

SEMIANNUAL RADIOACTIVE EFFLUENT
RELEASE REPORT

1st and 2nd Quarters of 1991

Facility: Shoreham Nuclear Power Station, Unit 1

Licensee: Long Island Lighting Company, Inc.

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- 1 Section E and Section F are not required by Technical Specification to be included in this report. These sections will appear in the next report, due 60 days after January 1, 1992, and will encompass all of

Note: During the period covered by this Report, SNPS was operating under License NPF-82 through Amendment 6. Amendment 7, which became effective on July 20, 1991, changed Appendix A, Technical Specification significantly, including the numbering of many sections. In addition, the numbering of some sections of the ODCM changed concurrently. All Technical Specification and ODCM section numbers used in this Report refer to NPF-82 through Amendment 6 and ODCM Revision 17.

INTRODUCTION

This Semiannual Radioactive Effluent Release Report, submitted in accordance with Technical Specification 6.9.1.7, Offsite Dose Calculation Manual (ODCM) 6.9.1.7 and 6.15.1, and Process Control Program (PCP) 9.4, covers the period from January 1, 1991 through June 30, 1991. By contractual agreement with New York State, the Long Island Lighting Company (LILCO) will transfer the Shoreham nuclear Power Station to the Long Island Power Authority. LILCO cannot operate the plant in the interim. In order to ready the plant for decommissioning and to protect plant systems, the fuel was transferred to the spent fuel pool in August 1989, and plant layup activities began. Prior to defueling, the plant was in a cold shutdown condition for almost two years.

A. SUPPLEMENTAL INFORMATION

1. Regulatory Limits

Shoreham's effluent regulatory limits are defined in Facility Operating License NPF-82, Shoreham Nuclear Power Station, Appendix A, Technical Specifications.

- a) Limits for gaseous effluents and noble gases are covered by Technical Specification 6.8.4 and ODCM Controls 3.11.2.1 and 3.11.2.2.
- b&c) Iodines and particulates with half-lives greater than 8 days in gaseous effluents are addressed in Technical Specification 6.8.4 and ODCM Control 3.11.2.3.
- d) Liquid effluent limits are described in Technical Specification 6.8.4 and ODCM Controls 3.11.1.1 and 3.11.1.2.
- e) In addition, with Shoreham's sampling and analysis program the following average minimum detectable activities (MDA's) were achieved for the first and second quarters in 1991. These MDA's are less than the required lower limits of detection (LLD's):

Liquid:

Ce-141	3.65 E-8	uCi/ml
Co-58	2.87 E-8	uCi/ml
Cs-137	3.60 E-8	uCi/ml
Mn-54	3.67 E-8	uCi/ml
Mo-99	1.79 E-8	uCi/ml
Zn-65	7.21 E-8	uCi/ml

Gaseous:

Cs-137	5.24 E-14	uCi/cc
I-131	7.63 E-14	uCi/cc
I-133	7.16 E-13	uCi/cc
Mn-54	4.88 E-14	uCi/cc
Xe-133	1.34 E-08	uCi/cc
Zn-65	1.23 E-13	uCi/cc

2. Maximum Permissible Concentrations

a-d) Maximum permissible liquid effluent concentrations (MPC's) are those specified in 10 CFR 20, Appendix B, Table II, Column 2. If an isotope is listed with values for SOLUBLE and INSOLUBLE states, the more conservative value is utilized. For gaseous effluents, MPC's were not used. Direct calculations of dose were utilized to satisfy the dose rate limitations of Technical Specification 6.8.4 and ODCM Control 3.11.2.1.

3. Average Energy

No isotopes above minimum detectable activities were measured in gaseous effluents. Therefore, there is no reportable average energy for this time period.

