U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Report Nos. 50-456/88025(DRSS); 50-457/88025(DRSS)

Dockets No. 50-456; 50-457 Licenses No. NPF-72; NPF-77

Licensee: Commonwealth Edison Company
Post Office Box 767
Chicago, IL 60690

Facility Name: Braidwood Station, Units 1 and 2

Inspection At: Braidwood Site, Braidwood, Illinois

Inspection Conducted: August 29 through September 8, 1988

Inspector: W. B. Grant for 9-23-88
Date

Approved By: L. Robert Greger, Chief 9-23-88
Facilities Radiation Protection Section Date

Inspection Summary

Inspection during the period August 29 through September 8, 1988 (Reports No. 50-456/88025(DRSS); 50-457/88025(DRSS))
Areas Inspected: Routine unannounced inspection of the operational radiation protection program and the gaseous liquid and solid radwaste programs, including: organization and management controls (IP 83722, 83750); audits and appraisals (IP 83722, 83750); training and qualification (IP 83723, 83750); external exposure control (IP 83724, 83750); internal exposure assessment (IP 83725, 83750); control of radioactive materials and contamination (IP 83726, 83750); ALARA activities (IP 83728, 83750); startup survey data (IP 83521); solid wastes (IP 84722, 84750); liquids and liquid wastes (IP 84723, 84750); gaseous waste system (IP 84724, 84750); transportation (IP 86721, 83750); and licensee actions on previous inspection findings (IP 92701).
Results: The licensee's radiation protection and radwaste programs continue to be effective in protecting the health and safety of occupational workers and the public. No violations or deviations were identified.

DETAILS

1. Persons Contacted

*R. Aker, Radiation/Chemistry Supervisor
*K. Aleshire, Health Physicist
*D. Ambler, Health Physicist
K. Appel, Engineering Assistant, ALARA
*P. Barnes, Regulatory Assurance Supervisor
*L. Bush, Regulatory Assurance
*E. Carroll, Regulatory Assurance
*L. Davis, Assistant Superintendent, Technical Services
J. Jasnosz, AR/PR Coordinator
*G. Nelson, Assistant Technical Staff Supervisor
*D. O'Brien, Services Superintendent
*J. Petro, Radwaste Planner
D. Poi, Health Physicist
*H. Pontious, Operations Staff
*R. Richard, Technical Staff, HVAC Group Leader
D. Shamlin, Lead Rad/Chem Foreman
R. Thacker, Health Physicist

*T. Tongue, NRC, Senior Resident Inspector
*T. Taylor, NRC Resident Inspector

The inspector also interviewed other plant personnel during the course of the inspection.

*Denotes those present at the exit meeting on September 8, 1988.

2. General

This inspection was conducted to examine the operational radiation protection program, the radwaste management program, Unit 1 and 2 startup survey data, and licensee action on previous inspection findings. Several tours were made of the licensee's controlled area; posting, labelling, access and contamination controls, and housekeeping appeared good.

3. Licensee Action on Previous Inspection Findings

(Closed) Open Item (456/8804-01; 457/88005-01): Develop a policy for controlling leakage to minimize contamination spread. The licensee has established a policy whereby equipment requiring repair for leaks is logged after daily operator rounds. BWAP 350-5, Revision 52, Equipment Daily Logs has been revised to implement the program. Licensee Generic Letter 88-05 Reactor Coolant Leaks in Contact with Carbon Steel Components also requires timely cleanup of leaks to reduce corrosion. This item is considered closed.

(Closed) Open Item (452/88004-02; 457/88005-02): Spurious spiking on control room ventilation monitors and containment fuel handling area radiation monitors. The licensee's investigation identified arcing of the Barksdale pressure switches as the apparent cause. Installation of a capacitor circuit "electro cubes" which was designed to suppress the electronic spiking has been completed and appears to have solved the problem. Spurious electronic spiking caused by arcing pressure switches has not occurred since the electro cubes were installed. This item is considered closed.

