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BY:

CLASSIF.:

2.790

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DESCRIPTION: (Must Be Unclassified)

**50-331 IOWA ELECTRIC LIGHT AND
POWER COMPANY
INSPECTION REPORT**

REFERRED TO

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WARNICK**B****WHITEAKER****D****IE FILES****C****REACTOR FACILITIES
BRANCH****A****PAULSON/DEBEVEC****E****R. W. HOUSTON, L****F**

ENCLOSURES:

REMARKS:

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

~~SAC~~
REACTOR FACILITIES
Branch

JUL 15 1976

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

Docket No. 50-331

Gentlemen:

This refers to the inspection conducted by C. C. Peck and D. J. Holody of this office on June 24-25, 1976, of activities at your Duane Arnold facility authorized by Title 10 CFR Part 70 and to the discussion of our findings with Messrs. Hammond and Haas 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.

Areas examined during the inspection concern a subject matter which is exempt from disclosure according to Section 2.790 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations. Consequently, our report of this inspection will not be placed in the Public Document Room.

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

In the discussion at the close of the inspection, the inspectors stated that the uranium fission and transmutation and plutonium production data that you reported on your semi-annual Material Status Report for the July-December 1975 period appear erroneous. This conclusion was based on check calculations made by the



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inspectors and also on the fact that the quantities reported did not have normal ratios to each other. It was agreed that these data would be investigated in conjunction with the preparation of the next Material Status Report, a revised report issued if appropriate, and that this office would be advised of your findings.

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

Sincerely yours,

J. A. Hind, Chief
Safeguards Branch

Enclosure:

**IE Inspection Report
No. 050-331/76-16**

cc w/encl:

**E. L. Hammond, Assistant
Chief Engineer
G. G. Hunt, Chief
Engineer**

bcc w/encl:

**Central Files
Regions I, II & V
IE Mail and File Unit**

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**PDR
Local PDR**

UNITED STATES NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION III

IE Inspection Report No. 050-331/76-16

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

Duane Arnold Energy Center
Palo, Iowa

License No. DPR-49
Category: C

Type of Licensee: BWR 800 MWe

Type of Inspection: Safeguards - Accountability

Dates of Inspection: June 24-25, 1976

Principal Inspector: C. C. Peck *C.C. Peck* 7/14/76
(Date)

Accompanying Inspector: *C.C. Peck for DJ Holody*
D. J. Holody 7/14/76
(Date)

Other Accompanying Personnel: None

Reviewed By: *J. A. Hind*
J. A. Hind, Chief 7/14/76
Safeguards Branch (Date)

Attachment:
Findings (Part 2.790(d) Information)

S-F3-76-317
Copy 3 of 10 copies
7 Pages

THIS DOCUMENT IS NOT TO BE
REPRODUCED WITHOUT SPECIFIC
APPROVAL OF IE:III

SUMMARY OF FINDINGS

Inspection Summary

Inspection conducted June 24-25, 1976 (76-16): Inspection consisted of an examination of internal SNM accountability records, NRC-741 and -742 reports, accountability procedures, and a visual inventory of SNM in storage. No items of noncompliance were identified. Licensee agreed to investigate apparent errors in uranium depletion and plutonium production quantities reported on NRC-742 for July-December 1975 period, to correct data if necessary, and to advise IE:III of conclusions.

Enforcement Items

No items of noncompliance were identified during the inspection.

Licensee Action on Previously Identified Enforcement Items

No previous enforcement items.

Other Significant Items

A. Systems and Components

Not applicable.

B. Facility Items (Plans and Procedures)

None.

C. Managerial Items

None.

D. Noncompliance Identified and Corrected by Licensee

None.

E. Deviations

None.

F. Status of Previously Reported Unresolved Items

No previous unresolved items.

Management Interview

Attendees:

E. L. Hammond, Assistant Chief Engineer
K. Haas, Nuclear Engineer
C. C. Peck, NRC
D. J. Holody, NRC

The licensee representatives were informed that no items of noncompliance had been found during the inspection. Data reported by the licensee on their Material Status Reports (NRC-742 forms) were discussed and it was pointed out that uranium fission and plutonium production quantities for the July-December 1975 period appeared to be in error. The licensee agreed to investigate these data and to make appropriate changes in a corrected report, if such changes are significant, and to advise IE:III of their findings.