4. Measurements and Approximations of Total Radioactivity

a-d) Samples were collected in the manner and with the frequency prescribed in Technical Specifications Surveillance Requirement 6.8.4 and ODCM Controls 4.11.1.1.1 and 4.11.2.1.2. Samples were analyzed in accordance with ODCM Controls Tables 4.11.1.1.1-1 and 4.11.2.1.2-1 regarding both type of analysis and level of sensitivity. Most samples were analyzed by gamma spectroscopy with a Germanium detector. A liquid scintillation counter was used to analyze for H-3 and Fe-55 while Sr-89, -90 analyses were done by proportional counter. Samples analyzed for iron and strontium underwent a chemical separation prior to counting. Approved sample collection and analysis procedures were followed.

Analytical results are examined to ensure that the minimum sensitivity levels required by ODCM lower limits of detection (LLD's) have been met. Any identifiable peaks above background are quantified.

The methods above were used for batch releases. The same methods were used for continuous discharges, but were combined with gross activity measurements on process streams and total flow for these streams.

No estimate of percent total error is provided in Table 1A and Table 2A because all values for gaseous and liquid effluents were determined to be less than required LLD's.

5. Batch Releases

a) Liquid	<u>1st Quarter</u>	<u>2nd Quarter</u>
1. Number of batches	31	20
2. Total Time (minutes)	4,387	3,176
3. Maximum Time (minutes)	198	270
4. Minimum Time (minutes)	81	78
5. Average Time (minutes)	142	159
6. Total Volume Discharged (gal)	5.20 E+5	3.36 E+5
7. Total Dilution Water (gal)	3.77 E+7	1.74 E+8
8. Average Flow (gpm) (with dilution)	8.71 E+3	5.49 E+4

b) Gaseous - None

6. Abnormal Releases

a) Liquid - None

b) Gaseous - None

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B - GASEOUS EFFLUENTS

1st and 2nd Quarters of 1991

All samples of gaseous effluents were analyzed and determined to be at or below minimum detectable activities (MDA's) for all radionuclides listed in Shoreham's ODCM. These MDA's were below the lower limits of detection required in ODCM Controls Table 4.11.2.1.2-1. In addition, no other radionuclides were identified. Therefore, no entries were made in Tables 1A, 1B or 1C that follow.

Composite sample results for the first and second quarters of this reporting period are all at or below MDA's.

TABLE 1A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT 1991

GASEOUS EFFLUENTS—SUMMATION OF ALL RELEASES

	Unit	Quarter 1	Quarter 2	Est. Total Error, %
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A. Fission & activation gases

1. Total release	Ci	. E	. E	. E
2. Average release rate for period	$\mu\text{Ci/sec}$. E	. E	
3. Percent of Technical specification limit	%	. E	. E	

B. Iodines

1. Total iodine-131	Ci	. E	. E	. E
2. Average release rate for period	$\mu\text{Ci/sec}$	. E	. E	
3. Percent of technical specification limit	%	. E	. E	

C. Particulates

1. Particulates with half-lives >8 days	Ci	. E	. E	. E
2. Average release rate for period	$\mu\text{Ci/sec}$	. E	. E	
3. Percent of technical specification limit	%	. E	. E	
4. Gross alpha radioactivity	Ci	. E	. E	

D. Tritium

1. Total release	Ci	. E	. E	. E
2. Average release rate for period	$\mu\text{Ci/sec}$	. E	. E	
3. Percent of technical specification limit	%	. E	. E	

TABLE 1B

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT 1991

GASEOUS EFFLUENTS—ELEVATED RELEASE

Nuclides Released	Unit	CONTINUOUS MODE		BATCH MODE	
		Quarter 1	Quarter 2	Quarter 1	Quarter 2

1. Fission gases

krypton-85	Ci	. E	. E	. E	. E
krypton-85m	Ci	. E	. E	. E	. E
krypton-87	Ci	. E	. E	. E	. E
krypton-88	Ci	. E	. E	. E	. E
xenon-133	Ci	. E	. E	. E	. E
xenon-135	Ci	. E	. E	. E	. E
xenon-135m	Ci	. E	. E	. E	. E
xenon-138	Ci	. E	. E	. E	. E
Others (specify)	Ci	. E	. E	. E	. E
	Ci	. E	. E	. E	. E
	Ci	. E	. E	. E	. E
unidentified	Ci	. E	. E	. E	. E
Total for period	Ci	. E	. E	. E	. E

