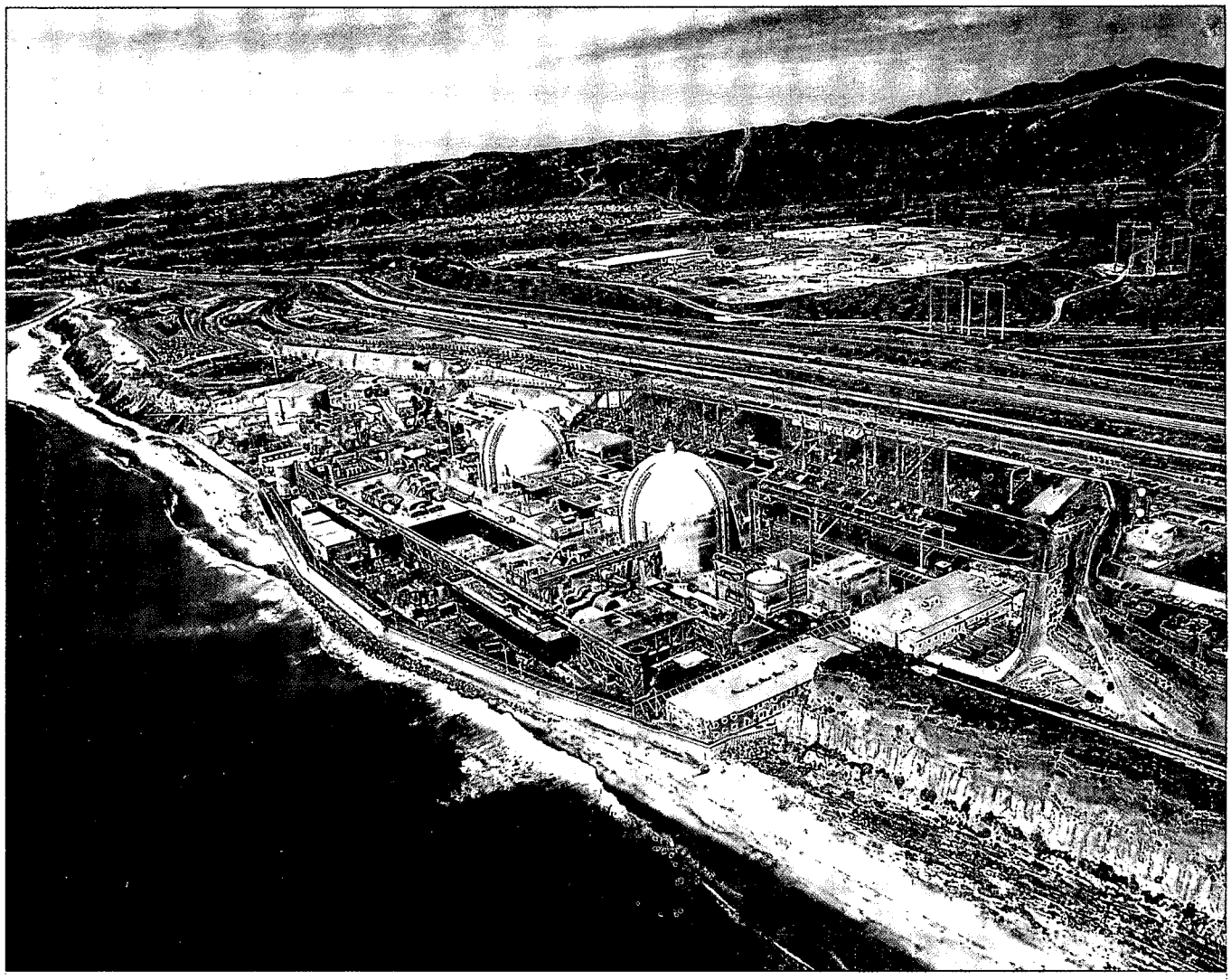

SAN ONOFRE

NUCLEAR GENERATING STATION

SEMIANNUAL EFFLUENT REPORT

JULY-DECEMBER 1990

Southern California Edison Company

SAN ONOFRE NUCLEAR GENERATING STATION
P.O. BOX 128
SAN CLEMENTE, CALIFORNIA 92672

PREFACE

San Onofre Nuclear Generating Station is located next to San Onofre State Beach, adjoining Camp Pendleton Marine Corps Base, in San Diego County, 64 miles south of Los Angeles, California. There are three pressurized water Reactors with a total rated capacity of 2664 net megawatts electrical.

Unit 1 was supplied by Westinghouse Electric Company and began commercial operation on January 1, 1968. It is currently rated at 410 net megawatts electrical. It is owned by Southern California Edison (80%) and San Diego Gas and Electric (20%).

Unit 2 and Unit 3 were supplied by Combustion Engineering, Inc., with turbine generators supplied by G.E.C. Turbine Generators, Ltd., of England. The units began commercial operation on August 18, 1983, and April 1, 1984, respectively and are rated at 1127 net megawatts electrical each. The twin units are owned by Southern California Edison (75.05%), San Diego Gas and Electric (20%), City of Anaheim (3.16%), and the City of Riverside (1.79%).

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SEMIANNUAL EFFLUENT REPORT

July - December (1990)

SECTION A. INTRODUCTION

This Semiannual Report summarizes the gaseous and liquid radioactive effluent releases and radwaste shipments made from the San Onofre Nuclear Generating Station, Unit 1. This report is prepared in the general format of USNRC Regulatory Guide 1.21 and includes:

1. Quarterly Summaries of Gaseous and Liquid Effluents for "Continuous" and "Batch" Modes of Release
2. Percent of Technical Specification Limits
3. Percent of Applicable Limits
4. Estimated Total Percent Error
5. Lower Limit of Detection Concentrations
6. Batch Release Summaries
7. Previous Semiannual Report Addendum
8. Radwaste Shipments
9. 10 CFR 50 Appendix I Requirements
10. Changes to Offsite Dose Calculation Manual

SECTION B. GASEOUS EFFLUENTS

Table 1A, "Gaseous Effluents-Summation of All Releases," provides a detailed listing of gaseous effluents released quarterly in four categories: fission and activation gases, iodine-131, particulates with half-lives greater than eight days, and tritium. Listed for each of the four categories are:

(1) the total curies released
(2) the average release rate
(3) the percent of Technical Specification Limit (TSL)
(4) the estimated total error

In addition, the particulate category lists the gross alpha radioactivity released for each quarter.

The methodology used to calculate the percent of Technical Specification Limit is presented in Section F of this report. The methodology used in Table 1A to calculate the estimated total error is presented in Section G of this report.

Table 1B, "Gaseous Effluents-Elevated Release," has not been included in this report since San Onofre Nuclear Generating Station Unit 1 does not conduct elevated releases.

Table 1C, "Gaseous Effluents-Ground Level Releases," provides the systematic listing by radionuclide for the quantity of radioactivity released in three categories: fission gases, iodines, and particulates. The total radioactivity for each radionuclide is listed for each quarterly period by both "continuous" and "batch" modes of release.

Waste gas decay tank and monitor calibration releases are considered to be "batch" releases. Containment purges and plant stack releases are considered to be "continuous" releases.

Table 1D, "Gaseous Effluents-Lower Limit of Detection," provides a listing of lower limit of detection concentrations for radionuclides not detected in Tables 1A and 1C.

Table 1E, "Gaseous Effluents-Radiation Doses at the Site Boundary," provides a quarterly summary of doses at the site boundary for this report period.

Table 1F, "Gaseous Effluents-Batch Release Summary," provides summary information regarding batch releases conducted during this report period from San Onofre Nuclear Generating Station Unit 1.

TABLE 1A

S.O.N.G.S. 1

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1990)
GASEOUS EFFLUENTS-SUMMATION OF ALL RELEASES

		Unit	Third Quarter	Fourth Quarter	Estimated Total Error, %
A.	Fission and activation gases				
1.	Total release	Ci	7.93E+2	0.00E+0	3.00E+1
2.	Average release rate for period	µCi/sec	9.98E+1	0.00E+0	
3.	Percent of technical specification limit	%	4.37E-1	0.00E+0	
B.	Iodines				
1.	Total iodine-131	Ci	6.02E-3	1.02E-5	1.90E+1
2.	Average release rate for period	µCi/sec	7.57E-4	1.28E-6	
3.	Percent of technical specification limit	%	9.85E-3	1.67E-5	
C.	Particulates				
1.	Particulates with half-lives > 8 days	Ci	6.87E-6	3.48E-6	1.60E+1
2.	Average release rate for period	µCi/sec	8.64E-7	4.38E-7	
3.	Percent of technical specification limit	%	1.96E-6	1.18E-6	
4.	Gross alpha radioactivity	Ci	<LLD	*	5.00E+1
D.	Tritium				
1.	Total release	Ci	2.12E+1	6.93E+0	2.50E+1
2.	Average release rate for period	µCi/sec	2.67E+0	8.72E-1	
3.	Percent of technical specification limit	%	1.73E-2	5.67E-3	

LLD Lower Limit of Detection; See Table 1D.

* Fourth quarter analyses not available at report time; values will be included in the following Semiannual Report.

TABLE 1C

S.O.N.G.S. 1

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1990)
GASEOUS EFFLUENTS-GROUND LEVEL RELEASES

Nuclides Released	Unit	Continuous Mode		Batch Mode	
		Third Quarter	Fourth Quarter	Third Quarter	Fourth Quarter
1. Fission gases					
krypton-85	Ci	<LLD	<LLD	2.52E+0	<LLD
krypton-85m	Ci	5.00E-2	<LLD	1.79E-2	<LLD
krypton-87	Ci	<LLD	<LLD	<LLD	<LLD
krypton-88	Ci	<LLD	<LLD	<LLD	<LLD
xenon-131m	Ci	1.94E+0	<LLD	6.33E-1	<LLD
xenon-133	Ci	7.03E+2	<LLD	7.67E+1	<LLD
xenon-133m	Ci	2.30E+0	<LLD	8.44E-1	<LLD
xenon-135	Ci	3.30E+0	<LLD	1.47E+0	<LLD
xenon-135m	Ci	<LLD	<LLD	<LLD	<LLD
xenon-138	Ci	<LLD	<LLD	<LLD	<LLD
Total for period	Ci	7.11E+2	<LLD	8.22E+1	<LLD
2. Iodines					
iodine-131	Ci	6.02E-3	1.02E-5	NA	NA
iodine-132	Ci	4.83E-5	<LLD	NA	NA
iodine-133	Ci	2.20E-4	<LLD	NA	NA
iodine-135	Ci	<LLD	<LLD	NA	NA
Total for period	Ci	6.29E-3	1.02E-5	NA	NA
3. Particulates					
barium-140	Ci	<LLD	<LLD	NA	NA
bromine-82	Ci	8.19E-6	<LLD	NA	NA
cesium-134	Ci	3.04E-7	2.74E-7	NA	NA
cesium-137	Ci	5.27E-6	2.97E-6	NA	NA
chromium-51	Ci	2.85E-7	7.02E-8	NA	NA
cobalt-58	Ci	9.49E-7	<LLD	NA	NA
cobalt-60	Ci	6.53E-8	1.68E-7	NA	NA
lanthanum-140	Ci	<LLD	<LLD	NA	NA
strontium-89	Ci	<LLD	*	NA	NA
strontium-90	Ci	<LLD	*	NA	NA

LLD Lower Limit of Detection; See Table 1D.

NA Iodines and particulates not analyzed prior to release via batch mode.

* Fourth quarter analyses not available at report time; values will be included in the following Semiannual Report.

TABLE 1D

S.O.N.G.S. 1

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1990)
GASEOUS EFFLUENTS-LOWER LIMIT OF DETECTION

RADIONUCLIDES	CONTINUOUS MODE LLD (μCi/cc)	BATCH MODE LLD (μCi/cc)
1. Fission and activation gases		
krypton-85	1.00E-5	9.20E-4
krypton-85m	5.30E-8	3.30E-6
krypton-87	1.20E-7	8.20E-6
krypton-88	2.20E-7	1.30E-5
xenon-131m	2.10E-6	1.20E-4
xenon-133	9.80E-8	5.70E-6
xenon-133m	3.80E-7	2.50E-5
xenon-135	5.30E-8	3.20E-6
xenon-135m	4.60E-7	2.40E-5
xenon-138	1.70E-6	7.10E-5
2. Iodines		
iodine-132	7.90E-12	NA
iodine-133	3.70E-13	NA
iodine-135	8.80E-12	NA
3. Particulates		
barium-140	9.00E-14	NA
bromine-82	1.40E-13	NA
cobalt-58	4.00E-14	NA
lanthanum-140	1.60E-13	NA
strontium-89	1.00E-14	NA
strontium-90	1.00E-15	NA
gross alpha	1.00E-14	NA

NA Iodines and particulates are not analyzed prior to release via batch mode.

TABLE 1E

S.O.N.G.S. 1

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1990)
GASEOUS EFFLUENTS-RADIATION DOSES AT THE SITE BOUNDARY

	Unit	Third Quarter	Fourth Quarter*
A. Noble Gas			
1. Gamma air dose	mrad	1.18E-1	0.00E+0
2. Percent Technical Specification Limit	%	2.36E+0	0.00E+0
3. Beta air dose	mrad	3.48E-1	0.00E+0
4. Percent Technical Specification Limit	%	3.48E+0	0.00E+0 *
B. Tritium, Iodine, Particulate (at the nearest receptor)			
1. Organ dose	mrem	5.27E-3	2.58E-4
2. Percent Technical Specification Limit	%	7.02E-2	3.44E-3

NOTE: Calculations performed in accordance with the ODCM utilizing the historical X/Q.

* Fourth quarter dose incomplete due to Sr-89, and Sr-90 analyses not available at report time; values will be reported in the following Semiannual Report.

TABLE 1F

S.O.N.G.S. 1

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1990)
GASEOUS EFFLUENTS-BATCH RELEASE SUMMARY

		6-MONTH PERIOD	
1.	Number of batch releases:	5	releases
2.	Total time period for batch releases:	1463	minutes
3.	Maximum time period for a batch release:	350	minutes
4.	Average time period for a batch release:	293	minutes
5.	Minimum time period for a batch release:	257	minutes

SECTION C. LIQUID EFFLUENTS

Table 2A, "Liquid Effluents-Summation of All Releases," provides a detailed summary of liquid effluents released quarterly in three categories: fission and activation products, tritium, and dissolved and entrained gases. Listed for each of the three categories are:

(1) the total curies released
(2) the average diluted concentration
(3) the percent of applicable limit
(4) the estimated total error

In addition, Table 2A lists:

(1) the gross alpha radioactivity
(2) the volume of batch waste released (prior to dilution)
(3) the total volume of dilution water

The methodology used to calculate the percent of applicable limit is presented in Section F of this report. The methodology used to calculate the estimated total error in Table 2A is presented in Section G of this report.

Table 2B, "Liquid Effluents," provides the systematic listing by radionuclide for the quantity of radioactivity released in each category. The total radioactivity of each radionuclide released is listed for each quarterly period by both "continuous" and "batch" modes of release.

Table 2C, "Liquid Effluents-Lower Limit of Detection," provides a listing of lower limit of detection concentrations for radionuclides not detected in Table 2B.

Table 2D, "Liquid Effluents-Radiation Doses at the Liquid Site Boundary," presents a quarterly summary of doses at the Liquid Site Boundary for this report period.

Table 2E, "Liquid Effluents-Batch Release Summary," provides summary information regarding batch releases conducted during this report period from San Onofre Nuclear Generating Station Unit 1.

TABLE 2A

S.O.N.G.S. 1

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1990)
LIQUID EFFLUENTS-SUMMATION OF ALL RELEASES

		Unit	Third Quarter	Fourth Quarter	Estimated Total Error, %
A.	Fission and activation products				
1.	Total release (not including tritium, gases, alpha)	Ci	1.57E-1	3.59E-2	1.90E+1
2.	Average diluted concentration during period	μCi/ml	4.47E-9	1.27E-9	
3.	Percent of applicable limit	%	9.18E-2	7.93E-3	
B.	Tritium				
1.	Total release	Ci	2.12E+2	3.26E+1	1.90E+1
2.	Average diluted concentration during period	μCi/ml	6.06E-6	1.15E-6	
3.	Percent of applicable limit	%	2.02E-1	3.82E-2	
C.	Dissolved and entrained gases				
1.	Total release	Ci	1.87E+0	1.14E-2	1.90E+1
2.	Average diluted concentration during period	μCi/ml	5.34E-8	4.03E-10	
3.	Percent of applicable limit	%	2.67E-2	2.02E-4	
D.	Gross alpha radioactivity				
1.	Total release	Ci	2.80E-5	*	5.00E+1
E.	Volume of waste released (prior to dilution)	liters	8.95E+5	6.37E+5	5.00E+0
F.	Volume of dilution water used during period	liters	3.50E+10	2.83E+10	5.00E+0

* Fourth quarter analyses not available at report time; values will be included in the following Semiannual Report.

TABLE 2B

S.O.N.G.S. 1

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1990)
LIQUID EFFLUENTS

Nuclides Released	Unit	Continuous Mode		Batch Mode	
		Third Quarter	Fourth Quarter	Third Quarter	Fourth Quarter
1. Fission and activation products					
antimony-124	Ci	<LLD	<LLD	1.53E-4	<LLD
barium-140	Ci	<LLD	<LLD	<LLD	<LLD
cerium-141	Ci	<LLD	<LLD	<LLD	<LLD
cerium-144	Ci	<LLD	<LLD	3.99E-5	6.76E-5
cesium-134	Ci	1.78E-2	7.21E-3	2.91E-2	3.86E-3
cesium-136	Ci	1.71E-4	<LLD	2.01E-4	<LLD
cesium-137	Ci	2.58E-2	1.19E-2	4.13E-2	5.51E-3
chromium-51	Ci	3.75E-5	<LLD	1.40E-3	5.97E-5
cobalt-57	Ci	<LLD	<LLD	2.30E-5	4.71E-6
cobalt-58	Ci	1.35E-4	<LLD	1.82E-2	1.50E-3
cobalt-60	Ci	2.54E-3	3.34E-4	4.78E-3	1.07E-3
iodine-131	Ci	4.10E-3	<LLD	2.87E-3	<LLD
iodine-133	Ci	<LLD	<LLD	7.20E-4	<LLD
iodine-135	Ci	<LLD	<LLD	1.76E-5	<LLD
iron-55	Ci	<LLD	*	5.16E-3	*
iron-59	Ci	<LLD	<LLD	3.35E-4	<LLD
lanthanum-140	Ci	<LLD	<LLD	1.96E-5	<LLD
manganese-54	Ci	2.96E-5	<LLD	9.55E-4	1.62E-4
molybdenum-99	Ci	<LLD	<LLD	4.49E-5	<LLD
niobium-95	Ci	<LLD	<LLD	1.09E-4	<LLD
ruthenium-103	Ci	<LLD	<LLD	1.28E-4	<LLD
silver-110m	Ci	<LLD	<LLD	1.01E-4	1.52E-4
sodium-24	Ci	<LLD	<LLD	2.44E-5	<LLD
strontium-89	Ci	<LLD	*	1.03E-4	*
strontium-90	Ci	<LLD	*	7.63E-5	*
strontium-92	Ci	<LLD	<LLD	<LLD	4.16E-3
technetium-99m	Ci	<LLD	<LLD	4.27E-5	<LLD
zinc-65	Ci	<LLD	<LLD	<LLD	4.73E-6
zirconium-95	Ci	<LLD	<LLD	<LLD	<LLD
Total for period	Ci	5.06E-2	1.94E-2	1.06E-1	1.65E-2

LLD Lower Limit of Detection; see Table 2C.

* Fourth quarter analyses not available at report time; values will be included in the following Semiannual Report.