REPORT DETAILS

Licensee Personnel Supplying Information

E. L. Hammond, Assistant Chief Engineer
R. Hannen, Reactor and Plant Performance Engineer
K. Haas, Nuclear Engineer

Scope of Inspection

Accountability data generated since the preoperational inspection of January 24, 1974 were inspected, including NRC-741 and -742 reports, internal transfer and fuel history records, and SNM inventory records. The licensee's accountability procedures were inspected. The current core inventory was checked for accuracy and a visual inventory of SNM in the spent fuel pool and vault was made. Quantities of uranium depletion and plutonium production that have been reported by the licensee on NRC-742 forms were audited and independent check calculations made to confirm their reasonableness.

Accountability Procedures

Administrative control procedures entitled "Core Component Accounting System" are in use at the facility. These are approved by the Chief Engineer, Chairman of the Operations Committee, Quality Supervisor and Reactor Engineer.

The procedures define the Material Balance Areas of the facility which consist of the core, the receipt station, the new fuel vault, the fuel inspection stand, spent fuel pool, and shipping cask(s).

The Reactor and Plant Performance Engineer has the overall responsibility for the accounting system.

The accounting system requires that the movement of core components, which include channels and control rods as well as fuel assemblies, be planned in advance on an internal form called a Planning Checklist. These forms are used as input to a computer at Cedar Rapids which checks that all planned moves are valid. The printout is used as a checklist in making the actual component movements. As movements are made they are recorded on an internal form called the MBA Transfer Report. These completed forms are the official records of component movements. Serial numbers, locations from and to which components are moved, date, time, and identity of the person executing the moves are required.

The offsite computer is programmed to provide a printout which lists the complete history of all core components from time of receipt at the facility. All locations of the components and dates and times of movements are provided. This system replaces the manually maintained index card system used at many facilities.

The process computer supplies fuel exposure data for fuel assemblies in the core. The data, on paper tapes, is translated to punched words. The cards are used as input to the licensee's computer at Cedar Rapids which provides a printout of the isotopic content of each fuel bundle in the core. This printout is the basis for calculations of uranium depletion and plutonium production quantities.

Records and Reports

The required Material Status Reports have been prepared for each six months period since fuel was initially received in 1973. An audit of these reports disclosed no discrepancies. The reports are approved by a company vice president.

Material Transaction Reports (NRC-741's) in the licensee's records were audited. During the inspection period fuel receipts from General Electric constituted the only SNM shipments involving the licensee. There were no shipments made by the licensee. The receipt forms examined were correctly completed and distributed.

MBA Transfer Reports completed during the refueling early in 1976 were spot checked against the core diagram and fuel pool inventory. These forms are official records of fuel and component movements within the facility. No discrepancies were found in the forms checked.

The current Core Component Accounting printout was not checked. Licensee representatives stated that such a printout providing current locations and the history of each component could be obtained, in a day or so but this had not been required since the refueling early in the year. An available printout that provided the component status prior to the refueling was examined. It appears to be complete and accurate.

An SNM material balance covering the period from January 1, 1974 through the most recent reporting period which ended December 31, 1975 is presented as Attachment 1.

Inventory and Inventory Verification

The licensee currently possesses a total of 456 fuel assemblies. There are 368 assemblies in the core and 88 irradiated assemblies in the spent fuel pool. The core was verified by comparing the position of an assembly as indicated on the current core diagram

with the position of the assembly as indicated on the official core status board in the refueling room. This was done for all 368 assemblies. The inspector also cross checked these positions against the position indicated for assemblies on MBA Transfer forms completed during the most recent refueling. This was done for 60 of the assemblies and there was agreement in all cases.

It was verified that there were 88 assemblies in the spent fuel pool in the same positions as indicated on the official pool status board in the refueling room. The serial numbers of the assemblies in the pool could not be confirmed because of the time required and the shortage of manpower at the facility. There were no fuel assemblies in the vault.

The licensee has no Special Nuclear Material other than what is in fuel.

Thermal Energy, Uranium Depletion, and Plutonium Production

The process computer provides thermal and electrical energy data on an hourly and daily basis. Daily and cumulative core exposures are manually logged daily in terms of MWD thermal and MWH electrical. These records were audited and found to be complete. Monthly thermal energy totals in MWD were found to be in agreement with data reported to the NRC which were used in NRC calculations of uranium depletion and plutonium production.

