

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-454/84-01(DRMSP); 50-455/84-01(DRMSP)

Docket Nos. 50-454; 50-455

License Nos. CPPR-130; CPPR-131

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

Facility Name: Byron Station, Units 1 and 2

Inspection At: Byron Site, Byron, Illinois

Inspection Conducted: January 10-12 and 13, 1984

*M. J. Oestmann*  
Inspectors: M. J. Oestmann

1/26/84  
Date

*W. J. Slawinski*  
W. J. Slawinski

1/26/84  
Date

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

1/27/84  
Date

Inspection Summary

Inspection on January 10-12, 13, 1984 (Reports No. 50-454/84-01[DRMSP]; 50-455/84-01[DRMSP]).

Areas Inspected: Routine, unannounced inspection of: (1) preoperational radiological environmental monitoring program (REMP), including implementation and results, quality assurance, and management controls; (2) review of the chemistry and radiochemistry program and procedures, including beta analytical results of a spiked liquid sample provided by NRC, and licensee internal audits; and (3) review of licensee actions taken regarding previously identified open items. The inspection involved 42 inspector-hours onsite by two NRC inspectors. Results: No items of noncompliance or deviations were identified.

## DETAILS

### 1. Persons Contacted

- \* R. Querio, Plant Superintendent, Byron Station
- R. Ward, Assistant Plant Superintendent for Administration and Support Services
- \* J. Van Laere, Rad/Chem Supervisor
- \*\*K. Weaver, Station Health Physicist
- B. Scott, Health Physicist
- S. Brown, Health Physicist
- S. Barrett, Station Chemist
- \* D. Herrmann, Chemist
- \* C. Lenth, Licensing Staff
- \* W. Jacobs, Licensing Staff
- \* W. Burkamper, Quality Assurance Supervisor
- \* L. Johnson, Quality Assurance Operations

The inspectors also interviewed several other licensee personnel during the course of the inspection, including chemical and health physics personnel.

\* Denotes those present at the plant exit interview on January 12, 1984.

\*\*Denotes those present during the telephone conversation on January 13, 1984.

### 2. Licensee Action on Previous Inspection Findings

- a. (Open) Open Item (50-454/83-14-02; 50-455/83-12-02): Resolution of anomalies and problems identified in the REMP. The licensee is continuing to study the REMP anomalies concerning the elevated gross beta concentrations of the cooling water discharge to the Rock River. The licensee identified that the discharged water is domestic water from the sewage treatment plant water. This water comes from deep wells onsite and is filtered and softened before entering the domestic (potable) water system. Gross beta activity in the sewage plant discharge is several times higher than in the untreated wellwater. The licensee has agreed to analyze samples taken along the treatment pathway to determine the source of this anomaly.

The licensee did provide information on the nature and depth of the onsite and offsite wells. The onsite well (By-18) is about 850-1500 feet deep and draws water from the Mt. Simon aquifer. The offsite well (By-14) has a depth of 177 feet and draws water from the Cambrian-Ordovician aquifer. The licensee provided information on another REMP anomaly concerning revised formula for calculating the radioiodine concentrations on charcoal adsorbers; however, the inspectors found the revised formula in the contractor's "Analytical Procedures Manual" (Revision 3, dated June 15, 1983) needed additional

correction. The licensee agreed to review this matter with the contractor. This item will remain open, pending better resolution of the discharge anomaly and correction of the radioiodine concentration formula.

- b. (Open) Open Item (50-454/83-14-03; 50-455/83-12-03): Development of procedures and a QA/QC program for radiochemistry sampling, counting, and analysis. The licensee has developed a procedure for calibration of the gamma detector-AAIS-CCP-3001, "Ge Detector Efficiency Calibration" dated June 10, 1981, for the multi-channel analyzers. However, the QA/QC procedure BAP-599-47, "Byron Station Chemistry Quality Control Program", has been drafted but not yet approved by the Byron Onsite Review Board (BOSR). This item remains open, pending final review and approval of procedures and a QA/QC program for radiochemistry (Section 5).
- c. (Open) Open Item (50-454/83-14-04; 50-455/83-12-04): Approval of procedures (Byron Program Descriptions [BPDs] and Byron Chemistry Descriptions [BCDs]) by BOSR. The inspectors determined that these procedures have been revised and are listed as Byron Administrative Procedures (BAPs) which are now going through review and approval by BOSR. This item remains open, pending completion of the review and approval by BOSR.
- d. (Closed) Open Item (50-454/83-28-01; 50-455/83-21-01): The licensee agreed to analyze spiked samples containing beta activity in a liquid sample provided by the NRC. Licensee results, as discussed in Section 6 of this report, show all agreements for the beta activity for H-3, Sr-89, and Sr-90.
- e. (Closed) Open Item (50-454/83-46-01; 50-455/83-34-01): Availability of key to By-07 air sampler and check on By-08 air sampler vacuum gauge. The inspectors noted during a tour of these sampling stations during this inspection that these problems had been resolved.
- f. (Open) Open Item (50-454/83-46-02; 50-455/83-34-02): Licensee agreed to place four additional air samplers on or near the site by the end of 1983. Because of severe weather conditions, the installation of these air samplers has been delayed. This item remains open until the samplers are installed and operational.

