

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

REGION III

Report No. 50-331/80-01

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: Duane Arnold Site, Palo, Iowa

Inspection Conducted: February 20-22, 1980

Inspectors: *W. L. Fisher*  
D. E. Miller

3/11/80

*R. A. Paul*  
R. A. Paul

3/12/80

Approved By: *W. L. Fisher*  
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Fuel Facility Projects and  
Radiation Support Section

3/11/80

Inspection Summary

Inspection on February 20-22, 1980 (Report No. 50-331/80-01)

Areas Inspected: Routine, unannounced inspection of operational radiation protection program during refueling and major maintenance, including: qualifications; training; planning and preparation; exposure control; posting, labeling, and control; surveys; and ALARA. The inspection involved 48 inspector-hours on site by two NRC inspectors.

Results: No items of noncompliance or deviations were identified.

## DETAILS

### 1. Persons Contacted

- \*D. Mineck, Chief Engineer
- \*B. York, Assistant Chief Engineer Operations
- \*D. Tepley, Operations Supervisor
- \*D. Rockhill, Mechanical Maintenance Supervisor
- \*R. McCracken, Quality Control Supervisor
- \*K. Young, Radiation Protection Engineer
- \*G. Kuehn, Assistant Radiation Protection Engineer
- E. Lange, Radwaste Supervisor
- P. Sawyer, Health Physics Supervisor (Applied Radiological Control, Inc.)

The inspectors also talked with several licensee and contractor radiation protection technicians during the inspection.

\*Denotes those present at the exit interview.

### 2. General

This inspection, which began at 8:00 a.m. on February 20, 1980, was conducted to examine the radiation protection aspects of the current refueling and major maintenance outage.

Several areas were visited during the inspection to observe access controls, postings, housekeeping, work in progress, and radiological controls.

### 3. Current Findings

During the inspection, the inspectors noted that the licensee was having difficulty keeping up with respiratory protective equipment cleaning and was unable to keep up with protective clothing dry-cleaning. During the inspection, the licensee added more laborers to help expedite mask handling, and was planning to install a second drycleaning machine which is stored on site.

Also, during tours of controlled areas, the inspectors noted that protective clothing and equipment was scattered around inside and outside of contaminated areas and housekeeping in general was poor. During the inspection, the licensee added more laborers to the group doing housekeeping chores.

### 4. Organization

The licensee has contracted about fifty additional radiation protection technicians, supervisors, and records maintenance persons for the duration of the refueling and maintenance outage.

The licensee routinely conducts written testing of contract senior radiation protection technicians before they participate in an outage. The testing is intended to provide an additional measure of qualification and acceptability.

5. Training

An inspector attended the licensee's general radiation protection orientation training during the inspection. Participation in the orientation is mandatory for all non-visitor persons before they are authorized to work in restricted areas. The orientation consists of taped and live presentations. Some of the areas discussed are: radioactivity, radiation, types of radiation, biological effects, ways to reduce exposure, ALARA, monitoring equipment, personal monitoring devices, signs and postings, worker rights, uses of respiratory protective equipment, emergency procedures, plant security requirements, Regulatory Guide 8.3, and a demonstration on protective clothing use. All persons attending the presentation are tested and must have a 68% correct passing grade.

The orientation adequately covers the requirements of 10 CFR 19.12. Some comments concerning the live oral portion of the presentation and the test were discussed with the licensee for their consideration.

No items of noncompliance or deviations were identified.

6. Surveys

Records of direct radiation, surface contamination, and airborne contamination surveys conducted during the refueling outage to date were selectively reviewed. No significant problems were identified.

7. Internal Exposure Control

a. Mask Fit Testing

The licensee has written a procedure for qualitative mask fit testing which will be used when their testing booth is inoperable. The procedure follows the NUREG 0041 recommendations for facial measurements and qualitative testing. If an individual's facial measurements do not fall within a specified range he is not allowed to wear a mask without quantitative fit testing.

b. In Vivo Counting

The licensee has recently purchased and is now using a commercially available chair-type whole body counter. Software, calibration phantoms, and calibration sources were supplied by the vendor. All contractor personnel are being routinely counted before they work in controlled areas, and are counted before they terminate employment at DAEC.

