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

REGION III

Report No. 50-331/80-05

Docket No. 50-331

License No. DPR-49

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

Facility Name: Duane Arnold Energy Center

Inspection At: Duane Arnold Site, Palo, Iowa

Inspection Conducted: March 18-19, 1980

Approved By:

Inspectors: R. G. C. Wright

L. Fisher, Chief Fuel Facility Projects and Radiation Support Section

4/14/80 4/15/80 4/14/80

Inspection Summary

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Inspection on March 18-19, 1980 (Report No. 50-331/80-05)

Areas Inspected: Nonroutine, announced special inspection of circumstances concerning an unplanned release of radioactive effluent to an unrestricted area. The inspection involved 21 inspector-hours on site by 2 NRC inspectors.

Results: Two items of noncompliance were identified: 1) 10 CFR 50.72, failure to notify NRC within required time after an unplanned release (paragraph 6); Technical Specification 3.3.1.B.2, failure to evaluate sample effluent prior to release (paragraph 6).

DETAILS

1. Persons Contacted

- *D. Mineck, Chief Engineer
- *D. Wilson, Assistant Chief Engineer, Technical
- D. Teply, Operations Supervisor
- K. Young, Radiation Protection Engineer
- G. Kuehn, Assistant Radiation Protection Engineer
- J. Van Sickel, Assistant Technical Engineer
- G. Roach, Plant Chemist
- D. Gipson, Shift Supervising Engineer
- R. Roberts, Shift Supervising Engineer
- R. Zook, Shift Supervising Engineer
- M. Hammer, Shift Supervising Engineer

*Denotes those present at exit interview.

2. Purpose of Special Inspection

This special inspection was conducted to review the circumstances surrounding an unplanned release of radioactive effluent to an unrestricted area.

3. History of Licensee Notifications to NRC on March 12-13, 1980

Initial notification to the NRC was on March 12, 1980. At that time Region III was informed that an estimated 540 gallons of water from the reactor cavity had been pumped to the circulating water system via the condenser hotwell through two leaking condenser tubes to one condenser water box. Region III was informed that no offsite release had occurred because the circulating water system was in the recirculation mode.

During the afternoon of March 13, 1980, the Region III Public Information Office was contacted by the licensee's public relations representative. The licensee indicated that the utility was planning on making a press release relative to the unplanned release of radioactive effluent from the circulating water system to the river. A subsequent phone call from Region III to onsite personnel confirmed that on two occasions during a previous evening, 7:00 p.m. on March 12, 1980, and 1:00 a.m. on March 13, 1980, unplanned releases of radioactive effluent had been made. In addition, a water sample from the condenser hotwell, taken on March 12, 1980, had been analyzed and indicated radioactive concentrations of 4.9E-4 microcuries per milliliter with all isotopes (excluding strontium 90) identified. The licensee further informed Region III that the initial 540 gallons had been diluted by approximately 823,000 gallons of water, in the circulating water system, and further diluted by well water while being released.

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4. Sequence of Events Leading to and Including the Unplanned Release

a. March 11, 1980:

At approximately 2:30 a.m. the licensee commenced draining the reactor cavity to the condenser hotwell to facilitate work in the reactor. Around 4:20 p.m. the level in the circulating water system pit was being reduced to allow an inspection of a circulating water pump shaft and bearings. Normal work activities in the condenser water boxes, including tube cleaning and tube plugging, stopped for the day at around 4:30 p.m. The inspection of the circulating pump was completed and the level in the circulating water system pit was allowed to increase, due to well water input, starting at 6:30 p.m.

Note: A review of the events by the licensee on March 12 concluded that the level in the hotwell reached the leaking tube elevation at around 6:00 p.m. on March 11.

b. March 12, 1980

Around 10:30 a.m. a health physics technician was notified by a worker that tubes in the water box were leaking water. The technician investigated the matter and took a smear of the wet area using a cotton glove liner. The glove liner was counted and a small quantity of radioactivity was detected, thus confirming that the water was from the hotwell. The technician notified the control room and the Assistant Radiation Protection Engineer of the leak around 11:15 a.m. The Assistant Radiation Protection Engineer in turn notified the Shift Supervising Engineer (SSE) and the Assistant Chief Engineer of the leak. Around 11:20 a.m. the SSE directed an operator to investigate the leak and to secure the pump transferring water from the water box to the circulating water system. The transferring of water out of the water box was a normal function to allow workers to enter the water boxes. The second assistant operator reported back to the SSE at approximately 11:30 indicating that the tubes had already been plugged and that the transfer pump was secured.

A preliminary investigation by the licensee resulted in the 540 gallon estimates base on an estimated leak rate of 0.5 gpm from 6:00 p.m. on March 11 and continuing for approximately eighteen hours.

