U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-454/85028(DRSS); 50-455/85022(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 Station, Units 1 and 2

Inspection At: Byron Site, Byron, Illinois

Inspection Conducted: June 24-28, 1985

Inspector: M. J. Oestmann 7/25/85
Date

Approved By: M. C. Schumacher, Chief 7/26/85
Independent Measurements and Date
Environmental Protection Section

Inspection Summary

Inspection on June 24-28, 1985 (Reports No. 50-454/85028(DRSS); 50-455/85022(DRSS))
Areas Inspected: Routine unannounced inspection of plant chemistry and radiochemistry, including management controls and organization, chemistry staffing, chemistry control, sampling and analysis of water quality, facilities and equipment, quality assurance/control of analytical measurements, chemical processes and practices of controlling chemical impurities, and licensee internal audits. The inspection involved 39 inspector-hours onsite by one NRC inspector.
Results: No violations or deviations were identified.

DETAILS

1. Persons Contacted

R. Querio, Plant Superintendent
*J. Van Laere, Rad/Chem Supervisor
*K. Weaver, Station Health Physicist
*S. Barrett, Station Chemist
*R. Pleniewicz, Assistant Superintendent - Operating
*D. St. Clair, Technical Staff Supervisor
*J. Langan, Licensing - Compliance
P. Floeter, Licensing - Compliance
*A. Chernick, Compliance Supervisor
*A. Britton, Quality Assurance Inspector
*W. Burkamper, Quality Assurance Supervisor - Operations
D. Herrmann, Chemist - Group Coordinator
J. Hamm, Chemistry Foreman
K. Lurkins, Chemist
W. Scheffler, Chemist - Group Coordinator
W. McNeill, Chemistry Training Instructor
G. Shoemaker, Radiation Chemistry Technician
E. Beegle, Radiation Chemistry Technician

J. Hinds, NRC Senior Resident Inspector
*P. Brockman, NRC Resident Inspector
*C. Vandenburgh, NRC Reactor Inspector

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

*Denotes those present at the plant exit interview on June 28, 1985.

2. Chemistry and Radiochemistry Programs

a. Management Controls and Organization

The inspector reviewed the management controls and organization of the Radiation-Chemistry (R/C) Group. The R/C Supervisor, who reports to the Assistant Superintendent for Administrative and Support Services, supervises the Station Chemist, Station Health Physicist, and GSEP Coordinator. The Station Chemist in turn supervises three Chemistry Staff, six Chemists and one Chemistry Foreman. This Foreman with the Health Physics Foreman supervises the 32 Radiation-Chemistry Technicians (RCTs) and directs on-the-job training and job assignments of the RCTs assigned to the chemistry laboratories. He is also responsible for sampling routines, chemistry surveillances, and sample point verification.

The Chemists and Chemistry Staff have Group Coordinators to direct their work assignments. The Analytical Chemistry Coordinator is responsible for laboratory quality control, the blind sample program, performance checks of counting equipment, sample panels (including the post-accident samplers), RCT certification, and chemical inventory and usage. The Operational Chemistry Coordinator is responsible for the primary, secondary, and auxiliary chemistry, the mass transport, environmental and radwaste chemistry programs. A third coordinator (Surveillance) is responsible for chemistry surveillances, technical specifications implementation and deviation reports. The Rad/Chem Department organization and staffing appear to meet the commitments of the FSAR and the requirements of the Technical Specifications.

The inspector discussed with licensee representatives the desirability of extending the assignments of the RCTs to the Chemistry Group. Because the RCTs rotate between the Health Physics and Chemistry Groups, they normally do not return to the Chemistry Group for a period of 8 or so weeks; this absence from the laboratory results in a loss of laboratory proficiency. A licensee representative reported that the licensee has under consideration assignment of RCTs permanently to one group or the other, but no decision has been made as yet.

b. Qualifications and Training

The qualifications and training of the Chemistry Group personnel in responsible positions were reviewed. The Station Chemist and his Group Coordinators have bachelor's degrees in chemistry. The Chemistry Foreman also has had several years experience at the licensee's Zion plant. Review of their qualifications and interviews indicate that they meet the position descriptions in BAP 200A 4-7, 4-8, and 4-9. Their qualifications and training appear to meet the commitments of the Technical Specification 6.3 and 6.4, including the requirements in Section 4 of ANSI/ANS 3.1-1978. No problems were noted in the qualifications of the chemistry staff.

In December 1984, the chemistry staff attended a pilot training course on water chemistry control being developed by the Byron Training Department in response to a corporate directive from the Division Vice President and General Manager - Nuclear Stations Division, dated September 9, 1983. This course is designed to make all levels of corporate and plant personnel aware of the importance of secondary water chemistry control on plant operations and performance in PWRs. This course is being expanded and will be presented to corporate and station management and technical support personnel in the near future. It will include the impact of poor chemistry on major components performance and the recognition of unusual conditions affecting plant operations.

