

Reactor Facilities
Br.

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

APR 20 1976

Iowa Electric Light and Power Company
ATTN: Mr. Duane Arnold, President
Security Building
P. O. Box 351
Cedar Rapids, Iowa 52405

Docket No. 50-331

Gentlemen:

This refers to the inspection conducted by Mr. G. T. Gibson of this office on March 16-19, 1976, of activities at the Duane Arnold Energy Center, authorized by License No. DPR-49, and to the discussion of our findings with Mr. G. G. Hunt and members of his staff at the conclusion of this 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 under Enforcement Items in the Summary of Findings section of the enclosed inspection report.

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 notice, the enclosed inspection report, and your response to this notice will be placed in the NRC's Public Document Room, except as follows. If this report contains information that you or your contractors believe to be



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Iowa Electric Light
and Power Company

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proprietary, you must apply in writing to this office, within twenty days of your receipt of this notice, 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 yours,

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

Enclosure:
IE Inspection Report
No. 050-331/76-07

cc w/encl:
G. G. Hunt, Chief
Engineer

bcc w/encl:
PDR
Local PDR
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UNITED STATES NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION III

Report of Environmental Monitoring Inspection
and
Confirmatory Measurements

IE Inspection Report No. 050-331/76-07

Licensee: Iowa Electric Light and Power Company
P. O. Box 351
Cedar Rapids, Iowa 52405

Duane Arnold Energy Center
Palo, Iowa

License No. DPR-49
Category: G

Type of Licensee: BWR - 1593 MWt (GE)

Type of Inspection: Routine, Unannounced

Dates of Inspection: March 16-19, 1976

Principal Inspector:

G. T. Gibson

G. T. Gibson

4-13-76

(Date)

Accompanying Inspector:

J. A. Pagliaro

J. A. Pagliaro

Other Accompanying Personnel: None

Reviewed By:

J. Pagliaro, Chief
Environmental and Special
Projects Section

J. A. Pagliaro

4-14-76

(Date)

SUMMARY OF FINDINGS

Inspection Summary

Unannounced Environmental Protection Inspection and Announced Confirmatory Measurements Inspection conducted on March 16-19, (76-07): Reviewed environmental program conduct and management; examined program results; discussed and reviewed program control of quality and laboratory radioanalysis; followed up items from previous environmental inspection; collected new set of confirmatory measurement effluent samples; and discussed results from previous effluent sample comparisons. Four items of noncompliance were noted relating to licensee failure to comply with the specifications contained in Appendix B to the Technical Specifications of the Operating License.

Enforcement Items

Deficiencies

- A. Contrary to Appendix B, Technical Specification 5.2.(D), requiring Iowa Electric to report the circumstances of any licensee identified environmental Technical Specification violations to the NRC as specified in Section 5.4.2, items of noncompliance identified by licensee Quality Assurance Audits were not reported to the NRC as per the referenced Technical Specification. This item of noncompliance was also cited in the previous inspection.^{1/} (Paragraph 3.a, Report Details)
- B. Contrary to Appendix B, Technical Specification 4.1.1.1, the general water quality analysis program was not conducted for sample Location 5 (discharge canal) on August 11, 1975. In addition, other specified laboratory tests to be performed on general water quality samples were not performed as specified in the Technical Specifications. This item^{2/} of noncompliance was also cited in the previous inspection. (Paragraph 4.b.(2)(a), Report Details)
- C. Contrary to Appendix B, Technical Specification 4.1.1.2, the complete water quality analysis program parameters were not performed as specified in the referenced Technical Specification on May 6, July 28-29, and October 20, 1975. (Paragraph 4.b.(2)(b), Report Details)

^{1/} IE Inspection Report No. 050-331/75-03.

^{2/} Ibid.

- D. Contrary to Appendix B, Technical Specification 4.1.1.8, the quarterly entrainment studies were only performed three times during 1975. (Paragraph 4.c.(3), Report Details)

Licensee Action on Previously Identified Enforcement Items

The inspector reviewed implementation of corrective action described in the licensee's letter dated April 22, 1975, in response to the three items of noncompliance identified during the previous inspection.^{3/} The previous items of noncompliance were reviewed by the inspector as follows:

A. Infraction

Contrary to Section 4.1.1 of the Appendix B, Technical Specification:

1. The semimonthly general water quality analysis specified in Appendix B, Technical Specification 4.1.1.1, was not conducted at the discharge canal location on five occasions during the calendar year 1974.
2. The Benthic studies specified in Appendix B, Technical Specification 4.1.1.5, were not conducted during the fourth quarter of 1974.
3. The impingement studies specified in Appendix B, Technical Specification 4.1.1.9, were not conducted during the second and third quarters of 1974.
4. Visual inspections for salt drift damage specified in Appendix B, Technical Specification 4.1.2, were not conducted during calendar year 1974.

