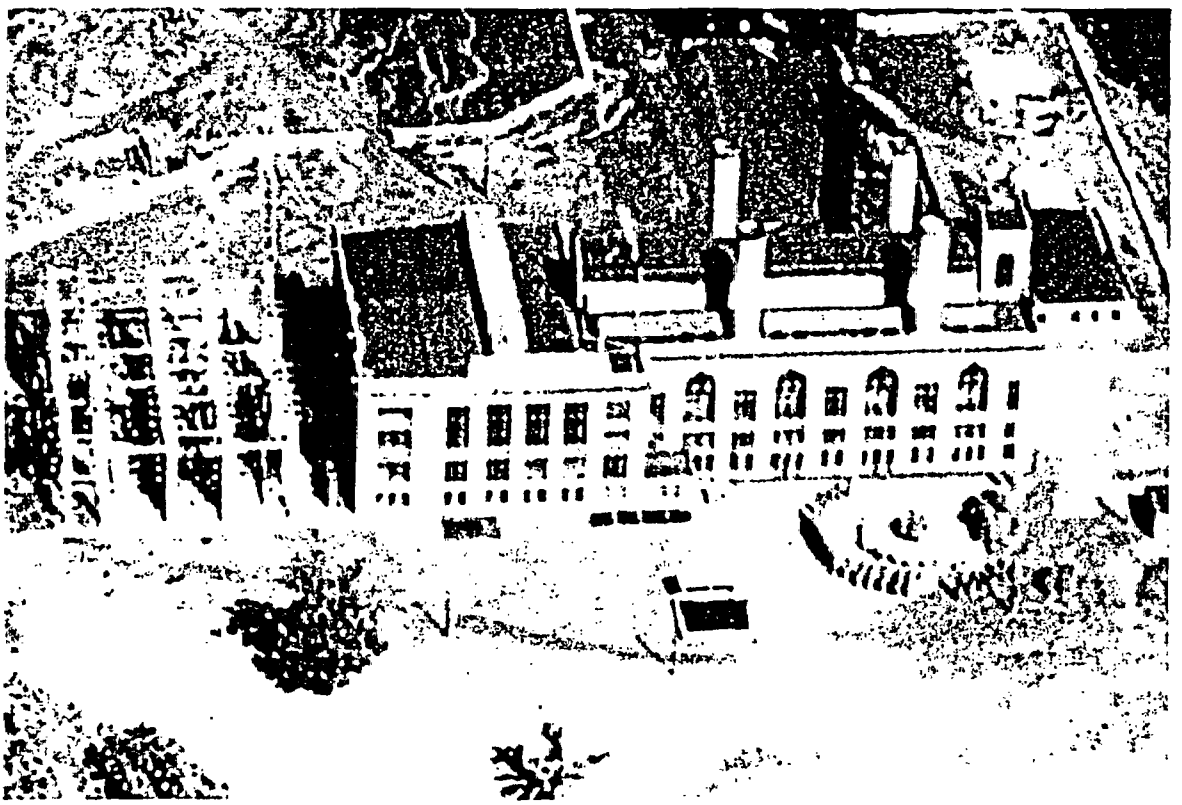
Final Status Survey Report

For

Saxton Nuclear Experimental Corporation
Saxton Steam Generating Station
Structural Surfaces –Intake Tunnel
SS19, SS20, SS21



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 2 and 3 structural surfaces of the Saxton Nuclear Experimental Corporation (SNEC) facility designated as SS19, SS20, and SS21. This FSS includes surveys of residual structural surfaces (e.g. concrete) in the intake tunnel of the Saxton Steam Generating Station of the SNEC site and was conducted in the summer of 2003.

The FSS was performed in accordance with the SNEC License Termination Plan (LTP). The intake tunnel survey area was divided into nine survey units. Each unit consisted of relatively flat residual structural surfaces. 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) Automated position sensitive large area detector surface contamination monitor (SCM) scans of about 40% of the surface area.

The SCM surveys were conducted by a contractor utilizing a large area position sensitive gas flow proportional counter. Portions of the survey units could not be surveyed with this equipment because of the large size of this detector and surface irregularity but coverage percentages were adequate.

