

U.S. NUCLEAR REGULATORY COMMISSION

Region III

Report No. 50-461/88005(DRSS)

Docket No. 50-461

License No. NPF-62

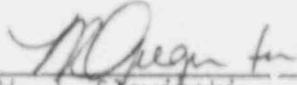
Licensee: Illinois Power Company
500 South 27th Street
Decatur, Illinois

Facility Name: Clinton Power Station, Unit 1

Inspection at: Clinton Site, Clinton, Illinois

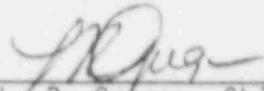
Inspection Conducted: February 24-26, 1988

Inspector:


W. J. Stawinski

3-31-88
Date

Approved By:


L. R. Greger, Chief
Facilities Radiation
Protection Section

3-31-88
Date

Inspection Summary

Inspection on February 24-26, 1988 (Report No. 50-461/88005(DRSS))

Areas Inspected: Routine, unannounced inspection of the solid radwaste program, including: organization and management controls (IP 83722), qualifications and training (IP 83723), solid radwaste (IP 84722), and transportation activities (IP 86721). Also reviewed were an apparent resin intrusion into the liquid radwaste stream, a licensee investigation of a former employee's concerns (IP 99024), and previous inspection findings (IP92701).

Results: The licensee's solid radwaste and transportation programs appear to satisfy NRC, DOT, and burial site requirements for processing, packaging, and disposal of solid radwaste. Waste appears to be solidified in accordance with the licensee's approved Process Control Program to meet applicable federal and state regulations. No violations or deviations were identified.

DETAILS

1. Persons Contacted

- **J. Barrett, Decontamination Supervisor
- **J. Brownell, Project Specialist - Licensing
 - *R. Campbell, Manager, Quality Assurance
 - R. Chalifoux, Assistant Supervisor, Solid Radwaste
- *R. Delong, Supervisor, Radiological Project Engineering
- *R. Freeman, Manager, NSED
- *M. Hallon, Technical Assessment Advisor
- **D. Hillyer, Director, Radiation Protection
- *P. Lancaster, Director, Human Resources
- *A. MacDonald, Director, Nuclear Program Assessment
 - P. McCampbell, Radiological Project Engineer
 - J. McLean, Supervisor, Stone and Webster
- *J. Miller, Manager, Scheduling and Outage Management
- *J. Perry, Manager, Nuclear Program Coordinator
- *F. Spangenberg, III, Manger, Licensing and Safety
- *D. Sykes, Supervisor, Radwaste
- *J. Weaver, Director, Licensing
- *J. Wilson, Plant Manager
- *R. Wyatt, Manager, Nuclear Training
- *P. Hiland, NRC Senior Resident Inspector
- S. Ray, NRC Resident Inspector

The inspector also contacted other licensee and contract employees including members of the quality assurance staff, plant utilitymen, and contract laborers.

- * Denotes those present at the exit meeting on February 26, 1988.
- ** Denotes those contacted by telephone from March 1-4, 1988.

2. General

This inspection was conducted primarily to review the solid radwaste programs, including organization and management controls, training and qualifications, solid radwaste, and transportation activities. Also reviewed were open items, circumstances surrounding the identification of resin in the station's Excess Water Tanks, and the licensee's investigation of a former employee's concerns. The inspection consisted of record and procedure reviews and discussions with licensee and contractor personnel.

3. Licensee Action on Previous Inspection Findings (IP 92701)

(Closed) Open Item (461/85050-03): Review ATI's test results, corrective actions, and the licensee's action taken in response to findings identified in QA audits conducted after the ATI system is processing radioactive

waste. Two QA audits were conducted in 1987 to determine the effectiveness of implementing the ATI waste solidification unit and its ability to perform waste solidification in accordance with the Process Control Program. A June 1987 audit (Q36-87-24) identified findings for procedural infractions, failure to implement procedures, lack of acceptance criteria for flush water to minimize internal contamination of equipment, failure to calibrate monitors, and unavailability of records. Adequate corrective actions have been implemented for all identified findings and their effectiveness verified by the licensee. A July 1987 audit (Q36-87-28) identified findings concerning procedure implementation, failure to fully implement the measuring and test equipment program, and computer software problems. Corrective actions have been adequately implemented, and overall administrative controls for the ATI solidification program have been strengthened. This item is considered closed. The ATI solidifications system is described in Section 6.

