

UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION III  
799 ROOSEVELT ROAD  
GLEN ELLYN, ILLINOIS 60137



Docket No. 50-331

JUN 6 1977

Iowa Electric Light and Power  
Company

ATTN: Mr. Duane Arnold  
President

IE Towers  
Post Office Box 351  
Cedar Rapids, IA 52406

Gentlemen:

This refers to the inspection conducted by Messrs. L. R. Greger and D. E. Miller of this office on May 2-5, 1977, of activities at Duane Arnold Energy Center authorized by NRC License No. DPR-49 and to the discussion of our findings with Mr. Mineck and others of your staff at the conclusion of the inspection.

The enclosed copy of our inspection report identifies areas examined during the inspection. Within these areas, the inspection consisted of a selective examination of procedures and representative records, observations, and interviews with personnel.

During this inspection, certain of your activities appeared to be in noncompliance with NRC requirements, as described in the enclosed Appendix A.

This notice is sent to you pursuant to the provisions of Section 2.201 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations. Section 2.201 requires you to submit to this office within twenty days of your receipt of this notice a written statement or explanation in reply, including for each item of noncompliance: (1) corrective action taken and the results achieved; (2) corrective action to be taken to avoid further noncompliance; and (3) the date when full compliance will be achieved.

In accordance with Section 2.790 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this letter, the enclosures, and your response to this letter will be placed in the NRC's Public Document Room,

JUN 6 1977

except as follows. If the enclosures contain information that you or your contractors believe to be proprietary, you must apply in writing to this office, within twenty days of your receipt of this letter, to withhold such information from public disclosure. The application must include a full statement of the reasons for which the information is considered proprietary, and should be prepared so that proprietary information identified in the application is contained in an enclosure to the application.

We will gladly discuss any questions you have concerning this inspection.

Sincerely,

James M. Allan, Chief  
Fuel Facility and  
Materials Safety Branch

Enclosures:

1. Appendix A, Notice of Violation
2. IE Inspection Report No. 50-331/77-10

cc w/encls:

Mr. E. L. Hammond, Chief  
Engineer  
Central Files  
Reproduction Unit NRC 20b  
PDR  
Local PDR  
NSIC  
TIC

OFFICE	RILL	RIFT	RILL	RILL	RILL
SURNAME	Griffith	Miller	Fisher	Allan	Klister
DATE	6/1/77				

Appendix A

NOTICE OF VIOLATION

Iowa Electric Light and  
Power Company

Docket No. 50-331

Based on the inspection conducted on May 2-5, 1977, certain of your activities appear to be in noncompliance with NRC requirements, as noted below. Items 1 and 2 are infractions.

1. Contrary to Technical Specification B-3.3.1:C.5, the quarterly testing of the off-gas stack and reactor building vent stack gaseous monitors during 1976 did not adequately check the calibration of those monitors.
2. Contrary to Technical Specification 4.7.B, required surveillance on the standby gas treatment system was not adequately performed in the following instances:
  - a. The incorrect revision of STP 47B003 was used to perform and record the June 23, 1976 surveillance testing.
  - b. An inoperable differential pressure gauge was used to demonstrate adequacy of the pressure drop across the combined high efficiency and charcoal filters (Train "B") during surveillance testing on May 5, 1976.
  - c. Run-time records, required to comply with the surveillance testing requirements after 720 hours of system operation, were not maintained before May 1976.

U.S. NUCLEAR REGULATORY COMMISSION  
OFFICE OF INSPECTION AND ENFORCEMENT

REGION III

Report No. 50-331/77-10

Docket No. 50-331 License No. DPR-49

Licensee: Iowa Electric Light and Power Company  
IE Towers  
Post Office Box 351  
Cedar Rapids, IA 52406

Facility Name: Duane Arnold Energy Center

Inspection at: Duane Arnold Site, Palo, IA

Inspection conducted: May 2-5, 1977

Inspectors: L. R. Greger

*L.R. Greger*

6/1/77

(date signed)

D. E. Miller

*D.E. Miller*

6/1/77

(date signed)

Approved by: W. L. Fisher, Chief  
Fuel Facility Projects and  
Radiation Support Section

*W.L. Fisher*

6/3/77

(date signed)

Inspection Summary

Inspection on May 2-5, 1977 (Report No. 50-331/77-10)

Areas Inspected: Routine, unannounced inspection of radioactive waste systems, including: effluent releases; records and reports of effluents; effluent control instrumentation; procedures for controlling releases; containment air-cleaning systems; reactor coolant water quality; solid radioactive waste; nonroutine reports; and licensee action on previously identified unresolved items. The inspection involved 56 inspector-hours onsite by two NRC inspectors.

