MASTER

DUQUESNE LIGHT COMPANY
SHIPPINGPORT ATOMIC POWER STATION

TEST RESULTS

DLCS 1690202
T-612075

RADIOACTIVE WASTE DISPOSAL SYSTEM
PERIODIC RADIATION MONITORING SURVEY

CORE I SEED 1

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TEST RESULTS

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RADIOACTIVE WASTE DISPOSAL SYSTEM PERIODIC RADIATION MONITORING SURVEY

CORE I, SEED 1

Purpose

To determine periodically the radiation level of all permanently installed monitored points in the Radioactive Waste Disposal Plant and the effectiveness of shielding facilities in working areas at times during which the radiation level is above limits set up by Health Physics.

Conclusions

The radiation level in all areas surveyed was less than 5 mr/hr which is the Health Physics limitation for the Radioactive Waste Disposal Area. Any area with a level above 5 mr/hr is a controlled access area posted with warning signs.

Description of Test Equipment and Test Procedure

The radiation levels at all monitored points in the Radioactive Waste Disposal Plant were obtained from the Radioactive Waste Disposal Monitoring Panel and installed "FRISKER" stations. A radiation survey of the Radioactive Waste Disposal Plant was made using a Thyac survey meter (0-20 mr/hr). The activity level of material which was burned was measured before and after burning. A survey of the incinerator area and the readings of the air samples from the Incinerator Room were taken before, during, and after incinerator operation. Part VI-E of the test could not be performed because there were no drumming operations during the test. Parts VI-D and VI-H of the test procedure were not performed because there were no areas of high activity and the activity level in the respective tanks was not high during normal operation.

Results

DLCS 1690202, Radioactive Waste Disposal System Periodic Radiation Monitoring Survey, (T-612075), was performed on November 2, 1959 with exception of the incinerator operation portion (Part VI-F-G) which was performed on November 5, 1959. There were no drumming operations because no drums were available for use.

Two of the five Frisker Stations were being repaired. The other three were in operation.

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Table I lists the radiation levels obtained from the Radioactive Waste Disposal Monitoring Panel and those obtained at the Frisker Stations. The calibration data for all the radiation instruments used during the test are listed in Table VI. Figures 1 through 4 are sketches of the Waste Disposal Service Building and surrounding areas with the measured radiation levels obtained during the general radiation survey.

The data obtained during the incinerator operation are listed in Tables I through V. Figure 5 contains radiation levels obtained in the incinerator area before, during and after incinerator operation.

There were no areas in the survey in which the activity was higher than the Health Physics limitation of 5 mr/hr. In general, the activity was approximately 0.02 to 0.04 mr/hr which is at or slightly higher than background activity. Most of the walkways between the tanks and around the building were at background level. The highest radiation level obtained in the Waste Disposal Service Building during the test was 5.0 mr/hr. It was measured on contact with the bottom of the 1B chemical waste tank.

RADIOACTIVE WASTE DISPOSAL SYSTEM
PERIODIC RADIATION MONITORING SURVEY,
DLS 1690202 ('T-612075)

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DICS 1690202 (T-612075)

Date: November 2, 1959

FIGURE 2

WASTE DISPOSAL CHEMICAL WASTE TANKS

All readings in mr/hr

Meter: THYAC #1118

DATE November 2, 1959

FIGURE 3

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FIGURE 4

Date: November 2, 1959

Meter: THYAC #1118

All readings in mr/hr

FIGURE 5

Incinerator Area Radiation Levels Before, During and After Incinerator Operation

Date: November 5, 1959

Time: 0945 to 1550

Meter: THYAC #1118

All readings in mr/hr

B- Before Incinerator Operation
D- During Incinerator Operation
A- After Incinerator Operation

TABLE I

Radiation Level Readings

November 2, 1959

Channel 1

Surge and Decay Tank Activity Level (R/Hr.)

1A - No Reading	1C - No Reading
1B - No Reading	1D - No Reading

Resin Storage Tank Activity Level (R/Hr.)

1A - No Reading	1B - No Reading
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Channel 2

Gas Decay Drum Activity Level (cps)

1A - No Reading	1C - No Reading
1B - No Reading	1D - No Reading

Vent Gas Surge Drum Activity Level (cps) - No Reading

Evaporation Bottoms Activity Level (cps) - No Reading

Channel 3

Stack Gas Activity Level (cps) - No Reading

Channel 4

Effluent Water Activity Level (cps) - out of service

Fisker Stations

No. 15 RWD Stairway to Basement - 50 cpm

TABLE I (cont'd)

Radiation Level Readings

November 5, 1959

No. 10 RWD Control Room - No Reading

No. 5 RWD Incinerator - 100 cpm

Access passage to gas stripper cubicle - out of service.