TABLE 2B

S.O.N.G.S. 1

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1990)
LIQUID EFFLUENTS (Continued)

Nuclides Released	Unit	Continuous Mode		Batch Mode	
		Third Quarter	Fourth Quarter	Third Quarter	Fourth Quarter
2. Dissolved and entrained gases					
krypton-85	Ci	<LLD	<LLD	5.64E-2	<LLD
krypton-85m	Ci	<LLD	7.38E-3	<LLD	<LLD
krypton-88	Ci	<LLD	3.68E-5	<LLD	3.97E-3
xenon-131m	Ci	3.11E-4	<LLD	4.82E-2	<LLD
xenon-133	Ci	3.16E-5	2.70E-6	1.77E+0	<LLD
xenon-135	Ci	<LLD	<LLD	5.11E-5	<LLD

LLD Lower Limit of Detection; see Table 2C.

TABLE 2C

S.O.N.G.S. 1

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1990)
LIQUID EFFLUENTS-LOWER LIMIT OF DETECTION

RADIONUCLIDES	CONTINUOUS MODE LLD (μCi/cc)	BATCH MODE LLD (μCi/cc)
1. Fission and activation products		
antimony-124	1.40E-7	4.70E-8
barium-140	2.10E-7	3.00E-7
cerium-141	9.70E-8	1.10E-7
cerium-144	4.00E-7	*
cesium-136	7.70E-8	9.30E-8
chromium-51	5.50E-7	*
cobalt-57	5.20E-8	*
cobalt-58	5.00E-8	*
iodine-131	7.00E-8	8.90E-8
iodine-133	2.30E-7	2.00E-7
iodine-135	3.00E-6	1.90E-7
iron-55	1.00E-6	*
iron-59	8.00E-8	1.40E-7
lanthanum-140	1.40E-7	5.10E-8
manganese-54	4.60E-8	*
molybdenum-99	8.00E-8	7.60E-8
niobium-95	3.30E-8	8.60E-8
ruthenium-103	6.70E-8	1.00E-7
silver-110m	6.90E-8	*
sodium-24	3.00E-7	1.40E-7
strontium-89	5.00E-8	*
strontium-90	1.00E-8	*
strontium-92	**	1.14E-8
technetium-99m	8.10E-8	7.70E-8
zinc-65	1.20E-7	1.50E-7
zirconium-95	6.30E-8	1.40E-7
2. Dissolved and entrained gases		
krypton-85	1.20E-5	5.20E-5
krypton-85m	6.40E-8	1.30E-7
krypton-88	2.00E-7	4.90E-7
xenon-131m	2.10E-6	4.00E-6
xenon-133	*	2.60E-7
xenon-135	5.40E-8	1.10E-7

* Nuclide detected in Table 2B.

** Analysis of weekly composites will not detect this isotope.

TABLE 2D

S.O.N.G.S. 1

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1990)
LIQUID EFFLUENTS-RADIATION DOSES AT THE LIQUID SITE BOUNDARY

		Unit	Third Quarter	Fourth Quarter*
A.				
1.	Total body dose	mrem	1.47E-1	6.74E-2
2.	Percent Technical Specification Limit	%	9.81E+0	4.49E+0
B.				
1.	Limiting organ dose	mrem	1.98E-1	9.13E-2
2.	Percent Technical Specification Limit	%	3.96E+0	1.83E+0

NOTE: The limiting organ for the third and fourth quarter is the Liver.

* Fourth quarter dose incomplete due to Sr-89, Sr-90, and Fe-55 analyses not available at report time; values will be reported in the following Semiannual Report.

TABLE 2E

S.O.N.G.S. 1

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1990)
LIQUID EFFLUENTS-BATCH RELEASE SUMMARY

		6-MONTH PERIOD	
1.	Number of batch releases:	14	releases
2.	Total time period for batch releases:	10859	minutes
3.	Maximum time period for a batch release:	1995	minutes
4.	Average time period for a batch release:	776	minutes
5.	Minimum time period for a batch release:	11	minutes
6.	Average saltwater flow during batch releases:	150000	gpm

SECTION D. PREVIOUS SEMIANNUAL REPORT ADDENDUM

S.O.N.G.S. 1

1. The January - June 1990 Semiannual Report values for composite gross alpha, Sr-89, Sr-90, and Fe-55 (Tables 1A and 1C, Gaseous Effluents, Tables 2A and 2B, Liquid Effluents) were incomplete due to data not available at report time. The values not reported were for the first quarter of 1990. The values are as follows:

GASEOUS EFFLUENTS (1st Quarter 1990)

Nuclides Released	Unit	Continuous Mode	Batch Mode
strontium-89	Ci	<LLD	*
strontium-90	Ci	<LLD	*
Gross alpha	Ci	2.72E-7	*

Sr-89 LLD = 1.00E-14 μCi/cc
Sr-90 LLD = 1.00E-15 μCi/cc

* All "batch" gaseous releases made from S.O.N.G.S. 1 are vented through the Plant Vent Stack, therefore, gross alpha, Sr-89, and Sr-90 are analyzed by "continuous" mode only.

LIQUID EFFLUENTS (1st Quarter 1990)

Nuclides Released	Unit	Continuous Mode	Batch Mode
iron-55	Ci	<LLD	2.55E-4
strontium-89	Ci	<LLD	<LLD
strontium-90	Ci	<LLD	<LLD
tritium	Ci	**	4.55E-5
Gross alpha	Ci	<LLD	<LLD

Fe-55 LLD = 1.00E-6 μCi/ml
Sr-89 LLD = 5.00E-8 μCi/ml
Sr-90 LLD = 1.00E-8 μCi/ml
Gross alpha LLD = 1.00E-7 μCi/ml

** Only composites from sewage sludge are analyzed for tritium. All other liquid pathways are analyzed for tritium onsite with the resultant curies enumerated in Table 2B.

SECTION D. PREVIOUS SEMIANNUAL REPORT ADDENDUM

S.O.N.G.S. 1

1. The January - June 1990 Semiannual Report values for composite gross alpha, Sr-89, Sr-90, and Fe-55 (Tables 1A and 1C, Gaseous Effluents, Tables 2A and 2B, Liquid Effluents) were incomplete due to data not available at report time. The values not reported were for the second quarter of 1990. The values are as follows:

GASEOUS EFFLUENTS (2nd Quarter 1990)

Nuclides Released	Unit	Continuous Mode	Batch Mode
strontium-89	Ci	<LLD	*
strontium-90	Ci	<LLD	*
Gross alpha	Ci	1.49E-7	*

Sr-89 LLD = 1.00E-14 μCi/cc
Sr-90 LLD = 1.00E-15 μCi/cc

* All "batch" gaseous releases made from S.O.N.G.S. 1 are vented through the Plant Vent Stack, therefore, gross alpha, Sr-89, and Sr-90 are analyzed by "continuous" mode only.

LIQUID EFFLUENTS (2nd Quarter 1990)

Nuclides Released	Unit	Continuous Mode	Batch Mode
iron-55	Ci	<LLD	2.03E-3
strontium-89	Ci	<LLD	<LLD
strontium-90	Ci	<LLD	5.70E-4
tritium	Ci	**	<LLD
Gross alpha	Ci	<LLD	<LLD

Fe-55 LLD = 1.00E-6 μCi/ml
Sr-89 LLD = 5.00E-8 μCi/ml
Sr-90 LLD = 1.00E-8 μCi/ml
Tritium LLD = 7.00E-6 μCi/ml
Gross alpha LLD = 1.00E-7 μCi/ml

** Only composites from sewage sludge are analyzed for tritium. All other liquid pathways are analyzed for tritium onsite with the resultant curies enumerated in Table 2B.

2. ADDITIONAL GASEOUS EFFLUENT-RADIATION DOSES AT THE SITE BOUNDARY

For the first and second quarters of 1990 Semiannual Report, Sr-89 and Sr-90.

		Unit	First Quarter	Second Quarter
A.	Tritium, Iodine, Particulate (at the nearest receptor)			
1.	Organ dose	mrem	0.00E+0	0.00E+0
2.	Percent Applicable Limit	%	0.00E+0	0.00E+0

NOTE: Calculations performed in accordance with the ODCM utilizing the historical X/Q.

3. ADDITIONAL LIQUID EFFLUENT-RADIATION DOSES AT THE SITE BOUNDARY

For the first and second quarters of 1990 Semiannual Report, Fe-55, Sr-89, and Sr-90.

		Unit	First Quarter	Second Quarter
A.				
1.	Total body dose	mrem	6.15E-5	9.94E-4
2.	Percent Applicable Limit	%	4.10E-3	6.63E-2
B.				
1.	Limiting organ dose	mrem	3.82E-4	5.11E-3
2.	Percent Applicable Limit	%	7.64E-3	1.02E-1

NOTE: The limiting organ is the bone.

SECTION E. RADWASTE SHIPMENTS

S.O.N.G.S. 1

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1990)
SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

A. SOLID WASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL (Not Irradiated Fuel)

1. Type of waste	Unit	6-month Period	Est. Total Error, %
a. Spent resins, filter sludges, evaporator bottoms, etc.	m^3	NA	
	Ci	NA	NA
b. Dry compressible waste, contaminated equip. etc.	m^3	5.06E+1 *	
	Ci	4.20E+0	3.00E+1
c. Irradiated components, control rods, etc.	m^3	NA	
	Ci	NA	NA
d. Other (filters).	m^3	5.66E-2 **	
	Ci	8.34E+0	3.00E+1

NOTE: Total curie content estimated.

* Shipped in Type B Cask (C of C 9208): 1 - 142 cu. ft. High Integrity Container, contents 4 - 55 gallon DOT 7A drums (7.5 cu. ft each).

* Material packaged in 55-gallon DOT 7A drums (7.5 cu. ft. each), or strong, tight containers (steel boxes, 98 cu. ft. each).

** Shipped in Type A Cask (C of C 9176): 1 - 50 cu. ft. High Integrity Container.

SECTION E. RADWASTE SHIPMENTS (Continued)

S.O.N.G.S. 1

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1990)
SOLID WASTE AND IRRADIATED FUEL SHIPMENT

A. SOLID WASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL (Not Irradiated Fuel) (Continued)

2. Estimate of major nuclide composition (by type of waste)

a.	Not applicable	%	0.00E+0

b.	americium-241	%	5.02E-2
	carbon-14	%	6.56E-2
	cesium-134	%	2.71E+0
	cesium-137	%	1.02E+1
	cobalt-58	%	5.70E-1
	cobalt-60	%	3.31E+1
	curium-243/244	%	1.36E-1
	europium-154	%	1.23E-1
	europium-155	%	3.66E-2
	iodine-129	%	5.98E-1
	iron-55	%	2.24E+0
	manganese-54	%	2.87E-1
	nickel-63	%	1.49E+1
	plutonium-238	%	9.49E-2
	plutonium-239/240	%	1.97E-2
	plutonium-241	%	3.14E+0
	strontium-90	%	5.45E+0
	technetium-99	%	7.21E-4
	tritium	%	2.62E+1

c.	Not applicable	%	0.00E+0

SECTION E. RADWASTE SHIPMENTS (Continued)

S.O.N.G.S. 1

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1990)
SOLID WASTE AND IRRADIATED FUEL SHIPMENT

A. SOLID WASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL (Not Irradiated Fuel) (Continued)

2. Estimate of major nuclide composition (by type of waste)

d.

americium-241	%	4.98E-2
carbon-14	%	3.72E-5
cesium-137	%	5.07E-2
cobalt-57	%	2.11E-2
cobalt-60	%	4.59E+1
curium-242	%	3.85E-4
curium-243/244	%	2.08E-2
iodine-129	%	3.09E-4
iron-55	%	2.90E+1
manganese-54	%	1.01E-1
nickel-63	%	2.16E+1
plutonium-238	%	5.56E-2
plutonium-239/240	%	1.97E-2
plutonium-241	%	1.81E+0
strontium-89	%	4.62E-4
strontium-90	%	8.43E-2
technetium-99	%	8.13E-4
tritium	%	1.31E+0

SECTION E. RADWASTE SHIPMENTS (Continued)

S.O.N.G.S. 1

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1990)
SOLID WASTE AND IRRADIATED FUEL SHIPMENT

A. SOLID WASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL (Not Irradiated Fuel) (Continued)

3. Solid Waste Disposition

See COMMON section of this report

B. IRRADIATED FUEL SHIPMENTS (Disposition)

See COMMON section of this report

SECTION F. TECHNICAL SPECIFICATION LIMITS AND APPLICABLE LIMITS

Gaseous Effluents - Technical Specification Limits

The percent of Technical Specification Limit, tabulated in Table 1A, was calculated using the following equation:

$$\% \text{ TSL} = \frac{(\text{Rel Rate})\ (X/Q)\ (100)}{MPC_{eff}}$$

where: Rel Rate = total curies released in each category and each quarter, divided by the seconds in a quarter; the value in Parts A.2, B.2, C.2 and D.2 of Table 1A, μCi/sec.

X/Q = 1.30E-5 sec/m^3; the annual average atmospheric dispersion defined in the Unit 1 ODCM, Rev. 3.

The MPC_{eff} is defined as:

$$\frac{1}{\sum_{i=1}^{n} \frac{F_i}{MPC_i}}$$

where: F_i = fractional abundance of the ith radionuclide obtained by dividing the activity (curies) for each radionuclide, C_i, by the sum of all the isotopic activity, C_T.

n = total number of radionuclides identified

MPC_i = MPC of the ith radionuclide

The % TSL is placed in Parts A.3, B.3, C.3 and D.3 of Table 1A.

SECTION F. TECHNICAL SPECIFICATION LIMITS AND APPLICABLE LIMITS

Liquid Effluents - Applicable Limits

The percent of applicable limit, tabulated in Table 2A, was calculated using the following equation:

$$\% \text{ Applicable Limit} = \frac{(\text{Dil Conc})\ (100)}{MPC_{eff}}$$

where: Dil Conc = total curies released in each category and each quarter divided by the total volume released (sum of Parts E and F in Table 2A); the value in Parts A.2, B.2 and C.2 of Table 2A, μCi/ml.

The MPC_{eff} is defined as:

$$\frac{1}{\sum_{i=1}^{n} \frac{F_i}{MPC_i}}$$

where: F_i = fractional abundance of the ith radionuclide obtained by dividing the activity (curies) for each radionuclide, C_i, by the sum of all the isotopic activity, C_T.

n = total number of radionuclides identified

MPC_i = MPC of the ith radionuclide

The % Applicable Limit is placed in Parts A.3, B.3 and C.3 of Table 2A.

SECTION G. ESTIMATION OF ERROR

S.O.N.G.S. 1

Estimations of the error in reported values of gaseous and liquid effluents releases have been made.

Sources of error for gaseous effluents - batch releases are:

(1) tank volumes
(2) sampling
(3) counting
(4) calibration

Sources of error for gaseous effluents - continuous releases are:

(1) fan flow rate
(2) sampling
(3) counting
(4) calibration
(5) differential pressure drop

Sources of error for liquid effluents - batch releases are:

(1) tank volumes
(2) sampling
(3) counting
(4) calibration

Sources of error for liquid effluents - continuous releases are:

(1) dilution flow rate
(2) sampling
(3) counting
(4) calibration

These sources of error are independent, and thus, the total error is calculated according to the following formula:

$$\text{Total Error} = \sqrt{\sigma_1^2 + \sigma_2^2 + \sigma_3^2 + \cdots \sigma_i^2}$$

where: σ_i = Error associated with each component.

SECTION H. 10 CFR 50 APPENDIX I REQUIREMENTS

S.O.N.G.S. 1

Table 1 in Section H presents the quarterly and annual maximum dose to an individual. Six different categories are presented:

(1) Liquid Effluents - Whole Body
(2) Liquid Effluents - Organ
(3) Airborne Effluents - Tritium, Iodines and Particulates
(4) Noble Gases - Gamma
(5) Noble Gases - Beta
(6) Direct Radiation

The doses for categories 1 and 2 were calculated using the methodology of the ODCM, this data is also presented in Table 2D for each of the four quarters. Categories 3, 4, and 5 were calculated utilizing RRRGS (Radioactive Release Report Generating System) software, Regulatory Guide 1.109 methodology, and concurrent meteorology. Table 1E of gaseous effluents previously presented, however, lists data similar to categories 3, 4 and 5 using methods described in the ODCM and the historical meteorology (X/Q). Category 6 presents direct dose data measured by TLD dosimeters. Each portion of each category is footnoted to briefly describe each maximum individual dose presented.

For individuals who may, at times, be within the site boundary, the occupancy of the individual will be sufficiently low to compensate for any increase in the atmospheric diffusion factor above that for the site boundary. For members of the public who traverse the site boundary via highway I-5, the residency time is considered negligible and hence the dose "0".

Table 2 in Section H presents the percent of Technical Specification Limits for each dose presented in Table 1.

SECTION H. 10 CFR 50 APPENDIX I REQUIREMENTS (Continued)

S.O.N.G.S. 1

TABLE 1

	Dose* (millirems)				
SOURCE	1st Q	2nd Q	3rd Q	4th Q	Year
LIQUID EFFLUENTS Whole body	1) 2.67E-3	2) 2.82E-2	3) 1.47E-1	4) 6.74E-2	5) 2.45E-1
Organ	6) 3.34E-3	7) 4.39E-2	8) 1.98E-1	9) 9.13E-2	10) 3.30E-1
AIRBORNE EFFLUENTS Tritium, Iodines, and Particulates	11) 5.59E-3	12) 3.33E-1	13) 4.44E-2	14) 6.86E-3	15) 3.86E-1
NOBLE GASES** Gamma	16) 3.33E-2	17) 1.06E-1	18) 1.03E-1	19) 0.00E+0	20) 2.30E-1
Beta	21) 9.51E-2	22) 2.90E-1	23) 3.07E-1	24) 0.00E+0	25) 6.55E-1
DIRECT RADIATION	26) 1.53E-1	27) 6.98E-2	28) 1.62E-1	29) 1.12E+1	30) 8.08E-1

NOTE: The numbered footnotes below briefly explain how each maximum dose was calculated, including the organ and the predominant pathway(s).

** Noble gas doses due to airborne effluents are in mrad, reflecting air dose.

SECTION H. 10 CFR 50 APPENDIX I REQUIREMENTS (Continued)

S.O.N.G.S. 1

1. This data was calculated using the methodology of the ODCM.

2. This data was calculated using the methodology of the ODCM.

3. This data was calculated using the methodology of the ODCM.

4. This data was calculated using the methodology of the ODCM.

5. This data was calculated using the methodology of the ODCM.

6. This data was calculated using the methodology of the ODCM; the Liver received the maximum dose primarily by the saltwater fish pathway.

7. This data was calculated using the methodology of the ODCM; the Thyroid received the maximum dose primarily by the saltwater fish pathway.

8. This data was calculated using the methodology of the ODCM; the Liver received the maximum dose primarily by the saltwater fish pathway.

9. This data was calculated using the methodology of the ODCM; the Liver received the maximum dose primarily by the saltwater fish pathway.

10. This data was calculated using the methodology of the ODCM; the Liver received the maximum dose primarily by the saltwater fish pathway.

11. The maximum organ dose was to a child's thyroid and was located in the NW sector. This was calculated using the activity reported in the January - June 1990 Semiannual Report with the assumptions of USNRC Regulatory Guide 1.109.

12. The maximum organ dose was to a child's thyroid and was located in the NW sector. This was calculated using the activity reported in the January - June 1990 Semiannual Report with the assumptions of USNRC Regulatory Guide 1.109.

13. The maximum organ dose was to a child's thyroid and was located in the NNW sector. This was calculated using the activity reported in the July - December 1990 Semiannual Report with the assumptions of USNRC Regulatory Guide 1.109.

14. The maximum organ dose was to a child's thyroid and was located in the NW sector. This was calculated using the activity reported in the July - December 1990 Semiannual Report with the assumptions of USNRC Regulatory Guide 1.109.

SECTION H. 10 CFR 50 APPENDIX I REQUIREMENTS (Continued)

15. The maximum organ dose was to a child's thyroid and was located in the NW sector. This was calculated using the activity reported in the January-December 1990 Semiannual Report with the assumptions of USNRC Regulatory Guide 1.109.

