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A Edward Scherer
Manager of Nuclear
Oversight and Regulatory Affairs

April 23, 2002

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

Subject: **Docket Nos. 50-206, 50-361 and 50-362**
Annual Radioactive Effluent Release Report - 2001
San Onofre Nuclear Generating Station, Units 1, 2 and 3

Gentlemen:

This letter provides the Annual Radioactive Effluent Release Report (ARERR) for 2001. The ARERR is required to be submitted by 10 CFR 50.36a, Unit 1 Technical Specification D6.9.1.4, and Units 2 and 3 Technical Specification 5.7.1.3. Also enclosed are Revision 18 to the Unit 1 and Revision 36 to Units 2/3 Offsite Dose Calculation Manuals (ODCMs).

If you require additional information, please contact me or Mr. Clay Williams at (949) 368-6707.

Sincerely,

Enclosures

cc: E. W. Merschoff, Regional Administrator, NRC Region IV
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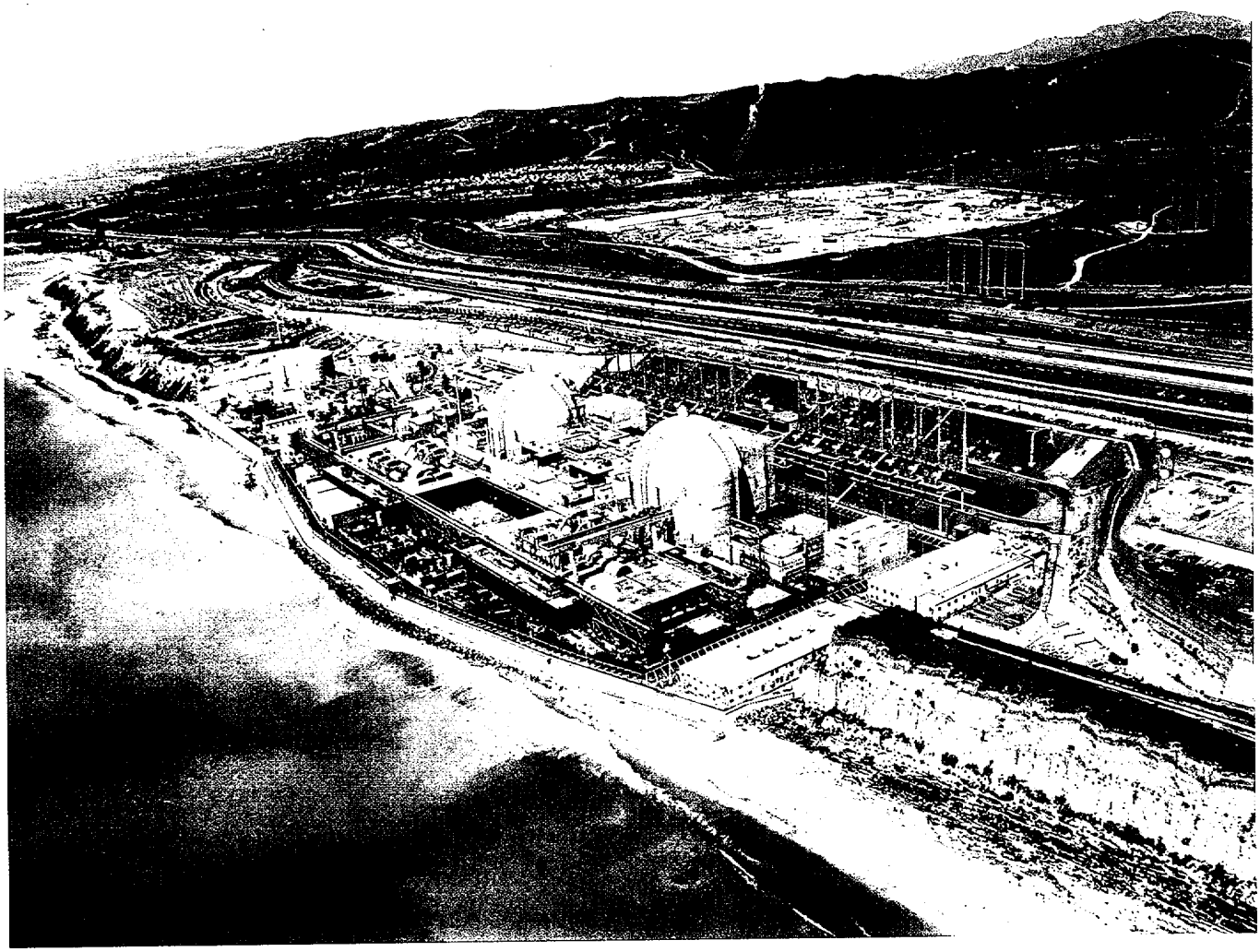

SAN ONOFRE NUCLEAR GENERATING STATION

Annual Radioactive Effluent Release Report

2001

January - December

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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 two operating pressurized water reactors with a total rated capacity of 2254 net megawatts electrical.

Unit 1, rated at 410 net megawatts electrical, was supplied by Westinghouse Electric Company and began commercial operation on January 1, 1968. The unit was permanently shutdown on November 30, 1992. 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%).

P. O. Box 128
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S.O.N.G.S. 1

TABLE OF CONTENTS

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

January - December

SECTION A. INTRODUCTION

This Annual Radioactive Effluent Release 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 Applicable Limits
3. Estimated Total Percent Error
4. Lower Limit of Detection Concentrations
5. Batch Release Summaries
6. Previous Radioactive Effluent Release Report Addendum
7. Radwaste Shipments
8. 10 CFR 50 Appendix I Requirements
9. Changes to Offsite Dose Calculation Manual

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 1

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 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 "continuous" mode of release. Plant stack releases are considered to be "continuous" releases. As of 8/4/93, "batch" mode releases are no longer conducted because of the permanent shutdown of the reactor.

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 for continuous mode releases only.

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," has been deleted. "Batch" mode releases are no longer conducted as of 8/4/93, due to the permanent shutdown of the reactor.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 1

TABLE 1A

GASEOUS EFFLUENTS-SUMMATION OF ALL RELEASES

	Unit	First Quarter	Second Quarter	Estimated Total Error, %
A. Fission and activation gases				
1. Total release	Ci	<LLD	<LLD	3.00E+1
2. Average release rate for period	μCi/sec	0.00E+0	0.00E+0	
3. Percent of applicable limit	% MPC	0.00E+0	0.00E+0	
4. Percent Effluent Concentration Limit	% ECL	0.00E+0	0.00E+0	
B. Iodines				
1. Total iodine-131	Ci	<LLD	<LLD	1.90E+1
2. Average release rate for period	μCi/sec	0.00E+0	0.00E+0	
3. Percent of applicable limit	% MPC	0.00E+0	0.00E+0	
4. Percent Effluent Concentration Limit	% ECL	0.00E+0	0.00E+0	
C. Particulates				
1. Particulates with half-lives >8 days	Ci	<LLD	<LLD	1.60E+1
2. Average release rate for period	μCi/sec	0.00E+0	0.00E+0	
3. Percent of applicable limit	% MPC	0.00E+0	0.00E+0	
4. Percent Effluent Concentration Limit	% ECL	0.00E+0	0.00E+0	
5. Gross alpha activity	Ci	1.62E-7	5.43E-8	5.00E+1
D. Tritium				
1. Total release	Ci	2.14E-1	3.51E-1	2.50E+1
2. Average release rate for period	μCi/sec	2.75E-2	4.46E-2	
3. Percent of applicable limit	% MPC	1.79E-4	2.90E-4	
4. Percent Effluent Concentration Limit	% ECL	3.58E-4	5.80E-4	