Results: Of the nine areas inspected, no items of noncompliance or deviations were found in seven areas; two apparent items of noncompliance were found in two areas (infraction - inadequate calibration - Paragraph 7; infraction - inadequate surveillance - Paragraph 10.a)

DETAILS

1. Persons Contacted

- \*G. Kuehn, Assistant Radiation Protection Engineer
- \*W. McVicker, Chemist
- \*D. Mineck, Assistant Chief Engineer
- L. Nelson, Surveillance Coordinator
- J. Vinqvist, Electrical Maintenance Supervisor
- \*R. York, Operations Supervisor
- \*K. Young, Radiation Protection Engineer

The inspectors also contacted several other licensee employees, including members of the technical and engineering staffs.

\* denotes those attending the exit interview.

2. General

This inspection was conducted to examine the licensee's radwaste operations for compliance with NRC regulations. The licensee's derivations and records of radioactive effluents were reviewed and compared with the radioactive releases reported in the licensee's semiannual reports. Liquid and gaseous effluent process monitor calibrations, containment air-cleaning system testing, and reactor coolant chemistry measurements were also reviewed.

The plant chemist terminated employment with the licensee at the end of April 1977. Mr. W. McVicker has been appointed to fill the plant chemist position. Mr. McVicker meets the minimum requirements of ANSI N18.1-1971 for the plant chemist position.

3. Licensee Action on Previous Inspection Findings

(Closed) Unresolved Item (50-331/76-14): Inoperable off-gas pretreatment monitor. NRR concluded that the technical specifications require that the pretreatment monitor be operable whenever steam pressure is available to the air ejectors.<sup>1/</sup> This item had been identified and corrected by the licensee.<sup>2/</sup>

4. Licensee Internal Audits

While reviewing the licensee's results of investigations of non-routine events (Paragraph 11), the inspector noted that the licensee

1/ Ltr, Lear to Arnold, dtd 11/10/76.

2/ Ltr, Hammond to Rusche, dtd 5/24/76.

had identified five items requiring corrective action. Corrective action had been completed for four items and initiated for the remaining item.

5. Radioactive Effluent Releases

a. Gaseous Releases

The licensee's calculations and records of gaseous releases for 1976 were selectively reviewed. According to the licensee's records, the maximum quarterly release rate was approximately 15% of the technical specification limit (quarterly average) and the maximum hourly release rate was approximately 30% of the technical specification limit (hourly average). One release in excess of the technical specification reporting requirements occurred during September.<sup>3/</sup> No release rates in excess of the technical specification limits were identified. Except as reported by the licensee (Paragraph 11), no discrepancies from the technical specification surveillance requirements were noted.

b. Radioiodine and Particulate Releases

The licensee's calculations and records of radioiodine and particulate releases for 1976 were selectively reviewed. According to the licensee's records, the maximum quarterly average release rate was approximately 25% of the technical specification limit (quarterly average) and the maximum release rate was approximately 16% of the technical specification limit (daily average). No releases in excess of the technical specification limits were identified. The licensee reported exceeding the technical specification notification limit on one occasion during 1976.<sup>4/</sup> The releases were later determined not to have exceeded the reporting limit.<sup>5/</sup> The inspectors have no further questions regarding this matter.

Except as reported by the licensee (Paragraph 11) or noted below, no discrepancies from the technical specification surveillance requirements were identified. The inspector requested that the licensee clarify, with NRR, the interpretation of Note No. 3 to Technical Specification Table B-3.3-2 regarding sample frequency requirements for particulate and charcoal filters. Although the licensee exceeded the release rate equivalent to the release rates specified in Technical Specification B-2.3.1.C.3 on at least four separate occasions during 1976, the referenced limits were exceeded for specific

3/ Ltr, Hammond to Rusche, dtd 9/13/76.