16. A maximum air dose of 2.52E-1 mrad for gamma radiation was located in the SSW sector, a seaward direction. The reported maximum air dose for gamma radiation was located in the NW sector, a landward sector, at the exclusion area boundary and calculated with the assumptions of the USNRC Regulatory Guide 1.109.

17. The maximum air dose of 2.71E-1 mrad for gamma radiation was located in the SSW sector, a seaward direction. The reported maximum air dose for gamma radiation was located in the NW sector, a landward sector, at the exclusion area boundary and calculated with the assumptions of the USNRC Regulatory Guide 1.109.

18. A maximum air dose of 1.56E-1 mrad for gamma radiation was located in the SSW sector, a seaward direction. The reported maximum air dose for gamma radiation was located in the NNW sector, a landward sector, at the exclusion area boundary and calculated with the assumptions of the USNRC Regulatory Guide 1.109.

19. A gaseous dose of 0.0 was calculated since the Unit was shut down during the entire fourth quarter.

20. A maximum air dose of 5.39E-1 mrad for gamma radiation was located in the SSW sector, a seaward direction. The reported maximum air dose for gamma radiation was located in the NW sector, a landward sector, at the exclusion area boundary and calculated with the assumptions of the USNRC Regulatory Guide 1.109.

21. A maximum air dose of 7.18E-1 mrad for beta radiation was located in the SSW sector, a seaward direction. The reported maximum air dose for beta radiation was located in the NW sector, a landward sector, at the exclusion area boundary and calculated with the assumptions of the USNRC Regulatory Guide 1.109.

22. The maximum air dose of 7.53E-1 mrad for beta radiation was located in the SSW sector, a seaward direction. The reported maximum air dose for beta radiation was located in the NW sector, a landward sector, at the exclusion area boundary and calculated with the assumptions of the USNRC Regulatory Guide 1.109.

23. A maximum air dose of 4.61E-1 mrad for beta radiation was located in the SSW sector, a seaward direction. The reported maximum air dose for beta radiation was located in the NNW sector, a landward sector, at the exclusion area boundary and calculated with the assumptions of the USNRC Regulatory Guide 1.109.

SECTION H. 10 CFR 50 APPENDIX I REQUIREMENTS (Continued)

24. A gaseous dose of 0.0 was calculated since the Unit was shut down during the entire fourth quarter.

25. A maximum air dose of 1.93E+0 mrad for beta radiation was located in the SSW sector, a seaward direction. The reported maximum air dose for beta radiation was located in the NW sector, a landward sector, at the exclusion area boundary and calculated with the assumptions of the USNRC Regulatory Guide 1.109.

26. Measurements were made using TLD dosimeters; values are presented as site wide dose and are prorated to 300 hours per year; highest dose was measured at the Site Boundary in the SW sector.

27. Measurements were made using TLD dosimeters; values are presented as site wide dose and are prorated to 300 hours per year; highest dose was measured at the Site Boundary in the SW sector.

28. Measurements were made using TLD dosimeters; values are presented as site wide dose and are prorated to 300 hours per year; highest dose was measured at the Site Boundary in the SW sector.

29. Measurements were made using TLD dosimeters; values are presented as site wide dose and are prorated to 300 hours per year; highest dose was measured at the Site Boundary in the SW sector.

30. Measurements were made using TLD dosimeters; values are presented as site wide dose and are prorated to 300 hours per year; highest dose was measured at the Site Boundary in the SW sector.

SECTION H. 10 CFR 50 APPENDIX I REQUIREMENTS (Continued)

S.O.N.G.S. 1

TABLE 2

	% Technical Specification Limit				
SOURCE	1st Q	2nd Q	3rd Q	4th Q	Year
LIQUID EFFLUENTS					
Whole body	1.78E-1	1.88E+0	9.81E+0	4.49E+0	8.18E+0
Organ	6.69E-2	8.78E-1	3.96E+0	1.83E+0	3.30E+0
AIRBORNE EFFLUENTS					
Tritium, Iodines, and Particulates	7.45E-2	4.44E+0	5.92E-1	9.15E-2	2.57E+0
NOBLE GASES					
Gamma	6.61E-1	2.12E+0	2.06E+0	0.00E+0	2.30E+0
Beta	9.51E-1	2.90E+0	3.07E+0	0.00E+0	3.28E+0

NOTE: Direct Radiation is not specifically addressed in the Technical Specifications.

SECTION I. CHANGES TO OFFSITE DOSE CALCULATION MANUAL

S.O.N.G.S 1

- There were no changes to the Unit 1 Offsite Dose Calculation Manual during the reporting period July 1, 1990 to December 31, 1990.

SECTION J. CHANGES TO RADIOACTIVE WASTE TREATMENT SYSTEMS

S.O.N.G.S 1

- There were no major changes to the Unit 1 Radioactive Waste Treatment Systems during the reporting period July 1, 1990 to December 31, 1990.

SECTION K. MISCELLANEOUS

S.O.N.G.S 1

- Loss of Containment Purge resulting in an Unplanned, Unmonitored Release

  On 7/3/90 at 1330, containment purge was inadvertently secured during a 480V bus transfer. At the time, Unit 1 was in Mode 5 with the equipment hatch open, having come off-line on 7/1/90. The No. 1 480V bus transfer was part of a work authorization being performed on the electrical system and resulted in the closure of POV-10, a containment vent valve. Subsequent plant monitoring failed to recognize the change in valve status and the decrease in the plant stack radiation monitor activity until 0620 7/4/90. Grab samples taken inside containment at 1700 on 7/3/90 showed the noble gas activity to be 3.64E-5 uCi/cc with tritium levels of 4.00E-7 uCi/cc. Based on that activity and a maximum assumed air exchange rate of 1 m^3/sec through the equipment hatch, approximately 1.02E-3 Ci of noble gas and 1.12E-5 Ci of tritium could have been discharged during those 16 hours. Resultant dose at the EAB is conservatively calculated at less than 0.02 MPC.

  For more information, see Unit 1 Operations Division Experience Report 01-90-011.

S.O.N.G.S. 1

o Unplanned Release of the Inservice Waste Gas Decay Tank

On 12/11/90 at 1655, Operations began the planned release of the south waste gas decay tank (SWGDT). The Unit was in Mode 6 with the core offloaded and no activity had been detected in the waste gas decay tank since August. At 0001 on 12/12/90, the graveyard operator recorded the pressure in the inservice (center) waste gas decay tank at 19 psig. Later at 0335, the same operator noted that the pressure in the CWGDT was down to 4 psig. During this time, the plant vent stack radiation monitor was inservice with an appropriately conservative setpoint installed. The release of the SWGDT was secured and the operator verified the valve alignment. During subsequent investigation, an isolation valve was determined to be the source of leakage and a maintenance order was generated on the valve. Samples taken from 12/11/90 and 12/12/90 show the activity in the CWGDT to be less than the lower limit of detection. No significant discharge of curies or dose resulted from this unplanned release.

For more information, see Unit 1 Operations Division Experience Report 01-90-26.

July 1, 1990 - December 31, 1990

EFFLUENT RADIATION MONITORS OUT OF SERVICE FOR GREATER THAN 30 DAYS

Monitor	Inoperability Period	Inoperability Cause	Explanation
R-1216 Steam Generator Blowdown	07/02/90 to present	No sample flow	No steam generator pressure/steam flow due to being in a thermal shield outage.
R-1217 Component Cooling Water System	11/27/90 to present	Removed from service	Performing 18 month calibration. New source standards required.
R-1218 Liquid Radwaste Effluent	07/15/90 to 09/13/90	Loss of alarm functions and contaminated detector.	Power supply work. DCP 1-3552 and detector canister decontamination.
R-1211 Containment Atmosphere Particulate	07/20/90 to 09/26/90	Heat trace system work	Required the redesign/rework of system circuit cards.

SECTION K. MISCELLANEOUS (Continued)

July 1, 1990 - December 31, 1990

EFFLUENT RADIATION MONITORS OUT OF SERVICE FOR GREATER THAN 30 DAYS

S.O.N.G.S 1

Monitor	Inoperability Period	Inoperability Cause	Explanation
R-1211/R-1212 Containment Atmosphere	07/30/90 to 09/09/90	Loss of alarm function	Power supply work. DCP 1-3552
	10/16/90 to present	Routine maintenance and low sample flow when selected to sphere.	Replace clogged strainer, performed flow balancing, and engineering review.
R-1214 Plant Vent Noble Gas	06/13/86 to present	Removed from service	Maintained out-of-service pending Technical Specification change.
R-1219/R-1220 R-1221 Plant Vent Stack	07/30/90 to 09/09/90	Loss of alarm function	Power supply work DCP-13552
R-1254 Plant Vent Stack Fan Flow Indication	08/12/88 to present	Process flow indication	Process Flow indication is deficient. Design change to improve/correct existing flow measurement under evaluation. Radiation monitor still operable.
Particulates and Iodines	07/30/90 to 09/26/9	Heat trace system work	Required the redesign/work of system circuit cards
Noble Gas	07/30/90 to 09/09/90	Loss of alarm function	Power supply work DCP 1-3552

SECTION L. S O N.G.S. 1 CONCLUSIONS

- Gaseous effluent releases, excluding tritium, totaled 7.93E+2 curies with Xe-133 98% of the total.

- The radiation doses from gaseous releases are: (a) gamma air dose: 1.18E-1 mrad at the site boundary, (b) beta air dose: 3.48E-1 mrad at the site boundary, (c) organ dose: 5.53E-3 mrem at the nearest receptor.

- Liquid releases totaled 2.47E+2 curies of which tritium was 2.45E+2 Ci, noble gases were 1.88E+0 Ci, and particulates and iodines were 1.92E-1 Ci.

- The radiation doses from liquid releases are: (a) total body: 2.14E-1 mrem, (b) limiting organ: 2.89E-1 mrem.

- The radioactive releases and resulting doses generated from Unit 1 were below the Technical Specification Limits for both gaseous and liquid effluents.

TABLE OF CONTENTS

SEMIANNUAL EFFLUENT REPORT

July - December (1990)

SECTION A. INTRODUCTION

This Semiannual Report summarizes the gaseous and liquid radioactive effluent releases and radwaste shipments made from the San Onofre Nuclear Generating Station, Units 2 and 3. This report is prepared in the general format of USNRC Regulatory Guide 1.21 and includes:

1. Quarterly Summaries of Gaseous and Liquid Effluents for "Continuous" and "Batch" Modes of Release
2. Percent of Applicable Limits
3. Estimated Total Percent Error
4. Lower Limit of Detection Concentrations
5. Batch Release Summaries
6. Previous Semiannual Report Addendum
7. Radwaste Shipments
8. 10 CFR 50 Appendix I Requirements
9. Changes to Offsite Dose Calculation Manual

SECTION B. GASEOUS EFFLUENTS

Table 1A, "Gaseous Effluents-Summation of All Releases," provides a detailed listing of gaseous effluents released quarterly in four categories: fission and activation gases, iodine-131, particulates with half-lives greater than eight days, and tritium. Listed for each of the four categories are:

(1) the total curies released
(2) the average release rate
(3) the percent of applicable limit
(4) the estimated total error

In addition, the particulate category lists the gross alpha radioactivity released for each quarter.

The methodology used to calculate the percent of Applicable Limit is presented in Section F of this report.The methodology used in Table 1A to calculate the estimated total error is presented in Section G of this report.

Table 1B, "Gaseous Effluents-Elevated Release," has not been included in this report since San Onofre Nuclear Generating Station Units 2 and 3 do not conduct elevated releases.

Table 1C, "Gaseous Effluents-Ground Level Releases," provides the systematic listing by radionuclide for the quantity of radioactivity released in three categories: fission gases, iodines, and particulates. The total radioactivity for each radionuclide is listed for each quarterly period by both "continuous" and "batch" modes of release.

Waste gas decay tank and calibration releases are considered to be "batch" releases. Containment purges and plant stack releases are considered to be "continuous" releases.

Table 1D, "Gaseous Effluents-Lower Limit of Detection," provides a listing of lower limit of detection concentrations for radionuclides not detected in Tables 1A and 1C.

Table 1E, "Gaseous Effluents-Radiation Doses at the Site Boundary," provides a quarterly summary of doses at the site boundary for this report period.

Table 1F, "Gaseous Effluents-Batch Release Summary," provides summary information regarding batch releases conducted during this report period from San Onofre Nuclear Generating Station Units 2 and 3.

TABLE 1A

S.O.N.G.S. 2-3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1990)
GASEOUS EFFLUENTS-SUMMATION OF ALL RELEASES

		Unit	Third Quarter	Fourth Quarter	Estimated Total Error, %
A.	Fission and activation gases				
1.	Total release	Ci	2.38E+2	3.08E+2	2.50E+1
2.	Average release rate for period	µCi/sec	2.99E+1	3.87E+1	
3.	Percent of applicable limit	%	6.21E-2	7.86E-2	
B.	Iodines				
1.	Total iodine-131	Ci	1.76E-3	1.33E-3	1.90E+1
2.	Average release rate for period	µCi/sec	2.21E-4	1.67E-4	
3.	Percent of applicable limit	%	1.06E-3	8.03E-4	
C.	Particulates				
1.	Particulates with half-lives > 8 days	Ci	6.75E-5	3.03E-5	1.60E+1
2.	Average release rate for period	µCi/sec	8.49E-6	3.81E-6	
3.	Percent of applicable limit	%	4.29E-6	3.59E-6	
4.	Gross alpha radioactivity	Ci	6.20E-7	*	5.00E+1
D.	Tritium				
1.	Total release	Ci	7.38E+0	4.98E+0	2.50E+1
2.	Average release rate for period	µCi/sec	9.28E-1	6.27E-1	
3.	Percent of applicable limit	%	2.23E-3	1.50E-3	

LLD Lower Limit of Detection; See Table 1D.

* Fourth quarter analyses not available at report time; values will be included in the following Semiannual Report.

TABLE 1C

S.O.N.G.S. 2-3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1990)
GASEOUS EFFLUENTS-GROUND LEVEL RELEASES

		Continuous Mode		Batch Mode	
Nuclides Released	Unit	Third Quarter	Fourth Quarter	Third Quarter	Fourth Quarter
1. Fission gases					
argon-41	Ci	5.96E+0	5.69E+0	<LLD	<LLD
krypton-85	Ci	<LLD	1.98E-1	<LLD	<LLD
krypton-85m	Ci	1.37E-2	2.11E-6	<LLD	<LLD
krypton-87	Ci	2.22E-4	<LLD	<LLD	<LLD
krypton-88	Ci	<LLD	<LLD	<LLD	<LLD
xenon-131m	Ci	<LLD	<LLD	1.37E-2	2.58E-2
xenon-133	Ci	2.17E+2	2.79E+2	4.29E-1	2.29E-1
xenon-133m	Ci	3.33E-2	7.06E-2	<LLD	<LLD
xenon-135	Ci	1.56E+1	2.29E+1	2.88E-3	5.64E-4
xenon-135m	Ci	<LLD	<LLD	<LLD	<LLD
xenon-138	Ci	<LLD	<LLD	<LLD	<LLD
Total for period	Ci	2.38E+2	3.08E+2	4.46E-1	2.55E-1
2. Iodines					
iodine-131	Ci	1.76E-3	1.33E-3	NA	NA
iodine-132	Ci	5.78E-5	2.26E-9	NA	NA
iodine-133	Ci	1.87E-3	1.22E-3	NA	NA
iodine-135	Ci	1.78E-4	1.81E-5	NA	NA
Total for period	Ci	3.87E-3	2.57E-3	NA	NA

LLD Lower Limit of Detection; See Table 1D.

NA Iodines and particulates are not analyzed prior to release via batch mode.

TABLE 1C (Continued)

S.O.N.G.S. 2-3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1990)
GASEOUS EFFLUENTS-GROUND LEVEL RELEASES

Nuclides Released	Unit	Continuous Mode		Batch Mode	
		Third Quarter	Fourth Quarter	Third Quarter	Fourth Quarter
3. Particulates					
barium-139	Ci	<LLD	6.90E-9	NA	NA
barium-140	Ci	<LLD	<LLD	NA	NA
bromine-82	Ci	1.47E-4	1.63E-4	NA	NA
cerium-143	Ci	1.45E-8	<LLD	NA	NA
cerium-144	Ci	2.29E-6	<LLD	NA	NA
cesium-134	Ci	<LLD	<LLD	NA	NA
cesium-137	Ci	8.75E-6	3.37E-6	NA	NA
cesium-138	Ci	1.79E-4	5.92E-6	NA	NA
chromium-51	Ci	2.15E-8	1.30E-9	NA	NA
cobalt-57	Ci	5.07E-8	2.27E-8	NA	NA
cobalt-58	Ci	5.14E-5	1.29E-5	NA	NA
cobalt-60	Ci	4.90E-6	1.38E-5	NA	NA
lanthanum-140	Ci	<LLD	<LLD	NA	NA
manganese-54	Ci	7.74E-8	1.83E-7	NA	NA
molybdenum-99	Ci	2.32E-8	<LLD	NA	NA
niobium-95	Ci	5.00E-8	<LLD	NA	NA
rubidium-88	Ci	1.18E-3	1.76E-6	NA	NA
strontium-89	Ci	<LLD	*	NA	NA
strontium-90	Ci	<LLD	*	NA	NA
technetium-99m	Ci	2.37E-8	<LLD	NA	NA
tellurium-132	Ci	<LLD	5.84E-11	NA	NA
tin-113	Ci	<LLD	1.36E-10	NA	NA

LLD Lower Limit of Detection; See Table 1D.

NA Iodines and particulates are not analyzed prior to release via batch mode.

* Fourth quarter analyses not available at report time; values will be included in the following Semiannual Report.

TABLE 1D

S.O.N.G.S. 2-3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1990)
GASEOUS EFFLUENTS-LOWER LIMIT OF DETECTION

RADIONUCLIDES	CONTINUOUS MODE LLD (μCi/cc)	BATCH MODE LLD (μCi/cc)
1. Fission and activation gases		
argon-41	*	6.60E-6
krypton-85	2.10E-5	1.10E-3
krypton-85m	*	1.70E-6
krypton-87	3.70E-7	5.90E-6
krypton-88	4.50E-7	5.10E-6
xenon-131m	5.40E-6	*
xenon-133m	*	1.40E-5
xenon-135m	1.20E-6	1.90E-5
xenon-138	2.30E-6	3.90E-5
2. Iodines		
3. Particulates		
barium-139	1.30E-10	NA
barium-140	6.00E-13	NA
cerium-143	9.00E-13	NA
cerium-144	8.00E-13	NA
cesium-134	1.90E-13	NA
lanthanum-140	1.00E-12	NA
molybdenum-99	2.40E-13	NA
niobium-95	**	NA
strontium-89	1.00E-13	NA
strontium-90	1.00E-14	NA
technetium-99m	2.40E-13	NA
tellurium-132	2.30E-13	NA
tin-113	2.00E-13	NA

NA Iodines and particulates are not analyzed prior to release via batch mode.

* Nuclides were detected in Table 1C.

** Nuclide is too short-lived to be detected by routine analysis.

TABLE 1E

S.O.N.G.S. 2-3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1990)
GASEOUS EFFLUENTS-RADIATION DOSES AT THE SITE BOUNDARY

		Unit	Third Quarter	Fourth Quarter*
A.	Noble Gas			
	1. Gamma air dose	mrad	2.46E-2	2.99E-2
	2. Percent Applicable Limit	%	2.46E-1	2.99E-1
	3. Beta air dose	mrad	4.35E-2	5.61E-2
	4. Percent Applicable Limit	%	2.18E-1	2.81E-1
B.	Tritium, Iodine, Particulate (at the nearest receptor)			
	1. Organ dose	mrem	1.52E-3	1.12E-3
	2. Percent Applicable Limit	%	1.01E-2	7.48E-3

NOTE: Calculations performed in accordance with the ODCM utilizing the historical X/Q.

