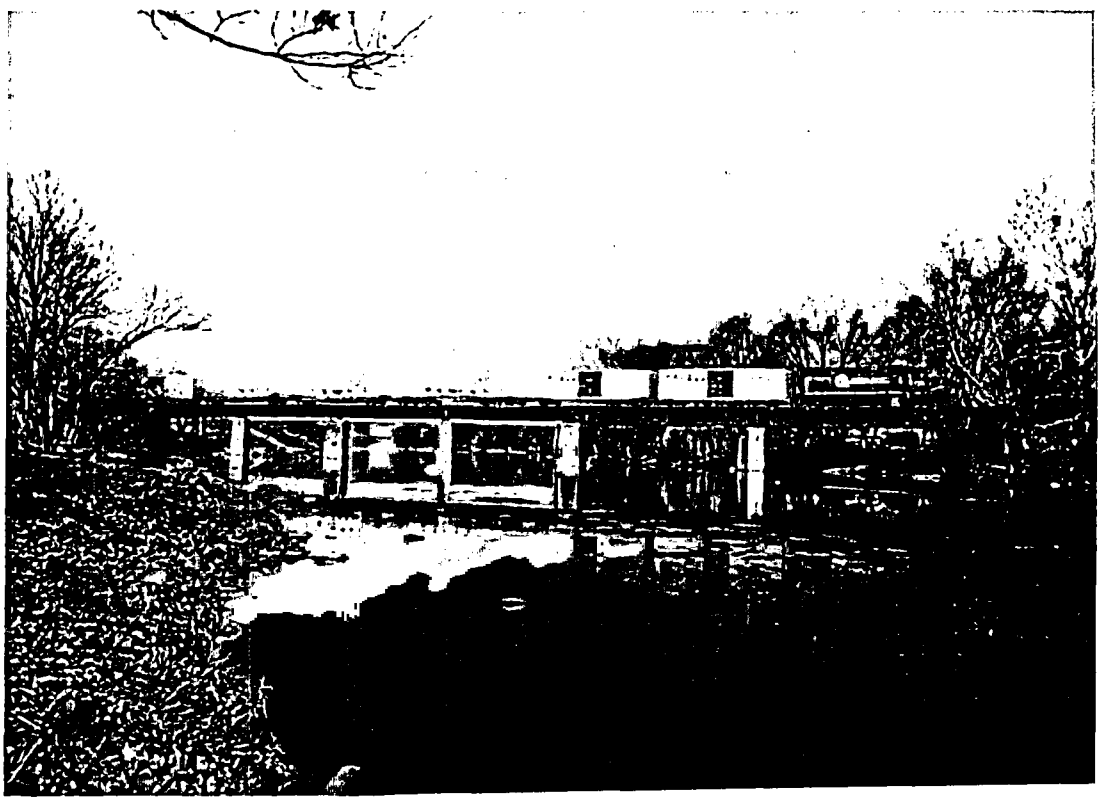
Saxton Independent Inspection Program

for the

Decommissioning of the Saxton Nuclear Reactor

Final Report

50-146



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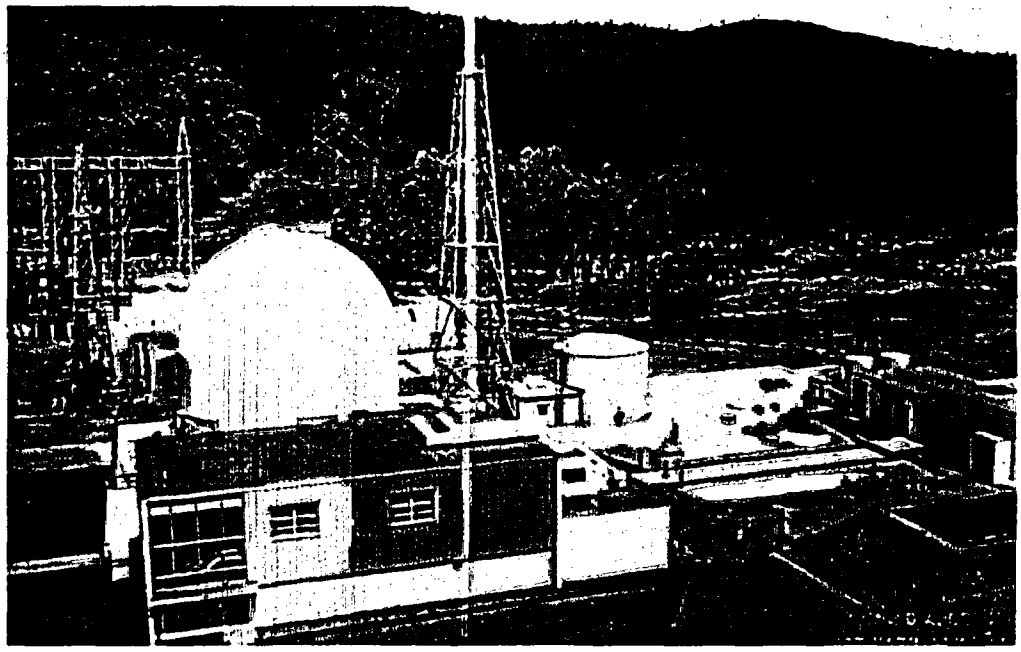

Rodger W. Granlund
Independent Inspector
133 Old Mill Road
State College, PA 16801
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May 2006

A020

Table of Contents

Attachments

An enormous amount of written information was generated during this project. I have reviewed and summarized some of those documents in this report. However, no single report could cover all the documents, at least not in one volume. The correspondence between GPU Nuclear and the NRC and the reports submitted to the NRC are public documents that are accessible via the internet in the NRC Electronic Reading room at http//www.nrc.gov. A number of the documents have been included as an attachment to this report in .pdf files on the CD that accompanies this report. The grid map of the Penelec site is also included on the CD but it is in a format that requires special drawing software to view. Therefore, a large printed copy of the map is included with this report. The narrative sections of the FSS reports are included on the CD, but the attachments for the reports were too large for a single CD.

Attachment A

SNEC Facility Site Area Grid Map, printed copy

Attachment B Compact Disc contents

- B1 Independent Inspection Program Final Report
- B2 Independent Inspection Program Quarterly reports
- B3 Decommissioning Plan
- B4 Historic Site Assessment Report
- B5 License Termination Plan, Revision 2
- B6 License Termination Plan, Revision 3
- B7 Final NRC inspection
- B8 Site map
- B9 Selected photographs

Acknowledgements

The SNEC Reactor was a Demonstration Power Reactor. It was at the forefront of a new technology, and served as a test bed for new concepts and as a training ground for that technology. The SNEC facility was also at the forefront of the decommissioning process and served as a test bed for new NRC decommissioning regulations and new survey MARSSIM procedures. The Independent Inspection Program was also a relatively new concept for such projects.

The Independent Inspection Program was only a small part of the decommissioning project. However, I think that it was successful in keeping the public informed about the progress of the decommissioning and providing some assurance that the project was being monitored by an independent representative.

However, I must acknowledge that the most important part of the public involvement in this project was the Saxton Citizens Task Force. The core group of the Task Force who faithfully attended meetings over a 10-year period are to be commended, especially the Chairman, James Fockler. Charlie Barker did not live to see the completion of the project, but his keen interest and assistance were very much appreciated. Jon Bachman, Editor of the Broadtop Bulletin and a Task Force member, wrote numerous articles that kept the public aware of the progress of the project. I think Jon is also credited with the suggestion of choosing representatives from a wide spectrum of organizations to achieve a Task Force that was representative of the whole community.

Throughout the decommissioning there was one member of the public, who could be counted on to attend the many meetings associated with the decommissioning project and to offer insightful comments and questions. Thank you Ernest Fuller for your involvement and your diligence.

The Bedford County Commissioners supported the project by serving as the official sponsor for the Independent Inspection Program and the Saxton Citizens Task Force. They provided that support without interfering in the process. Commissioner Dick Rice took a special interest in the project and was the only Commissioner to serve for the length of the project. I was saddened to hear of his death a few days ago. I was looking forward to personally presenting him a copy of the final report and extending my personal thanks. The Huntingdon County Commissioners were not officially involved in the project, but Huntingdon County was certainly involved and the support of the Commissioners and Huntingdon County residents was very important.

My job would have been much more difficult without the cooperation of the GPU Nuclear employees and subcontractors. There are too many to name, but I want to acknowledge Joe Kuehn, Perry Carmel, Mike Williams, Lou Shamanek, Jim

Byrne, Bob Homes, Art Paynter, Barry Brosey, Pat Donnachie, Sylvia Morris and all the radiation control and trades persons that assisted me.

I want to acknowledge the role of the Saxton Oversight Committee in building public confidence that safety of the public and the workers was a primary goal in the decommissioning project. I believe that inviting the Task Force members to attend the Oversight Committee meetings was a major factor in establishing that confidence.

It is probably not often that a federal regulatory agency is acknowledged for helping to accomplish a project. However, in this case I want to acknowledge two NRC employees, Tom Dragoun and Al Adams. They showed a desire to complete license termination process safely and as efficiently as the regulations would allow. They established enough confidence in the community that the Task Force objected to the NRC Commissioners when it appeared they might be taken off the Saxton project.

And to all the others who have assisted in this project, thank you.

Rodger W. Granlund
Saxton Independent Inspector

Disclaimer

As the Independent Inspector I have tried to be objective in my reporting and in providing information to the public on the decommissioning of the Saxton reactor. I also realize that in a 10-year period it is just about impossible not to introduce some of my own biases into the many reports that have been issued and the meetings attended. While there have been a few differences of opinion with the parties involved, none of the parties has attempted to change the way I chose to perform the duties of the Independent Inspector. Any opinions expressed by me are my own and do not represent the positions of the Bedford County Commissioners, the Saxton Citizens Task Force, Penn State University, GPU Nuclear, First Energy or any of the other parties that have been involved in this project.

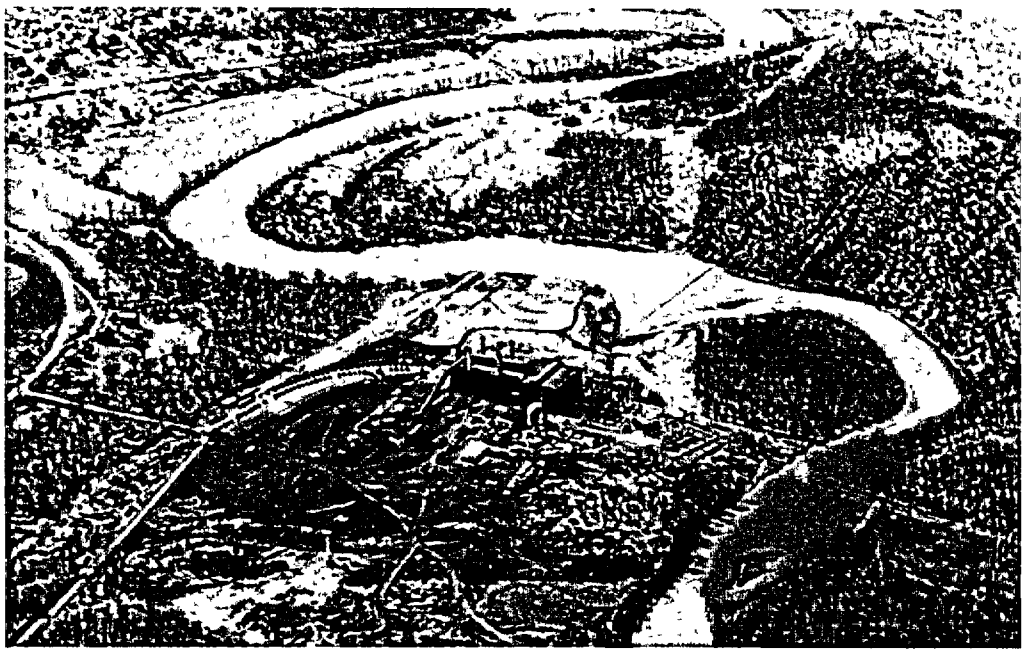
I also take responsibility for any errors and/or omissions in the reports and other material that I have prepared during the course of the project. As I was responsible for the preparation, typing, assembling and mailing of those reports, I really do not have anyone else to blame.

Rodger W. Granlund
Saxton Independent Inspector.

Acronyms and Abbreviations

ALARA	As Low As Reasonably Achievable
BRP	Bureau of Radiation Protection (Pennsylvania)
CD	Compact Disc
CFR	Code of Federal Regulation (10CFRnn is Title 10 Part nn)
Ci	Curie (unit of radioactivity, 3.7×10^{10} disintegrations/second)
cm	centimeter
CNS	Chem-Nuclear Systems
CCSS	Concerned Citizens for SNEC Safety
CV	Containment Vessel (reactor containment vessel)
cpm	counts per minute
DEP	Department of Environmental Protection (Pennsylvania)
DPR	Demonstration Power Reactor (NRC license, SNEC license was DPR-4)
DSB	Decommissioning Support Building
$DCGL_{EMC}$	Derived Concentration Guideline for areas with elevated concentrations
$DCGL_W$	Derived Concentration Guideline for average volumetric or surface concentrations
dpm	disintegrations per minute
FSAR	Final Safety Analysis Report
FSS	Final Status Survey
GFPC	Gas-Flow Proportional Counter
GPU	General Public Utilities
GPUN	GPU Nuclear
GEIS	Generic Environmental Impact Statement
g	gram
gcpm	gross count per minute
HSA	Historic Site Assessment
HTD	Hard to Detect (radionuclides that are hard to detect)
LBGR	Lower Bound of the Gray Region (part of the MARSSIM statistical test)
LTP	License Termination Plan
μCi	microcurie
μrem	microrem
μR	microroentgen
mCi	millicurie
mrem	millirem
mR	milliroentgen
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MDA	Minimum Detectable Activity
MDC	Minimum Detectable Concentration
ncpm	net counts per minute
NaI	sodium iodide (gamma ray scintillation detector)
NRC	Nuclear Regulatory Commission

ORISE	Oak Ridge Institute of Science and Education
PABRP	Pennsylvania Bureau of Radiation Protection
PADEP	Pennsylvania Department of Environmental Protection
Penelec	Pennsylvania Electric Company
PAF	Personnel Access Facility
pCi	picocurie
PRI Area	Post Remediation Isolation Area (area where remediation has been completed and access is restricted)
PSDAR	Post-Shutdown Decommissioning Activities Report
PZ	Pressurizer
PCP	Process Control Plan
R	roentgen
rem	rem, a unit of radiation dose
RWP	Radiation Work Permit
RWDF	Radioactive Waste Disposal Facility
RV	Reactor vessel
RRC	Readiness Review Committee
SARG	Saxton Activities Review Group
SNEC	Saxton Nuclear Experimental Corporation
SNEF	Saxton Nuclear Experimental Facility
SACMA	Special Alpha Control Monitoring Area
SCM	Surface Contamination Monitor (Shonka)
SMCM	Subsurface Multispectral Contamination Monitor (Shonka)
SRA	Shonka Research Associates
SSGS	Saxton Steam Generating Station
SWI	Station Work Instruction
SG	Steam generator
SCO	Surface Contaminated Object
TEDE	Total Effective Dose Equivalent
TLD	Thermoluminescent Dosimeter
TRU	Transuranic radionuclides (atomic number >92)



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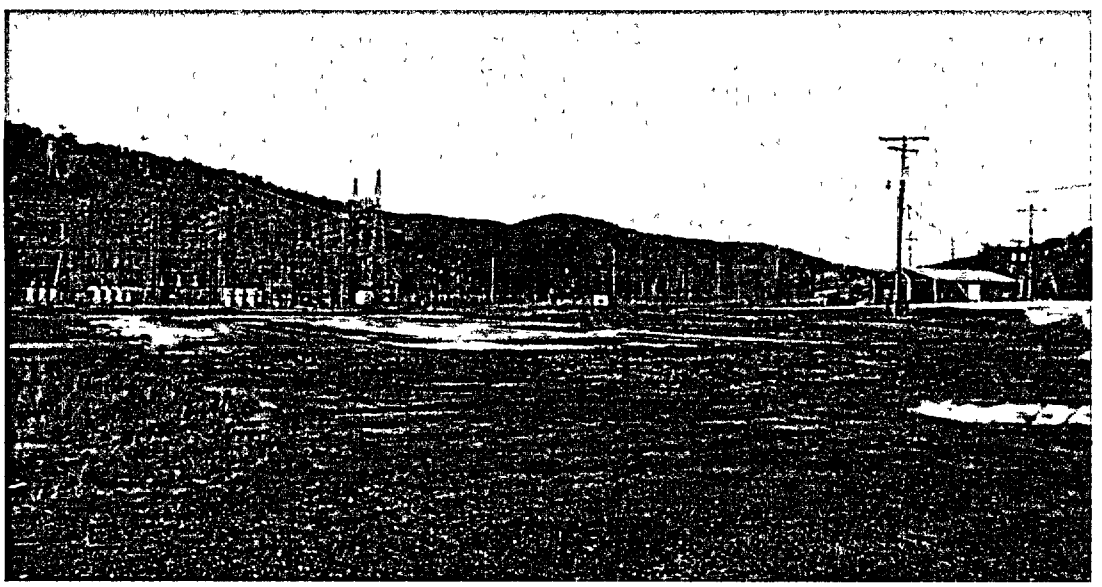

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Summary

The Saxton Nuclear Experimental Corporation (SNEC) nuclear reactor was built on the site of the Penelec Saxton Steam Generating Station at Saxton, PA. The 23.5 thermal megawatt pressurized water reactor achieved criticality on 12 Apr 1962 and operated until 1 May 72. Steam from the reactor was used to operate a turbine generator in the SSGS. The fuel was removed from the reactor in 1972 and shipped to the U. S. Atomic Energy Facility at Savannah River, SC. The buildings and structures that supported reactor operations were partially decontaminated in the 1972-1974 period. In 1980 SNEC arranged for GPU Nuclear to maintain the SNEC facilities and to be responsible for the decommissioning. In the period 1987 to 1989 the Control and Auxiliary Building, the Radioactive Waste Disposal Facility and other support facilities were decontaminated. The support buildings were demolished in1992. The Soil Remediation Project, which involved the disposal of 56,000 ft^3 of contaminated soil from about 2 acres around the reactor, was completed in 1994. In 1995 radiological and environmental data were collected for the Site Characterization Plan. In February 1996 GPUN submitted the SNEC Facility Decommissioning Plan to the NRC and the license amendment to allow decommissioning was issued on 20 Apr 98.

The Independent Inspection Program was initiated as a result of Public Utility Commission hearings involving the expenditure of funds for the decommissioning of the SNEC facility. GPU Nuclear Corporation, the operator of SNEC, and the Bedford County Commissioners agreed to a program in which GPU Nuclear contracted with Penn State University to provide the part-time services of Rodger Granlund as the Independent Inspector. The responsibility of the inspector was to keep the Bedford County Commissioners and the local community informed of the progress of the decommissioning work and to serve as a technical resource on radiation safety. Mr. Granlund reported on the decommissioning activities through quarterly written reports and verbal reports at the meetings of the Saxton Citizens Task Force.

The Saxton Citizens Task Force the local advisory committee for the decommissioning of the Saxton reactor. The Task Force membership included volunteers representing 15 organizations plus two members-at-large. Sylvia Morris, a GPU Nuclear Public Information Specialist, provided secretarial services as a non-voting member of the Task Force. The purpose of the Task Force was to serve as a vehicle for hearing and addressing public concerns about the decommissioning, to provide input into the effectiveness of communications between GPU Nuclear and the community, and to insure public involvement, open communications and education on decommissioning issues. The Bedford County Commissioners recognized the Task Force as the official advisory committee for the County for the decommissioning project. GPU Nuclear was responsible for providing the Task Force with reports about the

decommissioning project, providing administrative support for the Task Force, and providing responses to specific recommendations offered by the Task Force.

The decommissioning of the Saxton Reactor was one of the first to be completed under the revised NRC decommissioning regulations. The Final Status Surveys were performed according to the MARSSIM (Multi-Agency Radiation Survey and Site Investigation Manual). Some of the milestones in the project were:

- 2 Oct 95 The first meeting of the Saxton Citizens Task Force.
- Feb 96 Submission of the Decommissioning Plan to the NRC.
- 25 Jul 96 Approval of the tech spec change to allow construction of the decommissioning support building and asbestos removal.
- Dec 96 Completion of asbestos removal and construction of the Decommissioning Support Building.
- 28 Jan 97 NRC public meeting on the PSDAR (previously the Decommissioning Plan) at the Saxton Fire Hall.
- 25 Oct 97 Open house for the public at the Saxton reactor site with tours of the Decommissioning Support Building and the operating floor of the containment vessel.
- 9 Apr 98 The NRC approved the Environmental Assessment for decommissioning the Saxton reactor.
- 20 Apr 98 The NRC approved the license changes to allow GPU Nuclear to begin the decommissioning of the containment building and the site.
- Oct-Nov 98 Removal of the large components and shipping to Barnwell, SC for disposal.
- Jan 99 Decontamination of concrete inside the CV was started.
- 2 Feb 00 The License Termination Plan was submitted to the NRC.
- 25 May 00 Public meeting on the LTP at the Saxton Fire Hall.
- Dec 00 Decision to remove all concrete from the CV.
- Dec 00 Decision to remove fill from the SSGS foundation.
- Nov- Dec 01 Phase 1 of the Large Area Survey by SRA.
- Feb-Oct 02 Removal of all concrete from the CV.
- 30 Sep 02 The revised License Termination Plan was submitted to the NRC.
- 28 Mar 03 The NRC approved the License Termination Plan.
- Jun 03 The FSS report for the lower section of the CV was accepted by the NRC. The lower head was filled with crushed limestone to the inner support ring at the 774' elevation.
- Nov-Dec 03 The FSS for the CV section between 774' and 804' was accepted and the lower CV was backfilled and capped with concrete.
- 7 Oct 03 SNEC representatives and the Independent Inspector were invited to give presentations on the Saxton Citizens Task Force and the Independent Inspection Program to the NRC Commissioners.
- Dec 03 The DSB was disassembled and removed from the site.
- Jan-Mar 04 The above ground portion of the CV was removed.

- 4 Mar 04 Larry Foulke, President of the American Nuclear Society, presented a plaque designating the Saxton Nuclear Experimental Corporation Facility as a Nuclear Historic Landmark.
- Mar 04 The FSS report for the intake tunnels was accepted and the access points to the tunnels were sealed.
- Sep 04 Spots with ^{137}Cs contamination were found in several grids in the northeast quadrant of the Penelec property where contamination was not expected, extending the completion date.
- Mar 05 Remediation work was completed.
- Jun 05 All FSS's were completed.
- 28 Jul 05 The last group of FSS Reports were submitted to the NRC
- 15 Sep 05 The application for the termination of Operating License No. DPR-4 was submitted to the NRC.
- 31 Oct 05 The NRC issued Inspection Report No. 50-146/2005-201. The report covered inspections from 16 May 05 through 5 Oct 05 and the review of 43 FSS Reports. The inspection concluded that the requirements for license termination had been met.
- 7 Nov 05 The license termination for the SNEC facility license DPR-4 was issued by the NRC.

The decommissioning of the SNEC reactor site for unrestricted release was successfully completed. The estimated dose for a resident farm family living on the site within the next 10,000 years is less than the NRC limit of 25 millirem/year. The goal of keeping the portion of the dose from groundwater to less than the EPA limit of 4 millirem/year was also achieved. The project had an excellent industrial safety record. The total radiation dose to individual workers was well within the administrative limits for the site. The collective dose for workers was 38.2 person-rem.

In the Decommissioning Plan submitted to the NRC in Feb 1996 the project completion date was estimated to be June 1999 and the cost $22.2 million. The final cost was about $76 million and completion date was November 2005. There were numerous reasons for the added time and cost to complete the project. Difficulties with decontamination of the concrete in the containment vessel and unexpected contamination in the SSGS and in the old dump area of the site greatly extended the original time and cost estimates for the project. The time required to accomplish the necessary regulatory reviews and license changes was also consistently underestimated. The uncertainty in working with new decommissioning regulations probably also contributed to some of the delay.

The Independent Inspection Program was successful in keeping the Saxton Citizens Task Force and the Bedford and Huntingdon County Commissioners informed of the progress on the project. The on-site presence of the Independent Inspector and the quarterly reports were probably the most important aspects of the Independent Inspection Program. The most important

part of the final report of the Independent Inspector is the review summaries of the Final Status Survey Reports. There were literally hundreds of pounds of documents generated for this project, but there was no overall reference. This final report has attempted present a broad overview of the project in addition to the specific aspects of the Independent Inspection Program. A copy of the site classification and grid map is included as an attachment. Copies of all the Independent Inspector's quarterly reports and other documents are provided on the compact disc that is also included with this report.

The NRC license termination letter is included as part of this summary.

NRC Commissioner Merrifield presenting the license termination to First Energy Executive Vice-President Gary Leidich 8 Nov 05.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

November 7, 2005

Mr. J. J. Byrne, Program Director
Saxton Nuclear Experimental Corporation
Three Mile Island Nuclear Station
P.O. Box 480
Middletown, PA 17057-0480

SUBJECT: TERMINATION OF SAXTON NUCLEAR EXPERIMENTAL CORPORATION FACILITY LICENSE NO. DPR-4 (TAC NO. MC8350)

Dear Mr. Byrne:

On September 15, 2005, the Saxton Nuclear Experimental Corporation (SNEC) and GPU Nuclear, Inc. (GPU) (the licensees), submitted an application for termination of the SNEC Facility Amended Facility License No. DPR-4. The application states that GPU has completed the remaining radiological decommissioning and final radiation surveys (final site surveys) of the SNEC facility and the associated PENELEC site area in accordance with the NRC-approved license termination plan (LTP) and that the final radiation surveys demonstrate that the facility and site area meet the criteria in 10 CFR Part 20, Subpart E, for decommissioning and release of the site for unrestricted use.

The U.S. Nuclear Regulatory Commission (NRC) staff has completed its review of the final site survey reports (FSSRs) and concludes in accordance with 10 CFR 50.82(a)(11) that (i) dismantlement and decontamination activities were performed in accordance with the approved LTP and (ii) the FSSRs and associated documentation demonstrate that the facility and site have met the decommissioning criteria in 10 CFR Part 20, Subpart E. Therefore, License No. DPR-4 is terminated, effective November 07, 2005.

The staff's review of the FSSRs is documented in NRC Inspection Report Nos. 50-146/2003-201 (dated November 12, 2003), 50-146/2003-202 (dated December 17, 2003), 50-146/2004-201 (dated February 10, 2005), and 50-146/2005-201 (dated October 31, 2005).

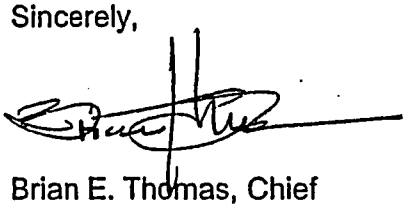
Enclosure 1 is a copy of the Notice of Termination we are sending to the Office of the Federal Register for publication.

We are also sending you two copies of Amendment No. 23 to Indemnity Agreement No. B-5 (Enclosure 2). Please sign and return one copy to this office.

In accordance with 10 CFR 2.390 of the NRC's "Rules of General Applicability," a copy of this letter will be available electronically in the NRC Public Document Room or from the Publicly Available Records (PARS) component of the NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html.

If you have any questions, please contact Alexander Adams, Jr., at 301-415-1127.

Sincerely,

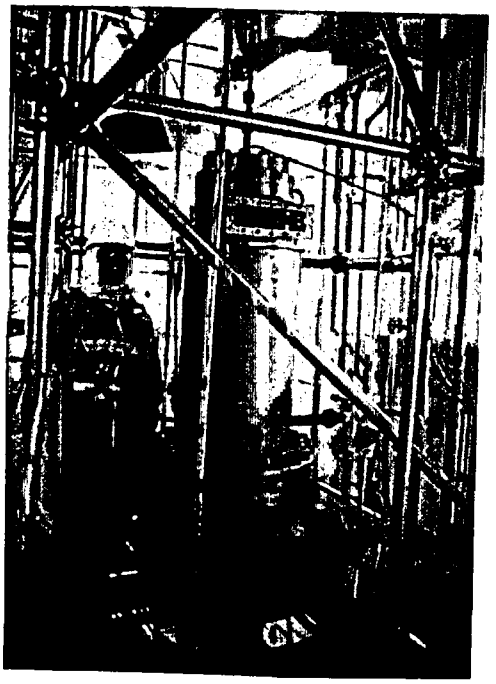


Brian E. Thomas, Chief
Research and Test Reactors Branch
Division of Policy and Rulemaking
Office of Nuclear Reactor Regulation

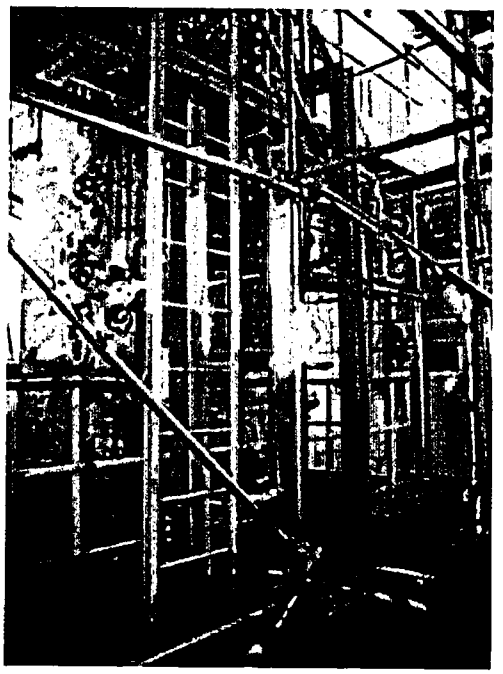
Enclosures: 1. *Federal Register* Notice
2. Amendment No. 23 to
Indemnity Agreement No. B-5

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

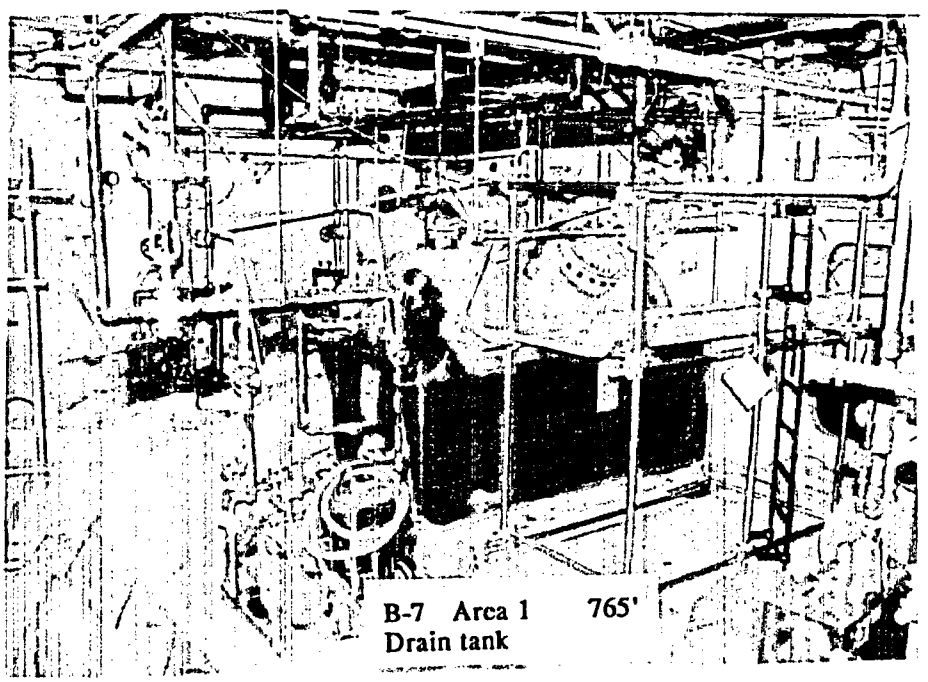
cc w/enclosures: See next page



Primary coolant pump, May 98.



Pressurizer and steam generator, May 98.



Basement level

Introduction

This is the final report of the Independent Inspection Program for the decommissioning of the Saxton Nuclear Reactor. It is a summary of the program and covers the period from the start of the program on 1 Jan 96 through the license termination on 8 Nov 05. The quarterly reports prepared by the Independent Inspector contain more detailed accounts of the decommissioning activities. Electronic files of the quarterly reports are on the CD that is included with this report.

Independent Inspection Program

The Independent Inspection Program was initiated as a result of Public Utility Commission hearings involving the expenditure of funds for the decommissioning of the SNEC (Saxton Nuclear Experimental Corporation) reactor by Penelec (Pennsylvania Electric Company), one of the owners of SNEC. Complainants in the hearings requested that a full time independent inspector reporting to the Bedford County Commissioners be required by the PUC. The complainants were Ernest Fuller and the organization Concerned Citizens for SNEC, represented by James Elder. Complainants wanted the inspection program to be paid for by funds provided to Bedford County by Penelec. Penelec proposed contracting with Penn State University to provide a qualified independent inspector who would report to the Bedford County Commissioners on the decommissioning project, and Penn State would be reimbursed for the cost of the program by an unrestricted grant from Penelec. In the order of 13 Apr 95, the PUC stated, regarding the independent inspector issue as follows.

...We would expect the Company to enter into discussions with the Bedford County Commission to establish inspection and reporting system requirements that are mutually satisfactory to the needs of the local community and Penelec, and report to the Commission on the selection of an inspector and agreements arising from such discussions. At a minimum, the agreement should require the inspector to report to the Bedford County Commission and this Commission any safety issues which the Saxton management fails to resolve in a reasonable amount of time: ...

GPU Nuclear Corporation, the operator of SNEC, and the Bedford County Commissioners agreed to a program in which GPU Nuclear would contract with Penn State University to provide an independent inspector. The inspector would be a Penn State employee and would not be supervised by either GPU Nuclear or the Bedford County Commissioners. The responsibility of the inspector would be to keep the Bedford County Commissioners and the local community informed of the progress of the decommissioning work and to serve as a technical resource on radiation safety. Any problems that could not be resolved with the site management were to be reported to the Bedford County Commissioners, the management of GPU Nuclear and the Nuclear Regulatory Commission. Part of

the agreement with the Bedford County Commissioners was the formation of a local advisory committee.

Saxton Citizens Task Force

The Saxton Citizens Task Force was formed as the local advisory committee for the decommissioning of the Saxton reactor. The Task Force membership included representatives and alternates from local government and civic organizations. The process for selecting the groups to be represented was a suggestion of Jon Baughman, Editor of the Broadtop Bulletin, and was endorsed by the Bedford County Commissioners. The mailing list for the original task force membership is included in the Independent Inspector's quarterly report for the first quarter of 1996.

The first meeting of the Task Force was held on 2 Oct 95 in the Saxton Fire Hall with 8 members and 6 alternates present. Others present included the three Bedford County Commissioners, two representatives from the Pennsylvania Bureau of Radiation Protection, and 12 others. Dr. Robert Long, Vice President of GPU Nuclear, presided over the meeting while the Task Force members elected Mike O'Brien as Chairman and James Fockler as Vice-Chairman. The Task Force accepted Dr. Long's offer to have Sylvia Morris, a GPU Nuclear Public Information Specialist, provide secretarial services as a non-voting member of the Task Force.

The Task Force prepared and adopted a charter over the course of the next two meetings. The Charter stated the purpose of the Task Force is to insure that there is a vehicle for hearing and addressing public concerns about the decommissioning, to provide input into the effectiveness of communications between GPU Nuclear and the community, and to insure public involvement, open communications and education on decommissioning issues. The Charter also stated that the Task Force membership would include volunteers representing 15 organizations plus two members-at-large. The Task Force would be an information channel to the Bedford and Huntingdon County Commissioners. The Independent Inspector will provide the Task Force with regular reports on the inspection activities and serve a technical consultant to the Task Force. The responsibilities of GPU Nuclear include providing the Task Force with reports about the decommissioning project, providing administrative support for the Task Force, and providing responses to specific recommendations offered by the Task Force. The Task Force members and GPU Nuclear are responsible for seeking acceptable solutions to local concerns.

The Bedford County Commissioners recognized the Task Force as the official advisory committee for the County for the decommissioning project.

The Task Force held regular meeting during the course of the decommissioning project. Minutes of the meetings were provided to the Task Force members and alternates, the Commissioners of Bedford and Huntingdon Counties, GPU

Nuclear, the Independent Inspector, local newspapers, and the Saxton Public Library. This report is not intended to cover the actions of the Task Force in detail, but the meetings are mentioned in the quarterly reports of the Independent Inspector, which are included in the CD provided with this report.

Independent Inspector
Rodger W. Granlund, University Health Physicist for Penn State, was designated as the Independent Inspector. Mr. Granlund had been in charge of the radiation safety program at Penn State since 1960 and had experience in public information programs involving radiation. While the 30-month contract with Penn State officially began on 1 Jan 96, Mr. Granlund had been involved in the preliminary arrangements, attended the meetings of the Task Force, and reviewed some of the draft decommissioning plan documents in 1995. The contract was for a 30-month period to June 1998, but was extended several times as the timetable for completion of the work was extended. The scope of work and the responsibilities of GPU Nuclear and the independent inspector under the contract are contained in the attachments on the CD that is included with this report.

SNEC Radiation Safety Committee
The GPU Nuclear Radiation Safety Committee provided oversight for the radiation safety programs at the GPU Nuclear facilities. After the transfer of ownership of the GPU Nuclear facilities, the Committee became the TMI-2/SNEC Oversight Committee. The Committee met alternately at the TMI and Oyster Creek facilities at the start of the project. After the sale of Oyster Creek, the SNEC portion of the meetings was routinely held at the Saxton site.

The Independent Inspector was invited to attend the SNEC portion of the Committee meetings beginning on 8 May 96. On 13 Aug 96 the Committee held their meeting at the Saxton site and invited the Saxton Citizens Task Force members to attend and 6 members were present. The Committee was interested in the Task Force activities and the members were invited to attend all subsequent meetings of the Committee. The public information program was on the agenda of all meetings and the Committee allowed time for the Task Force to provide comments or ask question. The opportunity to participate in the Committee meetings greatly increased the confidence of the Task Force in the operation of the radiation safety program.

The meetings of the Committee are summarized in the quarterly reports of the Independent Inspector that are contained in the attachments in the CD that is included with this report.

Historical Site Assessment
The decommissioning of the SNEC nuclear reactor was greatly affected by the presence of the Saxton Steam Generating Station (SSGS) on the same site. The operations of the two facilities were intertwined and the remnants of the SSGS

became a major part of the decommissioning activities. Thus, the decommissioning history actually begins with the construction of the SSGS in about 1923. The history of the facility is covered in the section of this report on the Historical Site Assessment.

Decommissioning Plan

The decommissioning process begins with the submission of a Decommissioning Plan to the NRC. Decommissioning work could not begin until the plan was accepted by the NRC. The SNEC Decommissioning Plan was submitted to the NRC in Feb 96 and was approved in Apr 98. Some provisions of the plan were:

- Jan through Dec 1996 would be the preparation phase involving the installation of temporary buildings and facilities and the procurement of equipment and consumable supplies.
- Jan 1997 through Sep 1998 would be the operational phase involving decontamination, dismantlement, and waste management activities to remove all hazardous and radiological contaminants.
- Sep through Dec 1998 would be the final survey phase involving radiological surveys of the containment vessel and the surrounding areas to verify that the facility met unrestricted release criteria.
- Jan through Jun 1999 would be the site restoration phase involving the NRC review and approval of site unrestricted status, demolition of clean structures, filling of below ground voids.
- On site decontamination would be limited to small items.
- Volume reduction would be done offsite by vendors.
- The containment vessel would be decontaminated for free release.
- The containment vessel would be removed to 3 feet below grade.
- Completion was scheduled for mid-1999.
- The cost estimate was $22.2 million.
- The dose estimate for the project was 31.8 person-rem.

