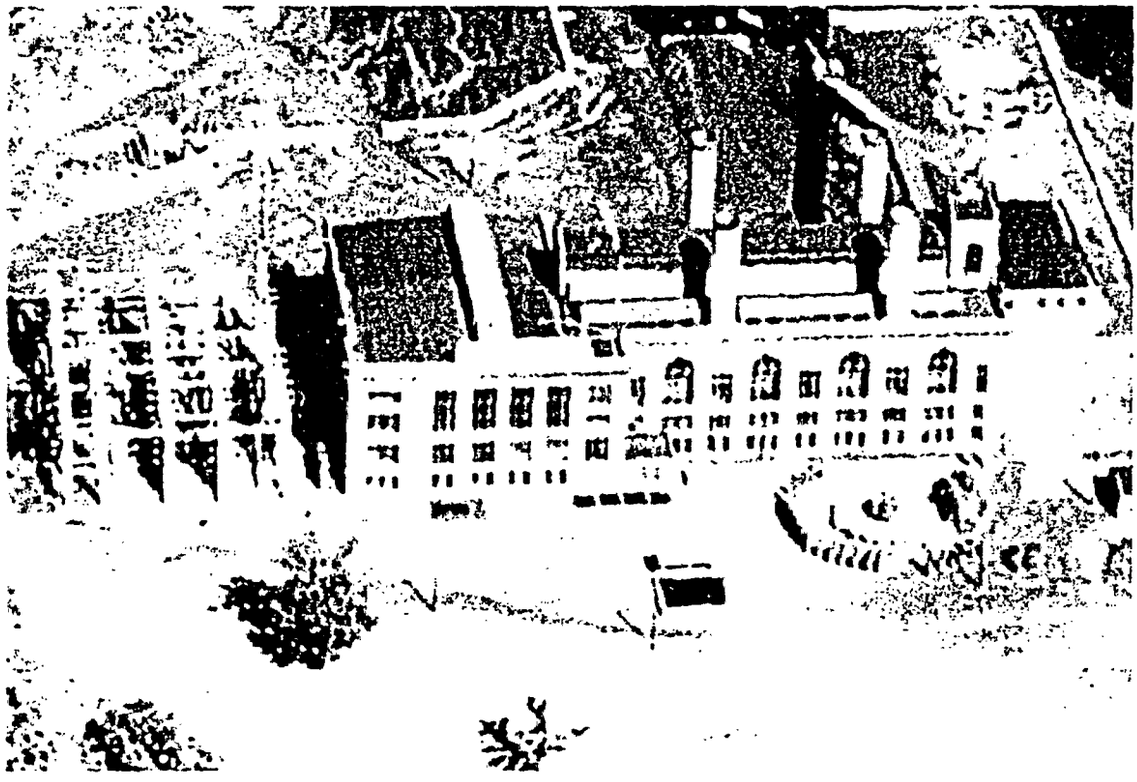
Final Status Survey Report

For

Saxton Nuclear Experimental Corporation
Saxton Steam Generating Station
Structural Surfaces – Seal Chambers SS8



Prepared by GPU Nuclear, Inc.

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Executive Summary

This report presents the results and conclusions of the final status survey (FSS) of the Class 1 structural surfaces of the Saxton Nuclear Experimental Corporation (SNEC) facility designated as SS8. This FSS includes surveys of residual structural surfaces (e.g. concrete and steel) in the three discharge tunnel seal chambers of the Saxton Steam Generating Station of the SNEC site and was conducted in November of 2003.

The FSS was performed in accordance with the SNEC License Termination Plan (LTP). The seal chambers survey area was divided into three survey units. Each unit consisted of relatively flat residual structural surfaces but did contain some uneven concrete and steel. 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) Gas Flow Proportional Counter (GFPC) scans of concrete and steel surfaces
2) NaI scans of rough concrete or corroded steel surfaces
3) Forty GFPC static measurements
4) Thirty-one NaI static measurements
5) Three concrete samples
6) Forty smear samples

The collected FSS survey data demonstrate that the 253 square meters of the SSGS Seal Chambers 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 residual structural surfaces in the SSGS seal chambers (three survey units designated SS8-1, SS8-2, and SS8-3) west 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 three Class 1 survey units of residual structural surface in the SSGS seal chambers. This report only addresses the FSS performed on this specific area . The format of this report follows the guidance contained in reference 9.2.

