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

CENTRAL FILES

Docket No. 50-331

SEP 30 1977

Iowa Electric Light and Power
Company
ATTN: Mr. Duane Arnold
President
IE Towers
P.O. Box 351
Cedar Rapids, IA 52406

Gentlemen:

This refers to the inspection conducted by Mr. W. B. Grant of this office on September 6-9, 1977, of activities at Duane Arnold Energy Center authorized by License No. DPR-49 and to the discussion of our findings with Mr. E. Hammond 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.

No items of noncompliance with NRC requirements were identified during the course of this inspection.

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 and the enclosed inspection report 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 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.

GD.

SEP 30 1977

During the inspection it was noted that since the last confirmatory measurements inspection, considerable progress has been made toward the upgrading of your existing analytical system but that the project has not been completed. Since you expect the projected system sensitivities will help you meet the criteria of the Confirmatory Measurements Program for minimum analytical sensitivity, we are concerned as to when your existing equipment will be fully augmented. Please advise us in writing within twenty days of receipt of this letter of the date when your existing analytical system will be fully upgraded.

Should you have any questions concerning this inspection, we will be glad to discuss them with you.

Sincerely,

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

Enclosure: IE Inspection
Report No. 50-331/77-18

cc w/encl:
E. L. Hammond, Chief
Engineer
Central Files
Reproduction Unit NRC 20b
PDR
Local PDR
NSIC
TIC

OFFICE	RIII	RIII	RIII	RIII		
SURNAME	Grant/jb	Essig	Allan	Kister		
DATE	9/29/77					

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

REGION III

Report No. 50-331/77-18

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

Licensee: Iowa Electric Light and Power Company
IE Towers
P.O. Box 351
Cedar Rapids, IA 52406

Facility Name: Duane Arnold Energy Center

Inspection at: Palo, IA

Inspection Conducted: September 6-9, 1977

Inspectors: W. B. Grant for T H Essig 9/29/77

Approved by: T. H. Essig, Chief T H Essig 9/29/77
Environmental and Special
Projects Section

Inspection Summary

Inspection on September 6-9, 1977 (Report No. 50-331/77-18)
Areas Inspected: Routine, unannounced inspection of emergency planning and confirmatory measurements including licensee internal audits; coordination with offsite support agencies; emergency facilities, equipment, instrumentation and supplies specified in the preparedness plan and procedures; training of emergency personnel; records of emergency exercises; results of comparative analyses of previous effluent samples; collection of samples for subsequent comparative analyses; program for quality control of laboratory radioanalyses; licensee corrective action on a noncompliance item noted in previous emergency planning inspection. The inspection involved 22 inspector-hours onsite by one NRC inspector.
Results: No items of noncompliance or deviations were identified.

DETAILS

1. Persons Contacted

Principal Licensee Employees

*E. Hammond, Chief Engineer (DAEC)
*K. Young, Radiation Protection Engineer (DAEC)
G. Kuehn, Assistant Radiation Protection Engineer (DAEC)
*B. McVicker, Plant Chemist
*R. Rinderman, Quality Supervisor (DAEC)
J. Davis, Quality Engineer (DAEC)
G. Hofferber, Radiation Chemistry Technician (DAEC)
D. Kalavatinos, Training Coordinator (DAEC)

*denotes those present at the exit interview.

Other Personnel

O. Workman, Linn County Sheriff
Sister Judith Meyers, Assistant Administrator, Mercy Hospital
K. Kula, RN, Head Nurse, Trauma Center, Mercy Hospital
A. Ahern, Director, Linn County Health Department
K. Popenhagen, Sheriff, Benton County

2. Licensee Action on Previous Inspection Findings

(Closed) Noncompliance (331/77-03): Failure to provide emergency directors with training in offsite evacuation criteria. The inspector reviewed records, other documentation and interviewed licensee representatives. It was determined that training in offsite evacuation criteria is currently part of the plant radiation protection and procedures manual, which is reviewed in the training of all emergency personnel.

(Closed) Significant Inspection Item (331/77-03): Improvement of the public address and alarm system audibility required maintenance action requests (MAR) for the addition of speakers in seven plant areas. It was determined that speakers have been installed and audibility checked in the areas requiring action.

3. Licensee's Internal Audits

The inspector reviewed reports and documentation of licensee audits conducted since the last inspection.[1/] It was noted that four

1/ IE Inspection Rpt No. 50-331/77-03.

audits were conducted including audits of the quarterly and annual exercises and of the preparedness plan implementing procedures. Quarterly reports did not identify any items requiring corrective action by the licensee.

