

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-454/94013(DRSS); 50-455/94013(DRSS)

Docket Nos. 50-454; 50-455

License Nos. NPF-37; NPF-66

Licensee: Commonwealth Edison Company  
1400 Opus Place  
Downers Grove, IL 60515

Facility Name: Byron Nuclear Generating Station, Units 1 and 2

Inspection At: Byron Site, Byron, Illinois

Inspection Conducted: May 23 through June 30, 1994

Inspector: *J. House*  
John House  
Senior Radiation Specialist

7/14/94  
Date

Approved by: *J. W. McCormick-Barger*  
J. W. McCormick-Barger, Chief  
Radiological Programs Section

7/14/94  
Date

Inspection Summary

Inspection on May 23-June 30, 1994 (Reports No. 50-454/94013(DRSS); 50-455/94013(DRSS))

Areas Inspected: Routine announced inspection of the chemistry and radiation protection programs (IP 84750 and 83750) including: chemistry comparisons, plant water quality, self assessment program, ALARA planning, interim radwaste storage, and the Radiological Environmental Monitoring Program (REMP).

Results: Licensee performance in the chemistry comparison program was excellent with the laboratory achieving all agreements in 22 comparisons. Plant water quality was very good, and a very good working relationship between chemistry and operations was evident in the plant water quality program. Audits were performance based, technically thorough and the self assessment program was a strength. The ALARA program was functioning well and plans for dose minimization for the upcoming outage had been developed. The radiological environmental monitoring program (REMP) was very well managed. No violations or deviations were identified.

## DETAILS

### 1. Persons Contacted

- +\*S. Barrett, Radiation Protection Supervisor
  - \*C. Bontjes, Inspector, Site Quality Verification
  - +\*D. Brindle, Regulatory Assurance Supervisor
    - L. Bushman, ALARA Coordinator
  - \*J. Capp, Radiation Protection Laboratory Supervisor
  - +P. Enge, Licensing Coordinator
  - +T. Gierich, Operations Manager
    - N. Gordon, Unit Chemist
  - \*B. Gossman, Chemistry Supervisor
  - +T. Higgins, Support Services Director
  - +\*P. Johnson, Technical Superintendent
  - +M. Lesniak, Regulatory Performance Administrator
  - \*R. Munson, ALARA Analyst
  - +\*G. Schwartz, Station Manager
    - +M. Snow, Work Control Superintendent
  - \*D. Starke, Quality Control Chemist
  - +D. St. Clair, Site Engineering and Construction Manager
- +\*H. Peterson, Senior Resident Inspector, NRC
- \*Present at the Exit Meeting on May 26, 1994  
+Present at the Exit Meeting on June 30, 1994

### 2. Chemistry Comparison Program (IP 84750)

The inspector submitted chemistry samples to the licensee for analysis as part of a program to evaluate the laboratory's capabilities to monitor nonradiological chemistry parameters in various plant systems with respect to regulatory and administrative requirements. The samples were analyzed by the licensee using routine methods and equipment.

The samples were diluted by licensee personnel in order to bring the concentrations within the ranges normally analyzed by the laboratory and were then analyzed in a manner similar to that of routine samples. The results are presented in Table 1 which also contains the criteria for agreement. The acceptance criteria were that the licensee's value should be within 2 Standard Deviations (SD) of the reference value for agreement and between 2 and 3 SD for qualified agreement. A qualified agreement may indicate a bias in the assay.

The licensee analyzed eleven unknowns at two concentrations each and all 22 comparisons were agreements. All of the results were within eight percent of the known values and most were within six percent. This indicates that these assays were well controlled. The licensee's analytical chemistry capability was excellent.

No violations or deviations were identified.

