

February 19, 2001

Mr. G. A. Kuehn, Jr.
Vice President SNEC and
Program Director SNEC Facility
GPU Nuclear, Inc.
Rout 441 south
P.O. Box 480
Middletown, PA 17057-0480

SUBJECT: NRC INSPECTION REPORT NO. 50-146/2001-201

Dear Mr. Kuehn:

This letter refers to the inspection conducted on March 26-30 and December 3-6, 2001, at your Saxton Nuclear Experimental Facility. The inspection included a review of activities authorized for your facility. The enclosed report presents the results of that inspection.

Areas examined during the inspection are identified in the report. Within these areas, the inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations of activities in progress. Based on the results of this inspection, no safety concerns or noncompliances of NRC requirements were identified. No response to this letter is required.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at (the Public Electronic Reading Room) <http://www.nrc.gov/NRC/ADAMS/index.html>.

Should you have any questions concerning this inspection, please contact Mr. Thomas Dragoun at 610-337-5373.

Sincerely,

/RA/

Patrick M. Madden, Section Chief
Research and Test Reactors Section
Operating Reactor Improvements Programs
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket No. 50-146
License No. DPR-4

Enclosure: NRC Inspection Report No. 50-146/2001-201

cc w/enclosure: Please see next page

Saxton Nuclear
Experimental Corporation

Docket No. 50-146

cc:

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Mr. Larry Sather, Chairman
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Hopewell Township Supervisors
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James Creek, PA 16657-9512

Mr. D. Bud McIntyre, Chairman
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February 19, 2002

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Division of Regulatory Improvement Programs
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Docket No. 50-146
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Enclosure: NRC Inspection Report No. 50-146/2001-201
cc w/enclosure: Please see next page

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U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION

Docket No: 50-146

License No: DPR-4

Report No: 2001-201

Licensees: GPU Nuclear/ FirstEnergy Corporation and
Saxton Nuclear Experimental Corporation

Facility: Saxton Nuclear Experimental Facility

Location: Saxton, Pennsylvania

Dates: March 26-30 and December 3-6, 2001

Inspector: Thomas F. Dragoun

Approved by: Patrick M. Madden, Section Chief
Research and Test Reactors Section
Operating Reactor Improvements Programs
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

EXECUTIVE SUMMARY

Saxton Nuclear Experimental Facility
Report No: 50-146/2001-201

The primary focus of this routine, announced inspection was the on-site review of selected aspects of the licensee's decontamination and dismantlement activities including: organization and staffing; on-site laboratory analysis; 10 CFR 50.59 change reviews; Oversight Committee; and the Large Area Survey.

Organization and Staffing

- The licensee's organization and staffing remain in compliance with the requirements specified in the Technical Specification Section 3.1. Supervisory responsibilities and staff resources were realigned to address current project challenges.

Laboratory Analysis

- Analysis of dirt and water samples for isotopes identified in the License Termination Plan was acceptably performed.

Change Reviews

- The NRC revised change review requirements in 10 CFR 50.59 were properly implemented at the Saxton Nuclear Energy Corporation facility in October 2001.

Oversight Committee

- Independent assessments provided by the Oversight Committee satisfied the Technical Specification requirements.

Large Area Survey

- Large area survey area classification will be confirmed with confidence due to conservative specifications required for the survey, and state of the art techniques used by the contractors performing the survey.

REPORT DETAILS

Summary of Plant Status

Additional office trailers were added to the site complex to house contractors associated with the removal of concrete from inside the reactor containment vessel (CV). Sections of soil adjacent to the CV exterior were being excavated to bedrock. Anchor bolts were then grouted into the bedrock for stabilizing the CV during concrete removal. Steel sheet pilings and 80 dewatering wells were being installed around the CV to control ground water and reduce CV buoyancy that will result during concrete removal. Boring material from the wells was analyzed for radioactivity and a surface scan radiation survey of approximately 30 acres of class 2 and 3 impacted areas (not likely or low probability of residual radioactivity) was conducted on site.

