U.S. NUCLEAR REGULATORY COMMISSION

Region I

Report No. 50-289/82-08

Docket No. 50-289

License No. DPR-50 Priority -- Category C

Licensee: GPU Nuclear Corporation

P.O. Box 480

Middletown, Pennsylvania 17057

Facility: Three Mile Island Nuclear Station, Unit 1

Inspection at: Middletown, Pennsylvania

Inspection conducted: May 25, 1982 - July 23, 1982

Inspector: _____ 8/10/82
T. Moslak, Radiation Specialist date signed

Reviewed by: _____ 8/13/82
M. Shanbaky, Senior Radiation Specialist date signed

Approved by: _____ 8/14/82
A. Fasano, Chief, Three Mile Island Section date signed
Projects Branch No. 2

Inspection Summary:

Inspection conducted on May 25, 1982 - July 23, 1982, (Inspection Report Number 50-289/82-08)
Areas Inspected: Routine, unannounced safety inspection by a radiation specialist of the Radiological Controls Program. The following areas of radiological controls were reviewed: Radiological controls program organization and personnel qualifications; internal quality assurance audits of the Radiological Controls Program; control of high radiation areas; respiratory protection; radioactive waste processing; effluent controls; radiological instrument calibration and surveillance testing; and exposure controls. The inspection involved 90 inspector-hours by 1 radiation specialist.
Results: Of 10 areas inspected, one violation was identified (failure to adhere to Radiological Control Procedures, paragraph 5).

Details

1. Persons Contacted

General Public Utilities (GPU) Nuclear Corporation

B. Ballard, Manager TMI Quality Assurance (QA) Modifications/Operations,
M. Beers, QA Radiological Controls Monitoring Supervisor
J. Boyer, Radwaste Engineer
J. Fornicola, QA Manager
E. Fuhrer, Radwaste Operations Manager
E. Gee, Respiratory Protection Manager
*W. Heysek, Site Audits Supervisor
*G. Kimball, QA Monitor
*G. Kuehn, Deputy Manager Radiological Controls
G. Lawrence, Foreman, Preventive Maintenance, Instrumentation and Control
W. Miller, Licensing Engineer
W. Potts, Radiological Controls Manager
J. Reed, Chemistry Supervisor
R. Shaw, Radiological Engineering Manager
C. Smyth, Licensing Supervisor
M. Snyder, Preventive Maintenance Manager
*R. Szczech, Licensing Engineer
*R. Toole, Operations and Maintenance Director
D. Tuttle, Radiological Controls Field Operations Manager

The inspector also interviewed several other licensee employees during the inspection. They included control room operators, maintenance personnel, engineering staff personnel and general office personnel.

*denotes those present at the exit interview.

2. Audits

The following documents were reviewed by the inspector:

-- Report on 1981 TMI Audit Program, presented by W. G. Heysek, Supervisor, Site Quality Assurance (QA) Audits, May 1982

-- QA Procedure 7-2-07, Quality Assurance Systems Engineering Program Review/Evaluation, effective August 3, 1981

-- QC Audit Report No. S-TMI-80-12, conducted May 5-9, 1980, Health Physics Audit of ALARA, Radiation Protection Training and Review of Radiation Protection Plan of Units 1 and 2

-- GPU Nuclear Audit Report No. S-TMI-80-21, conducted November 6, 1980, - January 1981, Units 1 and 2, Health Physics Audit of controls for effluents, contamination, airborne activity, sample analyses, and radiological engineering

-- (Preliminary) GPU Nuclear Audit Report No. S-TMI-81-15, conducted October 12-30, 1981, Radiological Controls TMI Units 1 and 2

-- GPU Nuclear Investigative Report No. 6161-82-036, Investigation of Allegations Made and Determination of Facts Associated with Violation of High Radiation Door Access Procedures, February 26, 1982

-- Selected Quality Assurance Monitoring Reports (QAMR) for the period January 6, 1981, through February 1, 1982

-- Radiological Investigative Reports (RIR) prepared during 1982

-- Radiological Deficiency Reports (RDR) prepared during 1982

-- QA Procedure TMI-2-01, Plant Quality Trend Analysis, effective June 1980

-- QA Procedure TMI-2-03, Stop Work Notification, effective July 21, 1980

-- QA Procedure TMI-2-04, Radiological and Environmental Controls Classification List of Activities Subject to QA Program, effective October 7, 1981

-- QA Procedure TMI-7-01, Radiological Controls Exempt Items List, effective May 11, 1981

The inspector interviewed licensee personnel concerning the findings of internal audits of the Radiological Controls Program and the timeliness and adequacy of subsequent corrective actions to the findings. The inspector conducted plant tours, made observations regarding internal audit findings, and the followup corrective actions.

