

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

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License Nos: DPR-58; DPR-74

Report Nos: 50- 315/99005(DRS); 50-316/99005(DRS)

Licensee: American Electric Power Company

Facility: Donald C. Cook Nuclear Generating Plant

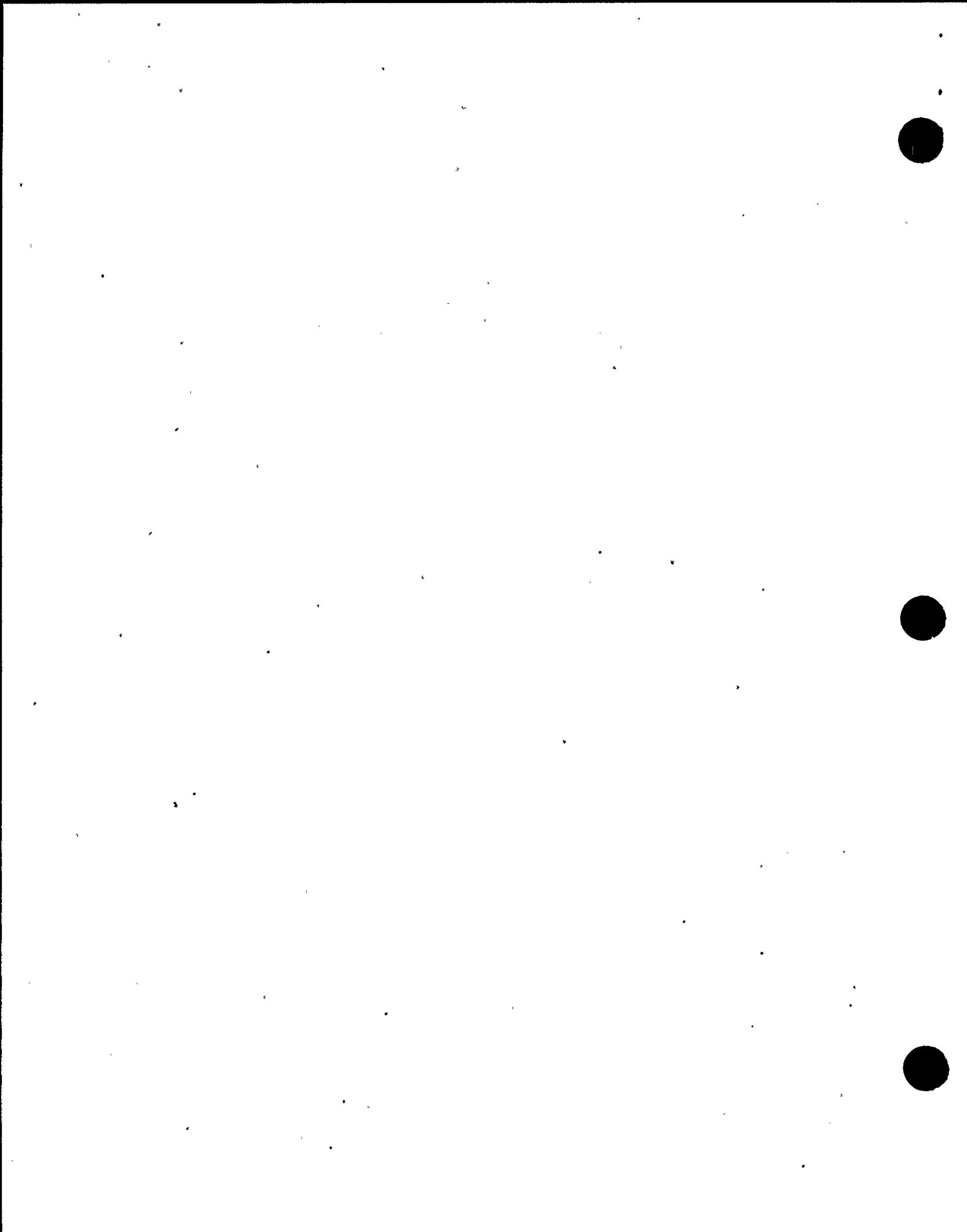
Location: 1 Cook Place
Bridgman, MI 49106

Dates: March 15 -19, 1999

Inspectors: W. Slawinski, Senior Radiation Specialist
A. Kock, Radiation Specialist

Approved by: Gary L. Shear, Chief, Plant Support Branch
Division of Reactor Safety