The collected FSS survey data demonstrate that the 1957 square meters of the SSGS intake tunnel 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 intake tunnel (nine survey units designated SS19-1, SS19-2, SS19-3, SS20-1, SS20-2, SS20-3, SS21-1, SS21-2, and SS21-3) 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 nine survey units consisting of six Class 2 and three Class 3 survey units of residual structural surface in the SSGS intake tunnel. 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 intake tunnel is Class 2 or 3 impacted structural surface located underground to the west of the SNEC facility. The survey unit encompasses about 1957 square meters of concrete. Because the area exceeds the size guidance in the SNEC LTP for Class 2 survey units (up to 1000 square meters recommended), and the classification varies spatially in the tunnel, the survey area has been divided into nine survey units. The nine 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 SS19-1 is a Class 2 residual concrete surface in the SSGS intake tunnel. It consists of the floor of the main intake tunnel – an underground tunnel from the river into the SSGS. The survey unit is approximately 167 square meters.

Survey unit SS19-2 is a Class 2 residual concrete surface in the SSGS intake tunnel. It consists of the floor of the north portion of the intake tunnel – an underground tunnel from the river into the SSGS. The survey unit is approximately 184 square meters.

Survey unit SS19-3 is a Class 2 residual concrete surface in the SSGS intake tunnel. It consists of the floor of the south portion of the intake tunnel – an underground tunnel from the river into the SSGS. The survey unit is approximately 154 square meters.

Survey unit SS20-1 is a Class 2 residual concrete surface in the SSGS intake tunnel. It consists of the walls of the main intake tunnel – an underground tunnel

from the river into the SSGS. The survey unit is approximately 269 square meters.

Survey unit SS20-2 is a Class 2 residual concrete surface in the SSGS intake tunnel. It consists of the walls of the north portion of the intake tunnel – an underground tunnel from the river into the SSGS. The survey unit is approximately 324 square meters.

Survey unit SS20-3 is a Class 2 residual concrete surface in the SSGS intake tunnel. It consists of the walls of the south portion of the intake tunnel – an underground tunnel from the river into the SSGS. The survey unit is approximately 359 square meters.

Survey unit SS21-1 is a Class 3 residual concrete surface in the SSGS intake tunnel. It consists of the ceiling of the main intake tunnel – an underground tunnel from the river into the SSGS. The survey unit is approximately 162 square meters.

Survey unit SS21-2 is a Class 3 residual concrete surface in the SSGS intake tunnel. It consists of the ceiling of the north portion of the intake tunnel – an underground tunnel from the river into the SSGS. The survey unit is approximately 184 square meters.

Survey unit SS21-3 is a Class 3 residual concrete surface in the SSGS intake tunnel. It consists of the ceiling of the south portion of the intake tunnel – an underground tunnel from the river into the SSGS. The survey unit is approximately 154 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

No remediation occurred in the intake tunnel. Water, sediment, and debris was removed from the area to permit surveying. The intake tunnel 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. SSGS discharge water was recirculated to the intake in winter to control ice buildup.

4.0 Site Release Criteria

The site release criteria applied to the structural surface areas of the SSGS intake tunnel 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 six Class 2 survey unit covered from approximately 38% to about 69%. Scans of the three Class 3 survey units covered from 13% to 17%. Scans were conducted using an automated position sensitive large area gas flow proportional counter ("Surface Contamination Monitor" - SCM).

No fixed point measurements were performed. Because of the manner in which the SCM measures continuously and collects position information as well, SCM scanning is equivalent to continuous, full coverage static measurements. Section 5.4.3 of the SNEC LTP provides for use of such positionally sensitive scanning in lieu of fixed point measurements when the scanning system has a detection limit a small fraction of the DCGL (e.g. 10%). MARSSIM section 6.7.1 requires that fixed point measurements be capable of detecting the DCGL. In addition, section 6.4.1 of MARSSIM briefly discusses the potential use of modern, positionally referenced survey instrumentation. The maximum MDC observed for a 100cm^2 area in the SCM scanning was less than 50% of the DCGL. Although the LTP recommends lower detection limits for use of the SCM as fixed point measurements, the use of the SCM results for direct measurements is acceptable because the detection limits meets the MARSSIM requirements. Therefore, no static measurements are required.

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) primarily from the discharge tunnel and seal chambers (attachment 2 of appendix A).

