f -IANNUAL RADIOACTIVE EFFLUENT
RELEASE REPORT

3rd and 4th Quarters of 1987
1987 Meteorological Summary and Offsite Dose Assessment

Facility: Shoreham Nuclear Power Station, Unit 1

Licensee: Long Island Lighting Company, Inc.

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INTRODUCTION

This Semiannual Effluent Release Report, submitted in accordance with Technical Specification 6.9.1.7, covers the periods from July 1, 1987 through September 30, 1987, and October 1, 1987 through December 31, 1987. Meteorological data summaries for the whole of 1987 are included as is an assessment of offsite doses due to liquid and gaseous effluents for the whole year. During 1987, the Shoreham Nuclear Power Station conducted tests below 5% power between May 26 and June 8, and was shutdown for the remainder of the year.

A. SUPPLEMENTAL INFORMATION

1. Regulatory Limits

Shoreham's effluent regulatory limits are defined in Facility Operating License NPF-36, 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) The following radionuclides in liquid effluents had typical minimum detectable activities of:

Ce-141	3.04E-8	uCi/ml
Co-58	4.03E-8	uCi/ml
Cs-137	2.54E-8	uCi/ml
Mn-54	3.05E-8	uCi/ml
Mo-99	2.24E-8	uCi/ml
Zn-65	6.04E-8	uCi/ml

The following radionuclides in gaseous effluents had typical minimum detectable activities of:

Cs-137	3.34E-14	uCi/cc
I-131	5.83E-14	uCi/cc
Kr-87	1.65E-8	uCi/cc
Mn-54	3.13E-14	uCi/cc
Xe-133	8.12E-9	uCi/cc
Zn-65	8.35E-14	uCi/cc

2. Maximum Permissible Concentrations

a-d) Maximum permissible 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 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 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 Ge(Li) or intrinsic germanium detector. A liquid scintillation counter was used to analyze for H3 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 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 Table 1A because all values for gaseous effluents were determined to be less than required lower limits of detection (LLDs). Counting LLDs reflect a two-sigma level of confidence. For liquid measurements, the overall error is estimated from the tank sampling error and from counting error at values close to minimum detectable activities to be approximately 50%.

5. Batch Releases

a) Liquid

	3rd quarter	4th Quarter
1. Number of batches	4.40E+1	5.40E+1
2. Total Time (minutes)	6.33E+3	7.86E+3
3. Maximum Time (minutes)	2.26E+2	1.85E+2
4. Average Time (minutes)	1.44E+2	1.46E+2
5. Minimum Time (minutes)	8.00E+0	1.00E+0
6. Average Flow (gpm) (Dilution)	2.82E+5	7.13E+4

b) Gaseous - None

6. Abnormal Releases

a) Liquid - None

b) Gaseous - None

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B - GASEOUS EFFLUENTS

3rd and 4th Quarters of 1987

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

Composite sample results for the fourth quarter of this reporting period are not available at this time. As has been done in the past, we are reporting previous composite results for portions of this reporting period. 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 MDA's.

A Station Ventilation Exhaust System outage occurred from October 19 to November 6. During portions of this time period the Reactor Building Standby Ventilation System (RBSVS) was operating and gaseous effluent samples were obtained from this release point. When the RBSVS was not operating, grab samples were taken in the Reactor Building, Turbine Building and Radwaste Building.

TABLE 1A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT 1987

GASEOUS EFFLUENTS–SUMMATION OF ALL RELEASES

	Unit	Quarter 3	Quarter 4	Est. Total Error, %
A. Fission & activation gases				
1. Total release	Ci	. E	. E	. E
2. Average release rate for period	μCi/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	μCi/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	μCi/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	μCi/sec	. E	. E	
3. Percent of technical specification limit	%	. E	. E	

TABLE 1B

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT 1987

GASEOUS EFFLUENTS–ELEVATED RELEASE

		CONTINUOUS MODE		BATCH MODE	
Nuclides Released	Unit	Quarter 3	Quarter 4	Quarter 3	Quarter 4
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 1987

GASEOUS EFFLUENTS–GROUND-LEVEL RELEASES

		CONTINUOUS MODE		BATCH MODE	
Nuclides Released	Unit	Quarter 3	Quarter 4	Quarter 3	Quarter 4
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
banum-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 EFFLUENT

3rd and 4th Quarters of 1987

Tables 2A and 2B contain information on the liquid batch releases for the third and fourth quarters of 1987. During portions of the reporting period there was no circulating water flow and dilution was by service water only. There were no radionuclides above MDA in continuous liquid releases, therefore, liquid discharge data for the continuous releases are not included in the table. Radionuclides that were at or below the MDA's, which were below the LLD's required in Technical Specification Table 4.11.1.1.1-1, are not included in the Tables. Percent of applicable limit was calculated as a sum of the fractions of individual isotopic limits instead of using the average diluted concentration.

Composite sample results for the fourth quarter of this reporting period are not available at this time. As has been done in the past, we are reporting previous composite results for portions of this reporting period for Fe-55, Sr-89 and Sr-90. When the actual results are available any significant differences will be noted in supplements to this report. Due to the low concentrations and resulting doses, no significant differences between the reported composite results and the actual results have occurred.

TABLE 2A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT 1987

LIQUID EFFLUENTS–SUMMATION OF ALL RELEASES

	Unit	Quarter 3	Quarter 4	Est. Total Error, %
A. Fission and activation products				
1. Total release (not including tritium, gases, alpha)	Ci	5.05 E-4	2.68 E-5	5.00 E+1
2. Average diluted concentration during period	μCi/ml	7.48 E-11	1.26 E-11	
3. Percent of applicable limit	%	2.98 E-5	1.40 E-5	
B. Tritium				
1. Total release	Ci	. E	. E	. E
2. Average diluted concentration during period	μCi/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	μCi/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	2.78 E+6	9.02 E+5	1.00 E+1
F. Volume of dilution water used during period	liters	6.75 E+9	2.12 E+9	2.00 E+1

TABLE 2B

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT 1987

LIQUID EFFLUENTS

		CONTINUOUS MODE		BATCH MODE	
Nuclides Released	Unit	Quarter	Quarter	Quarter 3	Quarter 4
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	1.26 E-5	. E
iodine-131	Ci	. E	. E	. E	. E
cobalt-58	Ci	. E	. E	8.70 E-5	2.68 E-5
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	9.76 E-6	E
chromium-51	Ci	. E	. E	2.36 E-4	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
IRON 55	Ci	. E	. E	1.60 E-4	. 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	5.05 E-4	2.68 E-5
xenon-133	Ci	. E	. E	. E	. E
xenon-135	Ci	. E	. E	. E	. E

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D - SOLID WASTE

3rd and 4th Quarters of 1987

Table 3 provides information on shipments of solid waste for the third and fourth quarters of 1987. All shipments consisted of dewatered Class A Resins, Filters and Evaporator Bottoms. There were no irradiated fuel shipments. Waste was shipped in 158.1 ft^3 DOT Spec 7A High Integrity Containers (HIC's), approved by the South Carolina Department of Health and Environmental Conservation.

TABLE 3

*** REGULATORY GUIDE 1.21 REPORT ****
SOLID WASTE SHIPPED OFFSITE FOR DISPOSAL
** DURING PERIOD FROM 7/1/87 to 12/31/87**

WASTE STREAM: Resins, Filters, & Evaporator Bottoms

WASTE CLASS	CUBIC METERS	CURIES	% ERROR (CI)
A	62.6	9.57E-2	±25%

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

WASTE CLASS	NUCLIDE	ABUNDANCE	CURIES
A	Fe-55	25.563%	2.45E-02
	Co-60	24.222%	2.32E-02
	Co-58	12.294%	1.18E-02
	Cr-51	8.984%	8.60E-03
	Mn-54	8.280%	7.93E-03
	Pu-241	7.026%	6.73E-03
	Zn-65	4.050%	3.88E-03
	Ag-110m	3.052%	2.92E-03
	Ce-144	2.162%	2.07E-03
	Fe-59	1.667%	1.60E-03
	Ni-63	1.018%	9.75E-04
	Cs-137	.800%	7.66E-04
	H-3	.274%	2.62E-04
	Co-57	.165%	1.58E-04
	Nb-95	.146%	1.40E-04
	Sb-124	.129%	1.23E-04
	Zr-95	.080%	7.71E-05
	Ce-141	.053%	5.08E-05
	Sr-90	.016%	1.55E-05
	Ni-59	.016%	1.55E-05
	C-14	.002%	1.70E-06
	Nb-94	.000%	3.21E-07
	Tc-99	.000%	0.00E+00
	I-129	.000%	0.00E+00
	Cm-242	.000%	0.00E+00

** SOLID WASTE DISPOSITION SUMMARY **

NUMBER OF SHIPMENTS	MODE OF TRANSPORTATION	DESTINATION
3	Truck	Barnwell
0	Truck	Richland
0	Truck	Beatty
0	Truck	Other

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E - RADIOLOGICAL IMPACT ON MAN

1987

Radiation doses due to the liquid releases reported for 1987 were calculated in accordance with the methodology and parameters in the ODCM, using the LADTAP II computer program. There was no release of radioactivity via the gaseous effluent pathway in 1987. Table 4 summarizes population doses, doses to the maximum exposed individual and doses to members of the public due to their activities inside the site boundary. Members of the public are assumed to be inside the site boundary for recreational activities on the Wading River. Detailed individual and population doses are given in the following pages, along with usage and other parameters used in the calculations. These detailed doses were calculated on a quarterly basis using the total liquid release for the quarter although the results are given in terms of annual dose.

Direct radiation (as measured on quarterly TLD's) made no contribution to offsite doses based on a comparison of 1987 dose rates with 1984 (preoperational) dose rates. The highest dose measured was 5.0 mRem/standard month (30.4 days) at indicator location 6A1 compared to the 1984 dose at the same maximum location of 5.1 mRem/standard month. Similarly, the average for all indicator locations was 3.7 mRem/standard month compared to a 1984 value of 3.9 mRem/ standard month.

TABLE 4

SUMMARY OF DOSES DUE TO LIQUID RELEASES
FOR 1987

Estimated Population Dose

Applicable Organ	Man-rem
Total Body	6.78 E-3
Bone	3.53 E-2

Estimated Dose to Most Likely
Exposed Member of the Public

	Applicable Organ	mrem
Adult	Total Body	8.24 E-6
	Bone	4.68 E-5
Teenager	Total Body	9.12 E-6
	Bone	4.93 E-5
Child	Total Body	1.15 E-5
	Bone	6.57 E-5

Estimated Dose to Members of the Public Due
To Their Activities Inside the Site Boundary

	Applicable Organ	mrem
Adult	Total Body	8.25 E-8
	Skin	8.92 E-8
Teenager	Total Body	4.30 E-7
	Skin	4.97 E-7
Child	Total Body	9.22 E-8
	Skin	1.04 E-7

* * * AS LOW AS REASONABLY ACHIEVABLE * * *

ADULT DOSES

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		1.69E-06	1.28E-06	5.36E-07	0.0	0.0	6.51E-07	3.06E-06
INVERTEBRATE		2.68E-06	2.13E-06	1.06E-06	0.0	0.0	1.03E-06	6.75E-06
SHORELINE	2.61E-08	2.23E-08	2.23E-08	2.23E-08	2.23E-08	2.23E-08	2.23E-08	2.23E-08
SWIMMING	0.0	7.12E-09	7.12E-09	7.12E-09	7.12E-09	7.12E-09	7.12E-09	7.12E-09
BOATING	0.0	3.56E-09	3.56E-09	3.56E-09	3.56E-09	3.56E-09	3.56E-09	3.56E-09
TOTAL	2.61E-08	4.40E-06	3.45E-06	1.63E-06	3.30E-08	3.30E-08	1.72E-06	9.84E-06

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)	SHOREWIDTH FACTOR=0.5
FISH	21.0	8.9	24.00	
INVERTEBRATE	5.0	8.9	24.00	
SHORELINE	12.0	8.9	0.0	
SWIMMING	52.0	8.9	0.0	
BOATING	52.0	8.9	[illegible]	

TEENAGER DOSES

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		1.77E-06	1.37E-06	5.62E-07	0.0	0.0	7.95E-07	2.16E-06
INVERTEBRATE		2.80E-06	2.26E-06	1.10E-06	0.0	0.0	1.26E-06	4.69E-06
SHORELINE	1.46E-07	1.24E-07	1.24E-07	1.24E-07	1.24E-07	1.24E-07	1.24E-07	1.24E-07
SWIMMING	0.0	7.12E-09	7.12E-09	7.12E-09	7.12E-09	7.12E-09	7.12E-09	7.12E-09
BOATING	0.0	3.56E-09	3.56E-09	3.56E-09	3.56E-09	3.56E-09	3.56E-09	3.56E-09
TOTAL	1.46E-07	4.70E-06	3.77E-06	1.80E-06	1.35E-07	1.35E-07	2.19E-06	6.99E-06

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)	SHOREWIDTH FACTOR=0.5
FISH	16.0	8.9	24.00	
INVERTEBRATE	3.8	8.9	24.00	
SHORELINE	67.0	8.9	0.0	
SWIMMING	52.0	8.9	0.0	
BOATING	52.0	8.9	0.0	

CHILD DOSES

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		2.32E-06	1.32E-06	6.67E-07	0.0	0.0	6.96E-07	7.73E-07
INVERTEBRATE		3.81E-06	2.25E-06	1.33E-06	0.0	0.0	1.14E-06	1.72E-06
SHORELINE	3.05E-08	2.60E-08	2.60E-08	2.60E-08	2.60E-08	2.60E-08	2.60E-08	2.60E-08
SWIMMING	0.0	3.97E-09	3.97E-09	3.97E-09	3.97E-09	3.97E-09	3.97E-09	3.97E-09
BOATING	0.0	1.98E-09	1.98E-09	1.98E-09	1.98E-09	1.98E-09	1.98E-09	1.98E-09
TOTAL	3.05E-08	6.16E-06	3.61E-06	2.03E-06	3.20E-08	3.20E-08	1.87E-06	2.52E-06

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)	SHOREWIDTH FACTOR=0.5
FISH	6.9	8.9	24.00	
INVERTEBRATE	1.7	8.9	24.00	
SHORELINE	14.0	8.9	0.0	
SWIMMING	29.0	8.9	0.0	
BOATING	29.0	8.9	0.0	

* * * SELECTED LOCATION * * *

LOCATION IS SHORELINE

ADULT DOSES

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		1.69E-06	1.28E-06	5.36E-07	0.0	0.0	6.51E-07	3.06E-06
INVERTEBRATE		2.68E-06	2.13E-06	1.06E-06	0.0	0.0	1.03E-06	6.75E-06
SHORELINE	2.61E-08	2.23E-08	2.23E-08	2.23E-08	2.23E-08	2.23E-08	2.23E-08	2.23E-08
SWIMMING	0.0	7.12E-09	7.12E-09	7.12E-09	7.12E-09	7.12E-09	7.12E-09	7.12E-09
BOATING	0.0	3.56E-09	3.56E-09	3.56E-09	3.56E-09	3.56E-09	3.56E-09	3.56E-09
TOTAL	2.61E-08	4.40E-06	3.45E-06	1.63E-06	3.30E-08	3.30E-08	1.72E-06	9.64E-06

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)
FISH	21.0	8.9	24.00
INVERTEBRATE	5.0	8.9	24.00
SHORELINE	12.0	8.9	0.0
SWIMMING	52.0	8.9	0.0
BOATING	52.0	8.9	0.0

SHOREWIDTH FACTOR=0.5

LOCATION IS SHORELINE

TEENAGER DOSES

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		1.77E-06	1.37E-06	5.62E-07	0.0	0.0	7.95E-07	2.16E-06
INVERTEBRATE		2.80E-06	2.26E-06	1.10E-06	0.0	0.0	1.26E-06	4.69E-06
SHORELINE	1.46E-07	1.24E-07	1.24E-07	1.24E-07	1.24E-07	1.24E-07	1.24E-07	1.24E-07
SWIMMING	0.0	7.12E-09	7.12E-09	7.12E-09	7.12E-09	7.12E-09	7.12E-09	7.12E-09
BOATING	0.0	3.56E-09	3.56E-09	3.56E-09	3.56E-09	3.56E-09	3.56E-09	3.56E-09
TOTAL	1.46E-07	4.70E-06	3.77E-06	1.80E-06	1.35E-07	1.35E-07	2.19E-06	6.99E-06

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)
FISH	16.0	8.9	24.00
INVERTEBRATE	3.8	8.9	24.00
SHORELINE	67.0	8.9	0.0
SWIMMING	52.0	8.9	0.0
BOATING	52.0	8.9	0.0

SHOREWIDTH FACTOR=0.5

LOCATION IS SHORELINE

CHILD DOSES

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		2.32E-06	1.32E-06	6.67E-07	0.0	0.0	6.96E-07	7.73E-07
INVERTEBRATE		3.81E-06	2.25E-06	1.33E-06	0.0	0.0	1.14E-06	1.72E-06
SHORELINE	3.05E-08	2.60E-08	2.60E-08	2.60E-08	2.60E-08	2.60E-08	2.60E-08	2.60E-08
SWIMMING	0.0	3.97E-09	3.97E-09	3.97E-09	3.97E-09	3.97E-09	3.97E-09	3.97E-09
BOATING	0.0	1.98E-09	1.98E-09	1.98E-09	1.98E-09	1.98E-09	1.98E-09	1.98E-09
TOTAL	3.05E-08	6.16E-06	3.61E-06	2.03E-06	3.20E-08	3.20E-08	1.87E-06	2.52E-06

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)
FISH	6.9	8.9	24.00

SHOREWIDTH FACTOR=0.5

INVERTEBRATE	1.7	8.9	24.00
SHORELINE	14.0	8.9	0.0
SWIMMING	29.0	8.9	0.0
BOATING	29.0	8.9	0.0

* * * FISH CONSUMPTION POPULATION DOSES * * *
MAN-REM

SPORT HARVEST

			DOSE (MAN-REM)						
PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH	ADULT	1.37E+07	1.08E-03	8.14E-04	3.32E-04	0.0	0.0	4.15E-04	1.86E-03
FISH	TEENAGER	1.60E+06	1.73E-04	1.33E-04	5.33E-05	0.0	0.0	7.77E-05	2.01E-04
FISH	CHILD	1.11E+06	3.64E-04	2.07E-04	1.02E-04	0.0	0.0	1.09E-04	1.16E-04
FISH	TOTAL	1.64E+07	1.61E-03	1.15E-03	4.87E-04	0.0	0.0	6.02E-04	2.17E-03

LOCATION	DILUTION	CATCH	TIME(HR)-INCLUDES FOOD PROCESSING TIME OF 1.68E+02 HR	POPULATION=2.80E+06
SPORT FISHING	8.85E+00	1.64E+07	1.92E+02	

AVERAGE INDIVIDUAL CONSUMPTION (KG/YR) ADULT=6.90E+00 TEEN=5.20E+00 CHILD=2.20E+00

* * * FISH CONSUMPTION POPULATION DOSES * * *
MAN-REM

COMMERCIAL HARVEST

			DOSE (MAN-REM)						
PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH	ADULT	2.74E+07	5.36E-05	4.04E-05	1.63E-05	0.0	0.0	2.07E-05	9.05E-05
FISH	TEENAGER	3.20E+06	8.60E-06	6.62E-06	2.62E-06	0.0	0.0	3.87E-06	9.81E-06
FISH	CHILD	2.22E+06	1.81E-05	1.03E-05	5.02E-06	0.0	0.0	5.43E-06	5.67E-06
FISH	TOTAL	3.28E+07	8.03E-05	5.73E-05	2.39E-05	0.0	0.0	3.00E-05	1.06E-04

LOCATION	DILUTION	CATCH	TIME(HR)-INCLUDES FOOD PROCESSING TIME OF 2.40E+02 HR	POPULATION=5.59E+06
COMM. FISHING	8.85E+00	1.64E+07	2.64E+02	

AVERAGE INDIVIDUAL CONSUMPTION (KG/YR) ADULT=6.90E+00 TEEN=5.20E+00 CHILD=2.20E+00

NEPA DOSES

NOTE--TOTAL NEPA DOSE INCLUDES SPORT CATCH

			DOSE (MAN-REM)						
PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH	ADULT	2.74E+07	2.15E-03	1.63E-03	6.58E-04	0.0	0.0	8.29E-04	3.67E-03
FISH	TEENAGER	3.20E+06	3.45E-04	2.66E-04	1.06E-04	0.0	0.0	1.55E-04	3.98E-04
FISH	CHILD	2.21E+06	7.27E-04	4.13E-04	2.03E-04	0.0	0.0	2.18E-04	2.30E-04
FISH	TOTAL	3.28E+07	3.22E-03	2.30E-03	9.67E-04	0.0	0.0	1.20E-03	4.30E-03

* * * INVERTEBRATE CONSUMPTION POPULATION DOSES * * *
MAN-REM

SPORT HARVEST

			DOSE (MAN-REM)						
PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
INVER	ADULT	1.99E+06	1.04E-03	8.24E-04	3.98E-04	0.0	0.0	4.02E-04	2.49E-03
INVER	TEENAGER	2.31E+05	1.67E-04	1.34E-04	6.34E-05	0.0	0.0	7.50E-05	2.66E-04
INVER	CHILD	1.67E+05	3.65E-04	2.15E-04	1.24E-04	0.0	0.0	1.10E-04	1.57E-04
INVER	TOTAL	2.39E+06	1.58E-03	1.17E-03	5.85E-04	0.0	0.0	5.87E-04	2.92E-03

LOCATION	DILUTION	CATCH	TIME(HR)-INCLUDES FOOD PROCESSING TIME OF 1.68E+02 HR	POPULATION=2.81E+06
SPORT INVERT.	8.85E+00	2.39E+06	1.92E+02	

AVERAGE INDIVIDUAL CONSUMPTION (KG/YR) ADULT=1.00E+00 TEEN=7.50E-01 CHILD=3.30E-01

* * * INVERTEBRATE CONSUMPTION POPULATION DOSES * * *
MAN-REM

COMMERCIAL HARVEST

			DOSE (MAN-REM)						
PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
INVER	ADULT	3.97E+06	1.21E-05	9.53E-06	4.55E-06	0.0	0.0	4.67E-06	2.83E-05
INVER	TEENAGER	4.62E+05	1.93E-06	1.55E-06	7.24E-07	0.0	0.0	8.70E-07	3.01E-06
INVER	CHILD	3.32E+05	4.24E-06	2.48E-06	1.41E-06	0.0	0.0	1.27E-06	1.78E-06
INVER	TOTAL	4.77E+06	1.83E-05	1.36E-05	6.68E-06	0.0	0.0	6.81E-06	3.31E-05

LOCATION	DILUTION	CATCH	TIME(HR)-INCLUDES FOOD PROCESSING TIME OF 2.40E+02 HR	POPULATION
COMM. INVERT.	8.85E+00	2.39E+06	2.64E+02	5.59E+06

AVERAGE INDIVIDUAL CONSUMPTION (KG/YR) ADULT=1.00E+00 TEEN=7.50E-01 CHILD=3.30E-01

NEPA DOSES

NOTE--TOTAL NEPA DOSE INCLUDES SPORT CATCH

			DOSE (MAN-REM)						
PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
INVER	ADULT	3.98E+06	2.09E-03	1.64E-03	7.89E-04	0.0	0.0	8.04E-04	4.93E-03
INVER	TEENAGER	4.63E+05	3.33E-04	2.67E-04	1.26E-04	0.0	0.0	1.50E-04	5.25E-04
INVER	CHILD	3.33E+05	7.30E-04	4.28E-04	2.45E-04	0.0	0.0	2.19E-04	3.10E-04
INVER	TOTAL	4.78E+06	3.15E-03	2.34E-03	1.16E-03	0.0	0.0	1.17E-03	5.76E-03

* * * RECREATION POPULATION DOSES * * *

LOCATION- POP BEACH

DILUTION=0.89E+01 TRANSIT TIME=0.0 HR SMF=0.5

PATHWAY	AGE GROUP	USAGE	DOSE(MAN-REM) SKIN	TOTAL BODY	THYROID
SHORELINE	TOTAL POPUL	1.03E+08	2.24E-04	1.91E-04	1.91E-04

LOCATION- POP SWIMMING

DILUTION=0.89E+01 TRANSIT TIME=0.0 HR

PATHWAY	AGE GROUP	USAGE	DOSE(MAN-REM) SKIN	TOTAL BODY	THYROID
SWIMMING	TOTAL POPUL	1.03E+08	0.0	1.41E-05	1.41E-05

LOCATION- POP BOATING

DILUTION=0.89E+01 TRANSIT TIME=0.0 HR

PATHWAY	AGE GROUP	USAGE	DOSE(MAN-REM) SKIN	TOTAL BODY	THYROID
BOATING	TOTAL POPUL	1.03E+08	0.0	7.05E-06	7.05E-06

* * * DOSE TO BIOTA * * *

MRADS PER YEAR

BIOTA DOSE DILUTION= 8.85E+00 TRANSIT TIME= 0.0 HR

	INTERNAL	EXTERNAL	TOTAL
FISH	1.68E-05	3.37E-05	5.06E-05
INVERTEBRATE	1.55E-04	6.63E-05	2.22E-04
ALGAE	1.31E-04	1.20E-06	1.32E-04
MUSKRAT	1.24E-04	2.21E-05	1.46E-04
RACCOON	6.22E-05	1.63E-05	7.85E-05
HERON	6.31E-05	2.19E-05	8.50E-05
DUCK	9.73E-05	3.29E-05	1.30E-04

* * * COST-BENEFIT ANALYSIS * * *

Quarter 1

NUCLIDE	RELEASE	MAN-REM DOSE		MAN-REM PER CURIE	
	CI/YR	TOTAL BODY	THYROID	TOTAL BODY	THYROID
26FE 55	3.68E-05	5.34E-04	6.43E-11	1.45E+01	1.75E-06
27CO 58	2.87E-04	7.74E-04	2.05E-04	2.70E+00	7.16E-01
TOTAL		1.31E-03	2.05E-04		