2. Iodines

iodine-131	Ci	. E	. E	. E	. E
iodine-133	Ci	. E	. E	. E	. E
iodine-135	Ci	. E	. E	. E	. E
Total for period	Ci	. E	. E	. E	. E

3. Particulates

strontium-89	Ci	. E	. E	. E	. E
strontium-90	Ci	. E	. E	. E	. E
cesium-134	Ci	. E	. E	. E	. E
cesium-137	Ci	. E	. E	. E	. E
barium-lanthanum-140	Ci	. E	. E	. E	. E
Others (specify)	Ci	. E	. E	. E	. E
	Ci	. E	. E	. E	. E
	Ci	. E	. E	. E	. E
unidentified	Ci	. E	. E	. E	. E

TABLE 1C

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT 1991

GASEOUS EFFLUENTS—GROUND-LEVEL RELEASES

Nuclides Released	Unit	CONTINUOUS MODE		BATCH MODE	
		Quarter 1	Quarter 2	Quarter 1	Quarter 2

1. Fission gases

krypton-85	Ci	. E	. E	. E	. E
krypton-85m	Ci	. E	. E	. E	. E
krypton-87	Ci	. E	. E	. E	. E
krypton-88	Ci	. E	. E	. E	. E
xenon-133	Ci	. E	. E	. E	. E
xenon-135	Ci	. E	. E	. E	. E
xenon-135m	Ci	. E	. E	. E	. E
xenon-138	Ci	. E	. E	. E	. E
Others (specify)	Ci	. E	. E	. E	. E
	Ci	. E	. E	. E	. E
	Ci	. E	. E	. E	. E
unidentified	Ci	. E	. E	. E	. E
Total for period	Ci	. E	. E	. E	. E

2. Iodines

iodine-131	Ci	. E	. E	. E	. E
iodine-133	Ci	. E	. E	. E	. E
iodine-135	Ci	. E	. E	. E	. E
Total for period	Ci	. E	. E	. E	. E

3. Particulates

strontium-89	Ci	. E	. E	. E	. E
strontium-90	Ci	. E	. E	. E	. E
cesium-134	Ci	. E	. E	. E	. E
cesium-137	Ci	. E	. E	. E	. E
barium-lanthanum-140	Ci	. E	. E	. E	. E
Others (specify)	Ci	. E	. E	. E	. E
	Ci	. E	. E	. E	. E
	Ci	. E	. E	. E	. E
unidentified	Ci	. E	. E	. E	. E

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C - LIQUID EFFLUENTS

1st and 2nd Quarters of 1991

All samples of liquid effluents were analyzed and determined to be at or below minimum detectable activities (MDA's) for all radionuclides listed in the ODCM.

These MDA's were below the LLD's required in ODCM Controls Table 4.11.1.1.1-1. In addition, no other radionuclides were identified. Therefore, no entries were made in Tables 2A and 2B that follow.

Composite sample results for the 1st and 2nd quarters of this reporting period are all at or below MDA's.

TABLE 2A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT 1990

LIQUID EFFLUENTS--SUMMATION OF ALL RELEASES

Unit	Quarter 1	Quarter 2	Est. Total Error, %
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A. Fission and activation products

1. Total release (not including tritium, gases, alpha)	Ci	. E	. E	. E
2. Average diluted concentration during period	$\mu\text{Ci/ml}$	. E	. E	
3. Percent of applicable limit	%	. E	. E	

B. Tritium

1. Total release	Ci	. E	. E	. E
2. Average diluted concentration during period	$\mu\text{Ci/ml}$	. E	. E	
3. Percent of applicable limit	%	. E	. E	