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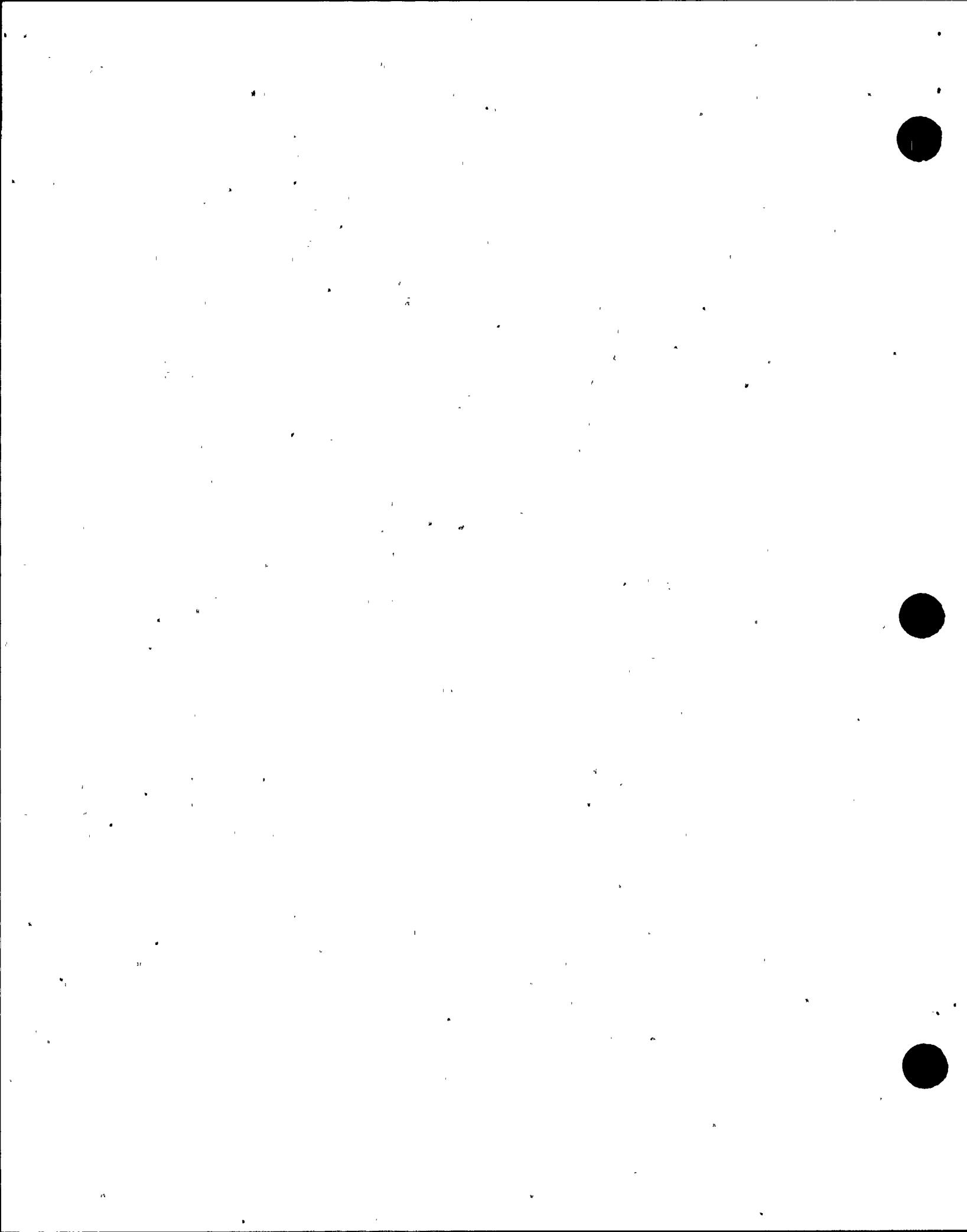
EXECUTIVE SUMMARY

D.C. Cook, Units 1 and 2
NRC Inspection Reports 50-315/99005; 50-316/99005

This routine, announced inspection assessed the effectiveness of the licensee's solid radioactive waste (radwaste) management and radioactive material transportation programs, and included a review of the quality assurance program for NRC approved packages and the audit and self-assessment program. Within these areas, the following conclusions were made:

Plant Support

- Direct licensee oversight of vendor resin dewatering activities and extensive supervisory involvement in radwaste processing ensured effective implementation of the radwaste management program. Wet solid wastes were processed in accordance with the Process Control Program (PCP) and implementing procedures, and dewatered waste streams were properly sampled and verified to ensure that regulatory limits for free standing liquid were met (Section R1.1).
- Deficiencies were identified with the level of detail in the licensee's PCP concerning 10 CFR 61.56 waste characteristics, and both the PCP and the Final Safety Analysis Report (FSAR) were not fully consistent with current onsite waste processing activities (Section R1.1).
- The radwaste packaging and transportation program was effectively implemented. Shipments of radwaste were appropriately classified, vehicle and package surveys were performed as required, and manifests were completed in accordance with regulatory requirements (Section R1.2).
- The program for classifying waste streams and scaling difficult to measure radio-nuclides was implemented in accordance with station procedures and industry guidance. However, the procedure for the scaling factor program was not sufficiently developed to ensure consistent and appropriate implementation of the program (Section R1.2).
- The training provided to licensee staff involved in the preparation and shipment of radioactive materials satisfied Department of Transportation requirements and imparted an adequate level of knowledge to ensure effective program implementation (Section R5.1).
- The audit and self-assessment programs for the packaging and transportation of radioactive material for the 10 CFR 71 Quality Assurance program and for the processing of radwaste were effectively implemented. Audits and assessments were generally properly focused and were of sufficient scope and depth to assess program performance. Identified deficiencies were placed into the licensee's corrective action process for resolution (Section R7.1).



DETAILS

IV. Plant Support

R.1 Radiological Protection and Chemistry (RP&C) Controls

R1.1 Radioactive Waste (Radwaste) Processing

a. Inspection Scope (IP 86750)