The training program for RCTs was also reviewed and includes on-the-job experience, supervisory observation and completion of a formal program to demonstrate proficiency in performing analytical measurements. A total of 32 RCTs have completed their 14-week training, including the water treatment program at the Braidwood Production Training Center. In addition, all have now completed the certification program in ten different areas of chemistry as described in the BCP-1930 RCT Certification Procedures approved by BOSR on March 17, 1983. The training program appears to be satisfactory.

c. Water Chemistry Control Program

The inspector reviewed the licensee's PWR Water Chemistry Control Program (Nuclear Stations Division Directive (NSDD-S01) issued on September 9, 1983). This program, established for all of the licensee's PWRs, addresses management policies, assignment of authority and responsibilities to implement the program, and provides guidance to the plants on operational chemistry limits designed to minimize localized corrosion in steam generators and turbines. An analytical measurements program, performance monitoring of the program, data management and trending, and training requirements (see Section 2.b) are also included.

Management responsibilities described in the directive include providing adequate resources of staff, equipment, funds and organization to implement the program effectively to avoid corrosion of the secondary system. Each station is directed to develop site-specific water chemistry control parameters and the necessary corrective actions to perform when the monitored parameters are observed and confirmed to be outside the normal operating values. Action levels are implemented whenever an off-normal value is detected.

The licensee is currently implementing this program primarily through BAP 599-15 "Steam Generator Blowdown Chemistry System Description," approved January 5, 1985, and BAP 599-39 "Secondary Chemistry Monitoring Program," approved March 17, 1984. These two BAPs meet the conditions of Technical Specification 6.8.4.e "Secondary Water Chemistry." These same conditions are also reflected in Amendment 44 to the FSAR (December 1983), Attachment 10.A "Proposed Secondary Water Chemistry Monitoring Program for Byron Station Units 1 and 2."

No problems were noted during the inspector's review of these documents.

d. Other Management Programs

The inspector reviewed the licensee's program to restrict and control the use of chemicals throughout the plant to maintain system integrity. This program is outlined in BAP 559-55, "Byron Station Chemical Inventory and Usage Program," approved on November 14, 1984. It includes classification of plant chemicals into five categories based on the effect of a particular chemical on a plant component. The Rad/Chem Department has the responsibility to determine the different categories, to restrict by quantity, area, and disposal of chemicals used in the plant, and to approve the field use of restricted chemicals. This program is a valuable asset to the long-term preservation of the plant and to the safety of the plant and to the workers involved in handling the chemicals used.

e. Implementation of the Chemistry and Radiochemistry Program

The inspector reviewed the chemistry and radiochemistry programs, including the physical facilities, laboratory operation, counting room practices, procedures and QA/QC practices in the laboratory.

The laboratory space is adequate. There are large, separated cold and hot laboratories, a store room, and a counting room. In each of the laboratories, there is sufficient fume hood space and bench area to conduct normal chemical operations. The laboratories had normal laboratory equipment, gas and ion chromatographs, atomic absorption spectrophotometers, pH, conductivity, and specific ion probe meters, a total organic carbon analyzer, and a boron titrator. The inspector found all of the instruments to be operable and properly calibrated in accordance with QC calibration schedule BCP 400-T14. No chemicals or reagents were identified that had labels with expired dates.

The radiochemistry equipment was also of high quality. There were four ORTEC gamma-ray spectrometers, each of which included a shielded Ge(Li) detector, three Canberra alpha-beta proportional multi-sample counters, Tennelec Model LB 1000 low background alpha-beta proportional multi-sample counter, an Eberline SAC-4 alpha scintillation counter, and a new Packard liquid scintillation counter.

An adequate QA/QC program is in place in the laboratory and counting room as outlined in BAP 599-47, "Byron Station Chemistry Quality Control Program," approved by BOSR on February 1, 1984, and BAP 599-51, "Byron Station Chemistry/Radiochemistry Performance Check Program," approved March 29, 1985. Performance checks are made on each laboratory and counting instrument in accordance with the BCP "310" and "320" series procedures.

No problems were identified during the inspector's review of the performance check results on various laboratory instruments. Control charts of the performance check sample results were developed for each counter in the counting room. Control limits are set at ± 1 and ± 2 sigma of the mean.

Selected chemistry procedures (BCPs) for various analyses and surveillances as listed below were being implemented and found current. No technical problems were noted during a review of the procedures and log sheets used in documenting the results. All of the analytical results were also being entered into a computer. Procedures reviewed included the following:

BCP 26	Boron Titration by Automatic Titration
BCP 310-1	Performance Check Schedule
BCP 320-1	Fluoride Electrode Slope Performance Check
BCP 320-3	Chloride Electrode Slope Performance Check
BCP 320-4	Sartorius Balances Performance Check
BCP 320-5	Conductivity Cell Performance Check
BCP 320-6	The Spectrophotometer Performance Check
BCP 320-7	Performance Check of the Altex 5000
BCP 320-10	Conductivity Bridge Performance Check
BCP 320-14	Liquid Scintillation Counter Performance Check
BCP 320-19	Beckman pH Monitor Performance Check
BCP 510-1	Laboratory Instrumentation Quality Control Calibration Schedule
BCP 510-2	Laboratory Instrumentation Quality Control Calibration Log and Data Sheets
BCP 700-A12	Steam Generator Blowdown
BCP 700-A20	Makeup Demineralizers
BCP 800-1	HRSS Operation-pH, Conductivity, and Dissolved Oxygen

