providing the design of the survey for these survey units is provided in Appendix A. Since most of the survey units were Class 2, scan measurements were conducted over 10% to 100% of the surface of each survey unit. Vertical walls of the Penelec Warehouse concrete are listed as Class 3 in the LTP; however, since they represent only 44 square meters of the total, it was decided that the walls would be surveyed to the more conservative Class 2 criteria rather than writing a separate survey design. For paved surfaces and concrete, scans were conducted using either an NaI detector, with a narrow window optimized for Cs-137 to reduce background, or a large area GFPC.

The number of static sample points was determined by using the COMPASS computer program (reference 9.6, attachment 7 of appendix A). These points were located on survey maps using the Visual Sample Plan program (reference 9.7, attachment 6 of appendix A). Static sample measurements are averaged

over a minimum 30-second count time to match the site surface dose model used in the SNEC LTP (reference 9.3).

The survey design uses a surrogate Cs-137 effective DCGL developed from a radionuclide mix analysis, from soil samples collected before the Final Status Survey, in the vicinity of the survey unit. The radionuclide mix (including the hard-to-detects listed in Table 5-1 of the LTP) for both survey units, OL7-1 and OL7-2, was based on the CV Yard Soil data (attachment 2 of appendix A). CV Yard Soil data were chosen because they were generally greater than MDA, whereas most of the OL7 data were near to or less than the MDA which led to an unrealistic DCGL.

Cs-137, Co-60, H-3, and Sr-90 were positively detected in one or more of these samples 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	OL7-1	OL7-1	OL7-1	OL7-2	OL7-2
Sub-Unit	N/A	MA8-18	MA8-19	MA8-20	MA8-21
SNEC Design Calc. #	E900-05-028	E900-05-028	E900-05-028	E900-05-028	E900-05-028
MARSSIM Classification	2	2	2	2	2
Survey Unit Area (m^2)	6,200 total 883 concrete *	6,200 total 795 asphalt *	6,200 total 761 asphalt *	4,200 total 792 asphalt *	4,200 total 711 asphalt *
Statistical Test	Sign	Sign	Sign	Sign	Sign
Type 1 decision error (α)	0.05	0.05	0.05	0.05	0.05
Type 2 decision error (β)	0.1	0.1	0.1	0.1	0.1
LBGR (cpm)	3,335	290	290	300	300
Estimated σ (cpm)	54.9	35.8	35.8	33.7	33.7
Relative Shift (Δ/σ)	2.99	2.99	2.99	2.88	2.88
Number of static points	11	11	11	11	11
DCGLw (Cs-137 dpm/100 cm^2)	26,445	26,445	26,445	26,445	26,445
Administrative Limit (Cs-137 dpm/100 cm^2)	19,834	19,834	19,834	19,834	19,834
Scan MDC (dpm/100 cm^2)	1,781	5,502	5,502	7,277	7,277
SNEC Survey Request #	SR237	SR238	SR238	SR239	SR239
Scan Survey Instrument	L2350-1 w/ 44-10 or	L2350-1 w/ 44-10	L2350-1 w/ 44-10	L2350-1 w/ 44-10	L2350-1 w/ 44-10

	43-68B				

* The remaining soil surface areas are described in the OL7 Soils FSS Report

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 Summary for Survey Unit OL7-1 (Concrete)

6.1.1 Scan survey

Scan measurements were made in 15 grids using a Ludlum 43-68B Gas Flow Proportional Counter (GFPC) with an MDCscan of either 1,781 dpm/100 cm^2 or 3,085 dpm/100 cm^2 (Table 2 on page 3 of appendix A). The different MDCscan values depended on whether the detector probe was moved at a rate of either 10 cm/sec or 30 cm/sec. The Administrative Limit was 19,834 dpm/100 cm^2 (Table 1 on page 2 of appendix A) and the adjusted surrogate Cs-137 DCGLw for this survey unit was 26,445 dpm/100 cm^2 (Table 1 on page 2 of appendix A). Since this is a Class 2 impacted survey unit, the EMC does not apply.

