

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Docket Nos: 50-454; 50-455
License Nos: NPF-37; NPF-66

Report Nos: 50-454/98021(DRS); 50-455/98021(DRS)

Licensee: Commonwealth Edison Company (ComEd)

Facility: Byron Generating Station, Units 1 & 2

Location: 4450 North German Church Road
Byron, IL 61010

Dates: October 13-16, 1998

Inspector: K. Lambert, Radiation Specialist
D. Nissen, Radiation Specialist

Approved by: Gary Shear, Chief, Plant Support Branch 2
Division of Reactor Safety

EXECUTIVE SUMMARY

Byron Generating Station, Units 1 & 2
NRC Inspection Reports 50-454/98021; 50-455/98021

This routine inspection of the radiation protection program included the ALARA planning and radiation work permit programs, and whole body counting and screening programs. The following conclusions were made.

- The as-low-as-is-reasonably-achievable (ALARA) planning and radiation work permit programs were effectively implemented. The radiation protection staff was actively involved in the work planning process to ensure that radiation protection goals and concerns were addressed (Section R1.1).
- The whole body counter and pre-screening monitoring programs were effectively implemented. Cognizant individuals were knowledgeable regarding use and calibration of the whole body counters and pre-screening monitors, and calibrations were performed in accordance with station procedures (Section R1.2).
- Lack of communication between radiation protection and radwaste staffs and the lack of management oversight of radioactive waste processing, resulted in poor housekeeping in the radioactive waste building (Section R2.1).

Report Details

IV. Plant Support

R1 Radiological Protection and Chemistry (RP&C) Controls

R1.1 As-Low-As-Is-Reasonably-Achievable Planning and Radiation Work Permit Programs

a. Inspection Scope (IP 83750)

The inspectors reviewed the station's program for performing as-low-as-is-reasonably-achievable (ALARA) reviews and the development of radiation work permits (RWPs). This included a review of applicable procedures, ALARA plans and RWPs, and discussions with cognizant individuals.

b. Observations and Findings

The inspectors' review of station procedures indicated that procedures were sufficiently detailed and were consistent with industry guidance. A member of the ALARA group, responsible for RWP preparations, attended the station's work planning meetings to ensure that the radiation protection staff was aware of upcoming work.

The station's procedures required that work groups initiate an RWP request 8 - 12 weeks before the scheduled work dates. The RWP coordinator is responsible for reviewing requests and ensures that radiological surveys are performed of the work area. Once surveys are completed, the overall dose for the job is estimated. The procedures required that an ALARA review be completed for jobs with a total dose greater than one person-rem. Jobs that required a formal ALARA review also required a pre-job briefing. In addition, the ALARA group began an initiative to perform micro ALARA planning of all jobs with a dose estimate greater than 100 millirem (mrem). The micro ALARA planning included a detailed review of the task for the job, the use of mockups and shielding, worker involvement in the ALARA planning and actions to reduce the dose.

The inspector's reviewed several RWPs and ALARA reviews prepared during the B2R07 refueling outage. ALARA plans were detailed and incorporated lessons learned from previous job evolutions. ALARA plans were attached to the RWPs and special instructions were included in the RWPs. RWPs were appropriately completed and provided applicable radiation protection information. Special instructions in RWPs were used to communicate hold points, radiation protection continuous coverage, or specific cautions regarding the work to be performed. RWPs, ALARA reviews, and surveys were all filed together as a work package, this aided in retrieving data for job history and lessons learned.

c. Conclusions

The ALARA planning and RWP programs were effectively implemented. The radiation protection (RP) staff was actively involved in the work planning process to ensure that radiation protection goals and concerns were addressed.

R1.2 Whole Body Counting and Screening Program

a. Inspection Scope (IP 83750)

The inspectors reviewed the calibrations for the whole body counter (WBC) and the pre-screening monitoring programs. This included a review of applicable procedures, calibration records and discussions with cognizant individuals.

b. Observations and Findings

The licensee used Eberline PM-7 personnel monitors with a count time of less than 30 seconds as a pre-screening tool for determining if internal contamination existed. Entrance and exit pre-screening was performed on employees and contractors. Pre-screening was also performed on workers for cause (i.e. had facial contamination or were involved in a work evolution where inhalation or ingestion of radioactive materials was possible). If a worker alarmed the PM-7 then a whole body count would be performed to determine what isotopes were present and to quantify the dose. The PM-7 monitors were calibrated every six months as required using a cobalt-60 source and were source checked before use with a plant smear of approximately 30 nanocuries (nCi) activity. The WBC calibration was performed every 18 months by personnel from the Commonwealth Edison corporate offices. Calibrations were technically sound, performed as required, and the sources used were appropriate. A previous review of the WBC quality control program was documented in NRC inspection report 50-454/455-97017.

c. Conclusions

The whole body counter and pre-screening monitoring programs were effectively implemented. Cognizant individuals were knowledgeable regarding the use of the whole body counters and pre-screening monitors, and calibrations were performed in accordance with station procedures.