Cs137, Co60, Am241, Ni63, Pu238, Pu239, and Sr-90 were positively detected in one or more of these samples and are accounted for in the adjusted surrogate DCGL. Additional sample results obtained later were used to modify the mix after the survey. 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	SS19-1, SS19-2, SS19-3, SS20-1, SS20-2, SS20-3	SS21-1, SS21-2, SS21-3
SNEC Design Calc. #	E900-03-016	E900-03-016
MARSSIM Classification	2	3
Survey Unit Area (m^2)	167, 184, 154, 269, 324, 359	162, 184, 154
Statistical Test*	N/A	N/A
Type 1 decision error (α)**	N/A	N/A
Type 2 decision error (β)	N/A	N/A
LBGR (cpm)	N/A	N/A
Estimated σ (dpm/100cm^2)	N/A	N/A
Relative Shift (Δ/σ)	N/A	N/A
Number of static points	N/A	N/A
DCGLw (Cs137 dpm/100cm^2)	27992	27992
75% Admin Limit (Cs137 dpm/100cm^2)	20994	20994
DCGLw (Cs137 cpm)	N/A	N/A
75% Admin Limit (cpm)	N/A	N/A
Scan MDC (dpm/100cm^2)	3087	3087
SNEC Survey Request #	SR82	SR82
Scan Survey Instrument	SCM	SCM

* this table presents final design DCGL and action level values – these were revised based on new mix ratio logic processes.
** Because of the use of the SCM, which provide 100% scan and 100% fixed point results, many statistical values are not applicable

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 9.9 which is filed in the SNEC history files.

6.1 Survey Unit SS19-1

6.1.1 Scan survey

Scan measurements were made in SS19-1 using the automated SCM system with an MDCscan of 3087 dpm/100cm^2 (section 4.6 on page 5 of appendix A). The adjusted surrogate Cs137 DCGLw for this survey unit for the SCM scans was 27992 dpm/100cm^2 and the 75% administrative limit was 20994 dpm/100cm^2 (table 6 page 11 of appendix C).

Of the 167 square meters of this survey unit, portions were inaccessible to the SCM scanning for various reasons, particularly uneven surfaces not amenable to large probe automated scanning. Of the 167 square meters, 115 were actually scanned. Therefore about 69 percent of the survey unit was scanned which is consistent with coverage requirements for Class 2 survey units.

All SCM surveys indicated activity less than the 75% administrative limit for a minimum 1 square meter grid averaging. One square meter averages are applied to the SCM data since this is the minimum size of an area for emc testing per the SNEC LTP. No follow-up 43-68 scans were required.

6.1.2 Fixed point measurements

This survey unit was scanned using an automated position sensitive proportional counter. This survey unit did not receive fixed point direct static measurements. As discussed in section 5.0, the SCM is equivalent to continuous static measurements of the entire surface scanned.

6.2 Survey Unit SS19-2

6.2.1 Scan survey

Scan measurements were made in SS19-2 using the automated SCM system with an MDCscan of 3087 dpm/100cm^2 (section 4.6 on page 5 of appendix A). The adjusted surrogate Cs137 DCGLw for this survey unit for the SCM scans was 27992 dpm/100cm^2 and the 75% administrative limit was 20994 dpm/100cm^2 (table 6 page 11 of appendix C).

Of the 184 square meters of this survey unit, portions were inaccessible to the SCM scanning for various reasons, particularly uneven surfaces not amenable to large probe automated scanning. Of the 184 square meters, 75 were actually

scanned. Therefore about 41 percent of the survey unit was scanned which is consistent with coverage requirements for Class 2 survey units.

All SCM surveys indicated activity less than the 75% administrative limit for a minimum 1 square meter grid averaging. One square meter averages are applied to the SCM data since this is the minimum size of an area for emc testing per the SNEC LTP. No follow-up 43-68 scans were required.

6.2.2 Fixed point measurements

This survey unit was scanned using an automated position sensitive proportional counter. This survey unit did not receive fixed point direct static measurements. As discussed in section 5.0, the SCM is equivalent to continuous static measurements of the entire surface scanned.

6.3 Survey Unit SS19-3

6.3.1 Scan survey

Scan measurements were made in SS19-3 using the automated SCM system with an MDCscan of 3087 dpm/100cm^2 (section 4.6 on page 5 of appendix A). The adjusted surrogate Cs137 DCGLw for this survey unit for the SCM scans was 27992 dpm/100cm^2 and the 75% administrative limit was 20994 dpm/100cm^2 (table 6 page 11 of appendix C).