* * * AS LOW AS REASONABLY ACHIEVABLE * * *

ADULT DOSES

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		6.52E-05	4.52E-05	1.08E-05	3.21E-12	1.74E-08	2.51E-05	2.84E-05
INVERTEBRATE		1.04E-04	7.18E-05	1.73E-05	3.82E-12	3.04E-09	3.99E-05	4.67E-05
SHORELINE	2.92E-07	2.48E-07	2.48E-07	2.48E-07	2.48E-07	2.48E-07	2.48E-07	2.48E-07
SWIMMING	0.0	6.99E-09	6.99E-09	6.99E-09	6.99E-09	6.99E-09	6.99E-09	6.99E-09
BOATING	0.0	3.49E-09	3.49E-09	3.49E-09	3.49E-09	3.49E-09	3.49E-09	3.49E-09
TOTAL	2.92E-07	1.69E-04	1.17E-04	2.84E-05	2.58E-07	2.79E-07	6.53E-05	7.54E-05

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)	SHOREWIDTH FACTOR=0.5
FISH	21.0	8.9	24.00	
INVERTEBRATE	5.0	8.9	24.00	
SHORELINE	12.0	8.9	0.0	
SWIMMING	52.0	8.9	0.0	
BOATING	52.0	8.9	0.0	

TEENAGER DOSES

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		6.83E-05	4.86E-05	1.16E-05	3.08E-12	1.72E-08	3.07E-05	2.27E-05
INVERTEBRATE		1.08E-04	7.70E-05	1.85E-05	3.66E-12	3.00E-09	4.86E-05	3.71E-05
SHORELINE	1.63E-06	1.38E-06	1.38E-06	1.38E-06	1.38E-06	1.38E-06	1.38E-06	1.38E-06
SWIMMING	0.0	6.99E-09	6.99E-09	6.99E-09	6.99E-09	6.99E-09	6.99E-09	6.99E-09
BOATING	0.0	3.49E-09	3.49E-09	3.49E-09	3.49E-09	3.49E-09	3.49E-09	3.49E-09
TOTAL	1.63E-06	1.78E-04	1.27E-04	3.15E-05	1.39E-06	1.41E-06	8.07E-05	6.12E-05

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)	SHOREWIDTH FACTOR=0.5
FISH	16.0	8.9	24.00	
INVERTEBRATE	3.8	8.9	24.00	
SHORELINE	67.0	8.9	0.0	
SWIMMING	52.0	8.9	0.0	
BOATING	52.0	8.9	0.0	

CHILD DOSES

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		8.96E-05	4.77E-05	1.50E-05	3.28E-12	1.27E-08	2.69E-05	9.40E-06
INVERTEBRATE		1.47E-04	7.83E-05	2.49E-05	4.04E-12	2.31E-09	4.42E-05	1.58E-05
SHORELINE	3.40E-07	2.89E-07	2.89E-07	2.89E-07	2.89E-07	2.89E-07	2.89E-07	2.89E-07
SWIMMING	0.0	3.90E-09	3.90E-09	3.90E-09	3.90E-09	3.90E-09	3.90E-09	3.90E-09
BOATING	0.0	1.95E-09	1.95E-09	1.95E-09	1.95E-09	1.95E-09	1.95E-09	1.95E-09
TOTAL	3.40E-07	2.37E-04	1.26E-04	4.02E-05	2.95E-07	3.10E-07	7.13E-05	2.55E-05

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)	SHOREWIDTH FACTOR=0.5
FISH	6.9	8.9	24.00	
INVERTEBRATE	1.7	8.9	24.00	
SHORELINE	14.0	8.9	0.0	
SWIMMING	29.0	8.9	0.0	
BOATING	29.0	8.9	0.0	

* * * SELECTED LOCATION * * *

LOCATION IS SHORELINE

ADULT DOSES

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		6.52E-05	4.52E-05	1.08E-05	3.21E-12	1.74E-08	2.51E-05	2.84E-05
INVERTEBRATE		1.04E-04	7.18E-05	1.73E-05	3.82E-12	3.04E-09	3.99E-05	4.67E-05
SHORELINE	2.92E-07	2.48E-07	2.48E-07	2.48E-07	2.48E-07	2.48E-07	2.48E-07	2.48E-07
SWIMMING	0.0	6.99E-09	6.99E-09	6.99E-09	6.99E-09	6.99E-09	6.99E-09	6.99E-09
BOATING	0.0	3.49E-09	3.49E-09	3.49E-09	3.49E-09	3.49E-09	3.49E-09	3.49E-09
TOTAL	2.92E-07	1.69E-04	1.17E-04	2.84E-05	2.58E-07	2.79E-07	6.53E-05	7.54E-05

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)
FISH	21.0	8.9	24.00
INVERTEBRATE	5.0	8.9	24.00
SHORELINE	12.0	8.9	0.0
SWIMMING	52.0	8.9	0.0
BOATING	52.0	8.9	0.0

SHOREWIDTH FACTOR=0.5

LOCATION IS SHORELINE

TEENAGER DOSES

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		6.83E-05	4.86E-05	1.16E-05	3.08E-12	1.72E-08	3.07E-05	2.27E-05
INVERTEBRATE		1.08E-04	7.70E-05	1.85E-05	3.66E-12	3.00E-09	4.86E-05	3.71E-05
SHORELINE	1.63E-06	1.38E-06	1.38E-06	1.38E-06	1.38E-06	1.38E-06	1.38E-06	1.38E-06
SWIMMING	0.0	6.99E-09	6.99E-09	6.99E-09	6.99E-09	6.99E-09	6.99E-09	6.99E-09
BOATING	0.0	3.49E-09	3.49E-09	3.49E-09	3.49E-09	3.49E-09	3.49E-09	3.49E-09
TOTAL	1.63E-06	1.78E-04	1.27E-04	3.15E-05	1.39E-06	1.41E-06	8.07E-05	6.12E-05

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)
FISH	16.0	8.9	24.00
INVERTEBRATE	3.8	8.9	24.00
SHORELINE	67.0	8.9	0.0
SWIMMING	52.0	8.9	0.0
BOATING	52.0	8.9	0.0

SHOREWIDTH FACTOR=0.5

LOCATION IS SHORELINE

CHILD DOSES

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		8.96E-05	4.77E-05	1.50E-05	3.28E-12	1.27E-08	2.69E-05	9.40E-06
INVERTEBRATE		1.47E-04	7.83E-05	2.49E-05	4.04E-12	2.31E-09	4.42E-05	1.58E-05
SHORELINE	3.40E-07	2.89E-07	2.89E-07	2.89E-07	2.89E-07	2.89E-07	2.89E-07	2.89E-07
SWIMMING	0.0	3.90E-09	3.90E-09	3.90E-09	3.90E-09	3.90E-09	3.90E-09	3.90E-09
BOATING	0.0	1.95E-09	1.95E-09	1.95E-09	1.95E-09	1.95E-09	1.95E-09	1.95E-09
TOTAL	3.40E-07	2.37E-04	1.26E-04	4.02E-05	2.95E-07	3.10E-07	7.13E-05	2.55E-05

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)
FISH	6.9	8.9	24.00

SHOREWIDTH FACTOR=0.5

INVERTEBRATE	1.7	8.9	24.00
SHORELINE	14.0	8.9	0.0
SWIMMING	29.0	8.9	0.0
BOATING	29.0	8.9	0.0

* * * FISH CONSUMPTION POPULATION DOSES * * *
MAN-REM

SPORT HARVEST

PATHWAY	AGE GROUP	USAGE	DOSE (MAN-REM) BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH	ADULT	1.37E+07	4.16E-02	2.89E-02	6.88E-03	1.73E-09	1.07E-05	1.60E-02	1.81E-02
FISH	TEENAGER	1.60E+06	6.68E-03	4.75E-03	1.13E-03	2.54E-10	1.62E-06	3.00 -03	2.21E-03
FISH	CHILD	1.11E+06	1.41E-02	7.48E-03	2.36E-03	4.34E-10	1.91E-06	4.22E-03	1.47E-03
FISH	TOTAL	1.64E+07	6.23E-02	4.11E-02	1.04E-02	2.42E-09	1.42E-05	2.33E-02	2.18E-02

LOCATION	DILUTION	CATCH	TIME(HR)-INCLUDES FOOD PROCESSING TIME OF 1.68E+02 HR	POPULATION=2.80E+06
SPORT FISHING	8.85E+00	1.64E+07	1.92E+02	

AVERAGE INDIVIDUAL CONSUMPTION (KG/YR) ADULT=6.90E+00 TEEN=5.20E+03 CHILD=2.20E+00

* * * FISH CONSUMPTION POPULATION DOSES * * *
MAN-REM

COMMERCIAL HARVEST

PATHWAY	AGE GROUP	USAGE	DOSE (MAN-REM) BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH	ADULT	2.74E+07	2.07E-03	1.44E-03	3.42E-04	7.99E-11	5.28E-07	7.98E-04	8.98E-04
FISH	TEENAGER	3.20E+06	3.32E-04	2.36E-04	5.63E-05	1.17E-11	7.98E-08	1.49E-04	1.10E-04
FISH	CHILD	2.22E+06	7.00E-04	3.72E-04	1.17E-04	2.01E-11	9.42E-08	2.10E-04	7.32E-05
FISH	TOTAL	3.28E+07	3.10E-03	2.04E-03	5.16E-04	1.12E-10	7.02E-07	1.16E-03	1.08E-03

LOCATION	DILUTION	CATCH	TIME(HR)-INCLUDES FOOD PROCESSING TIME OF 2.40E+02 HR	POPULATION=5.59E+06
COMM. FISHING	8.85E+00	1.64E+07	2.64E+02	

AVERAGE INDIVIDUAL CONSUMPTION (KG/YR) ADULT=6.90E+00 TEEN=5.20E+00 CHILD=2.20E+00

NEPA DOSES

NOTE--TOTAL NEPA DOSE INCLUDES SPORT CATCH

PATHWAY	AGE GROUP	USAGE	DOSE (MAN-REM) BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH	ADULT	2.74E+07	8.31E-02	5.76E-02	1.37E-02	3.33E-09	2.13E-05	3.20E-02	3.61E-02
FISH	TEENAGER	3.20E+06	1.33E-02	9.49E-03	2.26E-03	4.89E-10	3.22E-06	6.00E-03	4.42E-03
FISH	CHILD	2.21E+06	2.81E-02	1.49E-02	4.71E-03	8.36E-10	3.80E-06	8.43E-03	2.94E-03
FISH	TOTAL	3.28E+07	1.25E-01	8.21E-02	2.07E-02	4.66E-09	2.83E-05	4.65E-02	4.34E-02

* * * INVERTEBRATE CONSUMPTION POPULATION DOSES * * *
MAN-REM

SPORT HARVEST

			DOSE (MAN-REM)						
PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
INVER	ADULT	1.99E+06	4.03E-02	2.80E-02	6.74E-03	1.26E-09	1.13E-06	1.55E-02	1.81E-02
INVER	TEENAGER	2.31E+05	6.44E-03	4.59E-03	1.10E-03	1.84E-10	1.71E-07	2.90E-03	2.20E-03
INVER	CHILD	1.67E+05	1.41E-02	7.51E-03	2.39E-03	3.27E-10	2.10E-07	4.23E-03	1.51E-03
INVER	TOTAL	2.39E+06	6.09E-02	4.01E-02	1.02E-02	1.77E-09	1.51E-06	2.27E-02	2.19E-02

LOCATION	DILUTION	CATCH	TIME(HR)-INCLUDES FOOD PROCESSING TIME OF 1.68E+02 HR	POPULATION=2.81E+06
SPORT INVERT.	8.85E+00	2.39E+06	1.92E+02	

AVERAGE INDIVIDUAL CONSUMPTION (KG/YR) ADULT=1.00E+00 TEEN=7.50E-01 CHILD=3.30E-01

* * * INVERTEBRATE CONSUMPTION POPULATION DOSES * * *
MAN-REM

COMMERCIAL HARVEST

			DOSE (MAN-REM)						
PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
INVER	ADULT	3.97E+05	4.68E-04	3.25E-04	7.82E-05	1.35E-11	1.30E-08	1.80E-04	2.10E-04
INVER	TEENAGER	4.62E+05	7.47E-05	5.32E-05	1.28E-05	1.98E-12	1.96E-09	3.36E-05	2.55E-05
INVER	CHILD	3.32E+05	1.64E-04	8.71E-05	2.77E-05	3.52E-12	2.41E-09	4.91E-05	1.76E-05
INVER	TOTAL	4.77E+06	7.06E-04	4.65E-04	1.19E-04	1.91E-11	1.74E-08	2.63E-04	2.53E-04

LOCATION	DILUTION	CATCH	TIME(HR)-INCLUDES FOOD PROCESSING TIME OF 2.40E+02 HR	POPULATION=5.59E+0
COMM. INVERT.	8.85E+00	2.39E+06	2.64E+02	

AVERAGE INDIVIDUAL CONSUMPTION (KG/YR) ADULT=1.00E+00 TEEN=7.50E-01 CHILD=3.30E-01

NEPA DOSES

NOTE--TOTAL NEPA DOSE INCLUDES SPORT CATCH

			DOSE (MAN-REM)						
PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
INVER	ADULT	3.98E+06	8.06E-02	5.59E-02	1.35E-02	2.42E-09	2.25E-06	3.11E-02	3.62E-02
INVER	TEENAGER	4.63E+05	1.29E-02	9.16E-03	2.20E-03	3.54E-10	3.39E-07	5.79E-03	4.40E-03
INVER	CHILD	3.33E+05	2.82E-02	1.50E-02	4.77E-03	6.30E-10	4.17E-07	8.46E-03	3.03E-03
INVER	TOTAL	4.78E+06	1.22E-01	8.01E-02	2.04E-02	3.41E-09	3.01E-06	4.53E-02	4.36E-02

* * * RECREATION POPULATION DOSES * * *

LOCATION- POP BEACH

DILUTION=0.89E+01 TRANSIT TIME=0.0 HR SMF=0.5

PATHWAY	AGE GROUP	USAGE	DOSE(MAN-REM) SKIN	TOTAL BODY	THYROID
SHORELINE	TOTAL POPUL	1.03E+08	2.50E-03	2.13E-03	2.13E-03

LOCATION- POP SWIMMING

DILUTION=0.89E+01 TRANSIT TIME=0.0 HR

PATHWAY	AGE GROUP	USAGE	DOSE(MAN-REM) SKIN	TOTAL BODY	THYROID
SWIMMING	TOTAL POPUL	1.03E+08	0.0	1.38E-05	1.38E-05

LOCATION- POP BOATING

DILUTION=0.89E+01 TRANSIT TIME=0.0 HR

PATHWAY	AGE GROUP	USAGE	DOSE(MAN-REM) SKIN	TOTAL BODY	THYROID
BOATING	TOTAL POPUL	1.03E+08	0.0	6.92E-06	6.92E-06

* * * DOSE TO BIOTA * * *

MRADS PER YEAR

BIOTA DOSE DILUTION= 8.85E+00 TRANSIT TIME= 0.0 HR

	INTERNAL	EXTERNAL	TOTAL
FISH	1.62E-04	3.63E-04	5.25E-04
INVERTEBRATE	1.12E-03	7.25E-04	1.84E-03
ALGAE	1.73E-04	1.18E-06	1.74E-04
MUSKRAT	4.34E-04	2.42E-04	6.76E-04
RACCOON	1.45E-03	1.81E-04	1.63E-03
HERON	1.69E-03	2.42E-04	1.93E-03
DUCK	4.06E-04	3.62E-04	7.69E-04

* * * COST-BENEFIT ANALYSIS * * *

NUCLIDE	RELEASE	MAN-REM DOSE		MAN-REM PER CURIE	
	CI/YR	TOTAL BODY	THYROID	TOTAL BODY	THYROID
24CR 51	1.46E-06	1.63E-08	1.32E-08	1.12E-02	9.06E-03
25MN 54	6.36E-06	2.12E-05	1.00E-05	3.34E+00	1.57E+00
26FE 55	2.23E-03	2.06E-02	2.48E-09	9.25E+00	1.11E-06
27CO 58	2.21E-04	3.80E-04	1.01E-04	1.72E+00	4.56E-01
27CO 60	8.42E-05	2.35E-03	2.03E-03	2.80E+01	2.41E+01
42MO 99	1.97E-06	1.87E-08	1.02E-08	9.48E-03	5.17E-03
43TC 99M	2.18E-06	9.55E-09	9.55E-09	4.38E-03	4.38E-03
TOTAL		2.34E-02	2.14E-03		

* * * AS LOW AS REASONABLY ACHIEVABLE * * *

ADULT DOSES

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		5.76E-06	4.23E-06	1.13E-06	6.20E-10	1.10E-07	2.18E-06	3.35E-06
INVERTEBRATE		8.90E-06	6.25E-06	1.60E-06	7.39E-10	1.74E-08	3.43E-06	5.20E-06
SHORELINE	3.23E-08	2.76E-08	2.76E-08	2.76E-08	2.76E-08	2.76E-08	2.76E-08	2.76E-08
SWIMMING	0.0	2.06E-09	2.06E-09	2.06E-09	2.06E-09	2.06E-09	2.06E-09	2.06E-09
BOATING	0.0	1.03E-09	1.03E-09	1.03E-09	1.03E-09	1.03E-09	1.03E-09	1.03E-09
TOTAL	3.23E-08	1.47E-05	1.05E-05	2.77E-06	3.21E-08	1.58E-07	5.64E-06	8.58E-06

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)	SHOREWIDTH FACTOR=0.5
FISH	21.0	8.9	24.00	
INVERTEBRATE	5.0	8.9	24.00	
SHORELINE	12.0	8.9	0.0	
SWIMMING	52.0	8.9	0.0	
BOATING	52.0	8.9	0.0	

TEENAGER DOSES

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		6.04E-06	4.52E-06	1.14E-06	5.95E-10	1.13E-07	2.67E-06	2.56E-06
INVERTEBRATE		9.30E-06	6.69E-06	1.70E-06	7.06E-10	1.78E-08	4.18E-06	3.98E-06
SHORELINE	1.80E-07	1.54E-07	1.54E-07	1.54E-07	1.54E-07	1.54E-07	1.54E-07	1.54E-07
SWIMMING	0.0	2.06E-09	2.06E-09	2.06E-09	2.06E-09	2.06E-09	2.06E-09	2.06E-09
BOATING	0.0	1.03E-09	1.03E-09	1.03E-09	1.03E-09	1.03E-09	1.03E-09	1.03E-09
TOTAL	1.80E-07	1.55E-05	1.14E-05	2.99E-06	1.59E-07	2.88E-07	7.00E-06	6.70E-06

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)	SHOREWIDTH FACTOR=0.5
FISH	16.0	8.9	24.00	
INVERTEBRATE	3.8	8.9	24.00	
SHORELINE	67.0	8.9	0.0	
SWIMMING	52.0	8.9	0.0	
BOATING	52.0	8.9	0.0	

CHILD DOSES

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		7.91E-06	4.40E-06	1.38E-06	6.33E-10	9.41E-08	2.33E-06	1.01E-06
INVERTEBRATE		1.27E-05	6.79E-06	2.25E-06	7.80E-10	1.52E-08	3.79E-06	1.64E-06
SHORELINE	3.77E-08	3.22E-08	3.22E-08	3.22E-08	3.22E-08	3.22E-08	3.22E-08	3.22E-08
SWIMMING	0.0	1.15E-09	1.15E-09	1.15E-09	1.15E-09	1.15E-09	1.15E-09	1.15E-09
BOATING	0.0	5.74E-10	5.74E-10	5.74E-10	5.74E-10	5.74E-10	5.74E-10	5.74E-10
TOTAL	3.77E-08	2.06E-05	1.12E-05	3.66E-06	3.54E-08	1.43E-07	6.16E-06	2.68E-06

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)	SHOREWIDTH FACTOR=0.5
FISH	6.9	8.9	24.00	
INVERTEBRATE	1.7	8.9	24.00	
SHORELINE	14.0	8.9	0.0	
SWIMMING	29.0	8.9	0.0	
BOATING	29.0	8.9	0.0	

LOCATION IS SHORELINE

ADULT DOSES

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		5.76E-06	4.23E-06	1.13E-06	6.20E-10	1.10E-07	2.18E-06	3.35E-06
INVERTEBRATE		8.90E-06	6.25E-06	1.60E-06	7.39E-10	1.74E-08	3.43E-06	5.20E-06
SHORELINE	3.23E-08	2.76E-08	2.76E-08	2.76E-08	2.76E-08	2.76E-08	2.76E-08	2.76E-08
SWIMMING	0.0	2.06E-09	2.06E-09	2.06E-09	2.06E-09	2.06E-09	2.06E-09	2.06E-09
BOATING	0.0	1.03E-09	1.03E-09	1.03E-09	1.03E-09	1.03E-09	1.03E-09	1.03E-09
TOTAL	3.23E-08	1.47E-05	1.05E-05	2.77E-06	3.21E-08	1.58E-07	5.64E-06	8.58E-06

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)
FISH	21.0	8.9	24.00
INVERTEBRATE	5.0	8.9	24.00
SHORELINE	12.0	8.9	0.0
SWIMMING	52.0	8.9	0.0
BOATING	52.0	8.9	0.0

SHOREWIDTH FACTOR=0.5

LOCATION IS SHORELINE

TEENAGER DOSES

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		6.04E-06	4.52E-06	1.14E-06	5.95E-10	1.13E-07	2.67E-06	2.56E-06
INVERTEBRATE		9.30E-06	6.69E-06	1.70E-06	7.06E-10	1.78E-08	4.18E-06	3.98E-06
SHORELINE	1.80E-07	1.54E-07	1.54E-07	1.54E-07	1.54E-07	1.54E-07	1.54E-07	1.54E-07
SWIMMING	0.0	2.06E-09	2.06E-09	2.06E-09	2.06E-09	2.06E-09	2.06E-09	2.06E-09
BOATING	0.0	1.03E-09	1.03E-09	1.03E-09	1.03E-09	1.03E-09	1.03E-09	1.03E-09
TOTAL	1.80E-07	1.55E-05	1.14E-05	2.99E-06	1.59E-07	2.88E-07	7.00E-06	6.70E-06

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)
FISH	16.0	8.9	24.00
INVERTEBRATE	3.8	8.9	24.00
SHORELINE	67.0	8.9	0.0
SWIMMING	52.0	8.9	0.0
BOATING	52.0	8.9	0.0

SHOREWIDTH FACTOR=0.5

LOCATION IS SHORELINE

CHILD DOSES

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		7.91E-06	4.40E-06	1.38E-06	6.33E-10	9.41E-08	2.33E-06	1.01E-06
INVERTEBRATE		1.27E-05	6.79E-06	2.25E-06	7.80E-10	1.52E-08	3.79E-06	1.64E-06
SHORELINE	3.77E-08	3.22E-08	3.22E-08	3.22E-08	3.22E-08	3.22E-08	3.22E-08	3.22E-08
SWIMMING	0.0	1.15E-09	1.15E-09	1.15E-09	1.15E-09	1.15E-09	1.15E-09	1.15E-09
BOATING	0.0	5.74E-10	5.74E-10	5.74E-10	5.74E-10	5.74E-10	5.74E-10	5.74E-10
TOTAL	3.77E-08	2.06E-05	1.12E-05	3.66E-06	3.54E-08	1.43E-07	6.16E-06	2.68E-06

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)
FISH	6.9	8.9	24.00

SHOREWIDTH FACTOR=0.5

INVERTEBRATE	1.7	8.9	24.00
SHORELINE	14.0	8.9	0.0
SWIMMING	25.0	8.9	0.0
BOATING	29.0	8.9	0.0

* * * FISH CONSUMPTION POPULATION DOSES * * *
MAN-REM

SPORT HARVEST

PATHWAY	AGE GROUP	USAGE	DOSE (MAN-REM) BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH	ADULT	1.37E+07	3.68E-03	2.69E-03	7.22E-04	3.34E-07	7.02E-05	1.39E	2.09E-03
FISH	TEENAGER	1.60E+06	5.90E-04	4.42E-04	1.11E-04	4.90E-08	1.11E-05	2.61E-04	2.45E-04
FISH	CHILD	1.11E+06	1.24E-03	6.90E-04	2.16E-04	8.38E-08	1.48E-05	3.66E-04	1.56E-04
FISH	TOTAL	1.64E+07	5.51E-03	3.83E-03	1.05E-03	4.67E-07	9.61E-05	2.02E-03	2.49E-03

LOCATION	DILUTION	CATCH	TIME(HR)-INCLUDES FOOD PROCESSING TIME OF 1.68E+02 HR	POPULATION
SPORT FISHING	8.85E+00	1.64E+07	1.92E+02	=2.80E+06

AVERAGE INDIVIDUAL CONSUMPTION (KG/YR) ADULT=6.90E+00 TEEN=5.20E+00 CHILD=2.20E+00

* * * FISH CONSUMPTION POPULATION DOSES * * *

MAN-REM

COMMERCIAL HARVEST

DOSE (MAN-REM)

PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH	ADULT	2.74E+07	1.83E-04	1.34E-04	3.59E-05	1.54E-08	3.50E-06	6.93E-05	1.03E-04
FISH	TEENAGER	3.20E+06	2.94E-05	2.20E-05	5.50E-06	2.27E-09	5.51E-07	1.30E-05	1.21E-05
FISH	CHILD	2.22E+06	6.18E-05	3.43E-05	1.08E-05	3.88E-09	7.36E-07	1.82E-05	7.69E-06
FISH	TOTAL	3.28E+07	2.74E-04	1.90E-04	5.21E-05	2.16E-08	4.78E-06	1.00E-04	1.23E-04

LOCATION	DILUTION	CATCH	TIME(HR)-INCLUDES FOOD PROCESSING TIME OF 2.40E+02 HR	POPULATION=5.59E+06
COMM. FISHING	8.85E+00	1.64E+07	2.64E+02	