The inspectors noted that the detector positioning is vertically adjustable but is specifically preselected by procedure for a given type of count, such as a lung count, and that no alteration is made based on the individual's height. Also, the computer software does not include any correction factors for a person's weight or girth. The inspectors discussed these matters with the licensee who stated that he will consult with the vendor to determine what affect height and weight has on the determinations and if some corrections need to be made in certain circumstances.

The inspectors selectively reviewed the results of whole body counts performed during the current outage including an on-going evaluation of an apparent uptake of activation products that occurred when an individual hastily removed an air-supplied respirator. The licensee's preliminary evaluation of whole body counting and urinalysis results indicate an uptake equivalent to less than 40 MPC-hours inhaled. The licensee's evaluation will be further reviewed during a later inspection.

No other significant problems were noted.

8. External Exposure Control

Since January 1, 1980, TLD services have been supplied by a different contractor. As directed by the licensee, the new contractor places track-etch neutron dosimeters in the badges of plant personnel who are likely to work in neutron radiation areas. The licensee will continue portable instrument surveys in neutron radiation areas when there is occupancy, and calculate individual doses based on stay times. Comparisons of calculated doses and track-etch dosimeter results will be made to evaluate adequacy of the dosimeters for routine use.

The licensee's exposure control program during this outage includes a daily hand updated dose tally for each worker. This tally is distributed to appropriate supervisors. Based on self-reading dosimeter readings, dose plateaus are established which cannot be exceeded without TLD readout. At present, TLD's must be sent to the vendor for readout.

Also, each worker has a card attached to his identification on which a running dosimeter reading tally is maintained. This card also contains information concerning training, testing, and physical qualifications for respiratory protection equipment use.

No problems were identified.

9. Posting, Labeling, and Control

During the initial plant tour and other visits to areas of the plant, the inspectors noted that controlled area postings and control of high

radiation areas complied with regulatory requirements. The inspectors also reviewed the licensee's compliance with posting requirements specified in 10 CFR 19.11.

No problems were identified.

10. ALARA

In addition to the licensee's ongoing program, the following matters apply to the current outage.

- a. A significant amount of work is being performed in the torus. To reduce direct radiation exposure, and the potential for high airborne radioactivity, an extensive decontamination of the torus is being performed using hydrolasing and portable liquid cleanup equipment. Also, the licensee purchased and is using an 8,000 CFM portable air cleaning system to provide controlled ventilation of the torus. Decontamination was in progress during this inspection.
- b. The reactor coolant recirculation system nozzle safe ends, which were replaced after the cracking incident, are being inspected during this outage. The licensee has done extensive shielding of the nozzles to reduce the magnitude of radiation fields. This matter is further discussed in the next paragraph.
- c. Several jobs are being performed by persons not previously employed in nuclear work. The licensee has conducted lectures for some of these groups to supplement the normal radiation protection orientation training.

11. Planning and Preparation

The licensee described the following as examples of advanced planning and preparation for the refueling and maintenance outage:

- a. Preparation for decontamination of the torus to reduce exposures during outage work.
- b. Preparations for torus air cleanup system to reduce airborne radioactivity.
- c. Review of outage work to establish radiation protection manpower, supplies, and facility requirements.
- d. Daily meetings to review jobs in progress and planned.

However, during the inspection, the inspectors learned that the radiation protection organization was not aware that certain outage jobs were to be performed and had not participated in their planning. An example of this lack of advance planning was the in-service inspection of reactor coolant system nozzles which are located in high

radiation areas. As a result, preparations for shielding, control, and staffing had to be hastily made. This matter was discussed with licensee management.

12. Exit Interview

The inspectors met with licensee representatives (denoted in Paragraph 1) at the conclusion of the inspection on February 22, 1980.

The following matters were discussed:

- a. The purpose and scope of the inspection.
- b. The current problems concerning housekeeping, laundry, and mask cleaning. The licensee stated that corrective measures are being implemented. (Paragraph 3)
- c. The apparent ingestion of radioactive materials by an individual. The inspector stated that the licensee's evaluation would be reviewed during a future inspection. (Paragraph 7.b.)
- d. The lack of advance planning for some outage work. The licensee acknowledged the comments. (Paragraph 11)
- e. The need to obtain more information concerning whole body counter results interpretation. The licensee stated that the matter will be pursued. (Paragraph 7.b.)