The removal of fixed equipment from the CV (Containment Vessel) was not permitted until April 1998, when the NRC approved a license amendment that allowed decommissioning to start. Asbestos removal and other preparations had been completed by that time.

The NRC adopted new decommissioning regulations, which became effective on 28 Aug 96. The new regulations required an update of the FSAR (Final Safety Analysis Report) and the submission of a PSDAR (Post Shutdown Decommissioning Activities Report) in place of the Decommissioning Plan. The SNEC facility became one of the first facilities to be decommissioned under the new regulations and the uncertainties in any new regulations were probably responsible for some of the delays in getting the license amended to allow decommissioning.

License Termination Plan

Another requirement of decommissioning is a License Termination Plan (LTP). The LTP is the basis for the acceptance criteria after decommissioning and

remediation. The LTP also defines how the surveys will be done to determine whether the site meets the release criteria. The LTP for SNEC was submitted on 3 Feb 99 and approved by the NRC on 28 Mar 03, after many meetings and considerable revision of the Plan. The LTP is discussed in the LTP Section of this report.

Large Component Removal
A major part of the decommissioning was the removal of the large components; the reactor vessel (RV), the steam generator (SG) and the pressurizer (PZ). While a great deal of preparation for this part of the project had been accomplished, removal of fixed equipment was not permitted until the license was amended in Apr 1998. Work progressed rapidly after that date in preparation for removal of the large components in the fall of 1998.

The three large components were filled with concrete grout to fix the internal components in place and provide some shielding. The outside surfaces were cleaned and painted to fix any removable contamination. The large components were removed from the CV through holes cut in the top of the CV dome. None of the radioactive material in the large components was classified as Class C waste. The SG and the PZ did not require a shipping container. The RV was shipped inside a specially designed steel canister, which was also filled with concrete grout. The large components were transported by heavy-duty trailers to a rail siding at Huntingdon, PA and loaded onto flat cars for the trip to the Chem-Nuclear radioactive waste disposal site in South Carolina.

The complete RV package weighed 120 tons. The total activity in the RV was 1280 curies, of which 1270 curies were from activation in the steel.

The shipping weight for the SG was 35 tons and it contained about 1.22 Ci of activity. The maximum contact dose rate was 15 mrem/hr on the side and 30 mrem/hr on the bottom.

The shipping weight for the PZ was 20 tons. The maximum contact dose rate was 15 mrem/hr and it contained 0.7 Ci of activity.

The train with the large components left Huntingdon on 16 Nov 98 and arrived at the South Carolina disposal site on 20 Nov 98.

Concrete Removal
The containment vessel contained about 2500 tons of concrete. The lower portion of the containment shell had an 18" thick concrete lining and there were concrete shield walls up to 5' thick plus floors. The original intent was to clean the contamination from the concrete and only remove the portions that could not be cleaned. However, after spending about 2years cleaning concrete, it was decided in Dec 2000 that the contamination was too extensive and all the concrete would have to be removed. This involved extensive preparation to

dewater the soil around the CV and reinforce the shell to prevent buckling from the pressure of water and soil on the outside of the CV. Concrete removal started in Feb 2002 and was completed in Oct 2002. All the 2662 tons of concrete that was removed was shipped off site for processing. About 24% of the concrete had to disposed as radioactive waste.

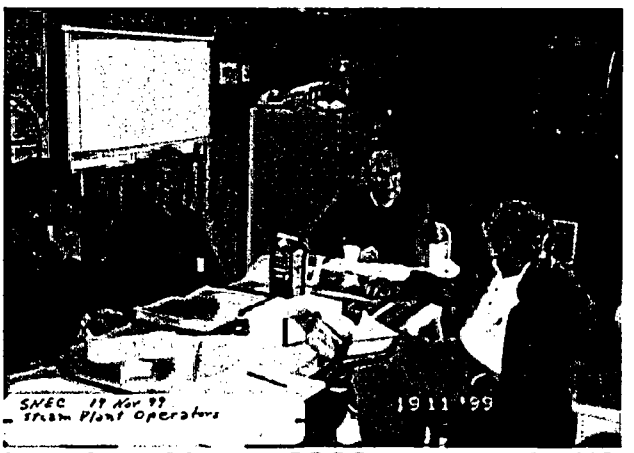
Decontamination of the Saxton Steam Generating Station
The SSGS was demolished in 1974 and the building rubble was used to backfill the basement. The plans for decommissioning did not anticipate that significant contamination would be found in the remnants of the old facility. Uncovering, surveying and decontaminating the SSGS basement, discharge tunnel and intake tunnels required a great deal more time than expected.

Decontamination of Soil
A large amount of contaminated soil was removed from the area inside the SNEC fence in the soil remediation project that was completed in 1994. It was known that the decontamination was not complete and that additional soil would have to be removed. Numerous spots with soil contamination were found outside the fence in the northeast section of the Penelec property. The large volume of soil in these areas that had to be excavated, surveyed and processed was not anticipated and extended the time required to complete the project.
Site contamination

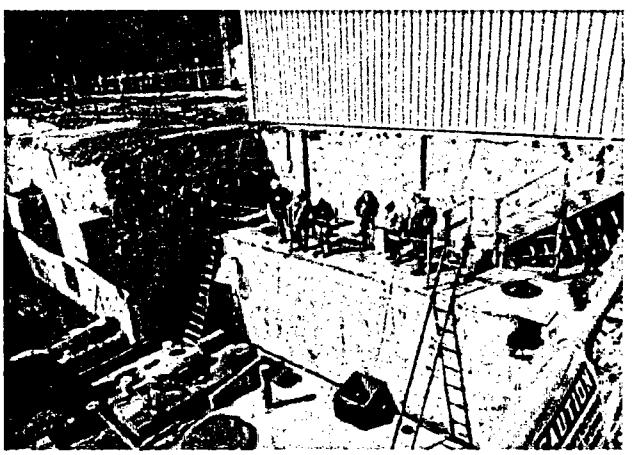
Final Status Surveys
The Final Status Survey of an area is the last step in the preparation for license termination. The FSS determines whether a survey area meets the release criteria. There were 39 FSS reports submitted to the NRC for review and approval. Most of the reports were submitted over the course of a few months in mid-2005. The FSS's are described in more detail in a separate section of this report. The FSS Summaries section of this report includes a short summary of each FSS report.

Additional Information
The Independent Inspection Program is completed with the issuance of this report. However, persons with questions, comments or requests for additional information are invited to contact me at the address on the title page. The Saxton Public Library also has a collection of documents on the SNEC facility. All the NRC documents are also available in the NRC public document room and the later ones can be accessed via the NRC web site, www.nrc.gov, in the electronic reading room.

Task force tour of CV, May 99



Interview of former SSGS operators for HSA.



RSC tour of facility, Mar 01.

Chronological List of Activities

The following is a chronological list of significant events in the decommissioning of the Saxton Nuclear Reactor. Additional events with more detailed descriptions are available in the quarterly reports of the Independent Inspector. The quarterly reports are included in the files on the CD that is provided with this Final Report.

2 Oct 95 The first meeting of the Saxton Citizens Task Force was held in the Saxton Fire Hall with 8 members and 6 alternates present. Others present included three Bedford County Commissioners, two representatives from the Pennsylvania Bureau of Radiation Protection, and 12 others. Dr. Robert Long, Vice-President of GPU Nuclear, presided over the meeting. The Task Force members elected Mike O'Brien as Chairman and James Fockler as Vice-Chairman. The Task Force accepted Dr. Long's offer for GPU Nuclear to have Sylvia Morris, a Senior Public Information Specialist, provide administrative services as a non-voting member of the Task Force.

13 Nov 95 The second meeting of the Task Force was held at the Saxton Fire Hall. The Task Force reviewed a draft charter for the organization.

13 Nov 95 The Task Force adopted their charter with revisions. GPU Nuclear reported that a hole had been accidentally drilled through the bottom of the containment vessel. It was sealed with an inflatable bladder and quick-setting cement.

11 Dec 95 At the meeting of the Task Force GPU Nuclear reported that a reactor license change request had been made to change the licensee from SNEC to GPU Nuclear. This must be done before GPU Nuclear can submit the Decommissioning Plan to the NRC. The estimated cost of the decommissioning project is $22 million.

20 Dec 95 The Independent Inspector reviewed the draft Decommissioning Plan dated 17 Nov 95 and sent comments to GPU Nuclear. Copies of the review were also distributed to the Saxton Citizens Task Force. A written response to the review was provided by Robert Holmes of GPU Nuclear on 22 Mar 96.

12 Feb 96 GPU Nuclear presented revised copies of the Decommissioning Plan to the Task Force. Some provisions of the plan were:

- On site decontamination will be limited to small items.
- Volume reduction will be done offsite by vendors.
- The containment vessel will be decontaminated for free release.
- The containment vessel will be removed to 3 feet below grade.
- Completion is scheduled for mid-1999.

29 Feb 96 GPU Nuclear presented the Decommissioning Plan to the Nuclear Regulatory Commission in a meeting at Rockville MD. In addition to GPU Nuclear

personnel, representatives of the Task Force, members of Concerned Citizens for SNEC Safety, Pennsylvania DEP, and the Independent Inspector also attended the meeting. The NRC indicated that it would try to complete review of the plan by the end of 1996. The NRC must also review the plan for transporting the reactor vessel.

10 May 96 The NRC approved the technical specification change to transfer control of the reactor license from Saxton Nuclear Experimental Corporation to GPU Nuclear.

9 Jun 96 An inspection team from the NRC visited the site. The group included 2 NRC contractors, who are involved in the review of the Decommissioning Plan.

10 Jun 96 The Independent Inspector toured the inside of the containment vessel with Art Paynter, the Radiation Safety Officer. All areas, except the reactor and fuel storage pool, were entered. The observation deck is accessible in street clothes, but areas below that level require protective clothing and radiation monitoring equipment because of the radiation and contamination levels in some locations. The highest radiation levels, other than around the reactor vessel, are in the room housing the steam generator and pressurizer. The visit to this room was limited to about 5 minutes. The radiation and contamination levels in other areas were not unusually high and the radiation dose received during the tour of about 1.3 hours was less than 2 millirem.

25 Jul 96 The technical specification request for change to allow construction of the decommissioning support building and asbestos removal was approved by the NRC.

7 Aug 96 The Readiness Review Committee met to discuss site preparation and
asbestos removal. Asbestos removal was scheduled to start about 22 Aug and be completed in early Dec 96.

19 Aug 96 The Reuter-Stokes continuous radiation monitor was moved from the Saxton Municipal Building to the Saxton High School, where it can be monitored by students in the physics class.

Aug 96 Removal of asbestos from the containment vessel was started in late August. Work started with glass insulation removal in areas with low contamination and radiation levels to give the asbestos workers experience working under a combination of radiological and asbestos controls. By the end of September a large portion of the removal work in those areas had been completed.

Sep 96 The Decommissioning Support Building was erected and under roof by the end of September and the building was expected to be completed by

December. Electrical work was still underway and a compressor for worker breathing air was installed outside the containment vessel.

10 Sep 96 The Independent Inspector and Charles Barker of the Saxton Citizens Task Force toured all levels inside the containment vessel. Asbestos removal on the upper levels was in progress and preparations were being made to start work at the lowest level.

29 Oct 96 GPU Nuclear submitter the revised Safety Analysis Report to cover decommissioning.

11 Nov 96 At the meeting of the Saxton Citizens Task Force the Concerned Citizens for SNEC Safety accepted the invitation to join the Saxton Citizens Task Force.

19-21 Nov 96 NRC inspector, Thomas Dragoun, conducted an inspection of the Saxton site. Kenneth Singh from the Pennsylvania Bureau of Radiation Protection was also on site during the inspection. The NRC Inspector looked at industrial hygiene, industrial safety, ALARA practices, shipping preparations, the Radiation Work Permit process, management oversight, the use of Readiness Review Committees, and the Independent Inspection Program. There were no violations. He encouraged the use of Readiness Review Committees and indicated that the 50.59 review process needed strengthened. He also commended GPU-Nuclear on their public outreach program.

11 Dec 96 The Independent Inspector inspected the asbestos removal activities. The inspection was based on GPU-Nuclear Readiness Review Committee Report on Asbestos Removal. There were no significant deviations from the conditions in the report.

Dec 96 Most of the asbestos removal activities were completed by mid-December. Radiation exposure of personnel working on asbestos removal was slightly higher than estimated at the start of the project. A larger amount of asbestos than was originally estimated had to be removed. However, the radiation levels were significantly reduced by the asbestos removal, so subsequent decommissioning work may require lower doses than originally estimated.

The major part of the work on the decommissioning support building was completed, including the installation of the weather seal between the building and the containment vessel. Penetration of the containment vessel could not be made until the NRC approved the decommissioning documents.

The total collective dose for 1996 attributed to asbestos removal was about 6 person-rem, which was larger than the projected value of 4.7-4.9 person-rem. The 1996 collective dose for all activities was about 6.5 person-rem, which was less than the site goal of 8 person-rem.

Jan 97 The NRC was expected to approve the technical specification and license changes to allow decommissioning work to start about June 97.

28 Jan 97 The Nuclear Regulatory Commission sponsored a meeting on the Post Shutdown Decommissioning Activities Report for the Saxton facility at the Saxton Fire Hall. The meeting was moderated by Norma Ickes, Chair, Bedford County Board of Commissioners. The NRC description of the regulatory and inspection process for decommissioning was followed by a question-and-answer period. The presentation by GPU representatives on the history of the Saxton facility, the decommissioning activities to date, future activities and the PSDAR was followed by a second question-and-answer period. GPU indicated that it did not anticipate any measurable dose to the public during the decommissioning and that the site would have no restrictions related to radiation after termination of the license. Decommissioning work was expected to be completed by mid-1999 and the project completed by 2000. The project cost was estimated to be $22 million.

10 Apr 97 The total dose for work to be done in 1997 was estimated to be 15 person-rem. This was revised in Aug 97 to 7.3 person-rem.

21 May 97 The Readiness Review Committee met at TMI to review the Decommissioning Support Building, the Personnel Access Facility and the ventilation system.

23 Jun 97 The Readiness Review Committee met at Saxton on the ventilation system for the containment vessel and the DSB.

Sep 97 The Raytheon Corporation was chosen by GPU as the contractor for removal of the heavy components from the containment vessel. The contract included removal, preparation for shipping and shipping the reactor vessel, pressurizer and steam generator to the disposal site at Barnwell, SC.

22 Oct 97 The completion date for the decommissioning project was estimated to be the second quarter of 2000.

25 Oct 97 An open house for the public was held at the Saxton reactor site. Tours were available of the new Decommissioning Support Building and the operating floor of the containment vessel. GPUN provided displays with information about the reactor and many historical photos showing the site from its construction as a steam generating plant through the present. The Independent Inspector provided displays on radiation detection methods, examples of naturally occurring radioactive material, consumer products containing radioactive material and photos of the interior of the containment vessel and some of the components to be removed. Attendance was 140 persons and 97 persons toured the containment vessel.

29 Oct 97 The Independent Inspector made gamma ray spectrum measurements of background radiation at several locations outside the fenced area. Except for a location near the radioactive waste storage area, which is inside the perimeter fence, the spectra showed only gamma rays from naturally occurring radioactive material.

6 Nov 97 The removal of the large components was contracted to Raytheon Corp., which had performed this type of work at other nuclear facilities. Moving the large components from Saxton to Huntingdon was subcontracted to Hake Company, which had experience moving heavy nuclear components and had moved large transformers locally. The steam generator and pressurizer were steel pressure vessels that could be transported with conventional flatbed trailers. The radiation levels associated with these components was relatively low and the vessels could be sealed and transported without outside packages. The exterior of the vessels were to be cleaned and painted to eliminate any external contamination and the interiors were to be filled with concrete grout, before the shipment. The reactor vessel required some additional shielding and was to be placed inside a large heavy-walled steel container for shipment. When packaged for shipment the reactor vessel would weigh in excess of 120 tons and would require a special transporter. The transporter consisted of a tractor and a trailer with 19 axles and 8 wheels per axle. It was estimated that it would take 2 days to move the reactor vessel the 26 miles from Saxton to the rail siding near Huntingdon. WMG Inc. was chosen to provide support for package certification, waste classification and shielding analysis. Chem-Nuclear was chosen for disposal of the components.

11 Nov 97 A remote camera was used to inspect the interior of the boric acid demineralizer and remove a sample of the resin. The activity and isotopic composition of the radioactive material in this tank were important, because estimates based on external radiation levels indicated that the material was close to the limit for Class C waste, the limit for waste that could be sent to the Barnwell disposal site. The assay of resin samples removed from the purification and boric acid demineralizers indicate that they can be classified as Class A and Class B radioactive waste, respectively.

4 Dec 97 GPUN made a presentation on the large component removal and the general decommissioning schedule at NRC headquarters in Rockville, MD. The schedule presented by GPUN expected NRC approval of the Decommissioning Plan in the first quarter of 1998, completion of decommissioning in the third quarter of 1999, completion of surveys in the second quarter of 2000 and site restoration by the fourth quarter of 2000. In addition to GPUN and NRC personnel, five members of the Saxton Citizens Task Force and the Independent Inspector were in attendance.

12 Dec 97 T. Gary Broughton, President of GPU Nuclear announced a reorganization. The reorganization will not result in significant changes in the

personnel responsible for the SNEC Facility. Dr. Arthur Rone was named the Vice President and Director of Engineering and is still in charge of the SNEC Facility. Joe Kuehn was moved to the Engineering Division and continues as the Program Director of SNEC and still reports to Rone. The nuclear safety assessment and licensing functions are now directly under the Office of the President. A new nuclear safety oversight and review committee is to be formed and it will also report to the President. Dave Ethridge, the Radiation Protection Manager at TMI, will continue to be responsible for the radiation protection program at Saxton.

12 Feb 98 Three representatives of the NRC met with GPUN personnel at the Saxton site to discuss some of the items that the NRC was reviewing for the site license amendment to allow decommissioning. The NRC indicated that it would use the GEIS (Generic Environmental Impact Statement) for test reactors to review the Saxton decommissioning project. GPUN personnel presented calculations to show that the doses and releases for the decommissioning would be within the bounds of the GEIS.

9 Apr 98 The NRC approved the Environmental Assessment for decommissioning the Saxton reactor.

20 Apr 98 The NRC approved the license changes to allow GPU Nuclear to begin the decommissioning of the containment building and the site. The license changes allowed the removal of fixed equipment from the containment building and decontamination of the steel and concrete building materials.

23 Apr 98 A new security system was instituted. A security guard was posted at the guardhouse at the entrance gate and all personnel were issued picture identification badges.

28 Apr 98 Testing of the ventilation system for the containment vessel was completed. A large hole was cut in the side to the containment vessel to allow access to the Decommissioning Support Building. The opening was secured by a roll-up door when it was not in use.

12 May 98 Five large concrete shield blocks were removed from the containment vessel. Seven shield blocks, each weighing about 38,000 pounds and a smaller key block, were used to shield the reactor cavity when the reactor was operating. The radiation levels above the reactor vessel were low enough that most of the shield blocks were no longer needed. Two of the blocks were left in place to shield the work area from the radiation emitted by the demineralizer tanks in the former fuel storage pool.

11-13 May 98 The NRC conducted an inspection at the site. There were no citations issued and no commitments from GPU Nuclear were required. The NRC checked physical security, safety reviews, and environmental sampling.

They observed the shipment of the shield blocks and reviewed the documentation. The inspectors indicated that previous weaknesses in the safety reviews had been corrected but felt that the documentation for the ventilation testing was weak.

26, 27 May 98 Three new monitoring wells were installed at the site. These wells are to provide additional monitoring in the vicinity of a well that has sometimes shown low levels of tritium. In the period from July 1994 through January 1998 21 samples were taken from the well and 9 showed tritium levels ranging from 180 to 760 pCi/l (picocuries per liter). These levels are less than 1% of the EPA drinking water limits, but additional information was needed about the movement and the source of the contamination. No other radionuclides have been detected in any of the monitoring wells at the site. The initial sampling of the wells showed tritium levels of 140-150 pCi/l in two of the new wells and 190 pCi/l in the old well. These levels are near the limit of detection (about 120 pCi/l). The third new well had a tritium level below the limit of detection.

9 Jun 98 A Readiness Review Committee meeting on the large component removal project was held at TMI. One of the items discussed was the grouting of the reactor vessel, steam generator, and pressurizer before shipment. The reactor vessel canister was to be fabricated by Raynor, a company in MA. Hake, a subcontractor to Raytheon, was selected to move the large components. Raytheon will perform the quality assurance checks on Hake's calculations. Whether DOT would accept the shipment as LSA and whether some of the internal reactor components are "greater than Class C" was not yet resolved. The NRC accepted the blending of the activity in the guide blocks with the lower core support plate so there is no waste classified as greater than Class C in the reactor pressure vessel.

18 Jun 98 A small amount of contaminated water spilled from a heat exchanger that was being moved. The contamination was confined to the small area around the heat exchanger. Radiation Control stopped the work in the area until the water was removed and decontamination was completed.

24 Jun 98 GPU Nuclear submitted a request for exemptions from the DOT (U.S. Department of Transportation) regulations for relief from some of the DOT regulations for the shipment of the large components to SC.

7 Jul 98 A contractor moved on site to remove the water and sludge from the old septic system for the site. There were numerous delays and the removal was not completed until 10 Jul. The water from the septic system and about 560 gallons of contaminated water from drums inside the CV were transferred to a special tanker truck for transfer to ATG, a waste processor in Richland, WA. The sludge from the septic tanks was transferred to steel boxes with plastic liners for later disposal. The tanker left the site on 10 Jul with 51,800 pounds (6,240 gallons) of water containing 4.02 millicuries of activity.

10 Aug 98 The Readiness Review Committee for the large component removal held its second meeting at the Saxton site. The Committee reviewed the responses to a list of 21 items of concern from the first meeting.

14-17 Sep 98 The NRC conducted an inspection of the site. The list below contains some of the items that were inspected.

- Preparation of the water supply and the ventilation system for winter weather.
- Preparation of a Radiation Work Permit.
- Worker compliance with a Radiation Work Permit.
- Use of a fire watch during and after welding.
- Inspection of welds.
- Training and testing for the use of respirators.
- Air sampling associated with respirator use.
- Shipment of used respirators to TMI for cleaning and testing prior to reuse.
- Fitness for duty program and procedures.
- Training on the regulations in 10CFR19.

22 Sep 98 The Readiness Review Committee held a meeting at TMI to decide what must be done to insure that cutting the holes in the dome of the containment vessel for removal of the steam generator, pressurizer and reactor vessel can be done safely with a dome thickness of 11/32" instead of 11/16", the thickness used in the original calculations.

28 Sep 98 Grouting of the steam generator, pressurizer, and the reactor vessel was performed. The boric acid demineralizer, purification demineralizer and storage well demineralizer were grouted at the same time.

An error in the steel thickness specified for the containment vessel dome was discovered by a Raytheon engineer checking on the specifications for welding the scaffolding to the containment vessel. A uniform thickness for the containment vessel of 11/16" had been used in the calculations previously performed to determine the structural effects of cutting the holes in the dome. However, the thickness of the upper portion of the dome was specified in the engineering drawings and later verified by inspection as11/32". Cutting of the holes was put on hold until the structural effects of cutting the holes in the dome could be recalculated and the SWI (Station Work Instruction) for the job revised. Additional bracing was required around the holes. The Readiness Review Committee for Cutting Containment Vessel Penetrations was reconvened to review the changes required.

5 Oct 98 GPU Nuclear representatives presented an update of the Large Component Removal Project to the NRC at Rockville, MD. The steam generator and pressurizer were scheduled to be transported to the rail siding at Huntingdon on 2 Nov 98. The reactor vessel was scheduled to follow on 3 and 4 Nov. The

rail shipment was scheduled to leave on 16 Nov and arrive at the disposal site near Barnwell, South Carolina on 19 Nov.

12 Oct 98 At the Saxton Citizens Task Force meeting a letter was received from Mr. Baldasseri, Chairman of the Saxton Nuclear Experimental Corporation, in answer to the letter from the Task Force about the effect of the TMI sale to Amgen on the decommissioning of the Saxton reactor. Mr. Baldasseri gave his assurance that GPU Nuclear is committed to the safe decommissioning of the facility and the sale to Amgen would not change this. There were no assurances that there would not be any management changes

Oct-Nov 98 Large Component Removal Activities

- 6 Oct 98 220 ton crane assembled and in place next to containment vessel.
- 6 Oct 98 5 feet diameter hole cut in dome and cover installed for intermediate lift of reactor vessel.
- 7 Oct 98 Test lift of concrete blocks with 220-ton crane.
- 9 Oct 98 Reactor vessel intermediate lift.
- 14 Oct 98 Reactor vessel lifted from containment vessel and set in lower half of canister.
- 15 Oct 98 Weld reactor vessel flange to lower half of canister.
- 16 Oct 98 Removal of steam generator from containment vessel.
- 18 Oct 98 Weld top and bottom sections of reactor vessel canister together.
- 19 Oct 98 Grout reactor vessel canister.
- 23 Oct 98 Remove pressurizer from containment vessel.
- 26 Oct 98 Trial run from Saxton to rail siding and return of tractor trailers for large component move.
- 2 Nov 98 Steam generator and pressurizer were moved from Saxton to the rail siding
    - 3 Nov 98 Reactor vessel was moved from Saxton to the rail siding
- 4 Nov 98 Large components were loaded onto the rail cars at the rail siding
- 16 Nov 98 Rail shipment leaves Huntingdon
- 20 Nov 98 Rail shipment arrives at disposal site
- 22 Nov 98 Large components are in CNS disposal trench

The reactor vessel was transported from the Saxton site to the rail siding on 3 Nov 98. The trip was accomplished in about 4.5 hours instead of the expected time of 2 days. A leaking air brake connection on one of the trailer wheels forced the convoy to stop for about 45 minutes near the Route 26/Route 994 intersection. Charles Barker, a Saxton Citizens Task Force member, who was accompanying the shipment with some of the GPU Nuclear personnel, supplied plugs from his home workshop to isolate the brake, which allowed the convoy to proceed with only a short delay. The convoy included the tractor-trailer with the

were not significantly different than the control location. Readings at the dosimeter locations were also made with portable survey meters when the dosimeters were deployed, at the time of collection and during the preparation of the components for shipping at the rail siding. These measurements did not indicate any measurable dose to the public during the shipment of the large components. During the transit of the reactor vessel through Saxton the Inspector measured the radiation level at curbside on Main Street using a portable GM counter in the scaler mode and an electronic personnel dosimeter. The dose was less than the measurement sensitivity for the instruments (about 0.3 microrem).

The maximum and the average speed of the tractor-trailer transporting the reactor vessel to the rail siding exceeded the 5 MPH limit that was incorporated in the procedures for the move.

15 Dec 98 Two large wood crates containing the steel from the reactor support can were loaded into a sealand box and shipped ATG Richland Corp., Richland, WA. The sealand box was lined with 0.75 inches of steel for shielding and lead blankets were packed around the boxes for additional shielding. A separate metal B-25 box was used for the lower section of the support can, which had much lower radiation levels. The shipment (SX-98-064) had a total weight of 25,600 pounds with 10,400 pounds of waste with an activity of 2.93 Ci. This shipment had about the highest external radiation levels of waste shipped to date. The maximum dose rate at 2 meters from the exterior of the sealand box was 7 mrem/hr.

22 Dec 98 Waste shipment SX-98-066 was sent to Manufacturing Sciences Inc. in Oak Ridge, TN. The shipment contained the pressurizer drain tank and other piping and components from the 765' level. The two sealand boxes had a gross weight of 41,900 pounds with an activity of 5.6 Ci. Maximum radiation level was 80 mrem/hr at the surface of one of the sealand boxes.

5 Jan 99 The remaining concrete shield blocks were shipped to F. W. Hake in Memphis, TN. The shipment included two 36,000 pound blocks from over the storage well and the 24,000 pound plug from the ceiling of the primary compartment. The estimated activity in the two large blocks was 0.457 millicurie each. The smaller block had an estimated activity of 0.306 millicurie but no detectable radiation emission.

13 Jan 99 Three individuals were found to have contamination on their faces, necks and around their noses after transferring waste on the 765' level. Nasal smears of the workers were positive and the continuous air monitor in the area alarmed. The air samples for the workers also indicated a positive uptake of radioactive material, mostly ^{137}Cs. The workers were sent to TMI for whole body counts the same day. The CEDE (committed effective dose equivalent) for the two persons handling the waste and the rad-con technician ranged from 2.0 to

3.7 mrem. The contamination was the result of contaminated water that leaked from plastic bags stored for several weeks in the control rod room on the 765' level. The contaminated liquid apparently dried and became airborne when the bags were moved to put the water into absorbent for disposal. The cause of the incident was attributed to poor procedure in handling the waste and conducting surveys and not notifying rad-con supervisors when it was first collected and stored. No activity was detected by the containment vessel ventilation exhaust monitor during this incident.

Decontamination of concrete was started in the primary compartment and the reactor cavity. Additional concrete removal will be required for areas where the contamination has penetrated beyond the depth removed to date. In the reactor cavity a thick tar-like covering plus one or more layers of paint were found to cover the concrete surface. This covering is very difficult to remove. The estimated area of the concrete in the CV is about 23,000 square feet. The total amount of concrete is estimated to be more than 4300 tons (only a fraction of this is expected to require removal).

The buoyancy of the containment vessel is a matter of concern as equipment and concrete are removed. The structural implications of removing concrete, such as the effect on the polar crane, are also being reviewed.

16-18 Feb 99 The NRC conducted an inspection. Tom Dragoun and Al Adams were accompanied by Jason Chang of Region I. They inspected the Saxton site, especially the ventilation system, and also visited the Environmental Measurements Lab in Harrisburg. The inspection report No. 50-146/1999201 was issued on 22 Mar 99. The inspectors reviewed the radioactive effluent controls, the Radiological Environmental Monitoring Program, and the site-specific parameters for dose assessment as parts of the Offsite Dose Calculation Manual. Sample calculations were made using the dose projection system and the NRC computer code for comparison. The inspectors also reviewed the control procedures for radioactive effluents and the 1997 annual report. The records for the calibration of the monitor for the exhaust gas ventilation system and the last filter change for the system were checked. The inspectors reviewed the 1998 quality assurance audit of the Offsite Dose Calculation Manual conducted by GPU Nuclear. The inspection included a visit to the GPU Nuclear Environmental Radioactivity Lab at Harrisburg and an inspection of the facilities and procedures there. Preparation for Year 2000 problems was also reviewed. There were no citations or open items as a result of the inspection. The inspectors commented favorably on the new alpha spectroscopy equipment at the ERL.

3 Mar 99 A HIC (High Integrity Container) with the boric acid demineralizer, storage well demineralizer and the purification demineralizer was shipped to the disposal site at Barnwell, SC. The HIC was shipped in a large cask to provide

shielding. The total activity in the shipment was estimated to be 11.9 Ci, most of it (11.8 Ci) being ^{137}Cs.

11 Mar 99 A meeting was held at NRC headquarters in Rockville, MD to review the License Termination Plan submission. Al Adams of the NRC chaired the meeting. In addition to Mr. Adams and Tom Dragoun, the inspector for Saxton, about four other NRC staff members were in attendance. GPU Nuclear personnel included Bill Hysek, Art Paynter, Barry Brosey, Joe Kuehn, Sylvia Morris, Pat Donnachie, and Perry Carmel. James Fockler, Charles Barker and Ernest Fuller, from the Saxton Citizens Task Force, the Independent Inspector, and a representative from Westinghouse were also present.

The release criteria for the site will be based on an annual dose limit to the average member of the critical group of 25 millirem total effective dose equivalent (NRC limit in 10 CFR 20), with no more than four millirem coming from drinking water (EPA limit in 40 CFR 141). A residential farmer scenario will probably be used for the dose calculations. The dose rate from gamma emitters will not exceed five microrem/hr at 1 meter above the surface, averaged over more than 10 m^2 with no single measurement exceeding 10 microrem/hr. The model for the critical group will be the "residential farmer" scenario. The computer code RESRAD will be used to calculate the values for the Derived Concentration Guideline Levels (DCGL) for soil, concrete and other materials. The survey methodology will be taken from MARSSIM (NUREG-1575). The reactor site is about 1.1 acres but it is expected that about 29 acres will be included in the survey. The fractions of the total area that will be Class 1 (potential for contamination based on past history), Class 2 (contamination not expected to exceed the DCGL) or Class 3 (contamination expected to be a small fraction of the DCGL) have not yet been determined.

It was estimated that more than 99% of the radioactive material in the containment vessel has already been removed.

A questionnaire was sent to former employees to help determine impacted areas and conditions during operation of the reactor.

24 Mar 99 Drilling was started on the core bores in the fill alongside the containment vessel. Four holes were started. One hole was successful in penetrating about 50 feet, through the fill, the concrete saddle below the containment vessel into the bedrock. This hole and a shallow hole with a depth of about 25 feet were cased and will be used to sample the water and measure ground water level.

27 Apr 99 The NRC notified GPU Nuclear that there was not sufficient information in the License Termination Plan that was submitted on 23 Feb 99 for

the NRC to complete a detailed review of the plan. GPU Nuclear expects to resubmit the plan about the end of September 1999.

17 May 99 The Saxton Citizens Task Force met at the SNEC site. Al Adams and Ledyard Marsh from the NRC were in attendance to answer question about the review of the License Termination Plan. Rod Figard and Larry Williams from the Chamber of Commerce and Mario Andrie and Bill Uhlig from GPU Energy were present to discuss the use of the Saxton site after decommissioning is completed. The GPU Energy representatives examined the property before the meeting and listened to suggestions for future use from the Task Force and Chamber of Commerce representatives.

1 Jul 99 A meeting on the Saxton License Termination Plan was held at the NRC headquarters in Rockville, MD. There were 23 persons in attendance including 5 from the NRC, 13 from GPU Nuclear and 2 from the Saxton Citizens Task Force. The purpose of the meeting was to discuss the details that would be required in the License Termination Plan, the procedure for making changes in the plan, and the use of survey data from prior decommissioning work at the site. The NRC has not yet decided how changes will be made to the License Termination Plan after it is approved.

16 Aug 99 The NRC hosted a meeting on the License Termination Plan at the Saxton Fire Hall. There were 28 persons in attendance including 9 representatives of GPU Nuclear, 4 from the NRC, 2 reporters and 9 members or alternates of the Saxton Citizens Task Force.

Joe Kuehn indicated that the concrete scabbling was about 1/3 complete and that concrete cutting was in progress. He also stated that the discharge tunnel for the steam power plant had been located, but the tunnel had not been surveyed yet. Pat Donnachie reported on the plans for the final site survey and dose modeling. The resident farmer scenario will probably be used to calculate the residual radiation and contamination limits for the site. The dose limits are 25 mrem/year total effective dose equivalent with no more than 4 mrem/year of the total from groundwater. The present plan is to leave the dome of the containment building in place until after license termination. The dome and all the remaining contents of the containment vessel will have to meet the residual radiation and contamination limits. After the license termination the dome of the containment vessel will be removed along with concrete to a level about 3 feet below grade. The lower section of the containment vessel will be backfilled and left in place. The predominant radionuclide is ^{137}Cs, but there are about 35 nuclides related to SNEC operations. The concentration of ^{137}Cs in the soil at the site is less than 2 pCi/g (picocuries/gram), except for some soil near the containment vessel. Samples taken from 20 locations 10-20 miles from Saxton to determine background levels had ^{137}Cs concentrations of 0.042-0.72 pCi/g with an average of 0.28 ± 0.39 pCi/g. The average concentrations of several naturally occurring radioisotopes in the background samples was 14 ± 16 pCi/g of

^{40}K, 1.8+1.1 pCi/g of ^{226}Ra and 0.9±0.5 pCi/g of ^{232}Th. Samples are also being collected of concrete from other locations to determine the background concentration of radionuclides in that material. GPU Nuclear indicated that they do not plan to subtract the background concentrations from their sample values in the final site survey. Some of the items that have not yet been determined are the leach rates for contaminated concrete immersed in groundwater, the classification of all parts of the Saxton site, and some limitations of the software programs that are being used.

30 Aug-3 Sep 99 The NRC conducted an inspection of the site. There were no citations or open items. Organizational structure and functions were found to be consistent with the Technical Specification requirements. The inspector reviewed the emergency plan and procedure changes, the emergency response kit, and emergency notifications. Several minor changes had been made to the plan that will be submitted to the NRC for review in a subsequent inspection. The inspector reviewed the fire protection program and the required training. No discrepancies were found. The facility inspection and the instrument calibration programs were also reviewed and found to be within specifications. The inspector reviewed specific work instruction (SWI) documents for scabbling and core boring and found that the work was performed in accordance with regulatory requirements. The only open item was the submission of changes in the emergency plan to the NRC for informational purposes.

20 Sep 99 At the meeting of the Saxton Citizens Task Force Perry Carmel presented some revised dates for the decommissioning work. The License Termination Plan is expected to be ready for submission to the NRC by the end of 1999 or early 2000. Work inside the containment vessel will continue through the winter and is expected to be completed about May 2000. Work on the discharge tunnel and the pipe tunnel will be suspended during the winter months and is expected to be completed by late spring or summer of 2000. Sampling and surveying of 30-40 acres of the site will also be done during the summer of 2000. If work is needed on the steam plant spray pond or the trash dump, it will also be done during the summer of 2000. The NRC approval of the license termination plan is expected in the fall of 2000. License termination is now projected for the fall of 2001.

The major activity has been a continuation of concrete scabbling. Almost all surfaces in the reactor cavity, primary compartment and the control rod drive room have been scabbled at least once. Up to 4 inches of concrete have been removed from some spots where the contamination had penetrated the concrete. To date about 10,800 pounds of scabble dust has been removed plus 16,900 pounds of concrete debris.

2 Nov 99 The NRC held a public meeting on the Saxton License Termination Plan at Rockville, MD. GPU Nuclear personnel explained the current status of the site and indicated that the License Termination Plan would be submitted by

the end of December 1999. It was indicated that GPU would like to terminate the Saxton license and dissolve GPU Nuclear as soon as possible and that an accelerated schedule is under consideration. The plans for decontamination of the discharge tunnel and sampling the spray pond were discussed. On the subject of previously remediated structures, the NRC indicated that the driving force for demolition of the structures was public safety and that the residues would now have to meet the same requirements as other impacted areas. The NRC agreed with the plans of GPU Nuclear to sample the Unistrut steel braces imbedded in concrete to determine whether the material could be cleaned in place or needed to be removed. The NRC also agreed with the use of default DCGL's (Derived Concentration Guide Line) from the Federal Register. GPU Nuclear indicated that further characterization will be done to check the radioisotope composition of the contamination that remains after decontamination.

The tentative GPU Nuclear schedule estimated 4 months each for the NRC review of the License Termination Plan and for the review and inspection of the Final Site Survey. The NRC felt that it could complete the review and inspection of the Final Site Survey in 4 months but that it would take at least 7 months to review the License Termination Plan. The Saxton Technical Specifications will need to be revised to reflect the changes in GPU Nuclear after the sale of the TMI-1 and Oyster Creek facilities. The changes cannot be made until the new organizational structure is known. The NRC has not yet resolved how it will make needed changes in the License Termination Plan after the Plan is approved. The NRC estimated that it would hold a public meeting on the License Termination Plan about 4-6 weeks after the plan is received by the Commission, to allow time for the acceptance review.

19 Nov 99 Three former operators of the Saxton Steam Generating Plant (Frank Steele, Jack Spencer and Landis Shriver) visited the Saxton site and were interviewed by Mike Williams of GPU Nuclear as part of the Historical Site Assessment. The men provided valuable information on the operation of the steam plant, the discharge tunnel and the spray field. They were able to clarify a number of questions about posting of radiation areas in the plant (none), use of personnel monitors in the steam plant (none), flushing the discharge tunnel (every 4-5 years), dredging the spray pond (about 2 times in 30 years). The remembered the demolition of the steam plant and that the salvage company removed the generating equipment. Lead bricks reported to be removed from the site were identified as unused items that were not contaminated. They also provided an operator's manual for the plant for Mr. Williams to examine.