* Fourth quarter dose incomplete due to Sr-89, and Sr-90 analyses not available at report time; values will be reported in the following Semiannual Report.

TABLE 1F

S.O.N.G.S. 2-3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1990)
GASEOUS EFFLUENTS-BATCH RELEASE SUMMARY

		6-MONTH PERIOD	
1.	Number of batch releases:	8	releases
2.	Total time period for batch releases:	2415	minutes
3.	Maximum time period for a batch release:	425	minutes
4.	Average time period for a batch release:	302	minutes
5.	Minimum time period for a batch release:	119	minutes

SECTION C. LIQUID EFFLUENTS

Table 2A, "Liquid Effluents-Summation of All Releases," provides a detailed summary of liquid effluents released quarterly in three categories: fission and activation products, tritium, and dissolved and entrained gases. Listed for each of the three categories are:

(1) the total curies released
(2) the average diluted concentration
(3) the percent of applicable limit
(4) the estimated total error

In addition, Table 2A lists:

(1) the gross alpha radioactivity
(2) the volume of batch waste released (prior to dilution)
(3) the total volume of dilution water

The methodology used to calculate the percent of applicable limit is presented in Section F of this report. The methodology used to calculate the estimated total error in Table 2A is presented in Section G of this report.

Table 2B, "Liquid Effluents," provides the systematic listing by radionuclide for the quantity of radioactivity released in each category. The total radioactivity of each radionuclide released is listed for each quarterly period by both "continuous" and "batch" modes of release.

Table 2C, "Liquid Effluents-Lower Limit of Detection," provides a listing of lower limit of detection concentrations for radionuclides not detected in Table 2B.

Table 2D, "Liquid Effluents-Radiation Doses at the Liquid Site Boundary," presents a quarterly summary of doses at the Liquid Site Boundary for this report period.

Table 2E, "Liquid Effluents-Batch Release Summary," provides summary information regarding batch releases conducted during this report period from San Onofre Nuclear Generating Station Units 2 and 3.

TABLE 2A

S.O.N.G.S. 2-3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1990)
LIQUID EFFLUENTS-SUMMATION OF ALL RELEASES

		Unit	Third Quarter	Fourth Quarter	Estimated Total Error, %
A.	Fission and activation products				
	1. Total release (not including tritium, gases, alpha)	Ci	4.52E-2	1.83E-2	1.90E+1
	2. Average diluted concentration during period	μCi/ml	7.35E-11	2.36E-11	
	3. Percent of applicable limit	%	2.82E-4	8.50E-5	
B.	Tritium				
	1. Total release	Ci	2.58E+2	2.83E+2	1.90E+1
	2. Average diluted concentration during period	μCi/ml	4.19E-7	3.65E-7	
	3. Percent of applicable limit	%	1.40E-2	1.22E-2	
C.	Dissolved and entrained gases				
	1. Total release	Ci	7.50E-2	1.01E-2	1.90E+1
	2. Average diluted concentration during period	μCi/ml	1.22E-10	1.30E-11	
	3. Percent of applicable limit	%	6.10E-5	6.50E-6	
D.	Gross alpha radioactivity				
	1. Total release	Ci	<LLD	*	5.00E+1
E.	Volume of waste released (prior to dilution)	liters	1.55E+7	8.40E+6	5.00E+0
F.	Volume of dilution water used during period	liters	6.16E+11	7.76E+11	5.00E+0

* Fourth quarter analyses not available at report time; values will be included in the following Semiannual Report.

TABLE 2B

S.O.N.G.S. 2-3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1990)
LIQUID EFFLUENTS

		Continuous Mode		Batch Mode	
Nuclides Released	Unit	Third Quarter	Fourth Quarter	Third Quarter	Fourth Quarter
1. Fission and activation products					
antimony-124	Ci	1.62E-4	<LLD	3.00E-4	1.57E-5
antimony-125	Ci	6.07E-4	<LLD	3.09E-3	1.70E-3
barium-139	Ci	<LLD	<LLD	<LLD	8.35E-5
barium-140	Ci	<LLD	<LLD	<LLD	<LLD
cerium-141	Ci	<LLD	<LLD	<LLD	<LLD
cerium-144	Ci	<LLD	<LLD	5.74E-5	5.35E-5
cesium-134	Ci	4.30E-4	<LLD	4.42E-3	1.19E-3
cesium-137	Ci	1.94E-3	2.98E-4	8.90E-3	3.03E-3
chromium-51	Ci	6.60E-4	<LLD	1.03E-3	9.88E-4
cobalt-57	Ci	9.60E-6	<LLD	7.24E-5	3.13E-5
cobalt-58	Ci	4.11E-3	1.83E-4	1.31E-2	5.30E-3
cobalt-60	Ci	5.08E-4	1.04E-4	1.70E-3	2.16E-3
iodine-131	Ci	<LLD	<LLD	8.45E-5	4.54E-5
iron-55	Ci	<LLD	*	8.30E-4	*
iron-59	Ci	3.34E-5	<LLD	6.19E-5	1.84E-5
lanthanum-140	Ci	<LLD	<LLD	<LLD	1.57E-6
manganese-54	Ci	1.00E-4	5.05E-5	3.26E-4	3.84E-4
molybdenum-99	Ci	<LLD	<LLD	<LLD	<LLD
niobium-95	Ci	4.51E-4	1.17E-4	1.25E-3	1.16E-3
niobium-97	Ci	<LLD	<LLD	1.78E-5	1.03E-5
ruthenium-103	Ci	<LLD	<LLD	<LLD	3.91E-5
silver-110m	Ci	<LLD	<LLD	1.13E-4	5.59E-4
strontium-89	Ci	<LLD	*	<LLD	*
strontium-90	Ci	<LLD	*	<LLD	*
strontium-92	Ci	<LLD	<LLD	7.20E-6	1.17E-5
technetium-99m	Ci	<LLD	<LLD	<LLD	<LLD
tin-113	Ci	<LLD	<LLD	1.06E-4	1.46E-4
zinc-65	Ci	<LLD	<LLD	<LLD	<LLD
zirconium-95	Ci	2.36E-4	<LLD	6.09E-4	6.32E-4
Total for period	Ci	9.25E-3	7.53E-4	3.60E-2	1.76E-2

LLD Lower Limit of Detection; see Table 2C.

* Third and Fourth quarter analyses not available at report time; values will be included in the following Semiannual Report.

TABLE 2B (Continued)

S.O.N.G.S. 2-3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1990)
LIQUID EFFLUENTS (Continued)

Nuclides Released	Unit	Continuous Mode		Batch Mode	
		Third Quarter	Fourth Quarter	Third Quarter	Fourth Quarter
2. Dissolved and entrained gases					
argon-41	Ci	<LLD	<LLD	<LLD	1.22E-6
krypton-85m	Ci	<LLD	<LLD	<LLD	1.54E-5
krypton-88	Ci	3.17E-2	<LLD	<LLD	<LLD
xenon-131m	Ci	<LLD	<LLD	<LLD	4.64E-4
xenon-133	Ci	1.08E-5	<LLD	4.27E-2	9.61E-3
xenon-133m	Ci	<LLD	<LLD	5.88E-4	<LLD
xenon-135	Ci	<LLD	<LLD	1.63E-5	7.46E-6

LLD Lower Limit of Detection; see Table 2C.

TABLE 2C

S.O.N.G.S. 2-3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1990)
LIQUID EFFLUENTS-LOWER LIMIT OF DETECTION

RADIONUCLIDES	CONTINUOUS MODE LLD (μCi/cc)	BATCH MODE LLD (μCi/cc)
1. Fission and activation products		
antimony-124	3.10E-7	*
antimony-125	1.80E-7	*
barium-139	**	2.80E-7
barium-140	3.00E-7	2.00E-7
cerium-141	8.90E-8	6.80E-8
cerium-144	3.90E-7	*
cesium-134	8.00E-8	*
chromium-51	6.60E-7	*
cobalt-57	5.30E-8	*
iodine-131	8.00E-8	*
iron-59	1.80E-7	*
lanthanum-140	4.90E-7	4.60E-8
molybdenum-99	1.10E-7	3.90E-8
niobium-97	8.50E-7	*
ruthenium-103	5.60E-8	6.20E-8
silver-110m	1.10E-7	*
strontium-89	5.00E-8	5.00E-8
strontium-90	1.00E-8	1.00E-8
strontium-92	**	*
technetium-99m	1.10E-7	3.90E-8
tin-113	6.40E-8	*
zinc-65	1.90E-7	6.90E-8
zirconium-95	1.40E-7	*
gross alpha	1.00E-7	1.00E-7
2. Dissolved and entrained gases		
argon-41	1.20E-7	3.70E-8
krypton-85m	1.30E-7	5.00E-8
krypton-88	4.00E-7	1.70E-7
xenon-131m	4.00E-6	1.80E-6
xenon-133	3.80E-7	*
xenon-133m	9.30E-7	5.50E-7
xenon-135	2.30E-8	*

* Nuclide detected in Table 2B.

** Analysis of weekly composites will not detect this isotope.

TABLE 2D

S.O.N.G.S. 2-3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1990)
LIQUID EFFLUENTS-RADIATION DOSES AT THE LIQUID SITE BOUNDARY

		Unit	Third Quarter*	Fourth Quarter*
A.				
1.	Total body dose	mrem	2.30E-3	8.32E-4
2.	Percent Applicable Limit	%	7.68E-2	2.77E-2
B.				
1.	Limiting organ dose	mrem	4.10E-3	3.76E-3
2.	Percent Applicable Limit	%	4.10E-2	3.76E-2

NOTE: The limiting organ for the third and fourth quarter is the GI-LLI.

* Fourth quarter doses incomplete due to Sr-89, Sr-90, and Fe-55 analyses not available at report time; values will be reported in the following Semiannual Report.

TABLE 2E

S.O.N.G.S. 2-3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1990)
GASEOUS EFFLUENTS-BATCH RELEASE SUMMARY

		6-MONTH PERIOD	
1.	Number of batch releases:	101	releases
2.	Total time period for batch releases:	21594	minutes
3.	Maximum time period for a batch release:	1480	minutes
4.	Average time period for a batch release:	214	minutes
5.	Minimum time period for a batch release:	2	minutes
6.	Average saltwater flow during batch releases:	694825	gpm

SECTION D. PREVIOUS SEMIANNUAL REPORT ADDENDUM

S.O.N.G.S. 2-3

1. The January - June 1990 Semiannual Report values for composite gross alpha, Sr-89, Sr-90, and Fe-55 (Tables 1A and 1C, Gaseous Effluents, Tables 2A and 2B, Liquid Effluents) were incomplete due to data not available at report time. The values not reported were for the first quarter of 1990. The values are as follows:

GASEOUS EFFLUENTS (1st Quarter 1990)

Nuclides Released	Unit	Continuous Mode	Batch Mode
strontium-89	Ci	<LLD	*
strontium-90	Ci	<LLD	*
Gross alpha	Ci	9.96E-9	*

Sr-89 LLD = 1.00E-13 μCi/cc
Sr-90 LLD = 1.00E-14 μCi/cc

* All "batch" gaseous releases made from S.O.N.G.S. 2-3 are vented through the Plant Stack, therefore, gross alpha, Sr-89, and Sr-90 are analyzed by "continuous" mode only.

LIQUID EFFLUENTS (1st Quarter 1990)

Nuclides Released	Unit	Continuous Mode	Batch Mode
iron-55	Ci	<LLD	3.75E-2
strontium-89	Ci	<LLD	<LLD
strontium-90	Ci	<LLD	<LLD
Gross alpha	Ci	<LLD	<LLD

Fe-55 LLD = 1.00E-6 μCi/ml
Sr-89 LLD = 5.00E-8 μCi/ml
Sr-90 LLD = 1.00E-8 μCi/ml
Gross alpha LLD = 1.00E-7 μCi/ml

SECTION D. PREVIOUS SEMIANNUAL REPORT ADDENDUM (Continued)

S.O.N.G.S. 2-3

1. The January - June 1990 Semiannual Report values for composite gross alpha, Sr-89, Sr-90, and Fe-55 (Tables 1A and 1C, Gaseous Effluents, Tables 2A and 2B, Liquid Effluents) were incomplete due to data not available at report time. The values not reported were for the second quarter of 1990. The values are as follows:

GASEOUS EFFLUENTS (2nd Quarter 1990)

Nuclides Released	Unit	Continuous Mode	Batch Mode
strontium-89	Ci	2.11E-9	*
strontium-90	Ci	<LLD	*
Gross alpha	Ci	<LLD	*

Sr-90 LLD = 1.00E-14 μCi/cc
Gross alpha LLD = 1.00E-13 μCi/cc

* All "batch" gaseous releases made from S.O.N.G.S. 2-3 are vented through the Plant Stack, therefore, gross alpha, Sr-89, and Sr-90 are analyzed by "continuous" mode only.

LIQUID EFFLUENTS (2nd Quarter 1990)

Nuclides Released	Unit	Continuous Mode	Batch Mode
iron-55	Ci	<LLD	1.54E-3
strontium-89	Ci	<LLD	<LLD
strontium-90	Ci	<LLD	<LLD
Gross alpha	Ci	1.99E-4	<LLD

Fe-55 LLD = 1.00E-6 μCi/ml
Sr-89 LLD = 5.00E-8 μCi/ml
Sr-90 LLD = 1.00E-8 μCi/ml
Gross alpha LLD = 1.00E-7 μCi/ml

2. ADDITIONAL GASEOUS EFFLUENT-RADIATION DOSES AT THE SITE BOUNDARY

For the first and second quarters of 1990 Semiannual Report, Sr-89 and Sr-90.

		Unit	First Quarter	Second Quarter*
A.	Tritium, Iodine, Particulate (at the nearest receptor)			
1.	Organ dose	mrem	0.00E+0	2.90E-9
2.	Percent Applicable Limit	%	0.00E+0	3.87E-8

NOTE: Calculations performed in accordance with the ODCM utilizing the historical X/Q.

3. ADDITIONAL LIQUID EFFLUENT-RADIATION DOSES AT THE SITE BOUNDARY

For the first and second quarters of 1990 Semiannual Report, Fe-55, Sr-89, and Sr-90.

		Unit	First Quarter	Second Quarter*
A.				
1.	Total body dose	mrem	2.45E-3	7.56E-5
2.	Percent Applicable Limit	%	8.17E-2	2.52E-3
B.				
1.	Limiting organ dose	mrem	1.52E-2	4.70E-4
2.	Percent Applicable Limit	%	1.52E-3	4.70E-3

NOTE: The limiting organ is the bone.

SECTION E. RADWASTE SHIPMENTS

S.O.N.G.S. 2-3

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1990)
SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

A. SOLID WASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL (Not Irradiated Fuel)

1. Type of waste	Unit	6-month Period	Est. Total Error, %
a. Spent resins, filter sludges, evaporator bottoms, etc.	m^3	NA	
	Ci	NA	NA
b. Dry compressible waste, contaminated equip. etc.	m^3	1.15E+2*	
	Ci	4.85E+0	3.00E+1
c. Irradiated components, control rods, etc.	m^3	NA	
	Ci	NA	NA
d. Other (filters)	m^3	1.36E+0**	
	Ci	2.66E+1	3.00E+1

NOTE: Total curie content estimated.

* Shipped in Type B Cask (C of C 9208): 1 - 142 cu. ft. High Integrity Container, contents 4 - 55 gallon DOT 7A drums (7.5 cu. ft each).

* Material packaged in 55-gallon DOT 7A drums (7.5 cu. ft. each), or strong, tight containers (steel boxes, 98 cu. ft. each).

** Shipped in Type A Cask (C of C 9176): 1 - 50 cu. ft. High Integrity Container.

SECTION E. RADWASTE SHIPMENTS (Continued)

S.O.N.G.S. 2-3

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1990)
SOLID WASTE AND IRRADIATED FUEL SHIPMENT

A. SOLID WASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL (Not Irradiated Fuel) (Continued)

2. Estimate of major nuclide composition (by type of waste)

a.

Not Applicable	%	0.00E+0

b.

antimony-125	%	8.37E-1
carbon-14	%	1.65E-2
cesium-134	%	7.59E+0
cesium-137	%	2.01E+1
cobalt-58	%	1.85E+0
cobalt-60	%	1.30E+1
iodine-129	%	3.61E-3
iron-55	%	2.61E+1
manganese-54	%	1.04E+0
nickel-63	%	3.38E+0
niobium-95	%	8.92E-1
strontium-89	%	2.32E-2
technetium-99	%	1.30E-3
tritium	%	2.49E+1
zirconium-95	%	2.99E-1

c.

Not applicable	%	0.00E+0

SECTION E. RADWASTE SHIPMENTS (Continued)

S.O.N.G.S. 2-3

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1990)
SOLID WASTE AND IRRADIATED FUEL SHIPMENT

A. SOLID WASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL (Not Irradiated Fuel) (Continued)

2. Estimate of major nuclide composition (by type of waste)

d.

americium-241	%	2.21E-4
antimony-124	%	2.93E-2
antimony-125	%	8.78E-1
carbon-14	%	1.76E-4
cerium-141	%	4.56E-5
cerium-144	%	4.27E-1
cesium-134	%	7.22E-1
cesium-136	%	4.41E-5
cesium-137	%	2.46E+0
chromium-51	%	7.99E-3
cobalt-57	%	1.46E-1
cobalt-58	%	4.97E+0
cobalt-60	%	9.71E+0
curium-242	%	1.17E-2
curium-243/244	%	6.14E-4
iodine-129	%	1.24E-3
iron-55	%	6.78E+1
iron-59	%	1.04E-2
manganese-54	%	1.09E+0
nickel-63	%	9.54E+0
niobium-94	%	5.86E-3
niobium-95	%	2.47E-2
plutonium-238	%	5.46E-4
plutonium-239/240	%	6.33E-4
plutonium-241	%	1.54E-1
ruthenium-103	%	8.44E-3
ruthenium-106	%	6.14E-1
silver-110m	%	2.60E-1
strontium-89	%	7.07E-4
strontium-90	%	1.05E-2
technetium-99	%	4.47E-4
tritium	%	8.37E-1
zirconium-95	%	2.58E-1

SECTION E. RADWASTE SHIPMENTS (Continued)

S.O.N.G.S. 2-3

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1990)
SOLID WASTE AND IRRADIATED FUEL SHIPMENT

A. SOLID WASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL (Not Irradiated Fuel) (Continued)

3. Solid Waste Disposition

See COMMON section of this report

B. IRRADIATED FUEL SHIPMENTS (Disposition)

See COMMON section of this report

SECTION F. APPLICABLE LIMITS

Gaseous Effluents - Applicable Limits

The percent of applicable limit, tabulated in Table 1A, was calculated using the following equation:

$$\% \text{ Applicable Limit} = \frac{(\text{Rel Rate})\ (X/Q)\ (100)}{MPC_{eff}}$$

where: Rel Rate = total curies released in each category and each quarter, divided by the seconds in a quarter; the value in Parts A.2, B.2, C.2 and D.2 of Table 1A, μCi/sec.

X/Q = 4.80E-6 sec/m^3; the annual average atmospheric dispersion defined in the ODCM, Rev. 17.

The MPC_{eff} is defined as:

$$\frac{1}{\sum_{i=1}^{n} \frac{F_i}{MPC_i}}$$

where: F_i = fractional abundance of the ith radionuclide obtained by dividing the activity (curies) for each radionuclide, C_i, by the sum of all the isotopic activity, C_T.

n = total number of radionuclides identified

MPC_i = MPC of the ith radionuclide

The % Applicable Limit is placed in Parts A.3, B.3, C.3 and D.3 of Table 1A.

