

Iowa Electric Light and Power Company

April 15, 1993  
NG-93-1551

Mr. A. Bert Davis  
Regional Administrator  
Region III  
U.S. Nuclear Regulatory Commission  
799 Roosevelt Road  
Glen Ellyn, IL 60137

Subject: Duane Arnold Energy Center  
Docket No: 50-331  
Op. License DPR-49  
March 1993 Monthly Operating Report

Dear Mr. Davis:

Please find enclosed the Duane Arnold Energy Center Monthly Operating Report for March 1993. The report has been prepared in accordance with the guidelines of NUREG-0020 and distribution has been made in accordance with DAEC Technical Specifications, Section 6.11.1.c.

Very truly yours,



David Wilson  
Plant Superintendent, Nuclear

DLW/RBW/cc  
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File A-118d  
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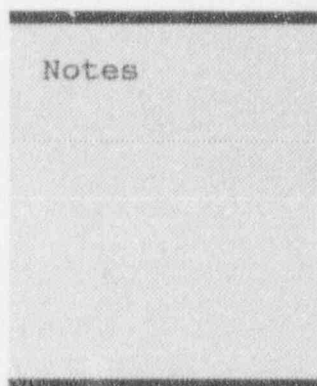
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# OPERATING DATA REPORT

DOCKET NO: 50-0331  
 DATE: 04/15/93  
 Unit: Duane Arnold Energy Center  
 COMPLETED BY: Richard Woodward  
 TELEPHONE: (319) 851-7318

## OPERATING STATUS

1. Unit Name: Duane Arnold Energy Center
2. Reporting Period: March 1993
3. Licensed Thermal Power (MWt): 1658
4. Nameplate Rating (Gross MWe): 565 (Turbine)
5. Design Electrical Rating (Net MWe): 538
6. Maximum Dependable Capacity (Gross MWe): 545
7. Maximum Dependable Capacity (Net MWe): 515
8. If Changes Occur in Capacity Ratings (Items Number 3 through 7) since the last report, Give Reasons: N/A
9. Power Level to Which Restricted, If Any (Net MWe): N/A
10. Reasons for Restrictions, If Any: N/A



	This Month	Year-to-Date	Cumulative
11. Hours in Reporting Period	744.0	2,160.0	159,216.0
12. Number of Hours Reactor Was Critical	744.0	2,035.1	118,016.3
13. Reactor Reserve Shutdown Hours	0.0	0.0	192.8
14. Hours Generator On-Line	744.0	2,020.1	115,042.6
15. Unit Reserve Shutdown Hours	0.0	0.0	0.0
16. Gross Thermal Energy Generated (MWH)	1,218,376.0	3,268,645.0	157,351,938.3
17. Gross Electrical Energy Generated (MWH)	409,480.0	1,090,752.0	52,715,662.5
18. Net Electrical Energy Generated (MWH)	386,005.4	1,027,758.4	49,424,412.2
19. Unit Service Factor	100.0%	93.5%	72.3%
20. Unit Availability Factor	100.0%	93.5%	72.3%
21. Unit Capacity Factor (Using MDC Net)	100.7%	92.4%	61.7%
22. Unit Capacity Factor (Using DER Net)	96.4%	88.4%	59.0%
23. Unit Forced Outage Rate	0.0%	0.0%	12.3%
24. Shutdowns Scheduled Over Next 6 Months (Type, Date, and Duration of each):	Refueling, July 29, 1993, 59 days,		
25. If Shutdown at End of Report Period, Est. Date of Startup:	<u>N/A</u>		

# AVERAGE DAILY UNIT POWER LEVEL

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MONTH March 1993

Day	Average Daily Power Level (MWe-Net)	Day	Average Daily Power Level (MWe-Net)
1	<u>525.4</u>	16	<u>515.4</u>
2	<u>519.9</u>	17	<u>526.1</u>
3	<u>524.2</u>	18	<u>526.1</u>
4	<u>525.4</u>	19	<u>524.0</u>
5	<u>526.4</u>	20	<u>523.6</u>
6	<u>528.5</u>	21	<u>393.7</u>
7	<u>519.2</u>	22	<u>496.2</u>
8	<u>521.8</u>	23	<u>524.0</u>
9	<u>525.6</u>	24	<u>526.3</u>
10	<u>523.4</u>	25	<u>524.0</u>
11	<u>526.2</u>	26	<u>525.8</u>
12	<u>527.3</u>	27	<u>524.9</u>
13	<u>522.6</u>	28	<u>520.7</u>
14	<u>522.5</u>	29	<u>520.1</u>
15	<u>531.6</u>	30	<u>520.9</u>
		31	<u>521.9</u>