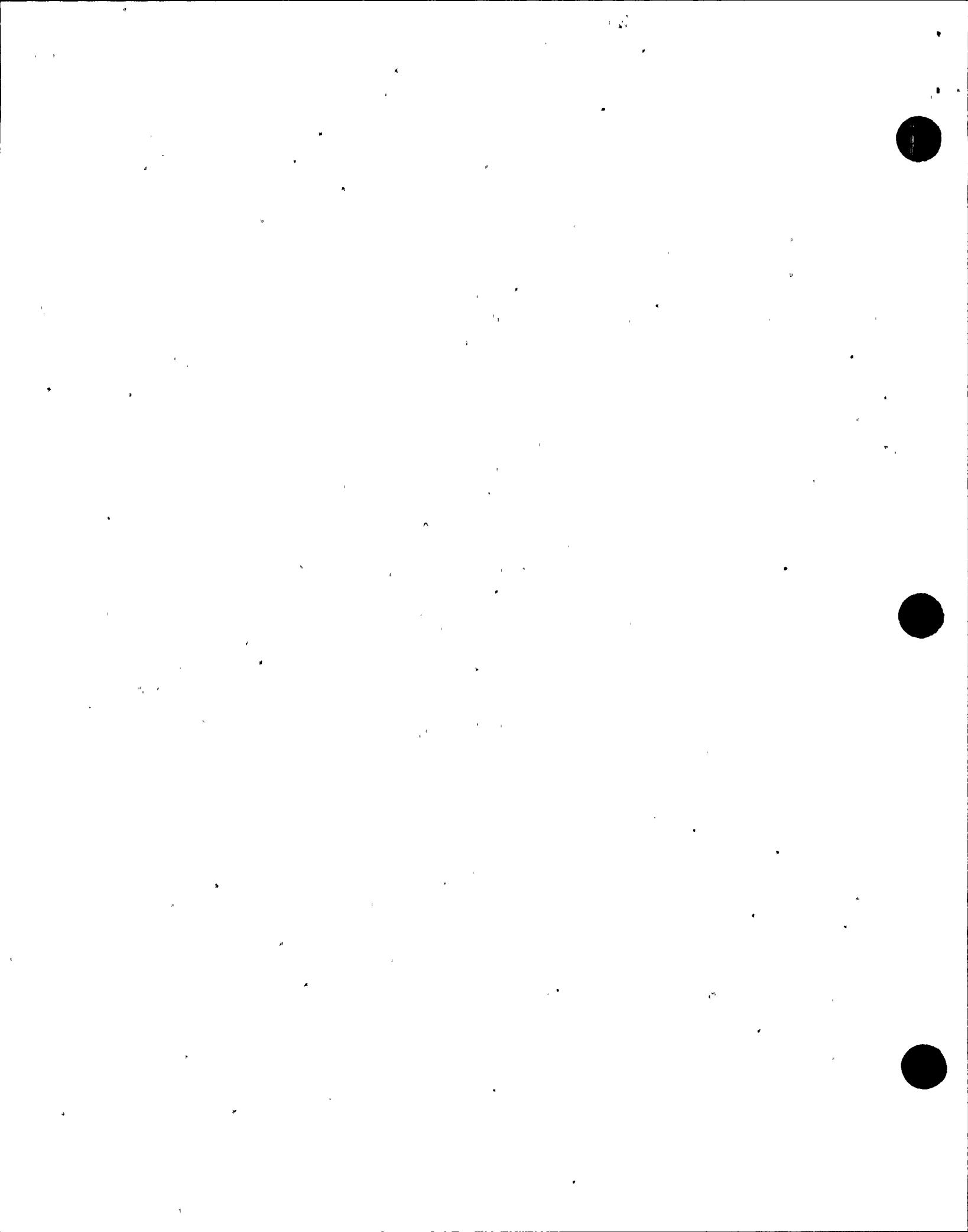
The inspectors reviewed the licensee's solid radwaste management program including the Process Control Program (PCP) and associated implementing procedures for the processing of radwaste, and the licensee's oversight of processing activities.

b. Observations and Findings

The licensee's solid radwaste streams consisted of spent resins from primary systems, secondary resins from radwaste processing systems, filter cartridges and filter media and various types of contaminated dry wastes (Dry Active Waste (DAW)).

Spent resins from primary systems were transferred to the spent resin storage tank by the licensee and subsequently sluiced into High Integrity Containers (HICs) and dewatered onsite by a vendor. Dewatered resins were subsequently shipped to a licensed waste disposal site or transferred to a vendor for further processing prior to disposal at the burial site. Filter cartridges and media were typically stored onsite and air dried and/or dewatered, and subsequently shipped for disposal to a licensed burial site. Dry active wastes and potentially contaminated solid wastes generated in radiologically protected areas were placed in designated receptacles throughout the plant, collected and sorted by the licensee, and transferred to a vendor for compaction and consolidation prior to disposal at a burial site. 10 CFR 61 waste stability requirements for dewatered waste products were met by placing the processed waste in a disposal container (e.g., HIC) that provided stability for land burial. A waste evaporator system previously used to concentrate dissolved or suspended solids in liquid radwaste streams has not been used for several years and was no longer maintained. Similarly, waste solidification processes ceased several years ago, although vendor solidification remained as an option for achieving waste stability.

The licensee developed a PCP to establish the parameters and provide assurance that the processing of radwaste resulted in a waste form that meets the requirements of both 10 CFR 61 and the low level waste disposal site licenses. The inspector reviewed the latest revisions to the licensee's PCP and the Final Safety Analysis Report (FSAR), and identified deficiencies with the PCP and inconsistency between both the PCP and FSAR compared to current radwaste processing activities. Specifically, both the PCP and FSAR referred to use of a waste evaporator system to process liquid wastes, and specify that solidification processes were used to achieve waste stability for certain waste forms. Additionally, the PCP described the solidification process and specified that written procedures are maintained to address solidification testing. However, because



solidification processes ceased several years ago, solidification procedures were no longer maintained. Also, while the PCP adequately addressed the free standing liquid requirements of 10 CFR 61.56, other waste characteristic requirements such as those for chemical and biological hazards were not addressed in the PCP. Although the licensee implemented programs to limit and control the use of chemicals at the station and the licensee periodically monitored liquid radwaste streams to evaluate chemical and environmental hazards, the licensee agreed that the PCP should address all the waste characteristic requirements of 10 CFR 61.56 to ensure consistency with the NRC's Branch Technical Position on Waste Form. The licensee planned to address the deficiencies with the PCP and evaluate the inconsistencies between the FSAR and PCP and revise these documents as warranted.