R2 **Status of RP&C Facilities and Equipment**

R2.1 Radiological Postings, Labeling, and Housekeeping

a. Inspection Scope (IP 83750)

The inspectors performed walkdowns of the radiologically posted areas (RPAs) in order to review radiological postings, labeling of containers, housekeeping and material condition of radiation protection equipment.

b. Observations and Findings

The inspectors observed that radiological postings and boundaries in the RPAs were generally well maintained. The inspectors verified, through independent measurements, that radiological postings reflected the actual area radiological conditions. Containers in the auxiliary building were labeled in accordance with station procedures and regulatory requirements. Material condition of radiation protection equipment was good. Housekeeping in the auxiliary building was also good.

During walkdowns of the radioactive waste (radwaste) building, the inspectors noted a large amount of processed radwaste stored in a non contaminated area of the building. The inspectors noted that some of these bags were not labeled, while others had holes in them. Dates on some bags were from June 1998, indicating that radwaste had been accumulating for several months. The inspectors also noted a large amount of processed radwaste stored in a contaminated area of the building and a third large area of radioactive waste waiting to be processed.

Discussion with RP supervisors revealed that radwaste workers were to notify the RP staff when radwaste was brought to the building in order for RP to survey and label the waste. RP supervisors indicated that they knew waste was being brought to the radwaste building, but were not notified by the workers. Because they were not notified, surveys were not performed. The inspectors noted that this demonstrated both a lack of initiative on the part of RP and a lack of communication between the RP and radwaste staffs. In addition, the workers who processed waste had been assigned to perform work at the settling pond. Without additional workers assigned to process waste, the amount of unprocessed waste had built up, adding to the overall poor appearance of the area.

Station management indicated that responsibility for radwaste had recently been transferred to the chemistry department. The inspectors discussions with both RP management and Chemistry management revealed that there had been a lack of management oversight in this area. Specifically, no management or supervisors had toured or been in this area for several weeks.

The inspectors informed station management that a lack of attention to processing and storage of radwaste led to the poor housekeeping condition of the radwaste building. Station management acknowledged and agreed with the inspectors' conclusions. Station management's immediate actions were to ensure bags were labeled and re-bagged those bags with holes. In addition, corrective actions included obtaining a sea-land container for storing the radwaste bags until they could be shipped to a radwaste processor. Station management was evaluating additional long term actions to prevent recurrence. Since corrective actions were not completed, the processing of radwaste and radwaste building housekeeping will be reviewed during a future inspection (Inspection Follow-up Item (IFI) 50/454/98021-01(DRS); 50-455/98021-01(DRS)).

c. Conclusions

Lack of communication between radiation protection and radwaste staffs and the lack of management oversight regarding the processing of radwaste and condition of the area, resulted in poor housekeeping in the radwaste building.

R8 Miscellaneous RP&C Issues

- R8.1 (Closed) Inspection Follow-up Item (IFI) 50-455/98010-04: While performing a turbine lube oil flush, the hose that was transporting oil disconnected and sprayed oil onto all levels of the turbine building. About 500 gallons of oil went into the condenser. The inspectors reviewed the results of the cleanup of the oil. Chemistry personnel performed a thorough assessment to determine how to remove the oil and to establish oil and grease levels that would be acceptable for startup. It was determined that if oil and grease levels were below one part per million, there would be no impact to the water quality of the unit and no Electric Power Research Institute (EPRI) action levels exceeded. The predetermined cleanup level for residual oil and grease was achieved during the cleanup, and no problems were identified with the water quality because of this event. This item is closed.
- R8.2 (Closed) Licensee Event Report (LER) 50-455/98-003: During the Unit 2 shutdown, when the reactor cavity was being flooded, the area radiation monitors alarmed on a high radiation signal. Dose rates peaked at about 650 milliroentgens per hour (mR/hr) at the surface of the cavity due to high levels of cobalt-58 (Co-58). The licensee had implemented the routine shutdown template devised by Byron and Braidwood stations. The template included direction for the addition of hydrogen peroxide to initiate a crud burst and a cleanup regime that removed the crud from the system. The licensee's investigation identified that low letdown flow during the cleanup (after the crud burst) was a contributor to the high radiation dose rates. The letdown flow was only at a rate of about 50 gallons per minute (gpm). However, letdown flow rates had historically been about 80 gpm or higher. The inspectors discussed this event with chemistry personnel who indicated that during the cleanup they had requested maximum flow from operations who had responded that approximately 50 gpm was maximum flow. The investigation identified two causes of the event. The first was inadequate cleanup analysis, due to poor communications between chemistry and operations. The second failure involved poor controls for reactor cavity flood up. The EPRI recommended limit for soluble Co-58 was 0.05 microcuries per milliliter (uCi/ml). The chemistry procedure did not adequately evaluate the consequences of not following the EPRI recommendations. The corrective actions included developing a formal interface between chemistry and operations personnel, revision of the procedures and a method to correlate Co-58 levels to approximate doses at the cavity surface after flood up. The inspectors reviewed the completed corrective actions which appeared appropriate. This item is closed.
- R8.3 (Closed) IFI 50-455/98010-03: During the Unit 2 shutdown, when the reactor cavity was being flooded, the area radiation monitors alarmed on a high radiation signal. The licensee issued an event report regarding this issue, and all subsequent actions are documented in section R8.2. This item is closed.