(Closed) Open Item (456/88004-03): Evaluate and resolve the matter of two radiation base point (RBP) levels in excess of test acceptance criteria. The two radiation base points, RBP 1C6-7 at the spent fuel pool in containment and RBP 1A2-2A at the RHR pump room cubicle entrance, were found to exceed test acceptance criteria during the 50% power test. The Project Engineering Department (PED) concluded that both areas would be controlled as High Radiation Areas (HRA); 50.59 reviews were performed. This item is considered closed. (See Section 11).

4. Organization and Management Controls (IP 83722, 83750)

The inspector reviewed the licensee's organization and management controls for the radiation protection and radwaste programs including changes in the organization's structure and staffing, effectiveness of procedures, and other management techniques used to implement these programs, experience concerning self-identification and correction of program implementation weaknesses, and effectiveness of audits of these programs. Audits are discussed in Section 5.

Since the last radiation protection inspection in January 1988, several organization changes have been made, including:

- Two experienced Health Physicists (HP) transferred to the staff, one from within the CECo organization and one from another nuclear utility.
- Three experienced HPs and an ALARA radiological engineer transferred or terminated.
- Three RCTs were promoted to Engineering Assistant and two RCTs were promoted to Foreman.
- Fourteen additional RCTs have been hired and are in training.
- The licensee is interviewing to fill one HP position.

The inspector reviewed Radiation Occurrence Reports (RORs) which were written in 1988. There have been 12 RORs written to date in 1988. RORs were reviewed for significance, corrective actions, and timeliness of corrective action; no problems were noted. The licensee appears to provide sufficient management attention to followup and investigation of RORs.

No violations or deviations were identified.

5. Audits (IP 83722, 83750)

The inspectors reviewed station Quality Assurance (QA) audits and surveillance of the radiation protection and radwaste programs conducted since the last radiation protection inspection. Extent of the audits and surveillances, qualifications of auditors, and adequacy of corrective actions were reviewed.

Two onsite quality assurance audits, one of the Radiation Protection Program and one of the Radioactive Waste Program were conducted during this period. Corrective action on findings appeared to be timely and adequate. The extent of the audits and the qualifications of the auditors appeared adequate.

Onsite quality assurance surveillance reports for radiation protection, access control, solid radwaste shipments, RORs, TLD program, mask issue, whole body counts, and Radiation Work permits were selectively reviewed. These surveillances included observation of compliance with DOT shipping regulations regarding solid radwaste shipments and radiological protection activities during mini outages for maintenance and surveillances. No significant problems were identified by the auditors who performed the surveillances.

No violations or deviations were identified.

6. Training and Qualifications (IP 83723, 83750)

The inspector reviewed the training and qualifications aspects of the licensee's radiation protection, radwaste, and transportation programs, including: changes in responsibilities, policies, goals, programs, and methods; qualifications of newly hired or promoted radiation protection personnel; and provision of appropriate radiation protection, radwaste, and transportation training for station personnel. Also reviewed were management techniques used to implement these programs and experience concerning self-identification and correction of program implementation weaknesses.

The inspector discussed training, especially radiation protection training, with several stationmen. According to the stationmen, the three weeks of training in all aspects of their job, including radiation protection, is adequate. The stationmen interviewed felt confident that they could perform their jobs efficiently and safely after the training they received. No problems were noted.

No violations or deviations were identified.

7. External Exposure Control and Personal Dosimetry (IP 83724, 83750)

The inspector reviewed the licensee's external exposure control and personal dosimetry programs, including: changes in facilities, equipment, personnel, and procedures; adequacy of the dosimetry program to meet routine and emergency needs; planning and preparation for maintenance

and refueling tasks including ALARA considerations; required records, reports, and notifications; effectiveness of management techniques used to implement these programs; and experience concerning self-identification and correction of program implementation weaknesses.

The licensee currently uses a NVLAP accredited in-house TLD system for whole body beta-gamma monitoring for all CECo and non-CECo personnel. Vendor-supplied neutron whole body badges and finger-ring extremity monitors are used as needed by both CECo and non-CECo personnel.