## REFUELING INFORMATION

DOCKET NO: 50-0331  
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**1. Name of facility.**

Duane Arnold Energy Center

**2. Scheduled date for next refueling shutdown.**

July 29, 1993

**3. Scheduled date for restart following refueling.**

September 1993

**4. Will refueling or resumption of operation thereafter require a technical specification change or other license amendment?**

Yes, Submitted RTS#255, Received approved Amendment #192

**5. Scheduled date(s) for submitting proposed licensing action and supporting information.**

Submitted RTS#255, 1/29/93, Revision of Source Range Monitor Functional Test Surveillance Interval. (Approved as Amendment #192 dated March 29, 1993)

**6. Important licensing considerations associated with refueling, e.g., new or different fuel design or supplier, unreviewed design or performance analysis methods, significant changes in fuel design, new operating procedures.**

No

**7. The number of fuel assemblies (a) in the core, (b) in the spent fuel storage pool.**

- a. 368
- b. 1152

**8. The present licensed spent fuel pool storage capacity and the size of any increase in licensed storage capacity that has been requested or is planned, in number of fuel assemblies.**

- a. 2050 - Licensed Capacity or
- b. 1898 under the presently installed storage rack capacity.
- c. 3152 requested by RTS#252, submitted March 26, 1993

**9. The projected date of the last refueling that can be discharged to the spent fuel pool assuming the present licensed capacity.**

- a. 2000 - Licensed Capacity or
- b. 1997 under the presently installed storage rack capacity.

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MAJOR/SAFETY RELATED MAINTENANCE REPORT MONTH: March 1993			
DATE	SYSTEM	COMPONENT	DESCRIPTION
03/16/93	JM Containment Isolation Control System	LS Level Switch	During repeatability testing, the Reactor Vessel Low Level Trip Switch, the signal to High Pressure Coolant Injection (HPCI) and Primary Containment Isolation System (PCIS) initiations, tripped at five different levels on consecutive checks. The faulty micro switch was replaced Redundant instrumentation was available at the time.
3/16/93	BM Low Pressure Core Spray System	20 Valve, Electrically Operated	Core Spray Motor Operated Test Bypass valve Limit Switch required replacement of broken rotor. Required entrance into seven day Limiting Condition for Operation.
03/18/93	KQ Fire Protection System (Water)	PSF Pipe Fittings	Falling chunks of ice had severed three Nitrogen Deluge lines causing a 10% power reduction for two hours when the three deluges tripped six cooling tower fans.
03/21/93	SE Steam Extraction System	LCV Level Control Valve	Feedwater heater level control drain valve stuck open at 45% position requiring level to be controlled with the dump valve. Stuck-open valve caused 4 MWe loss by diverting extraction steam from the feedwater system to the condenser. Required power reduction (ALARA) to permit heater bay entry to perform repair.
03/22/93	KP Fire Protection System (Water)	P Diesel Driven Fire Pump	Diesel engine cooling system high temperature was detected during post maintenance testing of the Nitrogen Deluge line repair. The repair required greater than seven days, exceeding the seven day Limiting Condition for Operation and requiring a special report.
03/22/93	TD Turbine Lube Oil System	P Pump	Emergency Bearing Oil Pump upper thrust bearing failed during surveillance due to lack of lubrication.

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UNIT SHUTDOWNS AND POWER REDUCTIONS  
 REPORT MONTH: March 1993

No.	Date	Type (1)	Duration (Hours)	Reason (2)	Method of Shutting Down Reactor (3)	Licensee Event Report #	System Code (4)	Comp. Code (5)	Cause
1	3/21/93	S	28	B	5	n/a	JB	HX	From Feb 11 until the repair the feedwater heater level had been controlled by the dump valve instead of the drain valve. This diversion of steam from the extraction steam system to the condenser had been causing a 4 MWe loss. The repair was scheduled to coincide with a scheduled Turbine Control Valve Surveillance.

