

SEMIANNUAL RADIOACTIVE EFFLUENT
RELEASE REPORT

1st and 2nd Quarters of 1990

Facility: Shoreham Nuclear Power Station, Unit 1

Licensee: Long Island Lighting Company, Inc.

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
Introduction	1
A. Supplemental Information	1
B. Gaseous Effluents	4
C. Liquid Effluents	8
D. Solid Waste	11
E. Not Required ¹	
F. Not Required ¹	
G. PCP and ODCM Revisions, REMP Non Compliances and Major Changes to Radioactive Waste Treatment Systems	14
H. Miscellaneous Special Reports	15

1. Section E, Radiological Impact on Man, and Section F, Meteorological Data 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, 1991, and will encompass all of 1990.

Introduction

This Semiannual Radioactive Effluent Release Report, submitted in accordance with Technical Specification 6.9.1.7, covers the periods from January 1, 1990, through March 31, 1990, and April 1, 1990, through June 30, 1990. 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. The plant has been in cold shutdown for over 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 Specifications 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 3.11.2.3.
- d) Liquid effluent limits are described in Technical Specifications 3.11.1.1 and 3.11.1.2
- e) In addition, with Shoreham's sampling and analysis program the following typical minimum detectable activities (MDA's) were achieved. These MDA's are less than the required lower limits of detection (LID's).

Liquid:

Ce-141	3.0 E-08	uCi/ml
Co-58	2.7 E-08	uCi/ml
Cs-137	3.3 E-08	uCi/ml
Mo-99	1.6 E-08	uCi/ml
Zn-65	7.3 E-08	uCi/ml
Mn-54	2.4 E-08	uCi/ml

Gaseous:

Cs-137	3.9 E-14	uCi/cc
Mn-54	3.7 E-14	uCi/cc
Zn-65	9.7 E-14	uCi/cc
I-131	5.3 E-14	uCi/cc
I-133	7.2 E-13	uCi/cc
Xe-133	4.6 E-08	uCi/cc

2. Maximum Permissible Concentrations

(a-d) Maximum permissible concentrations (MPCs) 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 MPCs were not used. Direct calculations of dose were utilized to satisfy the dose rate limitations of Technical Specification 3.11.2.1.

3. Average Energy

No fission or activation gas 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 Requirements 4.11.1.1.1 and 4.11.2.1.2. Samples were analyzed in accordance with Technical Specifications 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 Technical Specifications lower limits of detection (LLD's) have been met. Any identifiable peaks above background are quantified.

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

No estimate of percent total error is provided in either Table 1A or 2A because all values for gaseous effluents were determined to be less than required lower limits of detection (LLD's).

5. Batch Releases

a) Liquid	1st Quarter	2nd Quarter
1. Number of batches	2.70 E+01	1.40 E+01
2. Total Time (minutes)	4.18 E+03	2.22 E+03
3. Maximum Time (minutes)	2.23 E+02	1.71 E+02
4. Average Time (minutes)	1.55 E+02	1.58 E+02
5. Minimum Time (minutes)	3.80 E+01	1.01 E+02
6. Average Flow (gpm) (Dilution)	1.37 E+04	1.30 E+05

b) Gaseous - None

6. Abnormal Releases

a) Liquid - None

b) Gaseous - None

SEMIANNUAL RADIOACTIVE EFFLUENT
RELEASE REPORT

B - GASEOUS EFFLUENTS

1st and 2nd Quarters of 1990

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 Technical Specifications. These MDA's were below the lower limits of detection required in Technical Specification 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 second quarter of this reporting period are not available at this time. First quarter composite results were used for the second quarter. When the actual results are available, any significant differences will be noted in supplements to this report. However, as stated previously, all results are at or below MDAs. No significant differences have been noted between previously reported composite results and actual results. All results have been at or below MDA's.