Self-reading pencil dosimeters are used for secondary whole body dosimetry. The range of most of the dosimeters issued is 0-200 mR, but dosimeters with higher ranges are available. Electronic dosimeters are issued for entry into high radiation areas. A selected review of the records of calibration of the electronic dosimeters and of the acceptance tests and performance verification of the self-reading dosimeters was made; no problems were noted.

Approximately 1980 TLDs were issued for the two-week badge period beginning September 4, 1988. Exposure records of plant, contractor, CECo, and non-CECo personnel were reviewed for CY 1988 to date. No exposure greater than 10 CFR 20.101 or licensee administrative limits were noted. Licensee administrative limits are 50 mem/day for type-one RWPs and 100 mrem/day for type-two RWPs. Approval for doses in excess of 100 mrem per day or 300 mrem per week require the signature of the Rad/Chem Supervisor.

No violations or deviations were noted.

8. Internal Exposure Control and Assessment (IP 83725, 83750)

The inspector reviewed the licensee's internal exposure control and assessment programs, including: changes in facilities, equipment, personnel, respiratory protection training, and procedures affecting internal exposure control and dose assessment; determination whether engineering controls, respiratory equipment, and assessment of individual intakes meet regulatory requirements; planning and preparation for maintenance and refueling tasks including ALARA considerations; required records, reports, and notifications; effectiveness of management techniques used to implement these programs; and experience concerning self-identification and correction of program implementation weaknesses.

The licensee's Procedure BWRP 1340-2A1 schedules most radiation workers to be whole body counted (WBC) three times per year. All Braidwood workers are scheduled to be WBC at least once per year. The inspector reviewed WBC records for 1988 through July. All WBC were less than the 40 MPC-Hour control measure. To date, bonafide trace-levels of internal radionuclides have been seen only in WBCs of visiting radiation workers from other nuclear power plants.

The inspector reviewed the records of routine and special air sampling. The licensee's measurement and evaluation of concentrations of airborne radioactivity and use of respiratory protective equipment meet the requirements of 10 CFR 20.103.

No violations or deviations were identified.

9. Control of Radioactive Materials and Contamination (IP 83726, 83750)

The inspector reviewed the licensee's program for control of radioactive materials and contamination, including: adequacy of supply, maintenance, and calibration of contamination survey and monitoring equipment; effectiveness of survey methods, practices, equipment and procedures; adequacy of review and dissemination of survey data; and effectiveness of methods of control of radioactive and contaminated materials.

Personnel contamination reports (PCRs) were reviewed for 1988 to date. There have been 168 PCRs written through August 24; however, a significant number were from radon/noble gas daughter contamination. No problems were noted.

The active RWPs were selectively reviewed. The RWPs contained current survey information. Appraisals and ALARA reviews were included where required. Administrative exposure limits were noted to be consistently used.

10. Monitoring Occupational Exposures ALARA (IP 83728, 83750)

The inspector reviewed the licensee's program for maintaining occupational exposures ALARA, including: changes in ALARA policy and procedures; worker awareness and involvement in the ALARA program; and establishment of goals and objectives and effectiveness in meeting them. Also reviewed were management techniques used to implement the program and experience concerning self-identification and correction of program implementation weaknesses.

Two EAs, who are former Braidwood RCTs, have been added to the ALARA staff to replace two contractors and a CECo Engineering Assistant (EA) who terminated. The two EAs will be responsible for the RWP program and the Radiation Evaluation Program (REP). The REP program consists of an expansive data-base of historical exposure information and allows further accumulation and tabulation of such data to enhance job planning and dose tracking programs. The REP program will be utilized extensively to provide person-rem/person-hour information on past and present work conducted by various work groups. The program is also used extensively for primary and secondary dosimetry comparisons to identify trends, anomalies, and potential problem groups and individuals.

The current ALARA staff, which includes an ALARA coordinator, an ALARA maintenance planner, and the two EAs (RWPs and REP), appear to have the qualification, experience, and dedication necessary to implement an effective ALARA program.