4. Coordination With Offsite Agencies

The inspector reviewed records, procedures and written agreements relating to the licensee's coordination of emergency planning with the agencies listed in the emergency plan and procedures. The inspector discussed this subject with licensee representatives and in person with representatives of four offsite agencies -- the local sheriffs, County Health Department and Mercy Hospital, Cedar Rapids.

These discussions verified that existing agreements between the licensee and the agencies remain in effect and the licensee's contact and coordination were adequate for these agencies to maintain an effective response capability.

No items of noncompliance or deviations were identified.

5. Facilities and Equipment

The following selected emergency facilities, equipment, and materials were examined for maintenance and ready condition:

(a) Equipment Boxes

Examination of the emergency equipment boxes showed that they are located and supplied as specified in the preparedness plan. Review of documentation established that the materials inventory of the emergency equipment boxes has been performed on a quarterly basis as specified in the procedural controls.

(b) Decontamination Room and Supplies

The inspector reviewed the equipment and supplies in the decontamination room. It was established that the room is located and maintained as specified in the preparedness plan.

(c) First Aid Supplies

Selected first aid kits located throughout the plant and first aid supplies located in the first aid room were

examined. The items were located as specified. A licensee representative stated that the supplies in the first aid kits and in the first aid room are inventoried and maintained on a monthly schedule, thereby insuring the continous availability of the minimum quantity of materials.

(d) Instrumentation and Monitors

The inspector examined radiation monitors onsite, at the local hospital and at the licensee's corporate headquarters. It was noted that the portable radiation protection instruments were operable and had been calibrated on a quarterly basis. The portable radiation detection instruments for the Emergency Control Center (ECC) are stored in the Health Physics Area which adjoins the ECC. The current prepardness plan defines the Health Physics Area as part of the Emergency Control Center.

Radioactive release monitoring instruments, area monitors, and meteorological sensors were also reviewed.

No items of noncompliance or deviations were identified.

6. Training

The inspector reviewed documentation pertaining to the preparedness training of Duane Arnold Energy Center personnel. All the training and retraining program responsibilities are currently being transferred to the Training Coordinator. The inspector reviewed training related documentation for about thirty randomly selected persons to verify that training required by the Emergency Preparedness Plan and procedures had been conducted. Training conducted since January 31, 1977 included sessions for emergency directors, survey team members, operations personnel, general employees, security force and first aid personnel.

No items of noncompliance or deviations were noted.

7. Emergency Exercises

The inspector reviewed records of emergency test exercises conducted since the last emergency planning inspection.[2/] Two quarterly exercises involving onsite personnel and one annual

2/ Ibid.

"General Emergency" type exercise involving coordination with and participation by offsite agencies were conducted.

The inspector determined that the licensee used trained qualified personnel to evaluate the organizations response. Critiques were held following each exercise. Recommendations and suggestions for possible improvements in the exercises were discussed. Appropriate actions had been initiated or completed to correct any areas needing improvement.

A general critique following the annual emergency exercise noted one possible significant item in that the Iowa State Patrol did not respond to the Linn County Sheriff's request for assistance in establishing roadblocks and for possible area evacuation. According to a licensee representative the State Patrol indicated it could not respond to such exercises because of lack of funds but that it would respond in a real emergency.

No items of noncompliance or deviations were noted.

8. Confirmatory Measurements

This inspection showed that some of the licensee's measurements of these samples are acceptable under the test criteria used by the Office of Inspection and Enforcement for comparing measurement results. However, some of the licensee's measurements are not acceptable under the test criteria. The types of samples which were tested and the results of those measurements are given in the Table 1. The test criteria are given in Attachment 1.

9. Samples Not Meeting Acceptance Criteria

The licensee's reported results on analysis of gaseous waste for Xenon-133m yielded a comparison in the "disagreement" category. The licensee uses a NaI counting system together with an empirical calculational model in performing this analysis. The licensee's reported result was about 26% (i.e., approximately a factor of four underestimate) of that reported by the NRC reference laboratory. However, if releases of Xe-133m experienced near the time of this sample collection were increased by this factor of four, releases would still be within the DAEC technical specification limits.

The licensee's reported result on analysis of liquid waste samples for H-3, I-131, Ag-110m, Co-60 and Cs-137 yielded comparisons in the "disagreement" category. In that the licensee's reported results on these analyses with the exception of cesium-137 were 1.5 to 8 times greater than that reported by the NRC reference laboratory, the licensee may have overreported quantities or concentrations of radioiostopes released near the time of the sample collection. With regard to the cesium-137 analysis, the licensee's result is considered unacceptable due to the failure to identify the activity shown to be present by the reference laboratory analysis. The licensee is aware of the sensitivity limitations for gamma spectroscopic analyses using his existing analytical system. This problem has been identified in previous confirmatory measurement inspections. During discussions with the licensee, plans for improving analytical sensitivities were reviewed. A licensee representative stated that an improved preamplifier has been purchased and installed, additional calculator memory has been installed along with a new calculational package. The projected system sensitivities, when the existing equipment is augmented, are expected to meet the criteria of the Confirmatory Measurements Program for minimum analytical sensitivity. This item will be reviewed during a future inspection.