3. Water Chemistry Control Program (IP 84750)

The licensee's water chemistry program was consistent with the Electric Power Research Institute (EPRI) PWR Primary and Secondary Water Chemistry Guidelines. A review of selected trend records indicated that plant water quality was very good and no significant problems were observed. Extensive in-line monitoring instrumentation and a computer data base were used to monitor chemistry parameters. The licensee has continued to maintain a strong emphasis on operational chemistry. Cooperation among the chemistry, operations and instrument maintenance groups appeared to be very good and was reflected in the strength of the plant water quality program. Licensee representatives stated that additional in-line corrosion product monitors for sampling steam generator (S/G) blowdown would be installed in Unit 1 during the fall 1994 refueling outage.

Chemical cleaning of the Unit 1 Westinghouse Model D-4 steam generators will be performed during the fall 1994 outage to remove iron oxides (magnetite) that have built up in the crevices. The cleaning process involves chemical treatment along with heating and boiling to solubilize the corrosion products. The licensee believes that this may reduce the corrosion problems that have occurred with other D-4 steam generators.

No violations or deviations were identified.

4. Radiological Environmental Monitoring Program (IP 84750)

The inspector reviewed the Radiological Environmental Monitoring Program (REMP) and the 1993 Annual Operating Report which appeared to comply with the REMP requirements. Environmental samples had been collected and analyzed as required, and missing samples were documented in the report. A review of environmental sample data indicated that the operation of the Byron Nuclear Generating Station had no radiological effect on the environment.

A tour of selected air sampling stations was conducted with the Emergency Response Coordinator and the Environs Health Physicist who were responsible for managing the REMP. The air sampling equipment had calibration documentation, was in good operating condition and no air inleakage could be detected. Calibration of reference flowmeters was traceable to the National Institute of Science and Technology (NIST). The land use census had been conducted as required, and documentation of the sample collection program was very good. Licensee personnel were knowledgeable of the REMP and had provided strong oversight of the vendor.

No violations or deviations were identified.

5. Maintaining Occupational Exposures ALARA (IP 83750)

The inspector reviewed the ALARA organization and their planning for the fall refueling outage which included the use of remote dosimetry, a new

tool control program and use of contract technicians. The projected outage dose of 268 rem (2.68 sieverts) was high because Unit 1 has a higher source term which was thought to be caused by an ingress of cobalt from a reactor coolant pump bearing that was damaged during hot functional testing. The ALARA organization consisted of a manager and four staff members and was an integral part of the radiation protection department. A licensee representative stated that the ALARA organization is aware of approximately 90% of the outage work and much of the emergent work would be identified and shared with the ALARA organization during a meeting with operations following the Mode 3 walk down at the beginning of the outage.

Early boration will be performed at the beginning of the outage to remove radioisotopes from the primary system and thus reduce dose during the outage. This process is jointly monitored by chemistry and radiation protection. Cooperation between the groups appeared to be very good. The inspector discussed the importance of early boration and allowing the chemical volume control system (CVCS) adequate time to remove the radioisotopes with licensee management. Outage planning and the ALARA program will be reviewed prior to the fall 1994 refueling outage.

No violations or deviations were identified

6. Radwaste Storage (IP 84750)

The inspector reviewed the licensee's plan for interim storage of radwaste. High dose rate material, such as resins and filters, are to be stored behind concrete walls in the radwaste processing area which has a 2-4 year storage capacity. Space in a warehouse, located inside the protected area, had been allocated for low level waste storage. This storage area is to be designated a radiation controlled area and will be monitored by radiation protection personnel. Modifications still to be completed included sealing the concrete floor and building a berm inside the building. An October completion date was planned. Storage of radwaste on site will be followed in future inspections.

No violations or deviations were identified

7. Self Assessment Program (IP 84750)

The self assessment program included audits in which a team reviewed a department or an organization over a period of several weeks or more, and surveillances, which were conducted by one or a few persons, were of shorter duration and focused on a specific area or topic. The licensee's On-Site Quality Verification (SQV) personnel appeared to be well trained and were very knowledgeable of the areas they reviewed. The inspector reviewed audits and surveillances of the radiation protection, REMP, and chemistry programs. The self assessment program was performance based with SQV personnel accompanying chemistry, radiation protection and REMP personnel during the conduct of their assigned responsibilities. In addition, extensive document reviews were

interfaced with human performance. This resulted in thorough reviews which could identify both technical and compliance problems.