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 1

TABLE 1A (Continued)

GASEOUS EFFLUENTS-SUMMATION OF ALL RELEASES

	Unit	Third Quarter	Fourth Quarter	Estimated Total Error, %
A. Fission and activation gases				
1. Total release	Ci	<LLD	<LLD	3.00E+1
2. Average release rate for period	μCi/sec	0.00E+0	0.00E+0	
3. Percent of applicable limit	% MPC	0.00E+0	0.00E+0	
4. Percent Effluent Concentration Limit	% ECL	0.00E+0	0.00E+0	
B. Iodines [1]				
1. Total iodine-131	Ci	<LLD	<LLD	1.90E+1
2. Average release rate for period	μCi/sec	0.00E+0	0.00E+0	
3. Percent of applicable limit	% MPC	0.00E+0	0.00E+0	
4. Percent Effluent Concentration Limit	% ECL	0.00E+0	0.00E+0	
C. Particulates [1]				
1. Particulates with half-lives >8 days	Ci	1.63E-6	1.21E-5	1.60E+1
2. Average release rate for period	μCi/sec	2.05E-7	1.52E-6	
3. Percent of applicable limit	% MPC	8.89E-7	6.60E-6	
4. Percent Effluent Concentration Limit	% ECL	5.33E-6	3.96E-5	
5. Gross alpha activity	Ci	4.95E-8	6.01E-8	5.00E+1
D. Tritium				
1. Total release	Ci	8.19E-1	1.36E+0	2.50E+1
2. Average release rate for period	μCi/sec	1.03E-1	1.71E-1	
3. Percent of applicable limit	% MPC	6.70E-4	1.11E-3	
4. Percent Effluent Concentration Limit	% ECL	1.34E-3	2.22E-3	

(1) On 8/27/01, plant vent stack particulate and iodine samples were not collected for 7 hours. The weekly sample had very low levels of activity with minimal dose impact to the public. Prior and subsequent samples were <LLD. This event is documented in AR 010801535.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 1

TABLE 1C

GASEOUS EFFLUENTS-GROUND LEVEL RELEASES
CONTINUOUS MODE

Radionuclides Released	Unit	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
1. Fission and activation gases					
krypton-85	Ci	<LLD	<LLD	<LLD	<LLD
krypton-85m	Ci	<LLD	<LLD	<LLD	<LLD
krypton-87	Ci	<LLD	<LLD	<LLD	<LLD
krypton-88	Ci	<LLD	<LLD	<LLD	<LLD
xenon-133	Ci	<LLD	<LLD	<LLD	<LLD
xenon-133m	Ci	<LLD	<LLD	<LLD	<LLD
xenon-135	Ci	<LLD	<LLD	<LLD	<LLD
xenon-135m	Ci	<LLD	<LLD	<LLD	<LLD
xenon-138	Ci	<LLD	<LLD	<LLD	<LLD
Total for period	Ci	<LLD	<LLD	<LLD	<LLD
2. Iodines					
iodine-131	Ci	<LLD	<LLD	<LLD	<LLD
iodine-133	Ci	<LLD	<LLD	<LLD	<LLD
iodine-135	Ci	<LLD	<LLD	<LLD	<LLD
Total for period	Ci	<LLD	<LLD	<LLD	<LLD
3. Particulates					
barium-140	Ci	<LLD	<LLD	<LLD	<LLD
cerium-141	Ci	<LLD	<LLD	<LLD	<LLD
cerium-144	Ci	<LLD	<LLD	<LLD	<LLD
cesium-134	Ci	<LLD	<LLD	<LLD	<LLD
cesium-137	Ci	<LLD	<LLD	<LLD	7.66E-11
cobalt-58	Ci	<LLD	<LLD	<LLD	<LLD
cobalt-60	Ci	<LLD	<LLD	1.63E-6	1.21E-5
iron-59	Ci	<LLD	<LLD	<LLD	<LLD
lanthanum-140	Ci	<LLD	<LLD	<LLD	<LLD
manganese-54	Ci	<LLD	<LLD	<LLD	<LLD
molybdenum-99	Ci	<LLD	<LLD	<LLD	<LLD
strontium-89	Ci	<LLD	<LLD	<LLD	<LLD
strontium-90	Ci	<LLD	<LLD	<LLD	<LLD
zinc-65	Ci	<LLD	<LLD	<LLD	<LLD

LLD Lower Limit of Detection; see Table 1D.

NOTE: Due to the permanent shutdown of S.O.N.G.S. 1, "BATCH MODE" releases are no longer conducted.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 1

TABLE 1D

GASEOUS EFFLUENTS-LOWER LIMIT OF DETECTION
CONTINUOUS MODE

Radionuclides	LLD (μCi/cc)
1. Fission and activation gases	
krypton-85	2.10E-5
krypton-85m	5.00E-8
krypton-87	2.60E-7
krypton-88	1.80E-7
xenon-133	1.30E-7
xenon-133m	4.10E-7
xenon-135	5.30E-8
xenon-135m	2.00E-6
xenon-138	3.50E-6
2. Iodines	
iodine-131	2.90E-13
iodine-133	2.80E-12
iodine-135	1.90E-10
3. Particulates	
barium-140	5.90E-13
cerium-141	6.60E-14
cerium-144	2.60E-13
cesium-134	1.70E-13
cesium-137	1.40E-13
cobalt-58	1.50E-13
cobalt-60	2.40E-13
iron-59	3.80E-13
lanthanum-140	1.20E-12
manganese-54	1.50E-13
molybdenum-99	7.90E-14
strontium-89	1.00E-14
strontium-90	1.00E-15
zinc-65	4.00E-13

NOTE: Due to the permanent shutdown of S.O.N.G.S. 1, "BATCH MODE" releases are no longer conducted.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 1

TABLE 1E

GASEOUS EFFLUENTS-RADIATION DOSES AT THE SITE BOUNDARY

	Unit	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
A. Noble Gas					
1. Gamma Air Dose	mrad	0.00E+0	0.00E+0	0.00E+0	0.00E+0
2. Percent Applicable Limit	%	0.00E+0	0.00E+0	0.00E+0	0.00E+0
3. Beta Air Dose	mrad	0.00E+0	0.00E+0	0.00E+0	0.00E+0
4. Percent Applicable Limit	%	0.00E+0	0.00E+0	0.00E+0	0.00E+0
B. Tritium, Iodine, Particulates (at the nearest receptor)					
1. Organ Dose	mrem	8.01E-6	1.43E-5	4.36E-5	1.31E-4
2. Percent Applicable Limit	%	1.07E-4	1.91E-4	5.82E-4	1.74E-3

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

TABLE 1F

GASEOUS EFFLUENTS-BATCH RELEASE SUMMARY

NOTE: Due to the permanent shutdown of S.O.N.G.S. 1, "BATCH MODE" releases are no longer conducted.