TABLE 1A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT 1990

GASEOUS EFFLUENTS—SUMMATION OF ALL RELEASES

	Unit	Quarter 1	Quarter 2	Est. Total Error, %
--	------	--------------	--------------	------------------------

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 1990

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 1990
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

SEMIANNUAL RADIOACTIVE EFFLUENT
RELEASE REPORT

C - LIQUID EFFLUENTS

1st and 2nd Quarters of 1990

All samples of liquid effluents were analyzed and determined to be at or below minimum detectable activities (MDAs) for all radionuclides listed in Shoreham's Technical Specifications. These MDAs were below the lower limits of detection required in Technical Specification Table 4.11.2.1.1-1. In addition, no other radionuclides were identified. Therefore, no entries were made in Tables 2A or 2B.

Composite sample results for the second quarter are not available at this time. First quarter composite results were used for the second quarter. When actual results are available, any significant differences will be noted in supplements to this report. To date, no significant differences between reported composite results and the actual results have occurred.

TABLE 2A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT 1990

LIQUID EFFLUENTS—SUMMATION OF ALL RELEASES

Unit	Quarter 1	Quarter 2	Est. Total Error, %
------	--------------	--------------	------------------------

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
------------------	----	-----	-----	-----

E. Volume of waste released (prior to dilution)	liters	. E	. E	. E
--	--------	-----	-----	-----

F. Volume of dilution water used during period	liters	. E	. E	. E
---	--------	-----	-----	-----

TABLE 2B

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT 1990

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

SEMIANNUAL RADIOACTIVE EFFLUENT
RELEASE REPORT

D - SOLID WASTE

1st and 2nd Quarters of 1990

Table 3 provides information on shipments of solid waste for the first and second quarters of 1990. The resin and filter media waste was shipped (no evaporator bottoms waste was shipped during this period) in 158.1 ft³ DOT Spec 7A High Integrity Containers (HICs), while the dry active waste was shipped in two B25 boxes. Both the HICs and the boxes are approved by the South Carolina Department of Health and Environmental Conservation.

There were no irradiated fuel shipments during the first and second quarters of 1990.

TABLE 3 (Sheet 1 of 2)

*** REGULATORY GUIDE 1.21 REPORT ***
 SOLID WASTE SHIPPED OFFSITE FOR DISPOSAL
 ** DURING PERIOD FROM 1/1/90 to 6/30/90 **

<u>WASTE CLASS</u>	<u>WASTE STREAM: Resins, Filters, & Evaporator Bottoms</u> <u>CUBIC METERS</u>	<u>CURIES</u>	<u>% ERROR (CI)</u>
A	17.9	2.89E-03	±25%

** 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	26.740%	7.73E-04
	Fe-55	21.858%	6.32E-04
	Cr-51	17.158%	4.96E-04
	Co-58	2.583%	3.64E-04
	Zn-65	1.400%	1.27E-04
	Pu-241	4.239%	1.23E-04
	H-3	3.638%	1.05E-04
	Ag-110m	3.580%	1.04E-04
	Fe-59	1.491%	4.31E-05
	Mn-54	1.341%	3.88E-05
	Ce-144	1.269%	3.67E-05
	Ni-63	1.033%	2.99E-05
	Cs-137	.375%	1.08E-05
	Sb-124	.134%	3.87E-06
	Co-57	.109%	3.16E-06
	Ce-141	.026%	7.49E-07
	Ni-59	.019%	5.51E-07
	Sr-90	.007%	1.89E-07
	Nb-94	.007%	1.14E-08
	C-14	.006%	4.38E-09
	Cm-242	.000%	0.00E+00
	I-129	.000%	0.00E+00
	Tc-99	.000%	0.00E+00

TABLE 3 (Sheet 2 of 2)

*** REGULATORY GUIDE 1.21 REPORT ***
 SOLID WASTE SHIPPED OFFSITE FOR DISPOSAL
 ** DURING PERIOD FROM 1/1/90 to 6/30/90 **

<u>WASTE CLASS</u>	<u>WASTE STREAM: Dry Active Waste</u>		
	<u>CUBIC METERS</u>	<u>CURIES</u>	<u>% ERROR (CI)</u>
A	5.4	1.15E-02	±25%