2.0 Survey Area Description

The SSGS seal chambers are Class 1 impacted structural surface located below grade to the west of the SNEC facility. The survey unit encompasses about 253 square meters of concrete and steel. Because the area exceeds the size guidance in the SNEC LTP for Class 1 survey units (up to 100 square meters recommended), and because there are three distinct regions in the chambers, the survey area has been divided into three survey units. The three survey units are discussed below. The individual survey unit designations are derived from table 5-2 of the SNEC LTP (reference 9.3).

Survey unit SS8-1 is a Class 1 residual concrete and steel surface in the SSGS seal chamber number 1. It consists of the floors, walls, and ceilings of discharge tunnel seal chamber number 1 – an underground room at the upstream end of the discharge tunnel from the SSGS to the river outfall. The survey unit is approximately 73 square meters.

Survey unit SS8-2 is a Class 1 residual concrete and steel surface in the SSGS seal chamber number 2. It consists of the floors, walls, and ceilings of discharge tunnel seal chamber number 2 – an underground room at the upstream end of the discharge tunnel from the SSGS to the river outfall. The survey unit is approximately 71 square meters.

Survey unit SS8-3 is a Class 1 residual concrete and steel surface in the SSGS seal chamber number 3. It consists of the floors, walls, and ceilings of discharge tunnel seal chamber number 3 – an underground room at the upstream end of the discharge tunnel from the SSGS to the river outfall, and includes the external surfaces of 4 large steel pipes ('downcomers'). The survey unit is approximately 109 square meters. This slightly exceeds the 100 square meter guideline from

the LTP but is reasonable due to the geometry of the survey area and the total of the three units is less than 300 square meters.

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. Other shared systems also introduced SNEC activity into the SSGS and the main SNEC discharge entered the SSGS discharge tunnel. After shutdown in 1972, the SNEC 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. The SSGS was dismantled circa 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

The seal chambers had potential for contamination as a result of radioactive liquid effluent discharges from the SNEC Facility in two pathways: (1) a 6" pipe entering the #1 Seal Chamber through the south wall above the water line and

discharged into the Discharge Tunnel, and (2) shared water systems introduced contamination into the SSGS and discharged into #3 Seal Chamber. Remediation included removal of piping and concrete surfaces. Decontamination methods included concrete scabbling, grinding and torch cutting for steel, surface scraping, and water flushing.

4.0 Site Release Criteria

The site release criteria applied to the structural surface areas of the SSGS seal chamber 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 structural surfaces were derived by analyses using a building re-use 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 surfaces 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. Scan coverage of the three Class 1 survey units covered approximately 100% of the available surfaces. Scans were conducted using Gas Flow Proportional Counters (GFPC) and 2 inch by 2 inch NaI detectors. The SNEC calculation providing an assessment of the results is attached in Appendix B.

Fixed point measurements were performed with both the GFPC and NaI detectors.

The survey design uses a surrogate Cs137/gross beta effective DCGL developed from radionuclide mix analyses from samples collected before the Final Status Survey in the vicinity of the survey unit. The mix was based on radionuclide mix data (including the hard-to-detects listed in Table 5-1 of the LTP) from the seal chambers (attachment 2 of appendix B).

Cs137, Co-60, Pu239, 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 5.0-1) presents the Data Quality Objectives (DQO) and other relevant information from the survey design package.

Table 5.0-1 – DQO/Design

DQO/Design Parameter*	SS8-1, SS8-1, SS8-3	SS8-1, SS8-1, SS8-3
SNEC Design Calc. #	E900-03-030 E900-04-008	E900-03-030 E900-04-008
MARSSIM Classification	1	1
Survey Unit Area (m^2)	73, 71, 109	73, 71, 109
Statistical Test	WRS	WRS
Type 1 decision error (α)	0.05	0.05
Type 2 decision error (β)	0.10	0.10
LBGR (cpm)	450	N/A**
Estimated σ (cpm)	68	N/A
Relative Shift (Δ/σ)	2.9	N/A
Number of static points	8	N/A
DCGLw (Cs137+Sr90 dpm/100cm^2)	7650	7650
75% Admin Limit* (Cs137 dpm/100cm^2)	5737	5737
75%Admin limit -static (Sr90+Cs137 cpm)	578	N/A
DCGLw (Cs137 pCi/g)	N/A	3.19
75%Admin Limit -scan (cpm)	300 (net)	200 (gross)
75% Admin Limit (pCi/gm)	N/A	2.39
Scan MDC (dpm/100cm^2)	1174 (steel), 1459 (conc)	4993
SNEC Survey Request #	SR103	SR103
Scan Survey Instrument	GFPC	NaI

