

U. S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-454/85038(DRSS); 50-455/85042(DRSS)

Docket Nos. 50-454; 50-455

Licenses No. NPF-37; CPPR-131

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

Facility Name: Byron Nuclear Station

Inspection At: Byron Nuclear Station, Units 1 and 2

Inspection Conducted: August 28-29, 1985

Inspector: *L. J. Hueter*  
L. J. Hueter

9-30-85  
Date

Approved By: *M. C. Schumacher*  
M. C. Schumacher, Chief  
Independent Measurements and  
Environmental Protection Section

9-30-85  
Date

Inspection Summary

Inspection on August 28-29, 1985 (Reports No. 50-454/85038(DRSS);  
50-455/85042(DRSS))

Areas Inspected: Nonroutine, announced inspection of an occurrence involving initiation of a liquid radwaste release without required dilution prior to release to an unrestricted area. Also inspected was the gaseous and liquid radwaste startup program for Unit 1. The inspection involved 15 inspector-hours onsite by one NRC inspector.

Results: Two violations were identified (failure to follow liquid radwaste release procedures - Section 2 and failure to take timely action when a Technical Specification LCO release limit was exceeded - Section 2).

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## DETAILS

### 1. Persons Contacted

- <sup>1</sup>A. Chernick, Compliance Supervisor
- <sup>1</sup>J. Langan, Compliance
- <sup>1</sup>R. Pleniewicz, Assistant Superintendent, Operation
- R. Querio, Byron Station Superintendent
- A. Scott, Health Physicist
- <sup>1</sup>J. VanLaere, Rad-Chem Supervisor
- <sup>1234</sup>K. Weaver, Station Health Physicist
- <sup>1</sup>F. Willich, QA Inspector
  
- P. Brochman, NRC Resident Inspector
- <sup>1</sup>J. Hinds, Jr., NRC Senior Resident Inspector

<sup>1</sup>Attended the August 29, 1985 exit meeting.

<sup>2</sup>Telephone conversation September 3, 1985.

<sup>3</sup>Telephone conversation September 5, 1985.

<sup>4</sup>Telephone conversation September 20, 1985.

### 2. Liquid Radwaste Release Incident - August 22-23, 1985

On the afternoon of August 22, 1985, steps were taken to initiate a batch release, Release No. 50489, from a liquid radwaste tank. The prerequisites, including sampling, chemical and radioactivity analyses, radwaste and dilution flow rates, monitor alarm/isolation setpoint determinations, and associated paperwork with verification/approvals required by procedures were initiated. The principal procedure for liquid releases is BCP 400-T50, Revision 3, "Liquid Radwaste Release Form", which has a number of temporary changes in effect.

The release was initially started at 19:22 on August 22 with a release rate of 315 gpm and circulating water blowdown rate (dilution) of 24,000 gpm. However, the release was stopped 40 minutes later at 20:02 (tank level at 58%) at the request of the Station Control Room Engineer (SCRE) due to the need to stop circulating water blowdown flow because of the lowering water level in the circulating water flume. Following the termination of the release, the circulating blowdown flow was terminated to allow the circulating water level in the flume to rise to the desired level. After reaching the desired level it was planned to restart the circulating water blowdown flow but at a lower release rate (15,000 gpm) and then restart the liquid radwaste batch release. A new procedure package was initiated for this renewal of Release No. 50489. Portions of the procedure which required no change were signed off with the notation "performed previously."

In Section F, "Operating Department Responsibility - Discharging Release Tank to Circulating Water Blowdown Line," of procedure BCP 400-T50, Step 1.c. has provisions for date and initials of both the radwaste operator and radwaste foreman for verification that the circulating water blowdown rate is equal to or greater than the minimum rate stated in Section C, Step 3 (determined by health physics personnel) which was 15,000 gpm for the renewal of Release No. 50489.