The inspector reviewed the semimonthly general water quality analysis data and determined corrective action specified by the licensee did not preclude recurrence of this item of noncompliance. This is a recurrent item of noncompliance, with Appendix B, Technical Specification 4.1.1.1, identified in Enforcement Item B of this report. (Paragraph 4.b.(2)(a), Report Details)

The inspector reviewed benthic organism studies performed during 1975 and determined that contrary to Appendix B, Technical Specification 4.1.1.5, the licensee again failed to conduct the quarterly benthic study program during the first quarter of 1975. The licensee identified this item of noncompliance during the licensee Quality Assurance Audit of August, 1975. The licensee failed to report this identified item of noncompliance to

3/ Ibid.

the NRC as specified by Appendix B, Technical Specification 5.2.(D). Failure to report is a recurrent item of noncompliance with Appendix B, Technical Specification 5.2.(D), identified in Enforcement Item A of this report. (Paragraph 3.a, Report Details)

The inspector reviewed impingement study records conducted during calendar year 1975. The inspector determined the studies were conducted as specified in the Technical Specifications. The inspector noted that the licensee had identified during an April, 1975 Quality Assurance Audit, that impingement study records were not being forwarded monthly to the licensee's subcontractor as specified by Appendix B, Technical Specification 4.1.1.9. Failure of the licensee to report this licensee identified item of noncompliance with the referenced Technical Specification, is contrary to Appendix B, Technical Specification 5.2.(D). This is a recurrent item of noncompliance with Appendix B, Technical Specification 5.2.(D), identified in Enforcement Item A of this report. (Paragraph 3.a, Report Details)

The inspector reviewed licensee reports on the salt drift inspections for calendar year 1975. The inspector noted that salt drift inspections were conducted on an approximate monthly frequency, with twelve inspections during the year. The inspector has no further questions regarding this item at this time. (Paragraph 4.c.(5), Report Details)

B. Deficiencies

1. Contrary to Section 5.3 of the Appendix B, Technical Specifications:
 - a. Procedures for calibration of the Thermoluminescent Dosimeter (TLD) monitoring equipment had not been prepared and approved.
 - b. The Environmental Radiological sample collection procedures had not been reviewed by the operations committee as specified by Section 5.1 of the Technical Specifications.

The inspector reviewed procedures for the calibration of the Thermoluminescent Dosimeter (TLD) system and determined they had been prepared and approved as specified in the technical specifications. The inspector has no further questions regarding this item at this time. (Paragraph 3.c, Report Details)

The inspector reviewed the environmental radiological sample collection procedures and determined they had been prepared and approved as specified in the Technical Specifications. The inspector has no further questions regarding this item at this time. (Paragraph 3.b, Report Details)

2. Contrary to Section 5.4.2.1 of the Appendix B, Technical Specifications:

- a. Licensee identified instances of noncompliance with the temperature surveillance requirements specified in Section 3.1.1 were not reported to the NRC within the specified time periods.
- b. Licensee identified instances of noncompliance with the chlorine sampling requirements of Section 3.2.1, from December 10-30, 1974, were not reported to the NRC within the specified time periods.

The inspector reviewed the temperature surveillance system and reviewed individual records. The inspector reviewed the licensee identified item of noncompliance reported to the NRC on November 26, 1975, of an occurrence on November 19, 1975, of instrument failure of the computer logging system and subsequent failure to perform manual temperature recording. The inspector has no questions regarding this item at this time. (Paragraph 4.b.(2)(c), Report Details)

The inspector reviewed chlorine sampling requirements and determined the licensee has initiated chlorination procedures which preclude discharging cooling tower blowdown while chlorination is being performed. The inspector has no further questions regarding this item at this time. (Paragraph 4.b.(1), Report Details)

The inspector reviewed Quality Assurance Audits performed during 1975. The inspector noted the licensee had identified items of noncompliance with Appendix B, Technical Specifications regarding the conduct of the benthic organism study, conduct of the fish impingement program, location of soil and vegetation sample locations in the radiological program, and completion of calibration procedures to be approved by the licensee of the licensee's subcontractor. These items of noncompliance identified by the licensee were not reported to the Commission as specified by Technical Specification 5.2.(D). This is a recurrent item of noncompliance which has been identified in Enforcement Item A of this report. (Paragraph 3.a, Report Details)

Other Significant Items

A. Systems and Components

None.