15 Dec 99 The Independent Inspector toured the interior of the containment vessel to observe and photograph the concrete removal. One of the major problems is a seam between concrete pours in the reactor cavity and storage well wall. Water from the storage well entered the seam and contaminated it. The concrete around the seam will have to be removed. The seam runs through

several piers that provide structural support and work in these sections has stopped until additional supports can be installed. In the primary compartment all surfaces have been scabbled at least once but additional cleaning of some spots will be necessary and some parts of the 5-feet thick wall will probably have to be removed to clean the concrete seam mentioned above. In the auxiliary compartment most of the surface has been scabbled. Parts of the wall will have to be removed in this compartment also to clean the concrete seam. In the basement level the first pass of scabbling is complete, but further work will be necessary in some spots.

20 Dec 99 The sale of TMI-1 to AmerGen was finalized and the sale of the Oyster Creek plant to AmerGen is expected to be completed in March 2000. This will leave GPU Nuclear with only TMI-2 and Saxton and they want to complete the decommissioning of Saxton as soon as possible.

21 Jan 00 A meeting was held at NRC headquarters in Rockville, MD to discuss the impact of the sale of the Oyster Creek plant on the decommissioning of the Saxton facility. The Oyster Creek sale was expected to be finalized in March 2000 (date is now May 2000). It was stated that the existing management structure for SNEC would remain in place and the personnel would continue as GPU Nuclear employees. A GPU Nuclear Cognizant Officer will have responsibility for decommissioning SNEC and will have final authority for SNEC and TMI-2 decisions. Independent oversight of the project will continue with Nuclear Safety Assessment personnel from AmerGen reporting to the GPU Nuclear Cognizant Officer. The change in the Radiation Safety Committee and the changes in the Quality Assurance Plan will require an amendment of the Saxton license. GPU will guarantee funding for GPU Nuclear as needed.

25 May 00 The NRC held a public meeting at 7:00 P.M. at the Saxton Fire Hall to discuss the License Termination Plan. The NRC representatives toured the Saxton site before the public meeting. Dave Thompson the Chairman of the Bedford County Commissioners served as the moderator for the meeting. The NRC representatives explained the process for reviewing the License Termination Plan. They indicated that a notice of consideration would be published in the Federal Register in the next 45 days and that 30 days would then be allotted for interested parties to request a public hearing. The NRC expects that it will probably submit a formal written request for further information to GPU Nuclear in about September. Tom Dragoun, the NRC inspector for the Saxton decommissioning project, explained the inspection process and stated that they would probably have a contractor make independent measurements and review the Final Site Survey report. The approval of the License Termination Plan is not expected until sometime in early 2000. The License Termination Plan can be viewed on the NRC web site at www.nrc.gov./OPA/reports (document No.05000146). A copy of the plan is also available at the Saxton Public Library.

G. Kuehn and R. Holmes provided information on the history of the site and the schedule. The criteria for decontamination are that a person living on the site would not receive more than 25 mrem per year of effective dose from all pathways and no more than 4 mrem per year of that total from groundwater. The effective dose will also be ALARA (As Low As Reasonably Achievable). Restoration of the site is to be done after the termination of the license.

30 May 00 Representatives from GPU Nuclear and the NRC met in Rockville, MD at the request of GPU Nuclear to discuss the decommissioning schedule for Saxton and the NRC schedule for reviewing the License Termination Plan.

When the sale of Oyster Creek is finalized there will be an organizational change within GPU Nuclear. The person directly in charge of SNEC and TMI 2 will be the Cognizant Nuclear Officer (CNO) and Dr. Arthur Rone's position will be eliminated. The CNO will be Sandy Levin, who has had extensive experience at TMI and at Oyster Creek. Mr. Levin visited the Saxton site on 15 Jun 00 to tour the facility and to be briefed on the status of the decommissioning project. The briefing meeting took several hours and covered the service agreements with AmerGen, waste shipments, operating procedures, concrete cleaning and removal, the license termination plan, changes in the technical specifications, the decommissioning schedule, the dewatering plan, the final site survey plans, and the public information program. Mr. Levin will assume his duties on the date that the sale of Oyster Creek is finalized.

31 May 00 Pentek personnel started the removal of paint from inside the steel dome with a Wall-Walker Rotopeen machine. This device removes paint with a Rotopeen. The Rotopeen, a 3M product, is a rotating wheel with flaps imbedded with carbide studs attached to it. When it is moved over a surface the studs striking the material remove a thin layer from the surface. Hand held Rotopeens have been used extensively in this project to remove paint from concrete and metal surfaces. The Wall-Walker is unusual in that it is held to the surface by the suction created by a vacuum system that also collects the chips of paint and other material removed from the surface. The movement of the device is computer-controlled through motors and cables. After some difficulties in getting the system adjusted the work progressed somewhat slower than expected, but without major problems. It took about 3 weeks to complete the vertical section of the dome below the polar crane and another 3 weeks to complete the curved dome portion above the crane. One of the major difficulties was that the device was too large to work close to obstructions and where the weld seams projected above the surface of the metal the suction would not hold so about 20-30% of the area was not covered by the Wall-Walker. The paint in these areas will have to be removed by hand held tools. The polar crane will also have to be decontaminated using hand tools.

12-15 Jun 00 The NRC conducted a routine inspection of the SNEC license. The inspection was conducted by Thomas Dragoun. He was

accompanied by Takafumi Ikeda, an observer from the Science and Technology Agency of Japan. The inspection covered the Quality Assurance Program, industrial safety, radiation protection and the impact of changes brought about by the sale of TMI 1 and the proposed sale of the TMI 2 and Oyster Creek plants. In addition to the items inspected at the Saxton site, the inspector visited TMI to check on the services supplied to SNEC by AmerGen from that location. No violations were found and no significant safety issues were identified in this inspection.

The Radiation Safety Committee for Saxton will be replaced by an Oversight Committee for TMI-2 and SNEC. The Chairperson of the Committee is elected by the GPU Nuclear Board of Directors. The Chairperson appoints the Committee members with the concurrence of the CNO (Cognizant Nuclear Officer). The Committee is to have at least 6 members with expertise in quality assurance, radiological safety, environmental, decommissioning, civil structural engineering, industrial safety, and management. The members are to include the Manager, PDMS (AmerGen) and the Director, SNEC Facility (GPUN). The CNO is not a member. The Committee is to meet at least 3 times per year. The responsibility of the Committee is to investigate and recommend. The Committee is to be concerned with activities protecting the workers, the public and the environment and all aspects of work leading to final dismantling and disposition of Saxton facilities. It has no authority to direct or require action.

6 Jul 00 Representatives of GPU Nuclear, the NRC and Sandia Corporation held a meeting at the Saxton site. Sandia Corporation has been contracted by the NRC to do the environmental assessment for the Saxton License Termination Plan. Charles Butts of Haley and Aldrich was also in hand to answer questions about groundwater studies that have been done. G. Kuehn described the work that had been done to date on the site and the boundaries of the approximately 30 acres of impacted area. The attendees toured the site and examined the excavation next to the containment vessel, the locations of the old steam plant, the discharge tunnel, the spray pond, the intake tunnel and the pipe tunnel around the containment vessel. They also toured the 812' level of the containment vessel. Some of the items that were discussed were the justification for the site specific data used in the license termination plan, the assay results from the monitoring wells, any endangered species affected, the reasons for choosing the impacted and non-impacted areas, the suitability of instruments used for the final site survey, sampling for the discharge points that were used, the availability of records of the surveys after the reactor was shut down. The NRC guidelines call for solicitation of advice from affected members of the community, but it was explained that this is not required for facilities that have an unrestricted release. The NRC stated that it has not yet resolved the issue of whether the disposition of the site after the license is terminated will have to be addressed. The issue is whether the demolition of the containment vessel after the license has been terminated must be addressed in the License Termination Plan and approved by the NRC. The Sandia representatives said that NEPA

(National Environmental Protection Act) requires that "reasonably connected action" be considered. However, individual government agencies, the NRC in this case, have leeway in how this statement is interpreted.

Aug-Sep 00 A 32-hour asbestos worker training course was given at the Saxton site on 30, 31 Aug and 3,4 Sep 00. Workers who had worked on drilling wells in the old steam plant foundation and excavations in that area were very concerned that they might have been exposed to airborne asbestos. A large number of samples were taken of the soil in those areas over the period from 3 Aug to 12 Sep 00. Initial samples showed concentrations of up to 8% (volume) in some areas. Later, samples showed much lower concentrations. Samples from the inside of the workers trailers had very low or non-detectable concentrations. More asbestos was discovered in the excavation north of the containment vessel in October when digging resumed there. It appears that asbestos in plastic bags was buried in that location when it was refilled after the underground tanks were removed.

Oct 00 Over the past few months there has been considerable discussion about the amount of concrete that will have to be removed from the containment vessel to get all areas down to unrestricted release levels. The penetration of contaminated water into the concrete appears to be much greater than originally estimated. It may be more cost effective to remove most of the concrete from some areas instead of trying to remove individual contaminated spots. It also appears that more time will be needed to remove the contamination from the old steam plant than was previously estimated. Therefore, the estimated date for license termination has been extended about 6 months to the end of 2001.

Work on determining the extent of the contamination inside the foundation of the old steam power plant was interrupted when it was discovered that the building rubble used to back fill the foundation contains asbestos. All work was stopped until the workers could complete a 32-hour training program for asbestos workers.

1 Nov 00 GTS Duratek completed the removal of silt from the discharge tunnel down to the debris pile at the opening inside the switch yard on. They also washed the walls and ceiling of the tunnel in preparation for the final survey. They were not able to remove all of the debris from the seal chambers with their equipment and this will be done by site personnel

13-15 Nov 00 The NRC conducted an inspection. The inspector reviewed access controls and industrial safety at the excavation of the steam plant foundation and found the safety controls to be satisfactory. He reviewed training and qualification records and found them to be acceptable. The REMP (Radiological Environmental Monitoring Program) was found to be in compliance with the Offsite Dose Calculation Manual. The plans for replacement of the

services of the Environmental Monitoring Laboratory were discussed and will be reviewed in a future inspection. The control of liquid effluents and the operation of the tank farm were inspected and were found to be within regulatory requirements. The inspector attended the meeting of the TMI-2/SNEC Oversight Committee on 15 Nov 00 and found the activities of the Committee to be in accordance with the Technical Specifications.

Dec 00 Major revisions to the decommissioning schedule were made in the last quarter of 2000. Because the penetration of contaminated water into the concrete inside the containment vessel appears to be much greater than originally estimated, the decision was made to remove all of the approximately 2500 tons of concrete instead of trying to remove only the contaminated sections. Specifications for this work are being prepared so that bids can be solicited from contractors. TLG Services Inc. of Bridgewater CT was retained to estimate the cost of the project. They estimated that it would take 9-11 months to build a dewatering system around the containment vessel to avoid the buoyancy problem and an additional 8 months to remove the concrete at a total cost of about $7.5 million. This would extend the project to at least the end of 2002 and with the additional time needed to get bids and award a contract then perform and get NRC approval of the final surveys license termination would probably not occur before the middle of 2003. However, there is the possibility that the time to license termination might be reduced, if the contractor proposes a solution that would not require as much time for dewatering and concrete removal. On 28 Nov 00 the SNEC Board of Directors approved the spending of the $14.8 million that is estimated to be needed to complete the decommissioning project and an extension in time to the end of 2002.

The decision was made to remove the fill from the steam plant foundation so that the amount of radioactive contamination could be properly assessed. The concrete pad that was the floor for the boiler section of the steam plant was cleaned and is being used to store the debris removed from the foundation. A large amount of rubble has been removed from the foundation and parts of the basement floor have been uncovered (790' level, about 16' below grade). The basement floor is covered with a few inches of water because it is below the level of ground water.

At the suggestion of the SNEC and the NRC hydrologists seven new monitoring wells were drilled in December to improve the water monitoring and mapping system. A pair of wells, one in soil one in bedrock, was placed in the background area about 50 yards east of the entrance road. Another pair of wells was placed close to the river north of the containment vessel and an additional pair near the river about 50 yards west of the discharge tunnel outlet. A single well was placed in the southeast corner of the spray field next to Shoup Run. Permeability tests were run on the new wells on 20,21 Dec 00.

The closing of the Environmental Monitoring Laboratory will mean that other laboratories will have to perform the analysis of samples that had previously been done by that lab. However, the lab director will still be available to help with the dose modeling aspects of the License Termination Plan

Chemrad, a company from Oak Ridge, TN was selected from several bidders to perform Phase 1 of the large area final survey. The survey area includes about 35 acres outside the fence around the containment vessel. This area is not expected to contain any soil contamination above the DCGL (Derived Concentration Guideline Limit). Gamma radiation detectors mounted on a vehicle will be used to scan the entire area. The equipment provides a continuous record of the radiation measurement and the location, which is then used to produce a radiation map of the area. The survey is scheduled to start about the middle of February, weather permitting, and will take about 2 weeks.

2 Feb 01 At the Saxton Citizens Task Force meeting Mr. Kuehn announced that the merger of GPU with First Energy is expected in about May or June of 2001

Mar 01 Chemrad did not arrive on site for the survey of areas outside the restricted area as scheduled. They defaulted on the contract and SNEC is negotiating with one of the other bidders on the project to complete the work. Shonka Research Associates has agreed to do the survey and final arrangements are underway. They expect to be on site for Phase 1 of the survey in Oct 01.

An increase in the budget of $3.5 million is projected to complete the decommissioning. Most of the increase is attributed to concrete removal, the final site survey and characterization. This increases the overall project cost from $53.8 million to $57.3 million.

6 Aug 01 The NRC held a public meeting at the Saxton site to discuss the review of the License Termination Plan and the status of the decommissioning. G. Kuehn reported on the status of the decommissioning. Concrete removal is expected to be completed in the 1st quarter of 2002. The vessel tie-down for the concrete removal will be accomplished with two rings welded to the outside of the containment vessel attached to 30 to 40 rock bolts anchored in the bedrock below the containment vessel.

8 Oct 01 The SNEC staff personnel held a meeting to discuss some of the options for the remaining decommissioning projects. It has not yet been determined whether the lower section of the steel Containment Vessel shell will be removed from the ground. The removal might be necessary, if contamination is present in the backfill outside the shell. This will not be known until the sampling is done of the material removed by the drilling for the rock anchors next to the shell. Leaving the lower half of the shell in the ground is what has been

proposed to date and it has the advantage of not requiring changes in the License Termination Plan, the schedule or the budget. It is probably the easiest and safest option and it should not interfere with future use of the site because the Corps of Engineers flow easement on the property will not allow permanent structures. However, removing the shell might be the least expensive option, if the interior of the shell or the backfill around it needs to be decontaminated.

Another matter that was discussed was an apparent concern of the NRC about some of the items that were removed from the steam plant before it was demolished. The Historical Site Assessment could not account for all the items, but they were apparently transferred on paper to the Borough of Saxton, and sold to other power plants that received the items directly from the steam plant. Mr. Williams will write a letter to the NRC to indicate that a reasonable attempt has been made to locate the items but that not all could be accounted for.

9-18 Oct 01 Sampling of the river sediment was performed by Enercon. This sampling was to look for any radioactive material in the sediment that might have been released from the plant when the reactor was operating or during earlier stages of the decommissioning. Fifty-two samples from 26 locations were analyzed. Three of the locations were upstream background samples and the remainder was from Shoup Run downstream to the lake transition below Weaver's Bridge. The maximum ^{137}Cs concentration found was 2.9 picocurie/gram in a sample at the outlet of the sanitary sewer weir. This could have been from material dislodged from the sewer pipe when it was removed earlier this fall. The maximum concentration of ^{137}Cs in samples away from the weir was 0.16 picocuries/gram. About 70% of the samples were less than the minimum detectable concentration of about 0.06 picocuries/gram. One sample from the weir outlet area had a ^{60}Co concentration of 0.02 picocuries/gram, which is near the

27 Nov- 9 Dec 01 Phase 1 of the Large Area Survey was performed by SRA (Shonka Research Associates). The survey was performed with large (5"x2") NaI scintillation detectors. Up to 4 detectors were mounted on the front of a pickup truck equipped with equipment to continuously record gamma spectra and detector position. In locations inaccessible to the truck, the detectors were mounted on a handcart or a tripod. About 17 acres outside of the fence were surveyed in this phase. Slightly elevated ^{137}Cs levels might have been detected in one spot, but the initial look at the survey data did not indicate any areas above the projected DCGL (Derived Concentration Guideline Limit).

3-6 Dec 01 Tom Dragoun of the NRC was on site to inspect the Large Area Survey by SRA. He also looked at the chain of custody for samples, count room data and the 50.59 process. No violations and no open items were reported.

Dec 01 The prime contractor for concrete removal from the Containment Vessel is TLG. Concrete removal was scheduled to start in Dec 01 and be

finished in Feb 02. However, the subcontractor for the actual concrete removal could not meet the terms of the contract and a new subcontractor had to be found. This has been done and concrete removal is now scheduled to begin in late Jan or early Feb 02, with a completion date of May 02.

21 Jan 02 A Readiness Review meeting for the concrete removal project was held2. G. Kuehn moderated the meeting. He expects concrete removal to be complete in May 02 and license termination by the end of 2002. There will be two 10-hr shifts running from 7 A.M to 4 A.M for 5 days per week.

6 Feb 02 SNEC personnel met with environmental consultant, Bede Portz, to discuss questions on site restoration plans. It was the consultant's opinion that the containment vessel shell could be left in the ground with the 3' below grade removed. He did not think that it would matter to the state whether the shell is perforated and that the anchor bolts could be left in place. The casings should be removed, if possible, from monitoring wells and the wells sealed. The Saxton Steam Generating Station foundation and the tunnels can be left in place without demolition. Tunnel entrances should be sealed and the foundation backfilled. Debris removed from SSGS foundation and other locations on the site can be used for backfill, if organic matter and accessible iron is removed and contamination is within the DCGL.

14 Feb 02 The contractor moved a track hoe with a hydraulic hammer into the containment vessel and started breaking concrete. Progress has been slower than expected because of equipment problems and the strength of the reinforced concrete. Other methods of breaking the concrete were considered, including controlled explosives. Drilling the concrete and using a hydraulic splitter to crack the concrete prior to using the hydraulic hammer is the technique now being used. Completion of concrete removal is projected for Aug 02.

Mar 02 The removal of concrete from the Containment Vessel is about 6 months behind schedule and is not expected to be completed before Aug 02. Two shift operations were started on 4 Feb 02 and will continue until the concrete is removed

8 Apr 02 A meeting was held at NRC headquarters in Rockville, MD to cover items related to the LTP (License Termination Plan). The NRC is concerned about the slow pace of the review of the LTP and wants to make sure that the NRC staff is conveying what they need to SNEC.

30 Apr 02 The NRC notified SNEC management on 30 Apr 02 that a complaint had been received from an individual with allegations that several workers had become ill because of poor air quality in the work areas at SNEC. John Thomas was assigned to investigate the complaint to determine whether it was based on a real safety problem or the result of miscommunication or some other issue. Mr. Thomas reported his findings in a report on 20 May 02.

According to the report workers had complained of the odor of diesel fumes in the containment vessel and of having headaches from the fumes. The workers also reported that there had been many CO monitor alarms

A meeting of management representatives from SNEC, TLG and Washington Group plus the Ombudsman for the site was held on 23 May 02 to discuss the report and determine what corrective actions would be taken. There was agreement that the air monitoring program for non-radiological hazards needed improvement and that, while the instrumentation is adequate, the calibration, response checks and alarm checks were not being done according to the manufacturer's recommendations. TLG has taken steps to have Omega correct those deficiencies and to provide additional instrumentation. A notice of the determination that the CV does not require a permit for confined space entry will be posted at the entrance of the CV to eliminate confusion about that issue. An industrial hygienist from Amergen will be asked to review the safety program to determine whether it meets industry and regulatory standards. Mr. Kuehn addressed all the workers on 28 May 02 to let them know what is being done and to ask that safety concerns and complaints be brought to the attention of management promptly and they will be addressed.

8 May 02 A meeting was held at the Rockville, MD headquarters of the NRC on to discuss the modeling issues that were still unresolved in the LTP. On the issue of imbedded piping, SNEC will remove all piping from the Containment Vessel, but some piping will remain in the steam plant foundation. SNEC has reduced the list of 71 radionuclides that might have been present originally to 11 that might be present now.

22 May 02 A meeting was held at the Rockville, MD headquarters of the NRC to discuss the License Termination Plan. SNEC presented a table of transuranic and hard-to-detect radionuclides from the characterization work.

21 Jun 02 A meeting was held at the Rockville, MD headquarters of the NRC to discuss the License Termination Plan. The NRC asked for information on environmental issues at the plant and was told that several endangered plant species have been identified by the State of Pennsylvania.

The removal of some radionuclides from the list of those at the site was discussed. Radioisotopes can be delisted if they can be shown not to be present or if the dose from all delisted nuclides is less than 10% of the total estimated dose. If that is done, the total dose cannot exceed 90% of the 25 millirem permitted, or 22.5 millirem. One of the problem radionuclides is ^{242}Cm, which has too short a half-life to be present but has been reported in some of the sample analyses. Mr. Donnachie will check with the laboratories doing the analyses to determine whether the method for analyzing the data is the reason

that 242Cm is reported. If ^{242}Cm can be eliminated then the total dose from delisted radionuclides is well below 10% of the total.

The buildings that were previously knocked down or removed from the site were discussed. The NRC indicated that the previous decommissioning was reviewed but the site of the outbuildings was not released. Mr. Paynter indicated that the sampling for the previous decommissioning exceeded present day requirements and that the dose from modeling similar to the RESRAD program now being used was only a few millirem. He also stated that to insure the accuracy of the DCGL, the radioisotope ratios will be verified by sample analysis and that 5% of the analyses will include hard to detect nuclides. Background values specific to the material will be used for materials other than soil. No background subtraction will be made for soil.

26 Jun 02 A representative of the NRC Office of Investigation was onsite to investigate the security lapse that occurred 7 Dec 01. The CAP for this was noted in the Independent Inspector's report for the last quarter (a door to the Decommissioning Support Building was found unlocked in the morning check). No report has been received to date of the result of the investigation.

8 Jul 02 Penn State University notified the Independent Inspector that it could no longer be the contractor for the Independent Inspector because the Independent Inspector was a retiree under the State Employees Retirement System. Because the project was not expected to continue much longer it the Saxton Citizens Task Force, by a split vote, decided that it did not object to a direct contract between the Independent Inspector and First Energy.

31 Jul 02 A meeting was held with the NRC at Rockville on the DCGL calculation for the License Termination Plan. Additional information was provided to the NRC in a report on "Supporting Information for the SNEC Surface Model," results of groundwater samples shared with the NRC, calculations for the subsurface DCGL's, and information on the surface and subsurface dose models for the SNEC site. The NRC indicated that SNEC needed to include other possible water-dependent pathways, such as irrigation, in their analysis or explain why the pathways were eliminated. SNEC will provide additional calculations with the other pathways included. The NRC also indicated that it would review the DCGL's to assure compliance with the NRC 25 mrem/year limit, but if SNEC puts DCGL's based on 4 mrem/year in the approved LTP they will have to meet the 4 mrem/year DCGL's.

29 Aug 02 The last meeting with the NRC on the License Termination Plan revisions was held at Rockville, MD. The NRC questions on groundwater have all been resolved. The SNEC responses to the NRC RAI's (Request for Additional Information) should be put into the LTP revision along with the new groundwater sampling data.

The NRC will use ORISE (Oak Ridge Institute for Science and Education) to check the SNEC Final Site Survey procedures and to do split samples and observations. ORISE will make lab measurements, not field measurements. If ORISE does not discover any problems, the NRC will not do confirmatory surveys. The NRC will ask ORISE to devise a plan to check the survey for conformity to MARRSIM guidelines. SNEC will process an average of 5% of the samples for hard-to-detect and transuranic isotopes specific to the SNEC site. SNEC representatives indicated that they would have the revised copy of the LTP to the NRC by the end of September.

The following comments were in response to questions from members of the public at the meeting.
E-mail messages with the NRC are in the public record.
There will be testing (sampling) below the remnants of the tunnels.
The NRC will not approve the Final Status Survey before the LTP is approved, but the
The NRC will not review the LTP with respect to the SNEC 4 mrem/year groundwater administrative limit, only the 25 mrem/year NRC limit.
The public will be able to tell from looking at the survey results whether the 4 mrem/year administrative limit has been met.
The NRC does not intend to make confirmatory measurements. It will verify the process used by SNEC for the Final Site Survey.
The NRC representatives were not sure whether the NRC had a QA/QC program to review the work of their contractor ORISE.

30 Sep 02 The revised License Termination Plan was submitted to the NRC.

19 Oct 02 The Saxton Citizens Task Force and the County Commissioners were invited to the site on 19 Nov 02 to check on the progress of the decommissioning and to see the containment vessel with all the concrete removed.

21-24 Oct 02 Thomas Dragoun conducted a routine NRC inspection. He looked at 10 CFR 50.59 change reviews and the radwaste transportation records for the concrete removal project. He also examined the quality assurance monitoring reports done by Duke Engineering and the audits of the analytical laboratory and survey meter programs. The emergency response for a worker transferred by ambulance to the hospital in March was compared to the emergency plan. The ventilation system requirements for the containment vessel and Decommissioning Support Building were also inspected. No findings or violations were noted in this inspection.

25 Oct 02 A major milestone was reached in the decommissioning when the last load of concrete was removed from the containment vessel. A total of 2662 tons of concrete was removed. About 24% had to be shipped to the low-level radioactive waste disposal site in Utah. The remainder was of a low enough

concentration to be processed and disposed in an industrial landfill. Loose debris and steel studs were removed from the inside of the steel shell to prepare it for decontamination and the final survey. Penetrations that were suspected of having contamination inside were cut out of the containment vessel shell and blank plates welded in place to cover the holes.

31 Oct 02 A meeting was held at Rockville, MD with the NRC to discuss items that the NRC wanted changed or included in the revised License Termination Plan that was submitted on 30 Sep 02. Review and approval of the LTP by the NRC is now expected in the first quarter of 2003.

10-12 Feb 03 Representatives from the NRC and ORISE (Oak Ridge Institute for Science and Education) met at SNEC with the personnel responsible for the Final Status Survey. ORISE is under contract to the NRC to review the Final Status Survey and to perform some confirmatory measurements. The purpose of the meeting was to insure that the Final Status Survey procedures and report preparation would meet the requirements of the NRC and ORISE.

Mr. Holmes provided background information on the reactor history and milestones for the decommissioning project.

1972-1974 Initial decontamination did not meet release requirements and the facility was placed in storage.
1986 Decontamination and decommissioning of outbuildings.
1992 Release and removal of outbuildings.
1994 Removal of 55,000 m^3 of soil.
1996 Prepare Decommissioning Plan.
1998 Large Component Removal.
2003 Restoration

The site will meet the NRC dose limit of 25 mrem/year for free release (no restrictions on use because of radioactive contamination). The models for dose calculation indicated that meeting the 25 mrem/year limit for total dose will also meet the EPA limit of 4 mrem/year from groundwater. The computer program RESRAD 6.1 was used for dose modeling with site-specific parameters. The Saxton reactor was relatively small, but the use of mixed oxide fuel and the performance of failed fuel experiments made the modeling as complicated as that at larger sites. About 35 acres are classified as impacted by multiple release pathways.

Each survey unit will be covered with a separate package that will be reviewed by NRC/ORISE as it is completed. The final report must include enough information to show that the survey was performed according to MARSSIM. Material on the docket as part of the License Termination Plan can be included by reference. The NRC plans to do some analysis of split samples. The NRC will have ORISE do some confirmatory measurements. The NRC would like to

have about 10 days to review survey packages, before any actions are taken that would make an area inaccessible, such as backfilling.

21 Mar 03 The final survey of the lower head of the containment vessel was started. The survey was completed about 10 Apr 03 and NRC/ORISE review is expected to be completed by early May. Surveys of the material in the debris pile and the soil removed from excavations are estimated to continue into June. This material will be used to backfill the steam plant foundation and the excavation around the containment vessel.

26-28 Mar 03 Tom Dragoun of the NRC and Tim Bauer and Theresa Brown from ORISE were on site to inspect the Final Status Survey of the lower head of the containment vessel. The NRC was present for observation and will not make a written report of the inspection, but there will be a report from ORISE. The SNEC personnel were observed performing the survey and downloading and reviewing data. The ORISE representatives brought their own equipment and scanned a portion of the survey area. Split samples from the debris pile conveyor monitor were also taken. No problems were found. The inspectors recommended making an electronic copy of the survey data.

28 Mar 03 The NRC approved the License Termination Plan. This allows work to proceed according to the plan. It also means that procedures in the LTP that cover work already completed are accepted. This includes the surveys for areas covered by the internal and external support rings for the containment vessel.

30 Apr 03 Surveying of the 8500 tons of crushed debris from the steam plant basement, the garage and the warehouse was complete.

May-22 Jul 03 The Soil pile in the East Yard was processed through the Shonka monitoring system. Boulders and large pieces of concrete were removed from the pile with a vibrating screen. Scanning the soil pile started in May but had to be suspended because the clay soil was too wet to process. Monitoring was resumed at the end of Jun after allowing the pile to partially dry and was completed on 22 Jul. Some of the wet clay in the soil pile was spread out in the settling basin to speed up the drying. About 5,000 tons of soil was processed through the monitoring system. There were 27 alarms indicating elevated radiation levels in the soil during the scanning process.

Jun 03 The final status survey for the lower section of the containment vessel was accepted by the NRC and the lower head of the CV was filled with crushed limestone to the inner support ring at the 774' elevation.

Soil samples were taken from the Background Reference Area between the entrance drive and the property boundary. Slightly elevated levels of ^{137}Cs were found under the surface and it is doubtful that the area will be suitable as a

background reference. Higher ^{137}Cs levels were found under the surface in an area outside the fence at the north side of the site. In both of these areas the activity was associated with a layer of black coal dust and ash under a clay surface layer.

12-14 Aug 03 NRC Inspector, Tom Dragoun, was at the site for a routine inspection. During the inspection he discussed with SNEC personnel the comments from ORISE on the Final Status Survey of the containment vessel lower bowl. All the items were resolved and will be covered in the final FSS report. The conclusions of the survey did not change. He found the controls on the PRI areas (areas for which decontamination has been completed) to be satisfactory. He looked at the items in Section 2.9 of the License Termination that are to be checked by inspection and closed those for which action has been taken. The NRC will have ORISE design a confirmatory survey of the Penelec Line Shack, because it is the only building that will be left on the site after license termination. The NRC will also have ORISE inspect the soil analyses that are done by SNEC. In addition to SNEC personnel, Mr. Dragoun met with James Fockler, Chairman of the Saxton Citizens Task Force, and the Independent Inspector.

Sep 03 The containment vessel lower section between elevation 774' and 804' was cleaned and the final status survey completed. The NRC accepted the survey and backfilling was started on 24 Nov 03 with crushed stone from the debris pile. The backfilling was completed on 10 Dec 03 and was covered with a 6" concrete cap on 17 Dec 03.

The final status surveys of the Intake Tunnels, Discharge Tunnel and Penelec Line Shack were completed. The NRC/ORISE will make some confirmatory measurements on the Penelec Line Shack because it will be the only occupied building left on the site after termination of the license.

7 Oct 03 The NRC Commissioners held their annual briefing on decommissioning status and activities. The agenda for the meeting included a panel of NRC staff members, who summarized the status of power plants and uranium fuel cycle facilities that are being decommissioned. The Commissioners invited representatives from two sites with approved License Termination Plans, Connecticut Yankee and Saxton, to present information on their decommissioning projects. Saxton was invited to present information on the Saxton Citizens Task Force and the Independent Inspection Program. Gary Leidich, the President and CEO of First Energy indicated that while there have been problems at the Saxton site First Energy is committed to finishing the project. G. (Joe) Kuehn the Saxton Project Director described the membership of the Saxton Citizens Task Force and the importance of the Task Force to the public perception and acceptance of the project. Rodger Granlund, the Independent Inspector, described the history of the Independent Inspection program and the duties of the Inspector. Mr. Granlund indicated that the opening

of the Oversight Committee meetings to the Task Force, the long-term relationship with the NRC Program Manager and the NRC inspector for Saxton, and the quarterly reports of the Independent Inspector had all helped to improve public confidence and acceptance of the project.

29 Oct 03 GPU Nuclear personnel met with PA DEP representatives at the DEP South-Central headquarters building in Harrisburg. The meeting was to brief the DEP on the history of the SNEC site and the planned conditions when decommissioning is complete. Completion of the FSS is expected in late summer of 2004. Mr. Kuehn indicated that the SNEC facilities would be removed to at least 3 feet below grade, but the coal-fired plant remains would not be removed below grade. He estimated that 7,000 tons of fill would have to be brought into the site. There are no plans to continue the monitoring of the site after license termination. The Saxton Citizens Task Force would continue until license termination. The DEP representatives indicated that they did not foresee any problems with the planned conditions for the site at license termination.

Dec 03 The ventilation system for the containment vessel was taken out of service and removed in preparation for the removal of the containment building shell. Essentially all radioactive material had been removed from the containment vessel and the ventilation system was no longer required.

The Decommissioning Support Building was dismantled and removed from the site by Bryce Saylor and Sons crane service and will be reused. The steel building was surveyed prior to dismantling to determine that it met release limits.

21 Jan 04 The dome of the containment vessel and the polar crane were removed. A 275-ton crane with a 170' boom was assembled on site and used to remove the dome and the polar crane. The removal of this local landmark was well publicized and was attended by representatives from the local TV stations and newspapers. Some members of the public also braved the cold to see this historic event. Once the dome was removed the parts of the polar crane could be removed. Then the sidewalls were cut in sections and removed. The last of the steel wall sections were removed on 8 Mar 04. The steel plates were checked for contamination and released as scrap or packaged for shipment to waste processing or disposal facility. About 20 tons of the 160 tons of steel in the containment vessel and polar crane was not releasable as scrap. Steel that was not releasable was mainly from the parts of the polar crane and supports that could not be reached when the inside of the containment vessel was cleaned.

4 Mar 04 Larry Foulke, President of the American Nuclear Society, presented a plaque designating the Saxton Nuclear Experimental Corporation Facility as a Nuclear Historic Landmark. The plaque was received by Joe Kuehn, Vice President and Program Director of the SNEC Decommissioning Project. Mr.

Foulke described the history of the plant, the importance of the plant to the nuclear industry and the chronology of the decommissioning project.

5 Mar 04 The NRC notified the EPA that 2 of the DCGL values for SNEC exceed the EPA trigger values for radioisotopes in residential soil. The DCGL for ^{137}Cs is 6.6 pCi/g and the EPA trigger value is 6 pCi/g. The values for ^{152}Eu are 10.1 and 4 pCi/g respectively. It is expected that the measured soil concentrations after remediation will not exceed the EPA trigger values. If the measured values do exceed the EPA trigger values the NRC would have a Level 2 consultation with the EPA to determine an acceptable value for soil concentration.

Mar 04 The schedule for various parts of the decommissioning project at the end of Mar 04 was as follows.

Remove reminder of CV shell:	Mar 04
Remediate east yard and backfill:	Jun 04
Backfill discharge tunnel and spray pit:	Apr 04
Backfill steam plant foundation and steam tunnel	May 04
Complete Final Status Survey and submit to NRC	Oct 04
Restoration and demobilize:	Nov 04
NRC license termination	Dec 04

The final status survey for the intake tunnels has been accepted and the access points to the tunnels are sealed.

At the northeast corner of the power plant property there are numerous mounds where it appears that ashes containing trash from the coal-fired power plant were dumped in truckload quantities. The trash includes such things as electrical insulators, light bulbs, bottles, building materials, and some personal items, such as shoes. The mounds are covered with underbrush and trees. The large area survey by Shonka indicated some spots with slightly elevated readings in this area. Surveys with hand-held instruments have detected several spots with contamination that exceeds the DCGL. The contamination is distributed throughout volumes of a few cubic feet and does not appear to be associated with any specific items in the debris. The hand surveys and the remediation of this area have added significant time to the completion of the project.

13 May 04 The final survey for the steam plant foundation was completed and the trenches in the foundation were filled with concrete. This was done to help prevent collapse of the floor above the intake tunnels when the basement is backfilled. The foundation was then filled using the pile of material that had been removed from the foundation, crushed and survey by Shonka.

6-8 Jul 04 The NRC and their contractor for the final site surveys, ORISE, conducted an inspection. The inspection included confirmatory surveys of the Line Shack and soil samples for comparison analysis. They also inspected the processing and analysis of soil samples at SNEC. There were no findings from the inspection.

Sep 04 Spots with ^{137}Cs contamination were found in several grids in the northeast quadrant of the Penelec property where contamination was not expected. Because of this additional characterization surveys will be required, including assaying large numbers of surface and subsurface soil samples. Reclassification of some areas will also be necessary. This has extended the scheduled dated for license termination by about six months to May 2005.

Surveys of the discharge tunnel were completed and the access to the tunnel at the tank farm was backfilled to grade level.

Work has continued in an area along the edge of the wooded section just north of the fence. This area was used for the storage or disposal of ash from the steam plant. It was also apparently used for the disposal of some trash from the plant, such as bottles of various kinds, paint cans, roofing material, electrical insulators, concrete and other items. Some radioactive contamination has been found in or near these areas. The radioactive contamination does not appear to be from the deliberate disposal of radioactive waste. The activity is low and is distributed through small volumes of the soil and ash, indicating that it might have been unidentified contamination that was present on the material placed in those areas.

In one section some asbestos was found mixed in with the ash. The work crew for this area had to have training to bring their certification for asbestos work up-to-date. The ash was also checked for toxic materials and the assay of the material was reviewed by a person from the environmental section of First Energy to determine that the material was not classifies as hazardous material, which would have required additional training and precautions. Coal ash is exempted from some of the EPA restriction on hazardous material.

The discovery of contamination in the dump areas will require that some of the grids be reclassified to class 1 or class 2 areas, which will require that a greater fraction of the area be surveyed.

The large shed that housed the tank farm for processing water from the dewatering project was removed.

5,6 Oct 04 The NRC inspector was on site for the completion of the inspection started in Jul 04 with ORISE. The confirmation survey that ORISE did of the Line Shack at that time was satisfactory. ORISE had some minor recommendation for conformance with DOE quality assurance procedures for the

SNEC soil analysis process. The inspector looked at surveys in the dump area and was satisfied with the systematic search that was performed. He found the PRI areas to be properly implemented and the soil disposal shipments were satisfactory. There were no findings from the inspection. James Fockler, Chair of the Citizens Task Force, visited the site during the inspection and was briefed on the current remediation work.

Dec 04 The areas where characterization and remediation of soil are required are much larger than anticipated at the beginning of 2004. This has extended the schedule for completion of decommissioning into 2005. Remediation activities are now expected to be completed in Feb 05 and the Final Status Surveys in about May 05. Submission of the final license termination report to the NRC is expected by the end of Jun 05. License termination would occur after the NRC has reviewed and accepted the final report.