Vendor waste processing activities were governed by station procedures and implemented under the supervision of the licensee's radwaste staff. The inspectors reviewed the licensee's procedures for resin transfer, resin dewatering and for testing of the processed product, and concluded that the procedures were clear and included acceptance criteria that were consistent with 10 CFR 61.56 requirements for free standing liquid in the final waste form. The licensee's radwaste handling group provided oversight of contractor resin sluicing and dewatering activities and effectively monitored vendor activities by direct observation, supervisory review of waste processing records, and independent verification that dewatered products met free standing liquid requirements. The radwaste group packaged and/or completed final preparations for all shipments. Group supervisors ensured that packaging and shipment activities were completed in accordance with regulatory requirements and station procedures. Inspector discussions with those licensee staff involved in waste processing and inspector review of dewatering data revealed that the staff was knowledgeable of vendor activities and that waste was processed in accordance with station procedures. Dewatering calculations for several waste shipments were reviewed by the inspectors and confirmed that the waste met the 10 CFR 61 free standing liquid requirements. The inspectors concluded that the licensee exercised good oversight of contractor onsite dewatering activities and that radwaste group supervisors were extensively involved in each radwaste shipment.

c. Conclusions

Direct licensee oversight of vendor onsite resin dewatering activities and extensive supervisory involvement in radwaste processing ensured effective program implementation. Wet solid wastes were processed in accordance with the PCP and implementing procedures. Dewatered waste streams were sampled and verified to ensure that regulatory limits for free standing liquid were met. The licensee's PCP, however, was not sufficiently detailed to address all pertinent 10 CFR 61.56 waste characteristic requirements, and both the PCP and FSAR were not fully consistent with waste processing activities.

R1.2 Radwaste Packaging and Transportation

a. Inspection Scope (IP 86750)

The inspectors reviewed the licensee's radwaste packaging and transportation program for compliance with NRC, Department of Transportation (DOT) and waste burial site requirements, and evaluated the licensee's waste stream scaling factor (classification) program. The review included interviews of plant staff and review of station procedures, scaling data, and records of past shipments.

b. Observations and Findings

The inspectors verified that the licensee maintained current copies of NRC and DOT regulations, burial site and waste processor licenses, and that staff involved in radioactive material shipments were knowledgeable of their content. The radwaste handling group coordinated shipping activities and was responsible for the radioactive material and radwaste transportation program. A radioactive material senior specialist and the radwaste handling supervisor provided oversight of the radioactive material transportation program and ensured, by direct involvement, that the program was implemented in accordance with regulatory requirements and station procedures.

The inspectors reviewed station procedures governing radioactive material/radwaste packaging and shipping, completion of shipment manifests and for radwaste classification, and discussed their implementation with plant staff. The procedures reviewed by the inspectors were technically accurate and generally consistent with DOT and NRC requirements; however, some minor problems were identified with the procedure for the preparation of radioactive shipments, involving package marking and shipment manifest information. These deficiencies did not result in mislabeled or improperly completed manifests. The procedural issues were discussed with radiation protection (RP) management, who indicated that the procedure would be revised to correct the deficiencies.

The licensee used a vendor's computer program (i.e., D. W. James and Associates) to classify waste pursuant to 10 CFR 61.55, to determine reportable quantity (RQ) values, and to generate shipping manifests. The inspectors verified that the computer program methodology for determining waste classification was consistent with 10 CFR 61 requirements.

The licensee implemented a scaling factor program for waste stream sampling and analysis for Difficult To Measure (DTM) radionuclides in accordance with the NRC Branch Technical Positions on Waste Classification and Waste Form. Information generated in the analyses was used to classify waste, as required by 10 CFR 61. Representative waste streams for DAW, filter cartridges, primary resins and radwaste stream resins were sampled by the licensee throughout a given year, and scaling factors were determined annually and compared to the previous year's data. Analyses of DTM radionuclides were contracted to a vendor laboratory, and scaling factors were prepared by the licensee using the D. W James and Associates 10 CFR 61 Sample Analysis