B. Facility Items (Plans and Procedures)

None.

C. Managerial Items

None.

D. Noncompliance Items Identified and Corrected by Licensee

On November 19, 1975, a failure of the computer temperature logging system and subsequent operator failure to log hourly temperature values, resulted in noncompliance with Technical Specification 3.1.1. The licensee identified this item of noncompliance to the NRC in a letter dated November 26, 1975. The inspector reviewed this item of noncompliance, and has no further questions regarding this item. (Paragraph 4.b.(2)(c), Report Details)

E. Deviations

None.

F. Previously Reported Unresolved Items

Three previously reported unresolved items from the previous inspection^{4/} were reviewed during this inspection:

1. The inspector reviewed laboratory procedures and calibration data with respect to calibration of the amperometric titrator. The inspector determined that the licensee is conducting the analysis for pH within accepted standard laboratory practices. (Paragraph 3.c, Report Details)
2. The inspector reviewed the sensitivity and accuracy of the discharge and river temperature sensors. The inspector reviewed the calibration and periodic maintenance testing of the temperature sensors and determined the procedures, results, and documentation, identified the sensitivity and accuracy of the RTD sensors to be within Technical Specification limits. (Paragraph 4.b.(2)(c), Report Details)

4/ Ibid.

3. The inspector reviewed performance of the chlorination studies specified in Section 4.1.1.12 of the Appendix B, Technical Specifications. The licensee has maintained chlorination records of the circulating water system blowdown during chlorination. Since plant operating procedures provide that the blowdown is not released to the environment during chlorination, the licensee did not exceed discharge chlorination limits during 1975. The inspector has no further questions regarding this item at this time. (Paragraph 4.b.(1), Report Details)

Management Interview

A management interview was conducted on March 19, 1976, which was attended by the following individuals:

G. Hunt, Chief Engineer
E. Hammond, Assistant Chief Engineer
R. York, Operations Supervisor
K. Young, Radiation Protection Engineer

The following items were discussed on March 19, 1976, with the licensee representatives:

- A. The NRC inspector discussed the scope and intent of this specific inspection. (Paragraph 2, Report Details)
- B. The inspector and the licensee discussed environmental program management. (Paragraph 3, Report Details)
- C. The inspector discussed the review of licensee corrective action on the items of noncompliance from the previous inspection. (Paragraph 4, Report Details)
- D. The inspector discussed the items of noncompliance identified by the licensee during the period of this inspection. (Paragraph 4, Report Details)
- E. The inspector discussed the items of noncompliance identified by the inspector during this inspection. (Paragraph 4, Report Details)
- F. The inspector discussed the results of the confirmatory measurements comparison, (Paragraph 5, Report Details)

REPORT DETAILS

1. Personnel Contacted

Persons contacted, in addition to those identified in the Management Interview section of the Summary of Findings, are as follows:

R. Johnson, Plant Chemist
D. Vernon, Environmental Technician
G. Kuehn, Assistant Radiation Protection Engineer
J. Weeda, Nuclear Results Engineer
R. Rinderman, Quality Supervisor
D. Gemblar, Supervising Quality Assurance Engineer
J. Vinquest, Electrical Maintenance Supervisor

2. General

The Environmental Protection portion of this inspection consisted of an examination of the licensee's radiological and nonradiological environmental monitoring and nonradiological effluent control programs; including sample technique procedures, sample collection equipment and location, and program results. Management control aspects including organizational structures, assignment of responsibilities and authorities, and administrative control were also examined. The licensee's Technical Specifications were utilized as the primary inspection criteria.