All grids or portions thereof were accessible. Of the 15 full or partial grids, approximately 304.7 square meters were scanned out of a possible 1003 square meters (882 square meters horizontal and 121 square meters of vertical surfaces) of concrete in the survey unit. This is slightly more than 30 percent of the unit surface area.

The scans conducted in all 15 grids did not identify any activity on the concrete greater than the MDCscan. The Administrative Limit was >3400 ncpm. No area greater than 3400 ncpm was found on the OL7-1 concrete.

6.1.2 Fixed Point Measurements

A total of 11 random start, triangular grid, systematic static sample locations were defined for the survey unit based on a conservative relative shift of about 2.99. Keeping the relative shift between 1 and 3 per the LTP, an LBGR of 95% of the DCGL (as compared to 50% normally) was chosen producing a requirement for 11 measurements including a 20% adjustment. Each fixed point measurement was obtained using a Ludlum 43-68B GFPC.

None of the design fixed point measurements on OL7-1 concrete showed activity in excess of the Administrative Limit. Table 2 below shows the GFPC results for each fixed point measurement along with the mean, standard deviation, and

range of the fixed point measurement data. From Attachment 4-1 of Appendix A, the overall efficiency of the GFPC is 13.623% which is the product of the meter response (0.478), 2 pi source efficiency (0.5), and surface roughness efficiency correction factor (0.57). For conservative comparison reasons, the dpm/100 cm^2 column is calculated by converting gross cpm to dpm/100cm^2, without taking credit for background.

The gross counts per minute (cpm) mean and variability obtained during the FSS survey were both greater than those used for the survey design: 380 +/- 56.8 (OL7-1 concrete) versus 365 +/- 42.7 (OL1 concrete) and 306 +/- 34.5 (Williamsburg Station concrete). In spite of not taking background into account, one can see from Table 2 that the activities generated are almost an order of magnitude less than the Administrative Limit of 19,834 dpm/100 cm^2, hence the survey unit passes, the LBGR used was conservative, and neither biased samples nor changes to the survey design are required.

Table 2 – Fixed Point Measurements for OL7-1 (Concrete)

Fixed Point	GFPC gross cpm	* GFPC dpm/100cm^2
1	366	2,690
2	426	3,130
3	444	3,260
4	292	2,140
5	354	2,600
6	359	2,640
7	493	3,620
8	331	2,430
9	354	2,600
10	403	2,960
11	355	2,610
Mean	380	2,790
Std Dev	56.8	417
Min	292	2,140
Max	493	3,620

* Values in this column are calculated without regard for background. They divided by the efficiency (0.13623) directly. It is like a "gross dpm/100cm^2". In this way, since the gross dpm value is less than the Administrative Limit, then surely the net dpm values would be less than the DCGL.

6.2 Summary for Survey Unit OL7-1 (Asphalt)

6.2.1 Scan survey

Scan measurements were made in 13 grids using a 2 inch by 2 inch NaI(Tl) detector with an MDCscan of 5,502 dpm/100 cm^2 (Table 2 on page 3 of appendix A). The Administrative Limit was 19,834 dpm/100 cm^2 (Table 1 on page 2 of appendix A) and the adjusted surrogate Cs-137 DCGLw for this survey unit was 26,445 dpm/100 cm^2 (Table 1 on page 2 of appendix A). Since this is a Class 2 impacted survey unit, the EMC does not apply.

All grids or portions thereof were accessible. Of the 13 full or partial grids, approximately 709.5 square meters (347.6 in MA8-18 and 361.9 in MA8-19) was scanned out of a possible 1,556 square meters (795 in MA8-18 and 761 in MA8-19) of asphalt in the survey unit. This is more than 45 percent of the unit surface area.

The scans conducted in all 13 grids did not identify any activity on the asphalt paving greater than the MDCscan. The Administrative Limit was >330 ncpm. No area greater than 330 ncpm was found on the OL7-1 asphalt.

6.2.2 Fixed Point Measurements

A total of 11 random start, triangular grid, systematic static sample locations were defined for each survey unit (MA8-18 and MA8-19) based on a conservative relative shift of about 2.99. Keeping the relative shift between 1 and 3 per the LTP, an LBGR of 73% of the DCGL (as compared to 50% normally) was chosen producing a requirement for 11 measurements including a 20% adjustment. Each fixed point measurement was obtained using a Ludlum 44-10 NaI(Tl) probe.