AVERAGE INDIVIDUAL CONSUMPTION (KG/YR) ADULT=6.90E+00 TEEN=5.20E+00 CHILD=2.20E+00

NEPA DOSES

NOTE--TOTAL NEPA DOSE INCLUDES SPORT CATCH

DOSE (MAN-REM)

PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH	ADULT	2.74E+07	7.34E-03	5.38E-03	1.44E-03	6.43E-07	1.40E-04	2.78E-03	4.15E-03
FISH	TEENAGER	3.20E+06	1.18E-03	8.83E-04	2.21E-04	9.45E-08	2.21E-05	5.21E-04	4.88E-04
FISH	CHILD	2.21E+06	2.48E-03	1.38E-03	4.32E-04	1.62E-07	2.95E-05	7.31E-04	3.10E-04
FISH	TOTAL	3.28E+07	1.10E-02	7.64E-03	2.09E-03	8.99E-07	1.92E-04	4.03E-03	4.95E-03

* * * INVERTEBRATE CONSUMPTION POPULATION DOSES * * *
MAN-REM

SPORT HARVEST

			DOSE (MAN-REM)						
PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
INVER	ADULT	1.99E+06	3.47E-03	2.43E-03	6.21E-04	2.43E-07	6.75E-06	1.33E-03	1.97E-03
INVER	TEENAGER	2.31E+05	5.54E-04	3.98E-04	1.01E-04	3.55E-08	1.06E-06	2.49E-04	2.32E-04
INVER	CHILD	1.67E+05	1.21E-03	6.51E-04	2.14E-04	6.31E-08	1.46E-06	3.63E-04	1.54E-04
INVER	TOTAL	2.39E+06	5.24E-03	3.48E-03	9.36E-04	3.41E-07	9.27E-06	1.95E-03	2.36E-03

LOCATION	DILUTION	CATCH	TIME(HR)-INCLUDES FOOD PROCESSING TIME OF 1.68E+02 HR	POPULATION=2.81E+06
SPORT INVERT.	8.85E+00	2.39E+06	1.92E+02	

AVERAGE INDIVIDUAL CONSUMPTION (KG/YR) ADULT=1.00E+00 TEEN=7.50E-01 CHILD=3.30E-01

* * * INVERTEBRATE CONSUMPTION POPULATION DOSES * * *
MAN-REM

COMMERCIAL HARVEST

			DOSE (MAN-REM)						
PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
INVER	ADULT	3.97E+06	4.02E-05	2.82E-05	7.18E-06	2.62E-09	7.83E-08	1.55E-05	2.27E-05
INVER	TEENAGER	4.62E+05	6.42E-06	4.62E-06	1.16E-06	3.82E-10	1.22E-08	2.89E-06	2.67E-06
INVER	CHILD	3.32E+05	1.41E-05	7.55E-06	2.48E-06	6.80E-10	1.69E-08	4.22E-06	1.77E-06
INVER	TOTAL	4.77E+06	6.07E-05	4.04E-05	1.08E-05	3.68E-09	1.07E-07	2.26E-05	2.71E-05

LOCATION	DILUTION	CATCH	TIME(HR)-INCLUDES FOOD PROCESSING TIME OF 2.40E+02 HR	POPULATION=5.59E+06
COMM. INVERT.	8.85E+00	2.39E+06	2.64E+02	

AVERAGE INDIVIDUAL CONSUMPTION (KG/YR) ADULT=1.00E+00 TEEN=7.50E-01 CHILD=3.30E-01

NEPA DOSES

NOTE--TOTAL NEPA DOSE INCLUDES SPORT CATCH

			DOSE (MAN-REM)						
PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
INVER	ADULT	3.98E+06	6.93E-03	4.86E-03	1.24E-03	4.68E-07	1.35E-05	2.67E-03	3.92E-03
INVER	TEENAGER	4.63E+05	1.11E-03	7.96E-04	2.01E-04	6.84E-08	2.11E-06	4.97E-04	4.61E-04
INVER	CHILD	3.33E+05	2.42E-03	1.30E-03	4.28E-04	1.22E-07	2.91E-06	7.26E-04	3.06E-04
INVER	TOTAL	4.78E+06	1.05E-02	6.96E-03	1.87E-03	6.58E-07	1.85E-05	3.89E-03	4.69E-03

* * * RECREATION POPULATION DOSES * * *

LOCATION- POP BEACH

DILUTION=0.89E+01 TRANSIT TIME=0.0 HR SHF=0.5

PATHWAY	AGE GROUP	USAGE	DOSE(MAN-REM) SKIN	TOTAL BODY	THYROID
SHORELINE	TOTAL POPUL	1.03E+08	2.77E-04	2.37E-04	2.37E-04

LOCATION- POP SWIMMING

DILUTION=0.89E+01 TRANSIT TIME=0.0 HR

PATHWAY	AGE GROUP	USAGE	DOSE(MAN-REM) SKIN	TOTAL BODY	THYROID
SWIMMING	TOTAL POPUL	1.03E+08	0.0	4.08E-06	4.08E-06

LOCATION- POP BOATING

DILUTION=0.89E+01 TRANSIT TIME=0.0 HR

PATHWAY	AGE GROUP	USAGE	DOSE(MAN-REM) SKIN	TOTAL BODY	THYROID
BOATING	TOTAL POPUL	1.03E+08	0.0	2.04E-06	2.04E-06

* * * DOSE TO BIOTA * * *

MRADS PER YEAR

BIOTA DOSE DILUTION= 8.85E+00 TRANSIT TIME= 0.0 HR

	INTERNAL	EXTERNAL	TOTAL
FISH	1.83E-05	4.07E-05	5.90E-05
INVERTEBRATE	1.21E-04	8.10E-05	2.02E-04
ALGAE	4.95E-05	3.47E-07	4.98E-05
MUSKRAT	7.53E-05	2.70E-05	1.02E-04
RACCOON	1.29E-04	2.02E-05	1.49E-04
HERON	1.65E-04	2.70E-05	1.92E-04
DUCK	6.58E-05	4.05E-05	1.06E-04

* * * COST-BENEFIT ANALYSIS * * *

NUCLIDE	RELEASE	MAN-REM DOSE		MAN-REM PER CURIE	
	CI/YR	TOTAL BODY	THYROID	TOTAL BODY	THYROID
24CR 51	2.36E-04	3.15E-06	2.56E-06	1.33E-02	1.08E-02
25MN 54	9.76E-06	3.89E-05	1.84E-05	3.99E+00	1.88E+00
26FE 55	1.60E-04	1.77E-03	2.13E-10	1.10E+01	1.33E-06
27CO 58	8.70E-05	1.79E-04	4.74E-05	2.06E+00	5.45E-01
55CS 137	1.26E-05	3.01E-04	1.74E-04	2.39E+01	1.38E+01
TOTAL		2.29E-03	2.42E-04		

* * * AS LOW AS REASONABLY ACHIEVABLE * * *

ADULT DOSES

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		0.0	3.31E-08	7.41E-08	0.0	0.0	0.0	6.[illegible]E-07
INVERTEBRATE		0.0	7.87E-08	1.77E-07	0.0	0.0	0.0	[illegible].60E-06
SHORELINE	7.33E-09	6.26E-09	6.26E-09	6.26E-09	6.26E-09	6.26E-09	6.26E-09	6.26E-09
SWIMMING	0.0	2.00E-09	2.00E-09	2.00E-09	2.00E-09	2.00E-09	2.00E-09	2.00E-09
BOATING	0.0	9.99E-10	9.99E-10	9.99E-10	9.99E-10	9.99E-10	9.99E-10	9.99E-10
TOTAL	7.33E-09	9.25E-09	1.21E-07	2.60E-07	9.25E-09	9.25E-09	9.25E-09	2.28E-06

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)	SHOREWIDTH FACTOR=0.5
FISH	21.0	8.9	24.00	
INVERTEBRATE	5.0	8.9	24.00	
SHORELINE	12.0	8.9	0.0	
SWIMMING	52.0	8.9	0.0	
BOATING	52.0	8.9	0.0	

TEENAGER DOSES

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		0.0	3.29E-08	7.58E-08	0.0	0.0	0.0	4.53E-07
INVERTEBRATE		0.0	7.81E-08	1.80E-07	0.0	0.0	0.0	1.08E-06
SHORELINE	4.09E-08	3.49E-08	3.49E-08	3.49E-08	3.49E-08	3.49E-08	3.49E-08	3.49E-08
SWIMMING	0.0	2.00E-09	2.00E-09	2.00E-09	2.00E-09	2.00E-09	2.00E-09	2.00E-09
BOATING	0.0	9.99E-10	9.99E-10	9.99E-10	9.99E-10	9.99E-10	9.99E-10	9.99E-10
TOTAL	4.09E-08	3.79E-08	1.49E-07	2.94E-07	3.79E-08	3.79E-08	3.79E-08	1.57E-06

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)	SHOREWIDTH FACTOR=0.5
FISH	16.0	8.9	24.00	
INVERTEBRATE	3.8	8.9	24.00	
SHORELINE	67.0	8.9	0.0	
SWIMMING	52.0	8.9	0.0	
BOATING	52.0	8.9	0.0	

CHILD DOSES

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		0.0	2.63E-08	8.04E-08	0.0	0.0	0.0	1.53E-07
INVERTEBRATE		0.0	6.47E-08	1.98E-07	0.0	0.0	0.0	3.77E-07
SHORELINE	8.55E-09	7.30E-09	7.30E-09	7.30E-09	7.30E-09	7.30E-09	7.30E-09	7.30E-09
SWIMMING	0.0	1.11E-09	1.11E-09	1.11E-09	1.11E-09	1.11E-09	1.11E-09	1.11E-09
BOATING	0.0	5.57E-10	5.57E-10	5.57E-10	5.57E-10	5.57E-10	5.57E-10	5.57E-10
TOTAL	8.55E-09	8.97E-09	9.99E-08	2.87E-07	8.97E-09	8.97E-09	8.97E-09	5.39E-07

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)	SHOREWIDTH FACTOR=0.5
FISH	6.9	8.9	24.00	
INVERTEBRATE	1.7	8.9	24.00	
SHORELINE	14.0	8.9	0.0	
SWIMMING	29.0	8.9	0.0	
BOATING	29.0	8.9	0.0	

* * * SELECTED LOCATION * * *

LOCATION IS SHORELINE

A D U L T D O S E S

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		0.0	3.31E-08	7.41E-08	0.0	0.0	0.0	6.70E-07
INVERTEBRATE		0.0	7.87E-08	1.77E-07	0.0	0.0	0.0	1.60E-06
SHORELINE	7.33E-09	6.26E-09	6.26E-09	6.26E-09	6.26E-09	6.26E-09	6.26E-09	6.26E-09
SWIMMING	0.0	2.00E-09	2.00E-09	2.00E-09	2.00E-09	2.00E-09	2.00E-09	2.00E-09
BOATING	0.0	9.99E-10	9.99E-10	9.99E-10	9.99E-10	9.99E-10	9.99E-10	9.99E-10
TOTAL	7.33E-09	9.25E-09	1.21E-07	2.60E-07	9.25E-09	9.25E-09	9.25E-09	2.28E-06

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)
FISH	21.0	8.9	24.00
INVERTEBRATE	5.0	8.9	24.00
SHORELINE	12.0	8.9	0.0
SWIMMING	52.0	8.9	0.0
BOATING	52.0	8.9	0.0

SHOREWIDTH FACTOR=0.5

LOCATION IS SHORELINE

T E E N A G E R D O S E S

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		0.0	3.29E-08	7.58E-08	0.0	0.0	0.0	4.53E-07
INVERTEBRATE		0.0	7.81E-08	1.80E-07	0.0	0.0	0.0	1.08E-06
SHORELINE	4.09E-08	3.49E-08	3.49E-08	3.49E-08	3.49E-08	3.49E-08	3.49E-08	3.49E-08
SWIMMING	0.0	2.00E-09	2.00E-09	2.00E-09	2.00E-09	2.00E-09	2.00E-09	2.00E-09
BOATING	0.0	9.99E-10	9.99E-10	9.99E-10	9.99E-10	9.99E-10	9.99E-10	9.99E-10
TOTAL	4.09E-08	3.79E-08	1.49E-07	2.96E-07	3.79E-08	3.79E-08	3.79E-08	1.57E-06

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)
FISH	16.0	8.9	24.00
INVERTEBRATE	3.8	8.9	24.00
SHORELINE	67.0	8.9	0.0
SWIMMING	52.0	8.9	0.0
BOATING	52.0	8.9	0.0

SHOREWIDTH FACTOR=0.5

LOCATION IS SHORELINE

C H I L D D O S E S

DOSE (MREM PER YEAR INTAKE)

PATHWAY	SKIN	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH		0.0	2.63E-08	8.04E-08	0.0	0.0	0.0	1.53E-07
INVERTEBRATE		0.0	6.47E-08	1.98E-07	0.0	0.0	0.0	3.77E-07
SHORELINE	8.55E-09	7.30E-09	7.30E-09	7.30E-09	7.30E-09	7.30E-09	7.30E-09	7.30E-09
SWIMMING	0.0	1.11E-09	1.11E-09	1.11E-09	1.11E-09	1.11E-09	1.11E-09	1.11E-09
BOATING	0.0	5.57E-10	5.57E-10	5.57E-10	5.57E-10	5.57E-10	5.57E-10	5.57E-10
TOTAL	8.55E-09	8.97E-09	9.99E-08	2.87E-07	8.97E-09	8.97E-09	8.97E-09	5.39E-07

	USAGE (KG/YR,HR/YR)	DILUTION	TIME(HR)
FISH	6.9	8.9	24.00

SHOREWIDTH FACTOR=0.5

INVERTEBRATE	1.7	8.9	24.00
SHORELINE	14.0	8.9	0.0
SWIMMING	29.0	8.9	0.0
BOATING	29.0	8.9	0.0

* * * FISH CONSUMPTION POPULATION DOSES * * *
MAN-REM

SPORT HARVEST

			DOSE (MAN-REM)						
PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH	ADULT	1.37E+07	0.0	1.98E-05	4.44E-05	0.0	0.0	0.0	4.01E-04
FISH	TEENAGER	1.60E+06	0.0	3.02E-06	6.95E-06	0.0	0.0	0.0	4.16E-05
FISH	CHILD	1.11E+06	0.0	3.87E-06	1.18E-05	0.0	0.0	0.0	2.26E-05
FISH	TOTAL	1.64E+07	0.0	2.67E-05	6.32E-05	0.0	0.0	0.0	4.65E-04

LOCATION	DILUTION	CATCH	TIME(HR)-INCLUDES FOOD PROCESSING TIME OF 1.68E+02 HR	POPULATION=2.80E+06
SPORT FISHING	8.85E+00	1.64E+07	1.92E+02	

AVERAGE INDIVIDUAL CONSUMPTION (KG/YR) ADULT=6.90E+00 TEEN=5.20E+00 CHILD=2.20E+00

* * * FISH CONSUMPTION POPULATION DOSES * * *
MAN-REM

COMMERCIAL HARVEST

PATHWAY	AGE GROUP	USAGE	DOSE (MAN-REM) BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH	ADULT	2.74E+07	0.0	9.59E-07	2.15E-06	0.0	0.0	0.0	1.94E-05
FISH	TEENAGER	3.20E+06	0.0	1.46E-07	3.37E-07	0.0	0.0	0.0	2.01E-06
FISH	CHILD	2.22E+06	0.0	1.87E-07	5.73E-07	0.0	0.0	0.0	1.09E-06
FISH	TOTAL	3.28E+07	0.0	1.29E-06	3.06E-06	0.0	0.0	0.0	2.25E-05

LOCATION	DILUTION	CATCH	TIME(HR)-INCLUDES FOOD PROCESSING TIME OF 2.40E+02 HR	POPULATION
COMM. FISHING	8.85E+00	1.64E+07	2.64E+02	5.59E+06

AVERAGE INDIVIDUAL CONSUMPTION (KG/YR) ADULT=6.90E+00 TEEN=5.20E+00 CHILD=2.20E+00

NEPA DOSES

NOTE--TOTAL NEPA DOSE INCLUDES SPORT CATCH

PATHWAY	AGE GROUP	USAGE	DOSE (MAN-REM) BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
FISH	ADULT	2.74E+07	0.0	3.90E-05	8.75E-05	0.0	0.0	0.0	7.91E-04
FISH	TEENAGER	3.20E+06	0.0	5.95E-06	1.37E-05	0.0	0.0	0.0	8.20E-05
FISH	CHILD	2.21E+06	0.0	7.62E-06	2.33E-05	0.0	0.0	0.0	4.45E-05
FISH	TOTAL	3.28E+07	0.0	5.26E-05	1.25E-04	0.0	0.0	0.0	9.17E-04

* * * INVERTEBRATE CONSUMPTION POPULATION DOSES * * *
MAN-REM

SPORT HARVEST

PATHWAY	AGE GROUP	USAGE	DOSE (MAN-REM) BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
INVER	ADULT	1.99E+06	0.0	2.88E-05	6.46E-05	0.0	0.0	0.0	5.84E-04
INVER	TEENAGER	2.31E+05	0.0	4.37E-06	1.01E-05	0.0	0.0	0.0	6.02E-05
INVER	CHILD	1.67E+05	0.0	5.82E-06	1.78E-05	0.0	0.0	0.0	3.40E-05
INVER	TOTAL	2.39E+06	0.0	3.90E-05	9.24E-05	0.0	0.0	0.0	6.78E-04

LOCATION	DILUTION	CATCH	TIME(HR)-INCLUDES FOOD PROCESSING TIME OF 1.68E+02 HR	POPULATION
SPORT INVERT.	8.85E+00	2.39E+06	1.92E+02	=2.81E+06

AVERAGE INDIVIDUAL CONSUMPTION (KG/YR) ADULT=1.00E+00 TEEN=7.50E-01 CHILD=3.30E-01

* * * INVERTEBRATE CONSUMPTION POPULATION DOSES * * *
MAN-REM

COMMERCIAL HARVEST

			DOSE (MAN-REM)						
PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
INVER	ADULT	3.97E+06	0.0	3.25E-07	7.29E-07	0.0	0.0	0.0	6.59E-06
INVER	TEENAGER	4.62E+05	0.0	4.93E-08	1.14E-07	0.0	0.0	0.0	6.79E-07
INVER	CHILD	3.32E+05	0.0	6.57E-08	2.01E-07	0.0	0.0	0.0	3.83E-07
INVER	TOTAL	4.77E+06	0.0	4.40E-07	1.04E-06	0.0	0.0	0.0	7.65E-06

LOCATION	DILUTION	CATCH	TIME(HR)-INCLUDES FOOD PROCESSING TIME OF 2.40E+02 HR	POPULATION=5.59E+06
COMM. INVERT.	8.85E+00	2.39E+06	2.64E+02	

AVERAGE INDIVIDUAL CONSUMPTION (KG/YR) ADULT=1.00E+00 TEEN=7.50E-01 CHILD=3.30E-01

NEPA DOSES

NOTE--TOTAL NEPA DOSE INCLUDES SPORT CATCH

			DOSE (MAN-REM)						
PATHWAY	AGE GROUP	USAGE	BONE	LIVER	TOTAL BODY	THYROID	KIDNEY	LUNG	GI-LLI
INVER	ADULT	3.98E+06	0.0	5.68E-05	1.27E-04	0.0	0.0	0.0	1.15E-03
INVER	TEENAGER	4.63E+05	0.0	8.61E-06	1.98E-05	0.0	0.0	0.0	1.19E-04
INVER	CHILD	3.33E+05	0.0	1.15E-05	3.51E-05	0.0	0.0	0.0	6.69E-05
INVER	TOTAL	4.78E+06	0.0	7.69E-05	1.82E-04	0.0	0.0	0.0	1.34E-03

* * * RECREATION POPULATION DOSES * * *

LOCATION- POP BEACH

DILUTION=0.89E+01 TRANSIT TIME=0.0 HR SHF=0.5

PATHWAY	AGE GROUP	USAGE	DOSE(MAN-REM) SKIN	TOTAL BODY	THYROID
SHORELINE	TOTAL POPUL	1.03E+08	6.29E-05	5.37E-05	5.37E-05

LOCATION- POP SWIMMING

DILUTION=0.89E+01 TRANSIT TIME=0.0 HR

PATHWAY	AGE GROUP	USAGE	DOSE(MAN-REM) SKIN	TOTAL BODY	THYROID
SWIMMING	TOTAL POPUL	1.03E+08	0.0	3.96E-06	3.96E-06

LOCATION- POP BOATING

DILUTION=0.89E+01 TRANSIT TIME=0.0 HR

PATHWAY	AGE GROUP	USAGE	DOSE(MAN-REM) SKIN	TOTAL BODY	THYROID
BOATING	TOTAL POPUL	1.03E+08	0.0	1.98E-06	1.98E-06

* * * DOSE TO BIOTA * * *

MRADS PER YEAR

BIOTA DOSE DILUTION= 8.85E+00 TRANSIT TIME= 0.0 HR

	INTERNAL	EXTERNAL	TOTAL
FISH	3.65E-06	9.47E-06	1.31E-05
INVERTEBRATE	3.65E-05	1.86E-05	5.51E-05
ALGAE	3.65E-05	3.37E-07	3.68E-05
MUSKRAT	3.25E-05	6.21E-06	3.87E-05
RACCOON	7.13E-06	4.57E-06	1.17E-05
HERON	5.58E-06	6.15E-06	1.17E-05
DUCK	2.50E-05	9.22E-06	3.43E-05

* * * COST-BENEFIT ANALYSIS * * *

NUCLIDE	RELEASE	MAN-REM DOSE		MAN-REM PER CURIE	
	CI/YR	TOTAL BODY	THYROID	TOTAL BODY	THYROID
27CO 58	2.68E-05	2.17E-04	5.77E-05	8.11E+00	2.15E+00
TOTAL		2.17E-04	5.77E-05		

SEMIANNUAL RADIOACTIVE EFFLUENT
RELEASE REPORT

F - METEOROLOGICAL DATA

1987

Tables of cumulative joint frequency distribution of wind speed, wind direction, and atmospheric stability are given by quarter for release heights of 33 feet and 150 feet. The directional sector limits were changed during 1987 to correspond to those used by the computerized Radiation Monitoring System, ie, N=-11.25° to +11.25°, etc. The presented joint frequency distributions reflect the new limits.

During 1987 two Special Reports (LER's 87-005 and 87-028, Rev.1) were submitted to the Commission persuant to Technical Specifications 3.3.7.3, Action Statement a, and 6.9.2, describing malfunctions in the delta temperature system. In the Reports it was noted that the problem was intermittent and occurred only during periods of driving precipitation. It was stated that although the system was declared inoperable, all valid data, as determined by meteorological review, would be reported in this Seminannual Radioactive Effluent Release Report.

One of the Special Reports also described intermittent malfunctions of the 150' wind direction system. Again it was stated that all valid data as determined by meteorological review would be presented here.

The joint frequency distributions reflect all data that was determined to be valid by a meteorological consultant. Due to the delta temperature system malfunctions, a data recovery rate of only 89% was achieved for 1987.