** ESTIMATES OF MAJOR NUCLIDES BY WASTE CLASS & STREAM **
WASTE STREAM: Dry Active Waste

<u>WASTE CLASS</u>	<u>NUCLIDE</u>	<u>ABUNDANCE</u>	<u>CURIES</u>
A	Mn-54	24.074%	2.78E-03
	Co-60	23.035%	2.66E-03
	Fe-55	18.878%	2.18E-03
	Cr-51	14.756%	1.70E-03
	Co-58	10.807%	1.25E-03
	Zn-65	3.793%	4.38E-04
	Ag-110m	3.066%	3.54E-04
	Fe-59	1.282%	1.48E-04
	H-3	.308%	3.56E-05
	C-14	.000%	1.50E-08
	Cm-242	.000%	0.00E+00
	Pu-241	.000%	0.00E+00
	Cs-137	.000%	0.00E+00
	I-129	.000%	0.00E+00
	Tc-99	.000%	0.00E+00
	Sr-90	.000%	0.00E+00
	Nb-94	.000%	0.00E+00
	Ni-63	.000%	0.00E+00
	Ni-59	.000%	0.00E+00

** SOLID WASTE DISPOSITION SUMMARY **

<u>NUMBER OF SHIPMENTS</u>	<u>MODE OF TRANSPORTATION</u>	<u>DESTINATION</u>
1	Truck	Barnwell
0	Truck	Richland
0	Truck	Beatty
0	Truck	Other

SEMIANNUAL RADIOACTIVE EFFLUENT
RELEASE REPORT

G - PCP & ODCM REVISIONS, REMP
NON COMPLIANCES AND MAJOR
CHANGES TO RADIOACTIVE
WASTE TREATMENT SYSTEMS

1st and 2nd Quarters of 1990

According to Technical Specifications 6.9.1.7, 6.13.2a and 6.14.2a, the Semiannual Radioactive Effluent Release Report shall include any changes to the Process Control Program (PCP) and to the Offsite Dose Calculation Manual (ODCM) made during the reporting period.

- A. There were no changes made to the PCP during this reporting period.
- B. The ODCM was revised to incorporate the most recent Land Use Survey Data, i.e., the nearest resident and the nearest garden locations, a new REMP sampling location, and correct typographical errors.

These changes will enhance the accuracy and reliability of dose calculations and setpoint determinations since they will ensure that all such calculations and determinations are performed utilizing the most recent data.

The affected pages of the ODCM and the signature page, including ROC review and acceptance, are attached.

Action Statement c of Technical Specification 3.12.1 and action statements a and b of Technical Specification 3.12.2 requires certain items of REMP noncompliance to be reported in the Semiannual Radioactive Effluent Release Report.

- C. There were no such REMP noncompliances during this reporting period.

Technical Specification 6.15 states that the Semiannual Radioactive Effluent Release Report shall include major changes to radioactive waste treatment systems.

- D. There were no major changes to radioactive waste treatment systems reviewed by the Review of Operations Committee during this reporting period.

SEMIANNUAL RADIOACTIVE EFFLUENT
RELEASE REPORT

H - MISCELLANEOUS SPECIAL REPORTS

1st and 2nd Quarters of 1990

To fulfill the requirements of Technical Specification location Ia2 the ODCM provides two milk sample locations (10F1 and 8G2). On May 31, 1990, neither of these locations were available and a sample was obtained from new location 8F2 (9.5 mi SSE) which meets Technical Specification Table 3.12.1-1 requirements for location Ia2.

The requirement of Technical Specification location DR17 is met by the direct radiation monitoring station at location 5E2 (4.5 mi. E), as indicated on ODCM Table 5-2. Location 5E2 was inadvertently omitted from the latest revision of ODCM Figure 5-2. Attached is a markup of Figure 5-2 which shows the location of 5E2. This will be included in the next ODCM update.