The Confirmatory Measurements portion of this inspection consisted of a test of the licensee's measurements of activity in actual plant effluent samples. Comparisons were performed between the licensee's measurements to those of the NRC's reference laboratory. The two laboratories perform measurements on the same sample. The measurements made by the NRC laboratory are referenced to the National Bureau of Standards Radioactivity Measurements System by laboratory intercomparisons. The inspector also collected a new set of plant effluent samples, comparative analytical results of which will be examined during a subsequent confirmatory measurements inspection.

3. Management Control

The licensee's administrative and procedural controls for implementation of the environmental monitoring and nonradiological effluent control programs were examined. This examination included a review of assignments, responsibilities and authorities for program

management implementation. Since the previous environmental protection inspection,^{5/} the licensee has maintained the same management and audit functions relating to the conduct of environmental monitoring and radiological effluent control programs.

a. Review and Audit

The inspector reviewed reports and documentation of licensee audits conducted during 1975. Two audits were conducted: Iowa Electric Headquarters Quality Assurance (April and September, 1975), and DAEC Quality Assurance (August, 1975). The audits reviewed and documented laboratory equipment calibration, laboratory procedures, environmental program results, and determination of completeness of Appendix B, Technical Specification requirements. The following items of noncompliance with the Appendix B, Technical Specifications were identified during the 1975 licensee audits:

- (1) The quarterly benthic organism study specified in Appendix B, Technical Specification 4.1.1.5, was not conducted in the first quarter of 1975. This is a recurrent item of noncompliance with the referenced Technical Specification having been cited in the previous inspection report.^{6/}
- (2) Contrary to Appendix B, Technical Specification 4.1.1.9, the number of fish found in trash collection baskets, as determined by station personnel, were not forwarded monthly to Iowa Electric's consultant for analysis. Beginning May, 1975 plant procedures were revised to assure the fish impingement records were forwarded monthly to Iowa Electric's consultant.
- (3) Contrary to Appendix B, Technical Specification 4.3.1.A, environmental soil and vegetation samples were not collected at the locations shown in Appendix B, Technical Specification, Figure 4.3-1. The licensee revised the environmental sampling procedures to reflect new sample locations, and submitted a Technical Specification revision to resolve discrepancies between sampling procedures and the referenced Technical Specification.

5/ Ibid.

6/ Ibid.

- (4) Contrary to Appendix B, Technical Specification 5.3, requiring detailed written procedures to be prepared for instrument calibration and analysis for all components involved in carrying out the plant environmental monitoring program of Section 2.0, the University of Iowa subcontractor did not have approved procedures. The inspector noted approved subcontractor instrument calibration procedures were submitted subsequent to the September Quality Assurance Audit.

Contrary to Appendix B, Technical Specification 5.2.(D), requiring Iowa Electric to report any Technical Specification violations to the NRC; NRC notification of the violations of the Technical Specification listed above, were not performed. Failure to report identified violations of the Technical Specifications is a recurrent item of noncompliance as cited in the previous inspection.^{7/}

b. Operational Procedures

The inspector reviewed the licensee's radiological and environmental sampling procedures. The inspector noted that procedures had been developed, reviewed, and approved by the Operations Committee. The inspector reviewed contract laboratory procedures and determined approved subcontractor laboratory procedures were received after the September, 1975 Quality Assurance Audit. The inspector has no further questions regarding this item at this time.

c. Calibration Procedures

The inspector reviewed procedures for calibration of equipment utilized to comply with the environmental effluent requirements. The inspector reviewed calibration records and documentation of periodic maintenance of the thermoluminescent dosimeter monitoring equipment and amperometric titrator. The inspector has no further questions regarding these items at this time.

4. Implementation of Environmental Protection Programs

a. Radiological Monitoring Programs

The results of the licensee's radiological and environmental monitoring programs for the calendar year 1975 were selectively examined for compliance with monitoring and reporting requirements and for corrective action on previously identified items of noncompliance.^{8/} The installation and operability of selected radiological and environmental monitoring stations were also examined.

^{7/} Ibid.

^{8/} Ibid.

(1) Environmental Monitoring Reports

No unusual results or trends were identified in the inspector's review of the radiological environmental monitoring results. The inspector reviewed the two semiannual Operating Reports for 1975, and determined they were prepared and submitted as per requirements of the Technical Specifications.

(2) Sample Collection Stations

The inspector examined selected radiological air sampling stations and found them to be operable and located as specified. The inspector determined the licensee is in the process of replacing old air samplers with newer air samplers equipped with vacuum gauges. The air samplers also contain flow meters and elapsed time indicators. Completion of air sampler replacement is expected by June, 1976. This item will be reviewed during a subsequent inspection.