Of the 154 square meters of this survey unit, portions were inaccessible to the SCM scanning for various reasons, particularly uneven surfaces not amenable to large probe automated scanning. Of the 154 square meters, 86 were actually scanned. Therefore about 56 percent of the survey unit was scanned which is consistent with coverage requirements for Class 2 survey units.

All SCM surveys indicated activity less than the 75% administrative limit for a minimum 1 square meter grid averaging. One square meter averages are applied to the SCM data since this is the minimum size of an area for emc testing per the SNEC LTP. No follow-up 43-68 scans were required.

6.3.2 Fixed point measurements

This survey unit was scanned using an automated position sensitive proportional counter. This survey unit did not receive fixed point direct static measurements. As discussed in section 5.0, the SCM is equivalent to continuous static measurements of the entire surface scanned.

6.4 Survey Unit SS20-1

6.4.1 Scan survey

Scan measurements were made in SS20-1 using the automated SCM system with an MDCscan of 3087 dpm/100cm^2 (section 4.6 on page 5 of appendix A). The adjusted surrogate Cs137 DCGLw for this survey unit for the SCM scans was 27992 dpm/100cm^2 and the 75% administrative limit was 20994 dpm/100cm^2 (table 6 page 11 of appendix C).

Of the 269 square meters of this survey unit, portions were inaccessible to the SCM scanning for various reasons, particularly uneven surfaces not amenable to large probe automated scanning. Of the 269 square meters, 149 were actually scanned. Therefore about 55 percent of the survey unit was scanned which is consistent with coverage requirements for Class 2 survey units.

All SCM surveys indicated activity less than the 75% administrative limit for a minimum 1 square meter grid averaging. One square meter averages are applied to the SCM data since this is the minimum size of an area for emc testing per the SNEC LTP. No follow-up 43-68 scans were required.

6.4.2 Fixed point measurements

This survey unit was scanned using an automated position sensitive proportional counter. This survey unit did not receive fixed point direct static measurements. As discussed in section 5.0, the SCM is equivalent to continuous static measurements of the entire surface scanned.

6.5 Survey Unit SS20-2

6.5.1 Scan survey

Scan measurements were made in SS20-2 using the automated SCM system with an MDCscan of 3087 dpm/100cm^2 (section 4.6 on page 5 of appendix A). The adjusted surrogate Cs137 DCGLw for this survey unit for the SCM scans was 27992 dpm/100cm^2 and the 75% administrative limit was 20994 dpm/100cm^2 (table 6 page 11 of appendix C).

Of the 324 square meters of this survey unit, portions were inaccessible to the SCM scanning for various reasons, particularly uneven surfaces not amenable to large probe automated scanning. Of the 324 square meters, 142 were actually scanned. Therefore about 44 percent of the survey unit was scanned which is consistent with coverage requirements for Class 2 survey units.

All SCM surveys indicated activity less than the 75% administrative limit for a minimum 1 square meter grid averaging. One square meter averages are applied to the SCM data since this is the minimum size of an area for emc testing per the SNEC LTP. No follow-up 43-68 scans were required.

6.5.2 Fixed point measurements

This survey unit was scanned using an automated position sensitive proportional counter. This survey unit did not receive fixed point direct static measurements. As discussed in section 5.0, the SCM is equivalent to continuous static measurements of the entire surface scanned.

6.6 Survey Unit SS20-3

6.6.1 Scan survey

Scan measurements were made in SS20-3 using the automated SCM system with an MDCscan of 3087 dpm/100cm^2 (section 4.6 on page 5 of appendix A). The adjusted surrogate Cs137 DCGLw for this survey unit for the SCM scans was 27992 dpm/100cm^2 and the 75% administrative limit was 20994 dpm/100cm^2 (table 6 page 11 of appendix C).

Of the 359 square meters of this survey unit, portions were inaccessible to the SCM scanning for various reasons, particularly uneven surfaces not amenable to large probe automated scanning. Of the 359 square meters, 138 were actually scanned. Therefore about 38 percent of the survey unit was scanned which is consistent with coverage requirements for Class 2 survey units.