C. Dissolved and entrained gases

1. Total release	Ci	. E	. E	. E
2. Average diluted concentration during period	$\mu\text{Ci/ml}$	. E	. E	
3. Percent of applicable limit	%	. E	. E	

D. Gross alpha radioactivity

1. Total release	Ci	. E	. E	. E
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E. Volume of waste released (prior to dilution)	liters	. E	. E	. E
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F. Volume of dilution water used during period	liters	. E	. E	. E
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TABLE 2B

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT 1991

LIQUID EFFLUENTS

Nuclides Released	Unit	CONTINUOUS MODE		BATCH MODE	
		Quarter 1	Quarter 2	Quarter 1	Quarter 2
strontium-89	Ci	E	E	E	E
strontium-90	Ci	E	E	E	E
cesium-134	Ci	E	E	E	E
cesium-137	Ci	E	E	E	E
iodine-131	Ci	E	E	E	E
cobalt-58	Ci	E	E	E	E
cobalt-60	Ci	E	E	E	E
iron-59	Ci	E	E	E	E
zinc-65	Ci	E	E	E	E
manganese-54	Ci	E	E	E	E
chromium-51	Ci	E	E	E	E
zirconium-niobium-95	Ci	E	E	E	E
molybdenum-99	Ci	E	E	E	E
technetium-99m	Ci	E	E	E	E
barium-lanthanum-140	Ci	E	E	E	E
cerium-141	Ci	E	E	E	E
Other (specify)	Ci	E	E	E	E
	Ci	E	E	E	E
	Ci	E	E	E	E
	Ci	E	E	E	E
	Ci	E	E	E	E
unidentified	Ci	E	E	E	E
Total for period (above)	Ci	E	E	E	E
xenon-133	Ci	E	E	E	E
xenon-135	Ci	E	E	E	E

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D - SOLID WASTE

1st and 2nd Quarters of 1991

There was no shipment of solid waste of any kind offsite during the first and the second quarters of 1991. All entries in Table 3 are therefore zeros.

TABLE 3

*** REGULATORY GUIDE 1.21 REPORT ***
 SOLID WASTE SHIPPED OFFSITE FOR DISPOSAL
 ** DURING PERIOD FROM 1/1/91 to 6/30/91**

WASTE STREAM: Resins, Filters, & Evaporator Bottoms

<u>WASTE</u>	<u>ASS</u>	<u>CUBIC METERS</u>	<u>CURIES</u>	<u>% ERROR (CI)</u>
A		0	0.0	N/A

** ESTIMATES OF MAJOR NUCLIDES BY WASTE CLASS & STREAM **
 WASTE STREAM: Resins, Filters & Evaporator Bottoms with .0% CUTOFF

<u>WASTE CLASS</u>	<u>NUCLIDE</u>	<u>ABUNDANCE</u>	<u>CURIES</u>
A	Co-60	0%	0.0
	Fe-55	0%	0.0
	Cr-51	0%	0.0
	Co-58	0%	0.0
	Zn-65	0%	0.0
	Aq-110m	0%	0.0
	Pu-241	0%	0.0
	H-3	0%	0.0
	Mn-54	0%	0.0
	Fe-59	0%	0.0
	Ce-144	0%	0.0
	Ni-63	0%	0.0
	Cs-137	0%	0.0
	Nb-95	0%	0.0
	Sb-124	0%	0.0
	Co-57	0%	0.0
	Ce-141	0%	0.0
	Ni-59	0%	0.0
	Sr-90	0%	0.0
	Nb-94	0%	0.0
	C-14	0%	0.0
	Ga-242	0%	0.0
	I-129	0%	0.0
	Tc-99	0%	0.0

TABLE 3 (Cont'd)

*** REGULATORY GUIDE 1.21 REPORT ****
 SOLID WASTE SHIPPED OFFSITE FOR DISPOSAL
 ** DURING PERIOD FROM 1/1/91 to 6/30/91**