The area inside the fence and east of the containment vessel location is called the East Yard. This area was the location of the former waste processing building and the radioactive waste drum storage area. A large amount of soil was removed from this area and shipped off site for disposal in the previous phase of decommissioning. It was known that not all of the contaminated soil was removed and additional remediation would be required. However, the extent of the remediation was not anticipated.
The surface of the East Yard was surveyed and the soil removed in about 6" layers until no further contamination was found. Contamination was found in the stone pad for the former waste drum storage area and the pad was removed. Contaminated soil was also found in the backfill trenches that had been dug for water lines across the East Yard. This soil had to be removed and replaced with clean backfill.
The major remediation in the East Yard has been the removal of backfill and the tank bases for six underground tanks associated with the waste processing building. The tanks were removed in a previous decommissioning phase, but the remediation was not complete. The excavation for this work is up to 24' deep and has sidewalls that are too steep for safe access by personnel. The excavation fills with groundwater to a level about 6' below the surface and must be pumped any time work is done below that level. The post-remediation survey and the Final Status Survey will have to be done with instruments operated remotely and/or by personnel in a basket on a boom.

10 Feb 05 Shonka Research Associates finished the assay of the remaining soil piles. The processing was hampered by the wet freezing weather. Over 8500 tons of soil were processed through the NaI gamma ray detectors. There were only two alarms for small amounts of soil with ^{137}Cs above the acceptable concentration. The processed soil will be used as backfill on the site in the various areas that have been excavated

Mar 05 Remediation is finished. Seventeen areas remain to be surveyed. The final site surveys are scheduled to be completed by the middle of Jul 05 and the last report submitted to the NRC by the beginning of Aug 05. License termination will probably be several months later, after the NRC has reviewed and accepted the reports.

11 May 05 The final survey of the East Yard Excavation was completed. The excavation was pumped dry and the survey was performed using hydraulic lifts to suspend the survey team above the excavation. Backfilling the excavation was completed about 19 May.

24 May 05 Tom Dragoun, NRC Inspector, and representatives from ORISE arrived on site to do the last inspection of the Final Status Survey activities. Mr. Dragoun explained that the license termination would be issued after the final inspection report. Mr. Dragoun expected to send the inspection report to NRC Headquarters for review about the end of Aug 05.

The ORISE representatives will check the operation of the SNEC laboratory after recovery from shutdown caused by power losses during Hurricane Ivan. They will be checking survey results and will check about 5 soil samples analyzed by SNEC plus 5-10 additional new samples. They will also be testing the response of survey instruments operated with a ^{137}Cs window versus an open window. The Final Status Surveys at SNEC have used a ^{137}Cs window to reduce interference from natural background radiation and significantly increase the sensitivity of surveys.

25 May 05 Joe Hagen, Greg Halnon, and Greg Dunn from First Energy were at the site to meet with Tom Dragoun and Al Adams from the NRC and SNEC representatives to discuss the progress of the decommissioning. Mr. Kuehn reported that the project was now expected to meet the revised schedule and budget. All the Final Status Surveys should be submitted to the NRC by the end of July and the NRC/ORISE reviews should be complete by the end of August.

Mr. Kuehn estimated that the NRC would issue the license termination about the end of September. Mr. Adams stated that all open items under the License Termination Plan approval, EPA considerations and license termination considerations under 10 CFR parts 20, 50 and 70 would need to be covered. He said that the SNEC license termination might be the first one completed under MARSSIM.

Mr. Paynter said that about 40 acres have been classified as Impacted Areas. All Class 3 areas have been surveyed and the preliminary data looks acceptable. The area classified as Class 1 has about doubled from the original characterization. He stated that the Final Status Survey reports summarize the data. The original data will be archived. He reported that the drinking water dose estimate was based on the SNEC site-specific model, not the EPA model.

Meeting the NRC TEDE (Total Effective Dose Equivalent) of 25 mrem/year also meets the EPA limit of 4 mrem/year from ground water.

Mr. Adams stated that the cooperation and professionalism of the SNEC personnel working on the decommissioning project has been excellent.

Jun 05 All the remediation work and surveys were finished by the end of June. The concrete pad for the Decommissioning Support Building was core drilled in several places and samples of the underlying soil were taken as part of the Final Status Survey. The soil had previously been surveyed and sampled prior to pouring the concrete when the building was erected.

22-23 Jun 05 Two auditors from First Energy conducted an audit of the site on. They had no findings, but recommended that a record be made of the location of the tunnels, building foundations, residual asbestos and other items that might be of value for future users of the property. This will be done. The auditors also recommended a walk-down of the property with First Energy environmental representatives to make them aware of what has been done to the property and the location the features mentioned in the above paragraph. This was accomplished on 12 Jul 05.

12 Jul 05 Environmental representatives from First Energy and Penelec met at the site for information on the final status of the site. The meeting was attended by Kathy Kunkel, Karen Nolan, Frank Dux, G. Kuehn, Jim Byrne, Lou Shamanek, and Art Paynter. Jim Fockler from the Citizens Task Force and the Independent Inspector were also present.

It was explained that the FENOC area (reactor site) is 1.147 acres around the containment vessel. The rest of the area is Penelec property. It has not been resolved whether the FENOC property should be transferred to Penelec after license termination. About 40 acres of the property were classified as Impacted Areas for the decommissioning. Structures that remain on the site include the lower containment vessel shell and concrete cover, the control and administration building foundation, the steam plant foundation, tunnels, waste building foundation, waste tunnel floor, and the pads for the garage, warehouse and boilers. Some asbestos remains buried in areas that did not require remediation for radioactive contamination. There is no requirement that buried asbestos or other trash be removed. Kathy Kunkle is to check on any requirements for the large brush pile that remains from clearing areas that were remediated.

The Corp of Engineers has looked at the restoration of the former dump area in the northeast corner of the site and expressed their satisfaction with the work.

The group toured the site to observe the location of the above features. Recommendations were to backfill the exit of the Shoup Run bypass tunnel with

coarse rocks to prevent personnel access. Silt fence is to be removed when the area is stabilized, except for Corp of Engineers property, as the Corp wants it left in place. Holes in the chain link fence around the site should also be repaired. There was agreement to complete these items.

Records for the site are stored through Amergen. The Final Status Survey records will be transferred to FENOC. Kathy Kunkle complimented the SNEC staff for doing a good job on the remediation and restoration.

28 Jul 05 The last group of the Final Status Surveys were submitted to the NRC.

Jul 05 All grid markers were removed because of safety concerns over the steel posts sticking above ground or coming out of the ground from frost heaving.

As the Final Status Surveys were completed the areas were backfilled, graded and seeded, as necessary. The areas adjacent to the river were seeded with a seed mixture specified by the Corp of Engineers.

When the survey of the concrete pad over the site of the containment vessel was completed, five holes were drilled down through the bottom of the containment vessel shell, the concrete saddle under the shell and into the bedrock. This will allow groundwater to move in and out of the containment vessel shell and be at the same level as outside the shell.

15 Sep 05 James Byrne, Program Director for SNEC, submitted the application to the NRC for the termination of Operating License No. DPR-4.

29 Sep 05 SNEC submitted to the NRC the responses to the NRC additional comments on the FSS Reports.

12 Oct 05 SNEC representatives attended a meeting of the Bedford County Commissioners for a final update them on the status of the project.

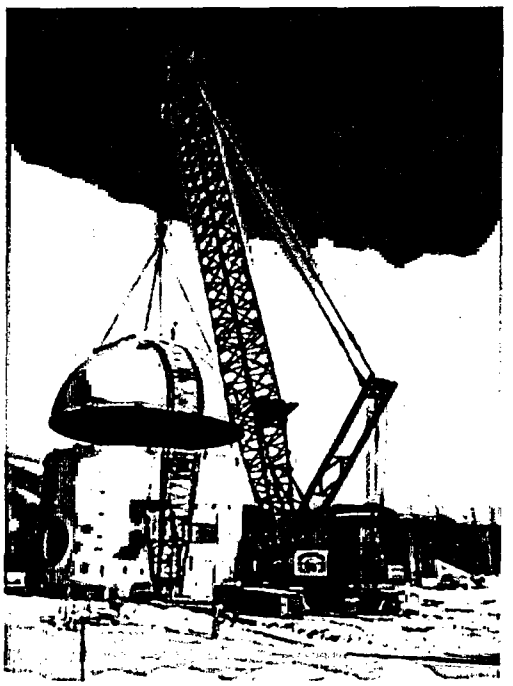
18 Oct O5 SNEC representatives attended a meeting of the Huntingdon County Commissioners for a final update them on the status of the project.

31 Oct 05 The NRC issued Inspection Report No. 50-146/2005-201. The report covered inspections from 16 May 05 through 5 Oct 05 and the review of 43 Final Status Survey Reports. The inspection concluded that the requirements for license termination had been met.

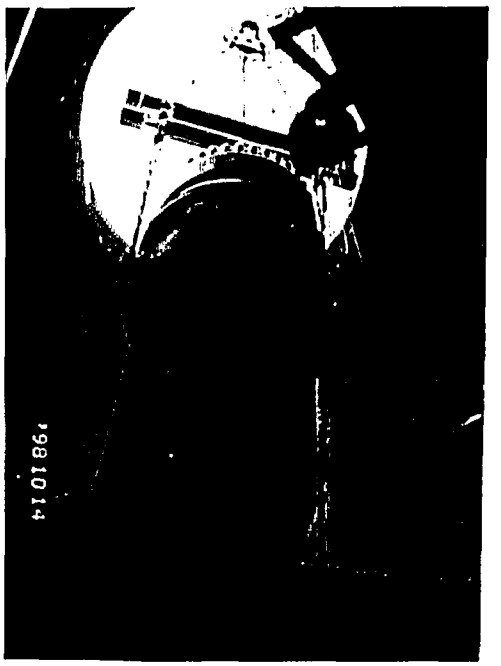
7 Nov 05 The license termination for the SNEC facility license DPR-4 was issued by the NRC.

8 Nov 05 A historic recognition ceremony was held at the Saxton site. NRC Commissioner Jeffrey Merrifield delivered the keynote address and presented the license termination letter to Gary Leidich of First Energy. The ANS historic plaque was presented to the Saxton Public Library for display.

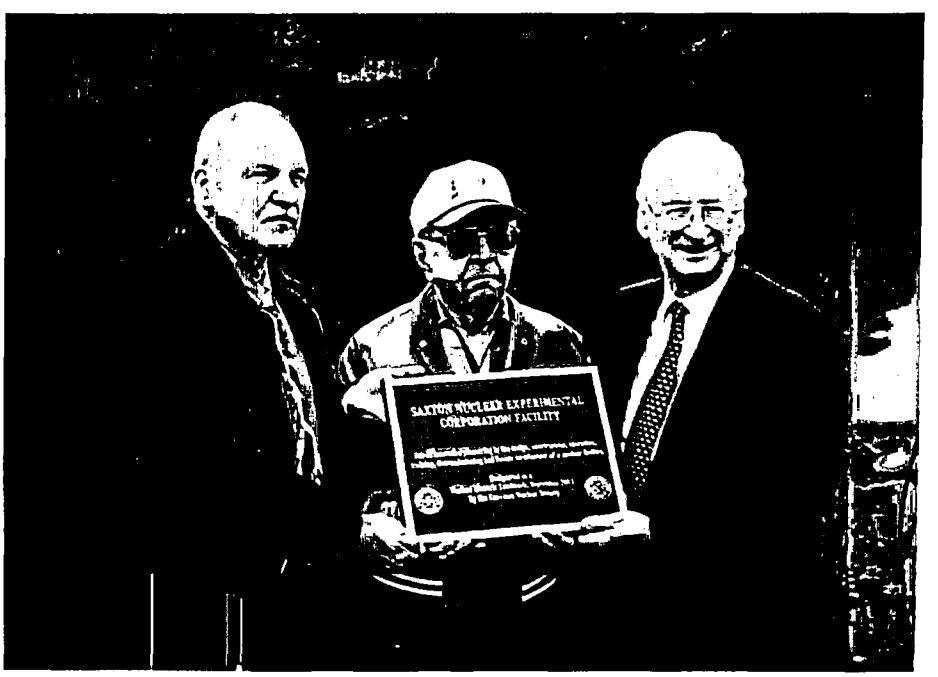
May 06 The Independent Inspector completed the Final Report for the Saxton Independent Inspection Program.



CV dome lift, 21 Jan 04.



Reactor vessel lift, 14 Oct 98



ANS historic site plaque presentation,4 Mar 04 to G. Kuehn and J. Fockler by L. Faulke.

Historical Site Assessment

One of the requirements of a decommissioning project is the compilation a Historical Site Assessment to aid in the planning and execution of the decommissioning of a facility. The March 2000 revision of the Historical Site Assessment Report for the SNEC Facility was prepared by the GPUN Decontamination and Decommissioning Engineering group. It includes information on the history and use of the facility, potential contaminated areas and contaminants, and environmental concerns.

The SNEC Facility was located on the 150-acre site of the PENELEC Saxton Steam Generating Station at Saxton, PA. The SSGS was built in the period 1922-1923 by Day and Zimmerman of Philadelphia, PA and operated from 1923 to 1974. The generating station consisted of a main building that housed the boilers and electrical generators plus a garage, a storeroom, a spray pond, coal storage areas and a coal conveyor. The main building was demolished in the 1975-1977 period. All iron, metal and wood was removed from the building and the brick and concrete were used to fill the below grade portion of the building. The area was then covered with crushed stone and soil. Some of the demolition debris was also used as fill in the spray pond area.

The SNEC Facility was built between 1960 and 1962 alongside the SSGS. The yard and buildings of the SNEC Facility were located on a 1.148 acre tract that was deeded to SNEC by PENELEC. The 23.5 thermal megawatt pressurized water reactor achieved criticality on 12 Apr 1962 and operated until 1 May 72. Steam from the reactor was used to operate a turbine generator in the SSGS.

The fuel was removed from the reactor in 1972 and shipped to the U. S. Atomic Energy Facility at Savannah River, SC. The reactor control rod blades, the superheater test loop and all the special nuclear material were also removed from the site at that time. The buildings and structures that supported reactor operations were partially decontaminated in the 1972-1974 period. The underground tanks and piping were removed and disposed along with most of the components from the reactor support buildings and the ventilation stack. . Surveys of the Radioactive Waste Disposal Facility, the Control and Administrative Building, the yard pipe tunnel, the Refueling Water Storage Tank, and the pump house in 1973 indicated removable contamination was less than 1000 dpm/100 cm^2 beta-gamma and 100 dpm/100 cm^2 alpha. General area exposure rates were 0.05 mR/hr to 0.3 mR/hr and most surface areas met the 0.4 mR/hr release criterion that was in effect at that time.

In 1980 SNEC arranged for GPU Nuclear to maintain the SNEC facilities and to be responsible for the decommissioning. In the period 1987 to 1989 the Control and Auxiliary Building, the Radioactive Waste Disposal Facility, the yard pipe tunnel, and the Filled Drum Storage Bunker were decontaminated. The Refueling Water Storage Tank and the Safety Injection Pump House were

removed. The top 6-12 inches of surface material from the Filled Drum Storage Bunker was removed and disposed. The decontamination and surveys of the reactor support buildings were completed in 1989. Oak Ridge Associated Universities conducted an independent verification survey in Oct 1991. After acceptance of the surveys by the NRC, demolition of the support buildings was conducted from Jun-Sep 1992.

The Soil Remediation Project, which involved soil monitoring, excavation, packaging and shipment of contaminated soil from about 2 acres around the reactor was completed in 1994. About 56,000 ft^3 of contaminated soil was shipped to a disposal site in UT and about 100 ft^3 to the disposal site in Barnwell, SC. Total activity in the soil was about 11 millicuries. Some contaminated soil was at a depth exceeding the work scope of this phase of the decommissioning and was covered and left in place for removal during the reactor vessel decommissioning.

In 1995 radiological and environmental data were collected for the Site Characterization Plan. In February 1996 GPUN issued the SNEC Facility Decommissioning Plan. The Decommissioning Support Facility was completed in November 1996. The NRC license amendment to allow decommissioning of the SNEC Facility was issued on 20 Apr 98.

In the fall of 1998 the reactor vessel, steam generator and pressurizer were removed from the containment vessel and shipped to the Chem-Nuclear disposal site in Barnwell, SC. After removal of all other components from the reactor vessel, decontamination of the concrete started in the spring of 1999.

The following is a summary of the list of items in the Historic Site Assessment Report that might affect the decommissioning of the SNEC Facility.

The historical information was used to suggest classifications for various items or areas, based past use or events that could have contaminated those areas. Areas that had no reasonable reason to suspect contamination were classified as non-impacted areas. Areas with some potential for residual contamination are classified as impacted areas. Class 1 impacted areas are those that are known to have a potential for contamination above the $DCGL_W$ (Derived Concentration Level Guideline). Class 2 impacted areas are those with a potential for contamination, but not exceeding the $DCGL_W$. Class 3 impacted areas are those in which any contamination is expected to be a small fraction of the $DCGL_W$.

The HSA Report recommended the following initial classifications.

Class 1

CV interior.

CV exterior surfaces from 2 meters above the grade elevation down to ~2 meters below grade

CV equipment hatch and the personnel hatch
Substation yard drainage area
SNEC facility yard septic system
Area surrounding the CV, out to approximately 10 feet, containing pipe stubs
Yard areas containing the Safety Injection Piping remnants
Yard area north-northwest of the CV shield wall above the Spent Resin Storage Tanks
Yard area above the underground tank sites
Site soil remediation areas
Steam tunnel/CV pipe tunnel
SNEC outfall piping and the river sediments at the point of release to the river
Yard areas contained within the 1.148-acre SNEC Site
Penelec Garage floor drains, the floors and the walls to a height of 2 meters
Burn area east of the Penelec warehouse
Penelec Line Shack
Decommissioning Support Building floors and walls up to 2 meters

Class 2

CV exterior
Meteorological dispersion zones
Spray pond
Site roadways
Pipe tunnel
Penelec Warehouse areas with fixed contamination
Intake tunnel from the point where spray pump water was introduced, back to the SSGS
Shoup Run shunt line from the point of the Garage Building floor drain tie-in on to its outfall
Decommissioning Support Building upper walls and ceiling

Class 3

Northeast dumpsite
Underground remnants of the C & A Building, the RWDF and the interconnecting Pipe tunnel
Penelec Garage upper interior walls and ceiling
Penelec warehouse, areas without fixed contamination
Intake tunnel inlet structure
Shoup Run shunt line outfall
Decommissioning Support Building exterior and carport

Impacted, further investigation required for classification

Former SSGS demolition site area
Areas immediately adjacent to site roadways

Non-Impacted Areas.

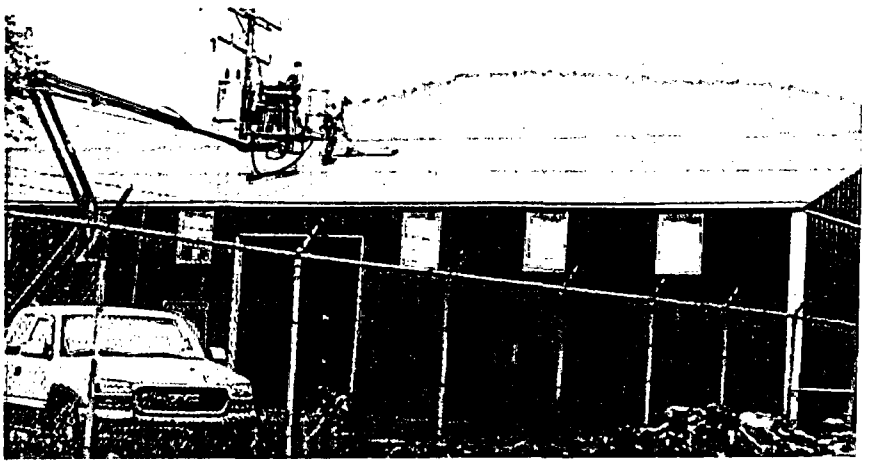
Balance of the Penelec site

The HSA Report included information on inadvertent releases and other items that might be of significance in the decommissioning project. The following is a list of the inadvertent release of airborne radioactive material over the life of the plant. These were apparently releases of short half-life gases with no significant particulate material. There would therefore be no detectable contamination from those events at present.

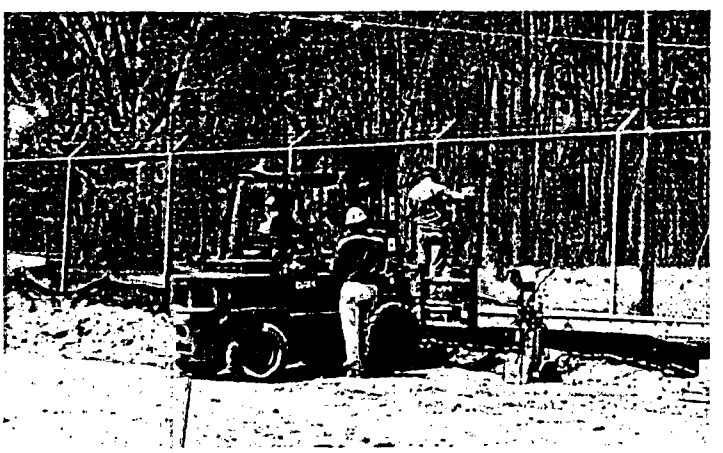
- Aug 1963, release of less than 2 millicuries from a leak in a 0.5-inch underground line in the Gas Decay Tank System.
- May 1970, release of 7.32 curies of ^{133}Xe and ^{135}Xe plus 41.4 microcuries of ^{31}I. The offsite dose estimate was 0.387 millirem.
- August 1970, release of 34 millicuries of ^{133}Xe and ^{135}Xe. The offsite dose estimate was 1.8 millirem.
- November 1971, release of 80.2 curies of ^{133}Xe and ^{135}Xe plus 4.3 microcuries of ^{131}I. The offsite dose estimate was 4.23 millirem.
- December 1971, release of 19.7 curies of ^{133}Xe and ^{135}Xe plus 281 microcuries of ^{31}I. The offsite dose estimate was 1 millirem.

Allegations were made that debris contaminated with radioactive material had been taken from the Saxton PENELEC site and disposed in the ash pile at the Williamsburg station. In 1989 and 1990 over 300 radiation measurements were taken at the ash pile and water samples were obtained from groundwater monitoring wells around the ash pile, leachate collection areas and the Juniata River. All radiation measurements and sample assays were consistent with natural background radiation.

The HSA Report concluded that sufficient information was available for the initial classification and for the SNEC staff to prepare the site for license termination.



Shonka FSS survey of Line Shack roof.



Final Status Survey of fence.

FSS of the inside of the CV.

License Termination Plan

The Nuclear Regulatory commission requires under 10 CFR part 50.82 that a facility that wants to terminate a power reactor license must submit a License Termination Plan at least 2 years before the license termination. The License Termination Plan must include:

- A site characterization;
- Identification of remaining dismantlement activities;
- Plans for site remediation;
- Detailed plans for the final radiation survey;
- A description of the end use of the site, if restricted;
- An updated site-specific estimate of remaining decommissioning costs;
- A supplement to the environmental report, pursuant to § 51.53, describing any new information or significant environmental change associated with the licensee's proposed termination activities; and
- Identification of parts, if any, of the facility or site that were released for use before approval of the license termination plan.

The NRC will terminate the license if it determines that the decommissioning has been performed in accordance with the License Termination Plan and the site meets the criteria for decommissioning in 10 CFR part 20, subpart E. A site is considered acceptable for unrestricted use if the residual radioactivity that is distinguishable from background radiation results in a TEDE (Total Effective Dose Equivalent) to an average member of the critical group that does not exceed 25 mrem per year. The TEDE is the peak dose expected in the first 1,000 years after decommissioning and includes the dose from groundwater sources of drinking water (a more conservative value of 10,000 years was used for SNEC). Also, the residual radioactivity must be reduced to levels that are as low as reasonably achievable (ALARA).

The SNEC License Termination Plan was submitted to the NRC by GPU Nuclear on 3 Feb 1999. The NRC returned the plan on 27 Apr 1999 with a request for additional information. After three public meetings between GPU Nuclear and the NRC in 1999 to discuss the plan, a revised Plan was submitted on 2 Feb 2000.

Public Meeting

The NRC held a public meeting on 25 May 2000 at the Saxton Fire Hall to discuss the License Termination Plan. The Chairman of the Bedford County Commissioners served as the moderator for the meeting. The NRC representatives explained the process for reviewing the License Termination Plan. They indicated that a notice of consideration would be published in the Federal Register in the next 45 days and that 30 days would then be allotted for interested parties to request a public hearing. The NRC representatives stated that thee NRC would probably submit a formal written request for further information to GPU Nuclear in about September. The NRC inspector for the

Saxton decommissioning project explained the inspection process and stated that the NRC would probably have a contractor make independent measurements and review the Final Site Survey report.

GPU Nuclear representatives explained that the criteria for decontamination were that a person living on the site would not receive more than 25 mrem per year of effective dose from all pathways and no more than 4 mrem per year of that total would be from groundwater. The effective dose would also be ALARA (As Low As Reasonably Achievable). Restoration of the site was to be done after the termination of the license.

The NRC and GPU Nuclear responses to question from the audience are listed below.

- The NRC will insure that the total dose to the public does not exceed the NRC limit of 25 mrem per year. The NRC will also verify the dose from groundwater, but GPU Nuclear can change the self-imposed 4 mrem/year groundwater dose limit, because it is not a NRC requirement.
- If a hearing is requested on the License Termination Plan, GPU Nuclear can continue work, if there is no significant safety problem.
- The limits for contamination left after decontamination of the outbuildings that were previously decontaminated and removed at the site were lower than the present limits for most radionuclides.
- GPU Nuclear could probably remove the steel dome of the containment vessel prior to license termination.
- The NRC will not allow the 50.59 process to be used to make changes in the License Termination Plan that will reduce the effectiveness of the plan or that change the technical specifications.
- The NRC must be satisfied that the funds to complete the decommissioning are available before it approves the License Termination Plan.
- The License Termination Plan will not be approved until all the areas are classified.
- GPU Nuclear will show what the actual calculated dose is on the final site survey, not just that it is below the 25 mrem/year or the Derived Concentration Guideline.
- The contamination limit for what is left of the containment vessel assumes building occupancy while the contamination limit for the soil assumes a residential farmer is present.
- No decision has been made yet about whether there will be any monitoring after the license for the site is terminated. GPU Nuclear may not exist to do any monitoring at that time.

Plan

The SNEC License Termination Plan contained the required elements of a termination plan, as listed above. The SNEC Facility was divided into eight areas with similar characteristics.

Area 1. CV Basement.
Area 2. CV Primary compartment.
Area 3. CV Auxiliary compartment.
Area 4. CV Operating floor and surfaces to the top of the dome.
Area 5. Pipe tunnel around the outer circumference of the CV.
Area 6. Reactor storage well and spent fuel pool.
Area 7. Outside of the CV dome.
Area 8. SNEC Facility yard areas.

The information from the Site Characterization Report was presented for each of these areas. The remaining tasks to decommission the areas and the remediation methods were also described.

Final Radiation Survey Plan

The License Termination Plan described the Final Radiation Survey Plan, which was used to determine that the site met the criteria for unrestricted release. The NRC dose standard of 25 mrem/year was used. This is the Total Effective Dose Equivalent (TEDE), including the dose from groundwater sources of drinking water, to the average member of the critical group. The Plan also stated the intent to achieve a goal of keeping the drinking water portion of the dose to four mrem/year or less. The Plan also stated that residual radioactivity would be reduced to levels As Low As Reasonably Achievable (ALARA).

Dose Models

Dose models were used to calculate the potential radiation dose to the public from radioactive material left after decommissioning. The models were used to derive the concentrations of radionuclides in soil and water or on surfaces that correspond to the dose limit. These Derived Concentration Guideline Levels (DCGL) were the maximum concentrations of radionuclides that could remain after decommissioning. The limit for the average concentration of radionuclides was designated the $DCGL_W$. There was also a limit on the concentration in small areas within a survey unit, called the Elevated Measurement Comparison DCGL ($DCGL_{EMC}$).

Two scenarios were used for dose modeling in the SNEC License Termination Plan.

- A Building Occupancy Scenario was used to calculate the dose to persons working 2,000 hours/year (40 hours/week for 50 weeks) in a building that had residual surface contamination. The dose pathways included external exposure to penetrating radiation, inhalation of re-suspended surface contamination, and inadvertent ingestion of surface contamination.

- The Residential Farming Scenario was used to calculate the dose from residual radioactive material in soil and groundwater. The critical group for this model was a farming family living on the site, using drinking water from a source on the site and growing a portion of the food for their diet on the site. The dose pathways in that scenario included external exposure

to penetrating radiation, inhalation of re-suspended soil, direct ingestion of soil, and ingestion of drinking water, plants, animals and fish from the site.

DCGL Values

Table 6.2 from the LTP lists the radionuclides of importance at the SNEC site and the $DCGL_W$ values. The DCGL value for a specific survey unit was adjusted according to the fraction of the total activity contributed by the various radionuclides. When the adjustments for hard-to-detect radionuclides and the administrative limit were made to the DCGL's for specific survey units to achieve the 25 mrem/year TEDE, the 4 mrem/year from groundwater goal was also met.

Table 6-2
SNEC Facility DCGL Values [a]

Radionuclide	25 mrem/y Limit Surface Area (dpm/100cm2)	25 mrem/y Limit (All Pathways) Open Land Areas (Surface & Subsurface) (pCi/g)	4 mrem/y Goal (Drinking Water) Open Land Areas [b] (Surface & Subsurface) (pCi/g)
Am-241	2.7E+01	9.9	2.3
C-14	3.7E+06	2	5.4
Co-60	7.1E+03	3.5	67
Cs-137	2.8E+04	6.6	397
Eu-152	1.3E+04	10.1	1440
H-3	1.2E+08	132	31.1
Ni-63	1.8E+06	747	1.9E+04
Pu-238	3.0E+01	1.8	0.41
Pu-239	2.8E+01	1.6	0.37
Pu-241	8.8E+02	86	19.8
Sr-90	8.7E+03	1.2	0.61

Footnotes:
a) While drinking water DCGL's will be used by SNEC to meet the drinking water 4 mrem/yr goal, only the DCGL values that constitute the 25 mrem/yr regulatory limit will be controlled under this LTP and the NRC's approving license amendment.
b) Listed values are from the subsurface model. These values are most conservative between the two models (i.e. surface & subsurface).

Release Conditions

An area satisfied the criteria for unrestricted release, if the following conditions were met.

- All measurements of residual radioactivity above background from all survey units were equal to or less than the $DCGL_W$ or individual measurements from small areas within a survey unit did not exceed the $DCGL_{EMC}$.
- All the survey data passed the applicable statistical testing criteria.

- Remediation was performed to reduce the residual concentrations of radioactive material to ALARA levels.

ALARA Analysis

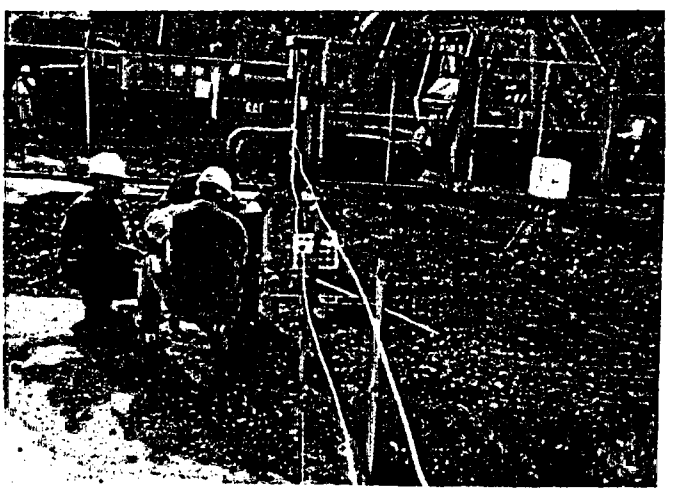
The SNEC LTP met the NRC ALARA requirement because contaminated surfaces were remediated and the DCGL's for the 25 mrem/year limit were met for surface and volumetric contamination.

MARSSIM

The License Termination Plan included the use of MARSSIM procedures. MARSSIM is an acronym for Multi-Agency Radiation Survey and Site Investigation Manual. It is a consensus document developed by the Department of Defense, Department of Energy, Environmental Protection Agency and the Nuclear Regulatory Commission to provide guidance for surveys to document compliance with decommissioning regulations. One of the basic requirements of MARSSIM is to classify the areas that are to be surveyed. Areas are classified as impacted or nonimpacted based on the Historical Site Assessment. Nonimpacted areas are those that have no reasonable potential for residual contamination and no surveys are required. Impacted areas are classified as Class 1, areas with a potential for contamination above the limit; Class 2, areas with a potential for contamination below the limit; and Class 3, areas that are not expected to have contamination greater than a small fraction of the limit. The classification and the variation in measurements determine the fraction of the area that has to be scanned and sampled for radiation or residual radioactive material. MARSSIM relies on various statistical tests to determine the required number and location of samples.

Stream sediment sampling, Oct 01

Monitoring well tests, Dec 00



Pressurized ion chamber measurements, Oct 01.

Final Status Surveys

The License Termination Plan (LTP) describes the Final Radiation Survey Plan, which is used to determine that the site meets the criteria for unrestricted release. The NRC dose standard of 25 mrem/year is used. This is the Total Effective Dose Equivalent (TEDE), including the dose from groundwater sources of drinking water, to the average member of the critical group. The LTP states the intent to achieve a goal of keeping the drinking water portion of the dose to four mrem/year or less. The LTP also states that residual radioactivity will be reduced to levels As Low As Reasonably Achievable (ALARA).

Dose Models

Dose models were used to calculate the potential radiation dose to the public from radioactive material left after decommissioning. The models were used to derive the concentrations of radionuclides in soil and water or on surfaces that correspond to the dose limit. The Derived Concentration Guideline Levels (DCGL) are the maximum concentrations of radionuclides that can remain after decommissioning. The limit for the average concentration of radionuclides is designated the $DCGL_W$. Most of the radioactive contamination remaining at the Saxton site is ^{137}Cs and it is the easiest to detect. Therefore, an effective $DCGL_W$ for ^{137}Cs, adjusted for the percentage of ^{137}Cs in the radionuclide mix, was used for most surveys. In order to insure that the doses in the survey units did not exceed the limits, an Administrative Limit of 75% of the DCGL was used for the surveys. The $DCGL_W$ is intended to be used as the average for large areas. For small areas within a survey unit the concentrations could exceed the $DCGL_W$, but could not exceed the Elevated Measurement Comparison DCGL ($DCGL_{EMC}$).

Two scenarios were used for dose modeling in the SNEC License Termination Plan. A Building Occupancy Scenario was used to calculate the dose to persons working 2,000 hours/year (40 hours/week for 50 weeks) in a building with residual surface contamination. The dose pathways included external exposure to penetrating radiation, inhalation of re-suspended surface contamination, and inadvertent ingestion of surface contamination.

The Residential Farming Scenario was used to calculate the dose from residual radioactive material in soil and groundwater. The critical group for this model is a farming family living on the site, using drinking water from a source on the site and growing a portion of the food for their diet on the site. The dose pathways in that scenario included external exposure to penetrating radiation, inhalation of re-suspended soil, direct ingestion of soil, and ingestion of drinking water, plants, animals and fish from the site.

Final Status Survey Plans

Information from the characterization surveys and any post-remediation surveys or samples is used to design a FSS plan for each survey area. Areas in which there is a large variation in the survey measurements or sample assays require a larger fraction of the area to be surveyed and more samples to be collected and analyzed than areas in which the measurements and samples have less variation.

An area satisfied the criteria for unrestricted release, if the following conditions were met.

- All measurements of residual radioactivity above background from all survey units were equal to or less than the $DCGL_W$ or individual measurements from small areas within a survey unit did not exceed the $DCGL_{EMC}$.
- All the survey data passed the applicable statistical testing criteria.
- Remediation was performed to reduce the residual concentrations of radioactive material to ALARA levels.

DCGL

The general $DCGL_W$ values for the radionuclides at the SNEC site to meet the 25 mrem/year NRC limit and the groundwater goal of 4 mrem/year are given in the table below. A specific DCGL was calculated for each survey unit, based on the composition of the radioactive material found in that area. That specific DCGL was used to determine whether the results of the final survey showed that the survey unit met the dose limits.

Exhibit 1

SNEC Facility Individual Radionuclide DCGL Values [a]

Radionuclide	25 mrem/y Limit Surface Area ($dpm/100cm^2$)	25 mrem/y Limit (All Pathways) Open Land Areas (Surface & Subsurface) (pCi/g)	4 mrem/y Goal (Drinking Water) Open Land Areas [b] (Surface & Subsurface) (pCi/g)
Am-241	2.7E+01	9.9	2.3
C-14	3.7E+06	2	5.4
Co-60	7.1E+03	3.5	67
Cs-137	2.8E+04	6.6	397
Eu-152	1.3E+04	10.1	1440
H-3	1.2E+06	132	31.1
Ni-63	1.8E+06	747	1.9E+04
Pu-238	3.0E+01	1.8	0.41
Pu-239	2.8E+01	1.6	0.37
Pu-241	8.8E+02	86	19.8
Sr-90	8.7E+03	1.2	0.61

NOTES:

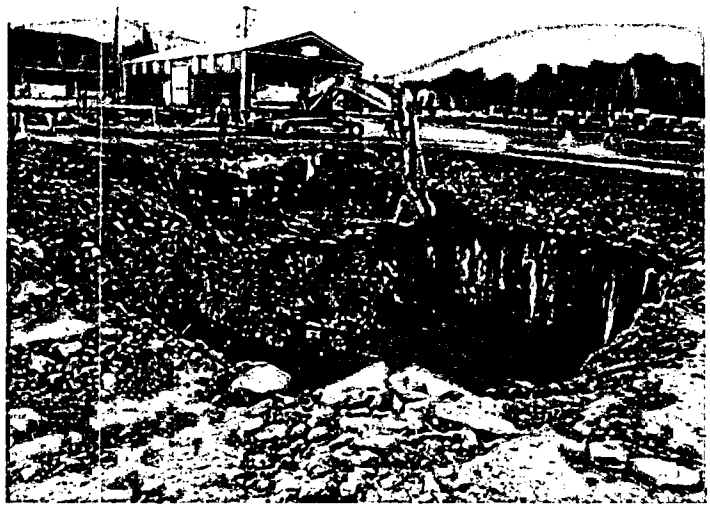
(a) While drinking water DCGLs will be used by SNEC to meet the drinking water 4 mrem/y goal, only the DCGL values that constitute the 25 mrem/y regulatory limit will be controlled under this LTP and the NRC's approving license amendment.

(b) Listed values are from the subsurface model. These values are the most conservative values between the two models (i.e., surface & subsurface).

FSS Reports

GPU Nuclear prepared a Final Status Survey Report for each of the 39 survey areas at the SNEC site and submitted them to the NRC. The reports were reviewed by the NRC inspector and by ORISE. After the NRC issued comments on any items that needed clarification or additional information and SNEC responded to the comments all the reports were accepted by the NRC. The complete reports were too large to be included in the CD provided with this report, but they were submitted to the NRC in electronic form and should be available on the NRC website. The complete set of FSS reports will also be provided in CD form to the Saxton Public Library with this final report.

The Independent Inspector examined the FSS Reports and prepared a summary for each one. A list of all the reports and the summaries are presented in Section 7 of this report.



East yard tank excavation, fall 04.

Soil removal from NE dump area, fall 04.

Removal of drain line to river, Jun 01.

Final Status Survey Report Summaries

The Independent Inspector reviewed each of the FSS reports and prepared a summary of each report. Those summaries are presented in this section of the Independent Inspector's Final report. All the survey areas met the NRC annual TEDE of 25 mrem. The SNEC goal of keeping the portion of the dose from groundwater to less than 4 mrem/year was also achieved. In my review I found the FSS reports to be complete and supported by the survey data. However, I do have the comment that the reviews were much more time consuming than necessary because of the inconsistent use of and the confusing switches between terms, such as, the $DCGL_W$ and the administrative limit, the action level and the administrative limit, and the net and gross cpm.