All SCM surveys indicated activity less than the 75% administrative limit for a minimum 1 square meter grid averaging. One square meter averages are applied to the SCM data since this is the minimum size of an area for emc testing per the SNEC LTP. No follow-up 43-68 scans were required.

6.6.2 Fixed point measurements

This survey unit was scanned using an automated position sensitive proportional counter. This survey unit did not receive fixed point direct static measurements. As discussed in section 5.0, the SCM is equivalent to continuous static measurements of the entire surface scanned.

6.7 Survey Unit SS21-1

6.7.1 Scan survey

Scan measurements were made in SS21-1 using the automated SCM system with an MDCscan of 3087 dpm/100cm^2 (section 4.6 on page 5 of appendix A). The adjusted surrogate Cs137 DCGLw for this survey unit for the SCM scans was 27992 dpm/100cm^2 and the 75% administrative limit was 20994 dpm/100cm^2 (table 6 page 11 of appendix C).

Of the 162 square meters of this survey unit, portions were inaccessible to the SCM scanning for various reasons, particularly uneven surfaces not amenable to large probe automated scanning. Of the 162 square meters, 21 were actually scanned. Therefore about 13 percent of the survey unit was scanned which is consistent with coverage requirements for Class 3 survey units.

All SCM surveys indicated activity less than the 75% administrative limit for a minimum 1 square meter grid averaging. One square meter averages are applied to the SCM data since this is the minimum size of an area for emc testing per the SNEC LTP. No follow-up 43-68 scans were required.

6.7.2 Fixed point measurements

This survey unit was scanned using an automated position sensitive proportional counter. This survey unit did not receive fixed point direct static measurements. As discussed in section 5.0, the SCM is equivalent to continuous static measurements of the entire surface scanned.

6.8 Survey Unit SS21-2

6.8.1 Scan survey

Scan measurements were made in SS21-2 using the automated SCM system with an MDCscan of 3087 dpm/100cm^2 (section 4.6 on page 5 of appendix A). The adjusted surrogate Cs137 DCGLw for this survey unit for the SCM scans was 27992 dpm/100cm^2 and the 75% administrative limit was 20994 dpm/100cm^2 (table 6 page 11 of appendix C).

Of the 184 square meters of this survey unit, portions were inaccessible to the SCM scanning for various reasons, particularly uneven surfaces not amenable to large probe automated scanning. Of the 184 square meters, 32 were actually scanned. Therefore about 17 percent of the survey unit was scanned which is consistent with coverage requirements for Class 3 survey units.

All SCM surveys indicated activity less than the 75% administrative limit for a minimum 1 square meter grid averaging. One square meter averages are applied to the SCM data since this is the minimum size of an area for emc testing per the SNEC LTP. No follow-up 43-68 scans were required.

6.8.2 Fixed point measurements

This survey unit was scanned using an automated position sensitive proportional counter. This survey unit did not receive fixed point direct static measurements.

As discussed in section 5.0, the SCM is equivalent to continuous static measurements of the entire surface scanned.

6.9 Survey Unit SS21-3

6.9.1 Scan survey

Scan measurements were made in SS21-3 using the automated SCM system with an MDCscan of 3087 dpm/100cm^2 (section 4.6 on page 5 of appendix A). The adjusted surrogate Cs137 DCGLw for this survey unit for the SCM scans was 27992 dpm/100cm^2 and the 75% administrative limit was 20994 dpm/100cm^2 (table 6 page 11 of appendix C).

Of the 154 square meters of this survey unit, portions were inaccessible to the SCM scanning for various reasons, particularly uneven surfaces not amenable to large probe automated scanning. Of the 154 square meters, 26 were actually scanned. Therefore about 17 percent of the survey unit was scanned which is consistent with coverage requirements for Class 3 survey units.

All SCM surveys indicated activity less than the 75% administrative limit for a minimum 1 square meter grid averaging. One square meter averages are applied to the SCM data since this is the minimum size of an area for emc testing per the SNEC LTP. No follow-up 43-68 scans were required.

6.9.2 Fixed point measurements

This survey unit was scanned using an automated position sensitive proportional counter. This survey unit did not receive fixed point direct static measurements. As discussed in section 5.0, the SCM is equivalent to continuous static measurements of the entire surface scanned.

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

SS19-1 had no alarm points during scan surveys of approximately 69% of the surface. Scan MDCs were adequate. Fixed point measurements were not required (reference 9.4 section 6.4.1). Scan fraction and elimination of fixed point measurements meets LTP and MARSSIM requirements.