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 waste released (prior to dilution)
(3) the 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.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 1

TABLE 2A

LIQUID EFFLUENTS-SUMMATION OF ALL RELEASES

	Unit	First Quarter	Second Quarter	Estimated Total Error, %
A. Fission and activation products				
1. Total release (not including tritium, gases, alpha)	Ci	2.47E-7	3.11E-6	1.90E+1
2. Average diluted concentration during period	μCi/ml	1.56E-13	1.93E-12	
3. Percent of applicable limit	% MPC	7.82E-7	9.66E-6	
4. Percent Effluent Concentration Limit	% ECL	1.56E-5	1.93E-4	
B. Tritium				
1. Total release	Ci	1.33E-2	5.23E-4	1.90E+1
2. Average diluted concentration during period	μCi/ml	8.42E-9	3.25E-10	
3. Percent of applicable limit	% MPC	2.81E-4	1.08E-5	
4. Percent Effluent Concentration Limit	% ECL	8.42E-4	3.25E-5	
C. Dissolved and entrained gases				
1. Total release	Ci	<LLD	<LLD	1.90E+1
2. Average diluted concentration during period	μCi/ml	0.00E+0	0.00E+0	
3. Percent of applicable limit	% MPC	0.00E+0	0.00E+0	
4. Percent Effluent Concentration Limit	% ECL	0.00E+0	0.00E+0	
D. Gross alpha radioactivity				
1. Total release	Ci	<LLD	<LLD	5.00E+1
E. Volume of waste released (batch & continuous, prior to dilution)	liters	8.31E+6	1.16E+6	5.00E+0
F. Volume of dilution water used during period	liters	1.58E+9	1.61E+9	5.00E+0

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 1

TABLE 2A (Continued)

LIQUID EFFLUENTS-SUMMATION OF ALL RELEASES

	Unit	Third Quarter	Fourth Quarter	Estimated Total Error, %
A. Fission and activation products [1]				
1. Total release (not including tritium, gases, alpha)	Ci	3.37E-5	3.42E-3	1.90E+1
2. Average diluted concentration during period	μCi/ml	2.03E-11	1.89E-9	
3. Percent of applicable limit	% MPC	1.02E-4	1.67E-2	
4. Percent Effluent Concentration Limit	% ECL	2.03E-3	1.35E-1	
B. Tritium				
1. Total release	Ci	1.48E-4	2.28E-0	1.90E+1
2. Average diluted concentration during period	μCi/ml	8.92E-11	1.26E-6	
3. Percent of applicable limit	% MPC	2.97E-6	4.20E-2	
4. Percent Effluent Concentration Limit	% ECL	8.92E-6	1.26E-1	
C. Dissolved and entrained gases				
1. Total release	Ci	<LLD	<LLD	1.90E+1
2. Average diluted concentration during period	μCi/ml	0.00E+0	0.00E+0	
3. Percent of applicable limit	% MPC	0.00E+0	0.00E+0	
4. Percent Effluent Concentration Limit	% ECL	0.00E+0	0.00E+0	
D. Gross alpha radioactivity				
1. Total release	Ci	<LLD	2.93E-5	5.00E+1
E. Volume of waste released (batch & continuous, prior to dilution)	liters	6.88E+5	6.31E+6	5.00E+0
F. Volume of dilution water used during period	liters	1.66E+9	1.81E+9	5.00E+0

(1) The 10/29/01 grab samples for the Yard Drain Sump (YDS) and Reheater Pit Sump were collected but discarded prior to compositing. The 10/23/01-10/29/01 composite for both sumps consisted of the two remaining grabs and were <LLD. The grab sample for the composite was not collected 12/28/01 for the YDS. The 12/25/01-12/31/01 composite was also <LLD. These events are documented in ARs 011001581 and 020100050.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 1

TABLE 2B

LIQUID EFFLUENTS
CONTINUOUS MODE

Radionuclides Released	Unit	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
1. Fission and activation products					
barium-140	Ci	<LLD	<LLD	<LLD	<LLD
cerium-141	Ci	<LLD	<LLD	<LLD	<LLD
cerium-144	Ci	<LLD	<LLD	<LLD	<LLD
cesium-134	Ci	<LLD	<LLD	<LLD	<LLD
cesium-137	Ci	2.47E-7	3.11E-6	3.37E-5	8.29E-6
chromium-51	Ci	<LLD	<LLD	<LLD	<LLD
cobalt-58	Ci	<LLD	<LLD	<LLD	<LLD
cobalt-60	Ci	<LLD	<LLD	<LLD	<LLD
iodine-131	Ci	<LLD	<LLD	<LLD	<LLD
iron-55	Ci	<LLD	<LLD	<LLD	<LLD
iron-59	Ci	<LLD	<LLD	<LLD	<LLD
lanthanum-140	Ci	<LLD	<LLD	<LLD	<LLD
manganese-54	Ci	<LLD	<LLD	<LLD	<LLD
molybdenum-99	Ci	<LLD	<LLD	<LLD	<LLD
niobium-95	Ci	<LLD	<LLD	<LLD	<LLD
strontium-89	Ci	<LLD	<LLD	<LLD	<LLD
strontium-90	Ci	<LLD	<LLD	<LLD	<LLD
technetium-99m	Ci	<LLD	<LLD	<LLD	<LLD
zinc-65	Ci	<LLD	<LLD	<LLD	<LLD
zirconium-95	Ci	<LLD	<LLD	<LLD	<LLD
Total for period	Ci	2.47E-7	3.11E-6	3.37E-5	8.29E-6
2. Dissolved and entrained gases					
xenon-133	Ci	<LLD	<LLD	<LLD	<LLD
xenon-135	Ci	<LLD	<LLD	<LLD	<LLD
Total for period	Ci	<LLD	<LLD	<LLD	<LLD

LLD Lower Limit of Detection; see Table 2C.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 1

TABLE 2B (Continued)