The collective dose for CY 1988 to date is 67 person-rem. The ALARA goal for CY 1988 is 200 person-rem.

No violations or deviations were identified.

11. Startup Tests (IP 83521)

The inspector reviewed the results of the following startup surveys for Units 1 and 2 conducted during 1988.

° Unit 1 BWSU-PS-33 Radiation Surveys during Power Ascension conducted at 96% power on June 29-30, 1988.

Test results were reviewed. Seven radiation base point (RBP) levels exceeded test acceptance criteria. The Project Engineering Department (PED) evaluated and resolved the test procedure deviations. The resolution was that the areas will be radiologically controlled as radiation areas (RA) or high radiation areas (HRA). A 50.59 review was performed.

° Unit 2 BWSU-PS-73 Radiation Survey during Power Ascension conducted at 3.5% power on May 20-26, 1988.

Test results showed all acceptance criteria were satisfied.

° Unit 2 BWSU-PS-73 Radiation Survey during Power Ascension conducted at 48.5% power on June 28-29, 1988.

Test results showed RBP in containment which exceeded acceptance criteria radiation levels. The containment is radiologically controlled as a HRA.

No violations or deviations were identified.

12. Solid Radioactive Waste (IP 84722, 84750)

The inspector reviewed the licensee's solid radioactive waste management program, including: determination whether changes to equipment and procedures were in accordance with 10 CFR 50.59; adequacy of implementing procedures to properly classify and characterize waste, prepare manifests, and mark packages; overall performance of process control and quality assurance programs; adequacy of required records, reports, and notifications; and experience concerning identification and correction of programmatic weaknesses.

The licensee has a functioning program including implementing procedures to meet the requirements of 10 CFR 20.311, 10 CFR 61.55, and 61.56.

Braidwood Administrative Procedure BWAP 371-3 requires that 10 CFR 61 samples for waste stream characterization be sent for offsite analyses each quarter for six quarters after the initial analysis (seven quarters total). For the initial Unit 1 analyses only four waste streams were in existence: radwaste resin (WX RSN), primary filters (PRIFLTR), radwaste filters (WX FLTR) and dry active waste (DAW). Scaling factors were determined by the licensee's vendor using the initial analyses. Subsequent second and third quarter samples of all eight waste streams have been submitted to the vendor for analysis, however, sample results/ scaling factors have not yet been received. The licensee is using generic scaling factors for the four waste streams for which sample results are pending.

No shipments of solid radioactive wastes were made in 1987. Eight shipments of dewatered resins/filters totaling 2.4 Ci have been made in 1988 to date. There have been no shipments of DAW to date, however, the first shipment is truck loaded and awaiting paperwork completion. A waste sorting table has been ordered and will be utilized to separate clean trash from DAW to minimize DAW to be compacted. An onsite vendor performs dewatering of resins/filters waste in vendor supplied metal liners. Licensee QA/QC personnel verify dewatering meets NRC and burial site requirements.

The Radwaste Volume Reduction System (VRS) is currently undergoing preop testing. The VRS will be tested in conjunction with the radwaste evaporators for a trial period of one year after which the licensee will determine its future use.

Classification and shipping of solid radwaste appear to have been performed in accordance with regulatory requirements and licensee procedures.

No violations or deviations were identified.

13. Liquids and Liquid Radioactive Wastes (IP 84723, 84750)

The inspector reviewed the licensee's reactor liquids and liquid radwaste management programs, including: determination whether changes to equipment and procedures were in accordance with 10 CFR 50.59; determination whether reactor liquids meet chemical and radiochemical requirements; determination whether liquid radioactive waste effluents were in accordance with regulatory requirements; adequacy of required records, reports, and notifications; determination whether process and effluent monitors are maintained, calibrated, and operated as required; and experience concerning identification and correction of programmatic weaknesses.

The inspector reviewed selected records and procedures associated with controlled liquid releases and the semiannual effluent reports for the last half of 1987 and the first half of 1988. With one exception, when

two composite samples were not taken, the pathways sampled and analyses performed appear to comply with the requirements of Technical Specification Table 4.11-1. (See Section 21 concerning the missed samples.)