- R8.4 (Closed) Violation (VIO) 50-454/98009-05 and 50-455/98009-05: The inspectors reviewed the implementation of corrective actions for a violation concerning the failure to post a contaminated area properly. The inspectors performed walkdowns in the auxiliary building to observe the posting of contaminated areas as well as other radiological postings. The inspectors noted that radiological rope boundaries established around contaminated areas were appropriate and in accordance with NRC regulations and station procedures. No problems with posting of contaminated areas were identified. This item is closed.
- R8.5 (Closed) VIO 50-454/98008-02 and 50-455/98008-02: The inspectors reviewed the effectiveness of the licensee's corrective actions for a violation concerning the failure to adhere to chemistry procedures. The inspectors observed a chemistry technician obtain a reactor coolant system sample and noted that there had been much improvement in chemistry technician performance and procedure adherence. No new examples were identified. This item is closed.

X1 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management at the conclusion of the inspection on October 16, 1998. The licensee acknowledged the findings presented.

The licensee did not identify any information discussed as being proprietary.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

B. Adams, Regulatory Assurance Manager
J. Bauer, Radiation Protection Manager
R. Colglazier, NRC Coordinator
D. Herrmann, Radwaste/Chemistry
J. Kuczynski, Technical Lead, Health Physics
W. Levis, Station Manager
W. McNeill, Operational Lead, Health Physics
E. Roche, Nuclear Oversight - Downers Grove

NRC

E. Cobey, Senior Resident Inspector

INSPECTION PROCEDURES USED

IP 83750 Occupational Radiation Exposure
IP 92904 Followup - Plant Support

LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

50-454/455-98021-01	IFI	Lack of attention to processing radwaste and poor housekeeping in the radwaste building.
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Closed

50-455/98010-04	IFI	Oil in the condenser.
50-455/98-003	LER	During the Unit 2 shutdown, when the reactor cavity was being flooded, the area radiation monitors alarmed on a high radiation signal.
50-455/98010-03	IFI	Shutdown chemistry alarmed radiation monitors.
50-454/455-98009-05	VIO	Failure to post the contamination area in accordance with procedures.
50-454/455-98008-02	VIO	Failure to follow chemistry procedures.

Discussed

None

LIST OF ACRONYMS USED

ALARA	As Low As is Reasonably Achievable
Co-58	Cobalt-58
EPRI	Electric Power Research Institute
gpm	Gallons per Minute
IFI	Inspection Follow-up Item
LER	Licensee Event Report
uCi/ml	Microcurie per Milliliter
mrem	Millirem
mR/hr	Milliroentgens per Hour
nCi	Nanocurie
NRC	Nuclear Regulatory Commission
PIF	Problem Identification Form
RP	Radiation Protection
RPA	Radiologically Posted Area
RWP	Radiation Work Permit
radwaste	Radiological Waste
VIO	Violation
WBC	Whole Body Counter

LIST OF DOCUMENTS REVIEWED

Radiation Protection Department Policy Statement, Micro ALARA Planning

BAP 700-1, Rev. 8, ALARA Program

BAP 700-2, Rev. 14, ALARA Action Review

BAP 575-9, Rev. 7, Radiation Work Permit Program

BAP 720-3, Rev. 20, Control of Materials for Conditional or Unconditional Release from Radiologically Posted Areas

BAP 700-T1, Rev. 11, ALARA Action Review, ALARA Brief Checklist

BRP 5010-1, Rev. 4, Radiological Posting and Labeling Requirements

BRP 6200-5, Rev.7, Writing Radiation Work Permits

BRP 6200-5TB, Rev. 7, Radiation Work Permit ALARA Recommendation Checklist

LER 50/455-98003

PIF B1998-03971

PIF B1998-03731

PIF B1998-03643

PIF B1998-03835

PIF B1998-04254

RWP Request 98003141

RWP 980201, Rev 2, Robotics Activities

Calibration records for the Eberline PM-7 and WBC