SECTION F. APPLICABLE LIMITS

Liquid Effluents - Applicable Limits

The percent of applicable limit, tabulated in Table 2A, was calculated using the following equation:

$$\% \text{ Applicable Limit} = \frac{(\text{Dil Conc})\ (100)}{MPC_{eff}}$$

where: Dil Conc = total curies released in each category and each quarter divided by the total volume released (sum of Parts E and F in Table 2A); the value in Parts A.2, B.2 and C.2 of Table 2A, μCi/ml.

The MPC_{eff} is defined as:

$$\frac{1}{\sum_{i=1}^{n} \frac{F_i}{MPC_i}}$$

where: F_i = fractional abundance of the ith radionuclide obtained by dividing the activity (curies) for each radionuclide, C_i, by the sum of all the isotopic activity, C_T.

n = total number of radionuclides identified

MPC_i = MPC of the ith radionuclide

The % Applicable Limit is placed in Parts A.3, B.3 and C.3 of Table 2A.

SECTION G. ESTIMATION OF ERROR

S.O.N.G.S. 2-3

Estimations of the error in reported values of gaseous and liquid effluents releases have been made.

Sources of error for gaseous effluents - batch releases are:

(1) tank volumes
(2) sampling
(3) counting
(4) calibration

Sources of error for gaseous effluents - continuous releases are:

(1) fan flow rate
(2) sampling
(3) counting
(4) calibration
(5) differential pressure drop

Sources of error for liquid effluents - batch releases are:

(1) tank volumes
(2) sampling
(3) counting
(4) calibration

Sources of error for liquid effluents - continuous releases are:

(1) dilution flow rate
(2) sampling
(3) counting
(4) calibration

These sources of error are independent, and thus, the total error is calculated according to the following formula:

$$\text{Total Error} = \sqrt{\sigma_1^2 + \sigma_2^2 + \sigma_3^2 + \cdots \sigma_i^2}$$

where: σ_i = Error associated with each component.

SECTION H. 10 CFR 50 APPENDIX I REQUIREMENTS

S.O.N.G.S. 2-3

Table 1 in Section H presents the quarterly and annual maximum dose to an individual. Six different categories are presented:

(1) Liquid Effluents - Whole Body
(2) Liquid Effluents - Organ
(3) Airborne Effluents - Tritium, Iodines and Particulates
(4) Noble Gases - Gamma
(5) Noble Gases - Beta
(6) Direct Radiation

The doses for categories 1 and 2 were calculated using the methodology of the ODCM, this data is also presented in Table 2D for each of the four quarters. Categories 3, 4, and 5 were calculated utilizing RRRGS (Radioactive Release Report Generating System) software, Regulatory Guide 1.109 methodology, and concurrent meteorology. Table 1E of gaseous effluents previously presented, however, lists data similar to categories 3, 4 and 5 using methods described in the ODCM and the historical meteorology (X/Q). Category 6 presents direct dose data measured by TLD dosimeters. Each portion of each category is footnoted to briefly describe each maximum individual dose presented.

For individuals who may, at times, be within the site boundary, the occupancy of the individual will be sufficiently low to compensate for any increase in the atmospheric diffusion factor above that for the site boundary. For members of the public who traverse the site boundary via highway I-5, the residency time is considered negligible and hence the dose "0".

Table 2 in Section H presents the percent of ODCM Specification Limits for each dose presented in Table 1.

SECTION H. 10 CFR 50 APPENDIX I REQUIREMENTS (Continued)

S.O.N.G.S. 2-3

TABLE 1

	Dose* (millirems)				
SOURCE	1st Q	2nd Q	3rd Q	4th Q	Year
LIQUID EFFLUENTS	1)	2)	3)	4)	5)
Whole body	1.21E-3	4.64E-3	2.30E-3	8.32E-4	8.99E-3
	6)	7)	8)	9)	10)
Organ	4.01E-3	6.54E-3	4.10E-3	3.76E-3	1.61E-2
AIRBORNE EFFLUENTS	11)	12)	13)	14)	15)
Tritium, Iodines, and Particulates	2.27E-3	5.94E-3	2.65E-3	2.14E-3	1.11E-2
NOBLE GASES**	16)	17)	18)	19)	20)
Gamma	9.90E-3	5.97E-3	5.37E-3	1.46E-2	3.51E-2
	21)	22)	23)	24)	25)
Beta	2.57E-2	1.70E-2	9.92E-3	2.75E-2	7.81E-2
	26)	27)	28)	29)	30)
DIRECT RADIATION	1.53E-1	6.98E-2	1.62E-1	1.12E-1	8.08E-1

NOTE: The numbered footnotes below briefly explain how each maximum dose was calculated, including the organ and the predominant pathway(s).

** Noble gas doses due to airborne effluents are in units of mrad reflecting the air dose.

SECTION H. 10 CFR 50 APPENDIX I REQUIREMENTS (Continued)

S.O.N.G.S. 2-3

1. This data was calculated using the methodology of the ODCM.

2. This data was calculated using the methodology of the ODCM.

3. This data was calculated using the methodology of the ODCM.

4. This data was calculated using the methodology of the ODCM.

5. This data was calculated using the methodology of the ODCM.

6. This data was calculated using the methodology of the ODCM; the GI-LLI received the maximum dose primarily by the saltwater fish pathway.

7. This data was calculated using the methodology of the ODCM; the Liver received the maximum dose primarily by the saltwater fish pathway.

8. This data was calculated using the methodology of the ODCM; the GI-LLI received the maximum dose primarily by the saltwater fish pathway.

9. This data was calculated using the methodology of the ODCM; the GI-LLI received the maximum dose primarily by the saltwater fish pathway.

10. This data was calculated using the methodology of the ODCM; the GI-LLI received the maximum dose primarily by the saltwater fish pathway.

11. The maximum organ dose was to a child's thyroid and was located in the NNW sector. This was calculated using the activity reported in the January - June 1990 Semiannual Report with the assumptions of USNRC Regulatory Guide 1.109.

12. The maximum organ dose was to a child's thyroid and was located in the N sector This was calculated using the activity reported in the January - June 1990 Semiannual Report with the assumptions of USNRC Regulatory Guide 1.109.

13. The maximum organ dose was to a child's thyroid and was located in the NNW sector. This was calculated using the activity reported in the July - December 1990 Semiannual Report with the assumptions of USNRC Regulatory Guide 1.109.

14. The maximum organ dose was to a child's thyroid and was located in the ESE sector. This was calculated using the activity reported in the July - December 1990 Semiannual Report with the assumptions of USNRC Regulatory Guide 1.109.

SECTION H. 10 CFR 50 APPENDIX I REQUIREMENTS (Continued)

15. The maximum organ dose was to a child's thyroid and was located in the NNW sector. This was calculated using the activity reported in the January-December 1990 Semiannual Report with the assumptions of USNRC Regulatory Guide 1.109.

16. The maximum air dose for gamma radiation was located in the E sector, at the exclusion area boundary and calculated with the assumptions of the USNRC Regulatory Guide 1.109.

17. The maximum air dose for gamma radiation was located in the ENE sector, at the exclusion area boundary, and calculated with the assumptions of the USNRC Regulatory Guide 1.109.

18. A maximum air dose of 6.00E-3 mrad for gamma radiation was located in the SSW sector, a seaward direction. The reported maximum air dose for gamma radiation was located in the E sector, a landward sector, at the exclusion area boundary and calculated with the assumptions of the USNRC Regulatory Guide 1.109.

19. The maximum air dose for gamma radiation was located in the E sector, at the exclusion area boundary, and calculated with the assumptions of the USNRC Regulatory Guide 1.109.

20. The maximum air dose for gamma radiation was located in the E sector, at the exclusion area boundary, and calculated with the assumptions of the USNRC Regulatory Guide 1.109.

21. The maximum air dose for beta radiation was located in the E sector, at the exclusion area boundary and calculated with the assumptions of the USNRC Regulatory Guide 1.109.

22. The maximum air dose for beta radiation was located in the ENE sector, at the exclusion area boundary, and calculated with the assumptions of the USNRC Regulatory Guide 1.109.

23. A maximum air dose of 1.61E-2 mrad for beta radiation was located in the SSW sector, a seaward direction. The reported maximum air dose for beta radiation was located in the E sector, a landward sector, at the exclusion area boundary and calculated with the assumptions of the USNRC Regulatory Guide 1.109.

SECTION H. 10 CFR 50 APPENDIX I REQUIREMENTS (Continued)

24. The maximum air dose for beta radiation was located in the E sector, at the exclusion area boundary, and calculated with the assumptions of the USNRC Regulatory Guide 1.109.

25. The maximum air dose for beta radiation was located in the E sector, at the exclusion area boundary, and calculated with the assumptions of the USNRC Regulatory Guide. 1.109.

26. Measurements were made using TLD dosimeters; values are presented as site wide dose and are prorated to 300 hours per year; highest dose was measured at the Site Boundary in the SW sector.

27. Measurements were made using TLD dosimeters; values are presented as site wide dose and are prorated to 300 hours per year; highest dose was measured at the Site Boundary in the SW sector.

28. Measurements were made using TLD dosimeters; values are presented as site wide dose and are prorated to 300 hours per year; highest dose was measured at the Site Boundary in the SW sector.

29. Measurements were made using TLD dosimeters; values are presented as site wide dose and are prorated to 300 hours per year; highest dose was measured at the Site Boundary in the SW sector.

30. Measurements were made using TLD dosimeters; values are presented as site wide dose and are prorated to 300 hours per year; highest dose was measured at the Site Boundary in the SW sector.

S.O.N.G.S. 2-3

TABLE 2

	% Applicable Limit				
SOURCE	1st Q	2nd Q	3rd Q	4th Q	Year
LIQUID EFFLUENTS					
Whole body	4.03E-2	1.55E-1	7.68E-2	2.77E-2	1.50E-1
Organ	4.01E-2	6.54E-2	4.10E-2	3.76E-2	8.06E-2
AIRBORNE EFFLUENTS					
Tritium, Iodines, and Particulates	1.51E-2	3.96E-2	1.77E-2	1.43E-2	3.70E-2
NOBLE GASES					
Gamma	9.90E-2	5.97E-2	5.37E-2	1.46E-1	1.75E-1
Beta	1.29E-1	8.50E-2	4.96E-2	1.38E-1	1.95E-1

NOTE: Direct Radiation is not specifically addressed in the Specifications

SECTION I. CHANGES TO OFFSITE DOSE CALCULATION MANUAL

S.O.N.G.S. 2-3

- On August 2, 1990 Revision 22 to the Offsite Dose Calculation Manual (ODCM) for Units 2 and 3 was adopted and published. This revision encompassed a variety of changes to the document which include: responses to the NRC re TAC Nos. 74359 and 74360, response to QA re CAR 1235, incorporation of several Compliance letters of Clarification, modifications to existing Specifications to more accurately reflect plant conditions, and changes to Specifications to conform to the Standard Radiological Effluent Technical Specifications, NUREG-0472. Additionally, there are numerous editorial changes which include typographical errors, misreferenced Sections, and misspellings. A determination has been made that these changes do not reduce the accuracy or reliability of the dose calculations and setpoint determinations. Documentation of the fact that this change has been reviewed and found acceptable by the Station Manager was indicated by his signature on a letter dated August 2, 1990.

A complete copy of Revision 22 is being submitted to the NRC per Technical Specification 6.14.2.3 concurrent with this report. Explanations of the changes are listed below and safety reviews have been performed for the following changes:

- Sampling on the plant vent stack, condenser air ejectors, and containment purge post transient for particulate and iodine
- Releasing from the Full Flow Condensate Polisher Demineralizer sumps as a contaminated liquid pathway
- Lowering gaseous administrative factors
- Sampling the turbine plant sump for a monitor out-of-service condition
- Releasing from the Blowdown Processing System Sump as a continuous (as well as batch) liquid pathway
- Modifying the reporting requirements for an out-of-service ventilation exhaust treatment system and making the verification of operability of the liquid and gaseous radwaste treatment system dependent on the operating status of the plant

No positive findings were found in any of the safety evaluations.

No safety evaluations were performed for the incorporation of Compliance Clarification letters 18, 51, 94, 105, 121, and 129. The Technical Specifications for Units 2 and 3 were written before NUREG-0472, Standard Radiological Effluent Technical Specifications for Pressurized Water Reactors, was made available to the Station. The Compliance Clarification letters reflect SCE's interpretations of Technical Specifications and the manner in which the Specifications have been administered. This administrative compilation ensures that all of the effluent-related Specifications are in one document with no resultant change in either the plant configuration or the operation of the plant.

SECTION I. CHANGES TO OFFSITE DOSE CALCULATION MANUAL (Continued)

S.O.N.G.S. 2-3

The responses to Corrective Action Request (CAR) 1235 provide clarification of current methods of calculating offsite doses. They are administrative and will not result in any changes to the effluent program. Hence no safety reviews were performed.

Similarly, the majority of the suggestions incorporated into this revision of the ODCM from TAC 74359 and 72360 do not affect the effluent program at San Onofre but rather serve to correct minor documentation deficiencies. Therefore, with the exception of the change to the administrative factors for gaseous pathways, no safety evaluations were performed.

Per NRC Generic Letter 89-01, no safety review was required or performed for editorial or typographical changes.

[a] Indicates editorial changes: typographical errors, misreferenced Sections, and misspellings only.

i List of Figures, List of Tables, and GENERAL - updated page numbers[a]

ii Added 2.6.4, 2.9.1.1, 2.9.1.2, and 2.9.1.3, [a]

iii Added sections 5.1.1, 5.1.1.1, 5.2.1, 5.2.1.1, 5.3.1, 5.3.1.1, and changed respective page numbers[a]

iv Added pg. 5-1 and changed respective page numbers[a]

1-1 Liquid Effluent surveillance requirements changed in response to TAC 74359 & 74360

1-2 Table 1-1 simplified for ease of reading[a]; added Full Flow Condensate Polisher demineralizers to Batch; added BPS to continuous

1-4 (*) Footnote deleted - no releases from Miscellaneous Waste Evaporator Condensate[a]

1-6 Modified reporting requirements for Gaseous Radwaste Treatment System. Added Surveillance .3 and revised Surveillance .2 to make verification of operability of liquid radwaste treatment system mode dependent

1-10 Deleted reference to Tech Specs since RETS now in ODCM[a]

1-15 Added FFCPD sumps per Clarification Letter 121

1-16&
1-17&
1-19 Added BPS to continuous release pathways

1-24 Incorporated Clarification Letter 105, for temporary discharge path on TPS

1-25 Continuation of page 1-24[a]

SECTION I. CHANGES TO OFFSITE DOSE CALCULATION MANUAL (Continued)

S.O.N.G.S. 2-3

1-26 Revised Calibration Constants to reflect current data

1-27 Changed Specification "1.1.2" to "1.2.1"[a]

1-28&
1-29 Incorporated dose factors in response to TAC 74359 & 74360

2-2 Table 2-1 simplified for ease of reading[a]

2-4 Modified post transient sampling frequencies for particulate and iodine

2-7 Modified reporting requirements for Gaseous Radwaste Treatment System and Ventilation Exhaust Treatment System

2-8 Added Surveillance .3 and changed Surveillance .2 to make verification of operability of gaseous radwaste treatment system mode dependent

2-11&
2-12&
2-18&
2-19 Administrative factor changed to 0.38 per TAC 74359 & 74360

2-20 Deleted initial "2" from "2RT-7828" per TAC 74359 & 74360[a]

2-27&
2-28&
2-29 Modified Q-dot definitions per TAC 74359 & 74360[a]

2-28 Changed "Table 2-3" to "Table 2-5"[a]

2-29 Deleted "projected" and changed "gama" to "gamma" per TAC 74359 & 74360[a]

2-30 Added note to 2.8.1.2 concerning use of computer code per C.A.R. 1235.

2-33 Added note to 2.8.2.2 concerning use of computer code per C.A.R. 1235.

3-1 Changed Specification "1.3.1.1" to "1.3.1"[a]; changed Specification "2.4.1.1" to "2.4.1"[a]

4-2 Incorporated Clarification Letter 121, added Full Flow Condensate Polisher to Table 4-1, 1b and 2b

4-3 Changed Specification "1.1.1.1" to "1.1.1"[a]
Incorporated Clarification Letter 18, concerning monitor operability. Modified Action 30 for TPS samples when radiation monitor is out of service.

4-4 Incorporated Clarification Letter 121, added Full Flow Condensate Polisher to Table 4-2, 1b and 2b.

SECTION I. CHANGES TO OFFSITE DOSE CALCULATION MANUAL (Continued)

S.O.N.G.S. 2-3

4-5 Incorporated Clarification Letter 94, footnote (1) changed to require verification of effluent isolation path.

4-7 Added asterisks (***) after "Instrument" to denote a note

4-8 Incorporated Clarification Letter 18, concerning monitor operability. Incorporated Clarification Letter 51, specifying alternate means of plant vent stack flow determination.

4-9 Continuation of pg. 4-8[a]

4-10&
4-11 Added asterisks (***) after "Instrument" to denote a note

4-12 Incorporated Clarification Letter 18, concerning monitor operability. Incorporated Clarification Letter 94, footnote (1) changed to require verification of effluent isolation path.

4-14&
4-15 Figures updated to include all pathways per TAC 74359 & 74360[a]

5-1&
5-2 Reformatted entire section for document consistency; revised 5.1.d to include previous omissions and duplicate old Technical Specification 3.12.1 Action c.[a]

5-4 On sections 3c and 3d sample location designations corrected to duplicate old Technical Specification Table 5-1[a]

5-6 Footnote a edited to reference actual figure in the ODCM[a]

5-9 Footnote a, Table 5-3, revised to include previous omissions and duplicate old Technical Specifications Table 4.12-1, footnote a.[a]

5-11 Reformatted for document consistency[a]

5-12 Reformatted INTERLABORATORY COMPARISON PROGRAM section to be consistent with document format[a]

5-12&
5-13 Reformatted for document consistency[a]

5-15 Incorporated inhouse review, changed "San Mateo Paint" to"San Mateo Point"[a]

5-19 Incorporated inhouse review, changed "San Clemente Canyon" to "San Clemente Ranch"[a]

6-2&
6-3 Added Technical Specification definitions for MEMBERS OF THE PUBLIC and SITE BOUNDARY[a]

SECTION I. CHANGES TO OFFSITE DOSE CALCULATION MANUAL (Continued)

S.O.N.G.S. 2-3

6-5 Incorporated Clarification Letter 129 to clarify definition of R.

6-6& 6-7 Section 6.2.2 and note f revised to include previous omission and duplicate old Technical Specification 6.9.1.9[a]

6-8 Added "Technical Specification" before 6.5.2 [a]

6-11 Incorporated C.A.R. 1235, added note concerning intermittent occupancy within site boundary by members of the public.

6-14 Previously page 5-12, MONITORING PROGRAM, moved to Bases section and second paragraph changed to reference appropriate table[a]

6-15 Bases for Land Use Census and Interlaboratory Comparison (previously page 5-12) moved to Bases section

o Unplanned Release of the Full Flow Condensate Polishing (FFCPD) System Holdup Tank

On 10/9/90, the Computer Technicians were given verbal approval to work on the neutralization panel computer per maintenance order 9010627. Following replacement of the CPU board at 0925 on 10/10/90, the computer was rebooted with all pump control switches in "OFF". At that time all alarms reset and valve indications showed open demand signals. The operator and computer technicians attempted to close the valves from the panel with no effect. Short-term observations (approximately 30 seconds) at the panel did not reveal any decrease in level on the holdup tank. Nearly fifteen minutes later, however, the operator noticed the holdup tank level had decreased and contacted the control room to shut 2HV3773, the Blowdown Processing System (BPS) overboard valve. The valve was successfully closed and the release terminated.

The FFCPD holdup tank discharge is via the BPS neutralization sump monitor 2-7817. The monitor was inservice during the release and did not alarm above the setpoint of 8.00E3 cpm (which corresponds to a particulate and iodine concentration of 4.2E-5 uCi/ml). A post-release sample taken 1035 10/9/91, showed activity to be less than the lower limit of detection. Thus no dose resulted from the unplanned release of approximately 6500 gallons from the holdup tank.