The inspector examined a representative sample of the licensee's Quality Assurance audits including Investigative Report No. 6161-82-036. As a result of this audit, several inadequacies were identified in the radiological controls of high radiation areas. The report prescribed the following actions to upgrade high radiation area controls and the inspector verified completion of these items.

-- Radiological Control Procedure (RCP) 1610.1 has been modified to include a more restrictive policy concerning high radiation area key control. The key controlling access to the high radiation area key locker always remains under the control of the Radiological Controls Foreman and the locked high radiation area key locker is locked at all times when unattended. No entry can be made into a locked high radiation area without first being granted permission from the Radiological Controls Department and documenting each key transaction.

-- A review of all locked high radiation areas was conducted by the licensee to insure that all locks positively lock from the outside and that such locks could not be opened by reaching around the door.

-- The Vice President of Radiological and Environmental Controls directed that Radiological Controls management and supervision increase their field time. Subsequent action by the Radiological Controls Field Operations Manager required that Radiological Controls Shift Foremen tour on-going operations two hours a day and document findings and Radiological Engineers are required to conduct tours weekly and to document their findings.

-- All personnel entering locked high radiation areas must initial a log sheet, acknowledging that they have been given a briefing on the required procedural items and dose control practices. Personnel must log out upon completion of work.

-- All postings of locked high radiation areas are reviewed and updated daily per procedure.

The inspector reviewed the Quality Assurance (QA) Department audits of health physics operations and examined QA Monitoring Reports. Procedures have been established to provide guidance in conducting audits and specifying the frequency of re-inspection. Through discussion with QA personnel and examination of records, the inspector determined that individuals with adequate radiological protection experience or training are assigned to conduct the audits.

The inspector determined that the licensee had an established program to identify nonconformances, establish trends, and institute timely corrective action to preclude repetition of identified problems in the area of radiological controls.

3. Radiological Controls Department Organization

The following licensee documents were reviewed by the inspector.

-- Three Mile Island Nuclear Station Unit 1 Radiation Protection Plan, Revision 4, August 27, 1980

-- RCP 1600, Department Organization Plan, Revision 3, April 29, 1982

-- RCP 1690.1, Radiological Field Operations Personnel Qualification/Training Standard, Revision 2, February 4, 1982

The licensee's present Radiological Controls Department (RCD) is shown in Figure 1 of this report. The inspector determined that the RCD organization is structured as specified in the Unit 1 Radiation Protection Plan, Revision 4, August 27, 1980. Radiological Controls