At the public meeting on the License Termination Plan in Saxton on 25 May 2000 the GPU Nuclear representative indicated, in response to a question from the public, that the actual dose would be estimated for each survey area in the FSS reports. However, in the FSS reports only the conclusions that the TEDE was less than the 25 mrem/year NRC limit and that the goal of a groundwater dose component less than 4 mrem/year was achieved were reported. The actual dose was not calculated from the survey results. In my review of the FSS reports I have made an estimate of the dose for each survey area. The estimates were made by comparing the actual radiation measurements and soil assays in the final surveys or in the characterization surveys to the $DCGL_W$ values. I want to emphasize that these are estimates only and they did not involve a full recalculation with the dose models. The estimates are provided to give some perspective of how the results of the decommissioning compare to the dose limits.

The table below is a list of the FSS reports. Summaries of each of the reports by the Independent Inspector are provided on the following pages.

	Survey Area
1	CV Interior Above the 774' Elevation and the Exterior
2	CV Interior Below the 774' Elevation
3	CV Yard Excavation - Soil and Structural Remnants
4	East Yard Excavation, OL1-7
5	Embedded/Buried Piping
6	GA1-1, Small Penelec Garage
7	MA2, Open Land Area, Discharge Tunnel Outfall
8	MA3/4, Weir Discharge Areas
9	MA-9, Fence
10	OL1, Residual Macadam
11	OL1-6 Trench
12	OL1 Residual Concrete
13	OL1 Open Land, Soils
14	OL2, Open Land Area
15	OL3, Paved Surfaces and Concrete
16	OL3, Open Land Area, Soils
17	OL4, Open Land Area
18	OL5, Open Land Area
19	OL6 and OL10, Open Land Area, Soils
20	OL7, Paved Surfaces and Concrete
21	OL7 Open Land Area, Soils
22	OL8, Open Land Area
23	OL9, Open Land Area
24	OL11, Open Land Area
25	OL13, Open Land Area
26	Penelec Switch Yard Control Building
27	Penelec Line Shack
28	Penelec Switch Yard
29	Remediated Soils
30	Seal Chamber Roofs
31	Seal Chambers
32	SP1, Spray Pond Area
33	SSGS Basement
34	SSGS Structural Surfaces, CV Steam Tunnel
35	SSGS Structural Surfaces, Discharge Tunnel
36	SSGS Discharge Tunnel, Transition Area
37	SSGS Firing Aisle
38	SSGS Structural Surfaces, Intake Tunnel
39	SSGS Structural Surfaces, Spray Pump

Document: Final Status Survey

Letter No: E910-05-0

Date: October 2003

Description: Final Status Survey for the Containment Vessel Interior Above the 774' Elevation and the Exterior
This survey area includes the interior of the CV (Containment Vessel) from elevation 774' (actually 775.2') to 805.4'. The interior of the CV below 774' was covered in a separate FSS report submitted to the NRC on 4 Sep 03. The portion of the CV below 774' was then backfilled and covered with a plywood floor to serve as a base for the scaffolding necessary to clean and survey the interior of the shell above the 774' elevation. The portion of the CV above the 805.4' elevation was removed and the steel was surveyed for release or processing as radioactive waste. This report also includes the accessible exterior surface of the CV below the 805.4' elevation and soil in the excavation around the CV. It also includes the measurements by SRA (Shonka Research Associates) on 16,200 tons of soil and crushed debris that was later used for backfill at various location on the site.

1. Interior of the CV Shell Above the 774' Elevation and Support Beams
The concrete lining of the CV was completely remove and the inside of the shell cleaned and the paint removed prior to the FSS. Steel W-beams were welded around the inside circumference of the shell at several locations to prevent buckling of the shell from pressure of the surrounding soil. The area covered by the W-beams was cleaned and surveyed prior to the welding and seam between the shell and the W-beam sealed so that contamination could not enter the space behind the W-beam during decontamination of the remaining interior surfaces. The W-beams were new steel, but were also surveyed. The interior of the shell was divided into 4 survey units and the W-beams comprised and additional 5 survey units.

Survey Unit CV1-1
This Class 1 survey unit of 100 m^2 area is composed of portions of steel plates from the 805.4' elevation down to the 798.1' elevation.

Survey Unit CV1-2
This Class 1 survey unit of 100 m^2 area is composed of portions of steel plates from the 798.1' elevation down to the 790.4' elevation.

Survey Unit CV1-3
This Class 1 survey unit of 91.1 m^2 area is composed of portions of steel plates from the 790.4' elevation down to the 783.3' elevation.

Survey Unit CV1-4
This Class 1 survey unit of 95.1 m^2 area is composed of portions of steel plates from the 783.3' elevation down to the 775.2' elevation.

Survey Unit CV2-24
This Class 1 survey unit of 33.7 m^2 area is composed of 2 short W-beams at the 803.5' and 799.5' elevation.

Survey Unit CV2-25
This Class 1 survey unit of 68.2 m^2 area is composed of one W-beam at the 792.5' elevation.

Survey Unit CV2-26
This Class 1 survey unit of 68.2 m^2 area is composed of one W-beam at the 787' elevation.

Survey Unit CV2-27
This Class 1 survey unit of 68.2 m^2 area is composed of one W-beam at the 782' elevation.

Survey Unit CV2-28
This Class 1 survey unit of 68.2 m^2 area is composed of one W-beam at the 778.25' elevation.

Survey Results for Interior of the CV Shell Above the 774' Elevation and Support Beams
The requirements for Class 1 areas are survey of 100% of the accessible area and all data points $\leq DCGL_W$. The surface $DCGL_W$ for ^{137}Cs for this survey area was 2,763 dpm/100 cm^2 (administrative limit 2,072 dpm/100 cm^2).

A Gas-Flow Proportional Counter was used for scans and fixed-point measurements for these survey units. The MDC for scanning was $\leq$574 dpm/100 cm^2 and for fixed-point measurements $\leq$370 dpm/100 cm^2. The scan action level was 200 net cpm.

The scans and fixed point measurements with the GFPC were all less than the action level. The actual area surveyed in these units ranged from 91% to 99% because of small areas inaccessible with the GFPC. The smears taken to check for removable contamination were all less than the MDC of $\leq$172 dpm/100 cm^2 for beta and $\leq$12.7 dpm/100 cm^2 for alpha radiation.

2. Exterior of the CV Shell Below Grade
The soil around the exterior of the CV was excavated to remove contaminated soil and for the installation of the exterior stabilization ring and the anchor bolts. The excavated area included about 300 degrees of the circumference. The remainder was the remnants of the concrete tunnel beneath the Material

Handling Area of the Decommissioning Support Building. The survey area extended from the 804' elevation down to the bottom of the excavation at about 796'. It was subdivided into 3 survey units.

Survey Unit CV4-1
This Class 1 survey unit of 7.17 m^2 area covers the space from the top of the support ring to the 804' elevation.

Survey Unit CV6-1
This Class 1 survey unit of 22.9 m^2 area covers center space of the CV6 survey unit.

Survey Unit CV5
This Class 2 survey unit of 7.17 m^2 area covers the space from the bottom of the lower support ring to the 796' elevation.

Survey Results for Exterior of the CV Shell Below Grade
The requirements for Class 1 areas are survey of 100% of the accessible area and all data points $\leq DCGL_W$. The surface $DCGL_W$ for ^{137}Cs for this survey area was 10,773 dpm/100 cm^2 (administrative limit 8,080 dpm/100 cm^2).

A Gas-Flow Proportional Counter was used for scans and fixed-point measurements for these survey units. The MDC for scanning was $\leq$441 dpm/100 cm^2 and for fixed-point measurements $\leq$226 dpm/100 cm^2. The scan action level was 1,000 net cpm.

The scans and fixed point measurements with the GFPC were all less than the action level. The actual area surveyed in these units was about 96% of the Class 1 areas and 55% of the Class 2 area. The smears taken to check for removable contamination were all less than the MDC of $\leq$169 dpm/100 cm^2 for beta and $\leq$12.7 dpm/100 cm^2 for alpha radiation.

3. CV Yard Soil (Excavation Area)
Survey Unit OL1-1
This Class 1 survey unit of 16.3 m^2 is the excavated area around the exterior of the CV. It slopes upward from the 796' elevation to grade level. It is part of the OL1 survey area. The volumetric $DCGL_W$ for ^{137}Cs for this survey area was 10,773 dpm/100 cm^2 (administrative limit 8,080 dpm/100 cm^2).

A sodium iodide scintillation detector was used for scans and fixed-point measurements. The MDC for the sodium iodide scans was 3.7 pCi/g. The action level for the sodium iodide scan corresponding to the administrative limit was 300 gross cpm.

Survey Results for CV Yard Soil (Excavation Area)

The scan with the sodium iodide detector identified 25 locations with count rates above the action level of 300 gross cpm. Static measurements were made at each of these locations. The average reading for these points was 347 gross cpm and the maximum 454 gross cpm. Soil samples were also collected at each location. All soil samples were less than the $DCGL_W$. The maximum soil concentration for ^{137}Cs was 3.9 pCi/g and 12 of the samples were less than the MDC. An additional 28 soil samples were taken at the survey design locations. The average for these samples was 0.08 pCi/g ^{137}Cs and the maximum 0.28 pCi/g.

3. Debris and Soil Piles

Debris removed from the SSGS basement, from the garage and warehouse demolition and soil and rocks from various locations on the site were crushed and scanned for radioactive material. The material was loaded onto a conveyor belt with a fixed width and depth and scanned with a SMCM (Subsurface Multi-spectral Contamination Monitor) that was built and operated by SRA. The material was processed in about 250-ton batches. No survey unit designation was assigned to this material, but each batch was assigned a SR (Survey Request) number.

Survey Results for the Debris and Soil Piles

Shonka Research Associates (SRA) surveyed this area using a SCM (Surface Contamination Monitor). The SCM is an automated, position sensitive, large-area gas-flow proportional counter. It continuously records position and count rate, so no fixed-point measurements are required. The volumetric $DCGL_W$ for ^{137}Cs for the debris and soil piles area was 5.61 pCi/g (administrative limit 4.21 pCi/g).
The scan MDC and the alarm set point was 2.91 pCi/g.

There were 28 alarms while processing the debris and soil piles. The conveyor was stopped when an alarm was received. A portable meter was used to find the contaminated soil, which was then removed for disposal. Soil samples were taken from the conveyor belt at regular intervals to provide a composite for each batch for laboratory assay. The average ^{137}Cs concentration in the debris samples was 0.069 pCi/g and in the soil samples 0.683 pCi/g.

Conclusion

The survey units in this report meet the survey requirements and the release criteria of 25 mrem/year for TEDE and 4 mrem/year from drinking water in the SNEC License Termination Plan. The annual dose for these survey units was not calculated in the FSS, but by comparing the average surface contamination levels and soil concentrations in the FSS to the DCGL values the TEDE (Total Effective Dose Equivalent) were estimated.

The TEDE estimated from the means of the fixed-point measurements for the 9 survey units inside the CV ranged from 0 to 0.7 mrem/year.

The TEDE estimated from the means fixed-point measurements for the 3 exterior CV survey units ranged from 0 to 0.1 mrem/year.

The TEDE estimated from the mean of the ^{137}Cs concentrations in the 28 design area soil samples from the CV excavation was 0.3 mrem/year and the groundwater dose was 0.02 mrem/year. The TEDE estimated from the mean of the ^{137}Cs concentrations in the 25 soil samples from locations with elevated readings was 1.1 mrem/year and the groundwater dose was 0.06 mrem/year. The corresponding doses estimated from the fixed-point measurements at the 25 locations with elevated readings were 3.5 mrem/year TEDE and 0.2 mrem/year for groundwater.

The TEDE estimated from the mean of the ^{137}Cs concentrations in the samples from the 38 debris pile batches was 0.3 mrem/year and the groundwater dose was 0.01 mrem/year. The TEDE estimated from the mean of the ^{137}Cs concentrations in the 18 soil samples from the soil pile was 2.9 mrem/year and the groundwater dose was 0.1 mrem/year.

Document: Final Status Survey

Letter No: N/A

Date: 4 Sep 03

Description: Final Status Survey for CV Interior for Elevation 774' and Below, Revision 1
The CV (Containment Vessel) interior was stripped of all concrete and equipment. The steel surface was cleaned and stripped of paint before the FSS. The portion of the CV below the 774' elevation is the rounded bottom section up to the lowest stabilization ring. It is a Class 1 area of 337 m^2 and it was divided into 8 survey units.

Survey Unit CV2-19, CV2-20, CV2-21, CV2-22
A w-beam support ring was welded to the interior circumference of the CV shell to provide prevent collapse of the shell after the concrete was removed. These survey units consist of the area of the shell covered by the W-beam. The survey was performed before the beam was welded in place. The circumference is divided into 4 survey units, with each quadrant having an area of 3.04 m^2 (12.2 m^2 total). After the survey the seams between the W-beam and the shell were sealed with caulk to prevent any contamination from entering during subsequent cleaning of the upper surfaces.

Survey Unit CV2-23
This survey unit is the 74.5 m^2 surface of the beam and a 360^0 by 5" wide ring of the CV shell (D-plates) just below the W-beam.

Survey Unit CV3-1
This survey unit of 104.9 m^2 consists of the 10 C-plates that make up the shell below the D-plates (CV2-23). The plates are tapered to form the round bottom of the CV shell.

Survey Unit CV3-2
This survey unit of 124.4 m^2 consists of the 16-Bplates that make up the shell below the C-plates (CV3-1). The plates are tapered to form the round bottom of the CV shell.

Survey Unit CV3-3
This survey unit of 21.1 m^2 consists of the 2 semicircular A-plates that make up the bottom of the CV shell.

Survey Results

The requirements for Class 1 areas are survey of 100% of the accessible area and all data points ≤ $DCGL_W$. A GFPC was used for the scan and fixed-point measurements of the survey units in this area. The $DCGL_W$ for ^{137}Cs for this survey area was 2,763 dpm/100 cm^2 (administrative limit 2,100 dpm/100 cm^2). For the CV2-19 to CV2-22 survey units the count rate corresponding to the administrative limit was 580 net cpm. The MDC of the scan was 425 dpm/100 cm^2 and 219 dpm/100 cm^2 for the fixed-point measurements. The action level for the scan was 250 net cpm. For the other survey units the count rate corresponding to the administrative limit was 400 net cpm. The MDC of the scan was 737 dpm/100 cm^2 and 337 dpm/100 cm^2 for the fixed-point measurements. The action level for the scan was 200 net cpm.

Smear samples were taken in each survey unit to measure removable activity. Beta activity above 1,000 dpm/100 cm2 was reported. The MDC for alpha activity was 13 dpm/100 cm^2. Smears were also combined from survey units CV2-19 - CV2-22 and assayed with gamma spectroscopy. The ^{137}Cs activity was below the MDC.

Survey Unit CV2-19

No locations above the action level were identified in the scan. The mean of the 9 fixed-point measurements was 170 gross cpm and the maximum 188 gross cpm. Background was 166 cpm. Smears were taken at 5 locations to check for removable activity. None of the 5 smears were greater than 1,000 dpm/100 cm^2 beta or the alpha MDC.

Survey Unit CV2-20

No locations above the action level were identified in the scan. The mean of the 9 fixed-point measurements was 167 gross cpm and the maximum 210 gross cpm. Background was 170 cpm. Smears were taken at 5 locations to check for removable activity. None of the 5 smears were greater than 1,000 dpm/100 cm^2 beta or the alpha MDC.

Survey Unit CV2-21

No locations above the action level were identified in the scan. The mean of the 9 fixed-point measurements was 149 gross cpm and the maximum 168 gross cpm. Background was 157 cpm. Smears were taken at 5 locations to check for removable activity. None of the 5 smears were greater than 1,000 dpm/100 cm^2 beta or the alpha MDC.

Survey Unit CV2-22

No locations above the action level were identified in the scan. The mean of the 9 fixed-point measurements was 146 gross cpm and the maximum 185 gross cpm. Background was 150 cpm. Smears were taken at 5 locations to check for removable activity. None of the 5 smears were greater than 1,000 dpm/100 cm^2 beta or the alpha MDC.

Survey Unit CV2-23
No locations above the action level were identified in the scan. Because of obstructions and corners, about 0.3% of this survey unit could not be surveyed. The mean of the 20 fixed-point measurements was 110 gross cpm and the maximum 129 gross cpm. Background was 103 cpm. Smears were taken at 5 locations to check for removable activity. None of the 3 smears were greater than 1,000 dpm/100 cm^2 beta or the alpha MDC. Eight gamma exposure rate measurements at 3' from the surface were approximately 3 microrem/hr.

Survey Unit CV3-1
No locations above the action level were identified in the scan. The mean of the 11 fixed-point measurements was 121 gross cpm and the maximum 139 gross cpm. Background was116 cpm. Smears were taken at 5 locations to check for removable activity. None of the 5 smears were greater than 1,000 dpm/100 cm^2 beta or the alpha MDC. Ten gamma exposure rate measurements at 3' from the surface were approximately 3 *microrem/hr.*

Survey Unit CV3-2
No locations above the action level were identified in the scan. The mean of the 18 fixed-point measurements was 156 gross cpm and the maximum 176 gross cpm. Background was 152 cpm. Smears were taken at 5 locations to check for removable activity. None of the 23 smears were greater than 1,000 dpm/100 cm^2 beta or the alpha MDC. Eighteen gamma exposure rate measurements at 3' from the surface were approximately 3-5 microrem/hr.

Survey Unit CV3-3
No locations above the action level were identified in the scan. The mean of the 9 fixed-point measurements was 147 gross cpm and the maximum 160 gross cpm. Background was 149 cpm. One smear was taken to check for removable activity. The smear activity was <1,000 dpm/100 cm^2 beta and less than the alpha MDC. Six gamma exposure rate measurements at 3' from the surface were approximately 3-5 microrem/hr.

Additional Smear Samples
Twenty-two additional smears were taken in the CV2-23, CV3-1, CV3-2 and CV3-3 survey units and assayed for ^{137}Cs in groups of 3-7 smears. The average ^{137}Cs activity was <9 dpm/100 cm^2.

Conclusion
The survey units in this report meet the survey requirements and the release criteria of 25 mrem/year for TEDE in the SNEC License Termination Plan. The annual dose for these survey units was not calculated in the FSS, but by comparing the means of the fixed-point measurements in each survey unit to

DCGL values the TEDE (Total Effective Dose Equivalent) was estimated. The maximum was 0.4 mrem/year and the average for all 8 survey units was 0.02 mrem/year.

Document: Final Status Survey

Letter No: E910-05-013

Date: 26 Jul 05

Description: CV Yard Excavation - Soil and Structural Remnants
This survey area includes the Containment Vessel concrete cap and the surrounding open land areas, the below-grade concrete structural remnants, and backfill materials. It includes 10 survey units, as described below. The northwest sector was contaminated by leakage from the piping and tanks of the reactor system. The south sector, northeast sector and southwest sectors were contaminated by leakage from the systems in the Pipe Tunnel. Contaminated soil was removed as part of the anchor bolt installation and the drilling for the grout curtain. Except for a small amount of concrete in Survey Unit MA8-1 projecting above grade level, these survey units were covered with clean backfill after the surveys were accepted.

Survey Unit OL1-2
This class 1 survey unit has an area of about 309 square meters with elevations between 803' and 811'.

Survey Unit OL1-3
This Class 1 survey unit has an area of 395 square meters and includes open land area and concrete blocks from the foundation of the Control Building.

Survey Unit OL1-4
This Class 1 survey unit has an area of 41 square meters and is composed of open land area soil between the elevations of 804' and 811'.

Survey Unit OL1-5
This Class 1 survey unit is an area of 66 square meters of soil between the elevations of 803' to 811'.

Survey Unit MA8-1
This Class 1 survey unit is composed of three concrete surfaces with an area of 48 square meters. The concrete surfaces are all located within the boundaries of Survey Unit OL1-2.

Survey Unit MA8-2
This Class 1 survey unit has and area of 13 square meters and is composed of the remnants of the CV Pipe Tunnel and the foundations of the Control and Auxiliary Building and the Decommissioning Support Facility.

Survey Unit MA8-3
This Class 3 survey units is the 182 square meter concrete cap that covers the backfilled lower portion of the containment vessel.

Survey Unit MA8-4
This Class 1 survey unit with an area of 7.8 square meters is composed of miscellaneous concrete structures in the vicinity of OL1-5.

Survey Unit CV4-2
This Class 1 survey unit has an area of 7.4 square meters is composed of external steel surface of the containment vessel from elevation 802.5' to 804'. It extends along about 77' of the south side of the CV.

Survey Unit CV5-1
This Class 2 survey unit has an area of 16.2 square meters. It is composed of the external steel surface of the containment vessel between elevation 800' and elevation 802.5' along the south side of the containment vessel below Survey Unit CV4-2.

Release Criteria
The volume $DCGL_W$ for the surrogate radioisotope, ^{137}Cs, for these survey units was 5.73 pCi/g and the administrative limit was 4.3 pCi/g. For surface contamination on the concrete and steel surfaces the $DCGL_W$ for the surrogate radioisotope, ^{137}Cs, for these survey units was 26,445 dpm/100 cm^2 and the administrative limit was 19,834 dpm/100 cm^2. However, the Gas-Flow Proportional Counter (GFPC) used for surface surveys cannot be set to detect only ^{137}Cs radiation. Therefore, the gross activity $DCGL_W$ of 44,434 dpm/100 cm^2 and the corresponding administrative limit of 33,325 dpm/100 cm^2 is used for surfaces. The DCGL's for OL1-5 and MA8-4 were slightly different, because they were based on different samples, but were within 2% of the values for the other survey units.

Survey Results
The 10 survey units were combined into 4 sectors. The backfill material was also surveyed. Soil areas were scanned with a sodium iodide scintillation detector with a window set to look at the ^{137}Cs gamma ray energy. Approximately 100% of the soil areas were scanned. Soil samples were also collected and analyzed for these survey units. The concrete and steel surfaces were scanned with a gas-flow proportional counter (GFPC). Static measurements (count for a preset time period in one location) were also made with the GFPC in prescribed locations. Except for MA8-3, 100% of the concrete and steel surfaces were scanned. Survey Unit MA8-3, the concrete cap for the CV, was a Class 3 area and about 17% of the area was scanned.

Northwest Sector

The Northwest Sector contained survey units OL1-2 and MA8-1. In the soil scan one alarm point was found in a small spot with 120 pCi/g ^{137}Cs and 1 pCi/g ^{60}Co. Subsequent soil assay and scans indicated the soil sample taken after the alarm had removed the soil with the elevated activity. Thirty-nine random soil samples from OL1-2 had a mean concentration of 0.42 pCi/g of ^{137}Cs and a maximum concentration of 1.4 pCi/g.

All the surface scans and static measurements were below the action level.

South Sector

The South Sector contained Survey Units OL1-3, MA8-2, CV4-2 and CV5-1. In the gamma scan of the soil and concrete block in OL1-3, fourteen spots exceeded the action level. Static measurements and soil samples indicated up to 2.0 pCi/g of ^{137}Cs. A gamma scan was also performed in MA8-2 and one spot exceeded the action level. A concrete sample from the spot indicated 1.0 pCi/g ^{137}Cs.

There were no areas above the action level in the GFPC scans or static measurements of MA8-2, CV4-2 or CV5-1.

Eighteen random soil samples were taken in OL1-3 and none were above the administrative limit of 4.30 pCi/g for ^{137}Cs. Nine of the samples were below the MDA and the maximum concentration for a sample above the MDA was 0.4 pCi/g.

Northeast Sector

The Northeast Sector contained Survey Units OL1-4 and MA8-3. In the gamma scan of the soil in OL1-4, five spots exceeded the action level. Soil samples of the elevated areas indicated up to 0.2 pCi/g of ^{137}Cs.

There were no areas above the action level in the GFPC scans or static measurements of MA8-3.

Thirty random soil samples were taken in OL1-4 and none were above the administrative limit of 4.30 pCi/g for ^{137}Cs. Thirteen of the samples were below the MDA and the maximum concentration for a sample above the MDA was 1.0 pCi/g.

Southwest Sector

The Southwest Sector contained Survey Units OL1-5 and MA8-4. No areas exceed the action level in the gamma scan of the soil in OL1-5.

There were no areas above the action level in the GFPC scans or static measurements of MA8-4.

Twelve random soil samples were taken in OL1-5 and none were above the administrative limit of 4.30 pCi/g for ^{137}Cs. Six of the samples were below the MDA and the maximum concentration for a sample above the MDA was 0.46 pCi/g.

Backfill Materials

The backfill materials included soil/debris/boulder piles from on-site excavations and additional shale from an off-site location. The backfill material not covered by previous FSS reports is divided into Survey Unit OL1-Misc-S (soil) and Survey Unit OL1-Misc-B (boulder). Gamma scans of 100% of both survey units were below the action levels. In OL1-Misc-S 104 soil samples were assayed. The highest concentration of ^{137}Cs was 2.4 pCi/g. In OL1-Misc-b 112 rock samples were assayed and the highest concentration of ^{137}Cs was 0.36 pCi/g.

Conclusion

Survey Units reviewed above meet the release criteria of 25 mrem/year for TEDE and 4 mrem/year from drinking water in the SNEC License Termination Plan. The annual dose for these survey units was not calculated in the FSS, but using the average soil concentration for the samples used to calculate the DCGL values the TEDE (Total Effective Dose Equivalent) would be 4.3 mrem/year and the drinking water dose 0.3 mrem/year. These values are based on samples that were mostly taken from elevated areas. More representative doses based on the soil samples taken during the FSS would be less.

Document: Final Status Survey

Letter No: E910-05-019

Date: 8 Jun 05

Description: Final Status Survey Report for the East Yard Excavation OL1-7

This Class 1 survey unit of 1,066 square meters is the excavation in the East Yard between the former Radwaste Disposal Facility and the Containment Vessel. The area had been previously been excavated to remove underground tanks. However, the tank bases and some of the mounting hardware had been left in the ground. This excavation was to remove contaminated tank remnants and soil. The excavation was up to 20' deep with vertical sidewalls on the east and south side. For safety reasons personnel could not enter the excavation so the surveys were performed from manlifts above the excavation. Ground water was also a problem and the excavation had to be pumped to keep it dry enough for the survey. The soil removed from the excavation that passed the screening with portable instruments was stockpiled and used for backfill after monitoring by SRA with the SCSM.

Survey Results

The requirements for Class 1 areas are survey of 100% of the accessible area and all data points $\leq$ $DCGL_W$. The $DCGL_W$ for ^{137}Cs for this survey unit was 5.73 pCi/g (administrative limit 4.30 pCi/g). Scan measurements were made using a sodium iodide scintillation crystal. The MDC of the scan was 6.2 pCi/g, which was higher than the $DCGL_W$ but less than the $DCGL_W$ times the effective area factor. Two locations of about 0.1 square meters with elevated count rates above the alarm level were found in the scan.

Soil samples were taken at 11 survey design points. Three of the samples were below the MDC and the maximum ^{137}Cs concentration was 1.8 pCi/g. The 2 soil samples from one of the elevated scan locations had a concentration of 5.31 pCi/g at the center and 2.51 pCi/g at the edge of the area, which are less than the $DCGL_W$. The center and edge sample from the other elevated area were both less than the MDC.

Conclusion

The survey areas in this report meet the survey requirements and the release criteria of 25 mrem/year for TEDE and 4 mrem/year from drinking water in the SNEC License Termination Plan. The annual dose for these survey units was not calculated in the FSS, but comparing the average soil concentrations in the FSS to the samples used to calculate the DCGL values the TEDE (Total Effective Dose Equivalent) would be 2.6 mrem/year and the drinking water dose 0.2 mrem/year.

Document: Final Status Survey

Letter No: E910-05-055

Date: 27 Jul 2005

Description: Embedded/Buried Piping
This report covered the embedded and buried pipes remaining in the Saxton Steam Generating Station structures. The piping was divided into 28 groups. A contractor, CoPhysics Corp., using a 1" diameter x 4" sodium iodide detector that could be inserted into the pipe, performed in-situ gamma ray surveys. These measurements were used to calculate the surface contamination and the concentration of ^{137}Cs in the sediment and scale. Samples of scale and sediment were also taken for laboratory analysis, where available.

The dose gamma ray from the residual contamination in piping is considered as part of the 25 mrem/year limit from all sources. Using a model with several sections of piping filled with contaminated sediment at the volumetric $DCGL_W$ for ^{137}Cs, the dose contribution from the piping was calculated to be 0.611 mrem/year. This was used as the bounding limit for the dose from residual contamination in the embedded/buried piping using a building reuse scenario.

Survey Results
The following table summarizes the results of the in-situ gamma ray surveys and the laboratory analyses of sediment and pipe scrapings. To stay within the bounding limit of 0.611 mrem/year from the embedded/buried piping the surface activity limit was 8150 dpm/100 cm^2 and the concentration limit was 6.38 pCi/g for ^{137}Cs. All the embedded/buried piping met the bounding limit of 0.611 mrem/year and was acceptable for unrestricted release.

#	Description	In-situ gamma				Lab scrape and sediment pCi/g	
		dpm/100 cm^2		pCi/g			
		Mean	Max	mean	max	mean	max
1	10 pipe segments removed from the intake tunnel and crossover	269	342	1.6	3.3	0.8	1.3
2	2 pipes, E. and W. side of s. chamber 3	415	512	2.0	2.4	No scale	
3	3 pipes, boiler pad to SSGS footprint	554	898	2.6	4.2	3.0	5.9
4	2 10" pipes, boiler pad to SSGS basement	268	421	1.3	2.0	No samples	
5	2 10" pipes, boiler pad to N. SSGS	326	574	1.5	2.7	0.1	0.1
6	4" and 2" pipes, boiler pad to SSGS bsmt.	829	1036	3.9	4.9	2.5	4.8
7	10" pipe SSGS N. wall to s. chamber 2	709	761	3.4	3.6	6.1	6.1
8	8" pipe, NE SSGS to rubble bed	423	493	2.0	2.3	No samples	
9	7 pipes through roofs of s. chambers 1&2	429	568	2.0	2.7	No samples	
10	6 pipes in top of s. chamber 3 *	2625	4696	12	22		1.5
11	10" pipe in ceiling of discharge tunnel	561	648	2.6	3.0	0.2	0.2
12	Rollup door in discharge tunnel	Results reported in separate FSS					
13	6 pipes in ceiling of discharge tunnel	551	857	2.6	4.0	3.0	5.9
14	2 floor drains in discharge tunnel	456	487	2.2	2.3	No samples	
15	6 large suction tubes, 2 small pipes and 2 large penetrations in intake tunnels	362	1131	1.4	2.0	0.29	0.37
16	Drain line, SW corner of warehouse slab	415	415	1.9	1.9	No samples	
17	7 pipes removed from boiler pad	350	377	1.2	1.3	0.36	1.3
18	9 24" pipes removed, intake tunnel to spray pond	442	499	1.6	1.8	1.7	2.7
19	Pipes and sumps, 4 sumps in garage	1426	2134	2.5	3.8	0.6	1.4
20	16" center yard drain to shunt line	459	910	1.4	2.0	0.59	1.1
21	12" yard drain near warehouse	617	1633	1.4	1.8	0.7	0.7
22	18"pipe, discharge tunnel to screen pit	247	375	0.9	1.3	2.2	4.2
23	12" drain line S. of garage to shunt	2.2	4.2	473	656	0.1	0.1
24	12" drain line E. of garage	489	565	1.7	2.0	0.1	0.1
25	3 pipes over s. chamber 3	585	1478	2.1	5.2	2.7	5.6
26	8" pipe, SW corner SSGS to screen pit	456	703	1.6	2.5	0.26	0.27
27	18" drain, warehouse to shunt	406	522	1.4	1.8	0.1	0.1
28	42" shunt, 2 12" , 1 16" connections	535	694	1.9	2.4	0.22	0.34

* The high readings in #10 were attributed to background from contamination that had not yet been removed from the inside of seal chamber 3. With background corrections the pipes met the release criteria.

Document: Final Status Survey

Letter No: E910-05-054

Date: 27 Jul 05

Description: GA1-1 Small Penelec Garage
The small Penelec garage was located near the boundary fence at the southwest corner of the SNEC site (grids AM-137 and AN-137). The building was used for storage and shop work during decommissioning. The building was demolished and only the 109 square meter Class 2 floor slab remains. The floor drains were covered in the FSS of the Embedded/Buried Piping.

Survey Results
The scan of the concrete slab was performed by SRA (Shonka Research Associates) using an automated, position-sensitive, large-area, gas-flow proportional counter, SCM (Surface Contamination Monitor). No fixed-point measurements were made because the SCM continuously collects position information during the scan. The $DCGL_W$ for ^{137}Cs was 28,000 dpm/100 cm^2 and the administrative limit was 21,000 dpm/100 cm^2. The scan MDC (Minimum Detectable Concentration) was 5,958 dpm/100 cm^2. Scan measurements were averaged over 1 square meter areas. No areas above the administrative limit were found in the 85% of the area scanned.

Conclusion
The survey area in this report meets the release criteria of 25 mrem/year for TEDE in the SNEC License Termination Plan.

Document: Final Status Survey

Letter No: E910-05-016

Date: 8 Jun 05

Description: Open Land Area MA2
This area is the open land at the outfall of the Discharge Tunnel. The total 600 square meter Class 3 area was put in one survey unit. No remediation was performed in this area. Because of the remediation in the Discharge Tunnel, it was designated as a Class 3 survey unit.

Survey Results
Approximately 15% of the area was scanned. No areas were found with a count rate above the administrative limit of 160 net cpm. Ten soil samples were taken and none were above the administrative limit of 4.89 pCi/g for ^{137}Cs. Two of the samples were below the MDA and the maximum concentration for a sample above the MDA was 0.54 pCi/g.

Open Land Area MA2 meets the release criteria of 25 mrem/year for TEDE and 4 mrem/year from drinking water in the SNEC License Termination Plan. The annual dose for these survey units was not calculated in the FSS, but using the average soil concentration for the samples used to calculate the DCGL values the TEDE (Total Effective Dose Equivalent) would be 3.8 mrem/year and the drinking water dose 0.02 mrem/year. These values are based on samples that were mostly taken from elevated areas. More representative doses based on the soil samples taken during the FSS would be less.

Document: Final Status Survey

Letter No: E910-05-053

Date: 27 Jul 05

Description: Weir Discharge Areas MA3 and MA4
The Weir Discharge Area is where a 10" discharge line from a weir near grid BB-126 on SNEC site entered the river. The 150 meters of discharge line from the weir was reported to have been contaminated by water from the Radioactive Waste Disposal Facility evaporator and water from the decontamination shower in the Control and Auxiliary Building. Samples from inside the discharge pipe had ^{137}Cs concentration up to 63.2 pCi/g. All of the discharge pipe from the weir to the concrete headwall at the river was removed prior to the final survey. The short pipe extension from the headwall into the river bed was also removed. Only the headwall remains. The annual REMP reports have listed detectable amounts of ^{137}Cs in the quarterly samples of river sediment taken near the discharge pipe outfall. The concentrations of ^{137}Cs for the 199-2004 period were less than 0.5 pCi/g.

Survey Area MA3 is a Class 2 area of about 25 square meters around the headwall.

Survey Area MA4 is a Class 3 buffer area of about 200 square meters around MA3.

The discharge pipe was buried at a depth of 1 to 2.5 meters and this report also includes the soil beneath the 110 meters of pipe from grid BF-127 to BQ-127. That survey area of about 220 square meters was surveyed when the pipe was removed.

Survey Results
The $DCGL_W$ calculations were based on CV yard soil and boulders. The administrative limit $DCGL_W$ for ^{137}Cs was 4.31 pCi/g for volume sources and 19,888 dpm/100 cm^2 for surface contamination.

Sampling of river sediment was performed by ENERCON Services in 2001. The results of the sediment sampling in the MA3 and MA4 areas was used for the FSS. Twelve samples were chosen from the survey areas and downstream of the survey area. Five of the samples were below the detection limit and the maximum concentration for ^{137}Cs was 2.55 pCi/g.

Forty soil samples were taken during removal of the discharge pipe. Twenty-seven samples were below the limit of detection and the maximum concentration

for ^{137}Cs was 3.9 pCi/g at the headwall, all other samples were less than 1.0 pCi/g.

The soil bed below the discharge pipe was scanned with an open window sodium Iodide scintillators. No areas were found above the $DCGL_W$. The concrete headwall was scanned with a GM detector. No areas were found above the $DCGL_W$.

The survey units in this report meet the release criteria of 25 mrem/year for TEDE and 4 mrem/year from drinking water in the SNEC License Termination Plan. The annual dose for these survey units was not calculated in the FSS, but using the average soil concentration for the samples used to calculate the DCGL values the TEDE (Total Effective Dose Equivalent) would be 4.3 mrem/year and the drinking water dose 0.3 mrem/year. These values are based on samples that were mostly taken from elevated areas. More representative doses based on the soil samples taken during the FSS would probably be less.

Document: Final Status Survey

Letter No: E910-05-023

Date: 22 Jun 05

Description: Fences MA9
This survey area is composed of 2,000 square meters of chain link fence remaining on the SNEC site. The survey area was divided into two survey units.

Survey Unit MA9-1
This Class 2 survey unit of 600 square meters is the fence in about 30 Class 1 soil grids. It is primarily the remaining fence that surrounded the original 1.2 acre reactor site.

Survey Unit MA9-2
This Class 3 survey unit of 1400 square meters is the fence in about 70 Class 2 soil grids. It is primarily the boundary fence around the former Saxton Steam Generating Station site. A small portion is along a Class 1/Class 2 boundary.

Survey Results
Scan and fixed-point measurements were made with a GFPC (Gas-Flow Proportional Counter). The $DCGL_W$ for ^{137}Cs was 26,445 dpm/100 cm^2 and the administrative limit was 19,834 dpm/100 cm^2. The scan MDC (minimum detectable concentration) was 11,966 cm^2.

In the Class 2 MA9-1 survey unit, fence in 11 grids or 36% of the total area was scanned. No activity above the scan MDC was detected. No activity was detected above the action level in 12 fixed-point measurements.

In the Class 3 MA9-2 survey unit, fence in 10 grids or 14% of the total area was scanned. No activity above the scan MDC was detected. No activity was detected above the action level in 11 fixed-point measurements.

Conclusion
The survey units in this report meet the release criteria of 25 mrem/year for TEDE in the SNEC License Termination Plan.

Document: Final Status Survey

Letter No: E910-05-051

Date: 27 Jul 05

Description: Final Status Survey Report for Residual Macadam in OL1
This survey area is only the 760 square meters of macadam surfaces within OL1. The area was divided into 10 Class 1 survey units.

Survey Unit MA8-6
This survey unit has an area of 96 square meters.
Survey Unit MA8-7
This survey unit has an area of 81 square meters.

Survey Unit MA8-8
This survey unit has an area of 100 square meters.

Survey Unit MA8-9
This survey unit has an area of 52 square meters.

Survey Unit MA8-10
This survey unit has an area of 76 square meters.

Survey Unit MA8-11
This survey unit has an area of 42 square meters.

Survey Unit MA8-12
This survey unit has an area of 82 square meters.

Survey Unit MA8-13
This survey unit has an area of 83 square meters.

Survey Unit MA8-16
This survey unit has an area of 93 square meters.

Survey Unit MA8-17
This survey unit has an area of 58 square meters.

Survey Results
The requirements for Class 1 areas are survey of 100% of the accessible area and all data points $\leq DCGL_W$. The flat surface in this survey area allowed the use of a model 43-37 large-area GFPC (Gas-Flow Proportional Counter) for scanning. The smaller model 43-68 GFPC was to be used for follow-up surveys of any elevated areas found with the large-area GFPC, but no elevated areas

were found. The $DGCL_W$ for the release of structural surfaces using the building re-use scenario was used for this area. The $DGCL_W$ for ^{137}Cs activity was 26,445 dpm/100 cm^2 (administrative limit 19,834 dpm/100 cm^2). The scan MDC for the model 43-37 detector was 7311 dpm/100 cm^2 and 4,634 dpm/100 cm^2 for the model 43-68 detector. The action level corresponding to the $DGCL_W$ administrative limit for the model 43-37 detector was 2,900 net cpm and for the model 43-68 detector 1,450 net cpm. The model 43-68 detector was used for fixed-point static measurements.