Total liquid radioactive effluent (excluding tritium) for 1987 were approximately 50 millicuries, 70%-80% cobalt-58. Liquid radioactive effluent for the first half of 1988 was approximately 11 curies (excluding tritium), 90% cobalt-58. The increase was attributed to maintenance on Unit 1 and startup of Unit 2. No problems were identified during the review of selected records. The records indicate that releases were maintained within applicable limits.

No violations or deviations were identified.

14. Primary Coolant Chemistry (IP 84723, 84750)

The licensee's reactor coolant chemistry results for 1988 to date were selectively reviewed to determine compliance with Technical Specification analysis requirements and surveillance frequencies. The inspector reviewed primary coolant system data for chloride, fluoride, boron, lithium, dissolved oxygen, pH, conductivity and dose equivalent I-131. The inspector also reviewed secondary system data for gross activity determination. The selective review and discussion with the licensee personnel indicated that all parameters for the primary system reviewed remained less than applicable Technical Specification limits.

The licensee has seen no fuel defects in Unit 1 to date. The reactor coolant activity indicates only tramp uranium contamination.

15. Gaseous Radioactive Waste (IP 84724, 84750)

The licensee's gaseous radwaste management program was reviewed, including: determination whether changes to equipment and procedures were in accordance with 10 CFR 50.59; determination whether gaseous radioactive waste effluents were in accordance with regulatory requirements; adequacy of required records, reports, and notifications; determination whether process and effluent monitors are maintained, calibrated, and operated as required; and experience concerning identification and correction of programmatic weaknesses.

The inspector reviewed selected records of radwaste gaseous effluent sampling and analysis, and the semiannual effluent reports for 1987 and the first half of 1988. The pathways sampled and analyses performed appeared to comply with the requirements of Technical Specification Table 4.11-2. Unit 1 achieved criticality May 29, 1987, and is operating at about 100% power. Unit 2 achieved criticality on March 8, 1988, and reached 100% power in late August 1988.

The gaseous radioactive effluent for 1987 and 1988 totaled:

1987	Third Quarter	- 22 millicuries
	Fourth Quarter	- 259 millicuries

1988 First Quarter - 5.78 curies
Second Quarter - 278 millicuries

Noble gas releases are quantified by radiation protection personnel based on analyses of samples collected prior to batch releases from waste gas decay tanks and containment venting. Qualification of continuous (non-batch) releases are made from daily grab samples taken from the auxiliary building vents. The continuous release activity which is collected in a 250 cc sample tube and analyzed on a GELI System has been below the Lower Limit of Detection (LLD) to date.

No violations or deviations were identified.

16. Effluent Control Instrumentation (IP 84723, 83724, 84750)

Calibration records for two liquid monitors and four noble gas monitors were reviewed. The liquid monitors were the turbine building fire and oil sump monitor and the liquid radwaste effluent monitor. The noble gas monitors were the two auxiliary building vent stack monitors (high and low range), the gas decay tank effluent monitor, and the steam jet air ejector/gland steam exhaust monitor. Calibrations appeared to be adequate and were timely.

The alarm setpoints for the above monitors were reviewed, no problems were identified.

No violations or deviations were identified.

17. Air Cleaning Systems (IP 84724)

Technical Specifications require filter testing of the control room emergency makeup ventilation system, non-accessible filter exhaust plenum of the auxiliary building ventilation system and the fuel handling building exhaust filter plenum. The inspector reviewed records of tests of these air cleaning systems and discussed testing procedures with personnel from the technical staff ventilation groups responsible for performance of the tests. The review included both in-place tests of HEPA filters and iodine adsorber units as well as laboratory tests of activated carbon samples.