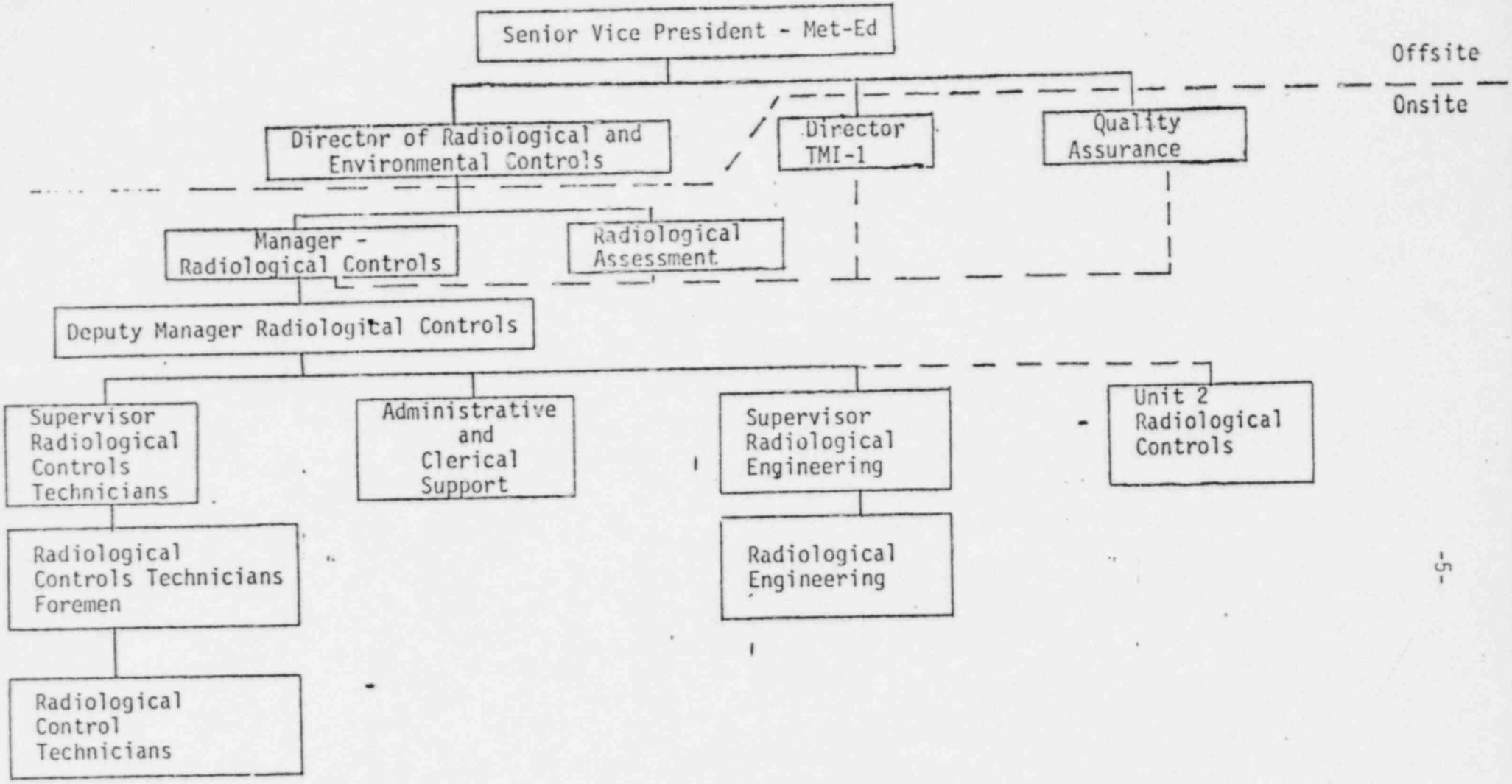

Figure 1

Radiological Controls Organization

Procedures have been implemented defining the authorities, inter-relationships, and responsibilities within the RCD. Procedures have also been developed specifying the qualifications and training standards for radiological field operations personnel.

During this inspection, the inspector interviewed various members of the RCD (supervisors and technicians), and examined resumes for selected individuals. Based on the review of this area, the inspector determined that the RCD staff meets the qualifications per Regulatory Guide 1.8 and ANSI/ANS-3.1-1978.

The inspector had no further questions in this area.

4. ALARA Program

The inspector examined the current status of the licensee's ALARA program and found that a documented program is established. The licensee has implemented the following ALARA RCPs.

-- RCP 1651, ALARA, Revision 4, July 17, 1981

-- RCP 1651.1, ALARA Preplanning, Revision 2, January 16, 1982

As a result of licensee Investigation No. 6161-82-036, the licensee determined that the Maintenance and Construction (M&C) Department needed additional guidance in planning work in which radiological controls are required. To strengthen their ALARA program, the licensee promulgated in April 1982 a "Guide for Planning and Performing Radiation Work". The "Guide" was being reviewed by licensee's foremen and work planners. Upon completion of this review, the "Guide" is to be incorporated into the licensee's training program. The inspector reviewed a copy of the "Guide" and discussed with the licensee how the use of this document will assist the Radiological Engineers in performing their ALARA reviews. The licensee stated that final implementation of the "Guide" will significantly increase employee awareness of the means to reduce radiation exposure and control contamination. Until the document is incorporated into the ALARA Program, licensee progress in this area will be monitored as an Inspector Follow Item (289/82-08-01).

The licensee's ALARA program specifies numerical man-rem criteria to determine if ALARA reviews are required for various jobs. Program goals have been established and progress is tracked by tabulating man-rem estimates on a weekly and on a yearly basis. Man-rem exposure goals are projected for each job and are based on past job exposure. The inspector examined selected ALARA reviews and found these in conformance with RCP 1651 and RCP 1651.1.