* this table presents revised DCGL and admin limit values from E900-04-008
** NaI measurement locations were the same as the GFPC locations and are based on the GFPC design

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 reference 9.8 which is filed in the SNEC history files.

6.1 Survey Unit SS8-1

6.1.1 Scan survey

Scan measurements were made in SS8-1 using the GFPC with follow-up using the NaI detector. The GFPC had an MDCscan of 1174 (steel) and 1459 (concrete) dpm/100cm^2 (section 4.17 on page 8 of appendix A). The adjusted surrogate Cs137 beta DCGLw for this survey unit was 7650 dpm/100cm^2 and the 75% administrative limit was 5737 dpm/100cm^2 (section 1.1 on page 2 of appendix B).

Of the 73 square meters of this survey unit, portions were inaccessible for GFPC scanning for various reasons, particularly uneven surfaces not amenable to the large GFPC probe. Of the 73 square meters, all were scanned, 69 with the GFPC and 4 with the NaI. Therefore about 100 percent of the survey unit was scanned.

All GFPC scan surveys indicated activity less than the action level of 300 net cpm. All NaI scan surveys indicated less than the action level of 200 gross cpm.

6.1.2 Fixed point measurements

Nine random start triangular grid systematic fixed point measurement locations were defined for the survey unit. Based on a conservative relative shift of about 2.9 a minimum of 8 fixed points were required.

None of the design fixed point measurements in SS8-1 had results in excess of the of 75% administrative limit of 578 net cpm for the GFPC measurements. No fixed point action level was pre-defined for the NaI measurements. However, the volumetric detection limit for static NaI measurements is about 0.7 pCi/gm (attachment 9-7 of appendix A). Based on this attachment, the NaI scans operated at about 0.02 pCi/g/netcpm (0.71 pCi/gm MDC divided by 3+3.29(sqrt(bkg) ~ 0.02). Therefore, the NaI data also shows that the survey unit was below the volumetric 75% administrative limit of 2.39 pCi/gm. The table below (Table 6.1-1) shows the gross beta and NaI results for each fixed point measurement, along with the mean, standard deviation and range of the fixed point measurement data.

Smears collected at the fixed point locations were all less than the MDC at <166 dpm/100cm^2 for beta and <11.6 dpm/100cm^2 for alpha.

The standard deviation of the GFPC measurements 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 fixed point measurements required is consistent between the survey design and the survey results. Based on this, no changes to the survey design or additional measurements are required.

Table 6.1-1 – Fixed point results for SS8-1

Point Number	GFPC Unshielded cpm	NaI cpm
1	160	73.8
2	216	55.2
3	167	56.2
4	187	59.8
5	194	55.8
6	219	63.6
7	200	73
8	178	66.4
9	173	58.6
Mean	189	62.5
Std Dev	19.6	7.2
Min	167	55.2
Max	219	73.8

6.2 Survey Unit SS8-2

6.2.1 Scan survey

Scan measurements were made in SS8-2 using the GFPC with follow-up using the NaI detector. The GFPC had an MDCscan of 1174 (steel) and 1459 (concrete) dpm/100cm^2 (section 4.17 on page 8 of appendix A). The adjusted surrogate Cs137 beta DCGLw for this survey unit was 7650 dpm/100cm^2 and the 75% administrative limit was 5737 dpm/100cm^2 (section 1.1 on page 2 of appendix B).

Of the 71 square meters of this survey unit, portions were inaccessible for GFPC scanning for various reasons, particularly uneven surfaces not amenable to the large GFPC probe. Of the 71 square meters, all were scanned, 66 with the GFPC and 5 with the NaI. Therefore about 100 percent of the survey unit was scanned.