None of the design fixed point measurements on OL7-1 asphalt showed activity in excess of the Administrative Limit. Table 3 below shows the 44-10 probe results for each fixed point measurement along with the mean, standard deviation, and range of the fixed point measurement data. In addition, the table shows dpm/100 cm^2 values (see Appendix B to this FSS Report for the conversion calculation).

The gross counts per minute (cpm) mean and variability obtained during the FSS survey were both similar to those used for the survey design: 92.2 +/- 34.3 (MA8-18) and 97.5 +/- 26.3 (MA8-19) versus 79.3 +/- 19.6 (Power Plant Road) and 82.5 +/- 30.0 (OL7-1 asphalt). In spite of the aforementioned, one can see from Table 3 that the activities generated are less than half of the Administrative Limit of 19,834 dpm/100 cm^2, hence the survey unit passes, the LBGR used was conservative, and neither biased samples nor changes to the survey design are required.

Table 3 – Fixed Point Measurements for OL7-1 (Asphalt)

	MA8-18		MA8-19	
Fixed Point	NaI(Tl) gross cpm	* NaI(Tl) dpm/100cm^2	NaI(Tl) gross cpm	* NaI(Tl) dpm/100cm^2
1	123	7,400	115	6,920
2	73	4,390	91	5,480
3	78	4,690	94	5,660
4	64	3,850	119	7,160
5	69	4,150	79	4,750
6	119	7,160	117	7,040
7	155	9,330	152	9,150
8	81	4,880	65	3,910
9	61	3,670	70	4,210
10	56	3,370	73	4,390
11	135	8,130	97	5,840
Mean	92.2	5,550	97.5	5,870
Std Dev	34.3	2,060	26.3	1,580
Min	56	3,370	65	3,910
Max	155	9,330	152	9,150

* Values in this column are calculated without regard for background. They are multiplied by the conversion factor directly. It is like a "gross dpm/100cm^2". In this way, since the gross dpm value is less than the Administrative Limit, then surely the net dpm values would be less than the DCGL.

6.3 Summary for Survey Unit OL7-2 (Asphalt)

6.3.1 Scan survey

Scan measurements were made in 19 grids using a 2 inch by 2 inch NaI(Tl) detector with an MDCscan of 7,277 dpm/100 cm^2 (Table 2 on page 3 of appendix A). The Administrative Limit was 19,834 dpm/100 cm^2 (Table 1 on page 2 of appendix A) and the adjusted surrogate Cs-137 DCGLw for this survey unit was 26,445 dpm/100 cm^2 (Table 1 on page 2 of appendix A). Since this is a Class 2 impacted survey unit, the EMC does not apply.

All grids or portions thereof were accessible. Of the 19 full or partial grids, approximately 833.7 square meters (428.7 in MA8-20 and 425 in MA8-21) was scanned out of a possible 1,503 square meters (792 in MA8-20 and 711 in MA8-21) of asphalt in the survey unit. This is more than 56 percent of the unit surface area.

The scans conducted in all 19 grids did not identify any activity on the asphalt paving greater than the MDCscan. The Administrative Limit was >330 ncpm. No area greater than 330 ncpm was found on the OL7-2 asphalt.

6.3.2 Fixed Point Measurements

A total of 11 random start, triangular grid, systematic static sample locations were defined for each survey unit (MA8-20 and MA8-21) based on a conservative relative shift of about 2.88. Keeping the relative shift between 1 and 3 per the LTP, an LBGR of 76% of the DCGL (as compared to 50% normally) was chosen producing a requirement for 11 measurements including a 20% adjustment. Each fixed point measurement was obtained using a Ludlum 44-10 NaI(Tl) probe.

None of the design fixed point measurements on OL7-2 asphalt showed activity in excess of the Administrative Limit. Table 4 below shows the 44-10 probe results for each fixed point measurement along with the mean, standard deviation, and range of the fixed point measurement data. In addition, the table shows dpm/100 cm^2 values (see Appendix B to this FSS Report for the conversion calculation).