NUREG-0737, Item III.D.3.3: Review compliance with NUREG-0737, Item III.D.3.3 concerning capabilities for inplant (iodine) radiation monitoring. According to Section 12.5.2 of the Safety Evaluation Report (NUREG-0853), the station maintains low- and high-volume air sampling equipment with both charcoal and silver zeolite filters available for radioiodine sampling. If entrapped noble gases interfere with the radioiodine analysis, clean air or nitrogen flushing can be performed in a laboratory fume hood. Low background counting facilities for postaccident analysis are available in the chemistry group counting room in the control building and radiation protection group counting room in the service building. GeLi and NaI multichannel analyzer systems are available in both facilities. The use of sampling equipment and analysis systems for the determination of radioiodine during an accident situation has been incorporated into the station's Rad-Chem Department Training and Qualification Program.

This matter will be tracked as an open item pending review and verification of the postaccident sampling and analysis provisions described in the SER (Open Item 461/88005-01).

4. Organization and Management Controls (IP 83722)

The inspector reviewed the licensee's organization and management controls for the radwaste program including: changes in the organizational structure and staffing, effectiveness of procedures and other management techniques used to implement the program, and experience concerning self-identification and correction of program implementation weaknesses.

The Radwaste Organization is responsible for overall supervision of personnel assigned to the station for liquid radwaste processing, station water management, low level waste handling, and decontamination. A Radwaste Supervisor is responsible for radwaste operations and reports to the Assistant Manager for Plant Operations. Radwaste operations are divided into four groups: utility, solid waste, liquid waste, and

decontamination; each is lead by a supervisor reporting to the Radwaste Supervisor. The Utility Supervisor is responsible for utilitymen and plant helpers who perform general housekeeping and other assigned duties currently including dry active waste (DAW) collection, processing, and packaging. The Decontamination Supervisor is responsible for the DAW, laundry, and decontamination programs; he directs activities of contract laborers and codirects utilitymen and plant helpers in carrying out his responsibilities.

CPS Procedure No. 1960.01, Revision 2, dated April 12, 1986, outlines the radwaste organization, responsibilities, and qualifications, and requires that the educational and experience requirements prescribed in ANSI/ANS 3.1-1978 be met by personnel assigned to the Radwaste Department. This procedure is more generally worded than either the FSAR or technical specifications, which designate members of the Radwaste Organization who must meet ANSI/ANS 3.1-1978 qualification criteria. Qualifications of radwaste staff members remain essentially as previously described (Inspection Report No. 461/86050), meeting the ANSI criteria. According to the licensee, it was not their intent to incorporate a procedural requirement which was more restrictive than technical specification requirements and FSAR commitments. In addition, the radwaste organizational structure described in Procedure 1960.01 does not correspond to the current station structure and the responsibilities of plant helpers, and contract laborers are not defined in the procedure. The licensee is aware of these procedural inconsistencies and plans to revise the procedure to be compatible with the FSAR and technical specifications and to reflect the current radwaste program. This matter was discussed at the exit meeting and will be reviewed during a future inspection (Open Item 461/88005-02).

There are currently twelve plant helpers and four utilitymen assigned to the station. Beginning February 8, 1988, these workers assumed DAW collection, processing, and sorting duties from contract laborers. The contract laborer force, recently reduced from about seventy to twenty workers, is primarily assigned laundry and decontamination duties.

No violations or deviations were identified; however, procedural inconsistencies were noted.

5. Training and Qualifications (IP 83723, 84722)

The inspector reviewed the training and qualification program for radwaste utilitymen delineated in Procedure 1962.05, Revision 1. The radwaste training program is also applicable to plant helpers and contract personnel performing duties covered by this procedure. Individuals accepted into the program must complete General Employee Training, Respiratory Protection and Confined Space Training, and Radworker Training before proceeding with the radwaste training and qualification program. The radwaste training and qualification program consists of on-the-job training (OJT), limited classroom instruction, and practical factor demonstrations documented on qualification (checkoff) cards.

Completion of the radwaste training and qualification program is documented per procedure CPS 1962.05C001. OJT is obtained through direct hands-on experience under the cognizance of a qualified worker or supervisor. The duration of OJT is not specified and is commensurate with the development of the trainee's knowledge and practical abilities. Qualifications consist of completion of qualification checklists (procedure 1962.05C001) through satisfactory completion of evaluation measures for the particular task. Evaluation measures include OJT, limited classroom training, and practical factor demonstrations by actual demonstration or walkthrough evaluated by authorized personnel. Currently, only the decontamination supervisor and one NTD trainer are authorized to evaluate trainee practical factors. Separate evaluation measures exist for DAW collection, DAW processing/compaction/packaging, and radwaste shipping and packaging regulations. An employee may independently operate equipment and perform assigned duties after successful completion of that portion of the applicable qualification checklist.