5. High Radiation Areas Access Control

As described in paragraph 2, the licensee has made progress in establishing administrative and engineering controls for locked high radiation areas. RCP 1610.1, Access Control for High Radiation Areas,

Revision 4, effective May 4, 1982, has been modified by Temporary Change Notice (TCN) No. 1-82-0062 to include a more definitive policy concerning key control. The inspector examined licensee records and logs referenced by RCP 1610.1 and found the following failure to follow procedure.

-- RCP 1610.1 requires that the Radiological Controls Foreman or designee audit the keys stored in the high radiation area key locker daily and note the results of this audit in the key control log. The inspector examined the key control log and noted that no audits were conducted for the period from May 31 through June 3, 1982.

-- Paragraph 5.9 of RCP 1610.1 requires that Radiological Controls Foremen or Technicians removing keys from or returning keys to the locked high radiation area key locker enter the required information in the locked high radiation area key log. The required information included documentation of the key number(s) issued, key number(s) returned, and the purpose for entry into each locked high radiation area. The inspector identified approximately 20 key transactions conducted during May 1982 in which the key numbers issued, key numbers returned, and purpose for entry into the locked high radiation area were not documented in the key log.

-- Paragraph 5.17.5 of RCP 1610.1 requires that the Radiological Controls Foreman review and verify, by signing, the high radiation area control check sheet, the status of all locked high radiation areas daily. The inspector noted that the Radiological Controls Foreman did not review and sign the high radiation area control check sheets for the period from May 4, 1982, through May 27, 1982, and again on June 2, 1982.

The inspector stated that this failure to follow procedure is a violation (289/82-02).

The inspector brought these discrepancies to the attention of Radiological Controls management. The licensee took immediate corrective action by generating a memorandum to all Radiological Controls Foremen and Technicians notifying them of the administrative and documentation errors. Followup examinations by the inspector of the key control log during the inspection revealed that all subsequent log entries were complete, key audits were performed within the stated frequency, and high radiation area control check sheets were signed by the Radiological Controls Foreman. The inspector verified, at various times during the inspection, that the high radiation area key locker was locked when unattended and that the locker key was under the control of the Radiological Controls Foreman. The inspector audited the key locker and found no discrepancies. The inspector examined survey records, conducted independent radiological measurements and toured high radiation areas to verify their status.

No violations were identified.

6. Respiratory Protection Program; Supplied Breathing Air

The inspector reviewed the following licensee documents.

-- RCP 1616, Respiratory Protection Program, Revision 17, April 2, 1982

-- RCP 1616.1, Selection and Use of Respiratory Protection Devices, Revision 7, March 19, 1982

-- RCP 1605.1, Analysis of Portable Air Samples for Particulates and Iodine, Revision 2, February 20, 1981

-- RCP 1758.1, Operation of Portable Air Samplers, Revision 1, March 2, 1982

-- Analytical Results of Breathing Air Quality Performed by Gannett-McCreath Laboratories

The inspector examined representative segments of the licensee's Respiratory Protection Program. The inspector discussed with the Respiratory Protection Manager items concerning the air-line respirator system and the associated respirator maintenance program. In Unit 1, the service air system is used as a source of breathing air. The inspector examined the following components of the system: two Chicago-Pneumatic compressors (oil type), moisture traps, reserve air storage tanks, high temperature trip switches, and temperature indicators on the water after coolers. Records of preventive maintenance and functional tests performed on the compressors were examined. The inspector observed operations at the Respirator Maintenance Facility and examined selected respirator maintenance records and respiratory protection equipment. The inspector examined results of analyses performed by Gannett-McCreath Laboratories indicating that the breathing air met the Compressed Gas Association Commodity Specification G-7.1-1966, Grade D specifications.

No violations were identified.

7. Radiation Work Permit and Control Point Program

The following documents were reviewed by the inspector.

-- RCP 1602, Radiation Dose Rate Surveys, Revision 9, March 2, 1982

-- RCP 1612, Monitoring for Personnel Contamination, Revision 9, February 20, 1982

-- RCP 1613, Radiation Work Permits, Revision 18, November 25, 1981

-- RCP 1614, Control Point Instruction, Revision 2, September 4, 1981

-- RCP 1610, Establishing and Posting Areas, Revision 11, May 8, 1981

-- RCP 1609, Surface Contamination Surveys, Revision 7, May 6, 1981

-- RCP 1602.1, Frequency of Routine Surveys, Revision 1, January 17, 1981

-- RCP 1641, Dosimetry Use and Exposure Controls, Revision 9, May 5, 1982

-- RCP 1692, Radiological Controls Logs, Revision 2, June 14, 1982

The inspector made tours of Unit 1 and visited access control points. The inspector reviewed Radiation Work Permits (RWP), survey records, posting of areas, and daily radiological controls foreman and shift logs. The inspector cross-checked portable survey instruments with the associated calibration records maintained at the licensee's calibration facility. Various on-going operations, such as radioactive waste solidifications and maintenance tasks were observed. The inspector noted that the RWP's were adequate for the jobs being performed and licensee personnel were complying with the requirements of the RWP.