The gross count per minute (cpm) means obtained during the FSS survey were both greater than those used for the survey design and both the variabilities were similar to those used for the survey design: 150 +/- 20.8 (MA8-20) and 150 +/- 24.0 (MA8-21) versus 79.3 +/- 19.6 (Power Plant Road) and 82.5 +/- 30.0 (OL7-1 asphalt). In spite of the aforementioned, one can see from Table 4 that the activities generated are about half of the Administrative Limit of 19,834 dpm/100 cm^2, hence the survey unit passes, the LBGR used was conservative, and neither biased samples nor changes to the survey design are required.

Table 4 – Fixed Point Measurements for OL7-2 (Asphalt)

	MA8-20		MA8-21	
Fixed Point	NaI(Tl) gross cpm	* NaI(Tl) dpm/100cm^2	NaI(Tl) gross cpm	* NaI(Tl) dpm/100cm^2
1	144	8,670	157	9,450
2	137	8,250	146	8,790
3	123	7,400	157	9,450
4	157	9,450	112	6,740
5	124	7,460	146	8,790
6	134	8,070	138	8,310
7	163	9,810	123	7,400
8	189	11,400	144	8,670
9	158	9,510	190	11,400

10	150	9,300	146	8,790
11	176	10,600	191	11,500
Mean	150	9,030	150	9,030
Std Dev	20.8	1,250	24.0	1,440
Min	123	7,400	112	6,740
Max	189	11,400	191	11,500

* Values in this column are calculated without regard for background. They are multiplied by the conversion factor directly. It is like a "gross dpm/100cm^{2}". In this way, since the gross dpm value is less than the Administrative Limit, then surely the net dpm values would be less than the DCGL.

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.

Appendix B shows the calculation used to convert NaI(Tl) fixed point, count per minute measurements into dpm/100 cm^2 values for comparison to both the Administrative Limit and the DCGL.

7.2 Summary of Overall Results

OL7-1 concrete had no alarm points during scan surveys of slightly more than 30% of the surface. Scan MDCs were adequate. Eleven fixed point measurements were all less than the DCGLw. Both the scan fraction and number of fixed point measurements meet the LTP and MARSSIM requirements.

OL7-1 asphalt had no alarm points during scan surveys of slightly more than 45% of the surface. Scan MDCs were adequate. Twenty two fixed point measurements were all less than the DCGLw. Both the scan fraction and number of fixed point measurements meet the LTP and MARSSIM requirements.

OL7-2 asphalt had no alarm points during scan surveys of slightly more than 56% of the surface. Scan MDCs were adequate. Twenty two fixed point measurements were all less than the DCGLw. Both the scan fraction and number of fixed point measurements meet the LTP and MARSSIM requirements.

7.3 Survey Variations (Design, survey request, LTP)

7.3.1 The LTP lists Penelec Warehouse survey units as WA1-X (floor slabs), WA2 (sump), and WA3 (exterior foundation walls). Per the FSS design, OL7-1 concrete includes the Penelec Warehouse surfaces, two concrete pillars in grids AR120 and AR121, and part of the SSGS Boiler Pad concrete slab.

The LTP designates the Penelec Warehouse surface areas as 450 square meters of floor, <10 square meters in the sump, and 374 square meters of exterior foundation walls. In actuality, the floor slab was 442 square meters, the sump was 7 square meters, and the ramp, stairs, and exterior walls were 102 square meters.

The LTP does not mention the concrete pillars in AR120 and AR121. Both are approximately 0.5 square meters of horizontal surface area; however, because of their two-meter height, they represent about 12 square meters of surface area.

The LTP lists SS12 as SSGS Boiler Pad (811' El.) with a surface area 1800 square meters. The SSGS Boiler Pad concrete slab extends from OL1 (approximately 800 square meters) through OL3-2 (921 square meters) to OL7-1 (441 square meters).