(3) TLD Systems

The Lithium Fluoride (LiF) Thermoluminescent Dosimeter (TLD) gamma radiation monitoring system was reviewed and selective sample sites were inspected. The inspector noted the licensee maintains the TLD containers away from the air sampler shelter housing which precludes possible shielding to gamma radiation.

b. Nonradiological Monitoring Program

Results of the licensee's nonradiological environmental monitoring programs for 1975, were selectively examined for compliance with monitoring and reporting requirements, and for corrective action on identified deficiencies.

(1) Chemical Dischargers

The inspector reviewed chemical analyses of the waste neutralizing tank discharges released during 1975. The inspector reviewed the release data for compliance with monitoring and effluent release limitations specified in the Technical Specifications. The inspector determined there were no occurrences of chemical releases reviewed exceeding those specified in the Technical Specifications. In addition, the inspector reviewed pH requirements and determined that reviewed releases were within the allowable pH range.

The inspector reviewed chlorination records and determined the licensee is securing the circulating water blowdown from the cooling towers prior to chlorination. After chlorination is completed, sampling of the blowdown water is performed and no releases are made until chlorine levels are less than 0.05 milligrams per liter. As specified in the previous inspection report,^{9/} since the facility is not releasing chlorine during blowdown releases, the licensee did not perform the general chlorination study as specified in 4.1.1.12. This is consistent with the Technical Specification change request to delete chlorine sampling in the environment, since chlorination levels in waste releases are below minimum detectable levels. The inspector has no further questions regarding this item at this time.

(2) Water Quality Monitoring

(a) General Water Quality Analysis

The inspector reviewed the general water quality analysis program which is conducted twice per month routinely. The inspector reviewed the general water quality analysis data presented in the two 1975 semiannual Operating Reports. The inspector determined that contrary to Technical Specification 4.1.1.1, the licensee did not conduct the water quality analysis program at sample Location 5 for August 11, 1975, nor perform turbidity analysis on any samples collected July 28, 1975. This is a recurrent item of noncompliance from the previous inspection.^{10/} The inspector discussed with licensee personnel the importance of close liaison with subcontractor programs and timely identification and reanalysis of missed samples or analysis.

(b) Complete Water Quality Analysis

As per Appendix B, Technical Specification 4.1.1.2, at each of the five general water quality sampling locations, the general water quality parameters plus 11 other chemical analysis are to be performed three times per year, with the addition of dissolved oxygen, pH and alkalinity determined at each site every four hours over a 24 hour period. Contrary to the referenced Technical Specification, the following analysis were not performed:

^{9/} Ibid.

^{10/} Ibid.

October 20: Mercury (All Locations)
May 6: pH (2 of 6 sampling periods) (All Locations)
July 28: Dissolved Oxygen, pH, Alkalinity (1 of 6
sampling periods) (All Locations)

(c) Thermal Monitoring

As identified by the licensee on November 19, 1975, failure of the computer logging system resulted in a six hour period when thermal discharge temperatures were not being recorded and manual recording was not initiated. On November 25, 1975, the licensee notified the NRC of the occurrence, and initiated corrective action to retrain operating personnel to assure that in the event of computer malfunction, manual temperature logging would be performed. The inspector reviewed selected temperature records and documentation of operator retraining. The inspector has no further questions regarding this item at this time.

The inspector reviewed documentation pertaining to calibration checks of the temperature (RTD) sensors. The inspector determined the licensee had performed testing of RTD sensors prior to installation and annual calibration checks with reference RTD sensors. The inspector has no further questions regarding this item at this time.

c. Special Studies

(1) Plankton, Bacteriological and Periphyton Study

The inspector reviewed the plankton, bacteriological and periphyton studies and determined that they were conducted and reported as required in the Technical Specifications. The inspector has no further questions regarding these items.

(2) Benthic Organism Study

Contrary to Appendix B, Technical Specification 4.1.1.5, requiring the conduct of quarterly benthic studies at four sample locations, the licensee did not perform the benthic organism study for the first quarter of 1975. The licensee identified the omission of the first quarter of 1975, during the August, 1975 Quality Assurance Audits, as discussed in Paragraph 3.a, of this report.