1. Organization and Staffing

a. Inspection Scope

The inspector reviewed the following regarding the licensee's organization and staffing to ensure that the requirements of Technical Specification (TS) Section 3.1, Amendment 16, dated August 10, 2000, were being met:

- organizational structure
- management responsibilities
- staffing requirements for safe performance of decommissioning activities.

b. Observations and Findings

Through discussions with licensee representatives, the inspector determined that management responsibilities and the organization at the facility had changed since the previous NRC inspection of this area in June 2000 (Inspection Report No. 50-146/2000-201). One reorganization change, implemented on August 23, 2001, involved the re-alignment of field work Group Radiological Controls Supervisors (GRCS) and associated Radiological Controls Technicians (RCT) to report directly to the work supervisor in charge of remediation in areas outside the Containment Vessel (CV). This integrates the radiation safety oversight and support with the craft labor performing the work. The Radiation Safety Officer (RSO) now supervises the staff responsible for developing and conducting the characterization surveys, final site status surveys, and the counting laboratory. This change allowed the RSO to focus technical expertise on the license termination surveys. However, he retained overall responsibility for the radiation safety programs as specified in TS 3.1.4.

During 2001, General Public Utilities, Inc.(GPU), merged with FirstEnergy Corporation (FE). As a result of the merger, the responsibilities of the GPU Nuclear Cognizant Officer described in TS 3.1.1 were transferred to the President, FirstEnergy Nuclear Operating Company (FENOC) on November 30, 2001. The Saxton Nuclear Energy Corporation (SNEC) Program Director stated that, at this time, no impact was anticipated on site policies, programs, or staff from this change.

A second radwaste shipper (contractor) was added to the staff in anticipation of the increased workload during CV concrete removal and disposal.

c. Conclusions

The licensee's organization and staffing remain in compliance with the requirements specified in the TS Section 3.1.

2. Laboratory Analysis

a. Inspection Scope

The inspector reviewed the following to ensure that the on-site analysis of dirt and ground water samples was conducted using generally accepted laboratory practices; produced reliable data; and laboratory equipment calibration and quality controls were as required by 10 CFR 20.1501(b):

- SNEC Procedure E900-ADM-4500.39, "Chain of Custody for Samples" rev. 3, effective December 3, 2001
- SNEC Procedure E900-IMP-4520.02, "Preparation of Sample Materials for Analysis" rev. 4, effective October 9, 2001
- SNEC Procedure E900-IMP-4520.04, "Survey Methodology to Support SNEC License Termination" rev 2, effective October 9, 2001
- Memorandum SNEC-01-035, "Gamma Spectroscopy System Counting Geometries for Soil, Sediments, and Liquids" dated December 5, 2001
- Quarterly inter-laboratory comparison of spiked sample analysis data with the Department of Energy/Environmental Measurements Laboratory (DOE/EML) and the Environmental Protection Agency (EPA) for 2001.

b. Observations and Findings

For many years, the Environmental Radioactivity Laboratory (ERL) performed the analysis of samples taken as specified by the NRC-approved Radiological Environmental Monitoring Program (REMP) for the three nuclear power plants owned by GPU and was routinely inspected by the NRC. After GPU sold its power plants, the ERL was closed in 2000 and the staff was terminated. SNEC purchased much of the laboratory equipment and spare parts and moved them to the SNEC site. A few ex-ERL staff were contracted along with equipment vendors to oversee the installation, operational check-out, and calibration of the analytical equipment now on the SNEC site. New computers were purchased for data acquisition and storage. The Genie 2000 software program was installed to perform the multi-channel analysis, spectrum stripping, and quality assurance trending for the gamma spectroscopy systems. Detecting efficiencies for the intrinsic gamma detectors were reported to be in the 40 percent range, thus indicating that performance was comparable to the current state of the art. Calibration standards had NIST certification. The licensee participates in quarterly inter-laboratory comparison programs administered by the DOE/EML and EPA and achieved acceptable results during the last three quarters of 2001. In addition, soil and water samples were sent to commercial laboratories for independent confirmation of analytical results. These results were satisfactory. One detector and associated liquid nitrogen cooling Dewar were portable for use in the field. This unique capability has not been used thus far, the primary use has been as a stationary device. The licensee's capability to detect the gamma emitters Co-60 and Cs-137 reported in the site characterization data of the License Termination Plan (LTP), dated February 2, 2000, was satisfactory. Current use of the laboratory was to support remediation and site

characterization surveys. The capability to measure sample activity at the Derived Concentration Guideline (DCGL) values to be used during the Final Status Survey (FSS) will be reviewed in a future inspection after the DCGLs are finalized.