LIQUID EFFLUENTS
BATCH MODE

Radionuclides Released	Unit	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
1. Fission and activation products					
barium-140	Ci	N/A	N/A	N/A	<LLD
cerium-141	Ci	N/A	N/A	N/A	<LLD
cerium-144	Ci	N/A	N/A	N/A	<LLD
cesium-134	Ci	N/A	N/A	N/A	9.86E-5
cesium-137	Ci	N/A	N/A	N/A	1.71E-3
chromium-51	Ci	N/A	N/A	N/A	<LLD
cobalt-58	Ci	N/A	N/A	N/A	<LLD
cobalt-60	Ci	N/A	N/A	N/A	1.56E-3
iodine-131	Ci	N/A	N/A	N/A	<LLD
iron-55	Ci	N/A	N/A	N/A	<LLD
iron-59	Ci	N/A	N/A	N/A	<LLD
lanthanum-140	Ci	N/A	N/A	N/A	<LLD
manganese-54	Ci	N/A	N/A	N/A	<LLD
molybdenum-99	Ci	N/A	N/A	N/A	<LLD
niobium-95	Ci	N/A	N/A	N/A	<LLD
strontium-89	Ci	N/A	N/A	N/A	<LLD
strontium-90	Ci	N/A	N/A	N/A	4.58E-5
technetium-99m	Ci	N/A	N/A	N/A	<LLD
zinc-65	Ci	N/A	N/A	N/A	<LLD
zirconium-95	Ci	N/A	N/A	N/A	<LLD
Total for period	Ci	N/A	N/A	N/A	3.42E-3
2. Dissolved and entrained gases					
xenon-133	Ci	N/A	N/A	N/A	<LLD
xenon-135	Ci	N/A	N/A	N/A	<LLD
Total for period	Ci	N/A	N/A	N/A	<LLD

N/A No releases conducted
LLD Lower Limit of Detection; see Table 2C.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 1

TABLE 2C

LIQUID EFFLUENTS-LOWER LIMIT OF DETECTION
CONTINUOUS MODE

Radionuclides	LLD (μCi/cc)
1. Fission and activation products	
barium-140	3.90E-7
cerium-141	5.80E-8
cerium-144	2.30E-7
cesium-134	1.00E-7
chromium-51	4.60E-7
cobalt-58	9.00E-8
cobalt-60	1.30E-7
iodine-131	8.00E-8
iron-55	1.00E-6
iron-59	2.10E-7
lanthanum-140	7.20E-7
manganese-54	8.90E-8
molybdenum-99	7.50E-8
niobium-95	9.10E-8
strontium-89	5.00E-8
strontium-90	1.00E-8
technetium-99m	7.70E-8
zinc-65	2.20E-7
zirconium-95	1.60E-7
2. Dissolved and entrained gases	
xenon-133	3.10E-7
xenon-135	1.20E-7
3. gross alpha	1.00E-7

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 1

TABLE 2C (Continued)

LIQUID EFFLUENTS-LOWER LIMIT OF DETECTION
BATCH MODE

Radionuclides	LLD (μCi/cc)
1. Fission and activation products	
barium-140	3.30E-7
cerium-141	5.30E-8
cerium-144	2.30E-7
chromium-51	4.20E-7
cobalt-58	8.70E-8
iodine-131	6.00E-8
iron-55	1.00E-6
iron-59	2.00E-7
lanthanum-140	2.40E-7
manganese-54	8.80E-8
molybdenum-99	3.50E-8
niobium-95	8.50E-8
strontium-89	5.00E-8
technetium-99m	3.60E-8
zinc-65	2.20E-7
zirconium-95	1.50E-7
2. Dissolved and entrained gases	
xenon-133	3.10E-7
xenon-135	1.20E-7
3. gross alpha	1.00E-7

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 1

TABLE 2D

LIQUID EFFLUENTS-RADIATION DOSES AT THE LIQUID SITE BOUNDARY

	Unit	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
A.					
1. Total body dose	mrem	7.40E-5	3.33E-5	3.51E-4	1.51E-2
2. Percent Applicable Limit	%	4.93E-3	2.22E-3	2.34E-2	1.01E+0
B.					
1. Limiting organ dose	mrem	7.54E-5	5.08E-5	5.36E-4	3.44E-2
2. Percent Applicable Limit	%	1.51E-3	1.02E-3	1.07E-2	6.88E-1
3. Limiting organ for period		Liver	Liver	Liver	GI/LLI

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 1

TABLE 2E

LIQUID EFFLUENTS-BATCH RELEASE SUMMARY

	12 month period
1. Number of batch releases:	1 release
2. Total time period for batch releases:	1380 minutes
3. Maximum time period for a batch release:	1380 minutes
4. Average time period for a batch release:	1380 minutes
5. Minimum time period for a batch release:	1380 minutes
6. Average saltwater flow during batch releases:	6650 gpm

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 1

SECTION D. PREVIOUS RADIOACTIVE EFFLUENT RELEASE REPORT ADDENDUM

1. The fourth quarter 2000 values for composite Sr-89, Sr-90 and Fe-55 were incomplete due to data not available at report time. Information is presented below. All values were <LLD, and therefore, no other data tables as earlier reported were affected.

TABLE 1C (2000)
GASEOUS EFFLUENTS-GROUND LEVEL RELEASES
CONTINUOUS MODE

Radionuclides Released	Unit	Fourth Quarter
3. Particulates		
strontium-89	Ci	<LLD
strontium-90	Ci	<LLD

Sr-89 LLD = 1.00E-14
Sr-90 LLD = 1.00E-15

TABLE 2B (2000)
LIQUID EFFLUENTS
CONTINUOUS MODE

Radionuclides Released	Unit	Fourth Quarter
1. Fission an activation products		
iron-55	Ci	<LLD
strontium-89	Ci	<LLD
strontium-90	Ci	<LLD

Fe-55 LLD = 1.00E-6
Sr-89 LLD = 5.00E-8
Sr-90 LLD = 1.00E-8

SECTION D. PREVIOUS RADIOACTIVE EFFLUENT RELEASE REPORT ADDENDUM (cont'd)

2. Dose calculations for Table 1 Airborne Effluents and Noble Gases of this report are performed using concurrent meteorological data. On 10/27/00, it was determined a conversion factor of 2 had incorrectly been applied to wind speeds collected from 07/27/98 to 12/31/99 subsequent to a hard drive failure. This event is documented in AR 001002318.

   The dose data have been reprocessed for the years 1998 and 1999. In no case did the percent of the dose limit exceed 1%. The revised data are provided in the following tables.

SECTION D. PREVIOUS RADIOACTIVE EFFLUENT RELEASE REPORT ADDENDUM (cont'd)

Section H. 10CFR50 Appendix I Requirements

TABLE 1 (1998)

SOURCE	Dose * (millirems)				
	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Year
AIRBORNE EFFLUENTS Tritium, Iodines, and Particulates	11) 2.06E-4	12) 0.00E+0	13) 0.00E+0	14) 5.64E-4	15) 7.70E-4
NOBLE GASES ** Gamma	16) 0.00E+0	17) 0.00E+0	18) 0.00E+0	19) 0.00E+0	20) 0.00E+0
Beta	21) 0.00E+0	22) 0.00E+0	23) 0.00E+0	24) 0.00E+0	25) 0.00E+0

* 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 effluent are in units of mrad, reflecting the air dose.

11-15 These were calculated using the assumptions of USNRC Regulatory Guide 1.109.

11. The maximum organ dose was to a child's thyroid and was located in the NW sector.

12-13 There was no activity detected during the release period, therefore the reported organ dose was 0.00E+0 mrem.

14. The maximum organ dose was to a child's thyroid and was located in the NW sector.

15. The maximum organ dose was to a child's thyroid and was located in the NW sector.

16-20 There was no activity detected during any of these release periods, therefore the reported air dose for gamma radiation was 0.00E+0 mrad.