### 3. Management Controls, Organization, and Training

The inspectors reviewed the licensee's management controls for implementation of the requirements of the preoperational REMP and determined that no changes to the management controls described in a previous inspection report<sup>1</sup> have occurred. The licensee continues to utilize the services of Teledyne Isotopes, Inc. as contractor to conduct the sampling and analysis of environmental media.

The inspectors also reviewed the organization and staffing of the Rad/Chem Department. These items were discussed in previous inspection reports.<sup>2,3,4</sup>

The Rad/Chem Department organization and staffing appear to meet the commitments of the FSAR. Personnel in the Rad/Chem Department appear to have the qualifications of the position description in BAP 200 A 4-7, 4-8, and 4-9 based on interviews with Rad/Chem personnel.

The training program for Rad/Chem Technicians (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. Seven new RCTs are completing their training at the Braidwood Training Center. They are attending the 14 week course covering generic Rad/Chem training, chemistry/radiochemistry training, and PWR system training. These seven will augment the 18 RCTs previously trained who are now involved in the RCT certification program. Sixteen RCTs have completed the certification program in the ten different areas in chemistry as described in BCP-1930 RCT Certification Procedures approved by BOSR on March 17, 1983. The training program appears to be satisfactory.

No items of noncompliance or deviations were identified.

4. Implementation of the Radiological Environmental Monitoring Program (REMP)

The inspectors discussed the implementation of the REMP with licensee representatives and reviewed environmental monitoring reports covering the period of January 1 through October 31, 1983 prepared by the licensee's contractor, Teledyne Isotopes, Inc. No problems were noted in the results except for the elevated gross beta concentrations in the discharge of the water to the Rock River. This item was discussed in Section 2.a of this report. All samples were collected and documented in the reports and weekly collection data sheets accounted for all samples. These data sheets also included explanations for missing samples.

A tour of several environmental stations including air sampling, TLD, and well water stations indicated no problems. In addition, no problems were identified in the contractor's internal QC program, or in the results of his participation in the EPA's cross check program for interlaboratory comparisons.

No items of noncompliance or deviations were identified.

<sup>1</sup>Inspection Reports No. 50-454/83-46; 50-455/83-34

<sup>2</sup>Inspection Reports No. 50-454/83-08; 50-455/83-06

<sup>3</sup>Inspection Reports No. 50-454/83-34; 50-455/83-26

<sup>4</sup>Inspection Reports No. 50-454/83-57; 50-455/83-40



5. The Licensee's Chemistry/Radiochemistry Program

The status of the chemistry/radiochemistry program which is being implemented in the preoperational hot functional tests were reviewed. The program remains the same as that described in previous inspections<sup>5</sup>. The licensee is performing sampling and analysis according to the Byron Chemical Procedures during the tests. The inspectors observed several RCT's performing several chemical analyses, in particular, specific ion tests for chloride and fluoride ions. No problems were identified. The RCT's interviewed appear to understand the steps that were followed in the analytical procedures used.

A tour of the cold and hot laboratory and counting room revealed no technical weaknesses. Instrumentation had been calibrated according to the QC calibration schedule BCP 400-T-14 and had calibration stickers affixed to each instrument. Reagents had labels with dates of preparation and expiration. No reagent was found with an expired date. In the counting room, the licensee performs daily background and performance checks of all counting equipment and maintains control charts on the equipment.

Although the licensee has established a QC program for non-radiological chemistry as described in a previous inspection<sup>6</sup>, in which unknown non-radiological samples are provided to the RCTs to analyze every six months, the licensee has not yet established a comparable program for radiological samples. A licensee representative stated that such a program is to be developed in the near future. The QA/QC program for radiochemistry will be examined in a subsequent inspection (Section 2.b).

The inspectors reviewed the following procedures that have been approved by BOSR:

|            |   |
|------------|---|
| BCP 530-1  | Phosphate K-Factor Determination                              |
| BCP 530-2  | Nitrite K-Factor Determination                                |
| BCP 530-3  | Hydrazine K-Factor Determination                              |
| BCP 530-4  | Silica K-Factor Determination                                 |
| BCP 610-2  | Chemical Standard and Reagent Test                            |
| BCP 400-T8 | Chemical Standard and Reagent Test                            |
| BCP 800-01 | HRSS Operation - pH, Conductivity and<br>Dissolved Oxygen     |
| BCP 800-02 | HRSS Operation - Ion Chromatograph<br>Chloride Determination  |
| BCP 800-03 | HRSS Operation - Gas Chromatography<br>Hydrogen Determination |

<sup>5</sup>Inspection Reports No. 50-454/83-46; 50-455/83-34

<sup>6</sup>Inspection Reports No. 50-454/83-14; 50-455/83-12

No problems were identified during the inspectors' review of these procedures.

