ORISE
OAK RIDGE INSTITUTE FOR SCIENCE AND EDUCATION

August 11, 2005

Mr. Thomas Dragoun
NRR/DRIP
U.S. Nuclear Regulatory Commission
475 Allendale Road
King of Prussia, PA 19406

**SUBJECT: DOCUMENT REVIEW—FINAL STATUS SURVEY REPORTS, SAXTON NUCLEAR EXPERIMENTAL CORPORATION, SAXTON, PENNSYLVANIA (DOCKET NO. 50-146; TASK 1)**

Dear Mr. Dragoun:

The Environmental Survey and Site Assessment Program (ESSAP) of the Oak Ridge Institute for Science and Education (ORISE) has reviewed Saxton Nuclear Experimental Corporation (SNEC) final status survey reports submitted to the U.S. Nuclear Regulatory Commission (NRC) on July 27, 2005. These documents describe the final status survey results for the following SNEC-designated areas: Embedded / Buried Piping, Open Land Area Survey Unit OL1-6, Open Land Area OL2, Residual Macadam in OL1, Small Penelec Garage, and Weir Discharge Area.

Comments identified are enclosed for your consideration. If you have any questions, please contact me at (865) 576-3356 or Alex J. Boerner at (865) 574-0951.

Sincerely,

Timothy J. Bauer
Health Physicist
Environmental Survey and
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TJB:ar

Enclosure

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**Comments on**
**Final Status Survey Reports**
**Saxton Nuclear Experimental Corporation**
**Saxton, Pennsylvania**

**August 2005**

Saxton Nuclear Experimental Corporation (SNEC) submitted final status survey reports (FSSR) to the U.S. Nuclear Regulatory Commission (NRC) on July 27, 2005. These documents described the final status survey (FSS) results for the following SNEC-designated areas: Open Land Area Survey Unit OL1-6, Open Land Area OL2, Residual Macadam in OL1, Small Penelec Garage, and Weir Discharge Area. The FSSRs were reviewed for completeness and conformance to the SNEC License Termination Plan (LTP, GPU 2004) and the MARSSIM (NRC 2000). Comments noted during the reviews are identified below.

***Open Land Area Survey Unit OL1-6 (GPU 2005a)***

1. Section 7.2.1, Page 11—This section states that soil samples were not collected at the bottom of the trench to one meter depth. To what depth were soil samples collected?

2. Section 8.0, Page 12—The first item in this section states that the "average residual radioactivity within the OL1-6 area is less than the assigned DCGLw." The average should be compared to the administrative limit (AL) rather than the $DCGL_W$. This comment also applies to the second item in this section.

3. Appendix A-1, Attachment 4-1—This attachment provides the MicroShield model output. Upon review, the source dimensions are different from a previously reviewed FSSR for Open Land Area OL3 (GPU 2005b). Specifically, the source radius was increased in this MicroShield model from 11 to 11.1 inches. This had the effect of increasing the conversion factor and thus decreasing the scan MDC. Please provide a justification for the increased source dimensions in the model. If this model was entered incorrectly, please review all FSSR MicroShield models for NaI soil scanning to ensure consistency.

4. Appendix A-1, Attachment 4-2—This attachment provides the scan MDC calculation. The noted background count rate is provided as 200 cpm. The same calculation for a previously reviewed FSSR for Open Land Area OL3 (GPU 2005b) used a background of 250 cpm. Please discuss how the background values were determined and why the background in a trench was lower than the background for a surface survey area.

***Open Land Area OL2 (GPU 2005c)***

1. Section 5.0, Table 1, Page 6 of 17—Please discuss, providing appropriate references (e.g. LTP), the applicability of using the Sign Test for non-radionuclide-specific measurements of the concrete surfaces. This approach contradicts Section 4.4 of the Penelec Switch Yard Control Building FSSR (GPU 2005d).

2. Section 8.0, Page 16 of 17—The first item in this section states that the "average residual radioactivity in the soils is less than the derived surrogate DCGLw in both survey units." The second item states that the "average residual radioactivity on the concrete is less than the derived surrogate DCGLw." The averages should be compared to the AL rather than the $DCGL_W$. This comment also applies to the third and fourth items in this section.

3. Appendix A, Attachment 3-1—Were the two instrument/probe combinations noted as having an instrument conversion factor/efficiency less than 205.6 cpm/μR/hr used during the FSS? Refer to Appendix A, Section 2.1.2, Page 2 of 9 for this requirement.

***Residual Macadam in OL1 (GPU 2005e)***

1. General—In many sections of the FSSR, data are compared to the $DCGL_W$ rather than the AL. Several examples are discussed below but are not intended to be all-inclusive. ESSAP recommends that SNEC review this FSSR carefully for additional applications of this comment.