21-25 There was no activity detected during any of the release periods, therefore the reported air dose for beta radiation was 0.00E+0 mrad.

TABLE 2 (1998)

SOURCE	Percent Applicable Limit				
	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Year
AIRBORNE EFFLUENTS Tritium, Iodines, and Particulates	2.75E-3	0.00E+0	0.00E+0	7.52E-3	5.13E-3
NOBLE GASES Gamma	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Beta	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 1

SECTION D. PREVIOUS RADIOACTIVE EFFLUENT RELEASE REPORT ADDENDUM (cont'd)

Section H. 10CFR50 Appendix I Requirements

TABLE 1 (1999)

SOURCE	Dose * (millirems)				
	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Year
AIRBORNE EFFLUENTS Tritium, Iodines, and Particulates	11) 0.00E+0	12) 1.03E-4	13) 6.85E-5	14) 7.07E-4	15) 8.79E-4
NOBLE GASES ** Gamma	16) 0.00E+0	17) 0.00E+0	18) 0.00E+0	19) 0.00E+0	20) 0.00E+0
Beta	21) 0.00E+0	22) 0.00E+0	23) 0.00E+0	24) 0.00E+0	25) 0.00E+0

* 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 effluent are in units of mrad, reflecting the air dose.

11-15 These were calculated using the assumptions of USNRC Regulatory Guide 1.109.

11. There was no activity detected during the release period, therefore the reported organ dose was 0.00E+0 mrem.

12. The maximum organ dose was to a child's thyroid and was located in the NW sector.

13. The maximum organ dose was to a child's thyroid and was located in the NW sector.

14. The maximum organ dose was to a child's thyroid and was located in the NW sector.

15. The maximum organ dose was to a child's thyroid and was located in the NW sector.

16-20 There was no activity detected during any of these release periods, therefore the reported air dose for gamma radiation was 0.00E+0 mrad.

21-25 There was no activity detected during any of these release periods, therefore the reported air dose for beta radiation was 0.00E+0 mrad.

TABLE 2 (1999)

SOURCE	Percent Applicable Limit				
	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Year
AIRBORNE EFFLUENTS Tritium, Iodines, and Particulates	0.00E+0	1.38E-3	9.13E-4	9.43E-3	5.86E-3
NOBLE GASES Gamma	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Beta	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 1

SECTION E. RADWASTE SHIPMENTS

TABLE 3

SOLID WASTE AND IRRADIATED FUEL SHIPMENT

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

1. Type of waste	Unit	12 month period	Estimated total error (%)
a. Spent resins, filter sludges, evaporator bottoms	m^3	N/A	
	Ci	N/A	N/A
b. Dry active waste (DAW), compactable and non-compactable *	m^3	2.52E+3	
	Ci	1.29E+0	3.00E+1
c. Irradiated components, control rods	m^3	N/A	
	Ci	N/A	N/A
d. Other	m^3	N/A	
	Ci	N/A	N/A

NOTE: Total curie content estimated.

(*) Material packaged in strong, tight containers of various sizes.

N/A No shipment made.

2. Estimate of major nuclide composition (by type of waste)		
a. not applicable	%	N/A
b. americium-241	%	4.37E-2
carbon-14	%	5.86E-1
cerium-144	%	1.87E-2
cesium-134	%	1.50E+0
cesium-137	%	1.24E+1
cobalt-60	%	4.19E+1
curium-242	%	3.72E-3
curium-243/244	%	1.04E-2
iron-55	%	2.92E+1
iron-59	%	7.22E-2
nickel-63	%	1.24E+1
niobium-94	%	6.24E-2
niobium-95	%	1.39E-1
plutonium-238	%	5.24E-2
plutonium-239/240	%	1.94E-2
plutonium-241	%	1.22E+0
plutonium-242	%	8.55E-3
strontium-90	%	1.77E-1
technetium-99	%	2.20E-3
tritium	%	1.07E-1
uranium-233/234	%	1.32E-4
zirconium-95	%	1.46E-1
c. not applicable	%	N/A
d. not applicable	%	N/A

3. Solid Waste Disposition

Number of Shipments	Mode of Transportation	Destination
30 *	Hitman Trucking Company Truck/Trailer	EnviroCare, UT
2	MHFLogistical Solutions Truck/Trailer	EnviroCare, UT
96	MHFLogistical Solutions Rail	EnviroCare, UT

* SONGS maintains a contract with vendor (GTS) that provides volume reduction services. These shipments were made from their processing facility. The thirty shipments made from this facility included waste from other generators. SCE's waste volume was a small fraction of the total waste volume of these shipments.

B. IRRADIATED FUEL SHIPMENTS (Disposition)

Number of Shipments	Mode of Transportation	Destination
None	No shipments were made	N/A

SECTION F. APPLICABLE LIMITS

Gaseous Effluents - Applicable Limits

The percent of Applicable Limits, tabulated in Sections A.3, B.3, C.3, and D.3 of Table 1A, was calculated using the following equation:

- % 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 Sections 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.

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

    where: F_i = fractional abundance of the i^{th} 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 = Maximum Permissible Concentration (MPC) of the i^{th} radionuclide from 10 CFR 20 (20.1-20.602), Appendix B, Table II, Column 1.

- % ECL = $\frac{(\text{Rel Rate})\ (X/Q)\ (100)}{ECL_{eff}}$

  where: Rel Rate = total curies released in each category and each quarter, divided by the seconds in a quarter; the value in Sections 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.

  - ECL_{eff} = $\frac{1}{\sum_{i=1}^{n} \frac{F_i}{ECL_i}}$

    where: F_i = fractional abundance of the i^{th} 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

    ECL_i = Effluent Concentration Limit (ECL) of the i^{th} radionuclide from 10 CFR 20 (20.1001-20.2402), Appendix B, Table 2, Column 1.

Liquid Effluents - Applicable Limits

The percent of Applicable Limits, tabulated in Sections A.3, B.3, and C.3 of Table 2A, were calculated using the following equations:

- % 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 Sections E and F in Table 2A); the value in Sections A.2, B.2, and C.2 of Table 2A, μCi/ml.

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

    where: F_i = fractional abundance of the i^{th} 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 = Maximum Permissible Concentration (MPC) of the i^{th} radionuclide from 10 CFR 20 (20.1-20.602), Appendix B, Table II, Column 2.

- % ECL = $\frac{(\text{Dil Conc})\ (100)}{ECL_{eff}}$

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

  - ECL_{eff} = $\frac{1}{\sum_{i=1}^{n} \frac{F_i}{ECL_i}}$

    where: F_i = fractional abundance of the i^{th} 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

    ECL_i = Effluent Concentration Limit (ECL) of the i^{th} radionuclide from 10 CFR 20 (20.1001-20.2402), Appendix B, Table 2, Column 2.

SECTION G. ESTIMATION OF ERROR

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:

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

where: σ_i = Error associated with each component.