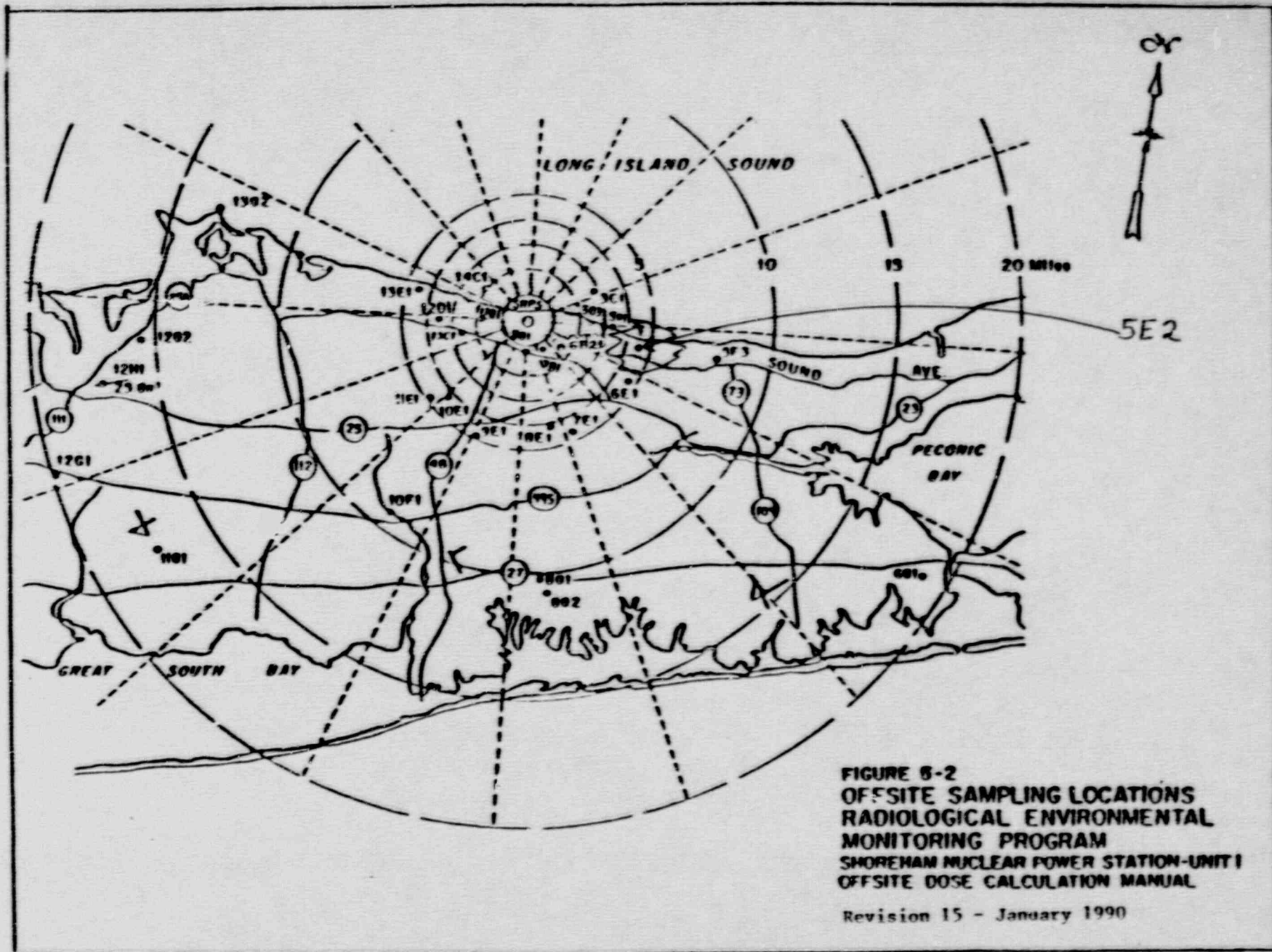


FIGURE 6-2
 OFFSITE SAMPLING LOCATIONS
 RADIOLOGICAL ENVIRONMENTAL
 MONITORING PROGRAM
 SHOREHAM NUCLEAR POWER STATION-UNIT 1
 OFFSITE DOSE CALCULATION MANUAL

Revision 15 - January 1990