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 1/ 1/87 TO 3/31/87
STABILITY CLASS: A
ELEVATION: 33

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	0	0	8	5	1	0	14
NNE	0	1	5	2	1	0	9
NE	0	0	3	0	0	0	3
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	1	0	0	0	1
WSW	0	0	0	0	0	0	0
W	0	0	3	0	0	0	3
WNW	0	1	17	1	0	0	19
NW	0	0	14	20	0	0	34
NNW	0	0	11	7	1	0	19
VARIABLE							

TOTAL 102
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 1/ 1/87 TO 3/31/87
STABILITY CLASS: B
ELEVATION: 33

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	0	1	5	1	0	0	7
NNE	0	0	3	0	0	0	3
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	1	0	0	0	0	1
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	2	0	0	0	2
WNW	0	1	8	2	0	0	11
NW	0	0	7	7	0	0	14
NNW	0	1	3	0	0	0	4
VARIABLE							

TOTAL 42
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 1/ 1/87 TO 3/31/87
STABILITY CLASS: C
ELEVATION: 33

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	0	1	0	2	0	0	3
NNE	0	2	2	0	1	0	5
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	1	1	0	0	0	2
SW	0	0	0	0	0	0	0
WSW	0	0	1	1	0	0	2
W	0	0	3	0	0	0	3
WNW	0	1	9	1	0	0	11
NW	0	0	3	5	0	0	8
NNW	0	0	1	2	0	0	3
VARIABLE							

TOTAL 37
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 1/ 1/87 TO 3/31/87
STABILITY CLASS: D
ELEVATION: 33

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	0	9	10	7	6	0	32
NNE	3	18	8	5	1	0	35
NE	1	4	9	2	0	0	16
ENE	0	7	4	0	0	0	11
E	1	0	0	0	0	0	1
ESE	0	0	0	0	0	0	0
SE	0	2	0	2	0	0	4
SSE	2	3	7	1	0	0	13
S	0	8	4	0	0	0	12
SSW	1	7	8	0	0	0	16
SW	1	6	4	0	0	0	11
WSW	1	11	17	4	0	0	33
W	0	18	36	8	0	0	62
WNW	1	32	43	27	4	0	107
NW	1	20	35	58	4	11	129
NNW	0	28	22	28	3	2	83
VARIABLE							

TOTAL 565
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 1/ 1/87 TO 3/31/87
STABILITY CLASS: E
ELEVATION: 33

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	3	20	44	16	1	0	84
NNE	2	9	16	15	0	0	43
NE	3	5	12	2	0	0	22
ENE	7	6	0	0	0	0	13
E	15	3	0	0	0	0	18
ESE	6	6	0	0	0	0	12
SE	3	4	6	1	0	0	14
SSE	2	9	1	0	0	0	12
S	6	16	8	0	0	0	30
SSW	4	34	10	0	0	0	48
SW	4	29	7	0	0	0	40
WSW	9	14	9	0	0	0	32
W	3	40	56	3	0	0	102
WNW	6	24	45	27	0	0	102
NW	3	22	78	54	1	0	158
NNW	4	19	56	8	0	0	87
VARIABLE							

TOTAL 817
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 1/ 1/87 TO 3/31/87
STABILITY CLASS: F
ELEVATION: 33

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	1	3	3	0	0	0	7
NNE	2	1	5	0	0	0	8
NE	1	0	3	3	0	0	7
ENE	1	2	0	1	0	0	4
E	6	2	0	0	0	0	8
ESE	5	2	0	0	0	0	7
SE	5	2	0	0	0	0	7
SSE	7	9	4	0	0	0	21
S	7	21	0	0	0	0	28
SSW	6	15	0	0	0	0	21
SW	11	22	0	0	0	0	33
WSW	7	5	1	0	0	0	14
W	4	8	2	0	0	0	14
WNW	1	7	0	0	0	0	8
NW	3	3	2	1	0	0	9
NNW	0	8	4	0	0	0	12
VARIABLE							

TOTAL 208
PERIODS OF CALM (HOURS): 2

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 1/ 1/87 TO 3/31/87
STABILITY CLASS: G
ELEVATION: 33

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	2	1	2	0	0	0	5
NNE	0	1	4	0	0	0	5
NE	1	2	2	0	0	0	5
ENE	0	0	1	0	0	0	1
E	0	0	0	0	0	0	0
ESE	1	0	0	0	0	0	1
SE	1	2	0	0	0	0	3
SSE	6	2	1	0	0	0	9
S	7	11	0	0	0	0	18
SSW	9	23	0	0	0	0	32
SW	11	9	0	0	0	0	21
WSW	5	2	0	0	0	0	7
W	1	1	0	0	0	0	2
WNW	0	2	2	0	0	0	4
NW	0	1	0	0	0	0	1
NNW	0	2	6	3	0	0	11
VARIABLE							

TOTAL 125
PERIODS OF CALM (HOURS): 1

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 4/ 1/87 TO 6/30/87
STABILITY CLASS: A
ELEVATION: 33

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	0	6	1	0	0	0	7
NNE	0	3	12	0	0	0	15
NE	0	2	11	5	0	0	18
ENE	0	0	3	2	0	0	5
E	0	0	5	0	0	0	5
ESE	0	1	3	0	0	0	4
SE	0	3	8	0	0	0	11
SSE	0	4	0	1	0	0	5
S	0	3	11	3	0	0	17
SSW	0	6	5	0	0	0	11
SW	0	1	1	0	0	0	2
WSW	0	4	0	0	0	0	4
W	0	4	8	3	0	0	15
WNW	0	7	15	2	0	0	24
NW	0	6	11	0	0	0	17
NNW	0	1	6	0	0	0	7
VARIABLE							

TOTAL 167
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 4/ 1/87 TO 6/30/87
STABILITY CLASS: 8
ELEVATION: 33

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	1	1	1	0	0	0	3
NNE	0	2	0	0	0	0	2
NE	0	3	2	0	0	0	5
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	2	0	0	0	2
SE	0	3	0	0	0	0	3
SSE	0	1	1	0	0	0	2
S	0	0	4	0	0	0	4
SSW	0	1	3	0	0	0	4
SW	0	1	0	0	0	0	1
WSW	0	4	1	0	0	0	5
W	0	2	5	1	0	0	8
WNW	1	10	2	0	0	0	13
NW	0	5	4	0	0	0	9
NNW	0	1	2	0	0	0	3
VARIABLE							

TOTAL 64
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 4/ 1/87 TO 6/30/87
STABILITY CLASS: C
ELEVATION: 33

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	0	2	0	0	0	0	2
NNE	0	6	3	0	0	0	9
NE	0	4	2	0	0	0	6
ENE	0	0	0	0	0	0	0
E	0	0	4	0	0	0	4
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	2	0	0	0	0	2
S	0	4	1	1	0	0	6
SSW	0	1	1	0	0	0	2
SW	0	7	0	0	0	0	7
WSW	0	2	0	0	0	0	2
W	0	3	2	0	0	0	5
WNW	0	14	0	1	0	0	15
NW	0	14	0	0	0	0	14
NNW	0	1	2	0	0	0	3
VARIABLE							

TOTAL 77
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 4/ 1/87 TO 6/30/87
STABILITY CLASS: D
ELEVATION: 33

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	2	19	3	3	0	0	27
NNE	5	27	10	0	0	0	42
NE	4	16	16	4	0	0	40
ENE	1	9	11	0	0	0	21
E	1	9	5	1	0	0	16
ESE	2	10	2	0	0	0	14
SE	3	4	1	0	0	0	8
SSE	3	25	0	0	0	0	28
S	1	25	27	1	0	0	54
SSW	2	13	4	0	0	0	19
SW	3	9	1	0	0	0	13
WSW	3	10	0	0	0	0	13
W	1	24	3	0	0	0	28
WNW	0	49	11	4	0	0	64
NW	2	16	5	0	0	0	23
NNW	1	15	2	0	0	0	18
VARIABLE							

TOTAL 428
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 4/ 1/87 TO 6/30/87
STABILITY CLASS: E
ELEVATION: 33

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	4	14	10	18	0	0	46
NNE	4	22	16	10	0	0	52
NE	9	31	26	14	0	0	80
ENE	12	28	2	0	0	0	43
E	9	18	8	0	0	0	35
ESE	5	16	3	0	0	0	24
SE	5	9	1	0	0	0	15
SSE	5	15	3	0	0	0	23
S	7	71	58	0	0	0	136
SSW	3	27	9	0	0	0	39
SW	1	11	0	0	0	0	12
WSW	8	17	2	0	0	0	27
W	4	26	17	0	0	0	47
WNW	4	20	17	0	0	0	41
NW	8	13	19	1	0	0	41
NNW	2	14	14	6	0	0	36
VARIABLE							

TOTAL 697
PERIODS OF CALM (HOURS): 1

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 4/ 1/87 TO 6/30/87
STABILITY CLASS: F
ELEVATION: 33

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	8	4	0	2	0	0	14
NNE	7	2	2	0	0	0	11
NE	11	10	7	4	0	0	32
ENE	6	18	2	0	0	0	26
E	5	8	0	0	0	0	13
ESE	5	1	1	0	0	0	7
SE	4	3	0	0	0	0	9
SSE	6	10	2	0	0	0	18
S	3	70	5	0	0	0	78
SSW	5	19	1	0	0	0	25
SW	7	7	0	0	0	0	14
WSW	4	7	0	0	0	0	11
W	4	4	0	0	0	0	9
WNW	3	10	0	1	0	0	14
NW	10	10	0	1	0	0	21
NNW	6	6	0	0	0	0	12
VARIABLE							

TOTAL 314
PERIODS OF CALM (HOURS): 3

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 4/ 1/87 TO 6/30/87
STABILITY CLASS: G
ELEVATION: 33

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	5	0	0	0	0	0	6
NNE	9	1	0	0	0	0	10
NE	8	0	0	0	0	0	8
ENE	4	0	0	0	0	0	4
E	4	0	0	0	0	0	4
ESE	3	0	0	0	0	0	3
SE	8	3	0	0	0	0	11
SSE	7	8	1	0	0	0	16
S	20	26	0	0	0	0	46
SSW	22	19	0	0	0	0	41
SW	9	5	0	0	0	0	14
WSW	5	1	0	0	0	0	7
W	5	0	0	0	0	0	5
WNW	1	0	0	0	0	0	2
NW	3	1	0	2	0	0	8
NNW	3	0	0	0	0	0	5
VARIABLE							

TOTAL 169
PERIODS OF CALM (HOURS): 7

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 7/ 1/87 TO 9/30/87
STABILITY CLASS: A
ELEVATION: 33

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	1	0	1	0	0	0	2
NNE	2	20	17	0	0	0	39
NE	0	6	3	0	0	0	9
ENE	0	1	0	0	0	0	1
E	0	1	0	0	0	0	1
ESE	0	3	0	0	0	0	3
SE	0	2	0	0	0	0	2
SSE	0	1	2	0	0	0	3
S	0	7	2	0	0	0	9
SSW	0	3	0	0	0	0	3
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	12	1	0	0	0	13
NW	0	4	7	0	0	0	11
NNW	0	1	0	0	0	0	1
VARIABLE							

TOTAL 97
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 7/ 1/87 TO 9/30/87
STABILITY CLASS: B
ELEVATION: 33

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	0	2	0	0	0	0	2
NNE	0	5	2	0	0	0	7
NE	0	0	1	0	0	0	1
ENE	0	0	0	0	0	0	0
E	0	1	0	0	0	0	1
ESE	0	3	0	0	0	0	3
SE	0	1	0	0	0	0	1
SSE	0	3	0	0	0	0	3
S	0	4	1	0	0	0	5
SSW	0	0	0	0	0	0	0
SW	0	1	0	0	0	0	1
WSW	0	0	0	0	0	0	0
W	0	1	0	0	0	0	1
WNW	0	12	2	0	0	0	14
NW	0	1	2	0	0	0	3
NNW	0	3	0	0	0	0	3
VARIABLE							

TOTAL 45
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 7/ 1/87 TO 9/30/87
STABILITY CLASS: C
ELEVATION: 33

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	0	5	0	0	0	0	5
NNE	0	8	0	0	0	0	8
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	1	0	0	0	0	1
SE	0	2	0	0	0	0	2
SSE	0	2	2	0	0	0	4
S	0	9	0	0	0	0	9
SSW	0	1	0	0	0	0	1
SW	0	1	1	0	0	0	2
WSW	0	0	0	0	0	0	0
W	1	4	0	0	0	0	5
WNW	0	18	1	0	0	0	19
NW	1	5	0	0	0	0	6
NNW	0	6	1	1	0	0	8
VARIABLE							

TOTAL 70
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 7/ 1/87 TO 9/30/87
STABILITY CLASS: D
ELEVATION: 33

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	2	13	1	0	0	0	16
NNE	2	27	7	0	0	0	36
NE	0	3	4	0	0	0	7
ENE	2	1	0	0	0	0	3
E	3	0	0	0	0	0	3
ESE	1	2	0	0	0	0	3
SE	1	7	0	0	0	0	8
SSE	2	25	3	0	0	0	30
S	2	47	12	0	0	0	61
SSW	2	20	2	0	0	0	24
SW	2	8	0	0	0	0	10
WSW	1	11	1	0	0	0	13
W	2	10	1	0	0	0	13
WNW	3	43	13	0	0	0	59
NW	3	27	3	3	0	0	36
NNW	3	22	1	1	0	0	27
VARIABLE							

TOTAL 349
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 7/ 1/87 TO 9/30/87
STABILITY CLASS: E
ELEVATION: 33

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	2	20	16	0	0	0	38
NNE	3	24	10	0	0	0	37
NE	3	10	2	0	0	0	15
ENE	3	2	0	0	0	0	5
E	6	8	0	0	0	0	14
ESE	0	8	0	0	0	0	8
SE	6	16	0	0	0	0	22
SSE	14	59	7	0	0	0	80
S	10	105	12	0	0	0	127
SSW	8	19	0	0	0	0	27
SW	4	12	0	0	0	0	16
WSW	8	10	0	0	0	0	18
W	1	20	1	0	0	0	22
WNW	7	28	15	0	0	0	50
NW	2	44	22	3	0	0	71
NNW	5	31	18	3	0	0	57
VARIABLE							

TOTAL 607
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION:

PERIOD OF RECORD: 7/ 1/87 TO 9/30/87
STABILITY CLASS: F
ELEVATION: 33

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	3	4	4	0	0	0	11
NNE	2	2	1	0	0	0	7
NE	6	2	0	0	0	0	8
ENE	3	5	0	0	0	0	8
E	5	4	0	0	0	0	9
ESE	12	2	0	0	0	0	14
SE	13	4	0	0	0	0	17
SSE	33	39	1	0	0	0	73
S	16	79	3	0	0	0	98
SSW	8	23	0	0	0	0	31
SW	10	8	0	0	0	0	18
WSW	2	4	0	0	0	0	6
W	14	5	0	0	0	0	19
WNW	6	8	1	0	0	0	15
NW	3	9	1	0	0	0	13
NNW	0	8	2	0	0	0	10
VARIABLE							

TOTAL 357
PERIODS OF CALM (HOURS): 2

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 7/ 1/87 TO 9/30/87
STABILITY CLASS: G
ELEVATION: 33

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	0	3	0	0	0	0	3
NNE	4	2	2	0	0	0	8
NE	5	10	1	0	0	0	16
ENE	7	6	0	0	0	0	13
E	4	2	0	0	0	0	6
ESE	7	0	0	0	0	0	7
SE	22	3	1	0	0	0	27
SSE	35	18	5	0	0	0	58
S	24	43	0	0	0	0	68
SSW	43	32	0	0	0	0	75
SW	24	5	0	0	0	0	30
WSW	9	5	0	0	0	0	16
W	4	5	1	0	0	0	10
WNW	5	2	1	0	0	0	9
NW	0	5	0	0	0	0	5
NNW	0	4	0	0	0	0	4
VARIABLE							

TOTAL 355
PERIODS OF CALM (HOURS): 6

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 10/ 1/87 TO 12/31/87
STABILITY CLASS: A
ELEVATION: 33

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	0	0	3	0	0	0	3
NNE	0	0	4	0	0	0	4
NE	0	1	1	0	0	0	2
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	1	0	1	0	2
NW	0	0	1	4	0	0	5
NNW	0	0	0	0	0	0	0
VARIABLE							

TOTAL 16
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 10/ 1/87 TO 12/31/87
STABILITY CLASS: B
ELEVATION: 33

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	0	0	1	0	0	0	1
NNE	0	0	3	0	0	0	3
NE	0	0	3	0	0	0	3
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	4	0	1	0	5
NW	0	0	4	0	0	0	4
NNW	0	0	1	0	0	0	1
VARIABLE							

TOTAL 17
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 10/ 1/87 TO 12/31/87
STABILITY CLASS: C
ELEVATION: 33

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	0	0	0	1	0	0	1
NNE	0	1	2	0	0	0	3
NE	0	0	2	0	0	0	2
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	3	0	0	0	0	3
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	1	0	0	0	1
WNW	0	0	7	2	4	0	13
NW	0	0	3	0	0	0	3
NNW	0	0	0	0	0	0	0
VARIABLE							

TOTAL 26
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 10/ 1/87 TO 12/31/87
STABILITY CLASS: D
ELEVATION: 33

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	1	4	5	4	0	0	14
NNE	1	5	6	1	0	0	13
NE	0	5	16	5	0	0	26
ENE	1	0	3	0	0	0	4
E	0	4	0	0	0	0	4
ESE	0	5	2	0	0	0	7
SE	1	19	5	0	0	0	25
SSE	0	8	5	0	0	0	13
S	0	17	17	3	0	0	37
SSW	0	11	24	0	0	0	35
SW	0	12	6	1	0	0	19
WSW	0	11	5	2	0	0	18
W	0	9	36	7	1	0	53
WNW	1	10	21	19	12	5	68
NW	1	13	10	16	21	8	69
NNW	1	15	4	3	0	1	24
VARIABLE							

TOTAL 429
PERIODS OF CALM (HOURS): 0

80

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 10/ 1/87 TO 12/31/87
STABILITY CLASS: E
ELEVATION: 33

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	2	14	27	25	5	0	73
NNE	1	6	8	29	16	5	65
NE	2	9	24	4	1	3	43
ENE	3	8	22	0	0	0	33
E	6	13	9	0	0	0	28
ESE	2	11	3	0	0	0	16
SE	2	20	2	0	0	0	24
SSE	3	20	6	0	0	0	29
S	4	35	67	2	0	0	108
SSW	7	37	27	0	0	0	71
SW	3	38	5	1	0	0	47
WSW	4	22	19	2	0	0	47
W	4	25	56	19	4	0	108
WNW	3	19	51	75	13	0	161
NW	0	12	26	61	14	7	120
NNW	4	15	14	19	0	5	57
VARIABLE							

TOTAL 1030
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 10/ 1/87 TO 12/31/87
STABILITY CLASS: F
ELEVATION: 33

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	0	1	6	0	0	0	7
NNE	1	1	4	0	0	0	6
NE	0	0	2	0	0	0	2
ENE	1	2	0	0	0	0	3
E	7	1	0	0	0	0	8
ESE	9	1	2	2	0	0	14
SE	11	21	9	0	0	0	41
SSE	3	22	7	0	0	0	32
S	5	41	4	1	0	0	51
SSW	6	40	1	0	0	0	47
SW	5	22	0	0	0	0	27
WSW	2	6	0	0	0	0	8
W	2	6	1	0	0	0	9
WNW	0	2	8	2	0	0	12
NW	1	1	7	1	0	0	10
NNW	1	6	5	3	0	0	15
VARIABLE							

TOTAL 292
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 10/ 1/87 TO 12/31/87
STABILITY CLASS: G
ELEVATION: 33

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	0	0	1	0	0	0	1
NNE	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0
ENE	2	0	0	0	0	0	2
E	6	0	0	0	0	0	6
ESE	4	0	0	0	0	0	4
SE	6	5	0	0	0	0	11
SSE	10	32	0	0	0	0	42
S	15	63	0	0	0	0	78
SSW	22	46	0	0	0	0	68
SW	14	14	1	0	0	0	29
WSW	4	0	1	0	0	0	5
W	1	1	0	0	0	0	2
WNW	6	0	1	0	0	0	7
NW	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0
VARIABLE							

TOTAL 255
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 1/ 1/87 TO 3/31/87
STABILITY CLASS: A
ELEVATION: 150

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	0	0	5	7	4	2	18
NNE	0	1	4	0	0	0	5
NE	0	0	2	0	0	0	2
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	1	0	0	0	1
SW	0	0	0	0	0	0	0
WSW	0	0	0	1	0	0	1
W	0	0	6	1	0	0	7
WNW	0	1	7	16	7	0	31
NW	0	0	3	7	9	1	25
NNW	0	0	7	3	2	0	12
VARIABLE							

TOTAL 102
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 1/ 1/87 TO 3/31/87
STABILITY CLASS: B
ELEVATION: 150

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	0	0	3	0	1	0	4
NNE	0	0	3	0	0	0	3
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	1	0	0	0	1
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	3	3	0	0	6
WNW	0	0	3	6	4	1	14
NW	0	0	3	3	1	0	7
NNW	0	0	5	2	0	0	7
VARIABLE							

TOTAL 42
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 1/ 1/87 TO 3/31/87
STABILITY CLASS: C
ELEVATION: 150

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	0	0	3	0	2	1	6
NNE	0	0	2	0	0	0	2
NE	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	1	0	0	0	1
SSW	0	0	0	1	0	0	1
SW	0	0	0	0	1	0	1
WSW	0	0	1	1	0	0	2
W	0	0	5	2	1	0	8
WNW	0	0	3	7	0	0	10
NW	0	0	1	3	0	0	4
NNW	0	0	0	0	2	0	2
VARIABLE							

TOTAL 37
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 1/ 1/87 TO 3/31/87
STABILITY CLASS: 0
ELEVATION: 150

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	1	16	8	13	4	8	50
NNE	0	12	1	5	0	0	18
NE	1	1	5	9	0	0	16
ENE	0	1	4	4	0	0	9
E	1	0	0	0	0	0	1
ESE	0	0	0	0	0	0	0
SE	0	0	3	2	3	0	8
SSE	1	2	3	3	1	0	10
S	0	4	9	4	0	0	17
SSW	0	0	5	2	4	0	11
SW	0	2	7	8	3	0	20
WSW	0	2	9	17	14	0	42
W	0	7	47	30	17	13	114
WNW	0	24	9	22	25	6	86
NW	1	11	9	36	33	22	112
NNW	0	11	10	16	13	1	51
VARIABLE							

TOTAL 565
PERIODS OF CALM (HOURS): 0

87

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 1/ 1/87 TO 3/31/87
STABILITY CLASS: E
ELEVATION: 450

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	0	11	26	31	16	4	88
NNE	0	5	13	15	0	0	33
NE	0	2	6	5	2	0	16
ENE	1	5	8	1	0	0	15
E	3	6	11	0	0	0	20
ESE	1	5	3	0	0	0	9
SE	0	3	5	5	1	0	14
SSE	0	0	7	5	0	0	12
S	1	2	16	5	0	0	24
SSW	2	6	13	26	0	0	47
SW	0	3	16	18	0	0	37
WSW	1	2	15	25	6	0	49
W	1	7	29	63	16	10	126
WNW	0	12	21	36	27	4	100
NW	0	11	26	75	31	1	144
NNW	1	14	29	35	3	1	83
VARIABLE							

TOTAL 817
PERIODS OF CALM (HOURS): 0

8808

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 1/ 1/87 TO 3/31/87
STABILITY CLASS: F
ELEVATION: 150

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	0	2	3	3	0	0	8
NNE	0	2	1	5	0	0	8
NE	0	2	0	3	0	0	5
ENE	0	3	7	0	0	0	10
E	0	3	3	0	0	0	6
ESE	0	6	2	0	0	0	8
SE	0	3	2	2	0	0	7
SSE	0	6	3	4	0	0	13
S	0	2	10	11	0	0	23
SSW	0	2	11	3	0	0	16
SW	1	5	14	8	0	0	28
WSW	1	1	13	2	0	0	17
W	0	4	11	1	1	0	17
WNW	0	6	9	0	0	0	15
NW	0	3	4	1	2	0	10
NNW	0	3	5	7	0	0	15
VARIABLE							

TOTAL 206
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 1/ 1/87 TO 3/31/87
STABILITY CLASS: G
ELEVATION: 150

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	0	1	2	2	0	0	5
NNE	0	1	3	2	0	0	6
NE	0	2	1	1	0	0	4
ENE	0	5	0	0	0	0	5
E	0	0	0	0	0	0	0
ESE	0	2	0	0	0	0	2
SE	0	1	0	0	0	0	1
SSE	0	2	1	2	0	0	5
S	0	7	1	1	0	0	9
SSW	1	0	15	7	1	0	24
SW	0	2	13	2	1	0	18
WSW	0	4	2	1	0	0	7
W	2	5	8	0	0	0	15
WNW	0	2	4	2	0	0	8
NW	1	2	2	0	0	0	5
NNW	0	1	1	6	2	0	10
VARIABLE							

TOTAL 124
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 4/ 1/87 TO 6/30/87
STABILITY CLASS: A
ELEVATION: 150

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	0	4	0	0	0	0	4
NNE	0	2	10	1	0	0	13
NE	0	1	9	8	1	0	19
ENE	0	0	0	4	3	0	7
E	0	0	3	2	0	0	5
ESE	0	0	5	1	0	0	6
SE	0	0	6	0	0	0	6
SSE	0	0	4	1	0	0	5
S	0	0	4	12	3	0	19
SSW	0	0	8	4	0	0	12
SW	0	0	2	1	0	0	3
WSW	0	1	7	3	0	0	11
W	0	3	6	7	5	2	23
WNW	0	11	4	6	0	0	21
NW	0	0	4	3	0	0	7
NNW	0	3	3	1	0	0	7
VARIABLE							

TOTAL 168
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 4/ 1/87 TO 6/30/87
STABILITY CLASS: B
ELEVATION: 150

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	0	0	0	0	0	0	0
NNE	0	2	0	0	0	0	2
NE	0	5	2	0	0	0	7
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	2	0	0	0	2
SE	0	0	1	0	0	0	1
SSE	0	1	3	0	0	0	4
S	0	0	1	5	0	0	6
SSW	0	1	1	1	0	0	3
SW	0	0	3	1	0	0	4
WSW	0	0	2	6	0	0	8
W	0	2	5	1	0	1	9
WNW	0	5	6	0	0	0	11
NW	0	1	1	1	0	0	3
NNW	0	0	3	1	0	0	4
VARIABLE							

TOTAL 64
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 4/ 1/87 TO 6/30/87
STABILITY CLASS: C
ELEVATION: 150

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	0	4	1	0	0	0	5
NNE	0	5	1	1	0	0	7
NE	0	2	3	0	0	0	5
ENE	0	0	0	3	0	0	3
E	0	0	0	2	0	0	2
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	2	0	0	0	2
S	0	1	1	3	1	0	6
SSW	0	1	0	1	0	0	2
SW	0	1	5	3	0	0	9
WSW	0	0	3	1	0	0	4
W	0	5	6	0	0	0	11
WNW	0	8	5	1	0	0	14
NW	0	5	0	0	0	0	5
NNW	0	0	2	0	0	0	2
VARIABLE							

TOTAL 77
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 4/ 1/87 TO 6/30/87
STABILITY CLASS: D
ELEVATION: 150

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	0	24	[illegible]	2	1	0	30
NNE	0	13	10	3	0	0	26
NE	1	8	19	12	1	0	41
ENE	3	1	17	15	0	0	30
E	1	2	7	4	2	0	16
ESE	1	5	4	1	0	0	11
SE	1	3	3	1	0	0	8
SSE	0	9	16	0	0	0	25
S	1	5	12	22	4	0	44
SSW	0	4	11	10	2	0	27
SW	0	4	12	4	0	0	20
WSW	0	1	18	5	0	0	24
W	0	7	42	4	3	1	57
WNW	0	16	12	6	0	0	34
NW	0	9	5	1	0	0	15
NNW	1	13	2	3	1	0	20
VARIABLE							

TOTAL 428
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 4/ 1/87 TO 6/30/87
STABILITY CLASS: E
ELEVATION: 150

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	1	7	6	14	15	1	44
NNE	0	14	9	16	6	1	46
NE	0	15	35	24	7	0	81
ENE	1	11	33	11	0	0	56
E	2	6	16	5	1	0	30
ESE	2	7	7	4	0	0	22
SE	1	6	2	1	0	0	10
SSE	1	7	7	4	0	0	19
S	0	7	24	50	15	0	96
SSW	0	1	21	46	0	0	68
SW	0	4	13	11	0	0	28
WSW	0	7	16	6	4	0	33
W	1	7	27	10	7	0	52
WNW	1	5	13	21	0	0	40
NW	1	8	10	20	2	0	41
NNW	1	5	6	16	3	1	32
VARIABLE							