2. Executive Summary, Page 1 of 27—This section notes that "42% of the actual surface area" was scanned. However, the following sections note that 100% of each survey unit of macadam was scanned. ESSAP recommends the discrepancy be corrected.

3. Section 5.0, Table 1, Page 7 of 27—Please discuss, providing appropriate references (e.g. LTP), the applicability of using the Sign Test for non-radionuclide-specific measurements of the concrete surfaces. This approach contradicts Section 4.4 of the Penelec Switch Yard Control Building FSSR (GPU 2005d).

4. Section 6.1.1, Page 8 of 27—This section compares the MDCscan to the $DCGL_W$ and states that since the MDCscan is less than the $DCGL_W$, the number of fixed point measurements did not need adjustment. The scan sensitivity should be compared to the AL. This comment also applies to Sections 6.2.1, 6.3.1, 6.4.1, 6.5.1, 6.6.1, 6.7.1, 6.8.1, 6.9.1, and 6.10.1.

5. Section 6.1.2, Page 8 of 27—This section compares fixed point measurements to the "adjusted surrogate DCGLw." The data should be compared to the AL. This comment also applies to Sections 6.2.2, 6.3.2, 6.4.2, 6.5.2, 6.6.2, 6.7.2, 6.8.2, 6.9.2, and 6.10.2.

6. Section 7.4.2, Page 25 of 27—This section describes the fixed point QC measurement results. SNEC noted that the results provided in Table 12 had good agreement and supported the same conclusion. However, according to SNEC Procedure E900-IMP-4520.04, *Survey Methodology to Support SNEC License Termination* (GPU 2005f), Section 4.6.2.4 indicates that for static measurements, QC measurements must have the same conclusion and must be within 20% of the original result. The following QC measurements shown in Table 12 do not meet the 20% requirement: MA8-8 2, MA8-9 1, MA8-13 2, MA8-16 1, and MA8-17 1. ESSAP recommends SNEC re-evaluate the QC measurements using the two times background provision discussed in Procedure E900-IMP-4520.04.

7. Section 8.0, Page 26 of 27—The first item in this section states that the "average residual radioactivity on the surfaces is less than the derived surrogate DCGLw in all the survey units." The average should be compared to the AL rather than the $DCGL_W$. This comment also applies to the second item in this section.

8. Appendix B, Section 2.1.2, Page 3 of 13—The SNEC Calculation Sheet notes that the instrument efficiency should not be less than 23.9%. Attachment 3-2 shows a total efficiency of 21.7% for detector serial number 92501. Was this detector used for the FSS?

*Small Penelec Garage (GPU 2005g)*

1. General—Was the Surface Contamination Monitor (SCM) data corrected for background contributions? If so, where were the background measurements using the SCM performed?

2. Section 5.0, Page 4 of 9—This section states that the "maximum MDC observed for a $100cm^2$ area in the SCM scanning was less than 25% of the DCGL." The MDC should have been compared to the AL, which results in a value of 28% of the AL.

3. Section 6.1, Page 6 of 9—This section states that "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." First, the 1 $m^2$ area factor can be applied to areas of elevated activity that are as small as 100 $cm^2$, which is the area used for demonstrating compliance. The 1 $m^2$ area factor is in effect a maximum concentration for any size of elevated area less than or equal to 1 $m^2$, not an acceptable area for averaging. Second, the SCM is capable of filtering the measured data, which is collected using virtual detectors with an area of 25 $cm^2$, and providing 100 $cm^2$ data in the form of summary statistical values, e.g. minimum, average, maximum. It is ESSAP's opinion that the 100 $cm^2$ data should have been reported instead of the 1 $m^2$ data.

4. Section 7.2, Page 7 of 9—This section states that there were no alarm points identified during scan surveys. What was the alarm set point? Was the SCM capable of providing an audible or visual alarm?

5. Section 7.4.1, Page 7 of 9—This section states that QC scans did not identify any activity above alarm points. Refer to Comment #4 above. Also, since the data collected was used to quantitatively assess the residual surface activity, it is ESSAP's opinion that the QC comparison should have been performed per Section 4.6.2.4 of SNEC Procedure E900-IMP-4520.04, *Survey Methodology to Support SNEC License Termination* (GPU 2005f) titled *Static Measurements* and documented in Section 7.4.2, *Fixed Point measurements*, of the FSSR.

6. Section 8.0, Page 8 of 9—The first item in this section states that the "average residual radioactivity on the surfaces is less than the derived surrogate DCGLw in all the survey units." The average should be compared to the AL rather than the $DCGL_W$. This comment also applies to the second item in this section.

