U.S. NUCLEAR REGULATORY COMMISSION

Docket No:	50-146
License No:	DPR-4
Report No:	1998204
Licensees:	GPU Nuclear Corporation and Saxton Nuclear Experimental Corporation
Facility:	Saxton Nuclear Experimental Facility
Location:	Saxton, Pennsylvania
Dates:	October 13 - November 6, 1998
Inspector:	Thomas F. Dragoun, Senior Reactor Inspector
Approved by:	Seymour H. Weiss, Director Non-Power Reactors and Decommissioning Project Directorate

Report Details

Summary of Plant Status

Two reinforced sections of the Containment Vessel (CV) dome were cut out, replaced, and resealed after removal of the reactor pressure vessel, steam generator, and pressurizer. Each large component, filled with grout to stabilize the internal structure, was placed on a shipping cradle. The reactor vessel was also enclosed in a steel overpack container. A 120-wheel transporter moved the reactor vessel from the site to the rail siding where it was transferred to a rail car. The other two components were transported by regular trucks. Shipping cradles for each component were welded to their rail cars.

1.0 Radiological Controls

a. Inspection Scope (Inspection Procedure 83100)

The inspector reviewed:

- Exposure controls,
- Control of airborne activity,
- Job coverage, and
- Radiation surveys.

b. Observations and Findings

Each of the large components was coated with epoxy paint and the painted surface surveyed prior to removal from the CV. This was to control the spread of loose surface contamination. Similarly, the inner surface of each CV opening cut-out was "diapered" with plastic sheeting to catch any dislodged loose contamination. Minor skin contamination (1,400 dpm/ 100 cm^2) occurred among workers cleaning the steam generator manway bolts prior to removal from the CV. Root cause analysis and corrective actions for this occurrence were appropriate.

A plastic containment tent was erected to enclose the reactor vessel and overpack during the welding to join the upper and lower sections of the overpack in the yard area. Air was drawn from the tent, passed through HEPA filters and exhausted into the Decommissioning Support Building (DSB). The air was additionally filtered passing through the CV/DSB ventilation system. The tent was removed after monitoring for airborne activity indicated only naturally occurring radioisotopes. Radiological controls for work in the yard area appeared to be proper.

Licensee calculations predicted that the direct shine dose rates in public areas from the reactor vessel while suspended from the crane would be below NRC limits specified in 10 CFR 20.1301. Continuous monitoring during removal indicated that actual levels were below predictions. Independent surveys by the inspector and Saxton Citizens Task Force independent assessor confirmed that dose rates were negligible.

Technical Specification (TS) 3.6.1.2.3 requires written procedures for radiological exposure control and survey activities. A Radiation Protection Plan specifically for the LCRP provided the detailed responsibilities of General Public Utilities Nuclear Corporation (GPU) and the contractor during the project. Radiation work permit (RWP) #98-047, "Reactor Vessel, Steam Generator, and Pressurizer Rigging and Preparation

Shipment to Rail Station," also satisfied this requirement when the components were inside and outside of the CV. The special precautions section of the RWP established appropriate controls. Verification that airflow was into the CV during removal of the dome cutouts was done by health physicist (HP) technicians. Continuous coverage by HP technicians was generally required during all work until hazards were determined to be insignificant . The Group Radiological Controls Supervisor (GRCS) discussed the required radiological safety precautions with work crew supervisors during the job status meetings and prejob briefings. The GPU Corporate HP Assessor also provided oversight during most work evolutions.

At the rail siding, a complete satellite HP program was implemented consisting of full time coverage by HP technicians, a supply of portable instruments, routine surveys, personnel barriers, warning signs, postings, and supervisory oversight. A motor home was used as an office. This program was required since the licensee shipped the components from the site to themselves at the rail siding. The controls were appropriate for the low radiation levels associated with the large components.

c. Conclusions

Radiological controls satisfied the regulatory requirements specified in 10 CFR 20 and Technical Specification 3.6.1.3.1.