The inspector reviewed selected evaluation measures and discussed the program with licensee and contractor personnel. The training program appears sufficient to meet the procedural requirements and provides trainees the necessary knowledge and practical abilities to adequately perform the activities assigned. Plant helpers, utilitymen and contract laborers, are currently in various stages of qualification. There appears to be a sufficient number of individuals qualified to perform various solid radwaste activities to implement the routine radwaste program. The licensee plans to eventually qualify plant helpers and utilitymen in all applicable tasks and contractor laborers in selected tasks.

DAW compaction and packaging activities commenced in late January 1987, initially utilizing utilitymen assigned to the radwaste group and later performed by contract laborers. Procedure 1913.01, "Packaging Radioactive Material," governed the activities. During this period, a small explosion in a drum occurred during compaction caused by a bottle of isopropyl alcohol within the drum. Subsequently, the licensee decided to open all trash bags and physically sort for items not allowed at the burial site. A temporary sorting facility was established, and all drums compacted prior to April 13, 1987, were opened, sorted, and recompactd. In July 1987, the licensee identified that certain procedure required QC witness points (container suitability inspections) were missed because of confusion regarding full implementation of Procedure 1913.01 and the status of a revised or replacement procedure. Apparently, radwaste supervision was informed that procedure 1913.01 was being totally revised or replaced by a new procedure, and that full implementation was not required. Radwaste assumed that the revision would be issued on a timely basis and thus had not adequately reviewed the existing procedure for full compliance. A new procedure (7013.20) was subsequently issued to better delineate and detail the packaging process. Through June 1987, nearly 100 containers had been used to package solid radwaste but had not been inspected by QC during the

packaging process. A Condition Report was issued describing the procedural violations and apparent lack of supervisory involvement in the packaging process; shipment hold tags were placed on the drums involved. Additionally, in October 1987, the licensee discovered that the qualifications for many workers packaging DAW (both contract workers and station utilitymen) were questionable; NTD training documents showed only one of nine workers as having completed the approved OJT and evaluation measures. Ensuing licensee investigation disclosed several programmatic problems in the implementation of the radwaste training and qualification program and supporting documentation. The problems stemmed from confusion regarding revisions to (DAW processing) training lesson plans, lesson plan approval, and whether workers trained under an initial unapproved (Revision 0) lesson plan met the approved (Revision 1) lesson plan qualification requirements.

As a result of the programmatic problems described above, the licensee suspended their initial shipment of DAW and resorted/repacked the contents of all DAW drums (approximately 114) which had been processed through October 1987. The repacking activities were performed in November and December 1987, by personnel satisfying the training and qualification requirements of Procedure 1962.05. This was verified by the inspector through comparison of completed "package forms" (i.e., certification forms); no problems were noted. Typically, the original drums were reused for the repackaged waste unless deemed physically unsuitable pursuant to Procedure 7013.20. New drum numbers were assigned in all cases. Drum content traceability was maintained by appropriate "package form" notations; material removed from a drum and packaged into different drum(s) was so noted on the package forms.

Adequate corrective actions were taken to improve documentation of training and qualifications for applicable contract and plant workers, approved lesson plans have been established and are being implemented, and a new procedure (7013.20) has been implemented to better delineate the packaging program and correspond with training and qualification requirements. Also, radwaste supervision currently reviews all completed "package forms" to verify packaging has been performed by qualified personnel.

No inspector identified violations or deviations were identified.

6. Solid Radwaste (IP 84722)

The inspector reviewed selected aspects of the licensee's solid radioactive waste management program, including overall performance of the Process Control Program (PCF); adequacy of required records and reports; and experience concerning identification and correction of programmatic weaknesses. Tours of DAW sorting, packaging, and storage areas and the Associated Technology Incorporated (ATI) radwaste solidification area were made.

DAW is collected, sorted for noncompactibles and other material not accepted at burial sites, compacted, packaged in 55-gallon steel drums, and shipped to a licensed burial site. HEPA filters are currently held pending procedural revision to allow use of LSA boxes. No program for sorting clean from contaminated waste exists at this time; however, the licensee plans to develop such a program in the near future. DAW compaction is performed using a conventional compactor. The licensee plans to install anti-spring back disks in the compactor to increase compaction capability by about 40% and is considering a supercompactor for future use.