At 23:28, at the request of the radwaste foreman, the radwaste operator made a telephone call to the center desk operator (nuclear station operator (NSO)) in the reactor control room to verify the circulating water blowdown rate was at least 15,000 gpm. The NSO's initial response was "Blowdown? We don't have any blowdown going." However, while still on the line he asked another occupant of the control room a question which the radwaste operator could not hear well. When the NSO came back on the line, the radwaste operator understood him to say that the blowdown rate is 15,000 gpm on the low end after which the radwaste operator asked "15,000 gpm?" and the NSO states "Yes." (However, the NSO in a written statement, said he told the radwaste operator that 15,000 gpm was the flow rate that would be established when blowdown was started). The radwaste operator proceeded to log the erroneous verification (due to miscommunication of established circulating water blowdown rate) in release procedure BCP 400-T50 in preparation for restarting the release of Release No. 50489. Following the telecon between the radwaste operator and the NSO, the radwaste foreman asked the radwaste operator for the rate of circulating water blowdown and he was told 15,000 gpm on the low end. The radwaste foreman also proceeded to log the erroneous verification of established circulating water blowdown rate in release procedure BCP 400-T50. Following completion of several more steps on the release procedure, the release tank outlet valve/isolation valve was unlocked and opened following which the discharge flow control valve was slowly opened at 23:59 on August 22, to the release rate of 300 gpm (within the 350 gpm allowed in Step 3 of Section C of the release procedure). This action initiated a liquid radwaste release into the circulating water blowdown line (which drains to the Rock River) without operation of the circulating water blowdown flow to provide required dilution before release to an unrestricted area. Procedure OBCS 11.1.1.1-1, Revision 1, which requires the release tank to be released with the circulating water blowdown system flow rate as specified in the Liquid Radwaste Release Tank Form BCP 400-T50, was not followed. Failure to positively verify that circulating water blowdown flow rate existed before initiating the liquid radwaste release and failure to have the circulating water blowdown flow rate specified in Release Procedure BCP 400-T50 while making a release from the radwaste release tank were identified by the inspector as a violation of Technical Specification 6.8.1.a which requires implementation of procedures for effluent discharges (Violation 454/85038-01).

The circulating water blowdown line monitor alarmed in the reactor control and was observed/acknowledged by the NSO within the first minute after the release from the radwaste tank was initiated. The NSO discussed the alarm condition with the SCRE. Unaware that a radwaste release had been initiated, they initially believed it might be a spurious alarm. The NSO

then made a phone call to notify the shift engineer (SE). The SE asked the NSO to call the radwaste operator to ask if any radwaste release was in progress. The NSO then called the radwaste operator and was informed that a radwaste release was in progress. The NSO informed the operator that circulating water blowdown flow had not been established and instructed the radwaste operator to terminate the release which he did at 00:09 on August 23, ten minutes after the release had been initiated. During the ten minutes, about 2700 gallons of liquid radwaste containing a radionuclide mixture with a concentration of about 30 times the limit specified in 10 CFR Part 20, Appendix B, Table II, Column 2, was released from the radwaste release tank into the circulating water blowdown line which drains to the Rock River. During this release, the circulating water blowdown flow rate (intended at 15,000 gpm) had not been established to provide necessary dilution. Action a. of Technical Specification 3.11.1.1 requires that when the concentration of radioactive material released in liquid effluents to unrestricted areas exceeds the concentrations specified in 10 CFR Part 20, Appendix B, Table II, Column 2, the concentration shall be immediately restored to within the above limits. The nine minute delay between the actuation of the blowdown monitor alarm and termination of the release appears inordinate and does not meet the immediacy requirement of the technical specification. This was identified by the inspector as a violation of Technical Specification 3.11.1.1 which requires immediate restoration to within the limits for release to an unrestricted area (Violation 454/85038-02).

The circulating water blowdown line is basically a 30 inch diameter pipe about 13,000 feet long, common to both units. It connects to the circulating water system a short distance downstream of the condenser water box of each unit and travels over several small hills and valleys before splitting into two pipes that discharge into a small canal about 300 yards long that flows into the Rock River. The blowdown flow is normally controlled by a valve near the beginning of the blowdown line of each unit before the blowdown lines combine into a common line. The motive force is supplied by the circulating water pumps on the the circulating water system. Valves are also located on each of the two pipes at the end of the blowdown line.

The ten minute release into the circulating water blowdown line was terminated at 00:09 on August 23. This situation was discussed between operations personnel and onsite radiation protection personnel and it was decided to open the upper blowdown valve and close the lower blowdown valves in an attempt to fill up the blowdown line for the benefit of whatever mixing and dilution could be obtained before release into the canal and Rock River.

At 00:15, six minutes after termination of the release, the upper blowdown valve was opened. At 00:23 and 00:29, the first and second valves respectively on the lower end of the blowdown line were closed. The latter two valves are located about five miles from the plant by road. Calculations indicate that closure at the end of the blowdown line should have occurred several minutes before the bolus containing the activity could have been released.

A dip sample was collected at 00:50 from the canal at the discharge from the blowdown line and subsequently analyzed. At 00:56 both valves on the lower end of the blowdown line were reopened to reestablish circulating water blowdown release to the canal/river. Additional grab samples were collected near the end of the blowdown via the composite sampler flow path at 01:10, 01:30 and 01:50 and subsequently analyzed.