4/ Ltr, Hammond to Stello, dtd 12/22/76.

5/ Ltr, Hammond to Stello, dtd 1/26/77.

sample intervals and not on a quarterly average basis. The licensee did not interpret the technical specifications to require daily sampling under these circumstances. This item is considered unresolved.

The licensee was noted to have examined the isokinetic sampling characteristics of the off-gas stack and reactor building vent stack samplers. Documentation reviewed during the inspection confirmed that the evaluation concluded that the sampler flow rates were matched to the effluent flow rates. The inspectors have no further questions regarding this matter at this time.

c. Liquid Releases

According to the licensee's records, twenty-one liquid radwaste batch releases were made during 1976. The licensee's records of radioactive concentrations, volumes, dilution flows, and release times for 1976 were selectively reviewed. Except as reported by the licensee (Paragraph 11), no discrepancies from the technical specification sampling and analysis requirements were identified. According to the licensee's records: (1) all batches were sampled prior to release; (2) the maximum concentration in the discharge canal was less than 0.75 MPC (75% of technical specification limit); (3) one release was made from the hotwell (tube leakage) to the circulating water system, the circulating water concentration being approximately 0.95 MPC before dilution (blowdown to discharge canal); and (4) total liquid radwaste activity released during 1976 (excluding tritium and noble gases) was less than 10 mCi (less than 0.1% of the quarterly technical specification discharge limit). No items of noncompliance or deviations were identified.

The inspectors requested that the licensee review the dissolved noble gas analysis procedure and make necessary changes to resolve minor inconsistencies between the procedure and the analysis method currently in use. The inspectors also requested that the licensee confirm the proportional counter efficiencies which are currently in use. These items will be reviewed further during a subsequent inspection.

6. Reports of Effluents

The inspectors reviewed the licensee's semiannual effluent reports for 1976 and corrections to the 1975 reports. <sup>6/77</sup> The inspectors

- 6/ Ltr, Hunt to NRC, dtd 7/22/76 (DAEC - 76-236).
- 7/ Ltr, Hunt to NRC, dtd 7/22/76 (DAEC - 76-203).

have no further questions regarding the 1975 effluent reports. In addition to the reported errors in the halogens and particulate data,<sup>8/</sup> minor inconsistencies were identified in the reported strontium-90 and "percent of T/S" data for liquid releases during the period January 1 through June 30, 1976. The inspectors requested that the licensee review these items and correct the reported data as necessary. These items will be reviewed further during a future inspection.

Noting that the effluent reports do not include krypton-85 releases, the inspectors discussed the desirability of reporting effluent data for the nuclides specified in Regulatory Guide 1.21. If nuclides are not detected by the licensee's counting technique, the value should be reported as less than the maximum sensitivity of measurement or calculated using measured ratios to nuclides which are routinely identified and measured. The licensee stated that the matter would be considered. This item will be reviewed further during a future inspection.

#### 7. Effluent Control Instrumentation

Process monitor surveillance records for calendar year 1976 were reviewed for compliance with the technical specification requirements for operability, trip setpoints/functions, and calibrations and related testing. The following monitors were reviewed:

- Liquid effluent monitor (RE 3972)
- Off-gas stack monitors (RE 4116A & 4116B)
- Reactor building vent stack monitors (RE 7613, 7614, and 7615)
- Off-gas pretreatment monitor (RE 4104)
- Off-gas post-treatment monitors (RE 4101A & 4101B)

Except as reported by the licensee, (Paragraph 11) the monitors were operable throughout 1976 according to licensee personnel and surveillance records. Except as noted below, no discrepancies from the technical specification surveillance requirements for daily, monthly, quarterly, and annual instrumentation checks were noted. Additionally, the automatic isolation functions of RE 3972, RE 4101A and RE 4101B were noted to have been conducted satisfactorily. Conversion factor calculations for the off-gas stack and reactor building vent stack monitors are calculated monthly from effluent grab samples. Activity response and energy response curves were generated for these monitors in conjunction with one point grab sample calibrations to satisfy the annual calibration requirements. The grab samples have not always been conducted in the same time frame as the activity and energy response checks in the past. Licensee personnel

<sup>8/</sup> Ltr, Young to Keppler, dtd 12/30/76.



stated that future annual calibrations would include activity and energy response checks and one point grab sample calibrations conducted at approximately the same time.