Spent resins, filter sludges, and evaporator bottoms are solidified using a vendor (ATI) solidification system. The ATI system is a portable volume reduction bitumen solidification system which uses an evaporator to remove free water from radioactive wastes and mixes the remaining solids with a bitumen binder. Solidification occurs upon cooling of the binder.

On December 30, 1987, the first shipment of solidified waste, approximately sixty drums, was staged for shipment. As a final quality check of the ATI solidification process, radiation protection management directed that a 10% sample of drums be punctured. Five drums were dry, but one leaked about a quarter cup of water, and the shipment was withheld. Even though this volume of free liquid is within NRC and burial site limits, it was unexpected and, therefore, cause for licensee concern. Subsequent licensee and ATI investigation revealed that the water resulted from condensation caused by steam escaping from the bottom of an evaporator column where solidified waste falls into the drum. The escaping steam should have been drawn into a condenser located at the top of the column, but the condenser was found to be fouled with bituminous residue. No water or vapor is expected in a solidified drum because the process operates at about 400°F; however, to promote cooling of the bitumen binder, the process chamber housing the drums being filled is maintained at 40-50°F, and during high temperature and humidity summer months, condensation is likely. Drums were often stationed in the fill area for several hours before being filled and susceptible to condensation from humid ambient air. ATI was aware that condensation from piping within the enclosure could drip into the drums and consequently insulated most of these pipes.

To correct the problems described above, ATI has restored the upper condenser to full cooling capacity and instituted a preventive maintenance program for it, installed a thermostat and hygrometer in the drum filling area, placed additional pipe insulation in the process area above the fill chamber, installed drip trays for the fill chamber area to direct condensation into the unit's sump, and is implementing a procedural change to specify a minimum delay for placing a drum in the fill chamber and beginning its fill.

ATI subsequently determined that the maximum quantity of water which could exist in material solidified in accordance with the PCP is withi

10 CFR 61 and burial site requirements. 10 CFR 61.56 requires that liquid shall not exceed 1% of the volume of the waste when the waste is in a disposal container designed to ensure stability or 0.5% of the volume of waste for waste processed to a stable form. ATI's determination assumed that the source of liquid was limited to condensation introduced into a drum prior to filling or between each fill pass and used conservative ambient air and humidity values for their calculations. Fouling of the upper condenser would invalidate these calculations; however, corrective actions to prevent condenser plugging appear sufficient. The licensee reviewed the ATI calculations and performed independent calculations using different processing parameters. Both the ATI and licensee calculations indicated a maximum water content of about 25% of the maximum allowable (0.5% by volume) limit. Based on the ATI corrective actions and the foregoing evaluation and ALARA considerations, the licensee decided not to expand future drum testing for free standing water beyond that required to meet technical specification 4.11.3. These issues were discussed with the licensee during the inspection and at the exit meeting. Corrective actions and future plans appear to be acceptable; solidified waste appears to be processed pursuant to the PCP.

No violations or deviations were identified.

7. Transportation of Radioactive Materials (IP 86721)

The inspector reviewed the licensee's radioactive materials transportation program, including: determination whether shipments are in compliance with NRC and DOT regulations; adequacy of required records, reports, shipment documentation, and notifications; and experience concerning identification and correction of programmatic weaknesses.

The inspector reviewed records for the three solid radwaste shipments made in 1987 and to date in 1988. The information on the shipping papers appears to satisfy NRC, DOT, and burial site requirements. Two solid radwaste shipments were made in December 1987, and consisted of compacted/non-compacted waste totaling about 136 millicuries in 1800 cubic feet. One shipment of solidified resins and sludge mixed in bitumen was made in February 1988, totaling 670 millicuries in about 450 cubic feet. The shipments were made to the Richland, Washington burial site; no problems were noted.

No violations or deviations were identified.

8. Resin Intrusion Into Liquid Radwaste System (IP 84723)

Problem Identification

On January 26, 1988, in preparation for liquid radwaste discharges from the licensee's two Excess Water Tanks (EWTs), chemistry samples collected to satisfy NPDES permit requirements for oil and grease detected a small

quantity of resin in one of the tanks (EWT-B). Although sample procedures did not require examination for resin, the chemistry technician visually noted what appeared to be resin beads in the sample. Two earlier samples of the tank collected on January 20, 1988, did not identify the presence of resin. The tank's contents were not released and were recycled back to the Unit-2 waste surge tank.