Thermal energy information and fuel assembly exposure data are also provided by the process computer on paper tapes. These are translated to punched cards by an off-line computer. The punched card information is used as input to the licensee's off-line computer at Cedar Rapids which provides a printout of the isotopic composition of each fuel bundle and of the core. The differences in the core inventory for a six months period are the basis for the uranium depletion and plutonium production totals reported to the NRC on forms 742.

The uranium and uranium-235 depletion and plutonium production for each of the four six-month periods since startup were calculated by the inspectors using the licensee's thermal output for the period. A comparison of the results with the data reported by the licensee is shown as Attachment 2. The comparison permits the following conclusions:

1. Agreement for the January-June 1974 period is not good, particularly for uranium. The quantity reported by the licensee appears to be too large for the small amount of thermal energy generated. However, the quantities involved are small and represent an insignificant part of the uranium total in the core.

2. Agreement for July-December 1974 and January-June 1975 periods is reasonable.
3. Agreement between licensee and NRC data for the July-December 1975 period is generally poor. Also the licensee's reported plutonium and uranium-235 totals do not seem reasonable when compared to each other. The ratio of uranium-235 depletion to plutonium production at the fuel exposure level of the core is normally about 2:1. The ratio of the reported data is only 1.3:1.

The data were discussed with the licensee who agreed that the totals reported for the July-December 1975 period appeared erroneous. He explained that the facility was entirely dependent on computerized data for determining depletion and production totals. The differences between isotopic core inventory reported by the computer at the beginning of the semi-annual period and those at the end of the period represent depletion and production. Since an inspection of these manually calculated differences showed no errors, it appears that the computer may be making some errors. The licensee agreed to investigate the data reported for the July-December 1975 period in conjunction with the calculations to be made for the current January-December 1976 period, to revise the Material Status Report if appropriate, and to advise IE:III of his findings.

Attachments:

Attachments 1 and 2

DUANE ARNOLD ENERGY CENTER (YZN)
 PRIVATELY OWNED ENRICHED URANIUM
 MATERIAL BALANCE AS OF
 DECEMBER 31, 1975

Units: Grams

	<u>Assemblies</u>	<u>Uranium</u>	<u>Uranium-235</u>
Beginning Inventory, 1/1/74	368	69,084,868	1,312,466
Receipts			
YLJ 24 (Adjustment)	-0-	(500)	1,369
YLJ 25	4	751,373	17,288
YLJ 26	28	5,154,626	141,162
YLJ 27	28	5,152,915	141,093
YLJ 28	28	5,153,601	141,292
Shipments	-0-	-0-	-0-
Fission and Transmutation	--	795,889	425,198
Ending Inventory, 12/31/75	456	84,500,994	1,329,472

Possession Limit of Licensee: 3500 kilograms of uranium-235.

Part 2.790(d) Information

DUANE ARNOLD ENERGY CENTER (YZN)
PRIVATELY OWNED PLUTONIUM
MATERIAL BALANCE AS OF
DECEMBER 31, 1975.

	Units: Grams	
	<u>Plutonium</u>	<u>Isotope (239 plus 241)</u>
Beginning Inventory, 1/1/74	-0-	-0-
Production	279,195	236,549
Ending Inventory, 12/31/75	279,195	236,549

Attachment 1
Page 2 of 2

DUANE ARNOLD
URANIUM DEPLETION AND PLUTONIUM PRODUCTION

<u>Period</u>	<u>U</u>	<u>U-235</u>	<u>Pu</u>
1/1/74 - 6/30/74			
Reported	43,149	16,681	11,125
NRC Calculated	25,337	16,833	9,793
% Difference	-41.3	0.9	-12.0
7/1/74 - 12/31/74			
Reported	273,460	176,635	109,041
NRC Calculated	284,646	180,142	99,554
% Difference	4.1	2.0	-8.7
1/1/75 - 6/30/75			
Reported	205,867	114,970	66,083
NRC Calculated	207,649	123,336	63,197
% Difference	0.9	7.3	-4.4
7/1/75 - 12/31/75			
Reported	273,413	116,912	92,946
NRC Calculated	248,528	138,698	65,230
% Difference	-9.1	18.6	-29.8
Overall			
Reported	795,889	428,705	279,195
NRC Calculated	766,160	455,502	237,774
% Difference	-3.7	6.2	-14.8

PROPRIETARY INFORMATION

NOTICE

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