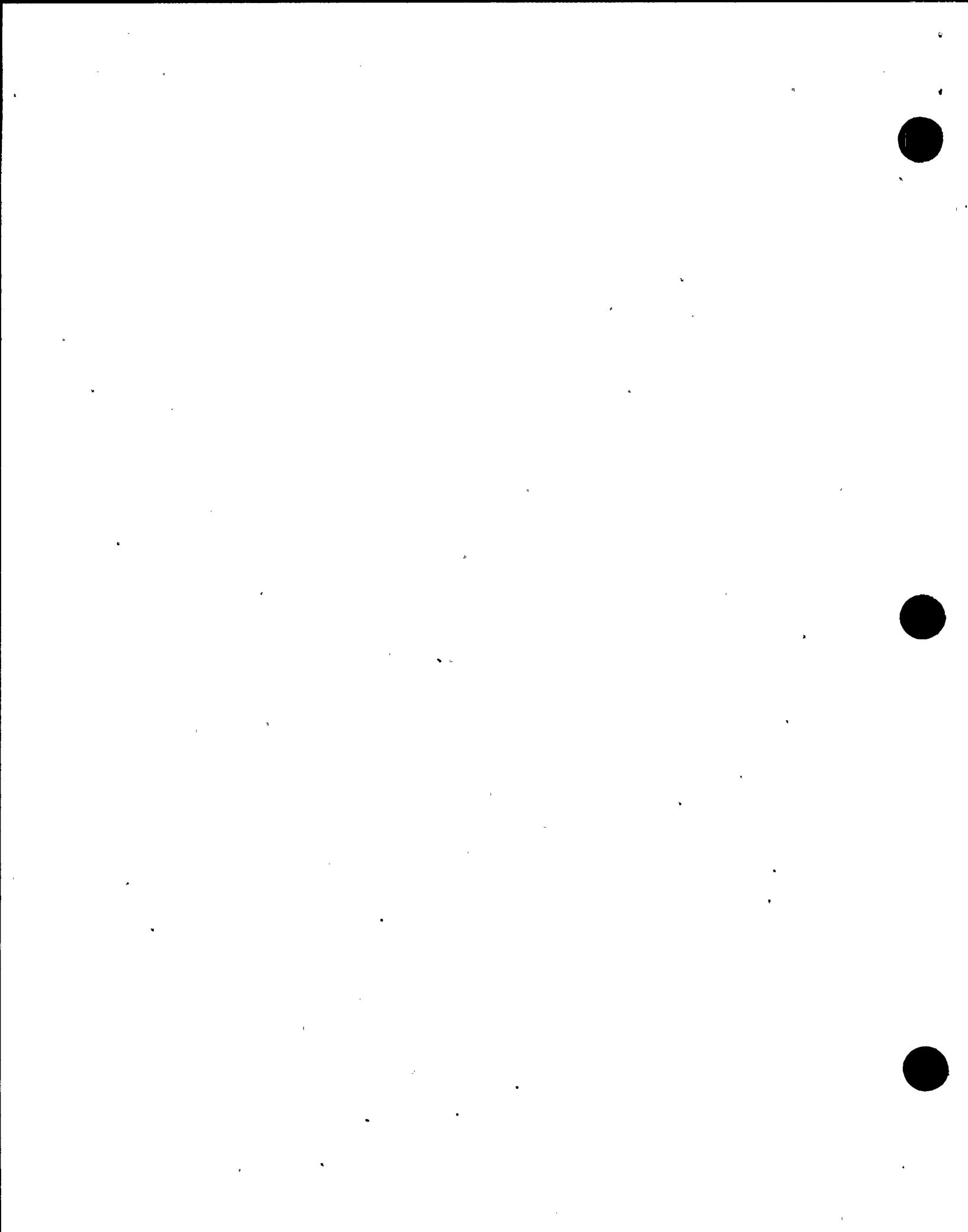
Program. Individual radioisotopes present in a waste stream were scaled to cobalt-60 gamma emitters, except for iodine-129 and transuranic isotopes, which were scaled to cesium-137 and plutonium-239, respectively. Electric Power Research Institute recommended generic scaling factors were used for iodine-129 and technetium-99, because the licensee lacked sufficient plant specific waste stream data for these isotopes. Also, a single set of transuranic scaling factors was applied to all waste streams because the licensee's data showed uniformity across the various waste streams generated at the station. The inspectors confirmed through record review and discussions with plant staff that waste stream analyses were completed at required intervals, and that the scaling factor program was implemented consistent with industry guidelines and the station procedure. However, the inspectors identified deficiencies with the scaling factor procedure in that it was not sufficiently developed to ensure consistent program implementation. Specifically, the procedure did not address the following important aspects of the scaling factor program:

- The circumstances for scaling DTM radionuclides to cobalt-60 versus scaling to other licensee measurable nuclides (depending on fuel integrity indicators and other operational data);
- The frequency and methodology for trending and reporting of reactor water chemistry data that could affect waste stream classification;
- The thresholds for reevaluating scaling factors based on operational data and scaling factor variations from year to year; and
- The preparation of waste stream samples to ensure they adequately represent the processed waste stream for moisture content and other characteristics.

The RP management acknowledged the inspectors' findings and planned to expand the existing procedure or develop a new procedure to address the deficiencies.

Fifty-four shipments of radwaste generated by the licensee were made to licensed burial sites in 1998. Of these 54 shipments, 15 were made from vendor facilities after additional processing. In 1997, 25 radwaste shipments were made directly to burial sites by the licensee, and 63 shipments were made to waste processors and subsequently to the burial site. The inspectors independently verified that three selected radwaste burial site shipments made in 1998 were correctly classified, that scaling factors were properly applied, that package labeling and marking was satisfactory, and that the results of package and transport vehicle surveys satisfied DOT requirements. The inspectors also verified that shipment manifests were completed consistent with the regulations and included emergency response information, and that the shipments were tracked as required by 10 CFR 20.

The licensee periodically used NRC approved (10 CFR 71) Type "A" casks for shipment of low specific activity material to licensed burial sites, as authorized by 10 CFR 71.52. The inspectors verified that valid Certificates Of Compliance (COCs) were maintained by the licensee for those casks used in 1998 to date, and that the licensee was registered



with the NRC as a user of the package under the general license provisions of 10 CFR 71.12. The inspectors reviewed COCs for two recently used casks and determined that the type, form, and quantity of the material shipped in the casks by the licensee was in compliance with the certificate. The licensee recognized that the COCs for those packages approved for use pursuant to 10 CFR 71.52 would expire on April 1, 1999, and could not be renewed. Consequently, the licensee planned additional shipments in these packages before the deadline.

In 1999, the licensee planed to ship four steam generator lower assemblies, removed from Unit 2 in 1988, to the Barnwell low-level waste site for disposal. To accommodate this project, the licensee sought exemptions from the DOT for surface contaminated object packaging requirements and for transport conveyance radioactivity limits. The latter exemption request was subsequently withdrawn by the licensee after additional steam generator sampling and analysis showed that the conveyance limit would not be exceeded. The steam generators will be shipped as unpackaged, surface contaminated objects pending DOT approval. The inspectors discussed the project with the licensee's staff, and reviewed the DOT exemption request and supporting waste characterization information. The actions completed by the licensee were consistent with NRC Generic Letter 96-07, "Interim Guidance on Transportation of Steam Generators." Waste characterization work was comprehensive and technically sound. The licensee was on track for shipment of the steam generators in June 1999, after the DOT exemption was approved and final preparations were completed.

c. Conclusions

The radwaste packaging and transportation program was effectively implemented. Radwaste shipments were appropriately classified, vehicle and package surveys were performed as required, and manifests were completed in accordance with regulatory requirements. The program for classifying waste streams and scaling difficult to measure radionuclides was implemented in accordance with industry guidance and station procedures. However, the station procedure for the scaling factor program was not sufficiently developed to ensure consistent and appropriate implementation of the program.