Initial chemistry samples of tank "EWT-A" did not identify resin; however, a subsequent specially strained (using 100-mesh strainers) sample noted "very little resin." Reportedly, indications were not distinctively resin materials, but could have been extremely small resin fines dispersible in water. Tank "A" was discharged on February 1, 1988, after another sample just prior to release did not identify any resin material. The next day, all further liquid discharges were suspended pending further investigation.

Licensee Investigation

In an effort to localize and clean up the resins, EWT-B was recycled to the Unit 2 waste surge tank for refiltration and reprocessing. Additional sampling revealed some resin bead material in the chemical evaporator monitor tank which was attributed by the licensee to a high water level excursion and resultant carryover in the chemical waste evaporator feeding this tank. The evaporator monitor tank was one of the sources of water for the EWT-B. According to the licensee, a radwaste operator overadjusted the evaporator feedrate causing the high level excursion in the chemical waste evaporator leading to solid material carryover into downstream systems. Resin fines were also identified in three waste sample tanks, reportedly resulting from a degraded resin retention element in the "A" waste demineralizer.

Recovery/Corrective Actions

Failed retention elements in the "A" waste demineralizer apparently led to resin release to downstream waste sample tanks and, via regeneration activities, into the chemical waste evaporator system. A maintenance work request was written to repair the failed element and to examine the resin trap downstream of the "A" waste demineralizer for possible degradation. The licensee has developed a temporary modification to the outlet of the discharge tanks to screen all liquid effluent commensurate with the upstream system design (approximately 40-mesh). Additionally, a corrective action and investigation action plan was developed and its implementation initiated which includes enhanced chemical sampling and screening, environmental sampling of the discharge pathway, an evaluation to establish acceptable resin release criteria, and review of evaporator operating procedures.

This problem, resultant licensee evaluations and investigations, and corrective actions will be reviewed further during a future inspection (Open Item No. 461/88005-03). These matters were discussed with the

licensee during the inspection and in a telephone conversation on March 2, 1988.

9. Licensee Internal Review of Former Employee Concerns

In a letter to the Clinton Plant Manager, received October 19, 1987, a former contract radiation protection technician expressed concerns regarding certain aspects of the radiation protection program, personnel hiring practices, and the individual's termination. Radiation protection program concerns stated were: (1) lack of supervisory experience within the radiation protection department; and (2) radiation work permits do not reflect the actual radiological conditions in the work area.

The licensee retained the services of a private investigator to investigate these concerns. The investigation report and associated transcripts were reviewed by the inspector during this inspection. The licensee investigation appeared to be thorough and well documented.

The first radiation protection program concern referred to management communication problems and inconsistency of supervisory personnel. Supervisory experience and qualifications were not challenged. Similar management concerns have previously been brought to the NRC's attention and have been reviewed by NRC (Allegations No. RIII-86-A-0194 and No. RIII-86-A-0164, described in Inspection Report No. 461/86068). The second radiation protection program concern referred to lack of accurate radiological survey information on RWPs. A similar concern was previously brought to the NRC's attention and was reviewed by NRC (Allegation No. RIII-86-A-200 is described in Inspection Report No. 461/87009).

The licensee's investigation determined that RWPs correctly specify the radiological working conditions and appropriate radiological control measures are established. The investigation further indicated a lack of factual basis to support the individual's supervisory concerns. There appears to be no evidence to dispute the licensee's investigative conclusions regarding these two issues. A previous NRC review of similar RWP program concerns also concluded that RWPs adequately specify measures to protect workers from radiation and contamination. The licensee responded to the individual's concerns in a letter dated December 17, 1987. Other issues described in the investigative transcript were not reviewed during this inspection.

10. Exit Meeting

The inspector met with licensee representatives (denoted in Section 1) at the conclusion of the inspection on February 26, 1988. The inspector discussed the scope and findings of the inspection. The inspector also discussed the likely informational content of the inspection report with regard to documents or processes reviewed by the inspector during the inspection. The licensee did not identify any such documents/processes as proprietary. In response to certain matters discussed by the inspector, the licensee:

- Acknowledged the need to revise CPS Procedure No. 1960.01 to be compatible with the FSAR, technical specifications, and the current radwaste organization. (Section 4)
- Acknowledged the inspector's statement that their internal review (investigation) of concerns expressed by a former member of the radiation protection department is subject to further NRC review. (Section 9)