TOTAL 698
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 4/ 1/87 TO 6/30/87
STABILITY CLASS: F
ELEVATION: 150

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	1	2	2	0	2	0	7
NNE	2	9	4	2	0	0	17
NE	2	10	16	5	2	0	35
ENE	1	7	20	1	0	0	29
E	0	7	4	0	0	0	11
ESE	1	5	0	0	1	0	7
SE	0	2	2	0	0	0	4
SSE	1	1	9	3	0	0	14
S	1	1	21	13	1	0	37
SSW	0	2	21	29	0	0	52
SW	0	5	10	8	0	0	23
WSW	1	3	7	3	0	0	14
W	0	5	2	0	0	0	9
WNW	0	5	8	1	0	0	14
NW	0	3	15	3	0	0	21
NNW	3	9	6	2	0	0	20
VARIABLE							

TOTAL 314
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 4/ 1/87 TO 6/30/87
STABILITY CLASS: G
ELEVATION: 150

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	1	1	0	0	0	0	2
NNE	0	4	0	0	0	0	4
NE	0	15	3	0	0	0	18
ENE	0	5	1	0	0	0	6
E	1	3	1	0	0	0	5
ESE	2	4	0	0	0	0	6
SE	0	10	3	0	0	0	13
SSE	0	5	2	5	0	0	12
S	1	5	13	4	0	0	23
SSW	1	1	12	15	0	0	29
SW	0	7	10	8	0	0	25
WSW	0	1	11	0	0	0	12
W	1	6	5	0	0	0	12
WNW	2	6	1	0	0	0	9
NW	0	6	4	0	0	0	10
NNW	0	4	0	0	0	0	4
VARIABLE							

TOTAL 190
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 7/ 1/87 TO 9/30/87
STABILITY CLASS: A
ELEVATION: 150

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	0	1	1	0	0	0	2
NNE	0	9	16	2	0	0	27
NE	0	5	14	0	0	0	19
ENE	0	0	1	1	0	0	2
E	0	0	0	0	0	0	0
ESE	0	0	3	0	0	0	3
SE	0	0	3	0	0	0	3
SSE	0	1	0	2	0	0	3
S	0	0	3	3	0	0	6
SSW	0	1	1	0	0	0	2
SW	0	2	0	0	0	0	2
WSW	0	0	0	0	0	0	0
W	0	0	5	1	0	0	6
WNW	0	0	9	0	0	0	9
NW	0	0	6	2	0	0	8
NNW	0	1	4	0	0	0	5
VARIABLE							

TOTAL 97
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 7/ 1/87 TO 9/30/87
STABILITY CLASS: B
ELEVATION: 150

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	0	4	2	0	0	0	6
NNE	0	1	3	0	0	0	4
NE	0	0	1	0	0	0	1
ENE	0	0	1	1	0	0	2
E	0	1	1	0	0	0	2
ESE	0	0	2	0	0	0	2
SE	0	1	1	0	0	0	2
SSE	0	1	1	0	0	0	2
S	0	0	3	1	0	0	4
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	1	5	0	0	0	6
WNW	0	1	9	1	0	0	11
NW	0	0	0	1	0	0	1
NNW	0	1	1	0	0	0	2
VARIABLE							

TOTAL 45
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 7/ 1/87 TO 9/30/87
STABILITY CLASS: C
ELEVATION: 150

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	0	4	0	0	0	0	4
NNE	0	3	1	0	0	0	4
NE	0	2	3	0	0	0	5
ENE	0	1	2	0	0	0	3
E	0	0	1	2	0	0	3
ESE	0	3	1	0	0	0	4
SE	0	0	0	0	0	0	0
SSE	0	0	3	1	0	0	4
S	0	0	5	0	0	0	5
SSW	0	0	2	1	0	0	3
SW	0	0	0	1	0	0	1
WSW	0	2	2	0	0	0	4
W	0	3	5	1	0	0	9
WNW	0	3	4	1	0	0	8
NW	0	8	0	2	0	0	10
NNW	0	3	0	0	0	0	3
VARIABLE							

TOTAL 70
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 7/ 1/87 TO 9/30/87
STABILITY CLASS: D
ELEVATION: 150

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	1	13	2	0	0	0	16
NNE	0	17	8	2	0	0	27
NE	0	4	8	1	0	0	13
ENE	0	4	7	5	0	0	16
E	0	6	1	2	0	0	9
ESE	0	2	2	0	0	0	4
SE	0	9	5	1	0	0	15
SSE	0	7	20	2	0	0	29
S	0	3	15	18	0	0	36
SSW	0	7	14	7	0	0	28
SW	0	3	8	3	0	0	14
WSW	0	6	14	3	0	0	23
W	0	12	8	11	2	0	33
WNW	0	22	9	5	0	0	36
NW	1	17	1	5	1	1	27
NNW	0	18	5	0	0	0	23
VARIABLE							

TOTAL 349
PERIODS OF CALM (HOURS): 1

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 7/ 1/87 TO 9/30/87
STABILITY CLASS: E
ELEVATION: 150

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	0	7	12	7	0	0	26
NNE	0	13	16	10	0	0	39
NE	0	9	12	5	0	0	26
ENE	2	11	9	4	0	0	26
E	0	3	5	2	0	0	10
ESE	0	8	9	1	0	0	18
SE	0	12	8	1	0	0	21
SSE	2	10	36	12	0	0	60
S	1	9	48	24	3	3	88
SSW	1	4	23	25	0	0	53
SW	1	11	9	7	1	0	29
WSW	0	2	17	5	0	0	26
W	0	3	20	7	2	0	33
WNW	2	5	23	16	3	0	49
NW	3	9	17	21	4	0	54
NNW	0	10	27	11	1	0	49
VARIABLE							

TOTAL 607
PERIODS OF CALM (HOURS): 2

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 7/ 1/87 TO 9/30/87
STABILITY CLASS: F
ELEVATION: 150

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	0	0	3	0	0	0	3
NNE	0	7	3	3	0	0	13
NE	0	8	16	7	0	0	31
ENE	1	6	7	6	0	0	20
E	0	6	6	1	0	0	13
ESE	1	14	4	0	0	0	19
SE	0	3	10	0	0	0	13
SSE	0	9	34	9	0	0	52
S	0	7	28	25	0	0	60
SSW	0	4	21	22	0	0	47
SW	0	3	6	8	0	0	17
WSW	0	0	12	0	0	0	12
W	4	3	15	1	0	0	23
WNW	0	2	10	0	0	0	12
NW	1	2	6	1	0	0	10
NNW	0	2	9	1	0	0	12
VARIABLE							

TOTAL 357
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 7/ 1/87 TO 9/30/87
STABILITY CLASS: G
ELEVATION: 150

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	0	1	1	0	0	0	2
NNE	1	4	5	1	0	0	11
NE	0	10	30	2	0	0	42
ENE	0	4	11	0	0	0	15
E	1	12	8	0	0	0	21
ESE	2	20	4	4	0	0	30
SE	0	5	11	4	0	0	20
SSE	1	7	11	4	0	0	23
S	0	8	21	19	0	0	48
SSW	2	7	21	7	0	0	38
SW	2	7	11	8	0	0	28
WSW	0	13	13	3	0	0	29
W	2	6	8	0	0	0	18
WNW	0	12	3	0	0	0	15
NW	0	7	3	0	0	0	10
NNW	1	3	1	0	0	0	5
VARIABLE							

TOTAL 355
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 10/ 1/87 TO 12/31/87
STABILITY CLASS: A
ELEVATION: 150

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	0	0	0	3	0	0	3
NNE	0	0	0	0	0	0	0
NE	0	1	5	0	0	0	6
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	1	0	0	1	2
NW	0	0	0	4	1	0	5
NNW	0	0	0	0	0	0	0
VARIABLE							

TOTAL 16
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 10/ 1/87 TO 12/31/87
STABILITY CLASS: B
ELEVATION: 150

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	0	0	0	1	0	0	1
NNE	0	0	0	0	0	0	0
NE	0	0	6	0	0	0	6
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0
WNW	0	0	1	3	0	0	4
NW	0	0	1	2	1	0	4
NNW	0	0	1	1	0	0	2
VARIABLE							

TOTAL 17
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 10/ 1/87 TO 12/31/87
STABILITY CLASS: C
ELEVATION: 150

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	0	0	0	1	0	0	1
NNE	0	0	0	0	0	0	0
NE	0	1	4	0	0	0	5
ENE	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0
S	0	0	3	0	0	0	3
SSW	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0
W	0	0	3	1	0	0	4
WNW	0	0	3	2	1	1	7
NW	0	0	1	2	1	2	6
NNW	0	0	0	0	0	0	0
VARIABLE							

TOTAL 26
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 10/ 1/87 TO 12/31/87
STABILITY CLASS: D
ELEVATION: 150

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	1	7	4	2	2	0	16
NNE	0	2	9	1	0	0	12
NE	1	2	12	7	0	0	22
ENE	0	6	2	1	0	0	9
E	0	0	1	2	0	0	3
ESE	1	3	6	0	0	0	10
SE	0	9	12	0	0	0	21
SSE	1	1	7	1	0	0	10
S	0	0	14	11	5	0	30
SSW	0	0	10	19	4	0	33
SW	0	1	19	16	0	0	36
WSW	0	1	15	4	3	0	23
W	0	3	17	25	12	5	62
WNW	0	5	15	10	15	10	55
NW	0	15	2	4	19	39	79
NNW	0	10	2	9	3	3	27
VARIABLE							

TOTAL 448
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 10/ 1/87 TO 12/31/87
STABILITY CLASS: E
ELEVATION: 150

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	2	3	25	28	9	6	73
NNE	0	1	13	28	16	12	70
NE	2	5	14	16	3	4	44
ENE	0	1	9	23	0	0	33
E	0	7	14	9	1	0	31
ESE	0	6	5	2	2	0	15
SE	0	5	12	2	0	0	19
SSE	1	3	12	10	0	0	26
S	0	2	14	15	1	2	34
SSW	0	3	26	83	5	0	117
SW	1	6	32	24	0	0	63
WSW	0	6	25	20	5	1	57
W	0	6	23	42	31	17	119
WNW	1	4	17	50	42	26	140
NW	3	10	15	33	49	23	133
NNW	0	2	8	28	23	8	69
VARIABLE							

TOTAL 1043
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 10/ 1/87 TO 12/31/87
STABILITY CLASS: F
ELEVATION: 150

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	0	0	9	2	0	0	11
NNE	0	0	6	0	0	0	6
NE	0	0	3	0	0	0	3
ENE	0	0	5	0	0	0	5
E	0	0	5	0	0	0	5
ESE	0	4	5	1	1	0	11
SE	0	3	16	6	3	0	28
SSE	0	1	7	15	1	0	24
S	0	0	22	6	3	0	31
SSW	1	2	25	12	0	0	40
SW	0	5	31	29	0	0	65
WSW	0	3	10	5	0	0	18
W	0	2	10	1	0	0	13
WNW	0	3	5	9	0	0	17
NW	0	0	3	5	2	0	10
NNW	0	1	5	7	0	0	13
VARIABLE							

TOTAL 300
PERIODS OF CALM (HOURS): 0

HOURS AT EACH WIND SPEED AND DIRECTION

PERIOD OF RECORD: 10/ 1/87 TO 12/31/87
STABILITY CLASS: G
ELEVATION: 150

WIND DIRECTION	WIND SPEED (MPH) 1-3	4-7	8-12	13-18	19-24	>24	TOTALS
N	1	1	0	1	0	0	3
NNE	1	2	0	0	0	0	3
NE	0	0	0	0	0	0	0
ENE	0	1	2	0	0	0	3
E	2	1	5	0	0	0	8
ESE	1	6	0	0	0	0	7
SE	0	0	7	2	0	0	9
SSE	0	8	12	3	0	0	23
S	1	4	21	7	0	0	33
SSW	0	5	37	20	0	0	62
SW	1	10	16	19	0	0	46
WSW	1	7	15	5	0	0	28
W	3	5	9	0	0	0	17
WNW	0	10	0	1	0	0	11
NW	1	3	3	0	0	0	7
NNW	0	1	1	0	0	0	2
VARIABLE							

TOTAL 262
PERIODS OF CALM (HOURS): 0

SEMIANNUAL RADIOACTIVE EFFLUENT
RELEASE REPORT

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

According to Technical Specification 6.9.1.7 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.

The following changes are hereby submitted in compliance with these requirements.

A. 1. Revision 4 of the PCP was issued to generalize the method for determining radwaste oil content and specify the units of the results. Several administrative corrections were also made. Oil content was previously determined by visual inspection to be less than 1% by volume.

2. This revision did not cause a reduction in the overall conformance of the solidified waste product to existing PCP requirements; it allowed more accurate methods to be used to determine oil content and required the results to be reported as % by volume.

3. The revised PCP and the document cover, indicating review and acceptance by the Review of Operations Committee (ROC), follow.

B. 1. Revision 10 of the ODCM was issued to

a. incorporate editorial changes and corrections,
b. revise figures and tables to comply with the most recent environmental monitoring data;
c. Mention the use of NRC computer codes in dose calculations prepared for the Semiannual Radioactive Effluent Release Report;
d. Change the critical dose location to reflect a newly identified milk animal and incorporate specific parameters relating to the location (ie, time on pasture, X/Q values).

2. The accuracy and reliability of the dose calculations will not be reduced since the changes made reflect current actual conditions and data to be used in dose calculations.

3. The affected pages of the ODCM and the signature page, indicating ROC review and acceptance, follow.

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

C. Milk samples at Technical Specification indicator location Ia1 became unavailable in August 1987, due to a) the owners moved (taking the goats) from the primary location 6B2, and b) the owner's extended travel plans at the secondary location, 6B1. At that time, no replacement milking animals were available for the indicator location. In lieu of milk sampling, fresh leafy vegetables were sampled at time of harvest at three locations as specified in the Technical Specification and the ODCM.

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

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

SEMIANNUAL RADIOACTIVE EFFLUENT
RELEASE REPORT

H - MISCELLANEOUS SPECIAL REPORTS

3rd & 4th Quarters of 1987

Action Statement b. of Technical Specification 3.3.7.10 requires that when certain liquid effluent monitoring instrumentation remains inoperable beyond a specified period of time, the reason why the inoperability was not corrected within that time should be explained in this Report.

The RHR heat exchanger service water radiation monitor 1D11*RE23A was declared inoperable on 8-11-87 due to a scheduled outage of Bus 101. It was returned to service on 10-13-87 after 62 days when the Bus 101 outage was over. Monitor 1D11*RE23B was declared inoperable on 9-30-87 because of low sample flow and a Maintenance Work Request was written. However, the problem was not corrected within 30 days, due to inaccessibility of the system for testing and repair.

In the previous Semiannual Radioactive Effluent Release Report it was stated that milk samples from a location meeting all the requirements of the indicator location specified in Technical Specification Table 3.12.1-1.4a were being collected to satisfy Technical Specification requirements although the location was not yet in the ODCM. This was again the case for July 1987. Samples from this location became unavailable in August 1987 (see Section G) however, a new milk location was identified in December 1987. It meets all the requirements of the Technical Specification indicator location. A sample from this location, identified as 13B1 was used to satisfy the December sample requirements. The ODCM will be updated to include this new location and presented in the next Report.

Effective Date: 8/14/87

SOLID WASTE
PROCESS CONTROL PROGRAM
FOR
SHOREHAM NUCLEAR POWER STATION - UNIT 1
REVISION 4

LONG ISLAND LIGHTING COMPANY
Docket No. 50-322

August 5, 1987

Prepared by: _____ Date: 8/5/87
Nuclear Engineering Department

Reviewed by: _____ Date: 8/5/87
ROC Chairman

Approved by: _____ Date: 8/5/87
Plant Manager W.E. Steiger

TABLE OF CONTENTS

1.0 PURPOSE

The Shoreham Nuclear Power Station (SNPS) Process Control Program (PCP) describes the administrative and process controls which provide reasonable assurance of a consistent quality radioactive waste product which is acceptable for shipment and burial. Implementation of this PCP will:

- Provide assurance that waste types produced at SNPS will be classified satisfactorily in accordance with the requirements of 10CFR61.

- Provide assurance that the requirements of 10CFR61 and specific disposal site criteria for Class A unstable waste to be solidified are met by the use of a mobile solidification system supplied by a qualified contractor. When additional sample solidification data becomes available, this PCP will be modified to demonstrate the qualification of the in-house solidification system that may be used, in addition to a mobile solidification system supplied by a qualified contractor, for processing of Class A unstable waste.

- Provide assurance that the waste form stability requirements of 10CFR61 for Class B and C wastes are met. This will be accomplished through the use of a mobile solidification system supplied by a qualified contractor or use of approved High Integrity Containers (HICs). Until such time as the contractor's Topical Report has been approved by the NRC, qualification will be based on the contractor's past record of producing acceptable BWR waste packages for waste streams similar to those produced at SNPS. The contractor's Process Control Programs are referenced in the "Mobile Service Contractor Documents" Section of this document. SNPS management shall ensure that the contractor's waste processing operations are performed in accordance with procedures.

- Provide assurance that dewatered Class A, B or C waste products meet the applicable burial site criteria for free standing water when the in-house or contractor's dewatering equipment and procedures are used.

- Provide assurance that the processing and packaging of solid radioactive wastes meet the requirements of federal and state regulations and disposal site criteria.

- Ensure that the quality assurance requirements delineated in 10 CFR 71.101, 71.103 and 71.105 are met for both in-house and mobile contractor processing.

2.0 RADIOACTIVE WASTE SOURCES

Low-level radioactive wastes are produced as a result of routine plant operation and maintenance of plant systems. The major contributing sources of radioactive waste are listed below:

2.1 EVAPORATOR BOTTOMS

2.1.1 Waste Evaporator

The waste Evaporator receives high conductivity waste primarily from the floor drains.

The design concentration of the Waste Evaporator is an 18 weight percent concentrate of dissolved and suspended solids.

2.1.2 Regenerant Evaporator

The Regenerant Evaporator receives primarily liquid chemical wastes produced by the acid/caustic regeneration of the condensate demineralizer resins.

The waste is collected, neutralized, and sampled in the Regenerant Liquid and Evaporator Feed Tanks, and then pumped to the Regenerant Evaporator for concentration to a 25 weight percent mixture of sodium sulfate and other dissolved and suspended solids.

2.1.3 Bottoms Transfer

Each evaporator is a forced circulation design with a reboiler providing process heat and an overhead entrainment separator and rectifying column which minimizes liquid droplets in the vapor. When the desired solid content has been reached, the concentrated evaporator bottoms are cooled and sent to the Evaporator Bottoms Tank or directly to the Evaporator Bottoms Metering Pump for solidification according to the contractor's procedure F458-P-002, "Operating Procedures for Mobile In-Container Solidification of Sodium Sulfate Slurries."

In order to provide maximum flexibility, each evaporator can be used as a back-up for the other.

2.2 FLOOR DRAIN FILTER

The filter is a horizontal traveling screen, precoat type, designed for air drying and air-aided discharge of the cake (without backflushing) into a shipping container for further dewatering. The waste may contain filter media such as diatomaceous earth or a powdered resin/fiber blend type material.

The floor drain filter is used to process the following combined liquid radwaste streams:

- o Reactor Bldg Floor Drains
- o Turbine Bldg. Floor Drains
- o Radwaste Bldg. Floor Drains
- o Machine Shop Floor Drains
- o Sample Tank Area Floor Drains
- o Turbine Bldg. Decon Area Floor Drains
- o Condensate Demin. System Waste Sump Pump Disch. and URC Backwash.
- o Cond. Storage and Transfer System overflow Sump Pumps discharge.
- o Laundry Drains Tank

Class A, B and C waste which is dewatered using in-house equipment is processed according to SP R3.710.02, "Dewatering of Spent Radwaste Media". Waste which is dewatered by the contractor's mobile equipment will be processed according to his procedures, (see "REFERENCES" Section).

2.3 RADWASTE FILTER

The Radwaste Filter is used to process the following combined liquid radwaste streams:

- o Low conductivity equipment drains
- o Reactor Bldg. Equip. Drains, drywell equip. drains, Radwaste Bldg equip. drains, and Turbine Bldg equip. drains
- o Solid Waste System dewatering tank decanted liquid

- o RW filters displacement and prefiltration liquid
- o Decanted liquid from the Phase Separator and the Spent Resin Tank
- o Blowdown from the reactor water cleanup and residual heat removal systems
- o Blowdown from the Fuel Pool Cooling and Clean-up System
- o Ultrasonic Resin Cleaner Backwash

The radwaste filter units are each composed of stacked horizontal filter discs assembled on an axially located hollow shaft. After draining the filter vessel and air-drying the filter cake, the filter assembly is spun to remove the filter cake from the filter discs and discharged directly into a waste shipping container for dewatering and disposal.

The waste resulting from the filters may contain diatomaceous earth, Ecodex or similar powdered resin/fiber blend material. If Class A, B or C waste is being dewatered using in-house equipment, it is processed according to SP R3.710.02, "Dewatering of Spent Radwaste Media". All classes of waste may also be dewatered by the contractor using procedures referenced in the "REFERENCES" Section.

2.4 SPENT RESIN TANK (SRT)

The Spent Resin Tank accepts resin/filter media (via the Phase Separator Tanks) from the reactor water cleanup (RWCU) filter demineralizers, the sludge from the backwash storage tank of the Fuel Pool Clean-up etched-disc type filter, in addition to spent bead resin from the condensate demineralizers, the fuel pool demineralizers, and the radwaste demineralizers. The resin is allowed to settle before excess water is decanted to the waste collector tanks.

Mixed powdered and bead resin in the SRT can be transferred directly into a HIC from the SRT for dewatering by the in-house equipment or the contractors' Mobile unit using the procedures in the "REFERENCES" section of this PCP.

2.5 CARTRIDGE FILTER

The Laundry Drain System and the Control Drive System use a cartridge type filter for processing. These cartridges may be immobilized in a cement mixture which includes evaporator bottoms concentrates or spent resins. These may also be compacted as Dry Active Waste (DAW) using SP R3.075.01 (provided the filter cartridge is dry). Liners that contain solid objects are specifically identified.

2.6 TRASH COMPACTOR

The drum compactor is used to compress low level dry waste such as rags, paper, shoe covers, floor sweepings, dry filters, HEPA filters, strainers and plastic gloves into 55 gallon steel drums for shipment offsite . Compaction force is rated at 18,000 lbs for an approximate 4:1 compaction ratio.

A box compactor will be installed which compresses waste into 96 cu. ft. metal boxes. This is a self-contained unit with its own HEPA filtering system. The compaction force is rated at 60,000 lbs.

3.0 RADIOACTIVE WASTE STREAMS

3.1 EVAPORATOR BOTTOMS CONCENTRATES

This may be a mixture of :

3.1.1 Chemical regeneration concentrates from the Regenerant Evaporator process.

3.1.2 Floor Drain concentrates from the Waste Evaporator process.

3.2 SPENT RESIN TANK WASTE

This might be a mixture of the following:

3.2.1 Condensate Demineralizer Resins

3.2.2 Radwaste Demineralizer Resins

3.2.3 Fuel Pool Demineralizer Resins

3.2.4 Phase Separator Resin

3.2.5 Vacco Filter Backwash Sludges

3.3 FUNDA FILTER GENERATED WASTE

3.4 FLOOR DRAIN FILTER GENERATED WASTE

3.5 DRY ACTIVE WASTE (DAW)

3.5.1 Compactible

3.5.2 Non-Compactible

3.6 FILTER CARTRIDGES

3.6.1 HEPA Filters

3.6.2 Laundry Drain Filter Cartridges

3.6.3 CRD Filter Cartridges

3.7 RADIOACTIVELY CONTAMINATED LIQUIDS AND SOLIDS

Due to varying burial site regulations, each will be handled on a case by case basis in accordance with the burial site criteria and federal regulations.

3.7.1 Organics (including oils)

3.7.2 Charcoal (Filters, Charcoal Beds)

4.0 IN-HOUSE SOLIDIFICATION SYSTEM

SNPS has a permanently installed Atcor radioactive waste solidification system which, when additional test data is available, may be used to package either radioactive evaporator bottoms or resins/sludges for disposal as Class A waste. Until that time, all wastes for solidification will be transferred to the contractor's mobile equipment.

The following is a description of the in-house system. Waste and cement flows are fixed by preset metering pumps using flow rates recommended by Atcor and verified by full scale testing. Flows are also monitored by tachometers installed on the control panel. The resin/sludge is processed from the Waste Dewatering Tank and evaporator bottoms are processed from the evaporator bottoms system or directly from the evaporators.

Cement and evaporator bottoms or resin/sludge are introduced into the mixer feeder unit for through mixing and discharge into a container. The small-volume continuous mixer limits the surface contact of the wet cement and also limits the quantity of wet cement in the system at any time. A manual handcrank is provided to permit emptying the mixer/feeder by the operator in case of power loss or equipment malfunction.

Flush water connections are provided inside the mixer/feeder to remove cement residue.

Safety features include:

- An interlock to prevent filling unless the pipe is properly inserted into the container fill opening.
- An ultrasonic level sensor, and a timer to monitor waste level in the container to prevent overflowing. Cement-bearing flush water cannot be discharged unless a receptacle is in place.
- Failure to initiate a flush sequence within 20 minutes after filling stops prompts an alarm.

When operational the system will be operated according to SP 23.713.01, "Solid Radwaste System." A simplified functional diagram appears in Figure 1.

5.0 IN-HOUSE DEWATERING

As an alternative to solidification, Class A, B, and C dewaterable waste may be dewatered in High Integrity Containers (HIC). Non high integrity containers can be used for Class A waste. All of these containers are equipped with internal filters to which a pump may be attached. Pumping continues until burial site criteria for free standing non corrosive liquid are met as described in SP R3.710.02.

Dewatering is conducted in accordance with plant procedure SP R3.710.02, "Dewatering of Spent Radwaste Media," to assure a consistently acceptable product.