The concentration in the release tank was approximately 30 times the unrestricted area release level based on observed concentrations of Co-58 ( $1.2E-3 \mu\text{Ci/ml}$ ), Co-60 ( $1.0E-4 \mu\text{Ci/ml}$ ), Mn-54 ( $1.0E-4 \mu\text{Ci/ml}$ ), and I-131 ( $3.6E-6 \mu\text{Ci/ml}$ ). The radionuclides identified in the grab samples and their respective concentrations are as follows:

<u>Time of Sample</u>	<u>Radionuclide</u>	<u>Concentration (<math>\mu\text{Ci/ml}</math>)</u>
00:56	Co-58	$1.7E-7$
01:10	Co-58 Mn-54	$2.8E-7$ $5.5E-8$
01:30	Co-58	$4.2E-7$
01:50	Co-58	$7.2E-8$

Although these samples show dilute concentrations (unrestricted area maximum permissible concentration (MPC) for Co-58 is  $9E-5 \mu\text{Ci/ml}$ ), it is noted that if the activity in the blowdown line were not well diluted the bolus containing the bulk of the activity could have been released in a period of a few seconds, between grab samples.

The licensee's evaluation concluded that the maximum instantaneous concentration reaching the unrestricted area could not be determined but was probably between 10 MPC and the release tank concentration of 30 MPC. On this basis the licensee plans to provide a 30 day written report pursuant to 10 CFR 20.405(a)(1)(v) as noted in the licensee's Deviation Report, 6-1-85-262, covering this event. The licensee calculated the dose to a member of the public from radioactive materials in this liquid effluent release. The dose was not significant in comparison with the dose limits specified in Technical Specification 3.11.1.2.

The remainder of the water in the release tank was released without incident beginning at 06:07 on August 23rd with proper circulating water blowdown flow established to provide dilution. A new procedure package was not initiated for this third part of Release No. 50489. The procedure package used for the second part of the release was reused with new data and new "sign offs" and the words "3rd Start" handwritten above or below the data for the release procedure for the second part of the release. This reuse of the release form together with handwritten temporary changes gave a very cluttered appearance to the release procedure. Although apparently not contributing to this event, this clutter could increase the potential for personnel error in following the release procedure.

The licensee is conducting an investigation/evaluation of the event to determine the cause, to take measures to prevent recurrence and to improve the release procedures and control of releases. As of the inspection date it was concluded that the cause was a communications problem and that the procedure for verification of circulating water blowdown flow rate was a contributing factor. A temporary procedure change has been implemented to preclude recurrence which now requires verification (initials and date) by a member of the reactor control room (SCRE or RSO) as well as the radwaste foreman that the circulating water flow rate is established at or above the minimum calculated rate needed to provide adequate dilution before the control room SE or SRO authorizes the release. This should preclude verification of dilution flow based solely on telephone conversation. A placard has also been prepared for placing at the circulating water blowdown flow control valve while releases are in progress. The placard states "Release in Progress." The placard's placement and removal are covered by procedure change.

To eliminate clutter and to enhance ease of following the radwaste release procedure, it has been retyped to include all the temporary changes and policy has been made to require use of a new procedure to continue release from a tank once the release has been terminated. Under consideration is total review of the procedure for possible simplification and introduction of a greater safety factor in the concentration planned for release to an unrestricted area. Also under consideration is a modification that would have an isolation function on the radwaste release tank upon reduction or loss of circulating water blowdown flow rate needed for dilution purposes.

Two violations were identified.

3. Startup - Comparison of Effluent Monitor Readings Against Known Effluent Concentrations

The licensee has conducted tests involving laboratory analysis of gaseous and liquid effluent samples and comparison of the results with respective effluent monitor readings. Good agreement was observed with the monitors responding slightly on the high side (conservative).

No violations were identified.

4. Startup - Demonstrate that Gaseous and Liquid Radioactive Waste Systems Operate Per Design

The licensee has demonstrated that gaseous and liquid radioactive waste processing, storage, and release systems operate in accordance with the design with the exception of the boric acid evaporator and the radwaste evaporator. These two evaporators are in the final stages of being made operable and testing. In the interim, a vendor resin system (covered by a 10 CFR 50.59 review) has been used for water cleanup. Operability is not imminent for the licensee's volume reduction system (incinerator), which involves primarily solids but also has provisions for treating liquid in the form of contaminated oil.

No violations were identified.

5. Startup - Nonradioactive Process and Effluent Streams Checked for Unanticipated Radioactivity

The licensee has established a program for gamma isotopic analysis of quarterly samples from normally non-radioactive process and effluent streams including the auxiliary steam system, station heating system, diesel generator cooling system and the makeup demineralizer system. No detectable activity has been identified.

Inspection Reports No. 50-454/85037; 50-455/85041 cover an occurrence involving a recent identification by the licensee of slight contamination (apparently from Unit-1) on vendor supplied resins used to purify flush water in Unit 2 piping systems, in preparation for preop testing.

6. Exit Interview

The inspector summarized the scope and findings of the inspection with licensee representatives (Section 1) at the conclusion of the inspection on August 29, 1985. The inspector 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 such documents or processes as proprietary.

Licensee representatives acknowledged the inspector's identification of a violation to follow adequate procedures and a violation of technical specification requirements. These matters were discussed in subsequent telephone conversations with various licensee representatives on September 3, 5, and 20. On September 20, the violations were reaffirmed.