GFPC scan surveys indicated activity less than the action level of 300 net cpm except for one approximately 1.3 square meter area that had a maximum reading of 337 net cpm. All NaI scan surveys indicated less than the action level of 200 gross cpm.

6.2.2 Fixed point measurements

Nine random start triangular grid systematic fixed point measurement locations were defined for the survey unit. Based on a conservative relative shift of about 2.9 a minimum of 8 fixed points were required.

None of the design fixed point measurements in SS8-2 had results in excess of the 75% administrative limit of 578 net cpm for the GFPC measurements. No fixed point action level was pre-defined for the NaI measurements. However, the volumetric detection limit for static NaI measurements is about 0.7 pCi/gm (attachment 9-7 of appendix A). Based on this attachment, the NaI scans operated at about 0.02 pCi/g/netcpm (0.71 pCi/gm MDC divided by 3+3.29(sqrt(bkg) ~ 0.02). Therefore, the NaI data also shows that the survey unit was below the volumetric 75% administrative limit of 2.39 pCi/gm. The table below (Table 6.2-1) shows the gross beta and NaI results for each fixed point measurement, along with the mean, standard deviation and range of the fixed point measurement data.

Smears collected at the fixed point locations were all less than the MDC at <166 dpm/100cm^2 for beta and <11.6 dpm/100cm^2 for alpha.

The standard deviation of the GFPC measurements 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 fixed point measurements required is consistent between the survey design and the survey results. Based on this, no changes to the survey design or additional measurements are required.

Table 6.2-1 – Fixed point results for SS8-2

Point Number	GFPC Unshielded cpm	NaI cpm
1	263	86.6
2	228	91.2
3	234	92.4
4	195	67.8
5	210	109.2
6	257	138.4
7	207	102.8
8	194	102.8
9	176	93
Mean	218	97.2
Std Dev	29.5	19.2
Min	176	67.8
Max	263	138.4

6.2.3 Elevated measurement investigation

GFPC scan measurements identified one area that slightly exceeded the action level of 300 net cpm. This area was about 1.3 square meters and the maximum observed count rate was 454 gross cpm or 337 net cpm. This elevated count rate value was measured using a fixed point 60 second count identical to the static

measurement process. Therefore, the 337 net cpm can be compared to the 578 net cpm action level for fixed point counts. This scan result is therefore less than the static action level equivalent.

In addition, as part of the investigation of the alarm point, three concrete samples were collected at the alarm point. The maximum result was 4.3 pCi/gm with an average of 2.5 pCi/gm.

Appendix B provides an assessment of the results of the elevated measurements and compares the results of this assessment to the release criteria. The dose to a member of the public is conservatively estimated to be about 1.1 mrem for a worst case contamination condition and assuming a person is present in the seal chamber greater than 10 feet below ground (section 4.8 on page8 of appendix B).

An elevated measurement comparison can also be done by using the observed activities and the elevated area factors for the 1.3 square meter area. In this case, using the 75% administrative limit, the 4.3 pCi/gm highest sample minus the survey unit mean as discussed below is 1.0 times the administrative limit ((4.3-1.9)/2.39=1.0). A 1.3 square meter area has an area factor of 10.45 for Cs137. The area factor for Sr90, the other dominant isotope in the mix, is higher. Therefore the use of the Cs137 area factors is conservative. The elevated measurement fraction for the alarm area is therefore 0.096 (1.0/10.45). Using the NaI static values and the 0.02 pCi/gm factor as shown above without subtracting background, the average of the survey unit is estimated as at most 1.9 pCi/gm which is 0.81 of the 75% administrative limit. Using this highly conservative approach, the emc test (equation 8.2) is 0.91. Therefore, the survey unit meets the release criteria for license termination.

6.3 Survey Unit SS8-3

6.3.1 Scan survey

Scan measurements were made in SS8-3 using the GFPC with follow-up using the NaI detector. The GFPC had an MDCscan of 1174 (steel) and 1459 (concrete) dpm/100cm^2 (section 4.17 on page 8 of appendix A). The adjusted surrogate gross beta DCGLw for this survey unit was 7650 dpm/100cm^2 and the 75% administrative limit was 5737 dpm/100cm^2 (section 1.1 on page 2 of appendix B).