The licensee's reported result on analysis of a charcoal adsorber sample for I-131 yielded a comparison in the "disagreement" category. The licensee uses a NaI counting system together with an emperical calculational model in performing this analysis. In that the licensee's reported result on this analysis is about 50% greater than that reported by the NRC reference laboratory, the licensee may have overreported quantities or concentrations of radioiodines released near the time of this sample collection. Licensee representatives stated that the improved plant Ge(Li) gamma-spectroscopy system will be utilized for the next comparative analysis of radioactivity on the charcoal adsorber. This item will be examined during a future inspection.

10. Program for Quality Control of Analytical Measurement

The licensee's program for quality control of laboratory analyses is governed by plant procedures. Procedures govern sampling techniques, instrument calibration and analytical techniques. Program review and discussion with licensee representatives indicate that there were no procedural revisions made since February 1977.

11. Exit Interview

The inspector met with licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection on September 9, 1977. The inspector summarized the purpose and scope of the inspection and the findings. Also discussed were the licensee's current plans to improve his existing analytical system for laboratory analysis to meet the criteria of the confirmatory measurements program for analytical sensitivity.

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.

RESOLUTION	RATIO = LICENSEE VALUE/NRC REFERENCE VALUE		
	Agreement	Possible Agreement "A"	Possible Agreeable "B"
<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 I

U S NUCLEAR REGULATORY COMMISSION

OFFICE OF INSPECTION AND ENFORCEMENT

CONFIRMATORY MEASUREMENTS PROGRAM
FACILITY: DAEC
FOR THE 1 QUARTER OF 1977

TYPE	ISOTOPE	NRC RESULT	NRC ERROR	LICENSEE RESULT	LICENSEE ERROR	NRC:LICENSEE Z VALUE	NRC:LICENSEE PCT	NRC:LICENSEE RATIO	NRC:LICENSEE RES	T
GAS	XE 133	7.7E-03	2.0E-04	5.2E-03	5.0E-06	1.2E+01	3.2E+01	6.8E-01	3.9E+01	F
	XE 133M	7.0E-04	4.0E-05	1.8E-04	6.0E-06	1.3E+01	7.4E+01	2.6E-01	1.7E+01	D
L WASTE	BETA	7.1E-05	1.0E-06	9.8E-05	6.0E-07	2.3E+01	3.8E+01	1.4E+00	7.1E+01	P
	SR 89	1.7E-06	7.0E-08	2.8E-06	2.0E-08	1.5E+01	6.5E+01	1.6E+00	2.4E+01	P
	H 3	1.5E-03	2.0E-05	2.1E-03	1.0E-05	2.7E+01	4.0E+01	1.4E+00	7.5E+01	D
	I 131	1.1E-05	6.0E-07	2.0E-05	2.0E-07	1.4E+01	8.2E+01	1.8E+00	1.8E+01	D
	CS 134	2.2E-05	7.0E-07	3.2E-05	2.0E-07	1.4E+01	4.5E+01	1.5E+00	3.1E+01	P
	CS 137	3.2E-05	1.0E-06	0.0	0.0	0.0	0.0	0.0	3.2E+01	D
	CO 58	5.4E-05	2.0E-06	7.9E-05	4.0E-07	1.2E+01	4.6E+01	1.5E+00	2.7E+01	P
	MN 54	3.3E-05	1.0E-06	5.1E-05	3.0E-07	1.7E+01	5.5E+01	1.5E+00	3.3E+01	P
	AG 110M	4.4E-06	3.0E-07	3.5E-05	2.0E-07	8.5E+01	7.0E+02	8.0E+00	1.5E+01	D
	CO 60	3.0E-05	1.0E-06	5.2E-05	4.0E-07	2.0E+01	7.3E+01	1.7E+00	3.0E+01	D
P FILTER	CS 137	0.0	2.0E-06	0.0	0.0	0.0	0.0	0.0	0.0	N
C FILTER	I 131	8.3E-03	2.0E-04	1.7E-02	1.0E-04	3.9E+01	1.0E+02	2.0E+00	4.1E+01	D

T TEST RESULTS:
A=AGREEMENT
D=DISAGREEMENT
P=POSSIBLE AGREEMENT
N=NO COMPARISON