6.0 MOBILE SOLIDIFICATION AND DEWATERING SERVICES

6.1 Wastes to be solidified must be transferred to the mobile solidification/dewatering equipment which is provided and operated by a qualified contractor. Class A, B or C dewatered wastes may be processed by the mobile services contractor or the in-house dewatering system at the discretion of the Radwaste Engineer. Class A solidified wastes may be processed by the contractor or by the in-house solidification system after qualification is completed.

6.2 The "Mobile Service Contractor Documents" in the "REFERENCES" Section lists those procedures which may be used by the mobile services contractor to ensure that waste products meet all requirements for shipment and burial offsite.

6.3 Provisions have been made for the mobile solidification equipment to be installed on Elevation 19' of the Radwaste Building which is a Seismic Category I Structure. This equipment will be installed and utilized as required. Spill are contained by installing the equipment in areas where sloping floors will carry liquids to floor drain sumps. The building ventilation system provides for filtering of particulate airborne contamination and monitoring of radiation before it enters the station vent.

7.0 SOLIDIFICATION PROCESS CONTROL PARAMETER DETERMINATION

When additional samples have been tested for solidification, this section will contain a summary of qualification test results for the in-house solidification system. During the interim, the in-house system will not be used to solidify waste for shipment offsite.

8.0 SOLIDIFICATION AND DEWATERING PRODUCT CONTROL

8.1 SAMPLING AND ANALYSIS

8.1.1 Samples shall be obtained and analyzed according to SP 72.002.18, "Radwaste Sampling for Disposal," prior to each solidification or dewatering operation and SP R4.014.01, "Radwaste Sample Solidification Test," prior to solidification.

8.1.1.1 Sampling for Solidification

1. The waste tank to be sampled shall be recirculated for a minimum of three tank volumes prior to sampling, unless the tank had been on recirculation continuously since it began filling.

2. An exception to the above is the Waste Dewatering Tank which is equipped with an agitator rather than a recirculating pump. Agitation is continued for at least 25 minutes prior to sampling.

3. The waste tank sampled shall remain isolated and in recirculation or agitation, as applicable, until the solidification process is started. If it becomes necessary to add material to the tank being processed, a new batch number will be initiated and a new sample will be taken after an appropriate mixing time.

4. Test solidification will be performed according to the schedule described in the "Batch Test Solidification" Section.

5. Solidification sampling requirements apply to all waste, whether it is being processed by permanently installed equipment or by the contractor's mobile equipment.

8.1.1.2 Sampling for Dewatering

Funda, Spent Resin Tank and flat bed filter wastes must be sampled from the liner. These will not be mixed prior to sampling.

8.1.2 The following applies to both Dewatering and Solidification.

1. Samples will be analyzed for pH and gamma emitters.

2. Oil content will be verified to be less than 1% by volume prior to shipment.

3. The analysis number will be added to the Solidification or Dewatering Record Sheet which is prepared for each waste container (liner or HIC).

8.2 CONDITIONING

8.2.1 Waste conditioning for solidification is required when any of the following conditions exist:

1. The pH is outside of the acceptable range according to the contractor's PCP.

2. Liquid content of the batch is above or below the acceptable envelope for solidification as indicated in the Contractor's PCP in the "REFERENCES" Section documents.

8.2.2 pH shall be determined on the decanted liquid from each container which has been dewatered. If pH is less than 4 or greater than 11 it will be determined on a case-by-case basis if any further action is required prior to shipment.

8.3 BATCH TEST SOLIDIFICATION

8.3.1 Test solidification shall be performed according to the following schedule:

1. One sample initially from each type of wet waste, and then from every tenth batch of each type of wet waste.

   NOTE: Batch is defined as the total volume of waste contained in a waste mixing tank that has been prepared for solidification.

2. When sample analyses fall outside the acceptable envelope established by the mobile services contractor, indicating a change in the waste type.

8.3.2 If any test specimen fails to solidify, the solidification of the batch under test shall be deferred until such time as additional test specimens can be obtained, alternative solidification parameters can be determined, and a subsequent test verifies solidification. Solidification of the batch may then be performed using the alternative solidification parameters determined.

Representative samples shall be obtained and tested from each consecutive batch of the same type of wet waste until at least three consecutive initial test specimens demonstrate solidification. The process control program shall be modified as required to assure solidification of subsequent batches of waste. The contractor shall modify his own PCP as necessary to accommodate unusual waste streams.

8.3.3 The test specimen shall be judged to have solidified successfully if, when its container has been removed, it remains a free standing monolith with no visible free liquid.

8.3.4 If a cement and water mixture (without waste) is used to solidify miscellaneous objects, this mixture will be tested for solidification prior to use.

8.4 WASTE CLASSIFICATION

8.4.1 In compliance with 10 CFR 20.311, wastes are classified as Class A, B or C, or greater than Class C, based on the presence of particular radionuclides and their activities as specified in 10 CFR 61.55. Plant procedures SP R2.713.06, "Calculations for Radwaste Curie Content," or SP R3.713.02 "RADMAN Computer Program" provide the methodology for this determination as used at SNPS.

8.4.2 Waste streams will be sampled based upon the Branch Technical Position requirements (or more frequently, if plant parameters indicate a change in waste characteristics) and analyzed for fission and activation products, including transuranics. Scaling factors developed from these complete analyses will be used with gamma spectra from each batch of waste to infer the concentrations of non-gamma emitting radionuclides.

8.4.3 During initial plant operation when the results of actual analyses are not yet available, radionuclide concentrations will be used in accordance with "RADMAN - Data Base Analysis Report".

8.4.4 The curie content of waste streams (such as trash) for which representative sampling is difficult may be inferred based on gamma analysis of representative smears and external dose rate measurement (SP R2.713.06 or SP R3.713.02).

8.5 CONTAINER CONTROL

8.5.1 A quality assurance program shall be established to inspect the container to be used for dewatering (and solidification) using SP R2.713.30, "Radwaste Container Control".

8.5.2 This program shall assure that prior to use, the containers to be used for dewatering are intact and free of any visual damage that would prevent the dewatering of waste to required limits.

8.6 DECONTAMINATION

Prior to shipment, containers will be swiped for removable contamination and examined for general condition. Decontamination will be conducted as necessary to meet shipping requirements.

8.7 CHANGES TO THE PROCESS CONTROL PROGRAM

Any changes to the Solid Waste Process Control Program for the Shoreham Nuclear Power Station shall be reviewed and found acceptable by the Review of Operations Committee and approved by the Plant Manager and reported to the NRC in the Semiannual Radioactive Effluent Release Report.

8.8 RECORDS AND INVENTORY CONTROL

8.8.1 Solidification

1. A Solidification Record Sheet (Appendix A) shall be completed for each liner filled for solidification.

2. If more than one liner results from a batch, then the initial liners will not be shipped until all liners for that batch have verified solidification. Those liners will be identified by a common analysis number.

8.8.2 Dewatering

Radiochemistry Analysis Sheet and Post Dewatering Survey Sheet (see Appendix B and Appendices 12.4 and 12.5 of SP R3.710.02) shall be completed for each container filled with dewatered waste.

8.8.3 Solidification and Dewatering

1. The Solidification or Dewatering Record Sheets and the attached isotopic analysis shall be forwarded to the Radwaste Engineer for retention until such time as the liner identified on the Record Sheet is shipped for final disposition.

2. When the identified liner is shipped and then verified received, the Solidification or Dewatering Record Sheets and other documents concerning the shipment shall be forwarded to SR2 for permanent record storage.

9.0 RESPONSIBILITIES

The following outlines departmental responsibilities and interfaces to implement and support all activities associated with the SNPS PCP.

NOTE: All service contractor procedures implementing the PCP which will be used at SNPS, prior to their utilization and implementation, must be approved by the Review of Operations Committee as per SNPS Tech. Spec. 6.8.1.h.

9.1 NOC Policy 25 (Management of Low Level Radioactive Waste) identifies the following departments as having direct responsibilities for the implementation, maintenance, licensing and regulatory interface of the SNPS PCP.

9.1.1 Nuclear Engineering Department, as also described in NED 1.02.

9.1.2 Shoreham Operation Department, as also described in SP R1.001.01.

9.1.3 Nuclear Operations Support Department.

9.1.4 Nuclear Quality Assurance Department (QA) as described in the QA Manual, Section 1.

9.1.5 Nuclear Review Board (NRB) as also described in the "Charter of the Shoreham Nuclear Power Review Board".

See NOC Policy 25 for more details.

9.2 Procedure NED 6.04, "Change Control", in conjunction with the NOSD 6, "Control of License Documents" shall be used to review, approve, control and disposition proposed changes and revisions to the SNPS PCP".

9.3 NED is responsible for preparing and maintaining the PCP current per NED Procedures 6.04 and 6.01.

9.4 The Review of Operations Committee (ROC) is responsible to review and find acceptable any changes to this program and the associated implementing procedures.

9.5 The Plant Manager's approval shall be obtained for every PCP revision.

9.6 ROC review and Plant Manager approval signatures shall be indicated on the cover page of the PCP.

9.7 PCP implementation is accomplished through station procedures and is the responsibility of the Radiological Controls and Operations Divisions.

10.0 REFERENCES

10.1 LILCO OPERATING PROCEDURES

10.1.1 SP 23.710.01, Low Conductivity Liquid Radwaste
10.1.2 SP R3.710.02, Dewatering of Spent Radwaste Media
10.1.3 SP 23.711.01, High Conductivity Liquid Radwaste
10.1.4 SP 23.712.01, Regenerant Chemical Liquid Radwaste
10.1.5 SP 23.713.01, Solid Radwaste System
10.1.6 SP 23.718.01, Liquid Radwaste Spent Resin
10.1.7 SP 23.719.01, Liquid Radwaste Evaporator Bottoms
10.1.8 SP R2.713.06, Calculations of Radwaste Curie Content
10.1.9 SP R2.713.24, Sampling, Treatment and Disposal of Radioactive Waste Oil
10.1.10 SP R2.713.30, Radwaste Container Control
10.1.11 SP R2.713.35, Storage of Packaged Radwaste Liners and DAW
10.1.12 SP R4.014.01, Radwaste Sample Solidification Test
10.1.13 SP 72.002.18, Radwaste Sampling for Disposal
10.1.14 SP R2.713.02, RADMAN Computer Program
10.1.15 SP R3.075.01, Compaction of Contaminated Waste
10.1.16 SP R1.020.01, Liquid Radwaste Process Control
10.1.17 SP R1.001.01, Radwaste Program-Policy & Objectives

10.2 MOBILE SERVICES CONTRACTOR DOCUMENTS

10.2.1 STD-R-05-007, Topical Report, Cement Solidified Wastes to Meet the Stability Requirements of 10CFR61, Westinghouse Hittman Nuclear, Inc.

10.2.2 F458-P-001, Process Control Program for the In-Container Solidification of 20-25 Weight Percent Sodium Sulfate Slurries

10.2.3 F458-P-002, Operating Procedure for Mobile Incontainer Solidification of Sodium Sulfate Slurries

10.2.4 F458-P-003, Process Control Program for Incontainer Solidification of Bead Resin - Powered Resin Mix

10.2.5 F458-P-004, Dewatering Powdered Resin Slurries in Hittman HN-100 Steel Liners with a Three Layer Flexible Underdrain Assembly to Less Than 1/2% Drainable Liquid

10.2.6 F458-P-005, Dewatering Bead Resins Mixed with Powered Resin in Hittman HN-100 Steel Liners with a Three Layer Flexible Underdrain Assembly to Less Than 1/2% Drainable Liquid

10.2.7 F458-P-006, Dewatering Powdered Resin Slurries in Hittman RADLOK™ - 100 Container with a Three Layer Flexible Underdrain Assembly to Less Than 1% Drainable Liquid

10.2.8 F458-P-007, Dewatering Bead Resin Mixed with Powdered Resin in Hittman RADLOK™ - 100 Containers with a Three Layer Flexible Underdrain Assembly to Less Than 1% Drainable Liquid

10.2.9 F458-P-008, Process Control Program for Incontainer Solidification of Powdered Resin

10.2.10 F458-P-009, Process control Program for the Incontainer Solidification of Radwaste Filter Cake. (50 weight percent powdered resin - 50 weight percent Diatomaceous Earth)

10.2.11 F458-P-010, Operating Procedure for Mobile Incontainer Solidification of Mixed Bead Resin - Powdered Resin Slurry (Maximum 28 weight percent powdered resin)

10.2.12 F458-P-011, Operating Procedure for Mobile Incontainer Solidification of Powdered Resin Slurry

10.2.13 F458-P-012, Operating Procedure for Mobile Incontainer Solidification of 50% Powdered Resin/50% Diatomacious Earth Filter Sludge

10.2.14 F458-P-013, Dewatering Filter Sludge Cakes in Hittman HN-100 Steel Liners with a Three Layer Flexible Underdrain Assembly to Less Than 1/2% Drainable Liquid

10.2.15 STD-P-05-025, Process Control Program for Incontainer Solidification of Sodium Sulfate Slurries Containing Mixed Solids

10.2.16 STD-P-05-014, Sodium Slufate Solidification

10.3 GENERAL REFERENCES

10.3.1 NRC Standard Review Plan 11.4, "Solid Waste Management Systems" (NUREG-0800)

10.3.2 NRC Branch Technical Position ETSB 11-3, "Design Guidance for Solid Waste Management Systems Installed in Light-Water-Cooled Nuclear Power Reactor Plants", July 1981

10.3.3 Code of Federal Regulations, Title 10, Part 61, "Licensing Requirements for Land Disposal for Radioactive Waste"

10.3.4 Code of Federal Regulations, Title 49, "Transportation"

10.3.5 South Carolina Department of Health and Environmental Control, Radioactive Material License No. 097, as amended.

10.3.7 State of Washington Radioactive Materials License #WN-I019-2, as amended, for Richland, Washington.

10.3.8 NRC Special Nuclear Material License No. 16-19204-01, as amended for Richland, Washington.

10.3.9 ANSI/ANS-55.1/1979, American National Standard for Solid Radioactive Waste Processing System for Light Water Cooled Reactor Plants.

10.3.10 AIF/NESP-027, Methodologies for Classification of Low-Level Radioactive Wastes form Nuclear Power Plants, Impell Corporation, January 1984.

10.3.11 NRC Low-Level Waste Licer[illegible] Branch, Final Waste Classification and Waste [illegible] Technical Position Papers May 11, 1983

10.3.12 RADMAN-Data Base Analysis Report - Shoreham Nuclear Power Station - Waste Management Group, Inc., August, 1985

10.3.13 QA Manual , App. K, "Packaging and Transport of Radioactive Material".

Appendix A
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SOLIDIFICATION RECORD SHEET

PART I Sampling and Pre-Solidification Analysis

1. Type of Waste _____

2. Waste tank placed on recirc. _____
Date/Time

3. Waste Tank sampled _____ analysis ID# _____
Date/Time

4. Waste Stream pH _____

5. Oil Content _____ % by volume

6. Isotopic Analysis Attached _____
Check

7. Estimated Curie content (SP R2.713.06) _____ µci/cc

8. Test Solidification Required _____ _____
Yes No

9. Acceptable Test Solidification performed (if required) _____
Initials

10. The above waste tank has been analyzed and is acceptable for solidification.

_____ _____
Radiochemistry Engineer or designee Date

SAMPLE

SOLIDIFICATION RECORD SHEET

PART II System Preparation and Processing
(Use Part IIa. if vendor supplied system is used)

1. Container _____ (Type) and _____ (ID#) (SP R2.713.30).

2. Container Properly Positioned Under Fill Pipe _____ (Check)

3. Fill Flange Properly Mated to Container _____ (Check)

4. Sufficient Cement Available _____ (Check)

5. Waste Dewatering Tank Level _____ inches
Evap. Bottoms Tank Level _____ inches

6. Authorization to commence process

_____ (Radwaste Supervisor) _____ (Date)

7. Time process started _____

8. Time process stopped _____

9. Tachometer reading (Metering Pump) _____

10. Waste Dewatering Tank Level _____ inches

11. Evap. Bottoms Tank Level _____ inches

12. Process Completed

_____ (Operator) _____ (Date) _____ (Time)

13. Waste Class: A ___ B ___ C ___

14. Liner Check for free standing water _____ (Initials) _____ (Date/Time)

15. Liner Capped _____ (Date) _____ (Time)

16. Container Weight _____ lbs.

SOLIDIFICATION RECORD SHEET

PART IIa Contractor System Preparation and Processing

1. Container ID Number _____ Type _____

2. Applicable connections made to liner for transferring waste and cement to liner _____
Initials

3. Connections made to liner for mixing contents, if applicable _____
Initials-

4. Process parameters

Waste to be added to liner _____ cf
Cement to be added to liner _____ cf
Water to be added to liner _____ cf

5. Authorization to commence processing

_____ _____ _____
Radwaste Supervision Date Time

6. Time processing started _____

7. Time processing stopped _____

8. Waste Class

Class A _____ Class B _____ Class C _____

9. Container checked for free standing water _____ _____
Initials Time/Date

10. Liner capped _____ _____
Date Time

11. Liner Weight _____ lbs.

SOLIDIFICATION RECORD SHEET

PART III Filled Liner Data

1. Filler Liner Radiation Levels

a. Contact Dose Rate _____ mR/hr 1 Meter Dose Rate _____ mR/hr

b. Smearable Activity

4 Quadrants (Use actual number)	1	_____ dpm/100 cm^2	&	1	_____ dpm/100 cm^2
	2	_____ dpm/100 cm^2	&	2	_____ dpm/100 cm^2
	3	_____ dpm/100 cm^2	&	3	_____ dpm/100 cm^2
	4	_____ dpm/100 cm^2	&	4	_____ dpm/100 cm^2

c. Liner decon performed _____
Yes/No

d. Smearable activity after decon (if performed) ___ dpm/100cm^2

e. Liner ready for shipping or transfer to storage

_____ _____ _____
Health Physics Supervision Date Time

2. Storage Location _____

_____
Radwaste Supervision

SAMPLE

Appendix B
Page 1 of 2

DEWATERING RECORD SHEET

RADIOCHEMISTRY ANALYSIS SHEET

1. Type of Waste _____

2. Waste Tank (or Liner) Sampled _____ (Date/Time) Analysis ID# _____

3. pH of Decant _____

4. Oil Content _____ % by volume

5. Isotopic Analysis of filter media and or bead resin attached _____ (Check)

6. The above waste tank/container has been sampled and found to contain the isotopes and properties as indicated on the attached data sheets.

_____ _____
Radiochemistry Supervision Date

DEWATERING RECORD SHEET

POST DEWATERING SURVEY SHEET

1. Container _____ (Type) and _____ (ID#)

2. Container Radiation Levels

   a. Contact Dose Rate _____ mR/hr
      1 Meter Dose Rate _____ mR/hr

   b. Smearable Activity

4 Quadrants (Use actual number)					
	1	_____ dpm/100 cm^2	or 1	_____ dpm/100 cm^2	
	2	_____ dpm/100 cm^2	or 2	_____ dpm/100 cm^2	
	3	_____ dpm/100 cm^2	or 3	_____ dpm/100 cm^2	
	4	_____ dpm/100 cm^2	or 4	_____ dpm/100 cm^2	

   c. Container Decon Performed _____ (Yes/No)

   d. Smearable activity after washdown/decon ____ dmp/100cm^2

   e. Liner ready for shipping or transfer to storage

_____ (Health Physics Supervision) _____ (Date) _____ (Time)

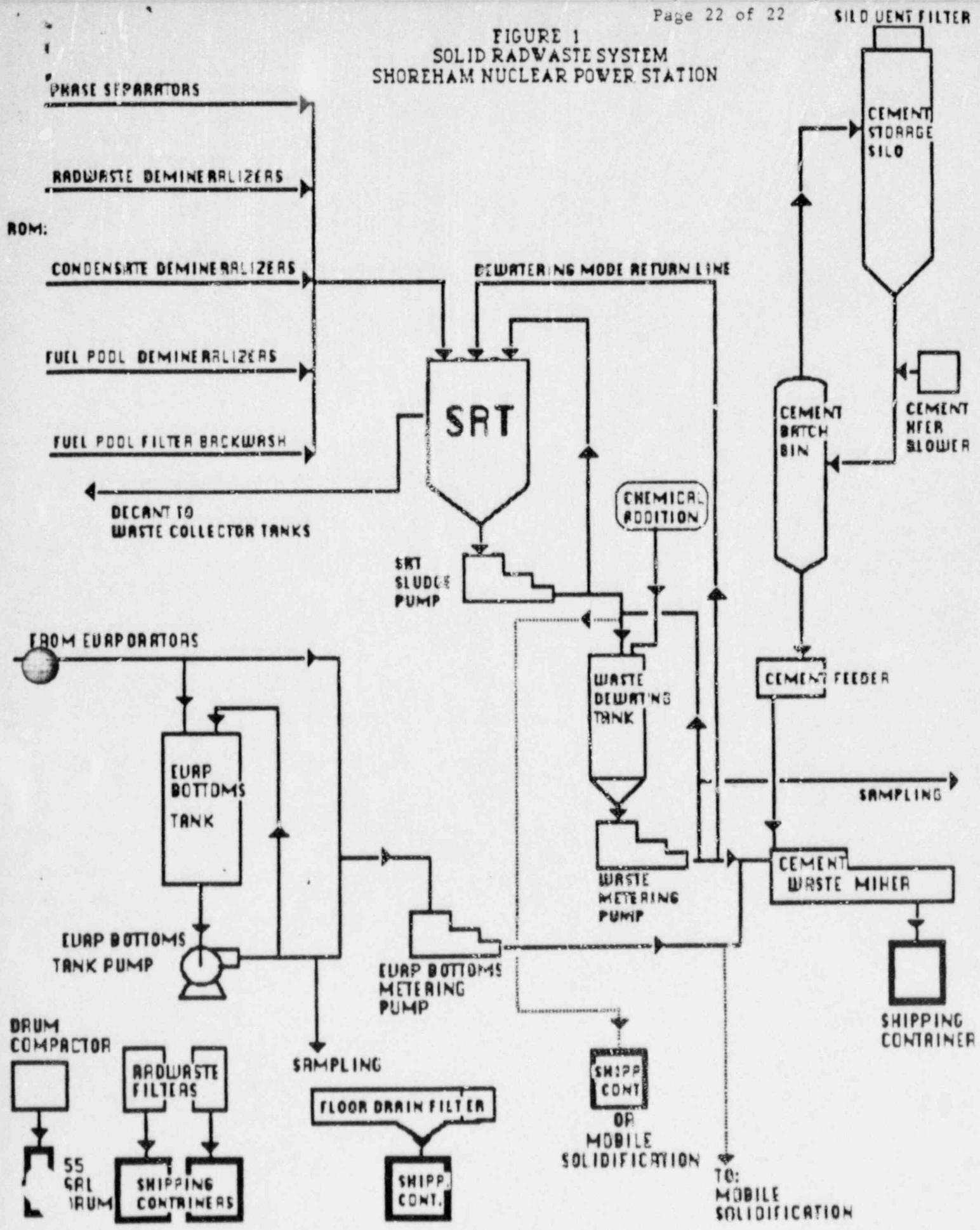
3. Waste Class A ___ B ___ C ___ _____ (Initials)

4. Storage Location _____

_____
Radwaste Supervision

SAMPLE

FIGURE 1
SOLID RADWASTE SYSTEM
SHOREHAM NUCLEAR POWER STATION



LILCO

Document No. 4170002
Eff. Date 8/21/87 Rev. No. 10

Prepared By	Date	Reviewed By	Date
László L. Drosz	8/7/87	K.K. Taylor for M. Beer	8/7/87

APPROVALS

Title/Dept.	Signature	Date
Radiation Div. Man. / ECD	[signature]	8/7/87
ROC CHAIRMAN	[signature]	8/11/87

TITLE OF DOCUMENT SHOREHAM NUCLEAR POWER STATION - UNIT 1
OFFSITE DOSE CALCULATION MANUAL

87-070-001

NOII. B

OFFSITE DOSE CALCULATION MANUAL

Revision 10 - August 1987

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OFFSITE DOSE CALCULATION MANUAL

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SECTION 2

SET POINTS

2.1 LIQUID EFFLUENT MONITOR SET POINTS (Compliance with Section 3.11.1.1 of the Radiological Effluent Technical Specification (RETS))

The radionuclide concentrations released via liquid effluents to unrestricted areas shall be limited to the concentrations specified in 10CFR20, Appendix B, Table II, Column 2 for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the total concentration shall be limited to 2×10^{-4} µCi/ml.

The set points of the effluent monitors are dependent on circulating or service water as follows:

1. a. With the circulating water system (a once-through system) in use, the circulating water flow rate (the circulating water system is composed of four pumps and circulates sea water at a rate of 574,000 gpm).

   b. The service water flow rate, if the circulating water system is not in use but service water is in use. (The service water system is composed of four reactor building service water pumps, each having a capacity of 8600 gpm and three turbine building service water pumps each having a capacity of 8000 gpm.)

2. Flow rates of effluents from tanks and/or from the RHR heat exchanger service water outlet, and/or yard piping drain sump.

3. Individual concentrations of gamma emitters (other than dissolved or entrained noble gases) and Sr-89, Sr-90, Fe-55, and H-3; and the total concentration of dissolved or entrained noble gases and gross concentration of the alpha emitters in the liquids to be discharged.

4. Maximum allowable concentration of 2×10^{-4} µCi/ml for the total concentration of dissolved or entrained noble gases and maximum permissible concentrations (MPCs) of other gamma emitters, Sr-89, Sr-90, Fe-55, H-3, and alpha emitters in the effluents as specified in 10CFR20, Appendix B, Table II, Column 2 for an unrestricted area.

   NOTE: Precautions should be taken to assure that the circulating water system flow rate or the service water system flow rate used in determining the set point remains constant during the period of discharge. If the circulating or service water flow rate during discharge becomes less than the flow rate that was used in calculating the discharge set point, the discharge must be terminated and a new set point calculated.