For more information, see Unit 2 Operations Division Experience Report 02-90-33.

July 1, 1990 - December 31, 1990

EFFLUENT RADIATION MONITORS OUT OF SERVICE FOR GREATER THAN 30 DAYS

S.O.N.G.S. 2

Monitor	Inoperability Period	Inoperability Cause	Explanation
2RT-7818 A/B Condenser Air Ejector	01/25/88 to present	Detector design deficiency	Design flaw in 2RI-7818 Channel B causes entire monitor to be inoperable.
2RT-7870 Condenser Air Ejector	02/18/89 to present	Process flow	Inconsistent flow indication. Design change to rework/replace existing circuitry and certain components is being initiated. Radiation monitor functions still operable.
2RI-8721 Turbine Bldg. Sump Mon.	09/19/90 - 11/28/90	Implement DCP 2-6629	Wiring and Piping modifications.

July 1, 1990 - December 31, 1990

EFFLUENT RADIATION MONITORS OUT OF SERVICE FOR GREATER THAN 30 DAYS

S.O.N.G.S. 3

Monitor	Inoperability Period	Inoperability Cause	Explanation
3RT-7818 Condenser Air Ejector	01/25/88 to present	Detector design deficiency	Design flaw in 3RI-7818 Channel B causes entire monitor to be inoperable.

SECTION J. MISCELLANEOUS (Continued)

July 1, 1990 - December 31, 1990

EFFLUENT RADIATION MONITORS OUT OF SERVICE FOR GREATER THAN 30 DAYS

S.O.N.G.S. 3

Monitor	Inoperability Period	Inoperability Cause	Explanation
3RT-7870 Condenser Air Ejector	03/03/89 to present	Process Flow	Inconsistent flow indication. Design change to rework/replace existing circuitry and certain components is being initiated. Radiation monitor functions still operable.
	04/16/90 to 07/18/90	Removed from service	No flow from condensers due to Unit being in an outage.
3RT-7865 Plant Vent Stack	04/17/90 to 08/09/90	Process flow	Process flow is out of range during refueling outage when main purge is in operation. Radiation monitor functions still operable.
3RT-6753/ 3RT-6759 Steam Generator Blowdown	04/14/90 to 07/16/90	No Sample Flow	No steam generator pressure/steam flow due to Unit being in a refueling outage.
3RT-7828 Containment Purge	05/31/90 to 07/14/90	Flow indication falls outside range.	Simulated flow value installed. Radiation monitor functions still operable.

SECTION K. S.O.N.G.S. 2-3 CONCLUSIONS

- Gaseous effluent releases, excluding tritium, totaled 5.46E-2 curies with Xe-133 91% of the total.

- The radiation doses from gaseous releases are: (a) gamma air dose: 5.45E-2 mrad at the site boundary, (b) beta air dose: 9.96E-2 mrad at the site boundary, (c) organ dose: 2.64E-3 mrem at the nearest receptor.

- Liquid releases totaled 5.41E+2 curies of which tritium was 5.41E+2 Ci, noble gases were 8.51E-2 Ci, and particulates and iodines were 6.35E-2 Ci.

- The radiation doses from liquid releases are: (a) total body: 3.13E-3 mrem, (b) limiting organ: 7.86E-3 mrem.

- The radioactive releases and resulting doses generated from Units 2 and 3 were below the applicable limits for both gaseous and liquid effluents.

COMMON RADWASTE SHIPMENTS

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1990)
SOLID WASTE AND IRRADIATED FUEL SHIPMENT

A. SOLID WASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL (Not irradiated fuel)

1. Type of waste	Unit	6-month Period	Est. Total Error, %
a. Spent resins, filter sludges, evaporate bottoms, etc.	m^3	NA	
	Ci	NA	NA
b. Dry compressible waste, contaminated equipment, etc.	m^3	NA	
	Ci	NA	NA
c. Irradiated components, control rods, etc.	m^3	NA	
	Ci	NA	NA
d. Other (filters)	m^3	2.12E-1 **	
	Ci	1.04E+0	3.00E+1

NOTE: Total curie content estimated.

** Shipped in Type A Cask (C of C 9176): 1 - 50 cu. ft. High Integrity Container.

2. Estimate of major nuclide composition (by type of waste)

a. Not Applicable		%	0.00E+0
b. Not Applicable		%	0.00E+0
c. Not Applicable		%	0.00E+0

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1990)
SOLID WASTE AND IRRADIATED FUEL SHIPMENT

A. SOLID WASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL (Not irradiated fuel)

2. Estimate of major nuclide composition (by type of waste).

d.			
	americium-241	%	2.49E-3
	antimony-124	%	3.63E-3
	carbon-14	%	6.18E-4
	cerium-144	%	1.98E-1
	cesium-134	%	4.26E-1
	cesium-137	%	9.81E-1
	chromium-51	%	1.06E-2
	cobalt-57	%	1.31E-1
	cobalt-58	%	2.23E+0
	cobalt-60	%	2.15E+1
	curium-242	%	1.12E-2
	curium-243/244	%	2.81E-3
	iodine-129	%	1.07E-5
	iron-55	%	5.54E+1
	iron-59	%	1.04E-2
	manganese-54	%	1.98E+0
	nickel-63	%	1.42E+1
	niobium-95	%	2.73E-2
	plutonium-238	%	3.01E-3
	plutonium-239/240	%	2.04E-3
	plutonium-241	%	2.15E-1
	silver-110m	%	5.57E-2
	strontium-89	%	6.07E-4
	strontium-90	%	2.65E-2
	technetium-99	%	3.92E-4
	tritium	%	2.42E+0
	zirconium-95	%	1.55E-1

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1990)
SOLID WASTE AND IRRADIATED FUEL SHIPMENT

A. SOLID WASTE SHIPPED OFFSITE FOR BURIAL OR DISPOSAL (Not Irradiated fuel) (Continued)

2. Solid Waste Disposition (S.O.N.G.S. 1, 2, and 3)

Number of Shipments	Mode of Transportation	Destination
* 1	Tri-State Motor Transit Truck/Cask	Richland, WA
* 8	Tri-State Motor Transit Truck/Trailer	Beatty, NV
* 1	Tri-State Motor Transit Truck/Cask	Beatty, NV
# 7	Ranger Transportation Truck/Trailer	Barnwell, SC
# 2	Tri-State Motor Transit Truck/Trailer	Richland, WA

* All waste packaged at SONGS is staged at one location. There are no independent shipments of Dry Active Waste (DAW) made for Unit 1 or Units 2/3 and are not reported separately.

\# SONGS maintains contracts with Vendors that provide volume reduction services. These shipments were made from their processing facilities.

B. IRRADIATED FUEL SHIPMENTS (Disposition)

Number of Shipments	Mode of Transportation	Destination
None	N/A	N/A

C. DEWATERING

Number of Containers	Solidification Agent
None	N/A

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1990)
SOLID WASTE AND IRRADIATED FUEL SHIPMENT

D. CHANGES TO THE PROCESS CONTROL PROGRAM AT SAN ONOFRE UNITS 1, 2 & 3

1. There were no revisions to the Process Control Program procedure, SO123-VII-8.5.1 during the reporting period, July 1, 1990 to December 31, 1990.

REFERENCES:

1. Unit 1 Technical Specifications, Section 3.19
2. Unit 2 & 3 Technical Specifications, Sections 6.5.2.9, 6.5.2.10, and 6.13.2

COMMON 40 CFR 190 REQUIREMENTS

Table 1 presents the annual site-wide doses and percent of Technical Specification or ODCM Specification limits to members of the public. These values are calculated utilizing doses resulting from all effluent pathways and direct radiation. The different categories presented are: (1) Total Body, (2) Limiting Organ, and (3) Thyroid.

Table 1

		Units	Year
1.	Total Body		
	a. Total Body dose	mrem	1.38E+0
	b. Percent of Technical Specification Limits	%	5.50E+0
2.	Limiting Organ		
	a. Organ Dose (Liver)	mrem	3.16E-1
	b. Percent of Technical Specification Limits	%	1.26E+0
3.	Thyroid		
	a. Thyroid dose	mrem	6.00E-2
	b. Percent of Technical Specification Limits	%	7.99E-2

In addition to the dose calculated in the table above, one additional pathway exists for radiation exposure to a member of the public. Southern California Edison collects marine benthic material from the screens of its circulating water intake structure. Because of the potential for this benthic material to contain radioactive substances previously discharged to the environment as liquid waste, Southern California Edison performs a survey to confirm that no plant-related radioactive materials are detectable. The lower limit of detection (LLD) of the survey is established so that, with due consideration of the potential future use of the land disposal site, the maximum annual dose to an individual after 40 years of continued disposal is within the limits specified by 40CFR190. In that LLD determination, the disposal site, 20 miles distant from San Onofre, is considered to be outside the sphere of influence of gaseous and liquid pathways.

COMMON CONCLUSIONS

- Radioactive releases from S.O.N.G.S. 1, 2 and 3 totaled 1.34E+3 curies for gaseous effluents (excluding tritium), 95% of which was Xe-133. Curies discharged for liquid effluents were: tritium, 7.86E+2 curies; noble gases, 1.97E+0 curies; particulates and iodines, 2.56E-1 curies.

- Radioactive releases and resulting doses generated from S.O.N.G.S. 1, 2 and 3 were below the Technical Specification and Offsite Dose Calculation Manual Specification Limits for both gaseous and liquid effluents.

- S.O.N.G.S. 1, 2 and 3 made three radwaste shipments to Richland, Washington; nine to Beatty, Nevada; and seven to Barnwell, North Carolina. Total volume was 1.67E+2 cubic meters containing 4.50E+1 curies of radioactivity.

- Meteorological conditions during the year were typical for S.O.N.G.S. Meteorological dispersion was good 38% of the time, fair 36% of the time and poor 26% of the time.

- The net result from the analysis of these effluent releases indicates that the operation of S.O.N.G.S. 1, 2 and 3 has met all the requirements of the Technical Specifications and other applicable regulatory requirements and therefore has not produced any detrimental effect on the environment.

APPENDIX A

GASEOUS EFFLUENTS - APPLICABLE LIMITS

A. Table 1A lists the total curies released and the release rate. The percent of applicable limit compares the released concentrations to the concentration limits of 10 CFR 20, Appendix B, Table II, Column 1.

B. Table 1E lists the air doses as calculated using the historical X/Q. The air dose due to noble gases released in gaseous effluents from S.O.N.G.S. (per reactor) to areas at and beyond the site boundary shall be limited to the following values:

1. During any calendar quarter: ≤ 5 mrad for gamma radiation and ≤ 10 mrad for beta radiation.

2. During any calendar year: ≤ 10 mrad for gamma radiation and ≤ 20 mrad for beta radiation.

C. The dose to a Member of the Public from iodines, tritium, and all radionuclides in particulate form with half-lives greater than eight days in gaseous effluents released from S.O.N.G.S. (per reactor) to areas at and beyond the site boundary shall be limited to the following values:

1. During any calendar quarter: ≤ 7.5 mrem to any organ.

2. During any calendar year: ≤ 15 mrem to any organ.

APPENDIX A (Continued)

LIQUID EFFLUENTS - APPLICABLE LIMITS

A. Table 2A lists the total curies released, the diluted concentration, and percent of the applicable limit. The percent of applicable limit compares the diluted concentration of radioactive material released to to the concentrations specified in 10 CFR 20, Appendix B, Table II, Column 2 for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration is limited to 2.00E-4 μCi/ml.

B. Table 2D lists doses due to liquid releases. The dose commitment to a Member of the Public from radioactive materials in liquid effluents released from S.O.N.G.S. (per reactor) to unrestricted areas shall be limited to the following values:

1. During any calendar quarter: $\leq$ 1.5 mrem to the total body and $\leq$ 5 mrem to any organ.

2. During any calendar year: $\leq$ 3 mrem to the total body and $\leq$ 10 mrem to any organ.

METEOROLOGY

The meteorology of the San Onofre Nuclear Generating Station for each of the four quarters, 1990 is described in this section. Meteorological measurements have been made according to the guidance provided in USNRC Regulatory Guide 1.23, "Onsite Meteorological Programs." A summary report of the meteorological measurements taken during each calendar quarter are presented in Table 4A as joint frequency distribution (JFD) of wind direction and wind speed by atmospheric stability class.

Hourly meteorological data for batch releases have been recorded for the periods of actual release. This data is available, as well as the hourly data for the Semiannual Report, but has not been included in this report because of the bulk of data records.

Table 4A lists the joint frequency distribution for each quarter, 1990. Each page of Table 4A represents the data for the individual stability classes: A, B, C, D, E, F, and G. The last page of each section is the JFD for all the stability classes. The wind speeds have been measured at the 10-meter level, and the stability classes are defined by the temperature differential between the 10- and 40-meter levels.

01/30/91 08:30 SITE: SAN ONOFRE

PERIOD OF RECORD 90010101-90033124
EXTREMELY UNSTABLE (DT/DZ LESS THAN -1.9 DEG.C/100 M)
PASQUILL A
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT
N	0	0	0	0	0	0	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	2	2	0	0	0	0	4
NE	0	0	0	0	0	0	1	0	0	0	0	0	1
ENE	0	0	0	0	0	0	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0	1	1	0	0	0	2
SSE	0	0	0	0	1	6	0	0	0	0	0	0	7
S	0	0	0	2	4	19	17	1	0	0	0	0	43
SSW	0	0	1	2	7	13	17	1	0	0	0	0	41
SW	0	0	0	7	12	26	15	2	0	0	0	0	62
WSW	0	0	0	6	11	36	32	1	1	0	0	0	87
W	0	0	0	4	8	64	62	6	3	0	0	0	147
WNW	0	0	0	0	3	13	27	14	12	1	0	0	70
NW	0	0	0	0	0	0	2	0	0	0	0	0	2
NNW	0	0	0	0	0	0	0	1	0	0	0	0	1
TOTALS	0	0	1	21	46	177	175	29	17	1	0	0	467

NUMBER OF CALMS	5
NUMBER OF INVALID HOURS	35
NUMBER OF VALID HOURS	467
TOTAL HOURS FOR THE PERIOD	2160

01/30/91 08:30 SITE: SAN ONOFRE

PERIOD OF RECORD 90010101-90033124
MODERATELY UNSTABLE (-1.9 < DT/DZ <= -1.7 DEG.C/100 M)
PASQUILL B
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT
N	0	0	0	0	0	0	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0	0	0	0	0	0	0
S	0	1	0	0	0	0	0	0	0	0	0	0	1
SSW	0	0	0	0	0	0	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	0	1	0	0	0	0	0	0	0	0	0	0	1

NUMBER OF CALMS	5
NUMBER OF INVALID HOURS	35
NUMBER OF VALID HOURS	1
TOTAL HOURS FOR THE PERIOD	2160

01/30/91 08:30 SITE: SAN ONOFRE

PERIOD OF RECORD 90010101-90033124
SLIGHTLY UNSTABLE (-1.7 < DT/TZ <= -1.5 DEG.C/100 M)
PASQUILL C
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT
N	0	0	0	0	0	0	2	0	0	0	0	0	2
NNE	0	0	0	1	0	1	0	0	0	0	0	0	2
NE	0	0	0	0	0	0	1	0	0	0	0	0	1
ENE	0	0	0	0	0	0	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0	0	0	0	0	0	0
ESE	0	0	0	0	1	0	0	0	0	0	0	0	1
SE	0	0	0	0	0	3	4	1	1	0	0	0	9
SSE	0	0	0	1	1	8	7	1	0	0	0	0	18
S	0	0	0	3	3	7	4	2	0	0	0	0	19
SSW	0	0	1	0	1	2	3	0	0	0	0	0	7
SW	0	0	0	1	1	3	0	1	0	0	0	0	6
WSW	0	0	0	1	0	3	1	2	1	0	0	0	8
W	0	0	2	0	2	3	4	2	0	1	0	0	14
WNW	0	0	0	2	2	5	2	2	0	0	0	0	13
NW	0	0	0	0	1	1	4	1	0	0	0	0	7
NNW	0	0	0	0	0	1	1	1	0	0	0	0	3
TOTALS	0	0	3	9	12	37	33	13	2	1	0	0	110

NUMBER OF CALMS	5
NUMBER OF INVALID HOURS	35
NUMBER OF VALID HOURS	110
TOTAL HOURS FOR THE PERIOD	2160

01/30/91 08:30 SITE: SAN ONOFRE

PERIOD OF RECORD 90010101-90033124
NEUTRAL(-1.5 < DT/DZ <= -0.5 DEG.C/100 M)
PASQUILL D
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22- .50	.51- .75	.76- 1.0	1.1- 1.5	1.6- 2.0	2.1- 3.0	3.1- 5.0	5.1- 7.0	7.1- 10.0	10.1- 13.0	13.1- 18.0	>18	TOT
N	0	0	2	1	6	7	2	1	0	0	0	0	19
NNE	0	1	1	8	9	9	3	2	0	0	0	0	33
NE	0	0	0	5	2	1	5	0	0	0	0	0	13
ENE	0	1	1	2	1	1	1	2	0	0	0	0	9
E	0	0	1	5	1	4	5	0	0	0	0	0	16
ESE	0	0	0	3	3	3	1	2	0	0	0	0	12
SE	0	0	0	1	6	18	31	17	6	0	0	0	79
SSE	0	0	0	6	9	19	25	7	2	4	1	0	73
S	0	0	2	4	8	7	5	12	3	5	1	0	47
SSW	0	0	2	5	8	9	6	0	2	1	0	0	33
SW	0	1	1	1	7	6	9	4	0	0	0	0	29
WSW	0	1	0	2	6	4	8	7	1	0	0	0	29
W	0	2	2	7	8	7	7	10	6	1	0	0	50
WNW	1	1	1	5	4	11	10	11	8	1	0	0	53
NW	0	1	3	3	3	10	10	3	4	0	0	0	37
NNW	0	0	2	8	3	4	2	4	0	0	0	0	23
TOTALS	1	8	18	66	84	120	130	82	32	12	2	0	555

NUMBER OF CALMS	5
NUMBER OF INVALID HOURS	35
NUMBER OF VALID HOURS	555
TOTAL HOURS FOR THE PERIOD	2160

01/30/91 08:31 SITE: SAN ONOFRE

PERIOD OF RECORD 90010101-90033124
SLIGHTLY STABLE (-0.5 < DT/DZ <= -1.5 DEG.C/100 M)
PASQUILL E
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT
N	1	3	3	5	9	7	8	1	0	0	0	0	37
NNE	0	2	6	20	24	18	3	1	1	0	0	0	75
NE	0	1	3	5	3	1	5	3	1	0	0	0	22
ENE	1	0	1	2	1	2	3	2	1	0	0	0	13
E	0	2	0	2	2	4	1	0	0	0	0	0	11
ESE	0	1	2	0	0	1	0	0	0	0	0	0	4
SE	0	2	1	1	4	5	4	2	0	0	0	0	19
SSE	0	1	0	0	0	4	2	0	1	0	0	0	8
S	0	1	0	2	0	0	0	1	0	0	0	0	4
SSW	0	1	2	2	0	2	0	0	0	0	0	0	7
SW	0	0	0	2	0	0	0	1	0	0	0	0	3
WSW	0	0	0	3	2	0	0	0	0	0	0	0	5
W	0	0	2	1	0	3	2	3	0	0	0	0	11
WNW	0	1	0	0	2	7	2	2	0	0	0	0	14
NW	0	0	0	0	0	2	2	0	0	0	0	0	4
NNW	0	1	2	3	6	5	4	2	0	0	0	0	23
TOTALS	2	16	22	48	53	61	36	18	4	0	0	0	260