WASTE STREAM: Dry Active Waste

<u>WASTE CLASS</u>	<u>CUBIC METERS</u>	<u>CURIES</u>	<u>% ERROR (CI)</u>
A	0	0.0	N/A

** ESTIMATES OF MAJOR NUCLIDES BY WASTE CLASS & STREAM **
 WASTE STREAM: Dry Active Waste with .0% CUTOFF

<u>WASTE CLASS</u>	<u>NUCLIDE</u>	<u>ABUNDANCE</u>	<u>CURIES</u>
A	Mn-54	0%	0.0
	Co-60	0%	0.0
	Fe-55	0%	0.0
	Cr-51	0%	0.0
	Co-58	0%	0.0
	Zn-65	0%	0.0
	Ag-110M	0%	0.0
	Fe-59	0%	0.0
	Ni-63	0%	0.0
	H-3	0%	0.0
	Sb-124	0%	0.0
	Co-57	0%	0.0
	Zr-95	0%	0.0
	Cs-137	0%	0.0
	Ni-59	0%	0.0
	Ce-141	0%	0.0
	C-14	0%	0.0
	Am-241	0%	0.0
	Sr-90	0%	0.0
	Nb-94	0%	0.0
	Ce-144	0%	0.0
	Cm-242	0%	0.0
	Pu-241	0%	0.0
	I-129	0%	0.0
	TC-99	0%	0.0

TABLE 3 (Cont'd)

*** REGULATORY GUIDE 1.21 REPORT ***
 SOLID WASTE SHIPPED OFFSITE FOR DISPOSAL
 ** DURING PERIOD FROM 1/1/91 to 6/30/91**

WASTE STREAM: Irradiated Components

<u>WASTE CLASS</u>	<u>CUBIC METERS</u>	<u>CURIES</u>	<u>% ERROR (CI)</u>
A	0	0.0	N/A

** ESTIMATES OF MAJOR NUCLIDES BY WASTE CLASS & STREAM **
 WASTE STREAM: Irradiated Components with .0% CUTOFF

<u>WASTE CLASS</u>	<u>NUCLIDE</u>	<u>ABUNDANCE</u>	<u>CURIES</u>
A	FE-55	0%	0.0
	Co-60	0%	0.0
	Ni-63	0%	0.0
	Mn-54	0%	0.0
	Ni-59	0%	0.0
	C-14	0%	0.0
	Nb-94	0%	0.0
	Pu-241	0%	0.0
	Pu239/40	0%	0.0
	Pu-238	0%	0.0
	Tc-99	0%	0.0
	Np-237	0%	0.0
	Cm-242	0%	0.0
	Am-241	0%	0.0
	Cr-51	0%	0.0
	Cm243/44	0%	0.0
	Pu-242	0%	0.0
	Am-243	0%	0.0
	Cs-137	0%	0.0
	I-129	0%	0.0
	Sr-90	0%	0.0
	H-3	0%	0.0

** SOLID WASTE DISPOSITION SUMMARY**

<u>NUMBER OF SHIPMENTS</u>	<u>MODE OF TRANSPORTATION</u>	<u>DESTINATION</u>
0	N/A	Barnwell
0	N/A	Richland
0	N/A	Beatty
0	N/A	Other

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G - ODCM REVISIONS, REMP LOCATION CHANGES AND
MAJOR CHANGES TO RADIOACTIVE WASTE TREATMENT SYSTEMS

A. Changes to the ODCM:

According to Technical Specification 6.14.c and ODCM Control 6.9.1.7, changes to the Offsite Dose Calculation Manual (ODCM) made during the reporting period shall be submitted with the Semiannual Radioactive Effluent Release Report in the form of a complete copy of the entire ODCM, with changes identified by markings in the margin of the pages that contain them.

There was a single revision to the ODCM, Rev. 17, that was made during this reporting period.

In this revision, changes were made to the ODCM to reflect the isotopic inventory and the radiological effluent monitoring requirements appropriate to the plant's non-operating, defueled condition with fuel stored in the spent fuel pool.