For the fuel handling building, both initial and acceptance tests were performed by plant construction to the same criteria specified in the Technical Specifications. Technical Specification (T/S) surveillance testing has not yet been performed for this system because no fuel has been stored in the storage pool and the applicability of the surveillance in the Technical Specification is "when fuel is in the storage pool." The licensee plans to complete this surveillance before the first Unit 1 refueling outage. Surveillance testing of the other two systems has been timely and test results have met acceptance criteria.

Spurious spiking of the monitors associated with the control room ventilation system required frequent operation of the makeup unit. This, plus the T/S required ten-hour operation per month combined operation, exceeded the 720-hour Technical Specification criteria requiring charcoal testing. The required representative sample of the activated carbon adsorber was laboratory tested and met acceptance criteria.

No violations or deviations were identified.

18. Transportation of Radioactive Materials (IP 86721, 83750)

The licensee's transportation of radioactive materials program was reviewed, including: determination whether written implementing procedures are adequate, maintained current, properly approved, and acceptably implemented; determination whether shipments are in compliance with NRC and DOT regulations and the licensee quality assurance program; determination if there were any transportation incidents involving licensee shipments; adequacy of required records, reports, shipment documentation, and notifications; and experience concerning identification and correction of programmatic weaknesses.

Records of radioactive material shipments made in 1988 to date were reviewed. In 1988 to date, the licensee made eight shipments of radioactive waste as Low Specific Activity (LSA) material in exclusive use vehicles. Additionally in 1988, 11 shipments of process samples to contractor laboratories, small sources, and contaminated laundry were made. No problems with shipment documentation or quality control/assurance were identified. Shipments of radioactive material appear to have been made in accordance with the requirements of 10 CFR 61, 49 CFR 170-179, and the licensee's transportation procedures.

No violations or deviations were identified.

19. NRC Information Notices (IP 92701)

No. 88-22: Disposal of Sludge from Onsite Sewage Treatment Facilities at Nuclear Power Stations.

Braidwood samples and analyzes sludge prior to onsite land application No radioactivity has been detected. The station holds an Illinois EPA permit for onsite land application of sludge. If radioactivity is detected in the sludge, a disposal permit by onsite land application will be requested from the Illinois Department of Nuclear Safety. Braidwood is proceeding in accordance with NRC Information Notice No. 88-22.

No. 87-32: Deficiencies in the Testing of Nuclear-Grade Activated Charcoal.

Braidwood is currently using a laboratory which reported acceptable results during the interlaboratory comparisons conducted by the NRC contractor. The lab certifies that testing is done in accordance with Regulatory Guide 1.52, Revision 2. Therefore, no further action was deemed necessary by the licensee.

20. Spent Fuel Pool Leakage (IP 92701)

Sight glasses to detect leakage from the spent fuel pool (SFP) liner are located in drain lines on the east wall of the auxiliary building (364' elevation) where it abuts the fuel handling building. The lines drain to the auxiliary building floor drain tank. There is no water in the SFP as yet.

No problems were noted.

21. Licensed Event Report Followup (IP 92700)

LER 456/88017: Missed Technical Specification Composite Samples Due to Failure to Implement Required Changes

On July 21, 1988, a routine licensee review of Technical Specifications found that two sampling requirements had not been incorporated into the sampling program. The samples were the Condensate Polisher Sump Discharge monthly composite and the Waste Water Treatment Discharge quarterly composite. The cause was the failure of the chemist to correctly read the recently amended (April 19, 1988) Technical Specification Table 4.11-1 Radioactive Liquid Waste Sampling and Analyses Program. Samples of the waste streams were obtained and both contained less than detectable (LLD) activity.

Corrective action included: the checklist used to document review and compliance with Technical Specifications changes was reviewed to ensure proper interpretation of changes are addressed. The general surveillance program is being reviewed to ensure proper review and concurrence of items being added or changed. The chemist was instructed in the proper reading of Technical Specifications.

22. Exit Meeting

The inspector met with licensee representatives (denoted in Section 1) on September 8, 1988. The scope and findings of the inspection were summarized. The inspector discussed the likely informational content of the inspection report with regard to documents or processes reviewed during the inspection. The licensee identified no such documents/ processes as proprietary.