NUMBER OF CALMS	5
NUMBER OF INVALID HOURS	35
NUMBER OF VALID HOURS	260
TOTAL HOURS FOR THE PERIOD	2160

01/30/91 08:31 SITE: SAN ONOFRE

PERIOD OF RECORD 90010101-90033124
MODERATELY STABLE (1.5 <= DT/DZ <= -0.5 DEG.C/100 M)
PASQUILL F
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT
N	0	1	1	4	5	8	8	0	0	0	0	0	27
NNE	0	1	6	24	47	52	12	1	0	0	0	0	143
NE	0	1	6	8	3	5	3	1	0	0	0	0	27
ENE	1	1	3	1	1	1	1	0	0	0	0	0	9
E	0	1	2	3	1	2	0	0	0	0	0	0	9
ESE	0	0	0	0	1	0	1	0	0	0	0	0	2
SE	0	2	0	0	0	2	1	0	0	0	0	0	5
SSE	0	1	1	1	0	1	0	0	0	0	0	0	4
S	0	0	2	3	0	1	0	0	0	0	0	0	6
SSW	0	1	1	0	0	0	0	0	0	0	0	0	2
SW	0	1	0	0	0	0	0	0	0	0	0	0	1
WSW	0	1	0	0	1	1	0	0	0	0	0	0	3
W	0	1	0	2	1	6	0	0	0	0	0	0	10
WNW	0	0	0	0	1	2	0	0	0	0	0	0	3
NW	1	0	1	1	0	0	2	0	0	0	0	0	5
NNW	1	0	1	2	0	5	0	0	0	0	0	0	9
TOTALS	3	12	24	49	61	86	28	2	0	0	0	0	265

NUMBER OF CALMS	5
NUMBER OF INVALID HOURS	35
NUMBER OF VALID HOURS	265
TOTAL HOURS FOR THE PERIOD	2160

01/30/91 08:31 SITE: SAN ONOFRE

PERIOD OF RECORD 90010101-90033124
EXTREMELY STABLE(DT/DZ EXCEEDS 4.0 DEG.C/100 M)
PASQUILL G
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT
N	0	1	1	2	0	4	16	5	0	0	0	0	29
NNE	0	1	1	4	32	201	120	3	0	0	0	0	362
NE	0	0	1	11	6	5	8	0	0	0	0	0	31
ENE	0	0	2	4	3	0	0	0	0	0	0	0	9
E	0	0	1	0	0	0	0	0	0	0	0	0	1
ESE	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	0	0	0	1	0	1	0	0	0	0	0	0	2
SSE	0	1	2	0	2	1	0	0	0	0	0	0	6
S	0	0	0	0	0	0	0	0	0	0	0	0	0
SSW	0	0	0	3	0	0	0	0	0	0	0	0	3
SW	0	0	0	0	0	0	0	0	0	0	0	0	0
WSW	0	1	0	0	1	1	0	0	0	0	0	0	3
W	0	0	1	2	0	2	3	0	0	0	0	0	8
WNW	0	0	1	0	1	3	2	0	0	0	0	0	7
NW	0	0	0	0	1	1	2	0	0	0	0	0	4
NNW	0	0	0	1	1	0	0	0	0	0	0	0	2
TOTALS	0	4	10	28	47	219	151	8	0	0	0	0	467

NUMBER OF CALMS	5
NUMBER OF INVALID HOURS	35
NUMBER OF VALID HOURS	467
TOTAL HOURS FOR THE PERIOD	2160

[8] SUMMARY OF ALL STABILITIES

01/30/91 08:31 SITE: SAN ONOFRE

PERIOD OF RECORD 90010101-90033124
ALL STABILITY, ALL DT/DZ
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT
N	1	5	7	12	20	26	36	7	0	0	0	0	114
NNE	0	5	14	57	112	281	140	9	1	0	0	0	619
NE	0	2	10	29	14	12	23	4	1	0	0	0	95
ENE	2	2	7	9	6	4	5	4	1	0	0	0	40
E	0	3	4	10	4	10	6	0	0	0	0	0	37
ESE	0	1	2	3	5	4	2	2	0	0	0	0	19
SE	0	4	1	3	10	29	40	21	8	0	0	0	116
SSE	0	3	3	8	13	39	34	8	3	4	1	0	116
S	0	2	4	14	15	34	26	16	3	5	1	0	120
SSW	0	2	7	12	16	26	26	1	2	1	0	0	93
SW	0	2	1	11	20	35	24	8	0	0	0	0	101
WSW	0	3	0	12	21	45	41	10	3	0	0	0	135
W	0	3	7	16	19	85	78	21	9	2	0	0	240
WNW	1	2	2	7	13	41	43	29	20	2	0	0	160
NW	1	1	4	4	5	14	22	4	4	0	0	0	59
NNW	1	1	5	14	10	15	7	8	0	0	0	0	61
TOTALS	6	41	78	221	303	700	553	152	55	14	2	0	2125

NUMBER OF CALMS	5
NUMBER OF INVALID HOURS	35
NUMBER OF VALID HOURS	2125
TOTAL HOURS FOR THE PERIOD	2160

01/30/91 08:36 SITE: SAN ONOFRE

PERIOD OF RECORD 90040101-90063023
EXTREMELY UNSTABLE (DT/DZ LESS THAN -1.9 DEG.C/100 M)
PASQUILL A
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT
N	0	0	0	0	0	0	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	0	0	0	0	0	1	4	4	0	0	0	0	9
SSE	0	0	0	0	1	0	5	9	4	0	0	0	19
S	0	0	0	1	2	12	50	11	6	0	0	0	82
SSW	0	0	0	0	1	22	36	2	0	0	0	0	61
SW	0	0	0	3	8	30	76	4	0	0	0	0	121
WSW	0	0	0	4	7	38	92	4	0	0	0	0	145
W	0	0	0	1	5	53	137	8	0	0	0	0	204
WNW	0	0	0	0	1	10	41	10	0	0	0	0	62
NW	0	0	0	0	0	0	0	3	1	0	0	0	4
NNW	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	0	0	0	9	25	166	441	55	11	0	0	0	707

NUMBER OF CALMS	18
NUMBER OF INVALID HOURS	4
NUMBER OF VALID HOURS	707
TOTAL HOURS FOR THE PERIOD	2183

01/30/91 08:36 SITE: SAN ONOFRE

PERIOD OF RECORD 90040101-90063023
MODERATELY UNSTABLE (-1.9 < DT/DZ <= -1.7 DEG.C/100 M)
PASQUILL B
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT
N	0	0	0	0	0	0	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0	0	0	0	0	0	0
WSW	0	0	0	0	1	0	0	0	0	0	0	0	1
W	0	0	0	0	0	0	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	0	0	0	0	1	0	0	0	0	0	0	0	1

NUMBER OF CALMS	18
NUMBER OF INVALID HOURS	4
NUMBER OF VALID HOURS	1
TOTAL HOURS FOR THE PERIOD	2183

01/30/91 08:36 SITE: SAN ONOFRE

PERIOD OF RECORD 90040101-90063023
SLIGHTLY UNSTABLE (-1.7 < DT/TZ <= -1.5 DEG.C/100 M)
PASQUILL C
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT
N	0	0	0	0	0	0	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	0	0	0	0	0	1	3	4	2	0	0	0	10
SSE	0	0	0	0	1	2	6	17	7	0	0	0	33
S	0	0	0	0	3	5	5	3	0	0	0	0	16
SSW	0	0	0	1	1	3	5	4	2	0	0	0	16
SW	0	0	1	3	2	4	3	0	0	0	0	0	13
WSW	0	0	0	4	4	2	2	1	0	0	0	0	13
W	0	0	0	0	3	5	3	1	0	0	0	0	12
WNW	0	0	0	0	0	7	10	0	0	0	0	0	17
NW	0	0	0	0	0	3	2	1	0	0	0	0	6
NNW	0	0	0	0	0	0	1	0	0	0	0	0	1
TOTALS	0	0	1	8	14	32	40	31	11	0	0	0	137

NUMBER OF CALMS	18
NUMBER OF INVALID HOURS	4
NUMBER OF VALID HOURS	137
TOTAL HOURS FOR THE PERIOD	2183

Semiannual Effluent Report
July - December 1990

01/30/91 08:36 SITE: SAN ONOFRE

PERIOD OF RECORD 90040101-90063023
NEUTRAL(-1.5 < DT/DZ <= -0.5 DEG.C/100 M)
PASQUILL D
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT
N	0	1	5	7	15	2	1	0	0	0	0	0	31
NNE	0	1	1	15	7	9	0	0	0	0	0	0	33
NE	0	0	2	2	5	0	0	0	0	0	0	0	9
ENE	0	0	0	3	2	4	0	0	0	0	0	0	9
E	0	0	1	2	1	15	7	0	0	0	0	0	26
ESE	0	3	2	3	0	13	11	0	0	0	0	0	32
SE	0	0	1	4	9	42	53	19	2	1	0	0	131
SSE	0	1	2	7	14	28	57	19	17	1	0	0	146
S	0	0	0	8	10	21	21	10	2	0	0	0	72
SSW	1	2	3	3	13	22	16	6	3	0	0	0	69
SW	0	0	1	6	5	16	12	2	0	0	0	0	42
WSW	2	0	2	10	3	10	12	8	1	0	0	0	48
W	0	2	2	7	8	11	14	2	0	0	0	0	46
WNW	0	3	1	5	7	17	20	3	1	0	0	0	57
NW	0	0	3	12	4	24	20	2	0	0	0	0	65
NNW	1	0	4	8	3	7	0	0	0	0	0	0	23
TOTALS	4	13	30	102	106	241	244	71	26	2	0	0	839

NUMBER OF CALMS	18
NUMBER OF INVALID HOURS	4
NUMBER OF VALID HOURS	839
TOTAL HOURS FOR THE PERIOD	2183

01/30/91 08:36 SITE: SAN ONOFRE

PERIOD OF RECORD 90040101-90063023
SLIGHTLY STABLE (-0.5 < DT/DZ <= -1.5 DEG.C/100 M)
PASQUILL E
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT
N	0	0	5	12	8	7	1	0	0	0	0	0	33
NNE	0	1	5	10	15	18	3	0	0	0	0	0	52
NE	0	1	2	6	2	1	0	0	0	0	0	0	12
ENE	0	1	1	0	0	0	0	0	0	0	0	0	2
E	0	1	1	0	5	8	0	1	0	0	0	0	16
ESE	1	0	1	1	2	4	4	2	0	0	0	0	15
SE	1	1	2	5	8	13	22	1	0	0	0	0	53
SSE	0	0	0	4	3	3	4	1	1	0	0	0	16
S	0	0	1	4	0	2	0	1	0	0	0	0	8
SSW	0	1	0	0	0	2	0	0	0	0	0	0	3
SW	0	1	0	0	0	0	1	0	0	0	0	0	2
WSW	0	0	1	0	0	0	0	0	1	0	0	0	2
W	0	0	1	1	2	4	1	0	0	0	0	0	9
WNW	1	1	0	0	0	1	5	1	0	0	0	0	9
NW	0	0	3	2	0	2	3	0	0	0	0	0	10
NNW	1	0	1	2	2	2	1	0	0	0	0	0	9
TOTALS	4	8	24	47	47	67	45	7	2	0	0	0	251

NUMBER OF CALMS	18
NUMBER OF INVALID HOURS	4
NUMBER OF VALID HOURS	251
TOTAL HOURS FOR THE PERIOD	2183

01/30/91 08:36 SITE: SAN ONOFRE

PERIOD OF RECORD 90040101-90063023
MODERATELY STABLE (1.5 <= DT/DZ <= -0.5 DEG.C/100 M)
PASQUILL F
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT
N	0	1	2	8	3	4	3	0	0	0	0	0	21
NNE	1	2	3	19	17	22	0	0	0	0	0	0	64
NE	0	2	4	1	0	0	0	0	0	0	0	0	7
ENE	0	1	2	0	0	0	0	0	0	0	0	0	3
E	0	0	0	1	0	0	0	0	0	0	0	0	1
ESE	0	0	0	1	1	0	1	1	0	0	0	0	4
SE	0	0	1	0	0	1	3	0	0	0	0	0	5
SSE	0	0	0	0	0	1	1	0	0	0	0	0	2
S	0	0	0	0	0	0	0	0	0	0	0	0	0
SSW	0	0	0	3	0	0	0	0	0	0	0	0	3
SW	0	0	0	1	0	0	0	0	0	0	0	0	1
WSW	1	0	0	0	0	0	0	0	0	0	0	0	1
W	0	0	0	0	0	1	0	0	0	0	0	0	1
WNW	0	0	0	1	0	0	3	0	0	0	0	0	4
NW	0	0	0	0	1	0	0	0	0	0	0	0	1
NNW	0	1	1	2	0	0	0	0	0	0	0	0	4
TOTALS	2	7	13	37	22	29	11	1	0	0	0	0	122

NUMBER OF CALMS	18
NUMBER OF INVALID HOURS	4
NUMBER OF VALID HOURS	122
TOTAL HOURS FOR THE PERIOD	2183

01/30/91 08:36 SITE: SAN ONOFRE

PERIOD OF RECORD 90040101-90063023
EXTREMELY STABLE(DT/DZ EXCEEDS 4.0 DEG.C/100 M)
PASQUILL G
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT
N	0	0	1	0	2	3	4	0	0	0	0	0	10
NNE	0	0	0	4	22	46	13	0	0	0	0	0	85
NE	0	0	0	4	2	0	0	0	0	0	0	0	6
ENE	0	0	1	0	0	0	0	0	0	0	0	0	1
E	0	0	0	0	1	0	0	0	0	0	0	0	1
ESE	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	0	0	0	0	0	1	0	0	0	0	0	0	1
SSE	0	0	0	0	1	0	0	0	0	0	0	0	1
S	0	0	0	3	0	0	0	0	0	0	0	0	3
SSW	0	0	0	0	0	0	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0	0	0	0	0	0	0
WSW	1	0	1	0	1	0	0	0	0	0	0	0	3
W	0	0	0	1	0	1	0	0	0	0	0	0	2
WNW	0	0	0	0	0	1	5	0	0	0	0	0	6
NW	0	0	0	0	0	0	1	0	0	0	0	0	1
NNW	0	0	0	0	0	1	1	0	0	0	0	0	2
TOTALS	1	0	3	12	29	53	24	0	0	0	0	0	122

NUMBER OF CALMS	18
NUMBER OF INVALID HOURS	4
NUMBER OF VALID HOURS	122
TOTAL HOURS FOR THE PERIOD	2183

[8] SUMMARY OF ALL STABILITIES

01/30/91 08:36 SITE: SAN ONOFRE

PERIOD OF RECORD 90040101-90063023
ALL STABILITY, ALL DT/DZ
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT
N	0	2	13	27	28	16	9	0	0	0	0	0	95
NNE	1	4	9	48	61	95	16	0	0	0	0	0	234
NE	0	3	8	13	9	1	0	0	0	0	0	0	34
ENE	0	2	4	3	2	4	0	0	0	0	0	0	15
E	0	1	2	3	7	23	7	1	0	0	0	0	44
ESE	1	3	3	5	3	17	16	3	0	0	0	0	51
SE	1	1	4	9	17	59	85	28	4	1	0	0	209
SSE	0	1	2	11	20	34	73	46	29	1	0	0	217
S	0	0	1	16	15	40	76	25	8	0	0	0	181
SSW	1	3	3	7	15	49	57	12	5	0	0	0	152
SW	0	1	2	13	15	50	92	6	0	0	0	0	179
WSW	4	0	4	18	16	50	106	13	2	0	0	0	213
W	0	2	3	10	18	75	155	11	0	0	0	0	274
WNW	1	4	1	6	8	36	84	14	1	0	0	0	155
NW	0	0	6	14	5	29	26	6	1	0	0	0	87
NNW	2	1	6	12	5	10	3	0	0	0	0	0	39
TOTALS	11	28	71	215	244	588	805	165	50	2	0	0	2179

NUMBER OF CALMS	18
NUMBER OF INVALID HOURS	4
NUMBER OF VALID HOURS	2179
TOTAL HOURS FOR THE PERIOD	2183

Semiannual Effluent Report
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02/08/91 12:02 SITE: SAN ONOFRE

PERIOD OF RECORD 90063024-90093023
EXTREMELY UNSTABLE (DT/DZ LESS THAN -1.9 DEG.C/100 M)
PASQUILL A
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT.
N	0	0	0	2	0	0	0	0	0	0	0	0	2
NNE	0	0	0	1	0	1	0	0	0	0	0	0	2
NE	0	0	0	0	0	0	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	0	0	0	0	0	3	1	0	0	0	0	0	4
SSE	0	0	0	0	0	2	1	4	0	0	0	0	7
S	0	0	0	0	6	16	56	28	2	0	0	0	108
SSW	0	0	0	0	6	21	40	12	0	0	0	0	79
SW	0	0	0	4	12	49	37	2	0	0	0	0	104
WSW	0	0	0	8	21	74	62	1	0	0	0	0	166
W	0	0	1	3	18	83	149	5	0	0	0	0	259
WNW	0	0	1	3	5	15	49	11	1	0	0	0	85
NW	0	0	0	0	0	3	5	0	0	0	0	0	8
NNW	0	0	0	0	0	0	2	0	0	0	0	0	2
TOTALS	0	0	2	21	68	267	402	63	3	0	0	0	826

NUMBER OF CALMS	0
NUMBER OF INVALID HOURS	35
NUMBER OF VALID HOURS	826
TOTAL HOURS FOR THE PERIOD	2208

02/08/91 12:02 SITE: SAN ONOFRE

PERIOD OF RECORD 90063024-90093023
MODERATELY UNSTABLE (-1.9 < DT/DZ <= -1.7 DEG.C/100 M)
PASQUILL B
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT.
N	0	0	0	0	0	0	0	0	0	0	0	0	0
NNE	0	0	0	0	1	0	0	0	0	0	0	0	1
NE	0	0	0	0	0	0	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0	0	0	0	0	0	0
S	0	0	0	0	0	0	1	0	0	0	0	0	1
SSW	0	0	0	0	0	0	1	0	0	0	0	0	1
SW	0	0	0	0	0	0	1	0	0	0	0	0	1
WSW	0	0	0	1	0	0	1	0	0	0	0	0	2
W	0	0	0	0	1	1	1	0	0	0	0	0	3
WNW	0	0	0	0	0	4	0	0	0	0	0	0	4
NW	0	0	0	0	0	0	1	0	0	0	0	0	1
NNW	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	0	0	0	1	2	5	6	0	0	0	0	0	14

NUMBER OF CALMS	0
NUMBER OF INVALID HOURS	35
NUMBER OF VALID HOURS	14
TOTAL HOURS FOR THE PERIOD	2208

Semiannual Effluent Report
July - December 1990

02/08/91 12:02 SITE: SAN ONOFRE

PERIOD OF RECORD 90063024-90093023
SLIGHTLY UNSTABLE (-1.7 < DT/TZ <= -1.5 DEG.C/100 M)
PASQUILL C
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT.
N	0	0	1	2	1	1	1	0	0	0	0	0	6
NNE	0	0	0	0	1	1	0	0	0	0	0	0	2
NE	0	0	1	1	0	1	0	0	0	0	0	0	3
ENE	0	0	0	0	0	1	0	0	0	0	0	0	1
E	0	0	0	0	0	1	3	0	0	0	0	0	4
ESE	0	0	0	0	0	1	0	0	0	0	0	0	1
SE	0	0	0	0	0	7	16	1	0	0	0	0	24
SSE	1	0	0	2	1	7	19	10	2	0	0	0	42
S	0	0	1	0	6	7	10	0	0	0	0	0	24
SSW	0	1	0	2	6	4	4	1	0	0	0	0	18
SW	0	1	0	3	4	5	0	3	0	0	0	0	16
WSW	0	0	0	4	1	4	0	1	0	0	0	0	10
W	0	0	0	6	5	3	1	3	0	0	0	0	18
WNW	1	0	1	5	5	8	6	4	0	0	0	0	30
NW	0	2	0	1	2	8	8	2	0	0	0	0	23
NNW	0	0	0	0	2	1	0	1	0	0	0	0	4
TOTALS	2	4	4	26	34	60	68	26	2	0	0	0	226