One liquid scintillation counter was operational for detecting beta emitters in water samples. Standard sample sizes, scintillating cocktail dilutions, and data reduction software were used. Sample runs included blanks and standards in each batch for quality control purposes in accordance with the manufacturers recommendations. Participation in the inter-laboratory programs described above indicated acceptable results were obtained during the same periods of 2001. The licensee's capability to detect the beta radiation emitters H-3, Ni-63, and Sr-90 reported in the LTP was satisfactory.

Equipment for laboratory detection of alpha radiation emitters was available but not operational. Off site laboratory services continue to be used for this analysis as required. However, the alpha emitter Am-241 reported in the LTP may be detected by its gamma emissions.

A representative from the Oak Ridge Institute for Science and Education (ORISE) was present during the March 27-29, 2001, portion of this inspection and reviewed the early phases of the laboratory installation. No issues were identified.

The inspector observed the taking of a sediment sample during the drilling of one dewatering well. The inspector noted that digital photographs are taken during sampling and become part of the chain of custody. The RSO stated that this was done due to the rapid changes in site conditions and the difficulty in returning to the same location in the future if questions arise. This was a commendable practice.

Sediment and soil samples were oven dried, sifted, placed in 1 liter Marinelli containers, weighed on a digital scale, and counted as required by the licensee's procedure. Generally accepted techniques were used. Chain of custody records were properly maintained and filed. After analysis, samples are stored on site.

c. Conclusions

Analysis of dirt and water samples for isotopes identified in the LTP was acceptably performed.

3. **Change Reviews**

a. Inspection Scope (IP 37801)

The inspector reviewed the following to ensure that the requirements of 10 CFR 50.59 and 50.82 were being met for the removal of concrete from the CV:

- SNEC Procedure E900-ADM-4500.52, "SNEC Facility Regulatory Review Process" rev. 2, effective October 24, 2001
- Station Work Instruction (SWI)-01-003, "SNEC Facility CV Concrete Removal Modification Package Instruction"
- SWI-01-003.1, "Control of Ground Water"
- SWI-01-003.1.1, "Interceptor Trench and Grading and Drainage Construction"

- Observed a work coordination meeting between SNEC and TLG personnel

b. Observations and Findings

The NRC revised section 10 CFR 50.59 and specified an effective date as March 13, 2001. However, NRC Regulatory Issue Summary (RIS) 2001-03, "Changes, Tests, and Experiments" dated January 23, 2001, stated that if a licensee is in compliance with the old rule, the licensee also satisfies the requirements of the amended rule. On this basis, SNEC management postponed implementation of the revised requirements until October 2001. Since all work on site is authorized by issuance of an approved SWI procedure, the 10 CFR 50.59 required reviews have been incorporated into the procedure development process.

The licensee stated that SNEC supervisors had trained the concrete removal contractor's staff (TLG) to provide draft SWIs for the work and document the associated change reviews required by 10 CFR 50.59 and 50.82. SNEC procedure E900-ADM-4500.52 provides the requirements for the reviews and satisfactorily implements NRC Regulatory Guide 1.187, "Guidance for Implementation of 10 CFR 50.59, Changes, Tests, and Experiments" dated November 2000 and Industry Guide NEI 96-07, "Guidelines for 10 CFR 50.59 Implementation" rev. 1 dated November 2000. The appendices to the SNEC procedure provided highly detailed guidance for answering each review "question." This approach ensured that the appropriate safety considerations were incorporated in formulating the response.

The three SWI's reviewed by the inspector were completed in accordance with the revised procedure. Signature records also indicated that independent reviews by the qualified technical expert required by TSs 3.5.1.2 and 3.5.2.2 and a committee consisting of site management were complete and the documentation was acceptable.

c. Conclusions

The NRC revised change review requirements in 10 CFR 50.59 were properly implemented at the SNEC facility in October 2001.

4. **Oversight Committee**

a. Inspection Scope

The inspector reviewed the following to verify compliance with TS 3.5.5:

- Observed Meeting No. 5 of the SNEC Oversight Committee held December 5, 2001
- Meeting agenda
- committee membership

b. Observations and Findings

A quorum was present at the meeting and agenda subject matter was as stipulated in the TS. The inspector noted that members of the public and the Independent Assessor attended the meeting. Information and status was provided to the committee by site management. One subject discussed was the safety issues associated with the concrete removal from the CV including the need for noise abatement for nearby

residents. During the break, the inspector commented to the SNEC Program Director that experience at other sites with rubblelizing high density concrete with large hydraulic impact hammers required shrapnel protection for the workers. A member of the public expressed a concern about the control of airborne releases. After the executive session of the Oversight Committee, the inspector was informed that one committee member was designated to personally observe the preparations and conduct of the concrete removal from the CV.

c. Conclusions

Independent assessments provided by the Oversight Committee satisfied the TS requirements.