The Assistant Radiation Protection Engineer and the Shift Supervising Engineer met around 1:30 p.m. to discuss the events and to initiate Deviation Report No. 80-45. It is the NRC inspectors' understanding that during this meeting the question of whether or not the contaminated water had actually been released to the river was not specifically addressed. From this point on, it is also the inspectors' understanding that all persons knowledgable of the tube leaks were under the assumption that all 540 gallons of contaminated water had already been released to the river. There was also some confusion as to whether or not the event constituted a one hour notification to the NRC as required by 10 CFR 50.72 as implemented by IE Information Notice No. 80-06.

After generating the Deviation Report, the Assistant Radiation Protection Engineer contacted the Assistant Technical Engineer around 2:15 p.m. to inform him of the Environmental Technical Specification violation. A lack of communication between the two individuals resulted in the Assistant Technical Engineer informing Region III, at approximately 2:20 p.m., that a leak had occurred. Bowever, the contaminated water was contained in the circulating water system and had not been released. Note that this is not what other licensee management personnel believed at the time.

A water sample of the hot well was taken at approximately 3:00 p.m. An analysis of the sample and calculation to determine extent of release were started.

Around 7:00 p.m. the circulating water system pit level was lowered, by release to the river, to prevent overflow of the system. Subsequent investigation revealed that this was the first time an actual release of contaminated water to the river had taken place, again contrary to common belief by licensee management. The duration of the release was approximately 45 minutes.

c. March 13, 1980

Around 1:00 a.m. the circulating water system pit level was again reduced, this time for approximately one hour.

At approximately 8:15 a.m. the Operations Supervisor, Assistant Radiation Protection Engineer, Assistant Chief Engineer and the Chief Engineer met to discuss the events of the previous two days. At this time, it was finally realized that management's initial assumption on the release was incorrect and that the actual releases had not occurred until 7:00 p.m. on the 12th and again at 1:00 a.m. on the 13th.

At this time licensee management was still under the assumption that the initial notification to the NRC, on March 12, had stated that the release had been to the river, when in fact, Region III had been informed that the material was contained within the circulatory water system and no offsite release had occurred.

Sometime between 9:00 a.m. and 10:00 a.m., the analysis results of the hotwell sample analysis, taken on March 12, was received and the effort to estimate the release was continued.

Around 3:00 p.m. the Iowa Electric Vice President, Public Relations, informed the Region III Public Relations Officer of the



proposed press release concerning the offsite discharge of radioactive water. This was the first time that Region III became aware of the offsite release to the river.

5. Analysis of Hotwell Water Sample

A water sample was taken of the water in the hotwell on March 12, and the results were received on March 13, 1980. The results of the analysis indicated that nine beta-gamma producing isotopes were identified with a combined concentration of 4.9E-4 microcuries per milliliter. By determining for each radionuclide in the mixture, the ratio of the quantity to the MPC established in 10 CFR 20, Appendix B, Table 2, Column 2 and then summing all the ratios, it was determined that the hotwell water was 113 times MPC. The 540 gallons of water containing the activity (1 millicurie) was diluted in the circulating water system which contained approximately 823,000 gallons of water. This reduced the concentration to 3.21E-7 microcuries per milliliter. The circulating water system release rate was calculated, by the licensee, to be 60.5 gpm. During the actual 105 minute release, the discharged circulating water was further diluted by well water at a rate of 950 gpm before being sent to the river. The additional dilution reduced the concentration to 2.08E-8 microcuries per milliliter at the discharge point. Using a dilution factor of 2.45E4 the concentration of the released water was .463 percent of the 10 CFR 20 MPC limits.

6. Items of Noncompliance

a. 10 CFR 50.72 states in part: "Each licensee of a nuclear power reactor licensed under "section" 50.21 or 50.22 shall notify the NRC Operations Center as soon as possible and in all cases within one hour by telephone of... any accidental, unplanned or uncontrolled radioactive release."

Contrary to the above, at 7:00 p.m. on March 12, 1980, and again at 1:00 a.m. on March 13, 1980, radioactive effluent was released from the facility without notifying the NRC Operations Center. This item is considered an infraction.

b. Environmental Technical Specification Section 3.3.1.B.2 states, in part, "prior to release of each batch of liquid effluent, a sample shall be taken from that batch and analyzed... to demonstrate compliance with 2.3.1.B..."

Contrary to the above, at 7:00 p.m. on March 12, 1980, and again at 1:00 a.m. on March 13, 1980, radioactive effluent was released from the facility without being analyzed. This item is considered an infraction.

7.- Exit Interview

The inspectors met with licensee representatives (denoted in Paragraph 1) at the conclusion of the special inspection. The following items were discussed:

- a. Purpose and scope of the special inspection.
- b. Items of noncompliance. (Paragraph 6)

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c. Corrective actions proposed for response to the items of noncompliance.

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