Survey Unit MA8-6
The scan of 100% of the survey unit did not detect any area above the action level. The maximum count rate at the 11 fixed-point locations was 472 gross cpm.

Survey Unit MA8-7
The scan of 100% of the survey unit did not detect any area above the action level. The maximum count rate at the 11 fixed-point locations was 512 gross cpm.

Survey Unit MA8-8
The scan of 100% of the survey unit did not detect any area above the action level. The maximum count rate at the 11 fixed-point locations was 432 gross cpm.

Survey Unit MA8-9
The scan of 100% of the survey unit did not detect any area above the action level. The maximum count rate at the 11 fixed-point locations was 510 gross cpm.

Survey Unit MA8-10
The scan of 100% of the survey unit did not detect any area above the action level. The maximum count rate at the 11 fixed-point locations was 430 gross cpm.

Survey Unit MA8-11
The scan of 100% of the survey unit did not detect any area above the action level. The maximum count rate at the 12 fixed-point locations was 440 gross cpm.

Survey Unit MA8-12
The scan of 100% of the survey unit did not detect any area above the action level. The maximum count rate at the 11 fixed-point locations was 450 gross cpm.

Survey Unit MA8-13

The scan of 100% of the survey unit did not detect any area above the action level. The maximum count rate at the 11 fixed-point locations was 450 gross cpm.

Survey Unit MA8-16

The scan of 100% of the survey unit did not detect any area above the action level. The maximum count rate at the 11 fixed-point locations was 496 gross cpm.

Survey Unit MA8-17

The scan of 100% of the survey unit did not detect any area above the action level. The maximum count rate at the 11 fixed-point locations was 489 gross cpm.

The survey units in this report meet the release criteria of 25 mrem/year for TEDE in the SNEC License Termination Plan. The annual dose for these survey units was not calculated in the FSS, but the mean count rates for the fixed-point measurements with the model 43-68 detector indicate that the annual dose would not exceed 1.8 mrem.

Document: Final Status Survey

Letter No: E910-05-052

Date: 27 Jul 05

Description: Final Status Survey Report for Open Land Survey Unit OL1-6
This Class 1 survey unit of 163 square meters is in the OL1 area west of the location of the former Drum Storage Bunker. It is the trench for a temporary water line installed in 1986. The trench was backfilled with soil that was slightly contaminated. The soil was removed from the trench and it was surveyed before backfilling with clean material. Soil concentrations of ^{137}Cs before remediation ranged from about 0.1 to 43 pCi/g.

Survey Results
The requirements for Class 1 areas are survey of 100% of the accessible area and all data points $\leq DCGL_W$. The $DCGL_W$ for ^{137}Cs for this survey unit was 5.75 pCi/g (administrative limit 4.31 pCi/g). The soil in the trench was scanned with a sodium iodide scintillation detector. The scan covered 100% of the area and two locations were found with elevated count rates.

Soil samples were taken at 18 random locations plus 2 QC duplicate samples and 3 samples from the 2 areas with elevated scan readings. Twelve of the soil samples were less than the MDC and the maximum ^{137}Cs concentration was 4.1 pCi/g.

Conclusion
The survey area in this report meets the survey requirements and the release criteria of 25 mrem/year for TEDE and 4 mrem/year from drinking water in the SNEC License Termination Plan. The annual dose for these survey units was not calculated in the FSS, but comparing the average soil concentrations in the FSS to the samples used to calculate the DCGL values the TEDE (Total Effective Dose Equivalent) would be 2.4 mrem/year and the drinking water dose 0.2 mrem/year.

Document: Final Status Survey

Letter No: E910-05-050

Date: 27 Jul 05

Description: Final Status Survey Report for Residual Concrete in OL1
This area includes numerous Class 1,2 and 3 residual concrete surfaces throughout the OL1 survey area. The area was divided into 9 survey units. The soil and other surfaces in OL1 were covered in separate FSS reports.

Survey Unit MA8-14
This survey unit is 33 square meters of Class 2 concrete and macadam around the Penelec Line Shack.

Survey Unit MA8-15
This survey unit is 37 square meters of Class 1 concrete at the northwest corner of the original SNEC facility area.

Survey Unit PF1
This survey unit is 37 square meters of Class 1 concrete that was part of DSB concrete floor.

Survey Unit DB1-1
This survey unit is 85 square meters of Class 1 concrete that was part of DSB concrete floor.

Survey Unit DB1-2
This survey unit is 109 square meters of Class 1 concrete that was part of DSB concrete floor.

Survey Unit DB5
This survey unit is 54 square meters of Class 1 concrete that was the DSB carport.

Survey Unit SS12
This survey unit is 658 square meters of Class 3 concrete that is a portion of the SSGS boiler pad.

Survey Unit SS24-1
This survey unit is 249 square meters of Class 3 concrete that is in the residual portion of the north end of the SSGS.

Survey Unit SS24-2

This survey unit is 321 square meters of Class 3 concrete that is in the residual portion of the north end of the SSGS.

DSB pad soils
Soil samples were taken through core borings in the DSB pad and around the edge of the pad to get representative samples of the soil under the pad.

Survey Results
The requirements for Class 1 areas are survey of 100% of the accessible area and all data points $\leq DCGL_W$. The requirements for Class 2 areas are survey of 10-100% of the accessible area and all data points $\leq$50% of the $DCGL_W$. The requirements for Class 3 areas are survey of 10% of the accessible area and all data points $\leq$10% of the $DCGL_W$.

The flat surfaces in this survey area allowed the use of a model 43-37 large-area GFPC (Gas-Flow Proportional Counter) for scanning. The smaller model 43-68 GFPC was to be used for follow-up surveys of any elevated areas found with the large-area GFPC and for small areas not accessible with the model 43-37. Fixed-point static GFPC measurements were made with the model 43-68 GFPC. The $DGCL_W$ for the release of structural surfaces using the building re-use scenario was used for this area. The $DGCL_W$ for the gross activity was 26,445 dpm/100 cm^2 (administrative limit 19,834 dpm/100 cm^2). The scan MDC for the model 43-37 detector was 7311 dpm/100 cm^2 and 4,634 dpm/100 cm^2 for the model 43-68 detector. The action level corresponding to the $DGCL_W$ for the model 43-37 detector was 2,900 net cpm and for the model 43-68 detector 1,450 net cpm. The model 43-68 detector was used for fixed point measurements.

The $DCGL_W$ for the DSB sub-slab soil samples for the 137Cs surrogate was 5.73 pCi/g (administrative limit 4.3 pCi/g).

Survey Unit MA8-14
The scan of 100% of the survey unit did not detect any area above the action level. The maximum count rate at the 11 fixed-point locations was 516 gross cpm.

Survey Unit MA8-15
The scan of 100% of the survey unit with the model I43-68 detector did not detect any area above the action level. The maximum count rate at the 11 fixed-point locations was 483 gross cpm.

Survey Unit PF1
The scan of 100% of the survey unit did not detect any area above the action level. The maximum count rate at the 12 fixed-point locations was 365 gross cpm.

Survey Unit DB1-1
The scan of 100% of the survey unit did not detect any area above the action level. The maximum count rate at the 13 fixed-point locations was 351 gross cpm.

Survey Unit DB1-2
The scan of 100% of the survey unit did not detect any area above the action level. The maximum count rate at the 13 fixed-point locations was 385 gross cpm.

Survey Unit DB5
The scan of 100% of the survey unit did not detect any area above the action level. The maximum count rate at the 11 fixed-point locations was 429 gross cpm.

Survey Unit SS12
The scan of 11% of this Class 3 survey unit did not detect any area above the action level. The maximum count rate at the 11 fixed-point locations was 467 gross cpm.

Survey Unit SS24-1
The scan of 42% of this class 3 survey unit did not detect any area above the action level. The maximum count rate at the 11 fixed-point locations was 465 gross cpm.

Survey Unit SS24-2
The scan of 38% of the survey unit did not detect any area above the action level. The maximum count rate at the 18 fixed-point locations was 588 gross cpm.

DSB Pad Soils
The soil under the DSB concrete slab was sampled and surveyed before the pad was poured. However, in response to questions from the FSS report reviewers, soil samples were taken through 4 core holes in the DSB slab and from 7 locations at the edge of the slab for this FSS. Four of the eleven samples had ^{137}Cs concentrations below the MDC and the maximum concentration was 0.31 pCi/g.

Conclusion
The survey units in this report meet the release criteria of 25 mrem/year for TEDE in the SNEC License Termination Plan. The annual dose for these survey units was not calculated in the FSS, but the mean count rates for the fixed-point measurements with the model 43-68 detector indicates that the annual dose would not exceed 3.2 mrem.

The DSB Pad soil samples met the survey requirements and the release criteria of 25 mrem/year for TEDE and 4 mrem/year from drinking water in the SNEC License Termination Plan. The annual dose for the soil was not calculated in the FSS, but comparing the average soil concentrations in the FSS to the samples used to calculate the DCGL values the TEDE (Total Effective Dose Equivalent) would be 0.6 mrem/year and the drinking water dose 0.04 mrem/year.

Document: Final Status Survey

Letter No: E910-05-041

Date: 26 Jul 06

Description: Final Status Survey for Open Land Area OL1 Soils
This area is 8,300 square meters of open land area within the OL1 survey area. It includes the area around the Penelec Line Shack and the area around the SSGS. The area is too large for a single survey unit, so it was divided into six survey units with the designations OL1-8 through OL1-13. All the survey units are Class 1 impacted areas. Survey units OL1-1 through OL1-6 were included in the CV Exterior and Excavations FSS and OL1-7 was covered in the East Yard Excavation FSS. The concrete and paved surfaces and some other parts of OL1 are covered in other FSS reports.

OL1-8
This survey unit of 1,534 square meters is located at the west side of the survey area. The north side borders the Penelec Switch Yard Fence.

OL1-9
This survey unit of 1,290 square meters is located near the center of the original SNEC site and contains the area where the remains of the reactor containment vessel are located.

OL1-10
This survey unit of 1,200 square meters is located east of OL1-9 and contains the area over the north end of the former RWDF (Radioactive Wasted Disposal Facility).

OL1-11
This survey unit of 1,200 square meters is located south of OL1-10 and contains the area of the former Filled Drum Storage Area and the south end of the RWDF.

OL1-12
This survey unit of 1,575 square meters contains the area around the north, east and south sides of the Penelec Line Shack.

OL1-13
This survey unit of 1,540 square meters contains the area around the concrete pad of the former DSB.

Survey Results

The requirements for Class 1 areas are survey of 100% of the accessible area and all data points $\leq DCGL_W$. Approximately 100% of the area was scanned with portable sodium iodide scintillation detectors. Ninety-six soil samples were taken from 78 locations. The $DCGL_W$ for ^{137}Cs was 5.73 pCi/g (administrative limit 4.30 pCi/g).

OL1-8

The scan survey covered 100% of the survey unit. No areas greater than the action level of 175 net cpm were found in the scan survey. Eighteen soil samples were collected. Eleven of the samples were below the MDC and the maximum concentration was 0.50 pCi/g.

OL1-9

The scan survey covered 100% of the survey unit. No areas greater than the action level of 175 net cpm were found in the scan survey. Eleven soil samples were collected. Eight of the samples were below the MDC and the maximum concentration was1.0 pCi/g.

OL1-10

The scan survey covered 100% of the survey unit. No areas greater than the action level of 175 net cpm were found in the scan survey. Eleven soil samples were collected. One of the samples was below the MDC and the maximum concentration was1.3 pCi/g.

OL1-11

The scan survey covered 100% of the survey unit. One spot of about 0.1 square meter area had soil with a count rate greater than the action level of 175 net cpm. Eleven designated soil samples were collected. One of the samples was below the MDC and the maximum concentration was1.3 pCi/g. An additional soil sample from the area with the elevated scan measurement had an assay of 0.22 pCi/g. No elevated measurement comparison test was required.

OL1-12

The scan survey covered 99.5% of the survey unit (100% of the accessible areas). Two spots within an area of about 10 square meters area had soil with a count rate greater than the action level of 175 net cpm. Twenty-two soil samples were collected from 11 random and 3 biased locations. Three of the samples were below the MDC and the maximum concentration was1.19 pCi/g. An additional 10 soil samples were collected from the area with the elevated scan measurement. All of these samples were below the MDC. No elevated measurement comparison test was required.

OL1-13

The scan survey covered 100% of the survey unit. One spot of about 0.2 square meter area had soil with a count rate greater than the action level of 175 net cpm. Sixteen designated soil samples were collected. Six of the samples were below the MDC and the maximum concentration was 0.55 pCi/g. An additional 4 soil samples were collected from the area with the elevated scan measurement. The maximum concentration was 0.29 pCi/g. No elevated measurement comparison test was required.

Conclusion

The survey units in this report meet the survey requirements and the release criteria of 25 mrem/year for TEDE and 4 mrem/year from drinking water in the SNEC License Termination Plan. The annual dose for these survey units was not calculated in the FSS, but comparing the average soil concentrations in the FSS to the samples used to calculate the DCGL values the TEDE (Total Effective Dose Equivalent) would be 1.1 mrem/year and the drinking water dose 0.07 mrem/year.

Document: Final Status Survey

Letter No: E910-05-049

Date: 27 Jul 05

Description: Final Status Survey Report for Open Land Area OL2
OL2 is a Class 1 survey area generally located in the northern section of the SNEC area and east of the Penelec Switch Yard. It includes the roadway outside the fence on the north side of the fenced area. It also includes residual concrete from a former transformer pad in the area outside the fence. The area was divided into 2 open land survey units north and south of the facility fence and 1 survey unit containing the concrete.

Survey Unit OL2-1
This is a Class 1 survey unit of 1,946 square meters in the northern section of the survey area.

Survey Unit OL2-2
This is a Class 1 survey unit of 1,750 square meters in the southern portion of the survey area.

Survey Unit MA8-5
This Class 3 survey unit of 70 square meters is the remnants of a concrete transformer pad located just outside the north Penelec Switch Yard fence.

Survey Results
The requirements for Class 1 areas are survey of 100% of the accessible area and all data points $\leq DCGL_W$. The requirements for Class 3 areas are survey of 10% of the accessible area and all data points $\leq$10% of the $DCGL_W$. The $DCGL_W$ for ^{137}Cs for this survey unit was 5.73 pCi/g (administrative limit 4.30 pCi/g). Scan measurements were made using a sodium iodide scintillation crystal. The MDC of the scan was 6.2 pCi/g, which was higher than the $DCGL_W$ but less than the $DCGL_W$ times the effective area factor.

Survey Unit OL2-1
The scan of 99.6% of the survey unit did not detect any area above the action level. Eleven soil samples were collected. Three of the samples were below the MDC and the maximum ^{137}Cs concentration was 0.49 pCi/g.

Survey Unit OL2-2
This survey unit contained 356 square meters of crushed stone about 6" deep that was below a sedimentation pond for the East Yard Excavation water. The stone was scanned and sampled then removed and the

underlying soil scanned and sampled. The scan of 100% the crushed stone did not detect any area above the action level. One spot with an elevated reading was found in the scan of the soil.

Eleven soil samples were collected at locations in the survey design. Five of the samples were below the MDC and the maximum ^{137}Cs concentration was 1.09 pCi/g. The two samples of the crushed stone were both below the MDC. Four soil samples were collected from the 0.1 square meter area with the elevated measurement. The maximum ^{137}Cs concentration was 0.65 pCi/g.

Survey unit MA8-5

Scan measurements were made on 85% of the concrete pad with a GFPC (Gas-Flow Proportional Counter). The $DCGL_W$ for the gross activity was 26,882 dpm/100 cm^2 (administrative limit 20,162 dpm/100 cm^2). The scan MDC for the gross activity was 2,969 dpm/100 cm^2. The action level corresponding to the $DCGL_W$ administrative limit was 3,400 net cpm. No areas above the action level were found in the scan.

Fixed point static measurements were made at eleven locations. No readings above the alarm point were found. The maximum gross count rate was 446 cpm.

Conclusion

The open land survey units in this report meet the survey requirements and the release criteria of 25 mrem/year for TEDE and 4 mrem/year from drinking water in the SNEC License Termination Plan. The annual dose for these survey units was not calculated in the FSS, but comparing the average soil concentrations in the FSS to the samples used to calculate the DCGL values the TEDE (Total Effective Dose Equivalent) would be 0.94 mrem/year and the drinking water dose 0.07 mrem/year.

The concrete pad survey unit in this report met the survey requirements and the release criteria of 25 mrem/year for TEDE. The annual dose for this survey unit was not calculated in the FSS, but the mean of the static measurements corresponds to an external dose of about 0.3 mrem/year.

Document: Final Status Survey

Letter No: E910-05-048

Date: 27 Jul 05

Description: FSS for Open Land Area OL3-Paved Surfaces and Concrete
This survey area consists of 1,216 square meters of Class 2 paved surfaces and Class 3 concrete structures contained within 4 of the 6 survey units in the Class 1 OL3 area. The soils in OL3 are covered in a separate FSS report.

Survey Sub-Unit MA8-22
Survey unit OL3-2 has an area of 1,800 square meters and contains 921 square meters of concrete in this sub-unit.

Survey Sub-Unit MA8-23
Survey unit OL3-2 has an area of 1,800 square meters and contains 225 square meters of asphalt in this sub-unit.

Survey Sub-Unit MA8-24
Survey unit OL3-4 has an area of 1,300 square meters and contains 6 square meters of concrete. Survey unit OL3-5 has an area of 2,000 square meters and contains 28 square meters of concrete. Survey unit OL3-6 has an area of 500 square meters and contains 36 square meters of concrete. The combined 70 square meters of concrete in survey units OL3-4, OL3-5 and OL3-6 are combined in this survey sub-unit.

Survey Results
The requirements for Class 2 areas are survey of 10-100% of the accessible area and all data points $\leq$50% of the $DCGL_W$. The requirements for Class 3 areas are survey of 10% of the accessible area and all data points $\leq$10% of the $DCGL_W$. The model 43-68 GFPC was used for scans and fixed-point static measurements. The $DGCL_W$ for the release of structural surfaces using the building re-use scenario was used for this area. The $DGCL_W$ for ^{137}Cs was 26,445 dpm/100 cm^2 (administrative limit 19,834 dpm/100 cm^2). The scan MDC for the model 43-68 detector was 4,405 or 5,077 dpm/100 cm^2. The action level corresponding to the $DGCL_W$ administrative limit for the model 43-68 detector was 1,190 net cpm.

Survey Sub-Unit MA8-22
The scan of 32% of this Class 3 survey unit did not detect any area above the administrative limit. The maximum count rate at the 11 fixed-point locations was 528 gross cpm (<11,000 dpm/100 cm^2).

Survey Sub-Unit MA8-23

The scan of 39% of this Class 2 survey unit did not detect any area above the administrative limit. The maximum count rate at the 11 fixed-point locations was 412 gross cpm (<8,600 dpm/100 cm^2).

Survey Sub-Unit MA8-24

The scan of 39% of this Class 3 survey unit did not detect any area above the administrative limit. The maximum count rate at the 11 fixed-point locations was 387 gross cpm (<8,100 dpm/100 cm^2).

Conclusion

The survey units in this report meet the release criteria of 25 mrem/year for TEDE in the SNEC License Termination Plan. The annual dose for these survey units was not calculated in the FSS, but the mean count rate for the fixed-point measurements with the model 43-68 detector indicate that the annual dose would not exceed 1.6 mrem.

Document: Final Status Survey

Letter No: E910-05-056

Date: 27 Jul 05

Description: Final Status Survey Report Open Land Area 0L3
The OL3 survey area is located along the south side of the SNEC property including a strip on the south side of the outer fence. It is a Class 1 area of 8,184 square meters. It was divided into 6 survey units. Four of the survey units contain asphalt or concrete surfaces that were covered in separate FSS reports.

Survey Unit OL3-1
This survey unit has an area of 2,000 square meters. It is located south of the former intake chamber and trash rack of the SSGS.

Survey Unit OL3-2
This survey unit has an area of 1,800 square meters. It contains 921 square meters of concrete and 225 square meters of asphalt. It is located south of the former SSGS and contains part of the boiler pad.

Survey Unit OL3-3
This survey unit has an area of 1,800 square meters. It is located east of OL3-2 and contains part of the driveway and parking area.

Survey Unit OL3-4
This survey unit has an area of 1,294 square meters. It is located in the southeast corner of the fenced area. It contains the pump house for the site water supply and about 6 square meters of concrete.

Survey Unit OL3-5
This survey unit has an area of 1,972 square meters. It is located inside the east side of the boundary fence north of OL3-4. It contains 28 square meters of concrete.

Survey Unit OL3-6
This survey unit has an area of 500 square meters. It is located north of survey unit OL3-1 over the intake tunnel and the intake chamber and trash rack and contains 36 square meters of concrete.

Survey Results
The requirements for Class 1 areas are survey of 100% of the accessible area and all data points $\leq DCGL_W$. The $DCGL_W$ for ^{137}Cs for this survey area was 5.73 pCi/g (administrative limit 4.30 pCi/g). Scan measurements were made using a sodium iodide scintillation crystal. The MDC of the scan was 6.2 pCi/g,

which was higher than the $DCGL_W$ but less than the $DCGL_W$ times the effective area factor.

Survey Unit OL3-1
The scan of 100% of the area produced one location with an elevated reading. A soil sample from that location had a ^{137}Cs concentration of 89.2 pCi/g. The EMC calculation for the soil sample was satisfactory. A second soil sample from the same location had a concentration of 1.12 pCi/g. Eleven soil samples were taken at the survey design locations. Ten of the samples were below the MDC and the other had a positive ^{137}Cs concentration of 0.23 pCi/g.

Survey Unit OL3-2
No area greater than the MDC was found in the 100% scan of this survey unit. Eleven soil samples were collected. Seven of the samples had a ^{137}Cs concentration below the MDC and the maximum was 0.31 pCi/g.

Survey Unit OL3-3
No area greater than the MDC was found in the 100% scan of this survey unit. Eleven soil samples were collected. Nine of the samples had a ^{137}Cs concentration below the MDC and the maximum was 0.27 pCi/g.

Survey Unit OL3-4
No area greater than the MDC was found in the 100% scan of this survey unit. Eleven soil samples were collected. Six of the samples had a ^{137}Cs concentration below the MDC and the maximum was 0.39 pCi/g.

Survey Unit OL3-5
The scan of 100% of the area produced one location with a slightly elevated reading. A soil sample from that location had a ^{137}Cs concentration of 0.135 pCi/g and no EMC was required. Twelve soil samples were collected at locations in the survey design. Six of the samples had a ^{137}Cs concentration below the MDC and the maximum was 0.29 pCi/g.

Survey Unit OL3-6
No area greater than the MDC was found in the 100% scan of this survey unit. Eleven soil samples were collected. Six of the samples had a ^{137}Cs concentration below the MDC and the maximum was 0.21 pCi/g.

Conclusion
The survey units in this report meet the survey requirements and the release criteria of 25 mrem/year for TEDE and 4 mrem/year from drinking water in the SNEC License Termination Plan. The annual dose for these survey units was

not calculated in the FSS, but comparing the average soil concentrations in the FSS to the samples used to calculate the DCGL values the TEDE (Total Effective Dose Equivalent) would be 0.6 mrem/year and the drinking water dose 0.04 mrem/year.

Document: Final Status Survey

Letter No: E910-05-022

Date: 22 Jun 05

Description: Final Status Survey for Open Land Area OL4
This survey is 4,800 square meters located outside the fence in the north-central portion of the Penelec site. It is a Class 1 area that has been extensively remediated. The area was overlaid with large amounts of flyash and cinders. Debris containing lab materials, trash and asbestos waste was found buried in the area. Large amounts of the cinders and flyash were removed and processed with the SRA SCSM monitor for use as backfill in other areas of the site. The survey area was divided into 4 survey units.

Survey Unit OL4-1
This survey unit of 1,100 square meters is located in the southern section of OL4.

Survey Unit OL4-2
This survey unit of 1,100 square meters is located north of OL4-1.

Survey Unit OL4-3
This survey unit of 1,200 square meters is located north of OL4-2.

Survey Unit OL4-4
This survey unit of 1,200 square meters is located east of OL4-3.

Survey Results
The requirements for Class 1 areas are survey of 100% of the accessible area and all data points $\leq DCGL_W$. A sodium iodide scintillation detector was used for the scan of the survey units in this area. The $DCGL_W$ for ^{137}Cs for this survey area was 6.46 pCi/g (administrative limit 4.84 pCi/g). The MDC of the scan was 6.2 pCi/g. The action level for the scan corresponding to the MDCscan was 175 net cpm.

Survey Unit OL4-1
No area greater than the MDC or the action level was found in the 100% scan of this survey unit. Eleven soil samples were collected. Three of the samples had a ^{137}Cs concentration below the MDC and the maximum was 0.33 pCi/g.

Survey Unit OL4-2
One location was found during the 100% scan of this survey unit that had a count rate that exceeded the alarm point of 175 net cpm (1,880 net

cpm). Eleven routine soil samples were collected. Four of the samples had a ^{137}Cs concentration below the MDC and the maximum was 0.68 pCi/g. Eight additional soil samples were taken from the 1 square meter area with the elevated count rate. The maximum ^{137}Cs concentration was 1.00 pCi/g.

Survey Unit OL4-3

No area greater than the MDC or the action level was found in the 100% scan of this survey unit. Eleven soil samples were collected. Four of the samples had a ^{137}Cs concentration below the MDC and the maximum was 0.26 pCi/g.

Survey Unit OL4-4

Two locations were found during the 100% scan of this survey unit that had a count rate that exceeded the alarm point of 175 net cpm (433 and 583 net cpm). Eleven routine soil samples were collected. Seven of the samples had a ^{137}Cs concentration below the MDC and the maximum was 0.63 pCi/g. Five additional soil samples were taken from the 1.3 square meter area with the elevated count rates. The maximum ^{137}Cs concentration was 0.38 pCi/g.

Conclusion

The survey units in this report meet the release criteria of 25 mrem/year for TEDE and 4 mrem/year from drinking water in the SNEC License Termination Plan. The annual dose for these survey units was not calculated in the FSS, but using the maximum soil concentration for the samples collected in this survey and the DCGL values the TEDE (Total Effective Dose Equivalent) would be about 3.9 mrem/year and the drinking water dose about 0.02 mrem/year.

Document: Final Status Survey

Letter No: E910-05-017

Date: 8 Jun 05

Description: Final Status Survey Report Open Land Area OL5
This survey is 3,800 square meters located outside the fence in the northeast corner of the Penelec site. It is a Class 1 area that has been extensively remediated. The area had been used as a dump for cinders, flyash and trash. It contained numerous mounds of debris covered with brush and small trees that were removed during the remediation work. The area was graded and seeded after the remediation work. The survey area was divided into 4 survey units.

Survey OL5-1
This survey unit of 600 square meters is located at the west end of OL5.

Survey Unit OL5-2
This survey unit of 1,200 square meters is located east of OL5-1.

Survey Unit OL5-3
This survey unit of 1,000 square meters is located east of OL5-2.

Survey Unit OL5-4
This survey unit of 1,000 square meters is located at the east end of OL5.

Survey Results
The requirements for Class 1 areas are survey of 100% of the accessible area and all data points $\leq DCGL_W$. A sodium iodide scintillation detector was used for the scan of the survey units in this area. The $DCGL_W$ for ^{137}Cs for this survey area was 6.28 pCi/g (administrative limit 4.71 pCi/g). Scan measurements were made using a sodium iodide scintillation crystal. The MDC of the scan was 6.2 pCi/g. The action level for the scan was 175 net cpm. Obstructions prevented 100% scan in some survey units.

Survey Unit OL5-1
No area greater than the MDC or the action level was found in the 100% scan of this survey unit. Eleven soil samples were collected. Ten of the samples had a ^{137}Cs concentration below the MDC and the maximum positive result was 0.09 pCi/g.

Survey Unit OL5-2
No area greater than the MDC or the action level was found in the 93% scan of this survey unit. Twelve soil samples were collected. Ten of the

samples had a ^{137}Cs concentration below the MDC and the maximum positive result was 0.15 pCi/g.

Survey Unit OL5-3

One location was found during the 90% scan of this survey unit that had a count rate that exceeded the alarm point of 175 net cpm (231 net cpm). Twelve routine soil samples were collected. Ten of the samples had a ^{137}Cs concentration below the MDC and the maximum was 0.36 pCi/g. Four additional soil samples were taken in and around the 1 square foot area with the elevated count rate. The maximum ^{137}Cs concentration was 0.38 pCi/g.

Survey Unit OL5-4

No area greater than the MDC or the action level was found in the 96% scan of this survey unit. Twelve soil samples were collected. Eleven of the samples had a ^{137}Cs concentration below the MDC and the maximum positive result was 0.18 pCi/g.

Conclusion

The survey units in this report meet the release criteria of 25 mrem/year for TEDE and 4 mrem/year from drinking water in the SNEC License Termination Plan. The annual dose for these survey units was not calculated in the FSS, but using the maximum soil concentration for the samples collected in this survey and the DCGL values the TEDE (Total Effective Dose Equivalent) would be about 1.5 mrem/year and the drinking water dose less than 0.01 mrem/year.

Document: Final Status Survey

Letter No: E910-05-033

Date: 14 Jul 2005

Description: Final Status Survey of Units OL6 and OL10
Open Land Survey Units OL6 and OL10 are located outside the fence north and northeast of the containment vessel location and have a total area of 22,436 square meters. The area contains native soil, cinders, coal ash, and building debris. Survey Unit OL10 is a Class 2 area that borders the river and is divided into 3 survey units with areas of 6,800, 6,800 and 7.000 square meters for OL10-1, OL10-2 and OL10-3 respectively. The OL6 and OL10 areas are similar, except that the OL6 areas were remediated and are, therefore, Class 1. Survey Unit OL6 is made up of 3 small areas with a total area of 1,775 square meters. Each OL6 area is surrounded by one of the three OL10 areas.

Release Criteria
The $DCGL_W$ for the surrogate radioisotope, ^{137}Cs, for this survey unit is 6.54 pCi/g and the administrative limit is 4.90 pCi/g.

Survey Results

Survey Unit 0L10-1
Approximately 56% of the 6,800 square meters in this area were scanned. One alarm point was found in about a 2 square meter portion of grid BI-125. The soil samples at this point had a maximum ^{137}Cs concentration of 3.1 pCi/g and an average concentration of 1.1 pCi/g. A total of 18 soil samples plus 2 QC samples were taken in OL10-1 as part of the survey design. The maximum ^{137}Cs concentration in these samples was 0.55 pCi/g and the average was 0.2 pCi/g.

Survey Unit OL10-2
Approximately 54% of the 6,800 square meters in this area were scanned. No readings above the alarm point of 350 net cpm were observed. A total of 25 soil samples plus 2 QC samples were taken in OL10-2 as part of the survey design. The maximum ^{137}Cs concentration in these samples was 0.37 pCi/g and the average was 0.14 pCi/g. Because this area is mounded with fill material some of the soil samples were taken at depths below the normal 1-meter depth. Three samples were taken to 2 meters and three samples to 3 meters depth.

Survey Unit OL10-3
Approximately 45% of the 7,000 square meters in this area were scanned. No readings above the alarm point of 350 net cpm were observed. A total of 16 soil samples plus 2 QC samples were taken in OL10-3 as part of the

survey design. The maximum ^{137}Cs concentration in these samples was 0.20 pCi/g and the average was 0.11 pCi/g.

Survey Unit OL6

Approximately 100% of the 1,775 square meters in this area were scanned. One alarm point was found in about a 2 square meter portion of grid BI-125 adjacent to the alarm point in OL10-1. The soil samples at this point had a maximum ^{137}Cs concentration of 1.5 pCi/g and an average concentration of 0.61 pCi/g. A total of 20 soil samples plus 2 QC samples were taken in OL6 as part of the survey design. The maximum ^{137}Cs concentration in these samples was 0.81 pCi/g and the average was 0.27 pCi/g.

Conclusion

Survey Units OL6, OL10-1, OL10-2 and OL10-3 meet the release criteria of 25 mrem/year for TEDE and 4 mrem/year from drinking water in the SNEC License Termination Plan. The annual dose for these survey units was not calculated in the FSS, but using the average soil concentration for the samples used to calculate the DCGL values the TEDE (Total Effective Dose Equivalent) would be 3.8 mrem/year and the drinking water dose 0.018 mrem/year. These values are based on samples that were mostly taken from elevated areas. More representative doses based on the soil samples taken during the FSS would be less.

Document: Final Status Survey

Letter No: E910-05-042

Date: 26 Jul 05

Description: FSS Report for OL7-Paved Surfaces and Concrete
The OL7 Survey Area is in the south central portion of the Penelec site. It is a Class 2 area and includes the old macadam access road and the present asphalt access road. It also serves as a buffer between the Class 1 OL3 area and the Class 3 OL8 area. This report covers only the 3,942 square meters of asphalt and concrete in OL7. The soil portions are covered in a separate report. The area was divided into two survey units containing four sub-units.

Survey Unit OL7-1 (Concrete)
This survey unit is portion of OL7 containing the concrete floor slabs of the former warehouse and garage and part of the SSGS boiler pad. There are 882 square meters of horizontal and 121 square meters of vertical concrete surfaces.

Survey Sub-Unit MA8-18
The asphalt in Survey Unit OL7-1 was divided into two sub-units. This sub-unit contains 795 square meters of asphalt.

Survey Sub-Unit MA8-19
The asphalt in Survey Unit OL7-1 was divided into two sub-units. This sub-unit contains 761 square meters of asphalt.

Survey Sub-Unit MA8-20
Survey Unit OL7-2 contains the old access road and was divided into two sub-units. This sub-unit contains 792 square meters of asphalt.

Survey Sub-Unit MA8-21
Survey Unit OL7-2 contains the old access road and was divided into two sub-units. This sub-unit contains 711 square meters of asphalt.

Survey Results
The requirements for Class 2 areas are survey of 10-100% of the accessible area and all data points $\leq$50% of the $DCGL_W$. The concrete surfaces were scanned with a model 43-68 GFPC (Gas-Flow Proportional Counter). This instrument was also used for fixed-point static measurements. The $DGCL_W$ for the release of structural surfaces using the building re-use scenario was used for this area. The $DGCL_W$ for ^{137}Cs activity was 26,445 dpm/100 cm^2 (administrative limit 19,834 dpm/100 cm^2). The scan MDC for the model 43-68 detector was 1,781 or 3.085 dpm/100 cm^2, depending on the scan speed. The action level

corresponding to the $DGCL_W$ administrative limit for the model 43-68 detector was 3,400 net cpm.

The scans and fixed-point static measurements of the asphalt surfaces were made with a sodium iodide scintillation detector. The scan MDC for this detector was 5,502 dpm/100 cm^2 in OL7-1 and 7,277 dpm/100 cm^2 in OL7-2. The action level corresponding to the $DGCL_W$ administrative limit for the scintillation detector was 330 net cpm.

Survey Unit OL7-1 (Concrete)
The scan of 30% of this Class 2 survey unit did not detect any area above the administrative limit. The maximum count rate at the 11 fixed-point locations was 493 gross cpm (<3,600 dpm/100 cm^2).

Survey Sub-Unit MA8-18
The scan of 44% of this Class 2 survey unit did not detect any area above the administrative limit. The maximum count rate at the 11 fixed-point locations was 155 gross cpm (<9,300 dpm/100 cm^2).

Survey Sub-Unit MA8-19
The scan of 48% of this Class 2 survey unit did not detect any area above the administrative limit. The maximum count rate at the 11 fixed-point locations was 152 gross cpm (<9,200 dpm/100 cm^2).

Survey Sub-Unit MA8-20
The scan of 54% of this Class 2 survey unit did not detect any area above the administrative limit. The maximum count rate at the 11 fixed-point locations was 189 gross cpm (<11,400 dpm/100 cm^2).

Survey Sub-Unit MA8-21
The scan of 60% of this Class 2 survey unit did not detect any area above the administrative limit. The maximum count rate at the 11 fixed-point locations was 191 gross cpm (<11,500 dpm/100 cm^2).

Conclusion
The survey units in this report meet the release criteria of 25 mrem/year for TEDE in the SNEC License Termination Plan. The annual dose for these survey units was not calculated in the FSS, but the mean count rates for the fixed-point measurements indicate that the annual dose would not exceed 4 mrem for the asphalt surfaces or 0.5 mrem for the concrete surfaces.

Document: Final Status Survey

Letter No: E910-05-035

Date: 22 Jul 05

Description: Open Land Area OL7
Survey Area OL7 is a Class 2 impacted area in the south-central portion of the SNEC Site. It includes the present driveway into the site, the original tree-lined driveway, strips bordering the driveways and a portion of the area inside the fence that contained the PENELEC warehouse and garage. The survey area of about 17,900 square meters exceeded the maximum size of 10,000 square meters for Class 2 survey areas, so it was divided into three smaller survey units. This report does not cover the concrete and paved portions of this area. These were covered in a separate FSS Report.

Survey Unit OL7-1.
This survey unit contains the areas around the PENELEC garage and warehouse plus a strip along the south and east side of the fence. The survey unit is approximately 6,200 square meters. The 3,761 square meters of soil is covered in this report. The 1,556 square meters of asphalt and 882 square meters of concrete are covered in a separate FSS Report.

Survey Unit OL7-2.
This survey unit contains the old access road from the highway to the fence. The survey unit is approximately 4,200 square meters. The 2,696 square meters of soil is covered in this report and the 1,503 square meters of asphalt is covered in a separate FSS Report.

Survey Unit OL7-3.
This survey unit contains the current gravel access road from the highway to the entrance gates on either side of the PENELEC line shack. The survey unit is approximately 7,500 square meters.

Release Criteria
The $DCGL_W$ for the surrogate radioisotope, ^{137}Cs, for this survey unit was 5.73 pCi/g and the administrative limit was 4.3 pCi/g.

Survey Results

Survey Unit OL7-1
In OL7-1 approximately 55% of the soil area was scanned. No areas were found with a count rate above the administrative limit of 160 net cpm. Eleven soil samples were taken and none were above the administrative

limit of 4.30 pCi/g for ^{137}Cs. Six of the samples were below the MDA and the maximum concentration for a sample above the MDA was 0.19 pCi/g.

Survey Unit OL7-2

In OL7-2 approximately 42% of the soil area was scanned. No areas were found with a count rate above the administrative limit of 160 net cpm. Eleven soil samples were taken and none were above the administrative limit of 4.30 pCi/g for ^{137}Cs. Eight of the samples were below the MDA and the maximum concentration for a sample above the MDA was 0.38 pCi/g.

Survey Unit OL7-3

In OL7-3 approximately 47% of the soil area was scanned. No areas were found with a count rate above the administrative limit of 160 net cpm. Eleven soil samples were taken and none were above the administrative limit of 4.30 pCi/g for ^{137}Cs. Nine of the samples were below the MDA and the maximum concentration for a sample above the MDA was 0.36 pCi/g.

Conclusion

Survey Units OL7-1, OL7-2 and OL7-3 meet the release criteria of 25 mrem/year for TEDE and 4 mrem/year from drinking water in the SNEC License Termination Plan. The annual dose for these survey units was not calculated in the FSS, but using the average soil concentration for the samples used to calculate the DCGL values the TEDE (Total Effective Dose Equivalent) would be 4.4 mrem/year and the drinking water dose 0.3 mrem/year. These values are based on samples that were mostly taken from elevated areas. More representative doses based on the soil samples taken during the FSS would be less.