Revision 17 to the ODCM was approved by the Review of Operations Committee on May 30, 1991 and became effective on June 24, 1991. A copy of this revision is attached to this Semiannual Effluent Release Report.

B. REMP Location Changes:

Action Statements c of ODCM Control 3.12.1 and a and b of ODCM Control 3.12.2 require REMP location changes to be reported in the Semiannual Radioactive Effluent Release Report.

There were no such REMP location changes during this reporting period.

C. Major Changes to Radioactive Waste Treatment Systems:

Solid Waste Process Control Program (PCP) 9.3.1 and 9.4.4 state that the Semiannual Radioactive Effluent Release Report shall include major changes to radioactive waste treatment systems.

There were no major changes to radioactive waste treatment systems during this reporting period.

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H - MISCELLANEOUS SPECIAL REPORTS

1st and 2nd Quarters of 1991

A. ODCM Revisions:

During the first two quarters of 1991, ODCM was revised once, from R.v. 16 to Rev. 17. As Revision 17 to ODCM became effective on June 24, 1991, Shoreham's REMP, as specified in the governing ODCM, was concurrently reduced in scope, reflecting the non-operating and defueled status of the plant.

Sampling frequencies for certain effluent pathways were reduced and analysis requirements for isotopes no longer available for release were deleted. Environmental sampling requirements for milk and ground water were deleted since the pathways do not currently exist. The outer ring of direct radiation monitoring stations was eliminated since potential exposure from routine shoreham related radioactivity is insignificant and all dose rates are evaluated to be at natural background level at these locations. Environmental sample analysis requirements were reduced similar to the effluent analysis requirements. In addition, ODCM control and surveillance requirements for the Ventilation Exhaust Treatment System, Containment Purging and Venting and the Gaseous Radwaste Treatment System were eliminated.

Biweekly in-season (May-October) milk sampling and quarterly potable water sampling were last collected on 6/14/91 and 6/6/91, respectively. Future collection of these two types of REMP samples will cease from this point on. The TLD's at the full 36 inner/outer station and the 5 extra school/park related locations were last collected for the 1991 2nd quarter on 7/11/91. Starting with the 3rd quarter, only 18 direct radiation monitors at the 16 inner plus 2 control locations will be collected. The remaining 23 will be permanently discontinued.

The food product sampling, primarily of broad leaf vegetation grown locally, is no longer merely a substitute for unavailable milk samples. Because of the shift of critical exposure path from milk to ground deposition after the changeover from full power operation mode to the defueled condition, sampling of vegetation is now scheduled to be a regular activity, with frequency depending on the timing of harvest.

Conduct of analysis of all REMP samples collected before the new REMP scope date of 6/24/91 has been ongoing in the old format, consistent with the intent of the sampling. Beginning in August 1991, all analyses will be in the new format, and all iodine-131 radioanalysis requirements in the weekly airborne particulate samples and the food product samples that were collected after 6/24/91 will be deleted.

B. Sample Flow Failure in Batch Liquid Discharge 91D-046:

On May 17, 1991, shortly after starting a batch discharge from the Discharge Waste Sample Tank, the sample pump on the Radwaste Discharge Sample Monitor unit (1D11-PNL-013) tripped. This trip went unnoticed due to the coincidental failure of the on-skid sample flow switch which normally would shut off the discharge valve upon a no flow signal, resulting in the batch discharge not being sampled continuously.

However, this batch was analyzed prior to starting its release in accordance with plant procedures and determined to be less than LL'D's for all nuclides of consequence. The batch dose totals across the waterborne exposure pathway are all zeros from the computerized calculations by the SNPS Liquid Radwaste Program.

An Engineering Change Request, ECR # 1478, was issued to make a software enhancement to detect and prevent this condition in the future. And it was determined (through SNPS Report of Abnormal Conditions RAC #91-04) to be a non-reportable event per 10CFR 50.72 and 50.73.