1 - F: Forced  
 S: Scheduled

2 - Reason:  
 A-Equipment Failure (Explain)  
 B-Maintenance or Test  
 C-Refueling  
 D-Regulatory Restriction  
 E-Operator Training & License  
 Examination  
 F-Administrative  
 G-Operational Error  
 (Explain)  
 H-Other (Explain)

3 - Method:  
 1-Manual  
 2-Manual Scram  
 3-Automatic Scram  
 4-Continued  
 5-Reduced Load  
 9-Other (Explain)

4 - Exhibit G-  
 Instructions for Preparation of Data Entry  
 Sheets for Licensee Event Report (LER) File  
 (NUREG-0161)

5 - Exhibit 1  
 (Same Source)

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#### Monthly Operational Overview for March 1993:

During March the DAEC operated at 94.7% capacity (Design Gross Electric equals 565.7 MWe).

On four occasions during the month the plant reduced recirculation flow in order to pull rods to maintain full thermal power capability. The most recent control rod movement, on March 29th, brought the core to "all rods out configuration". At the end of the month the plant was still capable of attaining licensed thermal power (1658 MWth). End of full power capability occurred April 9. Power level will coast down until the refueling outage, now scheduled to commence July 29.

Power was reduced 10% for two hours on March 4 when falling chunks of ice severed three nitrogen deluge lines in one cooling tower. Power was reduced because the actuation of the three deluges tripped six cooling tower fans. An hourly fire watch was placed into effect because of the isolation of the deluge system.

During the post-maintenance testing of the nitrogen deluge line repair, diesel driven fire pump cooling water high temperature was detected. This resulted in the pump being secured and declared inoperable. The repair required greater than seven days, exceeding the Limiting Condition for Operation (LCO) and requiring a Special Report. (LER#93-02 pending)

At 1321 hours Saturday March 13 a reactor recirculation pump speed runback occurred when instrument control power transferred to the secondary source. As a result of the runback reactor power dropped to 85% and the reactor water level swelled to 204" (turbine trip at 211"). Operator intervention into the feedwater controls prevented a more severe swell. At 1349, the speed of the recirculation pump was increased to return the plant to full power. At 1441 the 'A' recirculation pump was at full speed. A relay was subsequently replaced.

On March 22 the plant reduced power to 60% to perform turbine valve surveillance testing and make an entry into the heater bay to repair a feedwater heater drain valve. Prior to the repair, downstream temperatures indicated that the feedwater heater level control had been diverting steam flow to the condenser causing a 4 MWe loss. Following the repair, plant output increased as anticipated, downstream temperatures returned to normal. During the surveillances the Emergency Bearing Oil Pump also tripped. A bearing was subsequently replaced.



At 2250 on March 30 a pressure drop across the two stage seal on the B reactor recirculation pump shifted from 500 psig on each of the two stages to 950 psig on one seal and 50 psig on the other. This was diagnosed as a failed outer seal. Operations is monitoring drywell equipment leakage which has thus far increased from 1.5 to 1.9 gpm. If leakage sharply increases or exceeds 2.5 gpm, the present plan is to shift the plant to single recirculation pump operation. The replacement seal is being procured. Plant management has kept in close contact with Region III personnel on this issue.

The following table summarizes March plant operation and categorizes losses in terms of average MWe, capacity factor, and full power equivalent hours.

	MWe	Capacity Factor % of 565.7 MWe	No. of Full Power Equivalent Hours
Losses due to control rod movements, surveillance	0.5	0.1%	0.7
Negative losses, i.e., gains from cool weather	-3.3	-0.6%	-4.5
Losses due to degraded heat rate	7.5	1.3%	9.7
Estimated Metering inaccuracies	4.4	0.8%	6.0
Capacity Losses	1.0	0.2%	1.5
Planned maintenance	5.2	0.9%	6.7
<u>Actual Gross Electric output</u>	<u>550.4</u>	<u>97.3%</u>	<u>723.9</u>
Design Gross Electric Output	565.7	100.0%	744.0
<u>Licensing Action Summary:</u>			
Plant Availability:	100.0%	Auto-unplanned trips this month:	0
Number of reportable events:	1	Auto-unplanned trips last 12 months:	2