SECTION H. 10 CFR 50 APPENDIX I REQUIREMENTS

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. 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 members of the public, per the ODCM, who may at times be within the site boundary[1], 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 shall be considered negligible and hence the dose "0".

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

1. ODCM Figures 2-1 & 2-2.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 1

TABLE 1

SOURCE	Dose * (millirems)				
	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Year
LIQUID EFFLUENTS	1)	2)	3)	4)	5)
Whole Body	7.40E-5	3.33E-5	3.51E-4	1.51E-2	1.56E-2
	6)	7)	8)	9)	10)
Organ	7.54E-5	5.08E-5	5.36E-4	3.44E-2	3.45E-2
AIRBORNE EFFLUENTS	11)	12)	13)	14)	15)
Tritium, Iodines, and Particulates	7.17E-5	2.11E-4	5.65E-4	8.63E-4	1.71E-3
NOBLE GASES **	16)	17)	18)	19)	20)
Gamma	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
	21)	22)	23)	24)	25)
Beta	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
	26)	27)	28)	29)	30)
DIRECT RADIATION	9.36E-2	1.24E-1	6.84E-2	1.11E-1	3.52E-1

* 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 effluent are in units of mrad, reflecting the air dose.

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

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

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

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

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

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

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

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

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

10. This value 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 NW sector. This was calculated using 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 assumptions of USNRC Regulatory Guide 1.109.

13. The maximum organ dose was to a child's thyroid and was located in the NW sector. This was calculated using 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 assumptions of USNRC Regulatory Guide 1.109.

15. The maximum organ dose was to a child's thyroid and was located in the NW sector. This was calculated using the assumptions of USNRC Regulatory Guide 1.109.

16. There was no activity detected during the release period, therefore the reported air dose for gamma radiation was 0.00E+0 mrad.

17. There was no activity detected during the release period, therefore the reported air dose for gamma radiation was 0.00E+0 mrad.

18. There was no activity detected during the release period, therefore the reported air dose for gamma radiation was 0.00E+0 mrad.

19. There was no activity detected during the release period, therefore the reported air dose for gamma radiation was 0.00E+0 mrad.

20. There was no activity detected during the release period, therefore the reported air dose for gamma radiation was 0.00E+0 mrad.

21. There was no activity detected during the release period, therefore the reported air dose for beta radiation was 0.00E+0 mrad.

22. There was no activity detected during the release period, therefore the reported air dose for beta radiation was 0.00E+0 mrad.

23. There was no activity detected during the release period, therefore the reported air dose for beta radiation was 0.00E+0 mrad.

24. There was no activity detected during the release period, therefore the reported air dose for beta radiation was 0.00E+0 mrad.

25. There was no activity detected during the release period, therefore the reported air dose for beta radiation was 0.00E+0 mrad.

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 W 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 W 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 WSW 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 WSW 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 W sector.

TABLE 2

SOURCE	Percent Applicable Limit				
	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Year
LIQUID EFFLUENTS Whole Body	4.93E-3	2.22E-3	2.34E-2	1.01E+0	5.19E-1
Organ	1.51E-3	1.02E-3	1.07E-2	6.88E-1	3.45E-1
AIRBORNE EFFLUENTS Tritium, Iodines, and Particulates	9.56E-4	2.82E-3	7.53E-3	1.15E-2	1.14E-2
NOBLE GASES Gamma	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0
Beta	0.00E+0	0.00E+0	0.00E+0	0.00E+0	0.00E+0

NOTE: Direct Radiation is not specifically addressed in the Applicable Limits.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 1

SECTION I. CHANGES TO OFFSITE DOSE CALCULATION MANUAL

On February 21, 2001, revision 18 to the Unit 1 Offsite Dose Calculation Manual (ODCM) was adopted and published. Incorporated into this revision were:

1. Removal of Sewage Treatment Plant as an effluent pathway,
2. Change to 6.3.3.1.a to require ODCM updates be made in accordance with applicable regulations rather than 10CFR50.59, {*due to changes in the 10CFR50.59 program*}
3. Updated note 6 to Table 4-1, concerning MGPI monitors, by removing "When turned over to station, the" as all of the monitors have been turned over, and
4. Changes related to the Land Use Census update.

Safety evaluations were provided for items 1 and 2.

Minor format changes, correction of typographical errors, and removal of previously blank pages have been made and are described in the attached List of Affected Pages.

Per NRC Generic Letter 89-01, no safety reviews were required or performed for editorial changes or changes made to reflect actual plant operation.

None of the changes impact the accuracy or reliability of effluent dose or setpoint calculations. The level of radioactive effluent control required by 10CFR20, 40CFR190, 10CFR50.36a, and Appendix I to 10CFR50 will be maintained.

Throughout the document, change bars are marked in one of four ways as follows:

A	Addition
D	Deletion
F	Editorial/Format change
R	Revision

The following is a complete list of the changes:

PAGE	CHANGE	REASON
TOC	Renumbered pages as necessary based on changes in the body of the ODCM.	F
1-3	Removed Sewage Treatment Plant from Table 1-1.	D
2-21	Updated Controlling Location Factors per LUC update.	R
2-22	Renumbered table page number due to deletion of one page.	F
2-23	Renumbered table page number due to deletion of one page.	F
2-24	Moved San Mateo Pt Homes from Sector P to Sector Q. Page intentionally left blank.	D
2-25	Renumbered table page number due to addition of one page.	F
2-26	Renumbered table page number due to addition of one page.	F
2-27	Moved San Mateo Pt Homes from Sector P to Sector Q to reflect land use update.	A

Section 2	Renumbered Section 2 pages from 2-28 on to reflect the addition of pages	F
2-30	Renumbered table page number due to addition of one page. Was page 2-29.	F
2-31	Added Outage Worker to Sector B	A
4-6	Removed "When turned over to station, the" from note 6, as all MGPI monitors have been turned over to station.	R
5-17	Removed Table 5-5 as sample location per AR #000400602.	R
5-24	Corrected mileage for PIC 57.	R
6-3	Added word response to MGPI portion of Source Check definition. Was inadvertently omitted previously.	R
6-10	Changed "10CFR50.59" to "applicable regulations".	R

SECTION J. CHANGES TO RADIOACTIVE WASTE TREATMENT SYSTEMS

- There were no changes to the Unit 1 Radioactive Waste Treatment Systems during the reporting period, January 1, 2001 to December 31, 2001.

SECTION K. MISCELLANEOUS

- Yard Drain Sump Overflow

The Unit 1 Yard Drain sump overflowed to the PMF Catch Basin due to heavy rainfall twice in 2001. Since there was no detectable activity in the grab samples taken during the overflows, there were no dose consequences as a result of these unplanned, unmonitored releases.