Service water via the RHR heat exchanger service water outlet will be released continuously to the environment when the RHR heat exchanger is in operation. Reactor building salt water drain tank contents may be released to the environment either as a batch process or continously. The discharge waste sample tanks, recovery sample tanks, and yard piping drain sump contents will always be released to the environment as batch processes.

TABLE 2.2-1

DOSE FACTORS FOR EXPOSURE TO A SEMI-INFINITE CLOUD OF NOBLE GASES

Radio-nuclide	β-Air[1] (DFb_i)	β-Skin[2] (DFS_i)	γ-Air[1] (DF_i^{γ})	γ-Body[2] (DFB_i)	K_{si}[4] Skin Dose[2]	K_{sim}[5] Skin Dose[2]
Kr-83m	2.88E-04[3]	---	1.93E-05	7.56E- 08	1.5E-05	2.1E-05
Kr-85m	1.97E-03	1.46E-03	1.23E-03	1.17E- 03	2.4E-03	2.8E-03
Kr-85	1.95E-03	1.34E-03	1.72E-05	1.61E- 05	1.4E-03	1.4E-03
Kr-87	1.03E-02	9.73E-03	6.17E-03	5.92E- 03	1.5E-02	1.7E-02
Kr-88	2.93E-03	2.37E-03	1.52E-02	1.47E- 02	1.4E-02	1.9E-02
Kr-89	1.06E-02	1.01E-02	1.73E-02	1.66E- 02	2.4E-02	2.9E-02
Kr-90	7.83E-03	7.29E-03	1.63E-02	1.56E- 02	2.0E-02	2.5E-02
Xe-131m	1.11E-03	4.76E-04	1.56E-04	9.15E- 05	6.0E-04	6.5E-04
Xe-133m	1.48E-03	9.94E-04	3.27E-04	2.51E- 04	1.2E-03	1.4E-03
Xe-133	1.05E-03	3.06E-04	3.53E-04	2.94E- 04	5.8E-04	7.0E-04
Xe-135m	7.39E-04	7.11E-04	3.36E-03	3.12E- 03	3.3E-03	4.4E-03
Xe-135	2.46E-03	1.86E-03	1.92E-03	1.81E- 03	3.4E-03	4.0E-03
Xe-137	1.27E-02	1.22E-02	1.51E-03	1.42E- 03	1.3E-02	1.4E-02

TABLE 2.2-1 (CONT'D)

Radio-nuclide	β-Air[1] (DFb_i)	β-Skin[2] (DFS_i)	γ-Air[1] (DF_i^{γ})	γ-Body[2] (DFB_i)	K_{si}[4] Skin Dose[2]	K_{sim}[5] Skin Dose[2]
Xe-138	4.75E-03	4.13E-03	9.21E-03	8.83E- 03	1.1E-02	1.4E-02
Ar-41	3.28E-03	2.69E-03	9.30E-03	8.84E- 03	9.9E-03	1.3E-02

(1) $\frac{\text{mrad-m}^3}{\text{pCi-yr}}$

(2) $\frac{\text{mrem-m}^3}{\text{pCi-yr}}$

(3) 2.88E-04 = $2.88 * 10^{-4}$

(4) $K_{si} = (0.7 * 1.11 * DF_i^{\gamma}) + DFS_i$

(5) $K_{sim} = (1.11 * DF_i^{\gamma}) + DFS_i$

SECTION 3

DOSE CALCULATION METHODS

This section presents the calculational specifics required to demonstrate compliance with the following Radiological Effluent Technical Specifications (RETS) sections:

3.11.1.2 - Liquid Effluent Dose Calculation

3.11.1.3 - Operation of Liquid Radwaste Treatment System

3.11.2.1 - Gaseous Effluent Dose Rate

3.11.2.2 - Noble Gas Air Dose

3.11.2.3 - Gaseous Effluent Dose From Radioiodines, Tritium, and Radionuclides In Particulate Form

3.11.2.5 - Operation of Ventilation Exhaust Treatment System

Calculation methods are based on the equation and calculational methods described in Regulatory Guide 1.109 "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10CFR50, Appendix I".

Two methods are provided for each analysis. The first method is the method used by the computerized radiation monitoring system. Method 2 is a backup hand calculational method to be used only if the computer is not functional.

The Semi-Annual Effluent Release Report is produced and the land use census is evaluated using NRC codes which implement Regulatory Guide 1.109.

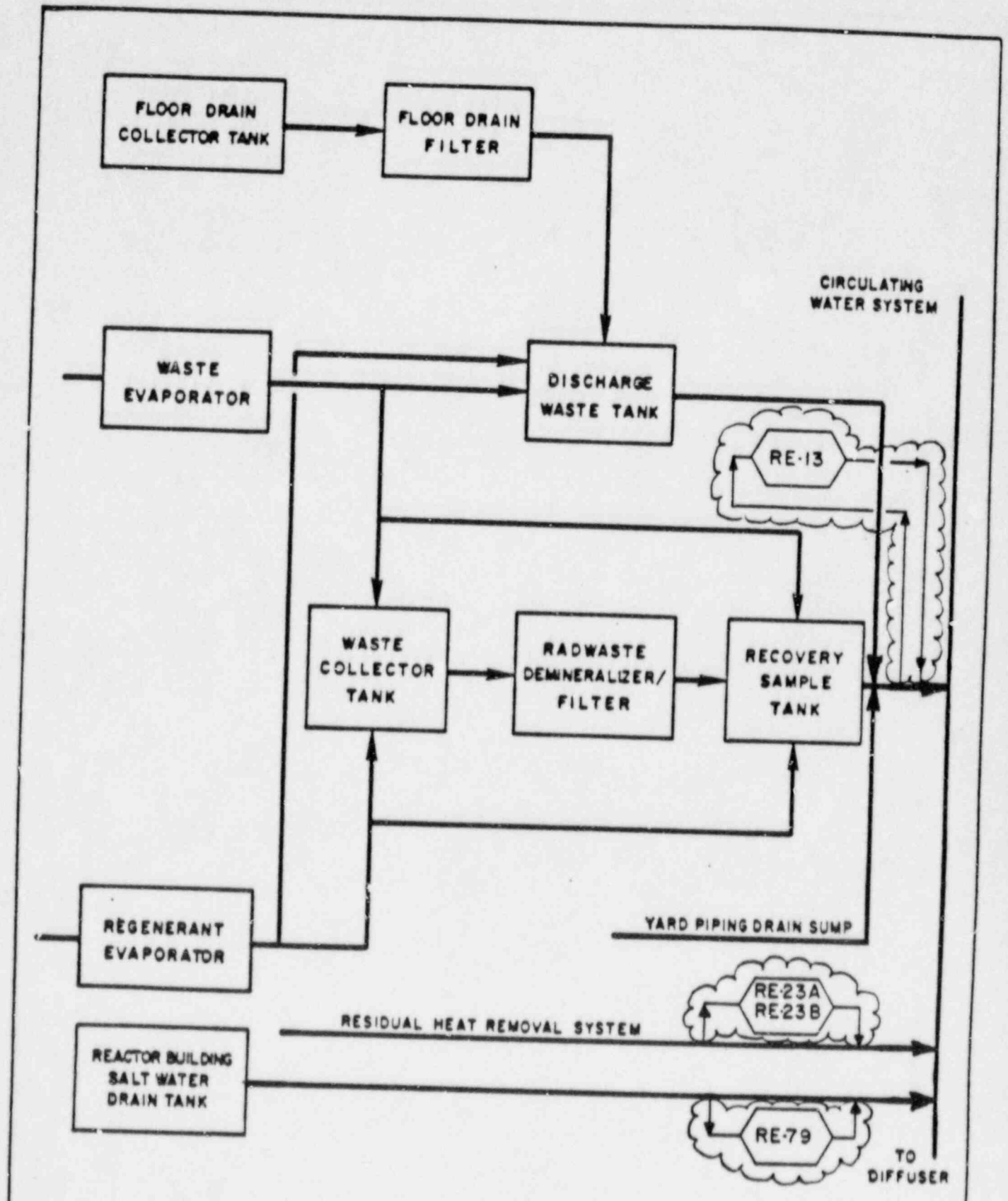

FIGURE 3.1-2
LIQUID RADWASTE SYSTEM MODEL
SHOREHAM NUCLEAR POWER STATION - UNIT 1
OFFSITE DOSE CALCULATION MANUAL

REVISION 10 - AUGUST 1987

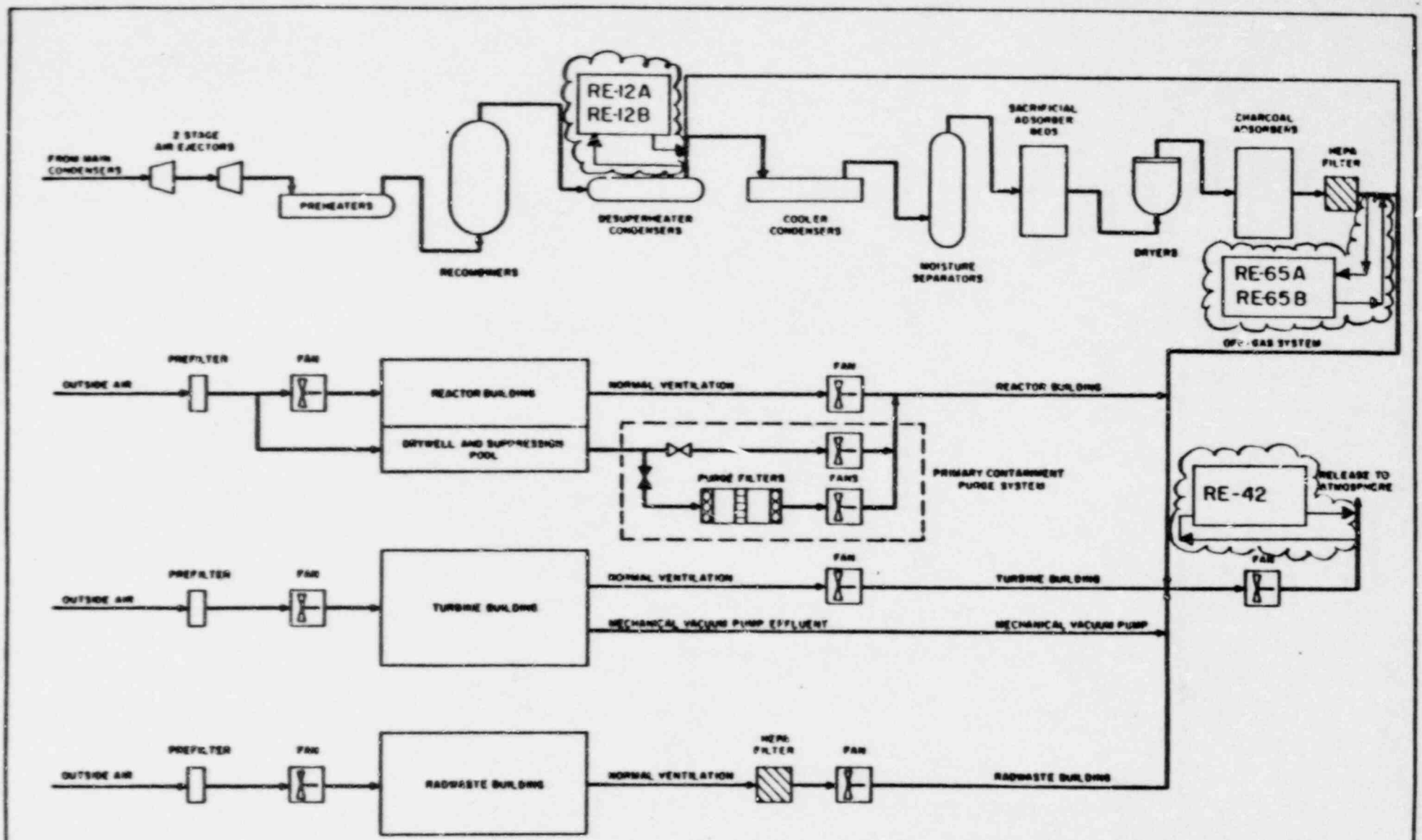

FIGURE 3.3-1
GASEOUS EFFLUENT MODEL
SHOREHAM NUCLEAR POWER STATION-UNIT 1
OFFSITE DOSE CALCULATION MANUAL

REVISION 10 - AUGUST 1987

If main condenser air removal is performed by the mechanical vacuum pump and the sampling is performed at the Station Vent, the following equation should be used:

$$D_{sj} = 10^6 * V_1 * R_a * \chi/Q_2 * \sum_i (P_{ij} * C_{i1}) \qquad \text{(mrem/yr)}$$

where:

D_{sj} = total dose rate to organ, j, mrem/yr.

P_{ij} = the inhalation dose conversion factor, for radionuclides other than noble gases, i, and organ, j, in mrem per pCi from Table 3.5-3.

The dose factor P_{ij} is based on the critical individual organ for the Child group, which is most restrictive. Inhalation dose factors for other age groups are given in Tables 3.5-1, 3.5-2, and 3.5-4.

R_a = inhalation rate (m^3/yr), from Table 3.5-5.

C_{i1} = the station ventilation exhaust duct release concentration of radionuclide, i,(μCi/cc) (from the isotopic analyses performed on the filter paper and charcoal cartridge taken from the station ventilation exhaust monitor),

C_{i2} = the air removal pump ventilation exhaust duct release concentration of radionuclide, i, (μCi/cc) (from the isotopic analyses performed on the iodine and particulate filters taken from the air removal pump discharge monitor),

C_{i3} = the containment drywell purge ventilation exhaust concentration of radionuclide, i, (μCi/cc) obtained from the iodione and particulate filters during a filtered release or from the containment drywell atmosphere monitor with the purge lines bypassing the primary containment purge filter (The concentration is obtained from the isotopic analyses performed on the iodine and particulate filters.),

V_1 = 1.70E+08 cc/sec (3.60E+05 cfm), station ventilation exhaust duct ventilation exhaust flow rate,

V_2 = 5.70E+05 cc/sec (1200 cfm), air removal pump exhaust duct ventilation exhaust flow rate,

V_3 = 5.70E+05 cc/sec (1200 cfm), containment drywell purge ventilation exhaust flow rate,

χ/Q_1 = annual average χ/Q at 2253 meters ESE due to releases via the station ventilation exhaust point (1.74E-07 sec/m^3),

χ/Q_2 = short term χ/Q at 2253 meters ESE due to condenser air removal pump release via the station ventilation exhaust point (4.65E-07 sec/m^3),

χ/Q_3 = short term χ/Q at 2253 meters ESE due to containment drywell purge via the station ventilation exhaust point (4.65E-07 sec/m^3).

3.5.1.2 Total Body Dose

$$D_{wb} = D_{wb}^{cloud} + D_{wb}^{inh} + D_{wb}^{ground}$$

where:

$$D_{wb}^{cloud} = (\chi/Q)_{\gamma}^{sa} F' 2.22 \times 10^{4} \sum_{nobles} f_i DFB_i$$

$$D_{wb}^{inh} = (\chi/Q)^{sa} F' 3.17 \times 10^{4} R_{ad} \sum_{part+I} f_i DFA_{ij,ad}$$

$$D_{wb}^{ground} = (D/Q) F' 7 \times 10^{11} \sum_{part+I} f_i DFG_{il} [1 - e^{-t_b \lambda_i}]/\lambda_i$$

D_{wb}^{cloud} = total body dose due to direct radiation from the radioactive cloud [mrem/hr] (Ref.: Reg. Guide 1.109 Eq. B-8; also similar to Eq. B-6 if one makes use of the gamma (χ/Q) and the DFB_i instead of Df_i^{γ} dose conversion factor)

D_{wb}^{inh} = total body dose (j = total body) due to inhalation [mrem/hr] (Ref.: Reg. Guide 1.109, Eqs. C-3 and C-4, for an adult)

D_{wb}^{ground} = total body dose due to particulate and iodine radioactivity depositing on the ground [mrem/hr] (Ref.: Reg. Guide 1.109, Eqs. C-1 and C-2 with the product 8760 [hr/yr] $(1/\lambda_i)$ [yr] replaced by $[1/\lambda_i)$ [hr] and parameter $\delta_i(r,\theta)$ represented by the (D/Q))

DFB_i = gamma dose to body conversion factor $[(mrem/yr)/(pCi/m^3)]$ (from Table B-1 of the Reg. Guide)

$DFA_{ij,ad}$ = dose conversion factor for nuclide i to organ j of an adult individual [mrem/pCi inhaled] (from Table E-7 of Reg. Guide 1.109)

DFG_{il} = total body conversion factor for standing on contaminated ground $[(mrem/hr)/(pCi/m^2)]$ (from Table E-6 of Reg. Guide 1.109)

$(\chi/Q)^{sa}$ = concentration dispersion factor (sector-average model) for the period of release (site boundary only) (sec/m^3)

U_a^L = ingestion rate of leafy vegetables by individual in age group a (from Table E-5 of the Guide, maximum individual) [kg/yr]

B_{iv} = concentration factor for uptake of radionuclide i from soil by edible parts of crops [(pCi/kg)(wet weight)/ (pCi/kg) (dry soil)] (Ref.: Reg. Guide 1.109, Table E-1 and included on Table 3.5-6)

DFI_{kja} = dose conversion factor for nuclide i to organ j of individual in age group a due to ingestion of contaminated food [mrem/pCi ingested] (from Tables E-11 through E-14 of the Guide)

$DFI_{C14,ja}$ = DFI_{ija} for Carbon-14

$DFI_{H3,ja}$ = DFI_{ija} for tritium

F_{C14} = f_i for Carbon-14 (see Section 3.5.1.1 above)

f_{H3} = f_i for tritium

H = absolute humidity of the atmosphere at the location of interest [g/m^3] (See Table 3.5-7)

$(X/Q)^{sa}$ = concentration dispersion factor (Sector - Average model) for the period of release (nearest garden and nearest residence) [sec/m^3]

(D/Q) = particulate deposition rate (nearest garden and nearest residence) [$1/m^2$]

3.5.1.6 Infant Thyroid Dose due to Ingestion of Goat Milk and Inhalation

Infant is used here as a default age group but in locations where there is no infant, such as 6B2 (see Table 5-5), child parameters will be substituted as appropriate.

$$D_{thy,inf} = D^{inh}_{thy,inf} + D^{milk}_{thy,inf}$$

where:

$$D^{milk}_{thy,inf} = \left(D^{milk}_{thy,inf}\right)_{part} + \left(D^{milk}_{thy,inf}\right)_{iodines} + \left(D^{milk}_{thy,inf}\right)_{C14} + \left(D^{milk}_{thy,inf}\right)_{H3}$$

$$D^{inh}_{thy,inf} = (x/Q)^{sa}\, F'\, 3.17 \times 10^4\, R_{inf} \sum_{part+I} f_i\, DFA_{i,thy,inf}$$

$$\left(D^{milk}_{thy,inf}\right)_{part} = (D/Q)\ F'\ 1.1 \times 10^{8} \sum_{part} U^{m}_{inf}\ f_i\ DFI_{i,thy,inf}$$

$$\times\ 6\ F_{mi}\ \left\{\frac{0.2}{0.7(\lambda_i + 0.0021)} + \frac{B_{iv}}{240\ \lambda_i}\right\}\ e^{-24\lambda_i}$$

$$\left(D^{milk}_{thy,inf}\right)_{iodines} = (D/Q)\ F'\ 5.5 \times 10^{7} \sum_{iodines} U^{m}_{inf}\ f_i\ DFI_{i,thy,inf}$$

$$\times\ 6\ F_{mi}\ \left\{\frac{1.0}{0.7\ (\lambda_i + 0.0021)} + \frac{B_{iv}}{240\ \lambda_i}\right\}\ e^{-24\lambda_i}$$

$$\left(D^{milk}_{thy,inf}\right)_{C14} = (\chi/Q)^{sa}\ F'\ 2.2 \times 10^{7}\ U^{m}_{inf}\ f_{C14}\ DFI_{C14,thy,inf}$$

$$\times\ 6\ F_{m,C14} \exp(-24\ \lambda_{C14})$$

$$\left(D^{milk}_{thy,inf}\right)_{H3} = (\chi/Q)^{sa}\ F'\ \left(\frac{1.2 \times 10^{7}}{H}\right)\ U^{m}_{inf}\ f_{H3}\ DFI_{H3,thy,inf}$$

$$\times\ 6\ F_{m,H3}\ \exp(-24\lambda_{H3})$$

$D^{inh}_{thy,inf}$ = infant thyroid dose due to inhalation of airborne radioactivity [mrem/hr] (Ref.: Reg. Guide 1.109, Eqs. C-3 and C-4)

$\left(D^{milk}_{thy,inf}\right)_{part}$ = infant thryoid dose due to ingestion of milk contaminated with radioactive particulates [mrem/hr] (Reg. Guide Eqs. C-5, C-6, C-10, C-11 and C-13) for milk, with the following:

- r (fraction of deposited activity retained on crops) = 0.2 (see pg 1.109-68 of the Guide)
- t_e (time period that crops are exposed to contamination during growing season) = ∞ [hrs]
- t_b (time period over which accumulation is evaluated) = ∞ [hrs]
- t_h (time delay for ingestion of forage by animals) = 0 [hrs] (see pg 1.109-69 of Reg. Guide)
- Y_v (agricultural productivity, grass-animal- milk-man pathway) = 0.7 [kg/m^2] (Reg Guide 1.109, Rev. 0)
- P (soil effective surface density) = 240 [kg/m^2]

- $\lambda_{Ei} = \lambda i + 0.0021$ [hr^{-1}] (see pgs .109-4 and 1.109-69)
- $\delta_i (r, 0) = (D/Q)$ [m^{-2}]
- t_f (average transport time of activity from the feed into the milk and to the receptor) = 24 [hrs]
- f_p (fraction of the year that animals graze on pasture) = 0.5863 (based on survey data)
- f_s (fraction of daily feed that is pasture grass when the animal grazes on pasture) = 0.5 (based on survey data)

$(D^{milk}_{thy,inf})_{iodines}$ = infant thyroid dose due to ingestion of milk contaminated with radio-iodines [mrem/hr] (Ref.: Reg. Guide Eqs. C-5, C-7, C-10, C-11, and C-13 for milk; similar to the infant thyroid dose due to the ingestion of particulates given above, with the exception of a different multiplying factor and r = 1.0)

$(D^{milk}_{thy,inf})_{C14}$ = infant thyroid dose due to ingestion of milk contaminated with C14 [mrem/hr] (Ref.: Reg. Guide 1.109, Eqs. C-8, C-10, C-11 and C-13 for milk, with p (the ratio of the total annual release time to the total annual time during which photosynthesis occurs) = 1, and t_f, f_p, and f_s as given above for the particulates)

$(D^{milk}_{thy,inf})_{H3}$ = infant thyroid dose due to ingestion of milk contaminated with tritium [mrem/hr] (Ref.: Reg. Guide 1.109, Eqs. C-9, C-10, C-11, and C-13 for milk, with t_f, f_p, and f_s as given above for the particulates)

R_{inf} = infant breathing rate [m^3/yr] (from Table E-5 of the Guide, for maximum individual)

$DFA_{i,thy,inf}$ = dose conversion factor for nuclide i to the infant thyroid due to inhalation [mrem/pCi inhaled] (from Table E-10 of the Guide)

$DFI_{i,thy,inf}$ = dose conversion factor for nuclide i to the infant thyroid due to ingestion [mrem/pCi ingested] (from Table E-14 of the Guide)

$DFI_{C14,thy,inf}$ = $DFI_{i,thy,inf}$ for Carbon-14

$DFI_{H3,thy,inf}$ = $DFI_{i,thy,inf}$ for tritium

Note: For short term releases such as from condenser air removal pump or containment drywell purge F_{ij} for C-14 must be adjusted (see note in Tables 3.5-15, 3.5-16 and 3.5-17).

R_a = inhalation rate (m^3/yr) from Table 3.5-5,

P_{oij} = the dose conversion factor for radionuclides, other than noble gases, i, and organ j, for the leafy vegetables, stored vegetables, and contaminated ground pathways in m^2 (mrem/yr per Ci/sec) respectively, from Table 3.5-9 and goat milk from Table 3.5-11.

The dose factors P_{ij}, P_{oij} are based on the critical individual organ for the child group, since this group is most restrictive.

t_1 = 7.88E+06 sec for quarterly dose calculation
= 3.15E+07 sec for yearly dose calculation,

t_2 = release period (sec) for condenser air removal pump,

t_3 = release period (sec) for containment drywell purge exhaust,

C_{i1} = the station ventilation exhaust duct release concentration of radionuclide, i, (μCi/cc) (from the isotopic analyses performed on the iodine and filter cartridge taken from the station ventilation exhaust monitor),

C_{i2} = the air removal pump ventilation exhaust duct release concentration of radionuclide, i, (μCi/cc) (from the isotopic analyses performed on the iodine and particulate filters taken from the air removal pump discharge monitor),

C_{i3} = the containment drywell purge ventilation exhaust concentration of radionuclide, i, (μCi/cc) obtained from the iodine and particulate filters during a filtered release or from the containment drywell atmosphere monitor with the purge lines bypassing the primary containment purge filter (The concentration is obtained from the isotopic analyses performed on the iodine and particulate filters.),

V_1 = 1.73E+08 cc/sec (3.66E+05 cfm), station ventilation exhaust duct ventilation exhaust flow rate,

V_2 = 5.70E+05 cc/sec (1200 cfm), air removal pump exhaust duct ventilation exhaust flow rate,

V_3 = 5.70E+05 cc/sec (1200 cfm), containment drywell purge ventilation exhaust flow rate,

χ/Q_1 = annual average χ/Q at 2253 meters ESE due to releases via the station ventilation exhaust point (1.74E-07 sec/m^3),

χ/Q_2 = short term χ/Q at 2253 meters ESE due to condenser air removal pump release via the station ventilation exhaust point (4.75E-07 sec/m^3),

χ/Q_3 = short term χ/Q at 2253 meters ESE due to containment drywell purge via the station ventilation exhaust point (4.65E-07 sec/m^3),

D/Q_1 = annual average D/Q deposition factor at 2253 meters ESE due to releases via the station ventilation exhaust point (3.86E-09 m^{-2}),

D/Q_2 = short term D/Q deposition factor at 2253 meters ESE due to condenser air removal pump releases via the station ventilation exhaust point (1.03E-08 m^{-2}),

D/Q_3 = short term D/Q deposition factor at 2253 meters ESE due to containment drywell purge exhaust via the station ventilation exhaust point (1.03E-08 m^{-2}),

3.17E-08 = inverse of 3.15E+07 sec/yr, and

NOTE:

If the land use census (see Table 3.5-8) changes, the critical location, i.e., the location where an individual would be exposed to the highest dose, must be reevaluated using Equation 3.5.2-1 for each of the following locations:

1. nearest residence,
2. nearest vegetable garden, and
3. nearest milk cow or goat.