Access passage to gas decay drums - out of service

Incinerator Operation

Activity level of material to be burned before being placed in the incinerator -
0.7 mr/hr (Avg.)

Operators dosimeter readings: Before - 0 MR/Hr.
After - 0 MR/Hr.

Channel 3 - Stack gas activity level - No Reading

Rotoclone Survey - 0.10 mr/hr. at west end
0.15 mr/hr at entrance to scrubber

Gas Scrubber Survey - 0.03 mr/hr. (Background)

Activity level of material in incinerator after burning - 0.7 mr/hr. (Avg.)

Thyac Meter No. 118 used.

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TABLE II

Air Sample Record

Date November 5, 1959 Area Waste Disposal Incinerator

Reason for Sample Before Incinerator Operation

Time On 2210 November 3, 1959 Air Flow 5 ft³/min.

Time Off 0934 November 5, 1959 Air Flow 0 ft³/min.

	Alpha		Beta-Gamma	
Length of Decay	<u>4 Hr.</u>	<u>24 Hr.</u>	<u>4 Hr.</u>	<u>24 Hr.</u>
Total Count	<u>778</u>	<u>24</u>	<u>2957</u>	<u>1114</u>
Background	<u>0</u>	<u>0</u>	<u>907</u>	<u>996</u>
Net Count	<u>778</u>	<u>24</u>	<u>2050</u>	<u>118</u>
Correction Factor	<u>3.57</u>	<u>3.57</u>	<u>2.56</u>	<u>2.56</u>
Disintegrations/5 Minutes	<u>2780</u>	<u>85.68</u>	<u>5250</u>	<u>302.08</u>
Disintegrations/Minute	<u>556</u>	<u>17.14</u>	<u>1050</u>	<u>60.416</u>
Air Sample Total	<u>5310</u>	<u>5310</u>	<u>5310</u>	<u>5310</u>
D/M/Cu. Ft.	<u>0.105</u>	<u>0.003</u>	<u>0.198</u>	<u>0.0114</u>

Air Sampler No. Anton

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TABLE III

Air Sample Record

Date November 5, 1959 Area Waste Disposal Incinerator

Reason for Sample During Incinerator Operation

Time On 0936 Air Flow 4.75 ft³/min.

Time Off 1057 Air Flow 2.00 ft³/min.

Time Counted 1504 4 Hr. Decay

Not Performed 24 Hr. Decay

Alpha

Beta-Gamma

	<u>4 Hr.</u>	<u>24 Hr.</u>	<u>4 Hr.</u>	<u>24 Hr.</u>
Length of Decay				
Total Count	26		1162	1141
Background	0		907	996
Net Count	26		255	145
Correction Factor	3.57		2.56	2.56
Disintegrations/5 Minutes	92.82		652.80	371.20
Disintegrations/Minute	18.564		130.56	74.24
Air Sample Total	273.375		273.375	273.375
D/M.Cu. Ft.	0.068		0.478	0.272

Air Sampler No. 29-S3-2

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TABLE IV

Air Sample Record

Date November 5, 1959 Area Waste Disposal Incinerator

Reason for Sample During Incinerator Operation

Time On 1058 Air Flow 5.0 ft³/min.

Time Off Air Flow 0 ft³/min.

	Alpha		Beta-Gamma	
	<u>4 Hr.</u>	<u>24 Hr.</u>	<u>4 Hr.</u>	<u>24 Hr.</u>
Length of Decay				
Total Count	<u>Not</u>	<u>4</u>	<u>Not</u>	<u>1122</u>
Background	<u>Performed</u>	<u>0</u>	<u>Performed</u>	<u>996</u>
Net Count		<u>4</u>		<u>126</u>
Correction Factor		<u>3.57</u>		<u>2.56</u>
Disintegrations/5 Minutes		<u>14.28</u>		<u>322.56</u>
Disintegration/Minute		<u>2.856</u>		<u>64.512</u>
Air Sample Total		<u>980</u>		<u>980</u>
D/M/Cu. Ft.		<u>0.003</u>		<u>0.066</u>

Air Sampler No. 29-S3-2

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TABLE V

Air Sample Record

Date November 5, 1959 to November 6, 1959 Area Waste Disposal Incinerator

Reason for Sample After Incinerator Operation

Time On 1550 November 5, 1959 Air Flow 5 ft³/min.