Start Date/Time	Stop Date/Time	Duration (min)	Activity (μCi/ml)	Estimated Release (Curies)	Estimated Whole Body Dose (mrem)	Estimated Organ Dose (mrem)
01/11/01 @ 0310	01/11/01 @ 0321	11	<LLD	0.00E+0	0.00E+0	0.00E+0
11/24/01 @ 1555	11/24/01 @ 1638	43	<LLD	0.00E+0	0.00E+0	0.00E+0

- PVS Monitor Sample Line Leak

On 8/30/01 during a routine Channel Functional Test, the flexible line for R-1254 particulate and iodine sampling skid was found in a degraded condition. Evaluation of sample results from the monitor and an auxiliary sampler during this time period revealed there was minimal or no in-leakage during normal operation. Therefore there were no dose consequences to members of the public as a result of this event that is documented in AR 010801574.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 1

EFFLUENT RADIATION MONITORS OUT OF SERVICE GREATER THAN 30 DAYS

January 1, 2001 - December 31, 2001

S.O.N.G.S. 1			
Monitor	Inoperability Period	Inoperability Cause	Explanation
R-1218 Liquid Radwaste Discharge Line Monitor	09/17/00 - 05/19/01	Radmonitor upgrade design change	Design change upgrade modification installed a new instrument and connected to Plant Information Monitoring System (PIMS) in conjunction with relocation of the Control Room.
R-2101 Yard Drain Sump Monitor	05/18/01 - 08/16/01	Monitor failure alarms	Monitor exhibited spurious readings and intermittent inoperability. Investigationidentified solar heating of a junction box as the cause. Housing was constructed to correct the problem that is documented in AR 010701251.

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

- Gaseous releases totaled 2.75E+0 curies of which noble gases were 0.00E+0 curies, iodines were 0.00E+0 curies, particulates were 1.37E-5 curies, and tritium was 2.75E+0 curies.

- The radiation doses from gaseous releases were: (a) gamma air dose: 0.00E+0 mrad at the site boundary, (b) beta air dose: 0.00E+0 mrad at the site boundary, organ dose: 1.71E-3 mrem at the nearest receptor.

- Liquid releases totaled 2.29E+0 curies of which particulates and iodines were 3.46E-3 curies, tritium was 2.29E+0 curies, and noble gases were 0.00E+0 curies.

- The radiation doses from liquid releases were: (a) total body: 1.56E-2 mrem, (b) limiting organ: 3.45E-2 mrem.

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

S.O.N.G.S. 2 and 3

TABLE OF CONTENTS

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

January - December

SECTION A. INTRODUCTION

This Annual Radioactive Effluent Release 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 Radioactive Effluent Release Report Addendum
7. Radwaste Shipments
8. 10 CFR 50 Appendix I Requirements
9. Changes to Offsite Dose Calculation Manual

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 2 and 3

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 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.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 2 and 3

TABLE 1A

GASEOUS EFFLUENTS-SUMMATION OF ALL RELEASES

	Unit	First Quarter	Second Quarter	Estimated Total Error, %
C. Fission and activation gases				
1. Total release	Ci	3.22E+1	8.98E+0	3.00E+1
2. Average release rate for period	μCi/sec	4.14E+0	1.15E+0	
3. Percent of applicable limit	% MPC	9.94E-3	4.15E-3	
4. Percent Effluent Concentration Limit	% ECL	1.89E-2	1.17E-2	
D. Iodines				
1. Total iodine-131	Ci	2.24E-3	1.77E-5	1.90E+1
2. Average release rate for period	μCi/sec	2.88E-4	2.25E-6	
3. Percent of applicable limit	% MPC	1.38E-3	1.08E-5	
4. Percent Effluent Concentration Limit	% ECL	6.91E-4	5.40E-6	
E. Particulates				
1. Particulates with half-lives >8 days	Ci	1.37E-3	4.78E-5	1.60E+1
2. Average release rate for period	μCi/sec	1.76E-4	6.08E-6	
3. Percent of applicable limit	% MPC	6.36E-5	5.64E-6	
4. Percent Effluent Concentration Limit	% ECL	1.52E-4	1.41E-5	
5. Gross alpha activity	Ci	7.66E-6	2.41E-6	5.00E+1
F. Tritium				
1. Total release	Ci	2.08E+1	1.89E+1	2.50E+1
2. Average release rate for period	μCi/sec	2.67E+0	2.40E+0	
3. Percent of applicable limit	% MPC	6.42E-3	5.77E-3	
4. Percent Effluent Concentration Limit	% ECL	1.28E-2	1.15E-2	

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 2 and 3

TABLE 1A (Continued)

GASEOUS EFFLUENTS-SUMMATION OF ALL RELEASES

	Unit	Third Quarter	Fourth Quarter	Estimated Total Error, %
A. Fission and activation gases				
1. Total release	Ci	1.73E+1	2.84E+1	3.00E+1
2. Average release rate for period	μCi/sec	2.16E+0	3.57E+0	
3. Percent of applicable limit	% MPC	8.13E-3	9.11E-3	
4. Percent Effluent Concentration Limit	% ECL	2.32E-2	1.86E-2	
B. Iodines				
1. Total iodine-131	Ci	2.00E-5	4.03E-4	1.90E+1
2. Average release rate for period	μCi/sec	2.52E-6	5.07E-5	
3. Percent of applicable limit	% MPC	1.21E-5	2.43E-4	
4. Percent Effluent Concentration Limit	% ECL	6.04E-6	1.22E-4	
C. Particulates				
1. Particulates with half-lives >8 days	Ci	2.57E-4	9.21E-5	1.60E+1
2. Average release rate for period	μCi/sec	3.23E-5	1.16E-5	
3. Percent of applicable limit	% MPC	3.03E-5	6.41E-6	
4. Percent Effluent Concentration Limit	% ECL	7.57E-5	1.91E-5	
5. Gross alpha activity	Ci	5.92E-6	7.03E-6	5.00E+1
D. Tritium				
1. Total release	Ci	1.36E+1	2.76E+1	2.50E+1
2. Average release rate for period	μCi/sec	1.71E+0	3.47E+0	
3. Percent of applicable limit	% MPC	4.11E-3	8.33E-3	
4. Percent Effluent Concentration Limit	% ECL	8.21E-3	1.67E-2	

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 2 and 3

TABLE 1C

GASEOUS EFFLUENTS-GROUND LEVEL RELEASES
CONTINUOUS MODE

Radionuclides Released	Unit	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
1. Fission and activation gases					
argon-41	Ci	2.47E+0	1.76E+0	3.56E+0	2.56E+0
krypton-85	Ci	3.91E-2	<LLD	<LLD	1.78E-1
krypton-85m	Ci	<LLD	<LLD	6.47E-4	<LLD
krypton-87	Ci	<LLD	<LLD	<LLD	<LLD
krypton-88	Ci	<LLD	<LLD	5.54E-4	<LLD
xenon-131m	Ci	2.92E-3	<LLD	1.22E-2	7.10E-2
xenon-133	Ci	2.86E+1	6.28E+0	1.32E+1	2.53E+1
xenon-133m	Ci	<LLD	<LLD	4.85E-3	2.60E-1
xenon-135	Ci	4.58E-2	<LLD	3.34E-2	8.10E-2
xenon-135m	Ci	<LLD	<LLD	<LLD	<LLD
xenon-138	Ci	<LLD	<LLD	<LLD	<LLD
Total for period	Ci	3.12E+1	8.05E+0	1.68E+1	2.84E+1
2. Iodines					
iodine-131	Ci	2.24E-3	1.77E-5	2.00E-5	4.03E-4
iodine-132	Ci	4.27E-2	1.03E-6	<LLD	4.61E-5
iodine-133	Ci	1.13E-4	1.76E-5	1.79E-5	4.72E-5
iodine-135	Ci	<LLD	<LLD	<LLD	1.59E-5
Total for period	Ci	4.50E-2	3.64E-5	3.80E-5	5.13E-4

LLD Lower Limit of Detection; see Table 1D.