2.0 Large Component Removal

a. Inspection Scope (Inspection Procedure 37801)

The inspector reviewed:

- procedures,
- safety reviews,
- audits and oversight, and
- industrial safety.

b. Observations and Findings

Specific work instructions (SWI) were available for cutting the CV dome openings, rigging and removal of each component. Each procedure was found to be detailed, well written, complete with supporting documentation, properly authorized and accompanied by reviews specified by 10 CFR 50.59 and 50.82(a)(6). Other reviews were completed and documented as specified by TS 3.5. The inspector confirmed that procedures were used in the field. Changes to the procedures were properly processed and approved. Signatures verifying completion of steps were entered as required.

The engineering design for the CV dome openings was based on a steel thickness of 11/16 inch. Subsequent review determined that an error occurred and the actual thickness was thinner at 11/32 inch. The Readiness Review Committee documented eight open items to be completed after its review of the SWI procedure for the dome openings. One of these items required an engineering evaluation of the impact of the decreased steel thickness on the stability of the dome after the openings were cut. The inspector was informed that this review was complete and satisfactory and that no

reinforcement was required. The quality assurance representative on site confirmed this information. Special strong-backs were welded to each cutout which provided lifting attachment.

In addition to project management staff, oversight during contractor work was provided by a GPU Crane Specialist, GPU Quality Assurance auditor, and a GPU-contracted Quality Verification Inspector. Discussions indicated that the audit plan was appropriate and that quality verification hold points placed in the SWI procedures were properly cleared before proceeding.

The LCRP subcontractor (Raytheon) provided a full time safety coordinator on site. Use of personal protective equipment by workers appeared satisfactory. Scaffolding was properly erected, braced, secured, and equipped with guard rails and toe boards. Life lines and harnesses were properly used when required. Crane operators possessed current licenses and certifications. Annual crane inspections and daily checks were completed and documented. Design, inspection, and load testing of lifting beams was satisfactory. Personnel testing the lifting and rigging equipment were qualified. Records of chemical analysis, tensile strength, foundry heat number, and specification certification for lifting beam fabrication steel were available on site. Slings and shackles were routinely inspected and appeared to be in good condition. An adequate number of fire watches and portable extinguishers were posted inside the CV during cutting of the openings. A cherry picker inside the CV was used to hold a steel catch basin under the cut. This caught the hot slag from arc gouging and was repositioned as the cut progressed. Fire protection practices satisfied requirements in TS 3.7. Clearances between rigging and the high voltage lines from the on site substation were acceptable. Safety precautions during automatic and stick welding operations seemed proper.

During this inspection, additional random testing of personnel for fitness-for-duty was noted. The licensee stated that no additional positives (drugs or alcohol) have been detected beyond those discussed in inspection report number 50-146/98203.

c. Conclusions

The LCRP was conducted in accordance with regulatory requirements and licensee commitments.

3.0 Transportation of Large Components

a. Inspection Scope (Inspection Procedure 86750)

The inspector reviewed:

- packaging and labeling of components,
- radiation and contamination surveys,
- loading, blocking and bracing,
- vehicle inspection, and
- shipping documents.

b. Observations and Findings

The licensee was granted an exemption by the US Department of Transportation (DOT) (exemption DOT-E-12144) to ship the steam generator and pressurizer as radioactive-surface contaminated objects class II (SCO-II). Each vessel was sealed, filled with grout, prepared to serve as its own package, mounted on the shipping cradle, and labeled in accordance with DOT requirements and conditions of the exemption.

Similarly, DOT exemption DOT-E-12115 allowed shipping the reactor vessel as radioactive-low specific activity class III (LSA-III). This classification was based on a waste characterization prepared by a contractor (WMG, Inc, Report #WMG 9801-7025, dated April 1998) in accordance with 10 CFR 61.55 and 61.56. The conclusions of this report were reviewed and accepted by NRC and DOT. In addition to sealing and filling with grout, the reactor vessel was placed in a custom fabricated overpack container made of two-inch thick steel with shielding added at certain locations. This packaging was designed to meet Industrial Package Type 2 (IP-2) specifications. The exterior of the package was labeled in accordance with DOT requirements.