Document: Final Status Survey

Letter No: E910-05-029

Date: 8 Jul 05

Description: Final Status Survey for Open Land Area OL8
This survey area is the Class 3 area around the perimeter of the Class 2 areas, except where the Class 2 area OL10 borders the river. The 46,300 square meters of the OL8 area was divided into 5 survey units.

Survey Unit OL8-1
This survey unit of 9,800 square meters is in the north and west section of OL8.

Survey Unit OL8-2
This survey unit of 9,500 square meters is in the west and southwest section of OL8.

Survey Unit OL8-3
This survey unit of 9,200 square meters is in the south section of OL8.

Survey Unit OL8-4
This survey unit of 8,900 square meters is in the southeast section of OL8.

Survey Unit OL8-5
This survey unit of 8,900 square meters is in the northeast section of OL8.

Survey Results
The requirements for Class 3 areas are survey of 10% of the accessible area and all data points <10% of the $DCGL_W$. A sodium iodide scintillation detector was used for the scan of the survey units in this area. The $DCGL_W$ for ^{137}Cs for this survey area was 5.73 pCi/g (administrative limit 4.30 pCi/g). The MDC of the scan was 5.67 pCi/g. The action level for the scan corresponding to the $DCGL_W$ was 160 net cpm. Soil samples were also collected.

Survey Unit OL8-1
No locations greater than the action level were found in the scan of 10% of the area in this survey unit. Seventeen soil samples were collected. Twelve of the samples were below the MDC and the maximum ^{137}Cs concentration was 0.30 pCi/g.

Survey Unit OL8-2
No locations greater than the action level were found in the scan of 10% of the area in this survey unit. Thirteen soil samples were collected. Ten of

the samples were below the MDC and the maximum ^{137}Cs concentration was 0.25 pCi/g.

Survey Unit OL8-3
No locations greater than the action level were found in the scan of 10% of the area in this survey unit. Seventeen soil samples were collected. All of the samples were below the MDC and the maximum ^{137}Cs MDC was 0.24 pCi/g.

The surveys in OL8 were performed in April 05. In June O5 soil from grid AL-132 in the Class 2 OL7-1 area was moved to an adjacent grid, AK-131 in survey unit OL8-3. The soil was removed from grid AK-131 and 100% of the grid was rescanned. Five additional soil samples were also taken from the grid. No location was found above the action level in the scan and the soil samples were all less than the MDC.

Survey Unit OL8-4
No locations greater than the action level were found in the scan of 10% of the area in this survey unit. Eighteen soil samples were collected. Sixteen of the samples were below the MDC and the maximum ^{137}Cs concentration was 0.22 pCi/g.

Survey Unit OL8-5
No locations greater than the action level were found in the scan of 10% of the area in this survey unit. Sixteen soil samples were collected. Thirteen of the samples were below the MDC and the maximum ^{137}Cs concentration was 0.44 pCi/g.

Conclusion
The survey units in this report meet the survey requirements and the release criteria of 25 mrem/year for TEDE and 4 mrem/year from drinking water in the SNEC License Termination Plan. The annual dose for these survey units was not calculated, but comparing the average soil concentrations in the FSS to the samples used to calculate the DCGL values the TEDE (Total Effective Dose Equivalent) would be 0.7 mrem/year and the drinking water dose 0.05 mrem/year.

Document: Final Status Survey

Letter No: E910-05-018

Date: 8 Jun 05

Description: Final Status Survey for OL9
This Class 2 survey area of 12,800 square meters is located in the southeast corner of the Penelec site. It is bordered by part of Class 2 area OL8, Class 3 areas SP1 and OL7 and Class 1 area OL3. It was divided into two survey units. One grid on the border with OL3 was found to exceed the $DCGL_W$. That grid and 4 adjacent grids were reclassified as Class 1 and added to survey area OL3-1.

Survey Unit OL9-1
This survey unit of 5,800 square meters is the southwestern portion of OL9.

Survey Unit OL9-2
This survey unit of 7,000 square meters is the northeastern portion of OL9.

Survey Results
The requirements for Class 2 areas are survey of 10-100% of the accessible area and all data points <50% of the $DCGL_W$. A Sodium iodide scintillation detector was used for the scan of the survey units in this area. The $DCGL_W$ for ^{137}Cs for survey unit OL9-1 was 3.76 pCi/g (administrative limit 2.82 pCi/g). The $DCGL_W$ for ^{137}Cs for survey unit OL9-2 was 5.73 pCi/g (administrative limit 4.30 pCi/g). The MDC of the scan was 5.97 pCi/g. The difference in the $DCGL_W$ values was because the samples that were used in the survey design for OL9-1 contained some of the hard-to-detect radionuclides with lower DCGL values. The action level for the scan corresponding to the MDC_{SCAN} was 350 gross cpm. Soil samples were also collected.

Survey Unit OL9-1
No locations greater than the action level were found in the scan of 50% of the area in this survey unit. Eighteen soil samples were collected. Eleven of the samples were below the MDC, the average ^{137}Cs concentration was 0.19 pCi/g and the maximum was 0.47 pCi/g.

Survey Unit OL9-2
Two locations in grid AT-138 in the vicinity of the screening chamber of the intake tunnel had elevated scan readings. Soil samples results were 4.7 pCi/g in one location and 14.3 pCi/g in the other. Grid AT-138 and 4 adjoining grids were reclassified as Class 1 and placed in survey unit OL3-1. After the reclassification no locations greater than the action level were

found in the scan of 49% of the area in OL9-2. Twenty-one soil samples were collected as part of the survey design, including the ones in the reassigned area. Nine of the samples were below the MDC, the average ^{137}Cs concentration 0.18 pCi/g and the maximum was 0.51 pCi/g. Five soil samples were collected in the grids that were reassigned to OL3-1. The sample results ranged from 0.10 to 14.3 pCi/g.

Conclusion

The survey units in this report meet the survey requirements and the release criteria of 25 mrem/year for TEDE and 4 mrem/year from drinking water in the SNEC License Termination Plan. The annual dose for these survey units was not calculated in the FSS, but comparing the average soil concentrations in the FSS to the samples used to calculate the DCGL values the TEDE (Total Effective Dose Equivalent) would be 1.3 mrem/year and the drinking water dose 0.01 mrem/year in OL9-1 and 0.8 and 0.01 mrem/yr respectively in OL9-2.

Document: Final Status Survey

Letter No: E910-05-025

Date: 22 Jun 05

Description: Final Status Survey of Open Land Area OL11
This 10,200 square meter Class 2 area is located in the northwest section of the Penelec site. It was divided into two survey units, OL11-1 and OL11-2.

Survey Unit OL11-1
This survey unit of 5,000 square meters was the western half of OL11.

Survey Unit OL11-2
This survey unit of 5,200 square meters was the eastern half of OL11.

Survey Results
The requirements for Class 2 areas are survey of 10-100% of the accessible area and all data points $\leq$50% of the $DCGL_W$. A sodium iodide scintillation detector was used for the scan of the survey units in this area. Approximately 57% of survey area OL11 was scanned. The $DCGL_W$ for ^{137}Cs for survey area OL11 was 3.22 pCi/g (administrative limit 2.41 pCi/g). The MDC of the scan was 5.97 pCi/g. The action level for the scan corresponding to the MDC_{SCAN} was 350 gross cpm. Soil samples were also collected.

Survey Unit OL11-1
No locations greater than the action level were found in the scan of this survey unit. Nineteen soil samples, including two QC samples, were collected. The maximum ^{137}Cs concentration was 0.26 pCi/g.

Survey Unit OL11-2
One elevated reading of 370 gross cpm was found in a 0.1 square meter area in grid BD-138. Nineteen soil samples were collected, including two QC samples. The sample depth was 6", instead of 1 meter, in 8 locations, because of the presence of the switchyard grounding mat below the surface. The maximum ^{137}Cs concentration was 0.87 pCi/g. Four soil samples were taken from the location with the elevated reading. The maximum ^{137}Cs concentration was 0.21 pCi/g

Conclusion
The survey units in this report meet the survey requirements and the release criteria of 25 mrem/year for TEDE and 4 mrem/year from drinking water in the SNEC License Termination Plan. The annual dose for these survey units was not calculated in the FSS, but comparing the average soil concentrations in the FSS to the samples used to calculate the DCGL values the TEDE (Total Effective

Dose Equivalent) for OL11-1 would be 1.2 mrem/year and the drinking water dose 0.08 mrem/year. The respective values for OL11-2 would be 2.5 and 0.2 mrem/year.

Document: Final Status Survey

Letter No: E910-05-024

Date: 22 Jun 05

Description: Final Status Survey Report for Open Land Area OL13
This large 27,600 square meter Class 3 survey area is located on the east side of the entrance road. A grid of Class 3 OL8 survey area lies between OL13 and the Class 2 survey areas OL7 and OL10. The survey area was divided into three survey units.

Survey Unit OL13-1
This 9,800 square meter section is the southern section of OL13.

Survey Unit OL13-2
This 8,800 square meter section is the middle section of OL13.

Survey Unit OL13-3
This 9,000 square meter section is the northern section of OL13.

Survey Results
The requirements for Class 3 areas are survey of 10% of the accessible area and all data points $\leq$10% of the $DCGL_W$. A sodium iodide scintillation detector was used for the scan of the survey units in this area. The $DCGL_W$ for ^{137}Cs for survey area OL13 was 6.46 pCi/g (administrative limit 4.84 pCi/g). The MDC of the scan was 5.67 pCi/g. The action level for the scan corresponding to the MDC_{SCAN} was 160 net cpm. Soil samples were also collected.

Survey Unit OL13-1
No locations greater than the action level were found in the scan of 10% of the area in this survey unit. Fourteen soil samples were collected. Ten of the samples were less than the MDC, the mean ^{137}Cs concentration was 0.18 pCi/g and the maximum 0.37 pCi/g.

Survey Unit OL13-2
No locations greater than the action level were found in the scan of 10% of the area in this survey unit. Thirteen soil samples were collected. All of the samples were less than the MDC, the mean ^{137}Cs concentration was 0.15 pCi/g and the maximum 0.19 pCi/g.

Survey Unit OL13-3
No locations greater than the action level were found in the scan of 10% of the area in this survey unit. Fourteen soil samples were collected.

Thirteen of the samples were less than the MDC, the mean ^{137}Cs concentration was 0.12 pCi/g and the maximum 0.32 pCi/g.

Conclusion

The survey units in this report meet the survey requirements and the release criteria of 25 mrem/year for TEDE and 4 mrem/year from drinking water in the SNEC License Termination Plan. The annual dose for these survey units was not calculated in the FSS, but comparing the average soil concentrations in the FSS to the samples used to calculate the DCGL values the TEDE (Total Effective Dose Equivalent) would be 0.6 mrem/year and the drinking water dose 0.003 mrem/year.

Document: Final Status Survey

Letter No: E910-05-032

Date: 14 Jul 05

Description: Penelec Switch Yard Control Building
The Switch Yard Control Building contains the control equipment for the Penelec substation and is located inside the Switch Yard fence. It is an active power handling facility and contains energized high voltage equipment. This limited access to a portion of the roof and personnel were not permitted within 12" of switching equipment in the interior of the building. The Switch Yard Control Building is listed as a Class 3 area, but was surveyed according to Class 2 area criteria. The area was divided into 7 survey units, as described below. The yard area was covered in a separate Final Status Survey Report.

Survey Unit PS1-1
This unit was 45.3 square meters of interior floor surfaces. The scanned area was 22%.

Survey Unit PS1-2
This unit was 19 square meters of interior painted steel surfaces (deck plate and doors). The scanned area was 63%.

Survey Unit PS1-3
This unit was 130.6 square meters of interior aluminum siding and ceiling materials (walls and ceiling). The scanned area was 11.5%.

Survey Unit PS2-1
This unit was 40.5 square meters of exterior concrete block walls. The scanned area was 17%.

Survey Unit PS2-2
This unit was 24.3 square meters of unpainted exterior concrete (base walls, sidewalk, and steps). The scanned area was 15%.

Survey Unit PS2-3
This unit was 67.7 square meters of unpainted exterior steel sheet metal roofing material. The scanned area was 15%.

Survey Unit PS2-4
This unit was 63.4 square meters of exterior aluminum siding covering the upper walls. The scanned area was 13%.

Survey Results

The total area of interior and exterior surfaces was 391 square meters. About 65.5 square meters or 17% of the area was scanned with Gas-Flow Proportional Counters. Static measurements were made at 77 locations. The gross activity $DCGL_W$ for the area was derived from measurements in the OL1/OL2 survey areas. The $DCGL_W$ was 44,317 dpm/100 cm^2 and the administrative limit was 33,238 dpm/100 cm^2. The alarm points for the scans were 600 to 800 gross cpm. No locations exceeding the alarm points were found in any of the survey units. None of the 77 static measurements exceeded the alarm point. No areas were found that exceeded 10% of the $DCGL_W$.

Conclusion

The survey areas in this report meet the release criteria of 25 mrem/year for TEDE in the SNEC License Termination Plan. The dose corresponding to the survey results would be less than 10% of that value.

Document: Final Status Survey

Letter No: E910-05-0

Date: 17 Aug 04

Description: Final Status Survey for the Penelec Line Shack
The Penelec Line Shack is located in the center of the Penelec site adjacent to the east fence of the SNEC area. It is used as a base for the Penelec line crew and contains a garage for equipment storage and an office area. It is the only building remaining on the site, except for the Control Building inside the Switchyard. It was chosen for some of the confirmatory measurements made by ORISE for the NRC. The Line Shack was never used for radioactive materials, but it was in place when the reactor was operating and could have been exposed to airborne releases or dust from the reactor site.

The exterior walls of the Line Shack were Class 3 and the remainder of the building Class 2 survey units. The garage, office and outside surfaces were divided into 6 survey units that were surveyed by SRA using SCM monitoring equipment. The attic area over the office section of the building was divided into 4 survey units and was surveyed by GPU Nuclear using GFPC detectors.

Line Shack Interior Walls and Floor Excluding the Attic (1070 m^2)
Survey Unit LS1-1
This Class 2 survey unit of 290 m^2 consists of portions of the Line Shack floor.

Survey Unit LS1-2
This Class 2 survey unit of 177 m^2 consists of portions of the Line Shack interior walls up to a height of 2 meters.

Survey Unit LS2-1
This Class 2 survey unit of 191 m^2 consists of portions of the Line Shack Line Shack interior walls above a height of 2 meters.

Survey Unit LS2-2
This Class 2 survey unit of 191 m^2 consists of portions of the Line Shack ceiling.

Line Shack Exterior Walls and Roof (667 m^2)
Survey Unit LS3
This Class 3 survey unit of 343 m^2 consists of portions of the Line Shack exterior walls.

Survey Unit LS4

This Class 2 survey unit of 324 m^2 consists of portions of the Line Shack roof.

Line Shack Attic
Survey Unit LS6-1
This Class 2 survey unit of 48 m^2 consists of portions of the Line Shack attic floor.

Survey Unit LS6-2
This Class 2 survey unit of 49 m^2 consists of portions of the Line Shack attic interior walls.

Survey Unit LS6-3
This Class 2 survey unit of 36 m^2 consists of portions of the Line Shack attic concrete block wall.

Survey Unit LS6-4
This Class 2 survey unit of 50 m^2 consists of portions of the Line Shack attic ceiling.

Survey Results
The requirements for Class 2 areas are survey of 10-100% of the accessible area and all data points ≤50% of the $DCGL_W$. The requirements for Class 3 areas are survey of 10% of the accessible area and all data points ≤10% of the $DCGL_W$. The surface $DCGL_W$ for ^{137}Cs for this survey area was 26,438 dpm/100 cm^2 (administrative limit 19,834 dpm/100 cm^2).

Shonka Research Associates (SRA) surveyed this area, except for the attic, using a SCM (Surface Contamination Monitor). The SCM is an automated, position sensitive, large-area gas-flow proportional counter. It continuously records position and count rate, so no fixed-point measurements are required. The Scan MDC varied from dpm/100 cm^2.

A Gas-Flow Proportional Counter was used for scans and fixed-point measurements in the attic. The MDC of the scan was dpm/100 cm^2. The scan action level was 2,000 gross cpm.

Smears were taken at each fixed-point location for GFPC measurements. All smears were less than the MDC of 162 dpm/100 cm^2 for beta and 10 dpm/100 cm^2 for alpha radiation.

Line Shack Interior Walls and Floor Excluding the Attic
Survey Unit LS1-1
The SCM was used to scan 51% of this survey unit. No locations above the administrative level were detected. No fixed-point measurements were required.

Survey Unit LS1-2
The SCM was used to scan 36% of this survey unit. No locations above the administrative level were detected. No fixed-point measurements were required.

Survey Unit LS2-1
The SCM was used to scan 22% of this survey unit. No locations above the administrative level were detected. No fixed-point measurements were required.

Survey Unit LS2-2
The SCM was used to scan 33% of this survey unit. No locations above the administrative level were detected. No fixed-point measurements were required.

Line Shack Exterior Walls and Roof
Survey Unit LS3
The SCM was used to scan 22% of this survey unit. No locations above the administrative level were detected. No fixed-point measurements were required.

Survey Unit LS4
The SCM was used to scan 52% of this survey unit. No locations above the administrative level were detected. No fixed-point measurements were required. The highest count rates were found on the older sections of the roof. Gamma spectroscopy indicated the activity was probably naturally occurring radionuclides in the layer of surface corrosion. The readings were not elevated on a portion of the roof that had been replaced.

Line Shack Attic
Survey Unit LS6-1
No locations above the action level were detected in the GFPC scan of 100% of the area in this survey unit. The mean of the 11 fixed-point measurements was 451 gross cpm and the maximum 512 gross cpm.

Survey Unit LS6-2
No locations above the action level were detected in the GFPC scan of 37% of the area in this survey unit. The mean of the 11 fixed-point measurements was 313 gross cpm and the maximum 369 gross cpm.

Survey Unit LS6-3

No locations above the action level were detected in the GFPC scan of 31% of the area in this survey unit. The mean of the 11 fixed-point measurements was 237 gross cpm and the maximum 258 gross cpm.

Survey Unit LS6-4

No locations above the action level were detected in the GFPC scan of 28% of the area in this survey unit. The mean of the 11 fixed-point measurements was 279 gross cpm and the maximum 300 gross cpm.

Conclusion

The survey units in this report meet the survey requirements and the release criteria of 25 mrem/year for TEDE in the SNEC License Termination Plan. The annual dose for these survey units was not calculated in the FSS. The mean annual dose for all the SCM surveys is 0.2 mrem. The maximum annual dose estimated from the survey unit averages of fixed-point readings in the attic is 1.1 mrem.

Document: Final Status Survey

Letter No: E910-05-030

Date: 8 Jul 05

Description: Final Status Survey of the Penelec Switch Yard
This area is the fenced area of the Penelec Switch Yard plus a small portion of OL12 to the west and east of the fence. The area has been divided into three survey units: PS4-1, PS4-2 and OL12-1. There are also separate survey units for concrete structures. There were limitations on the survey in this area because of the high voltage present on the components in this active Penelec substation. Penelec line personnel provided special training for the surveyors. Metal surfaces, except those in and around the Switch Yard Control Building, were not surveyed. The open land surface is a mix of cinders, ash, ash, soil and crushed stone. Soil sampling was restricted to a depth of 16", because of the ground mat that underlies the area at about that depth. Soil samples included the surface cover and a sample at the 16" depth above the grounding mat.

The $DCLG_W$ for OL12-1 of 3.22 pCi/g (administrative limit 2.41 pCi/g) for ^{137}Cs was derived from samples from OL-11. The $DCLG_W$ for the Switch Yard areas PS4-1 and PS4-2 were derived from samples from the OL1/OL2 areas. The value of the volumetric $DCLG_W$ for ^{137}Cs was 5.75 pCi/g (administrative limit 4.31 pCi/g) and the gross activity limit was 44,317 dpm/100 cm^2 (administrative limit 33,238 dpm/100 cm^2).

The Control Building in the Switch Yard is covered in a separate Final Status Survey Report.

Survey Unit OL12-1
This Class 2 area of 1,152 square meters is a narrow section of OL12 outside the fence along the west side and parts of the north and south sides.

Survey Unit PS4-1
This 1,612 square meter area covers the eastern third of the Switch Yard. Parts of this area were remediated so it is a Class 1 area.

Survey Unit PS4-2
This Class 2 area of 3,600 square meters is the western 2/3 of the Switch Yard.

Survey Unit PS3a-1

This Class 3 survey unit is inside the PS4-1 area includes the concrete walkway north of the Control Building and other concrete structures. The area contains about 414 square meters of accessible concrete surfaces.

Survey Unit PS3b-1
This is a Class 3 survey unit consisting of concrete base pads and pedestals within the PS4-2 area. The accessible area of concrete surface was 187 square meters.

Survey Unit PS 3-2
This is a Class 1 survey unit of two concrete block head walls for the yard drainage system. It has an area of 4.2 square meters and is located within PS4-1.

Survey Results
Survey Unit OL12-1
Approximately 55% of the 1,152 square meters in this area were scanned. No readings above the alarm point of 350 net cpm were observed. A total of 17 soil samples plus 2 QC samples were taken in OL12-1 as part of the survey design. The maximum ^{137}Cs concentration in these samples was 1.06 pCi/g and the average was 0.38 pCi/g.

Survey Unit PS4-1
Approximately 98% of the 1,612 square meters in this area were scanned. Several readings above the alarm point of 300 net cpm were observed and an area of about 1.5 square meters was identified with ^{137}Cs concentrations up to 11.3 pCi/g. This area met the $DCLG_{EMC}$ for elevated areas. A total of 28 soil samples plus 2 QC samples were taken in PS4-1 as part of the survey design. The maximum ^{137}Cs concentration in these samples was 1.58 pCi/g and the average was 0.62 pCi/g.

Survey Unit PS4-2
Approximately 86% of the 3,600 square meters in this area were scanned. Several readings above the alarm point of 300 net cpm. None of the soil samples from these areas exceeded the $DCLG_W$ and the maximum ^{137}Cs concentration was 3.10 pCi/g. A total of 33 soil samples plus 2 QC samples were taken in PS4-2 as part of the survey design. The maximum ^{137}Cs concentration in these samples was 2.00 pCi/g and the average was 0.45 pCi/g.

Survey Unit PS3a-1
Approximately 79% of 4.2 square meters in this area were scanned with a GFPC (Gas-Flow Proportional Counter). No readings above the alarm point of 1,000 gross cpm were observed. None of the 15 static measurements exceeded the gross activity $DCLG_W$.

Survey Unit PS3b-1
Approximately 87% of 4.2 square meters in this area were scanned with a GFPC. Readings above the alarm point of 1,000 net cpm were observed at 4 locations with a maximum gross count rate of 1186 cpm. None of the scanning measurements exceeded the $DCLG_W$. The average concentration in the 9 concrete samples taken at the elevated measurement points was 0.16 pCi/g and the maximum was 0.27 pCi/g. None of the measurements at the 15 survey design points exceeded the gross activity $DCLG_W$.

Survey Unit PS 3-2
Approximately 100% of 4.2 square meters in this area were scanned with a GFPC. No readings above the alarm point of 1,400 gross cpm were observed. None of the 15 static measurements exceeded the gross activity $DCLG_W$.

Conclusion
The survey units in this report meet the release criteria of 25 mrem/year for TEDE and 4 mrem/year from drinking water in the SNEC License Termination Plan. The annual dose for these survey units was not calculated in the FSS, but using the average soil concentration for the samples used to calculate the DCGL values the TEDE (Total Effective Dose Equivalent) for the OL12-1 area would be 7.7 mrem/year and the drinking water dose 0.5 mrem/year. The corresponding values for the open land area inside the Switch Yard would be 4.3 mrem/year and 0.3 mrem/year. These values are based on samples that were mostly taken from elevated areas. More representative doses based on the soil samples taken during the FSS would probably be less.

Document: Final Status Survey

Letter No: E910-05-031

Date: 14 Jul 06

Description: Final Status Survey for Remediated Soils
This survey area was about 6,150 tons of soil and debris accumulated from characterization and remediation. The material was pre-screened with portable radiation detectors when it was removed from the original location and any contaminated material was shipped offsite for disposal. The soil and debris that passed the pre-screening with portable instruments was stockpiled and surveyed in the period Dec 04 to Feb 05 by SRA (Shonka Research Associates) using their automated SMCM (Subsurface Multispectral Contamination Monitor). This equipment had previously been used to monitor debris that was used for backfill of the SSGS and the CV.

The material was prepared by crushing and screening, as necessary, then fed by conveyor through the SMCM. In the SMCM the soil was monitored at a fixed speed and geometry with multiple sodium iodide radiation detectors that measured the gamma ray spectra of radiation emitted from the soil in real time. The equipment was able to distinguish between emissions from naturally occurring radioactive material and ^{137}Cs. Concentration of ^{137}Cs above the alarm point sounded an alarm and the contaminated material was located with portable instruments and removed. Samples of the contaminated material were collected for laboratory analysis. Composite samples were also collected from each batch for laboratory analysis to verify the SMCM results. Fifty-seven batches ranging in size from 67 to 257 tons were processed.

Survey Results
The $DCGL_W$ for ^{137}Cs for this material was 5.61 pCi/g (administrative limit 4.21 pCi/g). The MDC and the alarm setpoint for the SMCM was 2.91 pCi/g. The maximum concentration of ^{137}Cs in the 136 batch samples was 1.0 pCi/g. There were 3 alarms and the maximum ^{137}Cs concentration found 6 samples of the suspect material was 0.62 pCi/g.

Conclusion
The survey units in this report meet the release criteria of 25 mrem/year for TEDE and 4 mrem/year from drinking water in the SNEC License Termination Plan. The annual dose for this survey unit was not calculated, but using the average soil concentration for the samples used to calculate the DCGL values the TEDE (Total Effective Dose Equivalent) would be 14 mrem/year and the drinking water dose _0.6 mrem/year. These values are based on samples that were mostly taken from elevated areas. More representative doses based on the soil samples taken during the FSS would probably be less.

Document: Final Status Survey

Letter No: E910-05-047

Date: 27 Jul 05

Description: Final Status Survey for Seal Chamber Roofs
Cooling water from the SSGS steam turbines was discharged into rectangular concrete boxes to provide a vacuum seal for the condensers. The water from these seal chambers overflowed into the discharge tunnel and was released to the river or the spray pond. This survey covers only the tops of the roofs of the three seal chambers and the surrounding wall surfaces. Seal Chamber 3 was the chamber that received the water from the turbine that was operated with steam from the nuclear reactor. The total area of 148 square meters was divided into four survey units.

Survey Unit SS17-1
This Class 3 survey unit of 35 square meters consists of the residual concrete and steel of the walls above the roof of Seal Chamber 3.

Survey Unit SS17-2
This Class 2 survey unit of 50 square meters consists of the residual concrete and steel of the walls above the roof of Seal Chamber 1 and Seal Chamber 2.

Survey Unit SS18-1
This Class 2 survey unit of 20 square meters consists of the residual concrete and steel of the top horizontal surface of the roof of Seal Chamber 3.

Survey Unit SS18-2
This Class 1 survey unit of 43 square meters consists of the residual concrete and steel of the top horizontal surface of the roofs of Seal Chamber 1 and Seal Chamber 2.

Survey Results
The requirements for Class 1 areas are survey of 100% of the accessible area and all data points $\leq DCGL_W$. The requirements for Class 2 areas are survey of 10-100% of the accessible area and all data points $\leq$50% of the $DCGL_W$. The requirements for Class 3 areas are survey of 10% of the accessible area and all data points $\leq$10% of the $DCGL_W$. The surface $DCGL_W$ for ^{137}Cs for this survey area was 27,250 dpm/100 cm^2 (administrative limit 20,438 dpm/100 cm^2). A Gas-Flow Proportional Counter was used for scans and fixed-point measurements. The MDC of the scan was 738 dpm/100 cm^2 in SS17-1 and SS 18-1 and 837 dpm/100 cm^2 in the other survey units. The action level for the

GFPC scan corresponding to the administrative limit was 900 net cpm for SS17-1 and SS18-1 and 1,100 gross cpm in the other survey units. A sodium iodide scintillation detector was also used for scanning. The MDC for the sodium iodide scans was 2.7 pCi/g for SS17-1 and SS18-1 and 5.3 pCi/g for the other survey units.

Survey Unit SS17-1
No locations above the action level were detected in the 50% scan of this survey unit with both the GFPC and the sodium iodide scintillation detector. None of the 10 fixed-point measurements with the GFPC had count rates in excess of the action level. The mean count rate was 339 gross cpm and the maximum was 434 gross cpm.

Survey Unit SS17-2
No locations above the action level were detected in the 50% scan of this survey unit with both the GFPC and the sodium iodide scintillation detector. None of the 14 fixed-point measurements with the GFPC had count rates in excess of the action level. The mean count rate was 286 gross cpm and the maximum was 361 gross cpm.

Survey Unit SS18-1
No locations above the action level were detected in the 50% scan of this survey unit with both the GFPC and the sodium iodide scintillation detector. None of the 12 fixed-point measurements with the GFPC had count rates in excess of the action level. The mean count rate was 442 gross cpm and the maximum was 525 gross cpm.

Survey Unit SS18-2
No locations above the action level were detected in the 96% scan (100% with the sodium iodide detector) of this survey unit with both the GFPC and the sodium iodide scintillation detector. None of the 15 fixed-point measurements with the GFPC had count rates in excess of the action level. The mean count rate was 393 gross cpm and the maximum was 571 gross cpm.

Conclusion
The survey units in this report meet the survey requirements and the release criteria of 25 mrem/year for TEDE in the SNEC License Termination Plan. The annual dose for these survey units was not calculated in the FSS, but comparing the mean surface count rates in the FSS to the DCGL values the highest TEDE (Total Effective Dose Equivalent) for a survey unit would be 5.1 mrem/year. The average of the shielded measurements with the GFPC was used as the background for this estimate.

Document: Final Status Survey

Letter No: E910-05-038

Date: 22 Jul 05

Description: Final Status Survey for SSGS Seal Chambers
Cooling water from the SSGS steam turbines was discharged into rectangular concrete boxes to provide a vacuum seal for the condensers. The three chambers are located along the north wall of the SSGS basement abutting the discharge tunnel. The water from the seal chambers overflowed into the discharge tunnel and was released to the river or the spray pond. This survey covers the interiors of the three seal chambers. Seal Chamber 3 was the chamber that received the water from the turbine that was operated with steam from the nuclear reactor. The total area of 253 square meters was divided into three survey units. The outside area of the seal chambers is covered in other FSS reports.

Survey Unit SS8-1
This survey unit is the interior floor, ceiling and walls of Seal Chamber 1 at the northeast corner of the SSGS basement. The Class 1 survey unit area is 73 square meters.

Survey Unit SS8-2
This survey unit is the interior floor, ceiling and walls of Seal Chamber 2, located on the west side of chamber 1. The Class 1 survey unit area is 71 square meters.

Survey Unit SS8-3
This survey unit is the interior floor, ceiling and walls of Seal Chamber 1 located on the west side of the SSGS basement. The Class 1 survey unit area is 109 square meters. It includes the external surfaces of 4 large steel pipes extending into the chamber from the ceiling.

Survey Results
The requirements for Class 1 areas are survey of 100% of the accessible area and all data points $\leq$ $DCGL_W$. The $DCGL_W$ for ^{137}Cs for this survey area was 3.19 pCi/g (administrative limit 2.39 pCi/g). The surface $DCGL_W$ for ^{137}Cs for this survey area was 7,650 dpm/100 cm^2 (administrative limit 5,737 dpm/100 cm^2). The low values for the $DCGL_W$ were because of the presence of ^{90}Sr in samples from the seal chambers.

A Gas-Flow Proportional Counter was used for scans and fixed-point measurements. The MDC of the scan was 1,459 dpm/100 cm^2 for concrete and

1,174 dpm/100 cm^2 for steel. The action level for the GFPC fixed-point measurements corresponding to the administrative limit was 578 net cpm.

A sodium iodide scintillation detector was also used for scans and fixed-point measurements. The MDC for the sodium iodide scans was 4,993 dpm/100 cm^2. The action level for the sodium iodide scan corresponding to the administrative limit was 200 gross cpm. The volumetric MDC of the sodium iodide detector for fixed-point measurements was 0.71 pCi/g.

Smears for removable contamination were also taken at the fixed-point measurement locations. The MDC for smears was166 dpm/100 cm^2 for beta and 12 dpm/100 cm^2 for alpha radiation.

Survey Unit SS8-1
About 95% of this survey unit was scanned with the GFPC and the remainder was scanned with the sodium iodide detector. All the scan surveys were less than the action level. None of the fixed-point measurements exceeded the administrative limit. The mean of the nine fixed-point measurements with the GFPC was 189 gross cpm and the maximum 219 gross cpm. The mean of the nine fixed-point measurements with the sodium iodide detector was 62.5 gross cpm and the maximum 73.8 gross cpm. The smears for removable contamination were all less than the MDC.

Survey Unit SS8-2
About 93% of this survey unit was scanned with the GFPC and the remainder was scanned with the sodium iodide detector. One area of 1.3 square meters had a net count rate of 337 cpm with the GFPC. None of the fixed-point measurements exceeded the administrative limit. The mean of the nine fixed-point measurements with the GFPC was 218 gross cpm and the maximum 263 gross cpm. The mean of the nine fixed-point measurements with the sodium iodide detector was 97.2 gross cpm and the maximum 138.4 gross cpm. The smears for removable contamination were all less than the MDC.

Three concrete samples were collected in the area with the elevated GFPC reading. The average ^{137}Cs concentration was 2.5 pCi/g and the maximum 4.3 pCi/g. The estimated annual dose for a person in this area is 1.1 mrem. The area passed the elevated measurement comparison test.

Survey Unit SS8-3
About 94% of this survey unit was scanned with the GFPC and the remainder was scanned with the sodium iodide detector. All the scan surveys were less than the action level. None of the fixed-point measurements exceeded the administrative limit. The mean of the 13

fixed-point measurements with the GFPC was 227 gross cpm and the maximum 309 gross cpm. The mean of the 13 fixed-point measurements with the sodium iodide detector was 121.3 gross cpm and the maximum 209.2 gross cpm. The smears for removable contamination were all less than the MDC.

An additional 9 fixed-point measurements were made with the GFPC on the outside of the pipes in this seal chamber. The mean of the measurements was 177 gross cpm and the maximum 265 gross cpm.

Conclusion

The survey units in this report meet the survey requirements and the release criteria of 25 mrem/year for TEDE. The calculation sheet in Appendix B of this FSS estimated the maximum external dose in the seal chambers (chamber 3) at 1.1 mrem/year.

Document: Final Status Survey

Letter No: E910-05-020

Date: 8 Jun 05

Description: Final Status Survey for Spray Pond Area SP-1
The Spray Pond area is a Class 2 area of 6600 square meters. It is located in the southwest portion of the Penelec site. In warm weather water from Discharge Tunnel was pumped to this area and sprayed upon the ground to allow for cooling before the water drained back to the river. The area is over-grown with trees and small shrubs. Building debris from the SSGS was dumper to a depth of several feet over the eastern section. The portion close to the river is frequently flooded.

Survey Results
The requirements for Class 2 areas are survey of 10-100% of the accessible area and all data points $\leq$50% of the $DCGL_W$. A sodium iodide scintillation detector was used for the scan of the survey units in this area. The $DCGL_W$ for ^{137}Cs for this survey area was 3.94 pCi/g (administrative limit 2.96 pCi/g). The MDC of the scan was 4.9 pCi/g. The action level for the scan corresponding to the MDC was 400 gross cpm. Soil samples were collected to a depth of 1 meter. In the filled area additional soil samples were collected to at least 6" into the base soil.

The scan covered 44% of the area in SP-1. No locations above the action level were found. Nineteen soil samples plus two QC samples were collected. In four locations in the filled area additional samples were taken to the base soil. The average ^{137}Cs concentration was 0.33 pCi/g and the maximum was 0.90 pCi/g.

Conclusion
The survey units in this report meet the survey requirements and the release criteria of 25 mrem/year for TEDE and 4 mrem/year from drinking water in the SNEC License Termination Plan. The annual dose for these survey units was not calculated in the FSS, but comparing the average soil concentrations in the FSS to the samples used to calculate the DCGL values the TEDE (Total Effective Dose Equivalent) would be 2.1 mrem/year and the drinking water dose 0.6 mrem/year.

Document: Final Status Survey

Letter No: E910-05-037

Date: 22 Jul 05

Description: Final Status Survey for the SSGS Basement
The SSGS Basement contains 1,094 square meters of concrete and steel divided into 7 Class1, 1 Class 2 and 1 Class 3 survey units.

Survey Unit SS14-1
This is a Class 1 survey unit of 65 square meters of concrete located in the east end of the basement. It does not include trenches and sumps.

Survey Unit SS14-2
This is a Class 1 survey unit of 58 square meters of concrete located in the east central part of the basement. It does not include trenches and sumps.

Survey Unit SS14-3
This is a Class 1 survey unit of 83 square meters of concrete located in the center of the basement. It does not include trenches and sumps.

Survey Unit SS14-4
This is a Class 1 survey unit of 61 square meters of concrete located in the west central part of the basement. It does not include trenches and sumps.

Survey Unit SS14-5
This is a Class 1 survey unit of 53 square meters of concrete located in the west end of the basement. It does not include trenches and sumps.

Survey Unit SS14-6
This is a Class 1 survey unit of 84 square meters of concrete containing the trenches and sumps of the floor area throughout the basement.

Survey Unit SS15
This Class 1 survey unit of 100 square meters of concrete is the wall in the east end of the basement.

Survey Unit SS16
This Class 2 survey unit of 240 square meters of concrete is the wall surfaces, except the east wall, up to a height of 2 meters from the floor.

Survey Unit SS17

This Class 3 survey unit of 350 square meters of concrete is the wall surfaces, except the east wall, above a height of 2 meters from the floor.

Survey Results

The requirements for Class 1 areas are survey of 100% of the accessible area and all data points $\leq DCGL_W$. The requirements for Class 2 areas are survey of 10-100% of the accessible area and all data points $\leq$50% of the $DCGL_W$. The requirements for Class 3 areas are survey of 10% of the accessible area and all data points $\leq$10% of the $DCGL_W$. Shonka Research Associates (SRA) using a SCM (Surface Contamination Monitor) surveyed this area. This instrument is an automated, position sensitive, large-area gas-flow proportional counter. It continuously records position and count rate, so no fixed-point measurements are required. The surface $DCGL_W$ for ^{137}Cs was13,571 dpm/100 cm^2 (Administrative Limit 10,178 dpm/100 cm^2). The Scan MDC was 1,102 to 2,078 dpm/100 cm^2.

Scan and fixed-point measurements were also made with a GFPC (Gas-Flow Proportional Counter). The scan MDC was 2,175 dpm/100 cm^2 for concrete and the action level was 500 net cpm.

Sodium iodide scintillation detectors were also used for scans and fixed-point measurements where the surface was inaccessible or too rough for the GFPC. The MDC of the scan was pCi/g. The action level was 300 gross cpm.

Concrete samples were also collected for laboratory analysis for ^{137}Cs at selected locations. Smear samples were taken to check for loose contamination at the fixed-point measurement locations. The MDC for smear samples was 162 dpm/100 cm^2 for beta and 12 dpm/100 cm^2 for alpha activity.

Survey Unit SS14-1

About 75% of the area was scanned with the SCM. The remaining surfaces were scanned with the GFPC and/or the scintillation detector. No activity greater than the 75% administrative level was detected with the SCM or GFPC scans.

The scan with the scintillation detector identified seven locations with an area of 2.2 square meters with readings above the alarm point.

The survey design included 13 fixed-point measurements with the GFPC and scintillation detector at random locations. None of the fixed-point readings with the GFPC exceeded the alarm level. One location exceeded the alarm level for the scintillation detector (356 gross cpm). The mean for the GFPC measurements was 382 gross cpm and the maximum was 514 gross cpm. The corresponding values for the scintillation counter measurements were 179 and 356 gross cpm.