5. Large Area Survey

a. Inspection Scope (IP 83801)

The inspector reviewed the following to verify compliance with the commitments made in the License Termination Plan rev.0 dated February 2, 2000:

- GPU Nuclear Request for Proposal for Site Survey, GPUN RFP 00TN0907, dated September 22, 2000.
- SNEC memorandum, "Data Quality Objectives for Phase I SNEC Site Survey Services" original, dated November 21, 2001
- SNEC SWI-01-001, "Shonka Research Associates Large Area Survey" rev.2, dated December 3, 2001

CHEMRAD Procedures and Documents:

- Technical Report on Radiological Scanning Methods for Final Status Surveys in Open Land Areas at the Saxton Nuclear Experimental Corporation Facility, rev.1, dated March 8, 2001
- Saxton Site Survey (proposal) dated October 18, 2000
- Standard Operating Procedure (SOP) -24, "Radiological Instrument Response Check" rev.1, dated March 15, 2001
- SOP-24, "USRADS Field Procedures" rev.1, dated March 20, 2001
- SOP-25, "PDGPS Field Procedures" rev.1, dated March 20, 2001
- SOP-26, "Soil Moisture Measurement Procedures" rev.1, dated March 15, 2001
- SSP-SNEC-02, "3X3 NaI Detector Calibration" rev.1, dated March 15, 2001
- SSP-SNEC-03, "3X3 NaI Detector Standardization" rev.1, dated March 15, 2001
- SSP-SNEC-04, "Setting Regions of Interest" rev.1, dated March 15, 2001
- SSP-SNEC-05, "Determining KUT Coefficients" rev.1, dated March 15, 2001
- SSP-SNEC-06, "Final Status Scanning Surveys" rev.1, dated March 15, 2001
- SSP-SNEC-07, "SNEC FSS Scan Data Processing" rev.0, dated March 15, 2001
- SSP-SNEC-08, "SNEC Logbook Documentation" rev.0, dated March 15, 2001
- PCN-01, "Procedure Change Notice", undated

Shonka Research Associates Procedures and Documents:

- Subsurface Multi-spectral Contamination Monitor (SMCM) Procedure 002, "Fixed *In situ* Data Collection in Support of SMCM Survey" rev.4, dated November 25, 2001
- SMCM Procedure 004, "Source Response Checks and Performance Based Checks of any NaI Detector Configuration Installed on the SMCM" rev.2, dated November 25, 2001

- SMCM Procedure 005, "Calibration and Confirmation of a SMCM Incremental Encoder" rev.2, dated November 25, 2001
- SMCM Procedure 006, "Requirements for Completion of a Survey Using the SMCM" rev.1, dated November 25, 2001
- SMCM Procedure 007, "Calibration of NaI Detector" rev.1, dated November 25, 2001
- Rancho Seco Non-Industrial Area Survey Project, Final Report, Revision 2, dated June 26, 2001 (2 volumes)

NRC

- Inspection Report No. 50-219/1999-013, dated March 2, 2000

b. Observation and Findings

In September 2000, the licensee initiated the SNEC Large Area Survey project to conduct 100 percent surface scan radiation surveys of the entire site to justify the classification of various areas. The project was divided into two phases; Phase 1 which included class 2 (not likely to have residual radioactivity) and class 3 (low probability of residual radioactivity) impacted areas identified in LTP Figure 5-1 "Site Area Grid Map" rev.0 dated January 17, 2000; Phase 2 which would involve the remainder of the site. The areas were classified in the LTP in accordance with NUREG-1575, "Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM)", dated December 1997. A 100 scan exceeded the MARSSIM recommendation for class 2 and 3 areas. A minimum detectable concentration (MDC) for the survey was set at ≤ 1.5 pCi/g of Cs-137. This was a factor of 10 below the anticipated value of the DCGL to be used during the final status survey.