In addition to the annual calibration requirements, Technical Specification B-3.3.1.C.5 requires that the calibration of the off-gas stack and reactor building vent stack monitors be checked quarterly with a check source. According to the licensee's surveillance records for 1976 and statements by licensee personnel, check sources are used in conjunction with the monthly functional and quarterly calibration checks but no attempt is made to determine acceptability of the actual monitor response to the predicted monitor response to the check source. The licensee's quarterly calibration check procedure does not, therefore, comply with the technical specification requirements.

The inspectors requested that the licensee examine the energy response characteristics of the reactor building vent monitors to beta radiation. This item will be reviewed further during a future inspection.

The applicability of Technical Specification B-2.3.1.C.8 to the off-gas pretreatment monitor was clarified in a letter from NRR to the licensee dated November 10, 1976. This item is considered resolved.

The technical specification operability requirements for the reactor building stack monitors and samplers are not entirely consistent. Technical Specification B-2.3.1.C.6 and B-3.3.1.C.1 require that the monitors and samplers operate continuously whenever radioactive effluents are being emitted from the reactor building vent stacks. Technical Specification B-2.3.1.C.8 on the other hand requires that the plant be shut down within 10 days after the monitors or samplers become inoperable; no reference is made to the status of reactor building vent stack releases in this specification. The inspectors stated that the reactor building vent stack monitors and samplers must be operable any time radioactive releases are being made via this release path. The licensee concurred with the inspectors and agreed to initiate action to resolve the apparent inconsistency in the technical specifications. This item will be reviewed further during a future inspection.

8. Radwaste Equipment

Operation of process equipment used in handling gaseous, liquid, and solid radwastes was reviewed through discussions with licensee personnel and review of operating and surveillance records. No

significant problems were identified. Off-gas system operation has been relatively trouble free. The liquid radwaste evaporator remains inoperable; the licensee is continuing to study alternatives. The licensee continues to use a dewatering process for waste solidification. The portable urea formaldehyde unit has not been used.

No items of noncompliance or deviations were identified.

9. Reactor Coolant Radiochemistry

The reactor coolant radiochemistry results for calendar year 1976 were reviewed. Reactor coolant radioiodine concentrations (I-131 dose equivalent) averaged  $1 \text{ E-4}$  to  $5 \text{ E-4}$   $\mu\text{Ci/gm}$  which is less than 0.1% of the technical specification limit. The maximum radioiodine concentration was less than 5% of the technical specification limit. The equilibrium radioiodine concentrations were not high enough to trigger the special sampling requirements associated with startup, off-gas increases, or power changes.

Except for the refueling outage in early 1976, no discrepancies from the radiochemistry sampling and analysis surveillance requirements were noted. Although the technical specifications do not specifically exempt the licensee from the sampling and analysis surveillance requirements when the plant is not operating, the radiochemistry limits are applicable only when the reactor is critical. The licensee has interpreted the lack of radiochemistry limits when shutdown to imply that the sampling and analysis surveillance is not required in the shutdown mode. The licensee indicated that the matter would be resolved with NRR and that a technical specification change request would be initiated to clarify the sampling and analysis surveillance requirements. This matter is considered unresolved.