R2 Status of RP&C Facilities and Equipment

The inspectors evaluated radiological area postings, package labeling, and the material condition of the solid radwaste processing areas in the auxiliary building and in the satellite radioactive material storage areas including the steam generator mausoleum, where the steam generators were being prepared for shipment. The drumming rooms and the radwaste demineralizer system room in the auxiliary building were properly posted and controlled, and material condition was acceptable. Satellite storage areas outside the protected area were posted and controlled in accordance with station procedures and regulatory requirements; however, some container labeling inconsistencies were identified by the licensee during an ongoing audit and were being addressed during the inspection. An inventory program was maintained for stored

radioactive material and waste and regularly updated to reflect inventory changes; however, the licensee's ongoing audit identified deficiencies in its implementation, which were also being addressed during the inspection.

Over the last several years, the licensee significantly reduced the back log of stored waste that accrued while State of Michigan licensees were banned from the Barnwell disposal site. Only a few HICs containing dewatered resins remained in the Radioactive Material storage Building (RMB) and were awaiting shipment to the Barnwell site. The inspectors walked down the RMB and determined that the material condition of the facility was excellent.

Inspection Reports 50-315/97011(DRS); 50-316/97011(DRS) reported that several of the demineralizer cubicle rooms were not entered in several years and the condition of the equipment was unknown. To address this concern, the licensee monitored the cubicles remotely and did not identify any material condition issues.

R5 Staff Training and Qualification in RP&C

R5.1 Training of Staff Involved in Transportation of Radioactive Material

a. Inspection Scope (IP 86750)

The inspectors reviewed the training provided to station staff involved in radioactive material transportation activities (i.e., hazardous material (hazmat) employees). The inspectors discussed the training program with station staff; reviewed training certificates, lesson plans, and test results; and evaluated selected hazmat employee qualification criteria.

b. Observations and Findings

The licensee designated two "shipping qualified personnel" in its radwaste handling group who were approved to authorize the shipment of radwaste and radioactive material from the site. These individuals verified that packages were properly marked and labeled, that waste destined for burial site disposal was properly characterized, and that all NRC and DOT requirements were met before certifying the shipment and authorizing its release. A staff of seven technicians in the radwaste handling group was responsible for all aspects of radioactive material and radwaste processing and packaging other than dewatering activities. The technicians conducted all packaging, loading, and radiological support work incident to the shipment program.

The inspectors reviewed the training provided to selected individuals involved in both the shipping and receipt of radioactive material packages, including training for the technicians and supervisors in the radwaste handling group, the environmental affairs staff involved in the packaging and processing of mixed waste, and for storeroom workers that receive radioactive material shipments. Lesson plans and test results were reviewed for the environmental affairs staff and storeroom personnel, qualification criteria for technicians were evaluated, and course completion certificates for the shipping

qualified personnel were reviewed. The inspectors' review disclosed that the training provided to these hazmat employees satisfied 49 CFR 172.704 requirements, and that recurrent training was provided at least every three years. Interviews of shipping qualified personnel revealed that they were very knowledgeable of pertinent transportation regulations.

c. Conclusions

The training provided to staff involved in packaging, preparation, and shipment of radioactive materials and radwaste satisfied DOT regulations and imparted an adequate level of knowledge to ensure effective program implementation.

R7 **Quality Assurance in RP&C Activities**

R7.1 Audits and Appraisals

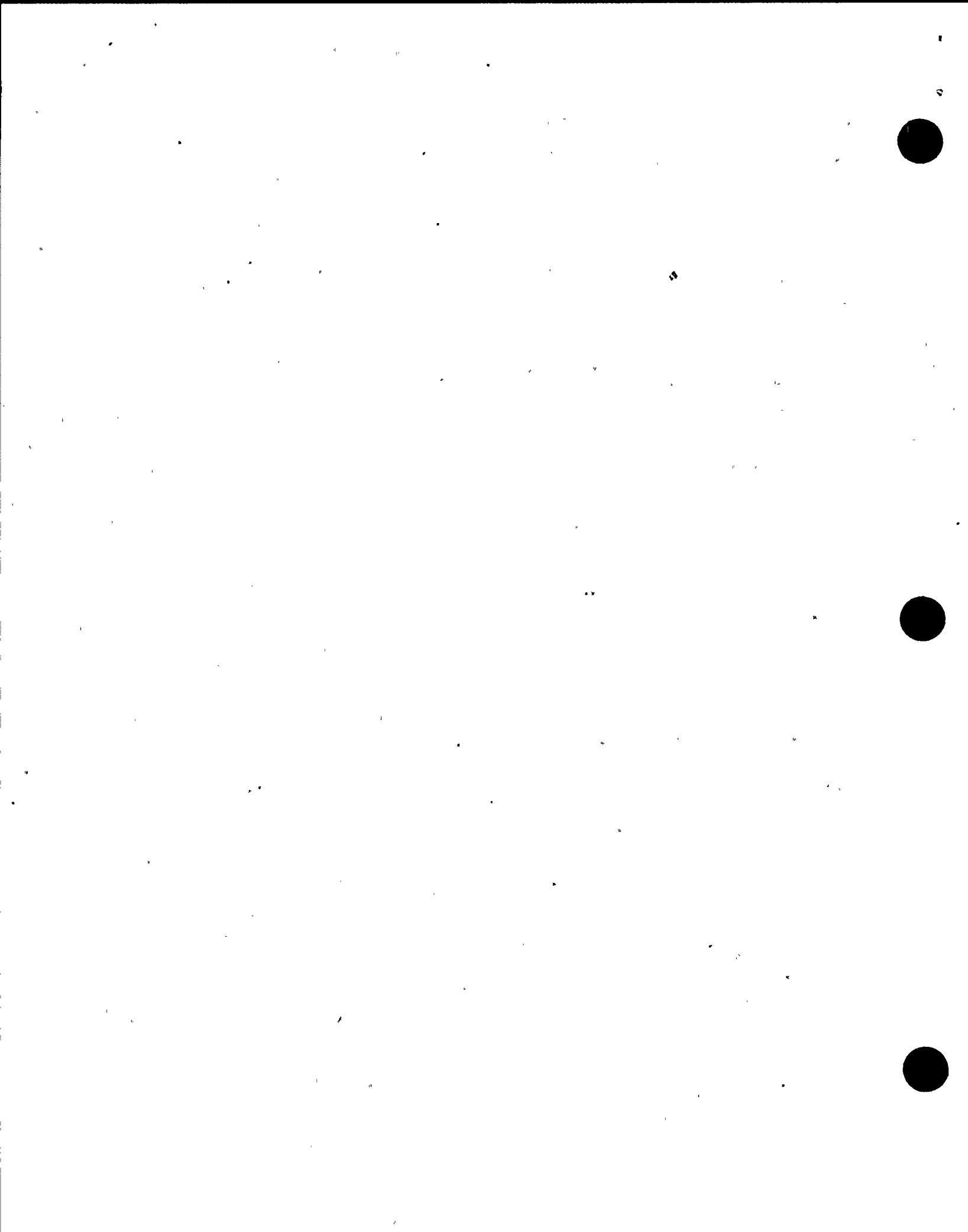
a. Inspection Scope (IP 86750)