A contract for the survey was issued to CHEMRAD and was scheduled to begin the last week in March 2001. The inspector and an NRC contractor representative (ORISE) observed the setup and calibration of the survey equipment. The field apparatus consisted of two NaI detectors mounted on a golf cart coupled to a computer for data and position acquisition. Position was determined from satellite data by a vehicle mounted Global Positioning System (GPS) with corrections from fixed Differential GPS receivers stationed in the survey area. The MDC for the apparatus met the specified criteria and was calculated based on NaI detector efficiency, scanning speed, and complex post-processing data analysis software. Due to equipment glitches and concerns about shielding from the high water content in the site soil after the rain, the survey was postponed until the weather improved. CHEMRAD went out of business before completing the survey.

A second contract was issued to Shonka Research Associates (Shonka) to perform the survey during the early part of December 2001. The inspector observed the calibration and use of the vehicle mounted and fixed mounted survey equipment. Calibration used NIST certified Co-60 and Cs-137 sources was performed daily. A field check was also performed by burying a Cs-137 calibration source at various depths in the soil. The mobile apparatus consisted of four NaI detectors mounted 2 meters apart and 1 meter above the ground on a pick-up truck. The same detectors were singly mounted on tripods for fixed measurements. Each detector was mounted in an environmental enclosure to minimize temperature drift. Accurate positional data was obtained from Differential GPS receivers and a rotation encoder mounted on one of the vehicle wheels. Alarms alerted the driver if the scan speed was exceeded or the recorded spectrum shifted more than two channels. Radon concentrations were continuously

monitored for adjustment of background corrections. A gamma energy peak of naturally occurring K-40 was used as a benchmark to provide continuous quality control verification that the spectrum calibration remained stable. A calibration check with the Co-60 and Cs-137 sources was performed every 4 hours during the survey. The standard deviation criteria for laboratory equipment was applied to the calibration data to verify equipment operability.

The software used to process the data had been developed under an NRC contract with Shonka and was published as NUREG/CR-6450, "Characterization of Contamination through the use of Position Sensitive Detectors and Digital Image Processing", dated June 1996. One of the authors of the report was the supervisory member of the survey team. The calculated MDC in vehicle scan mode satisfied the sensitivity requirement specified in the SNEC contract. In the fixed mount mode, the MDC was a factor of 5 better than the specification.

The apparatus, software, and techniques used during the SNEC survey had been previously reviewed by the NRC during the 1998 and 1999 scoping and final status surveys at the GPU Forked River Property adjacent to the Oyster Creek Nuclear Generating Station. It was found to be acceptable.

c. Conclusion

The classification of areas reported in the LTP will be confirmed with confidence during the Large Area Surveys due to: 1) conservative specifications required for the survey, and 2) state of the art techniques used by the contractors performing the survey.

6. Exit Interview

The inspection scope and results were summarized on December 6, 2001, with members of licensee management. The inspector described the areas inspected and discussed in detail the inspection findings. No dissenting comments were received from the licensee.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

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P. Carmel, SNEC Site Supervisor
G. A. Kuehn, SNEC Program Director
A. Paynter, SNEC Radiation Safety Officer
W. Stoner, SNEC Radiological Engineering
M. Williams, SNEC D&D Engineering

INSPECTION PROCEDURES USED

IP 37801 Safety Reviews, Design Changes, and Modifications
IP 83801 Inspection of Final Surveys at Permanently Shut Down Reactors.

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

None

LIST OF ACRONYMS USED

CFR	Code of Federal Regulations
CV	Containment Vessel
DCGL	Derived Concentration Guideline
DOE	Department of Energy
EML	Environmental Measurements Laboratory
EPA	Environmental Protection Agency
ERL	Environmental Radiation Laboratory
FE	FirstEnergy, Inc
FENOC	FirstEnergy Nuclear Operating Company
FSS	Final Status Survey
GPS	Global Positioning System
GPUN	General Public Utilities Nuclear
GRCS	Group Radiological Controls Supervisor
IP	Inspection Procedure
LTP	License Termination Plan
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MDC	Minimum Detectable Concentration
NEI	Nuclear Energy Institute
NIST	National Institute of Standards and Technology
NRC	Nuclear Regulatory Commission
ORISE	Oak Ridge Institute of Science and Education
RCT	Radiological Controls Technician
REMP	Radiological Environmental Monitoring Program
RFP	Request for Proposal
RIS	Regulatory Issue Summary
RSO	Radiation Safety Officer
SNEC	Saxton Nuclear Experimental Corporation
SWI	Station Work Instruction
TLG	Thomas LaGuardia Associates (contractor)
TS	Technical Specification