No violations were identified.

8. Radiological Investigative Reports

The inspector examined selected Radiological Investigative Reports (RIR) generated by the licensee to identify the causes of and institute corrective actions for abnormal events having radiological safety significance. Reports describe the event, immediate corrective actions, investigative actions, conclusions as to the causes of the event, state recommendations and responsibilities to prevent reoccurrence.

The inspector examined a sample of the licensee's RIR including RIR 82-038. This RIR discussed the incident in which a utility worker handled radioactive sludge without being issued extremity dosimetry. This item will remain unresolved pending review of licensee assessment during a subsequent inspection (289/82-08-03).

9. Effluent Instrumentation and Dose Assessment

The inspector reviewed the following documents.

-- Surveillance Procedure (SP) 1302-3.1, RMS Quarterly Calibration, Revision 34, November 2, 1981

-- RCP 1621, Releasing Radioactive Liquid Waste, Revision 24, May 5, 1982

-- RCP 1622, Releasing Radioactive Gaseous Waste, Revision 23, February 20, 1982

-- RCP 1627, Verification of Sample Representativeness and Accuracy-Effluents, Revision 2, March 25, 1982

The inspector examined quarterly calibration records of the airborne effluent, liquid effluent, and area monitors. Calibrations have been performed within the required frequency using representative and traceable (to the National Bureau of Standards) sources. Through July 12, 1982, the licensee has completed 49 liquid release permits as per RCP 1621. The inspector reviewed selected liquid release packages and found them complete and the dose assessments for each release in conformance with the Offsite Dose Calculation Manual and Appendix I of 10 CFR 50.

The inspector also reviewed SP 1302-6, Calibration of Non-Tech Spec Instruments Used for Tech Spec Compliance, Revision 9, April 2, 1982, and Chemistry Procedure 1958.3, Gamma Spectrum Analysis using the B&W CRAM (Computerized Radionuclide Analysis by Mini-Computer) Program, Revision 4, May 26, 1981. The Ge(Li) multi-channel analyzer counting system was calibrated annually with traceable sources and energy calibration checks performed daily and plotted to track counting deviations.

No violations were identified.

10. Licensee Action on Previous Inspection Findings

(Closed) Violation (289/81-34-01): Radioactive waste solidification system did not provide for adequate means of monitoring radioactive airborne effluent releases to the environment. The inspector reviewed the following documents.

-- Unit 1 Operating Procedure (OP) 1104-28A, Radioactive Waste Solidification-Hittman, Revision 4, effective June 28, 1982

-- Unit 1 OP 1104-28I, Process Control Program-Hittman, Revision 0, effective May 13, 1982

The inspector examined modifications the licensee has completed to the Hittman Solidification System. The following system modifications were completed:

-- installation of a ventilation system to draw airborne effluent from the solidification liner, pass it through a pre-filter, high efficiency particulate absolute (HEPA) filter, and charcoal filter, then discharge it to the Unit 1 Auxiliary Building

-- installation of continuous airborne monitors in the work area of the Hittman Solidification Building and at the ventilation discharge point in the auxiliary building

-- replacement of flexible hoses with hard (stainless steel) piping for transferring spent resins or waste from the concentrated waste storage tank to the solidification liner

-- modification of OP 1104-28A requiring smoke testing of the inspection port (when it is opened) to insure air is being drawn into the port.

The inspector determined, through examination of equipment, review of licensee procedures and records, observations of waste solidification operations, and discussions with licensee representatives, that adequate means have been provided for monitoring of radioactive airborne releases to the environment from the Hittman Waste Solidification System. The inspector had no further questions in this area.

(Closed) Violation (289/81-34-02): Failure to make suitable measurements for detecting and evaluating the concentrations of radioactive materials in gases and vapors vented from the Hittman Solidification container inspection port.

The inspector examined recently implemented engineering and administrative controls designed to prevent release of airborne radioactive materials from the solidification liner. These modifications appear adequate for monitoring airborne effluents.