*Weir Discharge Area (GPU 2005h)*

1. General—Please discuss how the submitted FSSR implements Section 5.5.3.4.7, *Subsurface Soil Contamination Survey*, of the LTP. Some examples of discrepancies noted by the reviewer include: 1) the referenced section of the LTP discusses soil sampling to one meter depth while the FSSR notes that samples were collected to a depth of 15 centimeters, 2) the referenced section of the LTP discusses determining the number of samples to collect using the applicable statistical test while the FSSR notes an arbitrary 30 samples for the entire length, and 3) the referenced section of the LTP discusses classifying the subsurface area while Table 3 of the FSSR notes the area as non-classified—the FSSR is contradictory in this regard because Section 1.0 notes the area as Class 3.

2. Section 6.3, Page 13—This section states that the "highest concentration found inside the Weir pipe remnants in this area was 63.2 pCi/g Cs-137 in grid BH-127." It is unclear to the reviewer the status of the Weir piping. What was the disposition of the pipe, especially the section mentioned with the residual activity exceeding the release criteria? What was the residual contamination on the inside of any other remaining Weir piping remnants?

3. Section 6.3, Page 13—This section notes that Appendix A-1 includes additional pipe internal sample results; however, Appendix A-1 only includes information regarding soil sampling.

4. Section 7.2, Page 16—Section 7.2.1 states that samples were collected from the soil bed below the Weir pipe in areas "where leaks would be expected." Section 7.2.2 states that "while the Weir Discharge line is a Class 1 survey object, the soil volume around the pipe is not." It is ESSAP's opinion that the soil beneath the pipe should have been considered Class 1 because of the contamination, corresponding to leaks in the Weir piping, exceeding the release criteria (Section 6.3, Page 13).

5. Section 7.2.6, Page 16—A concrete sample collected from the headwall is noted as having a Cs-137 concentration greater than the AL but less than the $DCGL_W$. Because another concrete sample "yielded a much lower concentration," the FSSR implies no further action was required. Please provide reference, e.g., from the LTP, noting that concrete volumetric samples can be used to demonstration compliance with intact and exposed concrete surfaces. Why, if surface scans were performed using a Geiger Mueller (GM) detector, the same detector was not used to perform direct measurements?

6. Section 8.0, Page 17—The first item in this section states that the "average residual radioactivity within the (MA3/MA4) area is less than the assigned DCGLw." The average should be compared to the AL rather than the $DCGL_W$. Also, a conclusion about the Weir piping remnants and soil around the piping outside the MA3/MA4 area is missing.

7. Appendix A-2—Survey Request (SR) number 0028 states that accessible areas of the Weir piping were to be surface scanned using a GM detector. The SR did not provide the amount of accessible area subject to surface scans.

8. Appendix A-5—This appendix provides the MicroShield model output. Upon review, the source dimensions are different from a previously reviewed FSSR for Open Land Area OL3 (GPU 2005b). Refer to Comment #3 under the *Open Land Area Survey Unit OL1-6* heading above.

9. Appendix A-6—This appendix provides the calculation of the scan MDC for the GM detector. What is the technical basis for selecting a surface efficiency ($\varepsilon_s$) equal to one (1)?

## REFERENCES


GPU Nuclear, Inc. (GPU). Saxton Nuclear Experimental Corporation Facility License Termination Plan. Saxton, Pennsylvania; Revision 3, February 2004.

GPU Nuclear, Inc. FSS Report – Open Land Area Survey Unit OL1-6. Saxton, Pennsylvania; July 27, 2005a.

GPU Nuclear, Inc. FSS Report – Open Land Area OL3. Saxton, Pennsylvania; July 27, 2005b.

GPU Nuclear, Inc. FSS Report – Open Land Area OL2. Saxton, Pennsylvania; July 27, 2005c.

GPU Nuclear, Inc. FSS Report – Penelec Switch Yard Control Building. Saxton, Pennsylvania; July 14, 2005d.

GPU Nuclear, Inc. FSS Report – Residual Macadam in OL1. Saxton, Pennsylvania; July 27, 2005e.

GPU Nuclear, Inc. SNEC Procedure E900-IMP-4520.04, *Survey Methodology to Support SNEC License Termination*, Revision 11. Saxton, Pennsylvania; May 24, 2005f.

GPU Nuclear, Inc. FSS Report – Small Penelec Garage. Saxton, Pennsylvania; July 27, 2005g.

GPU Nuclear, Inc. FSS Report – Weir Discharge Area. Saxton, Pennsylvania; July 27, 2005h.

U.S. Nuclear Regulatory Commission (NRC). Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM). Washington, DC; NUREG-1575; Revision 1, August 2000.