The inspectors reviewed the licensee's quality assurance (QA) program required by Subpart H of 10 CFR 71 for NRC approved packages and evaluated the audit and self-assessment program relative to processing, packaging, and transportation of radioactive material.

b. Observations and Findings

The licensee extended and applied its previously approved 10 CFR 50, Appendix B, QA program to packaging and transportation activities involving NRC approved packages, as authorized by 10 CFR 71.101. The 10 CFR 71 QA program was incorporated into the licensee's corporate QA program. The inspectors reviewed the licensee's QA program and concluded that it satisfied each of the applicable criteria of 10 CFR 71.103 through 71.137, as required.

The licensee regularly audited aspects of its QA program on a rolling schedule, so that all QA program elements were evaluated at intervals not to exceed 24 months. Additionally, performance audits of the radioactive material shipping and radwaste processing programs were completed every 24 months, as required by technical specifications, which also included elements of the QA program. The inspectors reviewed the results of a performance audit of the processing and transportation programs completed in April 1997, the preliminary results of a similar audit being completed in March 1999, and a self assessment of the radioactive material shipment program conducted in May 1998. The inspectors concluded that the audit and assessment activities were of sufficient scope and depth to assess overall performance of the radioactive material transportation and radwaste processing programs, and the effectiveness of the QA program as required by 10 CFR 71.137. The licensee acknowledged, however, that the audit of the QA program could be enhanced if compliance with the requirements contained in the COC for annual cask preventive maintenance (PM) completed by the cask manufacturer was verified as part of the audit.



The performance assurance staff planned to consider expanding future audits to address this issue.

No regulatory compliance issues or significant weaknesses were identified by the licensee's audits, although the adequacy of the characterization for a recent shipment of contaminated equipment sent to another utility was questioned during the most recent audit. The March 1999 audit also identified inventory deficiencies and labeling inconsistencies for containers maintained in the satellite radioactive material storage areas. The latter audit also identified that condition reports (CRs) were not always generated for issues to ensure proper followup. The inspectors verified that CRs were issued to document the recent audit findings and to track their resolution, and that radwaste staff thoroughly investigated identified issues.

c. Conclusions

The audit and surveillance program for the packaging and transportation of radioactive material, the 10 CFR 71 QA program, and the processing of radwaste was effectively implemented. Audits and surveillances were generally properly focused, were of sufficient scope and depth to assess program performance. Identified deficiencies were placed into the licensee's corrective action process for resolution.

V. Management Meetings

XI Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management and other station staff at the conclusion of the inspection on March 19, 1999. On March 24, 1999, one of the inspectors contacted Michael Skow, a supervisor in the licensee's Performance Assurance Department, and further discussed the inspection findings relative to audits of the Quality Assurance program. The licensee acknowledged the findings presented and did not identify any of the information reviewed as proprietary.

PARTIAL LIST OF PERSONS CONTACTED

J. C. Benedict, Performance Assurance
D. Bronicki, Radiation Protection Supervisor
J. Carlson, Environmental Affairs
D. Cooper, Plant Manager
R. Fein, Senior Technician, Radiation Protection
D. Foster, Performance Assurance
P. Holland, General Supervisor, Radiological Support
P. Hoppe, General Supervisor, Radiological Control
D. C. Kosloff, Licensing
J. Long, Radwaste Handling Supervisor
W. MacRae, Nuclear Materials
D. Noble, Chemistry/Radiation Protection Manager
B. O'Rourke, Licensing
M. Schaefer, Senior Radioactive Material Specialist
M. E. Skow, Supervisor, Internal Performance, Performance Assurance

