DUQUESNE LIGHT COMPANY

SHIPPINGPORT ATOMIC POWER STATION

TEST RESULTS

DLCS 2340106
T-641306

RADIATION LEVELS IN THE VICINITY OF THE PURIFICATION DEMINERALIZERS

CORE I SEED 2

EFPH 761.3

Section 1 of 1 Section

First Issue, March 13, 1961

DISCLAIMER

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Purpose

To determine the buildup of long-lived activity in the 1BD purification demineralizer.

Conclusion

This test indicates that the long-lived activity in the 1BD purification demineralizer has not increased appreciably since the last performance of this test.

The maximum radiation level detected was 650 mr/hr at 26 hours after shutdown near the mid-section of the 1BD demineralizer vessel, as compared to 625 mr/hr on September 6-7, 1959 detected at 30 hours after shutdown.

Description of Test Equipment and Test Procedure

Data was taken using approved procedure DLCS 23401, dated on May 11, 1960. A Jordan survey meter equipped with a 25 foot extension cord was used to determine the radiation levels inside the concrete enclosure and adjacent to the 1BD purification demineralizer vessel. Radiation levels were obtained at six-inch intervals from six feet to twenty-two feet below the top of the demineralizer cubicle. At each position, the probe was slowly rotated and the highest activity recorded. This survey was performed approximately 26 hours after shutdown. The 1AC demineralizer has been out of service since October 27, 1959; therefore, a survey was not made on this demineralizer.

Results

This test was performed at 2000 on June 11, 1960. The data obtained during the performance of this test is tabulated in Tables I, II and III.

The Station was shutdown at 1815 on June 10, 1960.

Table I is a tabulation of the Plant power output for the four-day period prior to this test.

Table II is a tabulation of the radiation levels measured at specific elevations in the 1BD purification demineralizer enclosure. Figure I is a plot of this data. A scale drawing of the demineralizer vessel in relation to the demineralizer enclosure and survey points is shown on this figure.

Table III contains the calibration data for the Jordan survey meter No. 669 which was used during this test.

The resin was charged to the 1BD demineralizer vessel on September 11, 1957. Since that time, the 1BD demineralizer has been in service for approximately 11,000 hours.*

The reactor has been in operation for 6567.4 effective full power hours. Of this total, 5806.1 effective full power hours were accumulated on Core I Seed 1 and 761.3 effective full power hours on Core I Seed 2.

The total gross generated power since the plant was put into operation is 439,678,000 KW hours.

A comparison of the activity levels measured in this performance with the activities measured in the fifth performance indicates that the radiation band in the 1BD demineralizer has dropped approximately 1 foot. In the fifth performance (September 7, 1959) the peak of the radiation band occurred between 9 and 9 1/2 feet from the top of the concrete enclosure. In this performance, the peak was measured at 10 to 10 1/2 feet from the top of the enclosure. The maximum activity of the radiation band has not changed appreciably. In the fifth performance, the maximum activity of the radiation band was 625 mr/hr at 30 hours after shutdown and in this performance, the band radiation level was 650 mr/hr approximately 26 hours after shutdown. The second performance (November 3, 1958) of this test showed a maximum activity of 84 mr/hr at 28 hours after shutdown. These relatively high activity levels (625 and 650 mr/hr) measured in the upper portion of the resin bed at 28 and 26 hours after shutdown indicate that the resin bed serves as a physical filter as well as an ion exchanger for long-lived fission products.

* Determined from the Station Operating Logs.

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FIGURE I
RADIATION LEVEL VS DISTANCE FROM TOP OF
1BD PURIFICATION CUBICLE

RADIATION LEVELS IN THE VICINITY OF THE
PURIFICATION DEMINERALIZERS
DLCS 2340106 (T-641306)