10. Air-Cleaning Systems

a. Standby Gas Treatment System (SBGTS)

The SBGTS surveillance records for calendar year 1976 were reviewed. According to licensee personnel and the surveillance records, both SBGTS trains were operable throughout 1976 (whenever secondary containment integrity was required). Except as noted below, no discrepancies from the technical specification surveillance requirements were noted. According to the surveillance records, in-place HEPA filter and charcoal adsorber testing demonstrated greater than 99.9% DOP and Freon removal, respectively, and laboratory carbon sample analyses

Review of surveillance test procedures STP 42D004 and STP 42D005 indicated that the automatic initiation surveillance testing is demonstrated by simulating a refueling floor ventilation high radiation condition. Although automatic operation of the SBGTS is also initiated by reactor building ventilation high radiation, high drywell pressure, and low reactor water level, these initiating signals are not demonstrated in the surveillance tests. The licensee stated that related surveillance testing may be adequate to test all of the SBGTS automatic operation initiating signals. This item is considered unresolved.

Minor procedural errors were noted in surveillance procedures STP 47B003 and STP 47B001. Licensee personnel stated that the procedures would be revised to correct the errors. This item will be reviewed during a future inspection.

(b. Control Room Air Treatment System

The control room ventilation surveillance records for calendar year 1976 were reviewed. According to licensee personnel and surveillance records, both control room air treatment systems were operable throughout 1976 (whenever containment integrity was required). No discrepancies from the technical specification surveillance requirements were noted. According to the licensee's surveillance records: (1) in-place HEPA filter and charcoal adsorber testing demonstrated greater than 99% removal of DOP and Freon, respectively; (2) laboratory carbon sample analysis demonstrated greater than 90% methyl iodide removal; and (3) system flow was shown to be  $1000 \pm 100$  cfm. Neither the charcoal nor HEPA filters were replaced during 1976.

No items of noncompliance or deviations were identified.

11. Review of Nonroutine Events Reported by the Licensee

The inspectors reviewed the licensee's actions with respect to the following licensee event reports. No items of noncompliance or deviations were identified. The inspector noted that the licensee had identified and initiated corrective actions for five items related to these events.

Inoperability of reactor building vent stack monitor sample pumps (RO 77-33)

Inoperability of drywell particulate monitor (RO 77-3 & 77-4)

Failure of reactor building ventilation monitor (RO 76-56)

Failure of off-gas stack dilution flow recorder (ESTV 77-2)

Frozen sample line for off-gas stack monitor (ETSV 77-1)

Improper performance of off-gas stack monitor daily sensor checks (ETSV 76-8)

Loss of Sr-89 and Sr-90 sample for third quarter 1976 liquid effluent (ETSV 76-6)

Abnormally cold weather experienced during January caused blockage of the off-gas stack monitor sample line and the consequent lapse in monitoring off-gas stack releases, a possibility that the licensee had been advised of during an earlier inspection.<sup>9/</sup> The licensee had responded to the earlier warnings by heat tracing portions of the off-gas stack sample line. However, the earlier heat tracing effort was apparently lacking and further heat tracing was initiated as a result of the January occurrence.

#### 12. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, items of noncompliance, or deviations. Unresolved items disclosed during the inspection are discussed in Paragraphs 5.b, 9 and 10.a.

#### 13. Exit Interview

The inspector met with licensee representatives (denoted in paragraph 1) at the conclusion of the inspection on May 5 and further discussed the inspection findings with Mr. Mineck by telephone on May 20, 1976. The inspector summarized the scope and findings of the inspection. The licensee made the following remarks in response to certain items discussed by the inspector:

- a. Acknowledged the statements by the inspectors with respect to the items of noncompliance. (Paragraphs 7 and 10)
- b. Stated that the sampling frequency requirements for particulate and charcoal filters would be clarified with NRR. (Paragraph 5.b)
- c. Acknowledged the inspector's request that the noble gas (liquid) analysis procedure and the proportional counter efficiencies be examined. (Paragraph 5.c)

9/ IE Inspection Report No. 50-331/73-16.

- d. Stated that the effluent reports would be reviewed and revised as necessary. (Paragraph 6)
- e. Acknowledged the inspector's comments with respect to calibration of the gaseous monitors and stated that the operability requirements for the reactor building vent stack monitors would be clarified with NRR. (Paragraph 7)
- f. Stated that the reactor coolant radiochemistry sampling and analysis requirements when not operating would be clarified with NRR. (Paragraph 9)
- g. Stated that the automatic initiation test procedure (standby gas treatment system) would be reviewed for adequacy. (Paragraph 10.a)