INSPECTION PROCEDURES USED

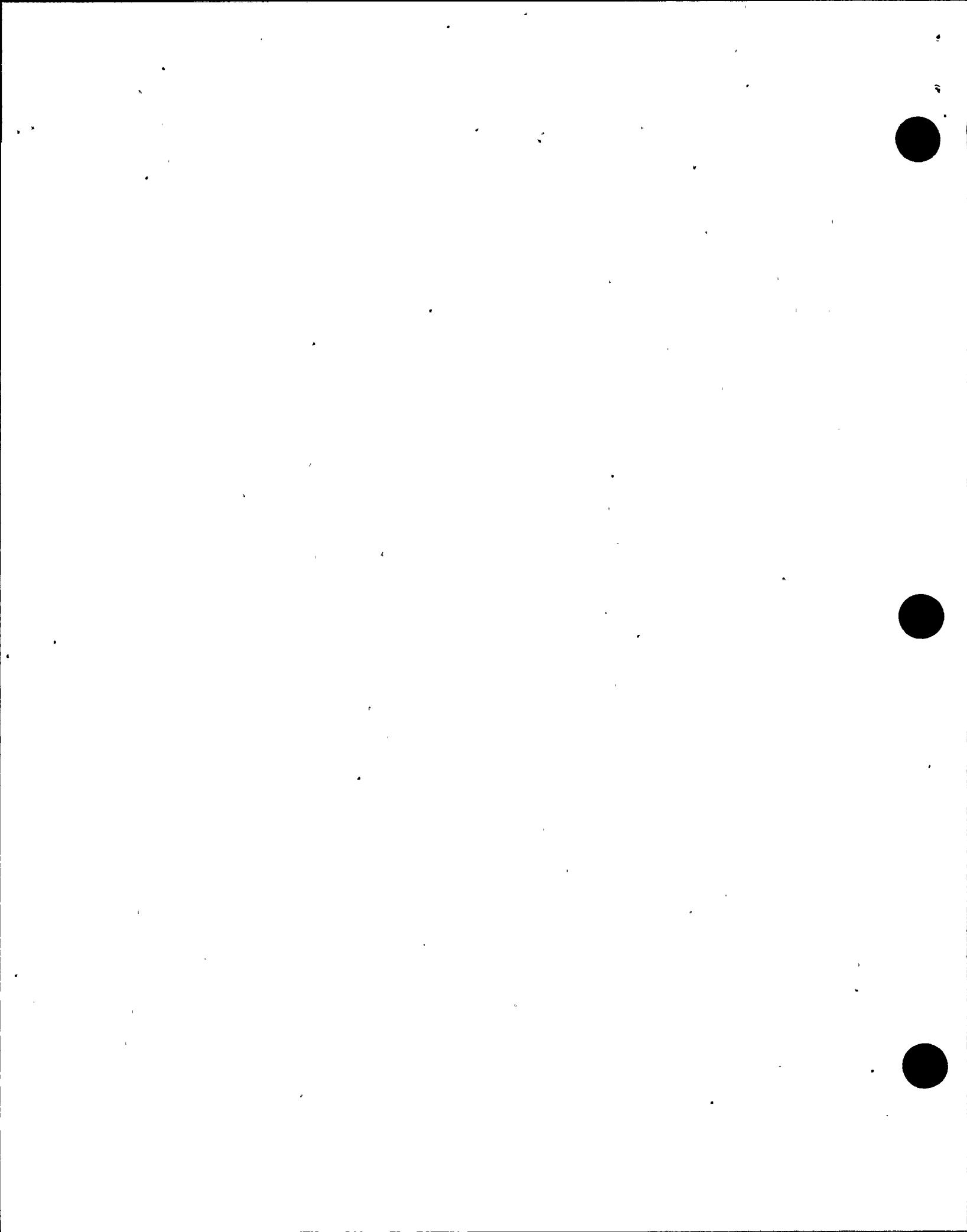
IP 83750	Occupational Radiation Exposure
IP 86750	Solid Radioactive Waste Management and Transportation of Radioactive Materials

ITEMS OPENED AND CLOSED

None

LIST OF ACRONYMS USED

CFR	Code of Federal Regulations
COC	Certificate of Compliance
DAW	Dry Active Waste
DOT	Department of Transportation
DTM	Difficult to Measure
FSAR	Final Safety Analysis Report
Hazmat	Hazardous Material
HIC	High Integrity Container
PA	Performance Assurance
PCP	Process Control Program
QA	Quality Assurance
Radwaste	Radioactive Waste
RMB	Radioactive Material Storage Building
RP	Radiation Protection



PARTIAL LIST OF DOCUMENTS REVIEWED

Station Procedures

- 12 THP 6010 RPP.908, (Rev 3), Surveillance, Inventory and Inspection of Stored Radioactive Material
- 12 THP 6010 RPP.903, (Rev 1), Activity Determination and Waste Classification
- 12 THP 6010 RPP.900, (Rev 6), Preparation of Radioactive Shipments
- 12 THP 6010 RPP.901, (Rev 3), Resin Transfer to Qualified Shipping Container
- 12 THP 6010 RPP.902, (Rev 2), Dewatering of High Integrity Containers
- PMP 6010 PCP.900, (Rev 3), Radioactive Waste Process Control Program

Audits, Surveillances and Related

PA Audit PA-97-05/NSDRC #241, April 1997

Audit Plan #21, PA-99-10/NSDRC #268

Surveillance #RPS-98-008

Surveillance #99-027

Other

COCs #9159, Rev 8; #222, Rev 6; and #9176, Rev 14

Waste Manifests #RMC-98-04, 1/7/98; #RMC-98-119, 10/20/98; #RMC-98-095, 9/3/98; and #RMC-98-024, 2/18/98

QA Program For The Cook Nuclear Plant, July 1995

Qualification Standards RP-0-PR00, (Rev 0), Radioactive Material Packaging and Shipping Activities

Lesson Plan HM-C-ST05, (Rev 0), DOT Hazmat Retraining

Scaling Factor Determination Report, 1997