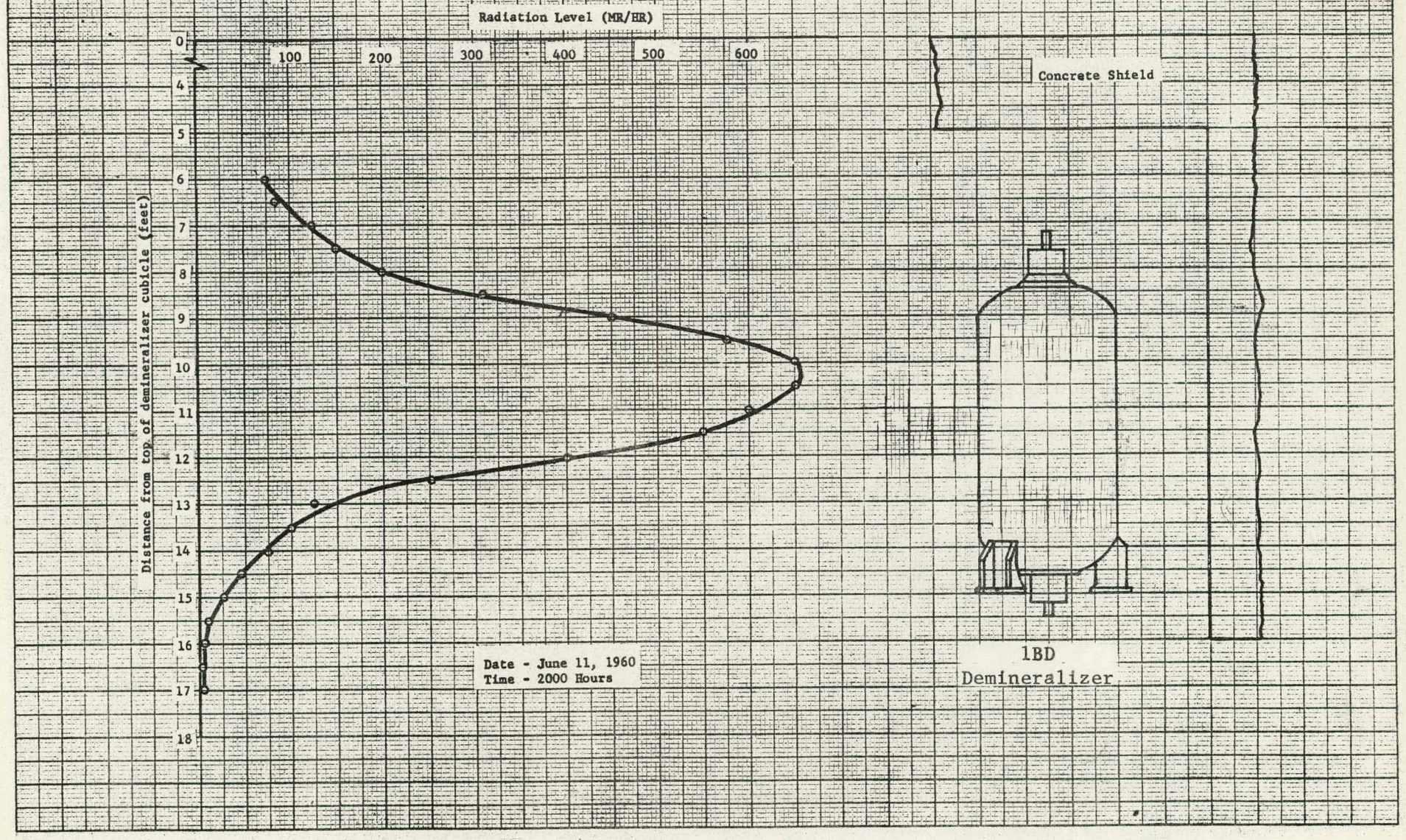

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TABLE I

POWER HISTORY

			Power (MW)		
Date	6/6/60	6/7/60	6/8/60	6/9/60	6/10/60
Time					
0100	67.4	67.6	66.8	66.4	66.8
0200	67.5	67.4	67.1	67.0	66.7
0300	67.5	67.2	67.3	66.9	66.7
0400	67.3	67.2	67.2	66.5	66.7
0500	67.3	67.0	67.5	66.7	67.6
0600	67.2	67.1	67.3	67.4	67.0
0700	66.2	67.2	67.4	66.8	66.9
0800	67.0	67.3	67.5	67.6	66.9
0900	66.8	67.4	67.4	67.0	67.0
1000	67.2	67.1	67.4	66.8	67.1
1100	67.2	67.3	67.6	67.2	67.1
1200	67.1	67.2	67.6	67.4	67.1
1300	67.2	67.1	67.8	67.8	67.2
1400	67.5	67.3	67.7	67.5	67.2
1500	67.1	67.6	67.2	67.2	67.9
1600	67.7	67.6	67.8	67.1	67.6
1700	67.5	67.8	67.5	67.2	67.6
1800	67.9	67.8	67.4	67.4	67.6
1900	67.5	67.3	67.8	67.6	
2000	67.3	66.9	67.3	67.9	*
2100	67.3	67.1	66.9	67.6	Generator
2200	67.5	67.3	67.5	67.6	Breaker
2300	67.5	67.4	67.6	67.5	Opened
2400	67.3	67.3	67.6	67.6	at 1815

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RADIATION LEVELS IN THE VICINITY OF THE
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TABLE II

1BD PURIFICATION DEMINERALIZER RADIATION LEVELS

Date - June 11, 1960

Distance from the Top of Enclosure (feet)	Radiation Level (Mr/Hr)	Time
6	75	2000
6.5	85	2000
7.0	125	2001
7.5	150	2001
8.0	200	2002
8.5	310	2002
9.0	450	2002
9.5	575	2002
10.0	650	2002
10.5	650	2002
11.0	600	2003
11.5	550	2003
12.0	400	2003
12.5	250	2003
13.0	125	2004
13.5	100	2004
14.0	75	2004
14.5	45	2004
15.0	25.0	2004
15.5	8.0	2005
16.0	6.0	2005
16.5	4.0	2005
17.0	3.5	2005
17.5	3.0	2005
18.0	2.75	2006
18.5	2.75	2006
19.0	2.75	2006
19.5	3.0	2006
20.0	2.75	2007
20.5	2.75	2007
21.0	2.75	2007
21.5	2.75	2007
22.0	2.75	

TABLE III

SURVEY METER CALIBRATION DATA

Survey Meter - Jordan No. 669

Calibrated Date	Source	Calculated Value mr/hr	Measured Value mr/hr
6/9/60	Co^{60}	0.5	0.5
6/9/60	Co^{60}	10.0	10.0
6/9/60	Co^{60}	25.0	26.0
6/9/60	Co^{60}	50.0	52.0
6/9/60	Co^{60}	100.0	100.0
6/9/60	Co^{60}	250.0	250.0
6/9/60	Co^{60}	500.0	500.0
6/9/60	Co^{60}	1R	1R
6/9/60	Co^{60}	1.5R	1.5R

TEST RESULTS DLCS 2340106 (T-641306)
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RADIATION LEVELS IN THE VICINITY OF THE PURIFICATION DEMINERALIZERS (cont'd)

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Results Reviewed By Roger J. Lawrence

Approved (Duquesne Light Company) George A Sentel Date 3-13-61