The LTP lists the Penelec Warehouse slab as Class 2, Warehouse foundation walls as Class 3, SSGS concrete as Class 3, and doesn't mention the pillars in AR120 and AR121. All concrete was surveyed to the Class 2 standard for the following reasons:

1. the Penelec warehouse ramp, stairs, and exterior walls represented less than 20% of the warehouse surface area,
2. the SSGS Boiler Pad was covered with dirt, which was removed prior to FSS, but the surface was used extensively to store equipment and materials over the life of the decommissioning project, and
3. little radiological information was known about the pillars in AR120 and AR121.

Class 2 structures require 10% to 100% of the surface to be scanned whereas Class 3 structures require scanning up to 10% of the surface area. The more robust Class 2 FSS design was written to scan close to 50% of the surfaces.

Per the design, OL7-1 concrete was 990 square meters; however, after accurately measuring the surfaces during FSS it was determined that the actual surface area was 1,003 square meters; slightly greater than the 1,000 square meter guideline for Class 2 structures found in MARSSIM.

7.3.2 The LTP makes reference to roadway classification of Class 2 in survey area OL5. As it turns out, the roadways were in survey area OL5 when the LTP was written. Subsequent renumbering of survey areas resulted in the roadways being put into both OL3 and OL7 and retaining their Class 2 designation. The asphalt paving was rather large, when compared to MARSSIM guideline for Class 2 structures, so it was broken into two relatively equal pieces for FSS. Grid AO133 (29 square meters in MA8-18) was not surveyed as it was broken concrete rather than asphalt paving. There were no other anomalies, inconsistencies, or variations with regard to the asphalt paving in either MA8-18 or MA8-19 comprising OL7-1 asphalt.

Section 4.6 of Appendix A of this report should have indicated that the 79 cpm asphalt background was obtained from the Power Plant Road immediately off site from the SNEC facility.

7.3.3 Similarly to section 7.3.2, the roadway was previously in OL5, but now resides in OL7. The asphalt paving was rather large, when compared to MARSSIM guideline for Class 2 structures, so it was broken into two relatively equal pieces for FSS. There were no anomalies, inconsistencies, or variations with regard to the asphalt in either MA8-20 or MA8-21 comprising OL7-2 asphalt.

7.4 QC comparisons

7.4.1 Scan surveys

Numerous grids were partially rescanned as QC duplicates. The QC rescans did not identify any activity above alarm points and so are in agreement with the primary scans. QC scans were conducted on 40.4 m^2 of concrete in OL7-1, 40 m^2 of asphalt in MA8-18, 40 m^2 of asphalt in MA8-19, 50 m^2 of asphalt in MA8-20, and 40 m^2 of asphalt in MA8-21. This represents about 13.3, 11.3, and 10.5 percent of survey units OL7-1 concrete, OL7-1 asphalt, and OL7-2 asphalt, respectively, and exceeds the minimum 5% required.

7.4.2 Fixed Point Measurements

One fixed point measurement was taken from each survey units. These duplicates had good agreement as shown in Table 5 below. Five QC fixed point measurements out of 55 samples exceeds the 5% minimum criterion.

Table 5 – OL8 QC Split Comparison

Fixed Point	Fixed Point Measurement gross cpm	QC Result gross cpm
OL7-1, AP134FP5	354	395
MA8-18, AN132FP5	69	82
MA8-19, AL136FP1	115	120
MA8-20, AF131FP7	163	180
MA8-21, AC125FP3	157	174

8.0 Final Survey Conclusions

The paved and concrete surfaces in both the OL7-1 and OL7-2 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 asphalt and concrete surfaces is less than the derived surrogate DCGLw in both survey units.

2) All measurements in both survey units were 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 OL8 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 E900-05-028, "Open Land FSS Design – OL7 Paved Surfaces and Concrete"
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 SR237 for FSS of OL7-1 Concrete
9.11 SNEC SR238 for FSS of OL7-1 (MA8-18 and MA8-19) Asphalt
9.12 SNEC SR239 for FSS of OL7-2 (MA8-20 and MA8-21) Asphalt

10.0 Appendices

Appendix A - SNEC Calculation E900-05-028, "Open Land FSS Design – OL7 Paved Surfaces and Concrete" (10 pages plus numerous attachments)
Appendix B – Calculation to Convert NaI cpm Values into dpm/100cm^2