Of the 109 square meters of this survey unit, portions were inaccessible for GFPC scanning for various reasons, particularly uneven surfaces not amenable to the large GFPC probe. Of the 109 square meters, all were scanned, 103 with the GFPC and 6 with the NaI. Therefore about 100 percent of the survey unit was scanned.

All GFPC scan surveys indicated activity less than the action level of 300 net cpm. All NaI scan surveys indicated less than the action level of 200 gross cpm.

6.3.2 Fixed point measurements

Thirteen random start triangular grid systematic fixed point measurement locations were defined for the survey unit. Based on a conservative relative shift of about 2.9 a minimum of 8 fixed points were required. In addition, 9 fixed point measurements using the GFPC were taken on the external surfaces of the steel 'downcomers' in SS8-3. Internal measurements on the downcomers will be discussed in a separate report on embedded piping.

None of the design fixed point measurements in SS8-3 or on the 'downcomers' had results in excess of the action level of 578 net cpm for the GFPC measurements. No fixed point action level was pre-defined for the NaI measurements. However, the volumetric detection limit for static NaI measurements is about 0.7 pCi/gm (attachment 9-7 of appendix A). Based on this attachment, the NaI scans operated at about 0.02 pCi/g/netcpm (0.71 pCi/gm MDC divided by 3+3.29(sqrt(bkg) ~ 0.02). Therefore, the NaI data also shows that the survey unit was, on average, below the volumetric 75% administrative limit of 2.39 pCi/gm. The tables below (Tables 6.3-1 and 6.3-2) show the gross beta and NaI results for each fixed point measurement, along with the mean, standard deviation and range of the fixed point measurement data.

Smears collected at the fixed point locations were all less than the MDC at <166 dpm/100cm^2 for beta and <11.6 dpm/100cm^2 for alpha.

The standard deviation of the GFPC measurements 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 fixed point measurements required is consistent between the survey design and the survey results. Based on this, no changes to the survey design or additional measurements are required.

Table 6.3-1 – Fixed point results for SS8-3

Point Number	GFPC Unshielded cpm	NaI cpm
1	207	79.6
2	309	116
3	201	114.6
4	219	109.4
5	212	209.2
6	208	54.2
7	197	174
8	247	126.8
9	274	126.2
10	224	152.2
11	269	107.2
12	194	107.2
13	188	113.2
Mean	227	121.3
Std Dev	37	39.7
Min	188	54.2
Max	309	209.2

Table 6.3-2 – Fixed point results for SS8-3 'Downcomers'

Point Number	GFPC Unshielded cpm
1	192
2	265
3	145
4	191
5	161
6	130
7	160
8	188
9	165
Mean	177
Std Dev	39
Min	130
Max	265

6.3.3 Elevated measurement investigation

Although there was no predefined action level for the NaI static measurements, the results of the static measurements did show one value that exceeded the scan action level. The dose assessment in appendix B (section 4.8 of page 7) includes the effect of the NaI measurements in SS8-3. Therefore, the

assessment in appendix B is bounding for SS8-3 as well and indicates that the survey unit meets the dose limit for license termination.

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

SS8-1 had no alarm points during scan surveys of approximately 100% of the surface. Scan MDCs were adequate. GFPC fixed point measurements were all less than the action level. Scan fraction and number of fixed point measurements meets LTP and MARSSIM requirements.

SS8-2 had one alarm point during scan surveys of approximately 100% of the surface. The alarm point was 337 net cpm with an action level of 300 net cpm and a DCGL equivalent of 578 net cpm. One of three follow-up concrete samples exceeded the DCGLw but the average of the three was about 78% of the DCGLw. Scan MDCs were adequate. GFPC fixed point measurements were all less than the action level. Scan fraction and number of fixed point measurements meets LTP and MARSSIM requirements. An assessment of the results shows that the dose consequence is about 1.1 mrem and therefore meets release requirements.

SS8-3 had no alarm points during scan surveys of approximately 100% of the surface. Scan MDCs were adequate. GFPC fixed point measurements were all less than the action level. One NaI fixed point exceed the scan action level. The assessment discussed above for SS8-2 is bounding for SS8-3 and shows that the dose consequence is about 1.1 mrem and therefore meets release requirements. Scan fraction and number of fixed point measurements meets LTP and MARSSIM requirements.