During a tour of the plant, the inspectors observed the sampling panels for the primary and secondary system and the High Radiation Sampling System (HRSS) and also the sampling system for decay tanks. The inspectors confirmed that samples are currently being collected from these systems. Gas sampling vessels to be used at Byron are similar to those used at Zion.

The inspectors reviewed records relating to several short Quality Assurance Department audits of the chemistry group activities conducted in the fall of 1983. The audits have been closed out regarding chemical analytical results obtained during hot functional tests.

No items of noncompliance or deviations were identified.

6. Sample Analysis for the Confirmatory Measurements Program

The licensee conducted a beta analysis of a liquid sample provided by the NRC. Comparative results are presented in Table 1 and comparison criteria are outlined in Attachment 1. The licensee obtained all agreements for the three comparisons.

No items of noncompliance or deviations were identified.

7. Exit Interview

The inspectors met with licensee representatives (Section 1) at the plant on January 12, 1984 to discuss the scope and findings of the inspection. Further discussion was held by telephone with licensee representatives on January 13, 1984, who agreed to further evaluate the discharge anomaly discussed in Section 2a.

Attachments:

1. Table 1, Confirmatory  
Measurements Program
2. Attachment 1, Criteria  
for Comparing Analytical  
Measurements

## ATTACHMENT 1

### CRITERIA FOR COMPARING ANALYTICAL MEASUREMENTS

This attachment provides criteria for comparing results of capability tests and verification measurements. The criteria are based on an empirical relationship which combines prior experience and the accuracy needs of this program.

In these criteria, the judgment limits are variable in relation to the comparison of the NRC Reference Laboratory's value to its associated one sigma uncertainty. As that ratio, referred to in this program as "Resolution", increases, the acceptability of a licensee's measurement should be more selective. Conversely, poorer agreement should be considered acceptable as the resolution decreases. The values in the ratio criteria may be rounded to fewer significant figures to maintain statistical consistency with the number of significant figures reported by the NRC Reference Laboratory, unless such rounding will result in a narrowed category of acceptance. The acceptance category reported will be the narrowest into which the ratio fits for the resolution being used.

| <u>RESOLUTION</u> | <u>RATIO = LICENSEE VALUE/NRC REFERENCE VALUE</u> |                               |                               |
|-------------------|---|-------------------------------|-------------------------------|
|                   | <u>Agreement</u>                                  | <u>Possible Agreement "A"</u> | <u>Possible Agreeable "B"</u> |
| <3                | No Comparison                                     | No Comparison                 | No Comparison                 |
| >3 and <4         | 0.4 - 2.5   | 0.3 - 3.0                     | No Comparison                 |
| >4 and <8         | 0.5 - 2.0   | 0.4 - 2.5                     | 0.3 - 3.0                     |
| >8 and <16        | 0.6 - 1.67  | 0.5 - 2.0                     | 0.4 - 2.5                     |
| >16 and <51       | 0.75 - 1.33                                       | 0.6 - 1.67                    | 0.5 - 2.0                     |
| >51 and <200      | 0.80 - 1.25                                       | 0.75 - 1.33                   | 0.6 - 1.67                    |
| >200              | 0.85 - 1.18                                       | 0.80 - 1.25                   | 0.75 - 1.33                   |

"A" criteria are applied to the following analyses:

Gamma spectrometry, where principal gamma energy used for identification is greater than 250 keV.

Tritium analyses of liquid samples.

"B" criteria are applied to the following analyses:

Gamma spectrometry, where principal gamma energy used for identification is less than 250 keV.

Sr-89 and Sr-90 determinations.

Gross beta, where samples are counted on the same date using the same reference nuclide.

TABLE 1

U S NUCLEAR REGULATORY COMMISSION  
 OFFICE OF INSPECTION AND ENFORCEMENT  
 CONFIRMATORY MEASUREMENTS PROGRAM  
 FACILITY: BYRON  
 FOR THE 4 QUARTER OF 1983

| SAMPLE   | ISOTOPE | -----NRC----- |         | ----LICENSEE---- |         | ---LICENSEE:NRC--- |         |   |
|----------|---------|---------------|---------|------------------|---------|--------------------|---------|---|
|          |         | RESULT        | ERROR   | RESULT           | ERROR   | RATIO              | RES     | T |
| L SPIKED | H-3     | 2.1E-02       | 5.0E-04 | 1.8E-02          | 0.0E-01 | 8.6E-01            | 4.2E 01 | A |
|          | SR-89   | 7.2E-02       | 2.4E-03 | 6.2E-02          | 3.0E-03 | 8.6E-01            | 3.0E 01 | A |
|          | SR-90   | 1.1E-02       | 4.0E-04 | 1.1E-02          | 1.0E-03 | 1.0E 00            | 2.8E 01 | A |

## T TEST RESULTS:

A=AGREEMENT

D=DISAGREEMENT

P=POSSIBLE AGREEMENT

N=NO COMPARISON