Radiation and contamination surveys performed prior to shipment were adequate in scope and indicated that levels were below limits specified in 49 CFR 173.441 and 173.443. Placarding of the vehicles and trailers was appropriate.

Blocking and bracing of the reactor vessel on the transporter trailer was completed in accordance with SWI-98-058, "Tie-down and vessel transport", revision 0.

The transporter trailer, primary tractor, and backup tractor were inspected for road worthiness prior to departure in accordance with GPU procedures. Minor deficiencies were found and corrected. One in-transit repair was required after failure of the air line to the brakes on one of the 120 wheels.

The shipment manifest and other documents were completed and authorized as specified in 10 CFR Part 20 Appendix F and 49 CFR Part 172. Other documentation required by the burial site appeared to be proper.

The licensee issued the document "Health and Safety Plan for the Transport of Saxton Nuclear Experimental Corporation's Reactor Vessel, Steam Generator, and Pressurizer" for use by the contractors performing the work. This satisfied the requirements in TS 3.6.1.2. The licensee also developed the "SNEC Facility Large Component Removal Project Transportation Plan" as requested by DOT as a requirement to obtain the exemptions. This document states that the maximum speed of the reactor vessel transporter is not to exceed 5 mph. During the accompaniment of the load to the siding, the inspector noted that this limit appeared to be occasionally exceeded on the steeper slopes of the road. On questioning during a stop, the driver indicated that all brakes are applied on the downhill runs. However, to maintain control of the load and ensure equipment safety, the limit may have been exceeded on some slopes. The licensee stated that a "Corrective Action Program" (CAP) finding was initiated to investigate this matter. The results of this investigation will be reviewed in a future inspection (Inspector Follow-up Item 50-146/98204-01).

The licensee stated that a team of specialists will accompany the components in a caboose attached to the exclusive use train. This team will be equipped to make appropriate notifications and take initial actions to respond to an emergency in route.

c. Conclusions

Transportation for disposal of the large components satisfied regulatory requirements.

4.0 Exit Interview (Inspection Procedure 30703)

The inspector presented the inspection results to members of licensee management at the conclusion of the inspection on November 6, 1998. The licensee acknowledged the findings presented.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

James Byrne, Manager, DD&E
Perry Carmel, Site Supervisor
Rod Case, GRCS
William Heysek, Licensing Department
Robert Holmes, Technical Consultant
Robert Lewis, Raytheon Site Superintendent
Sylvia Morris, Sr. Public Affairs Representative
Arthur Paynter, Radiation Safety Officer
Gordon Powers, Raytheon Engineer
Louis Shamanek, GPU Site Superintendent
Lawrence Simon, Radwaste Shipping Supervisor
G. A. Kuehn, Program Director

Saxton Citizens Task Force

Roger Granlund, Independent Assessor (Penn. State University)

Charles Barker, member

NRC

Alexander Adams, Jr., Senior Project Manager

INSPECTION PROCEDURES USED

IP 30703:	ENTRANCE AND EXIT INTERVIEWS
IP 37801	SAFETY REVIEWS, DESIGN CHANGES, AND MODIFICATIONS
IP 83100	OCCUPATIONAL EXPOSURE AT PERMANENTLY SHUTDOWN REACTORS
IP 86750	SOLID RADIOACTIVE WASTE MANAGEMENT

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-146/1998204-01 Investigate use of 5 mph speed limit for transporter

Closed

None

LIST OF ACRONYMS USED

CAP	Corrective Action Program
CFR	Code of Federal Regulations
CV	Containment Vessel
DSB	Decommissioning Support Building
DOT	Department of Transportation
GPU	General Public Utilities Corporation
GRCS	Group Radiological Controls Supervisor
HP	Health Physicist
HEPA	High Efficiency Particulate Air filter
IP	Inspection procedure
LCRP	Large Component Removal Project
NRC	Nuclear Regulatory Commission
RWP	Radiation Work Permit
TMI	Three Mile Island power station
TS	Technical Specifications