(3) Entrainment Studies

Contrary to Appendix B, Technical Specification 4.1.1.8, the quarterly entrainment study of species and biomass of organisms in the intake water, was only performed three times during 1975. This is an item of noncompliance with the referenced Technical Specification.

(4) Impingement Studies

Contrary to Appendix B, Technical Specification 4.1.1.9, the number of fish found in the trash basket on the station's intake, as determined by the station personnel, was not forwarded monthly to Iowa Electric's consultant for analysis. This item of noncompliance was identified by the licensee during the April, 1975 Quality Assurance Audit as discussed in Paragraph 3.a of this report.

(5) Terrestrial Salt Drift Studies

The inspector reviewed the monthly salt drift inspection summaries of the vegetation in and around the site to determine any possible salt drift damage. The inspector ascertained the salt drift reports indicate negligible impact by the salt deposition.

The inspector noted, however, that monthly surveys were conducted during the last week of each month. During November 1975, the program was delayed a week until December 2, due to adverse weather. The inspector discussed with the licensee personnel the importance of performing monthly sampling during the month specified. Licensee personnel stated a review of the subcontractor salt drift procedures would be initiated to assure that salt drift studies are performed during the month required. This item will be examined during a subsequent inspection.

5. Confirmatory Measurements

This inspection consisted of a test of the licensee's measurements of radioactivity in actual effluent samples. A set of confirmatory measurement samples is obtained and split between the licensee and the NRC. The NRC Reference Laboratory performs analysis on the sample, results of which are compared to the licensee's analysis of the duplicate sample split. The licensee results are compared to the NRC Reference Laboratory under test criteria used by the Office of Inspection and Enforcement. (Attachment 1)

The types of samples which were tested and the results of the measurements were as follows:

- a. Type of Sample: Liquid Waste (11/75)
(results in $\mu\text{Ci/ml}$)

ACCEPTABLE

<u>Radioanalysis</u>	<u>NRC Reference Measurement</u>	<u>Licensee's Measurement</u>
Gross Beta	$2.4 \pm 0.1 \text{ E-7}$	$1.88 \pm 0.04 \text{ E-7}$
H-3	$8.63 \pm 0.04 \text{ E-4}$	$9.02 \pm 0.06 \text{ E-4}$

NOT ACCEPTABLE

None.

- b. Type of Sample: Charcoal Adsorber (11/75)
(results in $\mu\text{Ci/sample}$)

ACCEPTABLE

<u>Radioanalysis</u>	<u>NRC Reference Measurement</u>	<u>Licensee's Measurement</u>
I-131	$1.5 \pm 0.3 \text{ E-4}$	$1.90 \pm 0.26 \text{ E-4}$

NOT ACCEPTABLE

None.

- c. Type of Sample: Gaseous Waste (11/75)
(results in $\mu\text{Ci/cc}$)

ACCEPTABLE

<u>Radioanalysis</u>	<u>NRC Reference Measurement</u>	<u>Licensee's Measurement</u>
Xe-133	$6.8 \pm 0.3 \text{ E-5}$	$5.06 \pm 0.25 \text{ E-5}$

NOT ACCEPTABLE

None.

The inspector discussed the results of the November comparison with licensee personnel. The inspector also collected a liquid waste sample for confirmatory measurements. Due to the facility being shutdown for fuel reloading, the inspector delayed collection of gaseous waste and charcoal adsorber samples. These new confirmatory measurement samples will be examined during a subsequent confirmatory measurement inspection.

Attachment:
Attachment 1

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 judgement limits are variable in relation to the comparison of the NRC Reference Laboratory's value to its associated 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 must be considered acceptable as the resolution decreases.

<u>RESOLUTION</u>	<u>RATIO = LICENSEE VALUE/NRC REFERENCE VALUE</u>		
	<u>Agreement</u>	<u>Possible Agreement A</u>	<u>Possible Agreement B</u>
3	0.4 - 2.5	0.3 - 3.0	No Comparison
4 - 7	0.5 - 2.0	0.4 - 2.5	0.3 - 3.0
8 - 15	0.6 - 1.66	0.5 - 2.0	0.4 - 2.5
16 - 50	0.75 - 1.33	0.6 - 1.66	0.5 - 2.0
51 - 200	0.80 - 1.25	0.75 - 1.33	0.6 - 1.66
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.

89Sr and 90Sr Determinations.

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