NUMBER OF CALMS	0
NUMBER OF INVALID HOURS	35
NUMBER OF VALID HOURS	226
TOTAL HOURS FOR THE PERIOD	2208

Semiannual Effluent Report
July - December 1990

02/08/91 12:02 SITE: SAN ONOFRE

PERIOD OF RECORD 90063024-90093023
NEUTRAL(-1.5 < DT/DZ <= -0.5 DEG.C/100 M)
PASQUILL D
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT.
N	1	0	8	9	5	6	1	0	0	0	0	0	30
NNE	0	1	5	9	5	11	0	0	0	0	0	0	31
NE	0	0	1	0	3	4	0	0	0	0	0	0	8
ENE	2	0	1	0	2	1	0	0	0	0	0	0	6
E	0	0	0	5	4	9	2	0	0	0	0	0	20
ESE	1	1	2	3	5	7	3	0	0	0	0	0	22
SE	0	2	3	15	24	47	56	3	1	0	0	0	151
SSE	0	2	4	19	26	30	45	21	1	0	0	0	148
S	2	1	4	12	16	14	14	4	0	0	0	0	67
SSW	0	2	1	10	7	4	5	0	0	0	0	0	29
SW	1	0	3	5	4	3	1	0	0	0	0	0	17
WSW	1	3	4	8	6	1	0	0	0	0	0	0	23
W	0	1	3	9	12	6	4	1	0	0	0	0	36
WNW	1	1	3	4	9	9	4	5	0	0	0	0	36
NW	0	0	2	7	5	6	9	2	1	0	0	0	32
NNW	0	1	1	8	3	6	3	3	0	0	0	0	25
TOTALS	9	15	45	123	136	164	147	39	3	0	0	0	681

NUMBER OF CALMS	0
NUMBER OF INVALID HOURS	35
NUMBER OF VALID HOURS	681
TOTAL HOURS FOR THE PERIOD	2208

02/08/91 12:02 SITE: SAN ONOFRE

PERIOD OF RECORD 90063024-90093023
SLIGHTLY STABLE (-0.5 < DT/DZ <= -1.5 DEG.C/100 M)
PASQUILL E
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT.
N	0	1	2	5	5	9	5	0	0	0	0	0	27
NNE	0	3	11	28	24	15	2	0	0	0	0	0	83
NE	0	2	3	1	3	1	0	0	0	0	0	0	10
ENE	0	0	1	3	1	4	0	1	0	0	0	0	10
E	0	0	0	2	0	2	0	0	0	0	0	0	4
ESE	0	1	0	0	0	1	0	0	0	0	0	0	2
SE	0	0	2	4	0	6	2	0	0	0	0	0	14
SSE	0	0	1	2	4	1	4	2	0	0	0	0	14
S	0	1	1	3	0	1	0	0	0	0	0	0	6
SSW	0	0	0	0	1	2	0	0	0	0	0	0	3
SW	0	1	2	1	0	0	0	0	0	0	0	0	4
WSW	1	1	1	1	0	0	0	0	0	0	0	0	4
W	2	0	0	0	0	0	1	0	0	0	0	0	3
WNW	1	0	1	0	0	3	10	0	0	0	0	0	15
NW	0	0	0	0	0	3	4	0	0	0	0	0	7
NNW	0	1	2	1	1	1	1	0	0	0	0	0	7
TOTALS	4	11	27	51	39	49	29	3	0	0	0	0	213

NUMBER OF CALMS	0
NUMBER OF INVALID HOURS	35
NUMBER OF VALID HOURS	213
TOTAL HOURS FOR THE PERIOD	2208

02/08/91 12:02 SITE: SAN ONOFRE

PERIOD OF RECORD 90063024-90093023
MODERATELY STABLE (1.5 <= DT/DZ <= -0.5 DEG.C/100 M)
PASQUILL F
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT.
N	0	0	1	2	4	4	4	0	0	0	0	0	15
NNE	0	2	3	17	26	24	5	0	0	0	0	0	77
NE	0	1	3	3	2	0	0	0	0	0	0	0	9
ENE	0	0	1	0	0	0	0	0	0	0	0	0	1
E	0	0	0	2	0	0	0	0	0	0	0	0	2
ESE	0	0	0	0	0	0	1	0	0	0	0	0	1
SE	0	0	0	0	0	1	0	0	0	0	0	0	1
SSE	0	0	0	0	1	0	0	0	0	0	0	0	1
S	0	0	0	2	0	0	0	0	0	0	0	0	2
SSW	0	0	0	0	0	0	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0	0	0	0	0	0	0
WSW	0	0	0	0	0	0	0	0	0	0	0	0	0
W	0	0	0	1	0	1	0	0	0	0	0	0	2
WNW	0	0	0	1	1	3	4	0	0	0	0	0	9
NW	0	0	0	0	0	1	0	0	0	0	0	0	1
NNW	0	0	1	0	0	0	0	0	0	0	0	0	1
TOTALS	0	3	9	28	34	34	14	0	0	0	0	0	122

NUMBER OF CALMS	0
NUMBER OF INVALID HOURS	35
NUMBER OF VALID HOURS	122
TOTAL HOURS FOR THE PERIOD	2208

02/08/91 12:02 SITE: SAN ONOFRE

PERIOD OF RECORD 90063024-90093023
EXTREMELY STABLE(DT/DZ EXCEEDS 4.0 DEG.C/100 M)
PASQUILL G
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT.
N	0	0	1	0	2	0	0	0	0	0	0	0	3
NNE	0	3	1	2	11	42	16	0	0	0	0	0	75
NE	0	1	0	2	2	0	0	0	0	0	0	0	5
ENE	0	0	0	0	0	0	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0	0	0	0	0	0	0
SSE	0	0	0	0	0	1	0	0	0	0	0	0	1
S	0	0	0	0	0	0	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0	0	0	0	0	0	0
SW	0	0	1	0	0	0	0	0	0	0	0	0	1
WSW	0	0	0	0	0	0	0	0	0	0	0	0	0
W	0	0	0	1	0	1	0	0	0	0	0	0	2
WNW	0	0	0	0	0	0	1	0	0	0	0	0	1
NW	0	0	0	0	0	2	0	0	0	0	0	0	2
NNW	0	1	0	0	0	0	0	0	0	0	0	0	1
TOTALS	0	5	3	5	15	46	17	0	0	0	0	0	91

NUMBER OF CALMS	0
NUMBER OF INVALID HOURS	35
NUMBER OF VALID HOURS	91
TOTAL HOURS FOR THE PERIOD	2208

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02/08/91 12:02 SITE: SAN ONOFRE

PERIOD OF RECORD 90063024-90093023
ALL STABILITY, ALL DT/DZ
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT.
N	1	1	13	20	17	20	11	0	0	0	0	0	83
NNE	0	9	20	57	68	94	23	0	0	0	0	0	271
NE	0	4	8	7	10	6	0	0	0	0	0	0	35
ENE	2	0	3	3	3	6	0	1	0	0	0	0	18
E	0	0	0	9	4	12	5	0	0	0	0	0	30
ESE	1	2	2	3	5	9	4	0	0	0	0	0	26
SE	0	2	5	19	24	64	75	4	1	0	0	0	194
SSE	1	2	5	23	32	41	69	37	3	0	0	0	213
S	2	2	6	17	28	38	81	32	2	0	0	0	208
SSW	0	3	1	12	20	31	50	13	0	0	0	0	130
SW	1	2	6	13	20	57	39	5	0	0	0	0	143
WSW	2	4	5	22	28	79	63	2	0	0	0	0	205
W	2	1	4	20	36	95	156	9	0	0	0	0	323
WNW	3	1	6	13	20	42	74	20	1	0	0	0	180
NW	0	2	2	8	7	23	27	4	1	0	0	0	74
NNW	0	3	4	9	6	8	6	4	0	0	0	0	40
TOTALS	15	38	90	255	328	625	683	131	8	0	0	0	2173

NUMBER OF CALMS	0
NUMBER OF INVALID HOURS	35
NUMBER OF VALID HOURS	2173
TOTAL HOURS FOR THE PERIOD	2208

02/08/91 12:07 SITE: SAN ONOFRE

PERIOD OF RECORD 90093024-90123123
EXTREMELY UNSTABLE (DT/DZ LESS THAN -1.9 DEG.C/100 M)
PASQUILL A
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT.
N	0	0	0	0	0	0	0	0	4	1	0	0	5
NNE	0	0	0	0	0	0	1	0	0	0	0	0	1
NE	0	0	0	0	0	0	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	1	1	0	0	0	0	2
SSE	0	0	0	0	2	2	3	0	0	0	0	0	7
S	0	0	0	0	8	15	7	0	0	0	0	0	30
SSW	0	0	1	3	9	14	10	0	0	0	0	0	37
SW	0	0	1	2	13	39	13	0	0	0	0	0	68
WSW	0	0	0	4	14	36	22	2	1	0	0	0	79
W	0	0	0	1	7	83	68	9	6	0	0	0	174
WNW	0	0	0	2	1	17	44	12	4	0	0	0	80
NW	0	0	0	0	0	0	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0	1	0	0	0	0	1
TOTALS	0	0	2	12	54	206	169	25	15	1	0	0	484

NUMBER OF CALMS	0
NUMBER OF INVALID HOURS	10
NUMBER OF VALID HOURS	484
TOTAL HOURS FOR THE PERIOD	2208

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PERIOD OF RECORD 90093024-90123123
MODERATELY UNSTABLE (-1.9 < DT/DZ <= -1.7 DEG.C/100 M)
PASQUILL B
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT.
N	0	0	0	0	0	0	0	0	0	0	0	0	0
NNE	0	0	0	0	0	0	0	0	0	0	0	0	0
NE	0	0	0	0	0	0	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0	0	0	0	0	0	0
SSE	0	0	0	0	0	0	0	0	0	0	0	0	0
S	0	0	0	0	0	0	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0	0	0	0	0	0	0
SW	0	0	0	0	0	1	0	0	0	0	0	0	1
WSW	0	0	0	0	0	0	0	0	0	0	0	0	0
W	0	0	0	0	0	0	0	0	0	0	0	0	0
WNW	0	0	0	0	0	0	0	0	0	0	0	0	0
NW	0	0	0	0	0	0	0	0	0	0	0	0	0
NNW	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	0	0	0	0	0	1	0	0	0	0	0	0	1

NUMBER OF CALMS	0
NUMBER OF INVALID HOURS	10
NUMBER OF VALID HOURS	1
TOTAL HOURS FOR THE PERIOD	2208

02/08/91 12:07 SITE: SAN ONOFRE

PERIOD OF RECORD 90093024-90123123
SLIGHTLY UNSTABLE (-1.7 < DT/TZ <= -1.5 DEG.C/100 M)
PASQUILL C
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT.
N	0	0	0	0	0	0	0	1	0	0	0	0	1
NNE	0	0	0	0	0	1	1	0	0	0	0	0	2
NE	0	0	0	0	0	1	1	0	0	0	0	0	2
ENE	0	0	0	0	0	0	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0	0	0	0	0	0	0
ESE	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	0	0	1	1	1	1	5	2	0	0	0	0	11
SSE	0	0	0	0	2	3	4	1	0	0	0	0	10
S	0	0	0	0	2	1	5	0	0	0	0	0	8
SSW	0	0	2	3	4	3	2	0	0	0	0	0	14
SW	0	0	0	1	1	2	4	0	0	0	0	0	8
WSW	0	0	1	2	1	0	2	0	0	0	0	0	6
W	0	1	0	1	1	4	2	0	4	0	0	0	13
WNW	0	0	0	1	5	7	5	1	0	0	0	0	19
NW	0	0	2	0	1	2	2	1	0	0	0	0	8
NNW	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	0	1	6	9	18	25	33	6	4	0	0	0	102

NUMBER OF CALMS	0
NUMBER OF INVALID HOURS	10
NUMBER OF VALID HOURS	102
TOTAL HOURS FOR THE PERIOD	2208

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PERIOD OF RECORD 90093024-90123123
NEUTRAL(-1.5 < DT/DZ <= -0.5 DEG.C/100 M)
PASQUILL D
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT.
N	0	2	3	4	3	6	0	1	5	1	0	0	25
NNE	0	0	0	5	8	6	0	0	4	0	0	0	23
NE	0	0	2	1	2	2	0	0	3	0	0	0	10
ENE	0	0	1	2	0	2	0	0	0	0	0	0	5
E	0	0	0	0	0	1	4	0	0	0	0	0	5
ESE	0	0	1	2	2	4	4	0	0	0	0	0	13
SE	0	0	1	2	4	20	25	6	0	0	0	0	58
SSE	0	0	1	6	5	10	9	3	0	0	0	0	34
S	0	0	0	4	2	10	10	1	1	0	0	0	28
SSW	0	0	2	3	2	4	4	3	0	0	0	0	18
SW	0	0	4	5	2	3	5	4	1	0	0	0	24
WSW	0	0	1	5	6	1	3	2	2	0	0	0	20
W	0	3	2	2	3	5	6	2	14	4	0	0	41
WNW	0	1	0	2	4	7	4	4	9	0	0	0	31
NW	0	0	0	1	3	17	17	3	0	1	0	0	42
NNW	0	0	2	3	3	6	1	0	0	0	0	0	15
TOTALS	0	6	20	47	49	104	92	29	39	6	0	0	392

NUMBER OF CALMS	0
NUMBER OF INVALID HOURS	10
NUMBER OF VALID HOURS	392
TOTAL HOURS FOR THE PERIOD	2208

Semiannual Effluent Report
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02/08/91 12:07 SITE: SAN ONOFRE

PERIOD OF RECORD 90093024-90123123
SLIGHTLY STABLE (-0.5 < DT/DZ <= -1.5 DEG.C/100 M)
PASQUILL E
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT.
N	0	2	3	9	8	16	5	0	0	0	0	0	43
NNE	0	1	8	21	28	14	11	2	1	0	0	0	86
NE	0	1	4	4	1	4	4	2	0	1	0	0	21
ENE	0	2	3	0	0	3	1	0	0	0	0	0	9
E	1	1	2	2	1	9	1	0	0	0	0	0	17
ESE	0	1	0	4	1	1	0	0	0	0	0	0	7
SE	1	0	0	3	3	6	2	1	0	0	0	0	16
SSE	0	2	0	1	2	0	1	0	0	0	0	0	6
S	0	0	2	3	2	0	0	0	0	0	0	0	7
SSW	0	0	0	1	0	0	0	0	0	0	0	0	1
SW	0	1	1	0	0	0	0	0	0	0	0	0	2
WSW	0	0	0	3	1	0	0	0	0	0	0	0	4
W	0	0	0	2	5	10	0	0	0	0	0	0	17
WNW	0	0	0	1	2	11	8	0	1	0	0	0	23
NW	1	1	1	0	4	7	3	0	1	0	0	0	18
NNW	0	0	1	2	3	3	3	0	2	0	0	0	14
TOTALS	3	12	25	56	61	84	39	5	5	1	0	0	291

NUMBER OF CALMS	0
NUMBER OF INVALID HOURS	10
NUMBER OF VALID HOURS	291
TOTAL HOURS FOR THE PERIOD	2208

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PERIOD OF RECORD 90093024-90123123
MODERATELY STABLE (1.5 <= DT/DZ <= -0.5 DEG.C/100 M)
PASQUILL F
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT.
N	0	2	0	6	5	10	11	0	0	0	0	0	34
NNE	0	0	2	30	67	57	23	1	1	0	0	0	181
NE	0	4	6	10	7	5	2	0	0	0	0	0	34
ENE	0	1	5	3	1	1	0	0	0	0	0	0	11
E	0	0	2	2	3	1	0	0	0	0	0	0	8
ESE	0	0	0	2	1	2	0	0	0	0	0	0	5
SE	0	0	2	1	1	1	0	0	0	0	0	0	5
SSE	0	0	1	0	2	2	0	0	0	0	0	0	5
S	0	0	0	1	0	0	0	0	0	0	0	0	1
SSW	0	0	2	0	0	0	0	0	0	0	0	0	2
SW	0	1	0	3	0	0	0	0	0	0	0	0	4
WSW	0	0	0	5	0	1	0	0	0	0	0	0	6
W	0	0	1	4	4	6	1	0	0	0	0	0	16
WNW	0	0	1	2	1	3	4	0	0	0	0	0	11
NW	1	0	1	1	1	1	0	0	0	0	0	0	5
NNW	0	0	0	1	1	5	1	0	0	0	0	0	8
TOTALS	1	8	23	71	94	95	42	1	1	0	0	0	336

NUMBER OF CALMS	0
NUMBER OF INVALID HOURS	10
NUMBER OF VALID HOURS	336
TOTAL HOURS FOR THE PERIOD	2208

Semiannual Effluent Report
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PERIOD OF RECORD 90093024-90123123
EXTREMELY STABLE(DT/DZ EXCEEDS 4.0 DEG.C/100 M)
PASQUILL G
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT.
N	0	0	0	4	3	12	19	5	0	0	0	0	43
NNE	0	2	4	14	51	202	160	4	0	0	0	0	437
NE	0	0	4	13	16	14	3	0	0	0	0	0	50
ENE	1	0	2	6	1	1	1	0	0	0	0	0	12
E	0	0	0	0	0	0	0	0	0	0	0	0	0
ESE	0	1	2	2	1	0	0	0	0	0	0	0	6
SE	0	1	0	2	2	0	0	0	0	0	0	0	5
SSE	0	0	0	4	0	0	0	0	0	0	0	0	4
S	0	0	2	5	0	0	0	0	0	0	0	0	7
SSW	0	0	0	0	0	0	0	0	0	0	0	0	0
SW	0	1	0	1	0	1	0	0	0	0	0	0	3
WSW	0	0	1	1	1	0	0	0	0	0	0	0	3
W	0	0	0	0	1	5	0	0	0	0	0	0	6
WNW	0	0	1	2	0	0	4	0	0	0	0	0	7
NW	0	0	1	0	0	1	0	0	0	0	0	0	2
NNW	0	0	0	1	0	5	1	0	0	0	0	0	7
TOTALS	1	5	17	55	76	241	188	9	0	0	0	0	592

NUMBER OF CALMS	0
NUMBER OF INVALID HOURS	10
NUMBER OF VALID HOURS	592
TOTAL HOURS FOR THE PERIOD	2208

Semiannual Effluent Report
July - December 1990

02/08/91 12:08 SITE: SAN ONOFRE

PERIOD OF RECORD 90093024-90123123
ALL STABILITY, ALL DT/DZ
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT.
N	0	6	6	23	19	44	35	7	9	2	0	0	151
NNE	0	3	14	70	154	280	196	7	6	0	0	0	730
NE	0	5	16	28	26	26	10	2	3	1	0	0	117
ENE	1	3	11	11	2	7	2	0	0	0	0	0	37
E	1	1	4	4	4	11	5	0	0	0	0	0	30
ESE	0	2	3	10	5	7	4	0	0	0	0	0	31
SE	1	1	4	9	11	28	33	10	0	0	0	0	97
SSE	0	2	2	11	13	17	17	4	0	0	0	0	66
S	0	0	4	13	14	26	22	1	1	0	0	0	81
SSW	0	0	7	10	15	21	16	3	0	0	0	0	72
SW	0	3	6	12	16	46	22	4	1	0	0	0	110
WSW	0	0	3	20	23	38	27	4	3	0	0	0	118
W	0	4	3	10	21	113	77	11	24	4	0	0	267
WNW	0	1	2	10	13	45	69	17	14	0	0	0	171
NW	2	1	5	2	9	28	22	4	1	1	0	0	75
NNW	0	0	3	7	7	19	6	1	2	0	0	0	45
TOTALS	5	32	93	250	352	756	563	75	64	8	0	0	2198

NUMBER OF CALMS	0
NUMBER OF INVALID HOURS	10
NUMBER OF VALID HOURS	2198
TOTAL HOURS FOR THE PERIOD	2208