Concrete samples taken from the seven locations with elevated readings had an average ^{137}Cs concentration of 23.8 pCi/g and a maximum of 52.9 pCi/g. Samples from six other locations in the survey unit had a mean concentration of 2.1 pCi/g and a maximum of 4.4 pCi/g. An assessment of the radiation exposure in this survey unit, assuming contamination of the entire survey unit at the average concentration for the 13 samples gave a value of 4.2 mR/year. The elevated reading area also passed the elevated measurement comparison test. Smears from the fixed-point measurement locations were all less than the MDC.

Survey Unit SS14-2
About 53% of the area was scanned with the SCM. The remaining surfaces were scanned with the GFPC and/or the scintillation detector. No activity greater than the 75% administrative level was detected with these scans. The survey design included 13 fixed-point measurements with the GFPC and scintillation detector at random locations. None of the fixed-point readings exceeded the alarm level. The mean for the GFPC measurements was 344 gross cpm and the maximum was 442 gross cpm. The corresponding values for the scintillation counter measurements were 123 and 179 gross cpm.

One concrete sample was collected. It had a ^{137}Cs concentration of 0.94 pCi/g. Smears from the fixed-point measurement locations were all less than the MDC.

Survey Unit SS14-3
About 80% of the area was scanned with the SCM. The remaining surfaces were scanned with the GFPC and/or the scintillation detector. No activity greater than the 75% administrative level was detected with these scans. The survey design included 12 fixed-point measurements with the GFPC and scintillation detector at random locations. None of the fixed-point readings exceeded the alarm level. The mean for the GFPC measurements was 293 gross cpm and the maximum was 353 gross cpm. The corresponding values for the scintillation counter measurements were 124 and 146 gross cpm.

One concrete sample was collected. It had a ^{137}Cs concentration of 0.6 pCi/g. Smears from the fixed-point measurement locations were all less than the MDC.

Survey Unit SS14-4
About 66% of the area was scanned with the SCM. The remaining surfaces were scanned with the GFPC and/or the scintillation detector. No activity greater than the 75% administrative level was detected with these scans. The survey design included 14 fixed-point measurements

with the GFPC and scintillation detector at random locations. None of the fixed-point readings exceeded the alarm level. The mean for the GFPC measurements was 285 gross cpm and the maximum was 338 gross cpm. The corresponding values for the scintillation counter measurements were 112 and 127 gross cpm.

One concrete sample was collected. It had a ^{137}Cs concentration of 0.2 pCi/g. Smears from the fixed-point measurement locations were all less than the MDC.

Survey Unit SS14-5

About 85% of the area was scanned with the SCM. The remaining surfaces were scanned with the GFPC and/or the scintillation detector. No activity greater than the 75% administrative level was detected with these scans. The survey design included 14 fixed-point measurements with the GFPC and scintillation detector at random locations. None of the fixed-point readings exceeded the alarm level. The mean for the GFPC measurements was 276 gross cpm and the maximum was 327 gross cpm. The corresponding values for the scintillation counter measurements were 126 and 140 gross cpm.

One concrete sample was collected. It had a ^{137}Cs concentration of <0.2 pCi/g. Smears from the fixed-point measurement locations were all less than the MDC.

Survey Unit SS14-6

Only 13% of the area could be scanned with the SCM. All of the surfaces were scanned with the GFPC and/or the scintillation detector. The surface $DCGL_W$ for ^{137}Cs for this survey unit was 5,940 dpm/100 cm^2 (Administrative Limit 4,455 dpm/100 cm^2). The Scan MDC was 1,894 dpm/100 cm^2. No activity greater than the 75% administrative level was detected with these scans. The survey design included 52 fixed-point measurements with the GFPC at random locations. None of the fixed-point readings exceeded the action level. The mean for the GFPC measurements was 260 gross cpm and the maximum was 338 gross cpm.

Smears from the fixed-point measurement locations were all less than the MDC.

Survey Unit SS15

The entire survey unit was scanned with the SCM and 23% with the GFPC and/or the scintillation detector. No activity greater than the 75% administrative level was detected with these scans. No fixed-point measurements were made.

Survey Unit SS16

About 56% of the area was scanned with the SCM and no activity greater than the 75% administrative level was detected. No fixed-point measurements were made.

Survey Unit SS17

About 15% of the area was scanned with the SCM and no activity greater than the 75% administrative level was detected. No fixed-point measurements were made.

Conclusion

The survey units in this report meet the survey requirements and the release criteria of 25 mrem/year for TEDE in the SNEC License Termination Plan. The annual dose for these survey units was not calculated in the FSS. The annual dose estimated from the maximum MDC of the SCM scans for all the survey units is 3.8 mrem. The annual dose estimated from the maximum mean of the fixed point GFPC measurements for SS14-1 through SS14-6 is 1.0 mrem. The annual dose estimated for the maximum mean of the scintillation counter fixed-point measurements for SS14-1 through SS14-5 is 6.6 mrem. The annual dose for SS14-1 using the elevated readings is 4.6 mrem. All the estimates are below the 25 mrem/year release criteria.

Document: Final Status Survey

Letter No: E910-05-045

Date: 25 Jul 05

Description: Final Status Survey for SSGS Structural Surfaces - CV Steam Tunnel

The Containment Vessel (CV) Steam Tunnel was used for the piping to convey steam and liquids between the CV and the SSGS. Most of the tunnel was removed. This survey area consists of the 91 square meters of residual concrete in the remaining 35' of tunnel. It also included steel Unistrut imbedded in the concrete. The area was divided into 3 survey units for concrete and 1 survey unit for the Unistrut. All the survey units are Class 1.

Survey Unit SS22-1
This survey unit of 21 square meters is the floor of the tunnel.

Survey Unit SS22-2
This survey unit of 48 square meters is walls of the tunnel.

Survey Unit SS22-3
This survey unit of 16 square meters is the ceiling of the tunnel.

Survey Unit SS22-5
This survey unit of 6 square meters is 70 linear feet of steel Unistrut imbedded in the walls of the tunnel.

Survey Results

The requirements for Class 1 areas are survey of 100% of the accessible area and all data points $\leq DCGL_W$. A sodium iodide scintillation detector was used for the scan of the survey units in this area. The surface $DCGL_W$ for ^{137}Cs for this survey area was 27,250 dpm/100 cm^2 (administrative limit 20,438 dpm/100 cm^2).

A Gas-Flow Proportional Counter was used for scans and fixed-point measurements. The MDC of the scan was 1,653 dpm/100 cm^2. The scan action level was 1,100 gross cpm.

A sodium iodide scintillation detector was also used for scans and fixed-point measurements. The MDC for the sodium iodide scans was 5,838 dpm/100 cm^2. The MDC for static sodium iodide measurements was 2,215 dpm/100 cm^2. The action level for the sodium iodide scan corresponding to the administrative limit was 300 gross cpm.

Smears were taken at the locations of fixed-point measurements to check for removable contamination. The MDC for the smears was 169 dpm/100 cm^2 for beta and 12 dpm/100 cm^2 for alpha radiation.

Survey Unit SS22-1

All of the accessible area, 95% of the total area, of this 21 square meter survey unit was scanned with the GFPC and sodium iodide detectors. No locations with readings above the action level were detected.

Fixed-point measurements were made at 15 locations with the GFPC. All measurements were less than the action level. The mean of the measurements was 344 gross cpm and the maximum was 378 gross cpm.

All smears collected at the fixed-point locations were below the MDC.

Survey Unit SS22-2

All of the accessible area, 98% of the total area, of this 48 square meter survey unit was scanned with the GFPC and sodium iodide detectors. No locations with readings above the action level were detected.

Fixed-point measurements were made at 11 locations with the GFPC. All measurements were less than the action level. The mean of the measurements was 336 gross cpm and the maximum was 408 gross cpm.

All smears collected at the fixed-point locations were below the MDC.

Survey Unit SS22-3

All of the accessible area, 88% of the total area, of this 48 square meter survey unit was scanned with the GFPC and sodium iodide detectors. No locations with readings above the action level were detected.

Fixed-point measurements were made at 13 locations with the GFPC. All measurements were less than the action level. The mean of the measurements was 391 gross cpm and the maximum was 440 gross cpm.

All smears collected at the fixed-point locations were below the MDC.

Survey Unit SS22-5

Fixed-point measurements were made with the sodium iodide detector at 1 foot intervals along the 70' of Unistrut, giving 100% coverage. The mean of the 81 measurements was 128 gross cpm and the maximum was 172 gross cpm. The maximum count rate corresponds to 38% of the administrative limit or 7.1 mrem/year.

All the smears taken at 26 locations were below the MDC.

Conclusions

The survey units in this report meet the survey requirements and the release criteria of 25 mrem/year for TEDE in the SNEC License Termination Plan. The annual dose for these survey units was not calculated in the FSS. The maximum annual dose estimated from the survey unit averages of fixed-point readings is 2.2 mrem for the concrete surfaces and 3.7 mrem for the Unistrut.

Document: Final Status Survey

Letter No: E910-05-044

Date: 26 Jul 05

Description: Final Status Survey for SSGS Structural Surfaces - Discharge Tunnel

The discharge tunnel is an underground concrete structure that was used to transport used cooling water from the SSGS to an outfall at the river. The tunnel runs in a westerly direction along the north side of the SSGS for about 150' then turns 90 degrees in a northerly direction under the west side of the switchyard about 550' to the outfall at the river. Locations along the tunnel are indicted by the number of feet from the start of the tunnel at the northeast corner of the SSGS (0') to the outfall at the river (700'). The survey area is about 1940 square meters and is divided into 9 survey units of Class 1, Class 2 and Class 3. Approximately 1,000 square meters of tunnel from the cleanout in the switchyard at about 385' to the outfall at the river was not surveyed because it was considered unsafe for entry. This portion of the tunnel is Class 3 and the survey coverage in the adjoining Class 3 unit covered enough area to meet the survey requirement for the inaccessible portion. After the FSS was accepted the access points to the tunnel were blocked or backfilled to prevent entry.

Survey Unit SS!
This Class 1 survey unit of 120 square meters is the floor of the first 150' of tunnel.

Survey Unit SS2
This Class 2 survey unit of 175 square meters is the floor surface in the 235' of tunnel from 150' to 385'.

Survey Unit SS3
This Class 3 survey unit of 234 square meters is the floor of the last 315 feet of tunnel from 385' to 700' at the river outfall.

Survey Unit SS4
This Class 1 survey unit of 120 square meters is the floor of the first 150 feet of tunnel.

Survey Unit SS5
This Class 3 survey unit of 400 square meters is the ceiling of the last 550' of tunnel from 150' to 700'.

Survey Unit SS6-1

This Class 1 survey unit of 145 square meters is the south wall of the first 150' of the tunnel.

Survey Unit SS6-2
This Class 1 survey unit of 145 square meters is the north wall of the first 150' of the tunnel.

Survey Unit SS7-1
This Class 3 survey unit of 300 square meters is the west wall of the last 550' of the tunnel.

Survey Unit SS7-2
This Class 3 survey unit of 300 square meters is the east wall of the last 550' of the tunnel.

Survey Results
The requirements for Class 1 areas are survey of 100% of the accessible area and all data points $\leq DCGL_W$. The requirements for Class 2 areas are survey of 10-100% of the accessible area and all data points $\leq$50% of the $DCGL_W$. The surface $DCGL_W$ for ^{137}Cs for this survey area was 8,807 dpm/100 cm^2 (administrative limit 6,605 dpm/100 cm^2).

Shonka Research Associates (SRA) surveyed this area using a SCM (Surface Contamination Monitor). The SCM is an automated, position sensitive, large-area gas-flow proportional counter. It continuously records position and count rate, so no fixed-point measurements are required. The Scan MDC varied from 1,085 to 4,478 dpm/100 cm^2.

A Gas-Flow Proportional Counter was also used for scans and fixed-point measurements in locations inaccessible to the SCM. The MDC of the scan was 2.466 dpm/100 cm^2. The scan action level was 300 net cpm.

A sodium iodide scintillation detector was also used for scans and fixed-point measurements. The MDC for the sodium iodide scans was 4,993 dpm/100 cm^2. The action level for the sodium iodide scan corresponding to the administrative limit was 200 gross cpm. The volumetric MDC of the sodium iodide detector for fixed-point measurements was 0.71 pCi/g.

Survey Unit SS1
The SCM was used to scan 88% of this survey unit and the GFPC was used for the remainder. No locations above the administrative level or the action level of the GFPC were detected. The fixed-point GFPC measurements at 15 locations were all below the 424 net cpm action level. The mean of the measurements was 226 gross cpm and the maximum was 275 gross cpm.

Survey Unit SS2
The SCM was used to scan 62% of this survey unit. No locations above the administrative level were detected. No fixed point measurements were required.

Survey Unit SS3
The SCM was used to scan 14% of this survey unit. No locations above the administrative level were detected. No fixed point measurements were required.

Survey Unit SS4
The SCM was used to scan 77% of this survey unit and the GFPC and sodium iodide detectors were used for the remainder. No locations above the administrative level were detected with the SCM. Four locations of about 2 square feet each were detected with the GFPC and the sodium iodide detectors. The survey design fixed-point GFPC measurements at 15 locations were all below the 424 net cpm action level. The mean of the measurements was 279 gross cpm and the maximum was 604 gross cpm. The estimated annual dose in the vicinity of the locations with the elevated readings was 61% of the administrative limit or 11.4 mrem.

Survey Unit SS5
The SCM was used to scan 9.5% of this survey unit. No locations above the administrative level were detected. No fixed point measurements were required.

Survey Unit SS6-1
The SCM was used to scan 83% of this survey unit and the GFPC and sodium iodide detectors were used for the remainder. No locations above the administrative level were detected with the SCM. One location of about 2 square feet was detected with the sodium iodide detector. The survey design fixed-point GFPC measurements at 15 locations were all below the 424 net cpm action level. The mean of the measurements was 216 gross cpm and the maximum was 321 gross cpm. The estimated annual dose in the vicinity of the location with the elevated readings was less than 20% of the administrative limit or less than 4 mrem.

Survey Unit SS6-2
The SCM was used to scan 70% of this survey unit and the GFPC and sodium iodide detectors were used for the remainder. No locations above the administrative level or the action level of the GFPC were detected. The fixed-point GFPC measurements at 15 locations were all below the 424 net cpm action level. The mean of the measurements was 207 gross cpm and the maximum was 363 gross cpm.

Survey Unit SS7-1

The SCM was used to scan 28% of this survey unit. No locations above the administrative level were detected. No fixed point measurements were required.

Survey Unit SS7-2

The SCM was used to scan 14% of this survey unit. No locations above the administrative level were detected. No fixed point measurements were required.

Conclusion

The survey units in this report meet the survey requirements and the release criteria of 25 mrem/year for TEDE in the SNEC License Termination Plan. The annual dose for these survey units was not calculated in the FSS. The mean annual dose for all the SCM surveys is 0.3 mrem. The annual dose estimated from the maximum 100 cm^2 reading in all the surveys is 33 mrem. The annual dose estimated from the maximum MDC of all of the SCM surveys is 13 mrem. The maximum annual dose estimated from the survey unit averages of fixed point readings is 4.0 mrem.

Document: Final Status Survey

Letter No: E910-05-039

Date: 22-jul 05

Description: Final Status Survey for the SSGS Discharge Tunnel Transition Area

The Discharge Tunnel Transition Area is the connection between the Spray Pond Pump area and the Discharge Tunnel. It is located at the corner where the tunnel changes direction from west to north. It is primarily residual concrete but also contains steel soil and wood. The total area of 154 square meters was divided into 2 Class 1 survey units and 2 Class 2 survey units.

Survey Unit SS23-1

This survey unit is 66 square meters of Class 2 residual concrete. I consist of the concrete surfaces of the walls in the tunnel entrance portion.

Survey Unit SS23-2

This survey unit consists of exposed rock and soil in the floor of the tunnel entrance. It is Class 2 with and area of 31 square meters.

Survey Unit SS25-1

This survey unit consists of the concrete surfaces in the Discharge Tunnel to Spray Pump transition area in the Discharge Tunnel. It is Class 1 with an area of 42 square meters.

Survey Unit SS25-2

This Class 1 survey unit consists of the steel surface of a gate in the SSGS Discharge Tunnel entrance. A portion of the gate was in the withdrawal well and was not accessible. The accessible portion of the gate has an area of 16 square meters.

Survey Results

The requirements for Class 1 areas are survey of 100% of the accessible area and all data points $\leq DCGL_W$. The requirements for Class 2 areas are survey of 10-100% of the accessible area and all data points $\leq$50% of the $DCGL_W$. The surface $DCGL_W$ for ^{137}Cs for this survey area was 8,807 dpm/100 cm^2 (administrative limit 6,605 dpm/100 cm^2).

A Gas-Flow Proportional Counter was used for scans and fixed-point measurements. The MDC of the scan was 1,817 dpm/100 cm^2 for concrete in the Class 2 units and 2,644 in the Class I units. The action level for the GFPC fixed-point measurements corresponding to the administrative limit was 593 net cpm in the Class 2 units and 424 net cpm in the Class 1 units. The action level for the

GFPC scan was 500 net cpm in the Class 2 units and 350 net cpm in the Class 1 units.

A sodium iodide scintillation detector was also used for scans and fixed-point measurements. The MDC for the sodium iodide scans of steel was 3,717dpm/100 cm^2. The action level for the sodium iodide scan corresponding to the administrative limit was 200 gross cpm in the Class 1 units and 300 gross cpm in the Class 2 units.

Smears for removable contamination were also taken at the fixed-point measurement locations. The MDC for smears was166 dpm/100 cm^2 for beta and 12 dpm/100 cm^2 for alpha radiation.

Survey Unit SS23-1
No locations above the action level were detected in the 30% of the area scanned in this unit with a GFPC. Thirteen fixed-point measurements were made with the GFPC. The mean of the measurements was 345 gross cpm. The maximum of 813 gross cpm, 450 net cpm, was less than the 593 net cpm action level.

Survey Unit SS23-2
The entire area of this unit was scanned with a sodium iodide detector. One location of about 6 square meters had a count rate of 363 gross cpm, which was above the action level. The GFPC was used to scan 6.5% of the area. No locations above the action level were found with the GFPC. Fixed point measurements were made with the GFPC at 9 locations. The mean measurement was 561 gross cpm and the maximum was 787 gross cpm.

A soil sample taken at the location with the elevated reading had a ^{137}Cs concentration of <0.1 pCi/g. Six soil samples were also collected in this unit prior to the FSS and all were <0.14 pCi/g ^{137}Cs.

Survey Unit SS25-1
The entire surface area of this unit was scanned with a GFPC and 98% was also scanned with a sodium iodide detector. Scans with both instruments were below the action level. Fixed-point measurements were made with the GFPC at 60 locations. The mean of the measurements was 289 gross cpm and the maximum 477 gross cpm.

Survey Unit SS25-2
This entire unit was scanned with a sodium iodide detector and no locations above the action level were detected. Fixed-point measurements were made with the sodium iodide detector at 35 locations. The mean measurement was 84.9 gross cpm and the maximum 229 gross cpm. Scrape samples of the surface of the two locations with the elevated

readings had ^{137}Cs concentrations of 45.1 and 40,8 pCi/g. A third scrape sample from a location with a low fixed-point reading had a concentration of 3.5 pCi/g. After the scrape samples were removed, readings at those locations were127 and 149 gross cpm, indicating that the sampling removed the contamination. The locations with the elevated counts passed the elevated measurement comparison test.

Conclusion

The survey units in this report meet the survey requirements and the release criteria of 25 mrem/year for TEDE in the SNEC License Termination Plan. The annual dose for these survey units was not calculated in the FSS, but comparing the mean surface count rates in the FSS to the DCGL values the highest TEDE (Total Effective Dose Equivalent) for a survey unit would be 11 mrem/year. The average of the shielded measurements with the GFPC was used as the background for this estimate. The annual dose corresponding to the maximum soil concentration (a MDC value of 0.14 pCi/g ^{137}Cs) is 0.5 mrem TEDE and 0.03 mrem for groundwater.

Document: Final Status Survey

Letter No: E910-05-036

Date: 22 Jul 05

Description: Final Status Survey for SSGS Firing Aisle
The Firing Aisle is a platform about 6 feet below ground between the SSGS basement and the Boiler Pad. The 640 square meter Class 3 area was divided into two survey units.

Survey Unit SS13-1
This survey unit of 560 square meters is the floor area of the Firing Aisle.

Survey Unit SS13-2
This survey unit of 80 square meters is the wall surface at the south side of the Firing Aisle up to grade level at the Boiler Pad.

Survey Results
The requirements for Class 3 areas are survey of 10% of the accessible area and all data points $\leq$10% of the $DCGL_W$. This area was surveyed in 2003 by Shonka Research Associates (SRA) using a SCM (Surface Contamination Monitor). This instrument is an automated, position sensitive, large-area gas-flow proportional counter. It continuously records position and count rate, so no fixed-point measurements are required. The surface $DCGL_W$ for ^{137}Cs was 13,571 dpm/100 cm^2 (Administrative Limit 10,178 dpm/100 cm^2). The Scan MDC was 3,622 dpm/100 cm^2 for SS13-1 and 4,304 dpm/100 cm^2 for SS13-2.

Survey Unit SS13-1
The SCM survey of 13% of the area indicated that all areas were below the administrative limit for surface contamination.

Survey Unit SS13-
The SCM survey of 28% of the area indicated that all areas were below the administrative limit for surface contamination.

Conclusion
The survey units in this report meet the survey requirements and the release criteria of 25 mrem/year for TEDE in the SNEC License Termination Plan. The annual dose for these survey units was not calculated in the FSS, but the mean surface activity detected in both survey units was below the MDC. The annual dose corresponding to the maximum MDC is 7.9 mrem.

Document: Final Status Survey

Letter No: E910-05-043

Date: 26 Jul 06

Description: Final Status Survey for SSGS Structural Surfaces - Intake Tunnel

The intake tunnel is an underground concrete tunnel used to bring cooling water by gravity from the river to the underside of the SSGS basement. The section of tunnel from the river to the second cleanout (abut 443') was classified as non-impacted and is not included in the FSS. The portion of the tunnel from the second cleanout, just outside the SNEC west fence, to the SSGS is designated the main tunnel for this survey. The portion of the tunnel under the SSGS is divided into a north and a south section. Each section is subdivided into separate survey units for the floor, the walls and the ceiling, for a total of 9 survey units. The floor and wall units are Class 2 and the ceiling survey units are Class 3. The total area is 1957 square meters.

The trash rake and intake screen portions of the main tunnel were backfilled when the SSGS was demolished. Samples from either end of this section and from drilled holes in the center section did not show contamination, so that portion of the main tunnel was not excavated and is not included in the FSS.

After the final survey was accepted, the entrances to the tunnel were blocked or backfilled with stone to prevent entry.

Survey Unit SS19-1
This Class 2 survey unit of 167 square meters is the main tunnel floor.

Survey Unit SS19-2
This Class 2 survey unit of 184 square meters is the north tunnel floor.

Survey Unit SS19-3
This Class 2 survey unit of 154 square meters is the south tunnel floor.

Survey Unit SS20-1
This Class 2 survey unit of 269 square meters is the main tunnel walls.

Survey Unit SS20-2
This Class 2 survey unit of 324 square meters is the north tunnel walls.

Survey Unit SS20-3
This Class 2 survey unit of 359 square meters is the south tunnel walls.

Survey Unit SS21-1
This Class 3 survey unit of 162 square meters is the main tunnel ceiling.

Survey Unit SS21-2
This Class 3 survey unit of 184 square meters is the north tunnel ceiling.

Survey Unit SS21-3
This Class 3 survey unit of 154 square meters is the south tunnel ceiling.

Survey Results
The requirements for Class 2 areas are survey of 10-100% of the accessible area and all data points $\leq$50% of the $DCGL_W$. The requirements for Class 3 areas are survey of 10% of the accessible area and all data points $\leq$10% of the $DCGL_W$.

Shonka Research Associates (SRA) surveyed this area using a SCM (Surface Contamination Monitor). The SCM is an automated, position sensitive, large-area gas-flow proportional counter. It continuously records position and count rate, so no fixed-point measurements are required. The surface $DCGL_W$ for ^{137}Cs was27,992 dpm/100 cm^2 (Administrative Limit 20,994 dpm/100 cm^2). The Scan MDC varied from 1,820 to 3,445 dpm/100 cm^2.

Survey Unit SS19-1
No locations above the administrative limit were detected in the survey of 69% of this survey unit. The mean for100 cm^2 areas in the survey was -50 dpm/100 cm^2 and the maximum was 4,094 dpm/100 cm^2. The MDC for the survey was 2,487 dpm/100 cm^2.

Survey Unit SS19-2
No locations above the administrative limit were detected in the survey of 41% of this survey unit. The maximum mean for 100 cm^2 areas in 3 surveys was 5 dpm/100 cm^2 and the maximum was 3,569 dpm/100 cm^2. The maximum MDC for the surveys was 2,497 dpm/100 cm^2.

Survey Unit SS19-3
No locations above the administrative limit were detected in the survey of 56% of this survey unit. The maximum mean for 100 cm^2 areas in 2 surveys was 26 dpm/100 cm^2 and the maximum was 3,927 dpm/100 cm^2. The maximum MDC for the surveys was 2,581 dpm/100 cm^2.

Survey Unit SS20-1
No locations above the administrative limit were detected in the survey of 55% of this survey unit. The maximum mean for 100 cm^2 areas in 5 surveys was 653 dpm/100 cm^2 and the maximum was 3,945 dpm/100 cm^2. The maximum MDC for the surveys was 3,445 dpm/100 cm^2.

Survey Unit SS20-2
No locations above the administrative limit were detected in the survey of 44% of this survey unit. The maximum mean for 100 cm^2 areas in 8 surveys was 18 dpm/100 cm^2 and the maximum was 3,475 dpm/100 cm^2. The maximum MDC for the surveys was 2,231 dpm/100 cm^2.

Survey Unit SS20-3
No locations above the administrative limit were detected in the survey of 38% of this survey unit. The maximum mean for 100 cm^2 areas in 5 surveys was -32 dpm/100 cm^2 and the maximum was 3,493 dpm/100 cm^2. The maximum MDC for the surveys was 2,170 dpm/100 cm^2.

Survey Unit SS21-1
No locations above the administrative limit were detected in the survey of 13% of this survey unit. The mean for100 cm^2 areas in the survey was 25 dpm/100 cm^2 and the maximum was 3,981 dpm/100 cm^2. The MDC for the survey was 2,682 dpm/100 cm^2.

Survey Unit SS21-2
No locations above the administrative limit were detected in the survey of 17% of this survey unit. The maximum mean for 100 cm^2 areas in 3 surveys was 150 dpm/100 cm^2 and the maximum was 3,220 dpm/100 cm^2. The maximum MDC for the surveys was 2,579 dpm/100 cm^2.

Survey Unit SS21-3
No locations above the administrative limit were detected in the survey of 17% of this survey unit. The mean for100 cm^2 areas in the survey was 70 dpm/100 cm^2 and the maximum was 4,014 dpm/100 cm^2. The MDC for the survey was 2,682 dpm/100 cm^2.

Prior to the FSS sediment samples and core bores were collected from the intake tunnel. The maximum ^{137}Cs concentration in the 142 sediment samples was 1.8 pCi/g and the average was 0.46 pCi/g. The ^{137}Cs concentration in the core samples was less than the MDC.

Conclusion
The survey units in this report meet the survey requirements and the release criteria of 25 mrem/year for TEDE in the SNEC License Termination Plan. The annual dose for these survey units was not calculated in the FSS. The mean annual dose for all the SCM surveys is 0.0 mrem. The annual dose estimated from the maximum reading in all the surveys is 3.7 mrem. The annual dose estimated from the maximum MDC of all of the SCM surveys is 3.1 mrem.

Document: Final Status Survey

Letter No: E910-05-046

Date: 27 Jul 07

Description: Final Status Survey for SSGS Spray Pump Area Structural Surfaces

The Spray Pump Area is located west of the Saxton Steam Generating Station foundation. It contained the sump and the pumps for pumping condenser water from the discharge tunnel to the spray pond. This survey covers the residual structural surfaces for this area. The 200 square meter area has been divided into 4 survey units.

Survey Unit SS9-1
This 52 square meter Class 1 survey unit consists of the spray pump pit floor and walls up to the floor of the spray pump building.

Survey Unit SS9-2
This 30 square meter Class 2 survey unit consists of the floor area of the spray pump room.

Survey Unit SS11-1
This 60 square meter Class 2 survey unit is the lower 2 meters of the spray pump room walls.

Survey Unit SS11-2
This 58 square meter Class 3 survey unit is the walls of the spray pump room above a height of 2 meters.

Survey Results

The requirements for Class 1 areas are survey of 100% of the accessible area and all data points $\leq DCGL_W$. The requirements for Class 2 areas are survey of 10-100% of the accessible area and all data points $\leq$50% of the $DCGL_W$. The requirements for Class 3 areas are survey of 10% of the accessible area and all data points $\leq$10% of the $DCGL_W$. The $DCGL_W$ for ^{137}Cs for this survey area was 8807 dpm/100 cm^2 (administrative limit 6605 dpm/100 cm^2). A Gas-Flow Proportional Counter was used for scans and fixed pint measurements. The MDC of the scan was 2644 dpm/100 cm^2 in SS9-1 and 1817 dpm/100 cm^2 in the other survey units. The action level for the scan corresponding to the administrative limit was 350 net cpm for SS9-1 and 500 net cpm in the other survey units. A sodium iodide scintillation detector was also used to scan Survey Unit SS9-1.

Survey Unit SS9-1

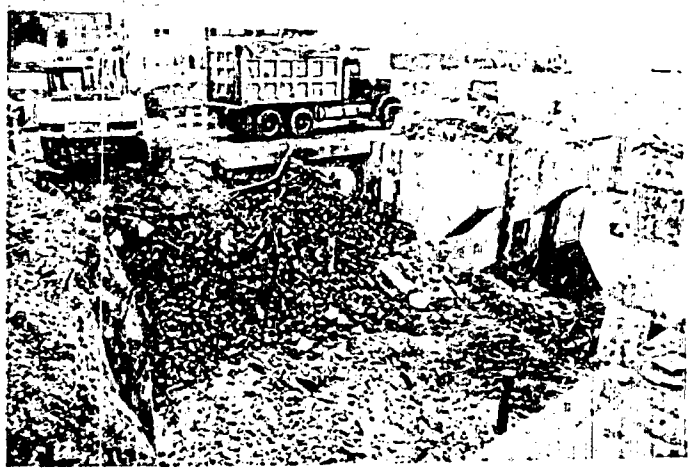
The scan of 100% of the surface in this survey unit did not detect any locations above the action level for the GFPC. No activity above the action level was detected in the survey of 76% of the area with the sodium iodide detector. The mean of the 15 fixed-point measurements with the GFPC was 244 gross cpm and the maximum was 294 gross cpm.

Survey Unit SS9-2
The scan of 8.5% of the surface in this survey unit did not detect any locations above the action level for the GFPC. The mean of the 13 fixed-point measurements with the GFPC was 321 gross cpm and the maximum was 365 gross cpm.

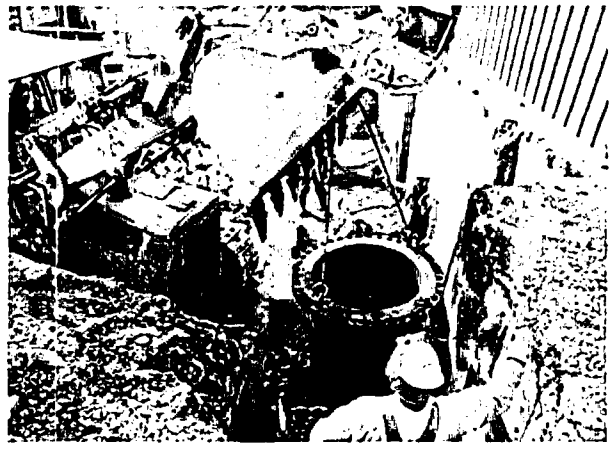
Survey Unit SS11-1
The scan of 35% of the surface in this survey unit did not detect any locations above the action level for the GFPC. The mean of the fixed-point measurements with the GFPC was 299 gross cpm and the maximum was 359 gross cpm.

Survey Unit SS11-2
The scan of 10.7% of the surface in this survey unit did not detect any locations above the action level for the GFPC. The mean of the 11 fixed-point measurements with the GFPC was 307 gross cpm and the maximum was 336 gross cpm.

Conclusions
The survey units in this report meet the survey requirements and the release criteria of 25 mrem/year for TEDE in the SNEC License Termination Plan. The annual dose for these survey units was not calculated in the FSS, but comparing the mean surface count rates in the FSS to the DCGL values the highest TEDE (Total Effective Dose Equivalent) for a survey unit would be 5.1 mrem/year. The average of the shielded measurements with the GFPC was used as the background for this estimate.



Removing debris from SSGS.



Removing downcomer from seal chamber 1, Nov 00.

Entry into N. intake tunnel below SSGS, Oct 01.

Conclusions

The decommissioning of the SNEC reactor site for unrestricted release was successfully completed. The NRC accepted the 39 Final Status Survey Reports and the license was terminated on 7 Nov 2005. The estimated dose for a resident farm family living on the site within the next 10,000 years was less than the NRC limit of 25 millirem/year. The goal of keeping the portion of the dose from groundwater to less than the EPA limit of 4 millirem/year was also achieved. The project had an excellent safety record for a project with all the potential safety problems of a major construction site. There were several minor injuries to workers and the most serious injuries were to two office workers from falls on ice. The total radiation dose to individual workers was well within the administrative limits for the site. The collective dose for workers was 38.2 person-rem, which was surprisingly close to the estimate of 31.8 person-rem in the Decommissioning Plan submitted to the NRC in 1996 before work started.

In the Decommissioning Plan submitted to the NRC in Feb 1996 the project completion date was estimated to be June 1999 and the cost $22.2 million. The final cost was about $76 million and completion date was November 2005. There were numerous reasons for the added time and cost to complete the project. Difficulties with decontamination of the concrete in the containment vessel and unexpected contamination in the SSGS and in the old dump area of the site greatly extended the original time and cost estimates for the project. The time required to accomplish the necessary regulatory reviews and license changes was also consistently underestimated. The uncertainty in working with new decommissioning regulations probably also contributed to some of the delay.

It is my impression that the public information portion of the project was successful, including the Independent Inspection Program. The Saxton Citizens Task Force provided a good representation of the community and was active throughout the project. GPU Nuclear/First Energy personnel were cooperative in providing access to the facility and keeping the Task Force informed of activities at the site and the reasons for the decisions that were made. Input from the community was considered in the decisions made by the SNEC management. Those decisions generally favored the more conservative options for decontamination and surveys.

The goal of the Independent Inspection Program was to provide the community with independent monitoring and to act as a source of information on the project, especially the radiation safety aspects. The most successful part of the program appeared to be the quarterly reports. Thirty-eight quarterly reports were prepared and distributed to the Commissioners of Bedford and Huntingdon counties, the Task Force members, local newspapers, GPU Nuclear supervisors, and the Oversight Committee. I received many favorable comments on the quarterly reports. On the other hand, there were no requests to address local

organizations on the decommissioning project and there were no requests for additional information via the toll-free telephone number that I maintained. I do not know whether that was because of lack of interest or because other sources were sufficient to satisfy the need for information. The other sources of information included the regular updates on the project published in the Broadtop Bulletin. I also received the impression that casual conversations with SNEC employees at restaurants and other establishments was a continual source of information for the public. Keeping all employees informed of activities, plans and problems serves the public information program and discourages the spread of rumors and incorrect information.

The selection of a university to operate the Independent Inspection Program was very satisfactory. In addition to being independent, a university is equipped to handle the necessary administrative support, such as contracts, payroll, insurance, etc. I can recommend this arrangement for other projects where independent monitoring is required. I was unable to complete the last couple of years of the program as a Penn State employee and the contract for that period was directly between me and GPU Nuclear/First Energy. This was done because I wanted to be able to see the project to completion and was a satisfactory arrangement. Even though I never experienced any attempt by any of the parties involved to influence how I conducted the inspection program, I would not recommend a direct contract and would not have started this project with such an arrangement. There was some discussion at the beginning of he Independent Inspection Program on a part-time versus a full-time inspector. I found that the duties for this size project could be handled on a part-time basis. Additional time was spent at the site when major projects, such as moving the large components, were in progress. In hindsight, I would probably prepare more written inspection reports. However, the Independent Inspection Program was not designed to duplicate the NRC inspections or the facility quality assurance audits. The regular presence of the Independent Inspector observing the operations at the site and reporting the activities in the quarterly reports was more effective than formal written inspection reports.

The selection of the Saxton Citizens Task Force from a wide variety of community groups and municipal organizations was also successful and I would recommend it for other projects. Representatives from some of the organizations will not be interested and will not participate. However, some individuals that would normally be overlooked when considering the usual choice of "pro and con" stakeholders do become interested and are active participants in the advisory group. These persons generally have organizational skills and can provide a broader perspective of the community attitudes than persons who are oriented to a single issue.

It is my opinion that active participation in a project is the best way to understand it and make informed judgments. I encouraged members of the Task Force to

visit the SNEC site to view the operations first hand and even to make their own independent measurements. Chairman Jim Fockler made routine visits to the site to check on progress and talk with the staff and was able to relay his observations to the Task Force and to others in the community. Charlie Barker was interested enough to learn to use a survey meter and to assist in the collection of routine radiation readings. I think Charlie's direct involvement in the project contributed to the confidence of the Task Force in the monitoring by SNEC personnel. Unfortunately, Charlie died before the project was completed and no one else was interested in continuing his activities.

I can attest to changes in the attitudes of individuals associated with the decommissioning project over the period1995-2005. At the start of the project I sensed distrust of the utility on the part of the community, based on past experience with the utility and regulators. I also sensed reluctance on the part of the utility to participate in open public information programs because of possible delays and criticism. The NRC also had some concern that it might interfere with their inspection program. Once communications between the two groups became more open, the Task Force could see that the utility was conducting their operations with a serious regard for the safety of workers and the community. The utility also found that open communications did not interfere with their operations. It became evident that decommissioning the site and unrestricted release was in the best interest of both the community and the utility. The Task Force also developed a sense of trust in the two NRC regulators, Tom Dragoun and Al Adams, who were most closely involved in the project.

The difficulties experienced with unexpected contamination of the concrete in the CV, the SSGS and the dumpsites made it clear that the information on the operating history was incomplete. The Historical Site Assessment should be a document-in-progress during the operating life of a nuclear facility. Knowing ahead of time the extent of the contamination at the SNEC site would probably have reduced the decommissioning time by at least the 2 years spent trying to decontaminate the concrete in the containment vessel. Decontamination of the SSGS and associated facilities would also have been more efficient before the structures were demolished and backfilled.

The Saxton site was probably chosen as the site for the SNEC reactor because of the infrastructure associated with the SSGS that was already on the site. This might have reduced the initial cost, but the combined operation of the facilities resulted in the need to decontaminate both facilities. Even though the SNEC facility was only designed for 5 years of operation, it was evident that decommissioning was not considered in the design or operation of the facility. In order to correct this problem, current NRC regulations require that new license applications describe how the design and procedures for operation will minimize contamination and the generation of waste and facilitate decommissioning.

As I indicated in the Introduction to this report, even though the project is completed and there is no longer an Independent Inspection Program, persons with questions, comments, or requests for additional information are invited to contact me at the address on the title page. I feel fortunate to have had the opportunity to participate in this project and I hope that my service has been of some value to the Saxton community.

Rodger W. Granlund, CHP
Saxton Independent Inspector
26 May 2006

License termination ceremony 8 Nov 05.

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