7.3 Survey Variations (Design, survey request, LTP)

7.3.1 Portions of the survey units that could not be scanned using the GFPC were scanned using a NaI detector. Total area scanned using the NaI was about 15 square meters.

7.3.2 Fixed point number 9 in SS8-2 was relocated 18 inches east due to the configuration of the concrete surface.

7.3.3 Fixed point number 12 in SS8-3 was relocated 4 inches east due to the configuration of the concrete surface.

7.4 QC comparisons

7.4.1 Scan surveys

Numerous areas were rescanned as QC duplicates. The QC rescans did not identify any activity above alarm points and therefore are in agreement with the primary scans because they both support the same conclusion, that the survey unit passes. GFPC QC scans were conducted on 13.5 m^2 of the survey area, which represents about 5.7 percent of the 238 m2 originally scanned with the GFPC. This exceeds the minimum 5% required. NaI QC scans were conducted on 4.7 m^2 of the survey area, which represents about 32 percent of the 15 m^2 originally scanned with the NaI. This exceeds the minimum 5% required.

7.4.2 Fixed Point measurements

Several fixed point measurements were duplicated for QC purposes. The QC fixed point measurements did not identify any activity above alarm points and therefore are in agreement with the primary result because they both support the same conclusion, that the survey unit passes. GFPC QC fixed point measurements were performed on 3 locations, which represent 7.5 percent of the 40 primary measurements. Table 7.4-1 below shows the GFPC comparison. NaI QC fixed point measurements were performed on 2 locations, which represent 7.4 percent of the 27 primary measurements. Table 7.4-2 below shows the NaI comparison. These exceed the minimum 5% required. One QC static measurement shielded reading did not meet QC acceptance criteria. No cause for this could be determined. Given the agreement with the rest of the samples, and the overall measurement was less than 10 % of the DCGL, the QC results were acceptable.

Table 7.4-1 – Fixed point GFPC QC

Point Number	Initial result cpm	QC result cpm
SS8-1 5	194	208
SS8-1 7	200	201
SS8-1 9	173	186

Table 7.4-2 – Fixed point NaI QC

Point Number	Initial result cpm	QC result cpm
SS8-1 5	55.8	58.2
SS8-3 5	209.2	216.8

7.4.3 Samples for gamma spectroscopy

One QC split was performed on concrete samples out of three collected which represents 33 percent. This exceeds the minimum 5% required. Results were in good agreement because they both support the same conclusion, that the survey

unit passes. The gamma spectroscopy comparison is shown in Table 7.4-3, below.

Table 7.4-3 – Concrete Samples QC

Point Number	Initial result Cs137 pCi/g	QC Result Cs137 pCi/g
SS8-2 1	4.3	3.9

7.4.4 Smears

Several smears received replicate analysis for QC purposes. The QC replicates had good agreement with the primary result because they both support the same conclusion, that the survey unit passes. The replicate smear analyses were performed on 8 locations, which represent 20 percent of the 40 primary measurements. This exceeds the minimum 5% required.

8.0 Final Survey Conclusions

The Structural Surfaces of the SSGS seal chambers survey units SS8-1, SS8-2, and SS8-3 final status survey was performed in accordance with the SNEC 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 on the surfaces is less than the derived surrogate DCGLw in all of the survey units.

2) All measurements were less than the DCGLw in units SS8-1, SS8-2, and SS8-3. Except for one concrete sample in S8-2.

3) A special dose assessment of residual volumetric concrete activity demonstrates that the dose consequences of the residual radioactivity is about 5% of the release dose limit.

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 Structural Surface Areas of the SSGS seal chambers designated SS8 are 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 COMPASS computer program, Version 1.0.0, Oak Ridge Institute for Science and Education
9.6 SNEC procedure E900-IMP-4500.59, "Final Site Survey Planning and DQA"
9.7 SNEC procedure E900-IMP-4520.04, "Survey Methodology to Support SNEC License Termination"
9.8 SNEC Survey Request (SR) # SR103

10.0 Appendices

Appendix A - SNEC Calculation E900-03-030 – "Seal Chambers – Survey Plan" (64 pages including numerous attachments)
Appendix B – SNEC Calculation E900-04-008 – "Assessment of E900-03 -030, Rev 0 – Seal Chambers – Survey Plan" (10 pages plus numerous attachments)