No violations or deviations were identified.

8. Exit Interview

The scope and findings of the inspection were reviewed with licensee representatives (Section 1) at an interim exit on May 26, 1994 and at the conclusion of the inspection on June 30, 1994. The following areas were discussed during the exits:

1. The chemistry comparison results.
2. The plant water chemistry program.
3. The REMP.
4. The self assessment program.
5. ALARA planning for the fall refueling outage.

During the exit interview, the inspector discussed the likely informational content of the inspection report with regard to documents or processes reviewed during the inspection. Licensee representatives did not identify any such documents or processes as proprietary.

Attachment:

1. Table 1, Chemistry Comparison Results  
2nd Quarter, 1994

TABLE 1  
 Nonradiological Chemistry Comparisons Results  
 Byron Nuclear Generating Station  
 Second Quarter, 1994

Analyte	Method <sup>1</sup>		Conc <sup>2</sup>	Ratio <sup>3</sup>	Acceptance Ranges <sup>4</sup>		Result <sup>5</sup>
					± 2RSD	± 3RSD	
<u>ppb</u>							
Fluoride	A	IC	2	0.925	0.875-1.125	0.813-1.187	A
	C		8	0.924	0.875-1.125	0.813-1.187	A
Chloride	A	IC	2	1.082	0.933-1.067	0.900-1.100	A+
	C		8	0.989	0.926-1.074	0.895-1.105	A
Sulfate	A	IC	2	0.963	0.895-1.105	0.842-1.158	A
	C		8	0.947	0.900-1.100	0.867-1.133	A
Iron	G	ICP	2000	1.045	0.904-1.096	0.854-1.146	A
	I		8000	0.935	0.903-1.097	0.855-1.145	A
Copper	G	ICP	2000	1.010	0.904-1.095	0.859-1.141	A
	I		8000	0.964	0.904-1.096	0.857-1.143	A
Sodium	J	ICP	500	1.070	0.863-1.137	0.784-1.216	A
	L		1500	1.058	0.862-1.138	0.789-1.211	A
Lithium	JJ	IC	1000	1.028	0.859-1.141	0.788-1.212	A
	LL		1000	1.004	0.868-1.142	0.787-1.213	A
Ammonia	M	IC	1000	1.010	0.902-1.098	0.856-1.147	A
	O		1000	0.992	0.902-1.098	0.856-1.147	A
Hydrazine	P	Spec	130	0.961	0.922-1.078	0.888-1.118	A
	R		100	1.003	0.922-1.078	0.888-1.118	A
Silica	S	Spec	150	0.967	0.906-1.094	0.859-1.141	A
	T		600	0.999	0.909-1.091	0.860-1.136	A
<u>ppm</u>							
Boron	D	Titr	1000	0.991	0.979-1.021	0.968-1.032	A
	F		5000	0.999	0.979-1.021	0.968-1.032	A

1. Methods: Titr - Titration  
IC - Ion Chromatography  
Spec - Ultraviolet/Visible Spectrophotometry  
ICP - Inductively Coupled Plasma Atomic Absorption Spectrophotometry
2. Conc: Approximate concentration analyzed.
3. Ratio of Licensee mean value to NRC mean value.
4. The standard deviation (SD) in the sixth and seventh columns represents the coefficient of variation obtained from averaging licensee data from the preceding cycle (Table 2.1 of NUREG/CR-5244). A result is considered to be in agreement if it falls within the  $\pm 2$  SD range; a qualified agreement if it lies outside  $\pm 2$  SD, but within  $\pm 3$  SD; and in disagreement if it is outside the  $\pm 3$  SD range.
5. Result:  
A = Agreement: Licensee value is within  $\pm 2$  SDs of the NRC mean value.  
A+ = Qualified agreement: Licensee is between  $\pm 2$  and  $\pm 3$  Sds of the NRC value.  
D = Disagreement: Licensee value is outside  $\pm 3$  Sds.