Time Off 1650 November 6, 1959 Air Flow 5 ft³/min.

	Alpha		Beta-Gamma	
	<u>4 Hr.</u>	<u>24 Hr.</u>	<u>4 Hr.</u>	<u>24 Hr.</u>
Length of Decay				
Total Count	<u>Not</u>	<u>37</u>	<u>Not</u>	<u>1176</u>
Background	<u>Performed</u>	<u>0</u>	<u>Performed</u>	<u>996</u>
Net Count		<u>37</u>		<u>180</u>
Correction Factor		<u>3.57</u>		<u>2.56</u>
Disintegrations/5 Minutes		<u>132.09</u>		<u>460.80</u>
Disintegrations/Minute		<u>24.42</u>		<u>92.16</u>
Air Sample Total		<u>7500</u>		<u>7500</u>
D/M/Cu. Ft.		<u>0.004</u>		<u>0.012</u>

Air Sampler No. Anton

TABLE VI

Calibration Data

*Channel No. 1	Source	Distance Between Source and Detector	Calculated Radiation Level	Indicated Radiation Level
		Inches	R/Hr.	R/Hr.
1A Resin Storage	47 MC Co ⁶⁰	7.48	1.50	1.50
		9.17	1.00	1.00
		12.90	0.50	0.60
		18.30	0.25	0.30
		27.70	0.15	0.15
		28.90	0.10	0.90
		40.90	0.05	0.03
1B Resin Storage	47 MC Co ⁶⁰	7.48	1.50	1.70
		9.17	1.00	1.30
		12.90	0.50	0.68
		18.30	0.25	0.36
		27.70	0.15	0.16
		28.90	0.10	0.13
		40.90	0.05	0.07
1A Surge and Decay Tank	47 MC Co ⁶⁰	7.48	1.50	1.50
		9.17	1.00	1.20
		12.90	0.50	0.70
		18.30	0.25	0.35
		27.70	0.15	0.22
		28.90	0.10	0.14
		40.90	0.05	0.08
1B Surge and Decay Tank	47 MC Co ⁶⁰	0.5	40.0	35.00
		3.5	6.0	4.90
		9.0	1.0	0.45
1C Surge and Decay Tank	47 MC Co ⁶⁰	7.48	1.50	1.60
		9.17	1.00	1.20
		12.90	0.50	0.68
		18.30	0.25	0.38
		27.70	0.15	0.18
		28.90	0.10	0.15
		40.90	0.05	0.07
1D Surge and Decay	47 MC Co ⁶⁰	0.5	40.0	40.0
		3.5	6.0	5.8
		9.0	1.0	1.0

* Obtained from DLCS 13508, 11/26/58.

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TABLE VI (cont'd)

Calibration Data

*Channel No. 2	Source	Distance Between Source and Detector Inches	Indicator Reading cps
1A Gas Decay Drum	1 MC Co ⁶⁰	9	65
1B Gas Decay Drum	1 MC Co ⁶⁰	9	60
1C Gas Decay Drum	1 MC Co ⁶⁰	9	60
1D Gas Decay Drum	1 MC Co ⁶⁰	9	50
Vent Gas Surge Drum	1 MC Co ⁶⁰	9	50
Evaporation Unit	47 MC Co ⁶⁰	0.5	70

*Channel No. 3	No data available		
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*Channel No. 4	Source Energy Level	Indicator Reading (cps)	Discriminator Voltage (Volts)
Effluent Line	3.0×10^{-4}	30.0	89.5
	7.7×10^{-4}	90.0	89.5
	7.2×10^{-3}	72.0	89.5

Date: October 30, 1959 Thyac Survey Met. No. 1118	Source Co ⁶⁰ 1.1 MC	Calculated Measured	.18 .18	1.5 1.5	15 15
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"Frisker" Instruments					
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Date: October 26, 1959 Source: Sr ⁹⁰ (1.2 mr/hr , 20 mr/hr)					
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Frisker No.	Location	3600 cpm Internal Pulse	As Read	Should Read
5	RWD Incinerator	2200	7000	5000
10	RWD Control Room	1100	4000	5000
15	RWD Basement Stairway	10000	11000	5000

All other Friskers out of service				
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* Obtained from DLCS 13508, 11/26/58.

TEST RESULTS DLCS 1690202

T-612075

RADIOACTIVE WASTE DISPOSAL SYSTEM PERIODIC RADIATION MONITORING SURVEY

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10-10-60