The inspector discussed the apparent inadequacies of the 10 CFR 50.59 review that the licensee prepared for evaluating the concentrations of airborne radioactive contaminants that could be released from the radwaste solidification operations. The review is inadequate in that the licensee attempted to correlate non-representative operations performed in Unit 2 with the Unit 1 solidification operations. Such correlation is incorrect since entrainment factors developed in Unit 2 are based on a static system at ambient temperatures whereas the Unit 1 solidification operations represent a dynamic system at elevated temperatures. Furthermore, previous licensee measurements of radioactive airborne materials made in the Unit 1 Concentrated Waste Storage Tank cubicle indicate airborne concentrations greater than predicted in the 50.59 review. Such measurements would be more representative of airborne concentrations generated during solidification operations. Discussions with licensee representatives lead to the licensee committing to reevaluate the 50.59 review and base the subsequent review on actual measurements of radioactive airborne contaminants generated in Unit 1 radioactive waste system operations. This 50.59 reevaluation will be classified as an Inspector Follow Item (289/82-08-04).

(Closed) Violation (289/82-34-03): Failure to document surveys of radioactive waste (radwaste) transfer hoses.

The licensee's corrective action requires that documented radiation surveys of the radwaste transfer piping that are performed at the time of radwaste transfer and following line flushing be attached to the completed procedure. Operating Procedure 1104-28A has been modified to specify this document control requirement. The inspector reviewed completed solidification procedures and verified that survey documents are attached.

The inspector had no further questions in this area.

(Closed) Violation (289/81-34-04): OP 1104-28A, Radioactive Waste Solidification-Hittman, Revision 2, effective September 4, 1981, was inadequate in that it did not include instructions for venting the Hittman Solidification liner during radwaste filling operations.

The inspector reviewed the current revision of OP 1104-28A, Revision 4, effective June 28, 1982, and verified that adequate instructions for venting the Hittman Solidification liner were included.

The inspector had no further questions in this area.

(Closed) Violation (289/82-34-05): Failure to follow procedures by not calibrating a Dioctyl Phthalate (DOP) generator and detector within the required calibration frequency and by not determining the locations of control vacuum cleaners weekly.

The inspector reviewed the controlled vacuum cleaner program. Responsibility for administration of this program has been transferred from the Radiological Controls Department to the Radwaste Department subsequent to inspection 81-34. The inspector examined calibration records for the DOP generator/detector and inventory records identifying the locations for storage and use of controlled vacuum cleaners. The inspector reviewed OP 1104-28G, Controlled Vacuum Cleaners, Revision 1, April 15, 1982, and OP 1104-28H, DOP Testing Controlled Vacuum, Revision 0, May 25, 1982. Based upon the review of licensee records, observations of work practices, and discussions with licensee representatives, the inspector had no further questions in this area.

(Closed) Unresolved Item (289/82-34-06): Reported presence of Sb-122 in evaporator bottoms, based on radioisotopic analyses using Ge(Li) System.

The inspector discussed with the licensee the methodology used to evaluate the types and quantities of radioisotopes in evaporator bottoms.

The inspector reviewed Unit 1 Chemistry Procedure 1958.3, Gamma Spectrum Analysis Using the B&W CRAM Program, Revision 4, May 26, 1981.

Based on discussions with licensee representatives, and review of licensee records and procedures, the inspector had no further questions in this area.

(Closed) Violation (289/82-01-01): Failure to adhere to high radiation area controls.

Based on examination of the licensee's stated corrective actions, discussions with licensee representatives, and examination of selected radiological operations and procedures, the inspector determined that adequate corrective actions were completed for this item. (Details paragraphs 2 and 5.)

(Closed) Violation (289/82-01-02): Failure to promptly correct inadequate high radiation area controls.

Based on examination of the licensee's stated corrective actions, discussions with licensee representatives, and examination of selected radiological operations and procedures, the inspector determined that adequate corrective actions were completed for this item. (Details paragraphs 2 and 5.)

11. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, violations, or deviations. An Unresolved item disclosed during the inspection is discussed in paragraph 8.

12. Exit Interview

Meetings were held with senior facility management periodically during the course of the inspection to discuss the inspection scope and findings. The inspector met with the licensee representatives (denoted in paragraph 1) at the conclusion of the inspection on July 23, 1982, and summarized the purpose and scope of the inspection and the findings. The licensee representatives acknowledged the findings.