SS19-2 had no alarm points during scan surveys of approximately 41% of the surface. Scan MDCs were adequate. Fixed point measurements were not required (reference 9.4 section 6.4.1). Scan fraction and elimination of fixed point measurements meets LTP and MARSSIM requirements.

SS19-3 had no alarm points during scan surveys of approximately 56% of the surface. Scan MDCs were adequate. Fixed point measurements were not required (reference 9.4 section 6.4.1). Scan fraction and elimination of fixed point measurements meets LTP and MARSSIM requirements.

SS20-1 had no alarm points during scan surveys of approximately 55% of the surface. Scan MDCs were adequate. Fixed point measurements were not required (reference 9.4 section 6.4.1). Scan fraction and elimination of fixed point measurements meets LTP and MARSSIM requirements.

SS20-2 had no alarm points during scan surveys of approximately 44% of the surface. Scan MDCs were adequate. Fixed point measurements were not required (reference 9.4 section 6.4.1). Scan fraction and elimination of fixed point measurements meets LTP and MARSSIM requirements.

SS20-3 had no alarm points during scan surveys of approximately 38% of the surface. Scan MDCs were adequate. Fixed point measurements were not required (reference 9.4 section 6.4.1). Scan fraction and elimination of fixed point measurements meets LTP and MARSSIM requirements.

SS21-1 had no alarm points during scan surveys of approximately 13% of the surface. Scan MDCs were adequate. Fixed point measurements were not required (reference 9.4 section 6.4.1). Scan fraction and elimination of fixed point measurements meets LTP and MARSSIM requirements.

SS21-2 had no alarm points during scan surveys of approximately 17% of the surface. Scan MDCs were adequate. Fixed point measurements were not required (reference 9.4 section 6.4.1). Scan fraction and elimination of fixed point measurements meets LTP and MARSSIM requirements.

SS21-3 had no alarm points during scan surveys of approximately 17% of the surface. Scan MDCs were adequate. Fixed point measurements were not required (reference 9.4 section 6.4.1). Scan fraction and elimination 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 could not be scanned using the SCM automated detector system. However, this was considered in the design that expected scanning of accessible areas.

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 so are in agreement with the primary scans. QC scans were conducted on 160 m^2 of the survey area, which represents about 20 percent of the 783 m^2 originally scanned. This exceeds the minimum 5% required.

7.4.2 Fixed point measurements

Since no fixed point measurements were required due to the unique nature of SCM scanning, no specific fixed point QC measurements were made.

8.0 Final Survey Conclusions

The Structural Surfaces of the SSGS intake tunnel survey units SS19-1, SS19-2, SS19-3, SS20-1, SS20-2, SS20-3, SS21-1, SS21-2, and SS21-3 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 SS19-1, SS19-2, SS19-3, SS20-1, SS20-2, SS20-3, SS21-1, SS21-2, and SS21-3.

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 intake tunnel designated SS19-1, SS19-2, SS19-3, SS20-1, SS20-2, SS20-3, SS21-1, SS21-2, and SS21-3 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 Left intentionally blank
9.6 COMPASS computer program, Version 1.0.0, Oak Ridge Institute for Science and Education
9.7 SNEC procedure E900-IMP-4500.59, "Final Site Survey Planning and DQA"
9.8 SNEC procedure E900-IMP-4520.04, "Survey Methodology to Support SNEC License Termination"
9.9 SNEC Survey Request (SR) # SR082
9.10 Shonka Research Associates, Inc. "Final Report for SCM Survey of Saxton Nuclear Experimental Corporation", March 3, 2005

10.0 Appendices

Appendix A - SNEC Calculation E900-03-016 – "Shonka Discharge and Intake Tunnels FSS Survey Design" (9 pages plus numerous attachments)
Appendix B - SNEC Calculation E900-03-016 – "Shonka Discharge and Intake Tunnels FSS Survey Design" Revision 1 (9 pages)
Appendix C - SNEC Calculation E900-03-016 – "Shonka Discharge and Intake Tunnels FSS Survey Design" Revision 2 (16 pages)

Appendix A

Survey Design
Revision 0

Appendix B

Survey Design
Revision 1

Appendix C

Survey Design
Revision 2