The inspector observed an RCT performing a series of chemical analyses in the laboratory, primarily of boron, chloride, fluoride, hydrogen, and dissolved oxygen, and reboiled conductivity measurements of steam generator blowdown. The RCT followed procedures and was well acquainted with each step of the procedure used in each analysis. He properly calibrated each instrument and standardized each chemical standard solution prior to performing an analysis on the reactor coolant water. The inspector also observed another RCT collect gas and liquid samples at the Sentry High Radiation Sample System (HRSS) panel. The inspector noted one small plastic tube leaking which caused some contamination inside the sampling panel. The RCT stated that this would be corrected during the plant outage which started on June 28, 1985. No other problems were observed. Each RCT appeared to understand his job and had an appreciation of the importance of performing a high quality analysis. The ability of each RCT to perform a particular analyses was documented on appropriate log sheets and any off-normal result was promptly

reported to chemistry management who in turn reported this to the shift engineer. Selected log sheets reviewed were found to be in good order.

The inspector reviewed the licensee's QC program providing the RCTs with blind samples prepared by the Analytical Chemistry Group Coordinator. These involved analyses of chloride, fluoride and boron. Results for 1984 and 1985 to date showed that only five (10%) analyses out of about fifty analyses performed had to be redone before the results were found to be within an acceptable range as defined by the coordinator. The inspector discussed the importance of a good QA/QC program with licensee representatives, particularly in regard to the increasing importance being attached to tight chemical controls needed for maintaining high water quality. The licensee representatives agreed to continue to improve their QC program.

The inspector also reviewed records relating to several Quality Assurance Department audits and surveillances of the chemistry group activities performed during 1984 and 1985. The audits have been closed out with all findings and observations responded to in a timely manner.

f. Water Sampling, Monitoring, and Processing

The inspector reviewed the water treatment, sampling and monitoring programs and observed related equipment during a tour of the plant.

Licensee representatives indicated there has been no difficulty in maintaining the required chemistry of the primary reactor coolant system since the plant went critical in February 1985. No technical specifications involving Section 3/4.4.7 or limiting conditions of operation of dissolved oxygen, chloride, and fluoride in reactor coolant were exceeded.

A licensee representative stated that there is no evidence of any primary-to-secondary leakage in the steam generators. However, maintaining desired secondary chemistry in accordance with administrative limits given in BAP 599-39, "Secondary Chemistry Monitoring Programs," has been difficult, particularly during power transients. The licensee has been adding more than normal amounts of hydrazine to the blowdown in order to remove organics which are causing higher than desired cation conductivity levels. There are no technical specification limits for this parameter in the secondary system. However, the self imposed action levels in BAP 599-39 require investigation of levels above 0.8 umhos/cm with reduction to 30% of full power if not restored within one week, and reduction to 30% power within 4 hours any time levels exceed 2.0 umhos/cm.

Because the cation conductivity of interest is that owing to inorganic ions, the licensee is controlling at 0.8 umhos/cm based on analysis of a so called reboil sample of blowdown which has had the volatile organics removed. At the same time, the licensee is controlling total conductivity at 2.0 umhos/cm. Review of licensee trend plots indicate that these levels have been generally maintained since reaching 30% power and that power level reductions were made when exceeded. The most recent data indicate that cation conductivity has been decreasing, presumably, because organics are being reduced.

The licensee has been generally successful in maintaining other secondary chemistry parameters (pH, dissolved oxygen, total solids, chlorides, sodium, and silica) within the action levels of BAP 599-39.

During a nine day outage that began June 28, 1985, the licensee intends to make a number of secondary system modifications that should improve chemistry control. These include installation of improved oxygen monitors, rerouting of blowdown to hot well rather than the condensate storage tank to reduce ingress of impurities, increasing blowdown pump capacity from 270 gpm to 360 gpm, installation of a distribution header to improve polisher efficiency, and changing the source of demineralizer backwash water to reduce dissolved oxygen spikes.

The licensee maintains extensive logs and trend plots of the various chemical parameters. Appropriate action levels have been implemented for abnormal conditions.

g. Laboratory Safety

The inspector observed that the licensee had effectively implemented laboratory safety practices through the procedures in the BAP 550 Series. This series includes procedures in the receiving and storage of chemicals, dispensing and disposal of chemicals, and controlling and cleanup of different chemical spills. The inspector observed that the laboratory had available eyewash and shower and fire extinguishers. No safety hazards were evident.

No violations or deviations were identified.

3. Exit Interview

The inspector met with licensee representatives (Section 1) at the conclusion of the inspection on June 28, 1985. The scope and the findings were discussed.

The inspector discussed the likely information content of the inspection report with regard to documents or processes reviewed by the inspector during the inspection. Licensee representatives did not identify any such documents or processes as proprietary.