P_{oij} used in Equation 3.5.2-1 will include the values in Tables 3.5-10 through 3.5-14, if those pathways exist.

At each location, the following pathways must be considered and dose (dose rates) reevaluated if any actual pathway exists:

1. inhalation,
2. leafy vegetables (fresh),
3. stored vegetables,
4. goat's or cow's milk (if both exist choose the one resulting in the higher dose), and
5. deposition on ground.

Since a person will always be present, pathways 1 and 5 must always be evaluated.

Once the location of the critical individual is determined and found to be other than the one at 2253 meters ESE, the values of χ/Q and D/Q at the updated critical location must be used.

SNPS-1 ODCM
TABLE 3.5-1

INHALATION DOSE FACTORS FOR ADULTS
(mrem per pCi inhaled)

Radio-nuclide	Bone	Liver	T. Body	Thyroid	Kidney	Lung	GI-LLI
H-3	No Data	1.58E-07	1.58E-07	1.58E-07	1.58E-07	1.58E-07	1.58E-07
C-14	2.27E-06	4.26E-07	4.26E-07	4.26E-07	4.26E-07	4.26E-07	4.26E-07
Na-24	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06
P-32	1.65E-04	9.64E-06	6.26E-06	No Data	No Data	No Data	1.08E-05
Cr-51	No Data	No Data	1.25E-08	7.44E-09	2.85E-09	1.80E-06	4.15E-07
Mn-54	No Data	4.95E-06	7.87E-07	No Data	1.23E-06	1.75E-04	9.67E-06
Mn-56	No Data	1.55E-10	2.29E-11	No Data	1.63E-10	1.18E-06	2.53E-06
Fe-55	3.07E-06	2.12E-06	4.93E-07	No Data	No Data	9.01E-06	7.54E-07
Fe-59	1.47E-06	3.47E-06	1.32E-06	No Data	No Data	1.27E-04	2.35E-05
Co-58	No Data	1.98E-07	2.59E-07	No Data	No Data	1.16E-04	1.33E-05
Co-60	No Data	1.44E-06	1.85E-06	No Data	No Data	7.46E-04	3.56E-05
Ni-63	5.40E-05	3.03E-06	1.81E-06	No Data	No Data	2.23E-05	1.67E-06
Ni-65	1.92E-10	2.62E-11	1.14E-11	No Data	No Data	7.09E-07	1.54E-06
Cu-64	No Data	1.83E-10	7.69E-11	No Data	5.78E-10	8.48E-07	6.12E-06
Zn-65	4.05E-06	1.29E-05	5.82E-06	No Data	8.62E-06	1.08E-04	6.68E-06
Zn-69	4.23E-12	8.14E-12	5.65E-13	No Data	5.27E-12	1.15E-07	2.04E-09
Br-83	No Data	No Data	3.01E-08	No Data	No Data	No Data	2.90E-08
Br-84	No Data	No Data	3.91E-08	No Data	No Data	No Data	2.95E-13
Br-85	No Data	No Data	1.60E-09	No Data	No Data	No Data	1.00E-24
Rb-86	No Data	1.69E-05	7.37E-06	No Data	No Data	No Data	2.08E-06
Rb-88	No Data	4.84E-08	2.41E-08	No Data	No Data	No Data	4.18E-19
Rb-89	No Data	3.20E-08	2.12E-08	No Data	No Data	No Data	1.16E-21
Sr-89	3.80E-05	No Data	1.09E-06	No Data	No Data	1.75E-04	4.37E-05
Sr-90	1.24E-02	No Data	7.62E-04	No Data	No Data	1.20E-03	9.02E-05
Sr-91	7.74E-09	No Data	3.13E-10	No Data	No Data	4.56E-06	2.39E-05
Sr-92	8.43E-10	No Data	3.64E-11	No Data	No Data	2.06E-06	5.38E-06
Y-90	2.61E-07	No Data	7.01E-09	No Data	No Data	2.12E-05	6.32E-05
Y-91m	3.26E-11	No Data	1.27E-12	No Data	No Data	2.40E-07	1.66E-10
Y-91	5.78E-05	No Data	1.55E-06	No Data	No Data	2.13E-04	4.81E-05
Y-92	1.29E-09	No Data	3.77E-11	No Data	No Data	1.96E-06	9.19E-06
Y-93	1.18E-05	No Data	3.26E-10	No Data	No Data	6.06E-06	5.27E-05

TABLE 3.5-8

LOCATION OF NEAREST RESIDENCE, VEGETABLE GARDEN, AND SITE BOUNDARY BY SECTOR*

Sector	Nearest Residence Distance* (M)	Nearest Residence Elevation** (M)	Nearest Residence Distance* (M)	Nearest Residence Elevation** (M)	Nearest Residence Distance* (M)	Nearest Residence Elevation** (M)
N	-	-	-	-	436	6.1
NNE	381	6.1	-	-	365	6.1
NE	518	6.1	-	-	32	6.1
ENE	884	6.1	1,932	30	311	6.1
E	1,128	6.1	3,867	67	346	6.1
ESE	914	6.1	1,932	25	457	6.1
SE	1,097	26	2,091	50	1,105	26
SSE	914	30	1,771	40	876	30
S	610	25	1,771	37	610	25
SSW	518	28	7,080	58	457	22
SW	549	17	4,073	46	533	17
WSW	1,585	33	2,252	42	457	15
W	1,570	31	2,252	35	360	6.1
WNW	610	6.1	-	-	354	6.1
NW	-	-	-	-	419	6.1
NNW	-	-	-	-	436	6.1

NOTES:

* Distances are given from the reactor center lines out to 8,046 meters.

There are no milk cows or meat animals within the 8,046 m radius of the site. The nearest milk cow is located 8,690 m east of the site. The nearest milk goats are located 2,253 m and 2,478 m east-southeast and 3,846 m southwest of the site. Corresponding elevations above mean sea level are 32 m, 49 m and 46 m, respectively.

** Elevations (meters) given are above mean sea level.

TABLE 4-1

CRITICAL RECEPTOR LOCATIONS FOR GASEOUS EFFLUENT CALCULATIONS

Technical Specification Section	3.11.2.1	3.11.2.2	3.11.2.3	3.11.2.5
Sections in this Manual Limiting Criteria	3.3 Instantaneous Dose Rate to Whole Body and Skin due to Noble Gas and Dose to any organ due to radionuclides other than Noble Gas	3.4 Quarterly and Annual Air Doses due to Gamma and Beta radiation	3.5 Quarterly and Annual Dose due to radionuclides other than Noble Gas	3.6 Dose to any organ due to radionuclides other than Noble Gas for 31 day period
Distance and Direction of Receptor from the Plant	1) Noble Gas: 366 meters, NNE 2) Organ: 2253 meters, ESE	457 meters, ESE	2253 meters, ESE	2253 meters, ESE
Description of Location	Location of highest Dose Rate	Location of highest Dose	Location of highest Dose	Location of highest Dose
Long Term Atmospheric Dispersion Factor for Station Ventilation Exhaust X/Q_1	1) 6.6E-07 sec/m^3 (1) 2) 1.74E-07 sec/m^3 (3)	8.44E-07 sec/m^3 (2)	1.74E-07 sec/m^3 (3)	1.74E-07 sec/m^3 (3)
Short Term Atmospheric Dispersion Factor for Air Removal Pump X/Q_2	1) 3.6E-06 sec/m^3 (1) 2) 4.65E-07 sec/m^3 (3)	1.83E-06 sec/m^3 (2)	4.65E-07 sec/m^3 (3)	4.65E-07 sec/m^3 (3)
Short Term Atmospheric Dispersion Factor for Containment Drywell Purge X/Q_3	1) 3.6E-06 sec/m^3 (1) 2) 4.65E-07 sec/m^3 (3)	1.83E-06 sec/m^3 (2)	4.65E-07 sec/m^3 (3)	4.65E-07 sec/m^3 (3)

TABLE 4-1 (CONT'D)

Long Term Relative Deposition Factor for Station Ventilation Exhaust D/Q_1	1) NA 2) 3.86E-09 m^{-2}(3)	NA	3.86E-09 m^{-2}(3)	3.86E-09m^{-2}(3)
Short Term Relative Deposition Factor for Air Removal Pump D/Q_2	1) NA 2) 1.03E-08 m^{-2}(3)	NA	1.03E-08 m^{-2}(3)	1.03E-08 m^{-2}(3)
Short Term Relative Deposition Factor for Containment Drywell Purge D/Q_3	1) NA 2) 1.03E-08 m^{-2}(3)	NA	1.03E-08 m^{-2}(3)	1.03E-08 m^{-2}(3)

(1) Long Island Lighting Company, Shoreham Nuclear Station - Unit One, FINAL ENVIRONMENTAL STATEMENT, NUREG 0285, October 1977, Docket 50-322.

(2) "Compliance with 10CFR50 Appendix I", Shoreham Nuclear Power Station - Unit One, Long Island Lighting Company, Docket 50-322, SNAC-119, July 30, 1976.

(3) Internal Calculation using methodology outlined in NRC Regulatory Guide 1.111, Revision 1, July 1977.

SECTION 5

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM SAMPLING LOCATIONS

The purpose of this section is to identify those sampling locations from which the radiological environmental monitoring samples shall be collected pursuant to Technical Specification 3/4.12.

Table 5-1, based on NUREG 0473, defines an acceptable Radiological Environmental Monitoring Program by providing guidelines for the sampling locations according to pathways. It specifies the number, location and frequency of sample collection and the required analyses.

The Shoreham-specific implementation of the program is given in Tables 5-2, 5-3, 5-4 and 5-5, corresponding to the four pathways of direct, airborne, waterborne and ingestion doses. The corresponding onsite and offsite sampling locations are shown in Figures 5-1 and 5-2, respectively.

TABLE 5-1

RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM*
(TYPICAL SAMPLING AND COLLECTION FREQUENCY)
REFER TO TECHNICAL SPECIFICATIONS FOR CURRENT PROGRAM

EXPOSURE PATHWAY AND/OR SAMPLE	NUMBER OF REPRESENTATIVE SAMPLES AND SAMPLE LOCATION[a]	SAMPLING AND COLLECTION FREQUENCY	TYPE AND FREQUENCY OF ANALYSIS
1. DIRECT RADIATION[b]	36 routine monitoring stations, DR1-DR36, either with two or more dosimeters or with one instrument for measuring and recording dose rate continuously, placed as follows: a. An inner ring of stations, one in each meteorological sector in the general area of the SITE BOUNDARY, DR1-DR16; b. An outer ring of stations, one in each meteorological sector in the 6- to 8-km range from the site, DR17-DR25; c. The balance of the stations, DR26-DR36, to be placed in special interest areas such as population centers, nearby residences, schools, and in 1 or 2 areas to serve as control stations.	Quarterly.	Gamma dose quarterly.

*The number, media, frequency, and location of samples may vary from site to site. This table presents an acceptable minimum program for a site at which each entry is applicable. Local site characteristics must be examined to determine if pathways not covered by this table may significantly contribute to an individual's dose and should be included in the sampling program.

TABLE 5-2

RADIOLOGICAL ENVIRONMENTAL
MONITORING PROGRAM (REMP)
DIRECT RADIATION MONITORING STATIONS

Functional Designation (NUREG-0473)	Location Code (Shoreham REMP)	Location Description
DR1	1S1	Beach east of intake, 0 3 mi. N
DR2	2A2	West end of Creek Road, 0.2 mi. NNE
DR3	3S1	Site Boundary, 0.1 mi. NE
DR4	4S1	Site Boundary, 0.1 mi. ENE
DR5	5S2	Site Boundary, 0.1 mi. E
DR6	6S2	Site Boundary, 0.1 mi. ESE
DR7	7A2	North Country Road, 0.7 mi. SE
DR8	8A3	North Country Road, 0.6 mi. SSE
DR9	9S1	Service Road SNPS, 0.2 mi. S
DR10	10A1	North Country Road, 0.3 mi. SSW
DR11	11A1	Site Boundary, 0.3 mi. SW
DR12	12A1	Meteorological Tower, 0.9 mi, WSW
DR13	13S3	Site Boundary, 0.2 mi. W
DR14	14S2	St. Joseph's Villa, 0.4 mi. WNW
DR15	15S1	Beach west of intake, 0.3 mi. NW
DR16	16S2	Site Boundary 0.3 mi. NNW
DR17	5D3	Wildwood State Park, 3.1 mi. E
DR18	6E1	LILCO ROW, 4.8 mi. ESE
DR19	7E1	Calverton, 4.9 mi. SE
DR20	8E1	Calverton, 4.4 mi. SSE
DR21	9E1	Brookhaven National Laboratory, 5.0 mi. S
DR22	10E1	Ridge Substation, 4.0 mi. SSW
DR23	11E1	LILCO ROW. 4.7 mi. SW
DR24	12D1	North Shore Beach Substation, 3.7 mi. WSW
DR25	13E1	Sound Way Drive, 4.5 mi. W
DR26	5D1	Wildwood State Park, 3.4 mi. E
DR27	5F3	Dairy Farm, 7.8 mi. E
DR28	7B1	Overhill Road, 1.4 mi. SE
DR29	12G2	Flowerfield Substation, 15.4 mi. WSW
DR30	12G1	Central Islip Substation, 19.9 mi. WSW
DR31	11G1	MacArthur Substation, 16.6 mi. SW
DR32	8G1	Wading River Road, 10.1 mi. SSE
DR33	6G1	Hampton Bays Substation, 19.0 mi. ESE
DR34	6A1	Sound Road, 0.7 mi. ESE
DR35	2A3	Nearest Residence, 0.3 mi. NNE
DR36	9S2	East Gate SNPS, 0.3 mi. S

TABLE 5-3

RADIOLOGICAL ENVIRONMENTAL
MONITORING PROGRAM (REMP)
(PARTICULATES AND RADIOIODINE

Functional Designation (NUREG-0473)	Location Code (Shoreham REMP)	Location Description
A1	6S2	Site Boundary, 0.1 mi. ESE
A2	2A2	West end of Creek Road, 0.2 mi. NNE
A3	3S1	Site Boundary, 0.1 mi. NE
A4	7B1	Overhill Road, 1.4 mi. SE
A5	11G1	MacArthur Substation, 16.6 mi. SW

TABLE 5-4

RADIOLOGICAL ENVIRONMENTAL
MONITORING PROGRAM (REMP)
WATERBORNE MONITORING STATIONS

Functional Designation (NUREG-0473)	Location Code (Shoreham REMP)	Location Description
WA1	13G2	Surface, background area, 13.2 mi. W
WA2	14C1	Surface, outfall area, 2.1 mi. WNW
WA3	3C1	Surface, outfall area, 2.9 mi. NE
Wb1	2S1	Potable Water, well on site, 0.1 mi. NNE
Wb2	13S2	Potable Water, well on site, 0.2 mi. W
Wd1	2A4	Sediment, beach, 0.4 mi. NNE

TABLE 5-5

RADIOLOGICAL ENVIRONMENTAL
MONITORING PROGRAM (REMP)
INGESTION MONITORING STATIONS

Functional Designation (NUREG-0473)	Location Code (Shoreham REMP)	Location Description
Ia1*	6B1	Goat Farm, 1.55 mi. ESE
	6B2	Goat Farm, 1.40 mi. ESE
Ia2*	10F1	Goat Farm, 9.2 mi. SSW
	8G2	Dairy (Cow), 10.8 mi. SSE
Ib1	3C1	Fish and Invertebrates, outfall area, 2.9 mi. NE
Ib2	14C1	Fish and Invertebrates, outfall area 2.1 mi. WNW
Ib3	13G2	Fish and Invertebrates, background, 13.2 mi. W
Ic1	8B1	Local Farm, 1.2 mi. SSE
Ic2	5C2	Local Farm, 2.8 mi. E
Ic3	12H1	Background Farm, 26 mi. WSW

*Samples will be obtained from one of the locations listed as available. Priority will be given to the first of the two locations listed. If samples are unavailable from that location, substitution will be made from the second location listed.

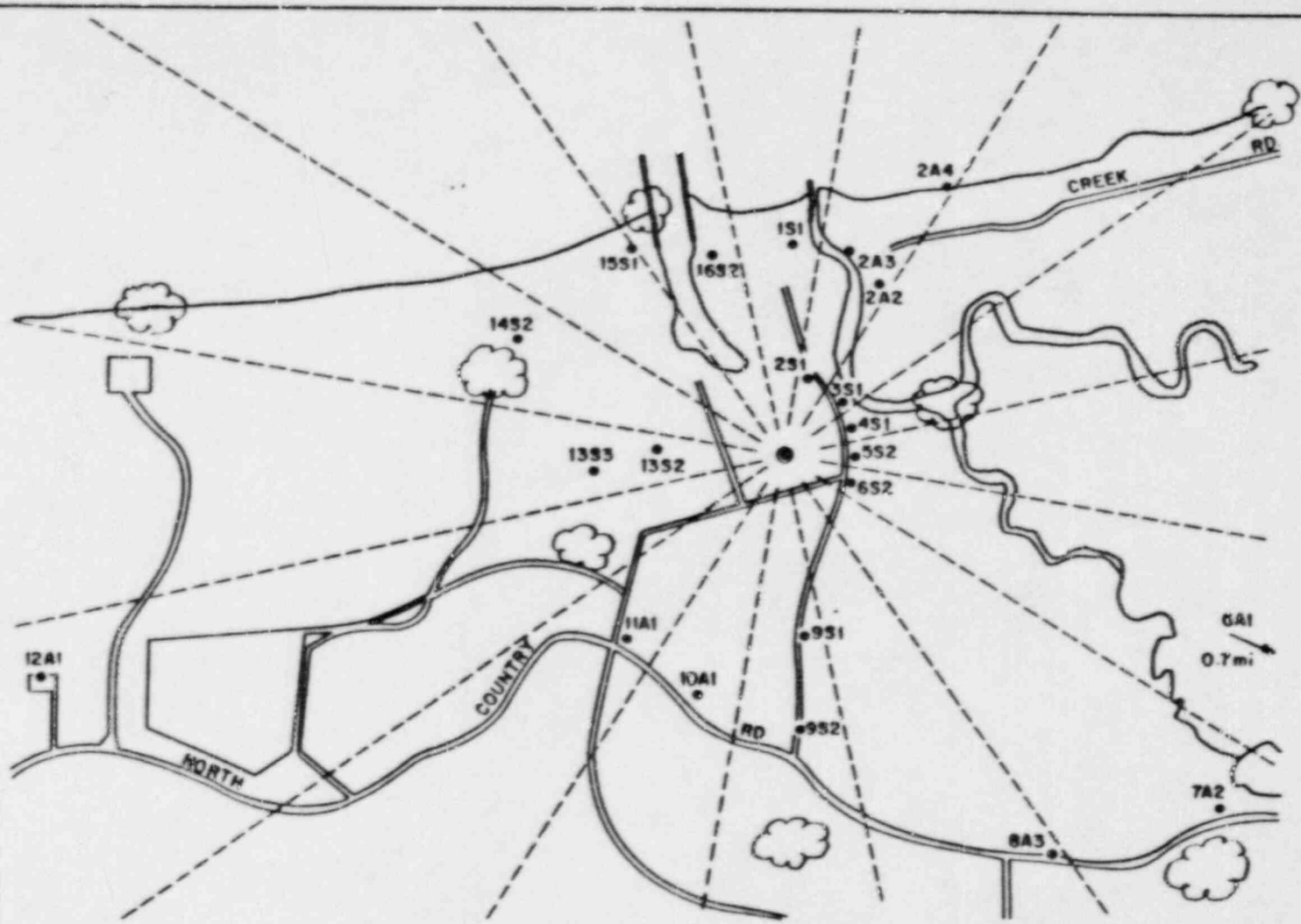

FIGURE 5-1
ONSITE SAMPLING LOCATIONS
RADIOLOGICAL ENVIRONMENTAL
MONITORING PROGRAM
SHOREHAM NUCLEAR POWER STATION - UNIT 1
OFFSITE DOSE CALCULATION MANUAL

REVISION 10 - AUGUST 1987

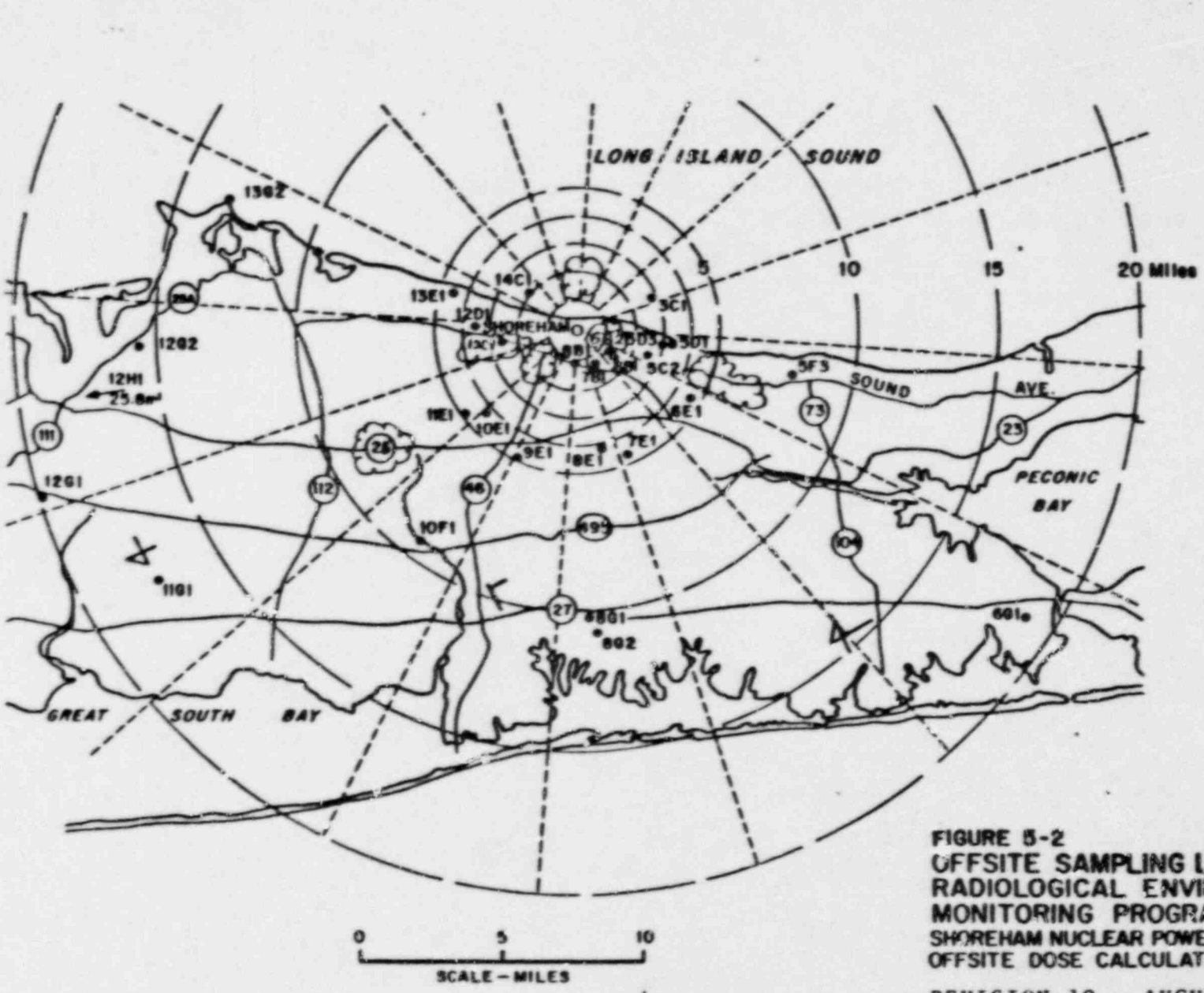

FIGURE 5-2
OFFSITE SAMPLING LOCATIONS
RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM
SHOREHAM NUCLEAR POWER STATION-UNIT I
OFFSITE DOSE CALCULATION MANUAL

REVISION 10 - AUGUST 1987

LILCO

LONG ISLAND LIGHTING COMPANY
SHOREHAM NUCLEAR POWER STATION
P.O. BOX 618, NORTH COUNTRY ROAD • WADING RIVER, N.Y. 11792

JOHN D. LEONARD, JR.
VICE PRESIDENT - NUCLEAR OPERATIONS

FEB 26 1988

SNRC-1429

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Semiannual Radioactive Effluent Release Report
Shoreham Nuclear Power Station
Docket No. 50-322

Reference: Facility Operating License NPF-36 (Shoreham)

Gentlemen:

Enclosed is a copy of our Semiannual Radioactive Effluent Release Report covering the third and fourth quarters of 1987 which was prepared according to Technical Specification 6.9.1.7. This report includes information for each type of solid waste shipped offsite and changes made to the Process Control Program and the Offsite Dose Calculation Manual during the period.

If you require additional information, please contact this office.

Very truly yours,

John D. Leonard, Jr.
Vice President - Nuclear Operations

SM:ck

Enclosure

cc: R. Lo/S. Brown
W. Russell
F. Crescenzo

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