TABLE 1C (Continued)

GASEOUS EFFLUENTS-GROUND LEVEL RELEASES
CONTINUOUS MODE

Radionuclides Released	Unit	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
3. Particulates					
barium-140	Ci	<LLD	<LLD	<LLD	<LLD
bromine-82	Ci	6.39E-5	2.75E-5	4.85E-5	7.66E-5
cerium-141	Ci	<LLD	<LLD	<LLD	<LLD
cerium-144	Ci	<LLD	<LLD	<LLD	<LLD
cesium-134	Ci	<LLD	<LLD	<LLD	1.52E-7
cesium-137	Ci	1.99E-4	4.56E-5	2.49E-4	2.93E-5
chromium-51	Ci	8.36E-6	<LLD	<LLD	<LLD
cobalt-58	Ci	1.13E-3	2.21E-6	7.84E-6	5.71E-5
cobalt-60	Ci	1.57E-5	<LLD	<LLD	5.58E-6
iron-59	Ci	<LLD	<LLD	<LLD	<LLD
lanthanum-140	Ci	<LLD	<LLD	<LLD	<LLD
manganese-54	Ci	1.47E-5	<LLD	<LLD	<LLD
molybdenum-99	Ci	<LLD	<LLD	<LLD	<LLD
niobium-95	Ci	1.43E-6	<LLD	<LLD	<LLD
sodium-24	Ci	<LLD	<LLD	<LLD	4.93E-6
strontium-89	Ci	<LLD	<LLD	<LLD	<LLD
strontium-90	Ci	<LLD	<LLD	<LLD	<LLD
technetium-99m	Ci	<LLD	<LLD	<LLD	6.17E-7
zinc-65	Ci	<LLD	<LLD	<LLD	<LLD

LLD Lower Limit of Detection; see Table 1D.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 2 and 3

TABLE 1C (Continued)

GASEOUS EFFLUENTS-GROUND LEVEL RELEASES
BATCH MODE *

Radionuclides Released	Unit	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
1. Fission and activation gases					
krypton-85	Ci	9.93E-1	9.34E-1	3.77E-1	<LLD
krypton-85m	Ci	<LLD	<LLD	<LLD	<LLD
krypton-87	Ci	<LLD	<LLD	<LLD	<LLD
krypton-88	Ci	<LLD	<LLD	<LLD	<LLD
xenon-133	Ci	2.03E-3	<LLD	7.54E-2	<LLD
xenon-133m	Ci	<LLD	<LLD	<LLD	<LLD
xenon-135	Ci	<LLD	<LLD	5.79E-4	<LLD
xenon-135m	Ci	<LLD	<LLD	<LLD	<LLD
xenon-138	Ci	<LLD	<LLD	<LLD	<LLD
Total for period	Ci	9.95E-1	9.34E-1	4.53E-1	<LLD

LLD Lower Limit of Detection; see Table 1D.

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

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 2 and 3

TABLE 1D

GASEOUS EFFLUENTS-LOWER LIMIT OF DETECTION
CONTINUOUS MODE

Radionuclides	LLD (μCi/cc)
1. Fission and activation gases	
krypton-85	2.10E-5
krypton-85m	5.00E-8
krypton-87	2.60E-7
krypton-88	1.80E-7
xenon-131m	1.70E-6
xenon-133m	4.10E-7
xenon-135	5.30E-8
xenon-135m	2.00E-6
xenon-138	3.50E-6
2. Iodines	
iodine-132	6.00E-10
iodine-135	1.70E-10
3. Particulates	
barium-140	2.70E-11
cerium-141	3.40E-12
cerium-144	1.40E-11
cesium-134	9.20E-12
chromium-51	3.20E-11
cobalt-60	1.30E-11
iron-59	2.00E-11
lanthanum-140	2.20E-11
manganese-54	8.20E-12
molybdenum-99	2.10E-12
niobium-95	7.70E-12
sodium-24	3.30E-12
strontium-89	1.00E-13
strontium-90	1.00E-14
technetium-99m	1.20E-11
zinc-65	2.20E-11

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 2 and 3

TABLE 1D (Continued)

GASEOUS EFFLUENTS-LOWER LIMIT OF DETECTION
BATCH MODE

Radionuclides	LLD (μCi/cc)
1. Fission and activation gases	
krypton-85	1.20E-3
krypton-85m	2.50E-6
krypton-87	1.20E-5
krypton-88	8.90E-6
xenon-133	5.70E-6
xenon-133m	2.30E-5
xenon-135	2.90E-6
xenon-135m	3.70E-5
xenon-138	5.50E-5

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 2 and 3

TABLE 1E

GASEOUS EFFLUENTS-RADIATION DOSES AT THE SITE BOUNDARY

	Unit	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
A. Noble Gas					
1. Gamma Air Dose	mrad	5.07E-3	2.81E-3	5.76E-3	5.02E-3
2. Percent Applicable Limit	%	5.07E-2	2.81E-2	5.76E-2	5.02E-2
3. Beta Air Dose	mrad	6.20E-3	2.08E-3	4.02E-3	5.47E-3
4. Percent Applicable Limit	%	3.10E-2	1.04E-2	2.01E-2	2.74E-2
B. Tritium, Iodine, Particulates (at the nearest receptor)					
1. Organ Dose	mrem	3.10E-3	7.65E-4	1.06E-3	1.48E-3
2. Percent Applicable Limit	%	2.07E-2	5.10E-3	7.09E-3	9.89E-3

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

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 2 and 3

TABLE 1F

GASEOUS EFFLUENTS-BATCH RELEASE SUMMARY

	12 month period
1. Number of batch releases:	8 releases
2. Total time period for batch releases:	2672 minutes
3. Maximum time period for a batch release:	468 minutes
4. Average time period for a batch release:	334 minutes
5. Minimum time period for a batch release:	23 minutes

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 2 and 3

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 waste released (prior to dilution)
(3) the 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.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 2 and 3

TABLE 2A

LIQUID EFFLUENTS-SUMMATION OF ALL RELEASES

	Unit	First Quarter	Second Quarter	Estimated Total Error, %
A. Fission and activation products				
1. Total release (not including tritium, gases, alpha)	Ci	4.78E-3	3.58E-3	1.90E+1
2. Average diluted concentration during period	μCi/ml	9.62E-12	5.72E-12	
3. Percent of applicable limit	% MPC	1.36E-5	1.10E-5	
4. Percent Effluent Concentration Limit	% ECL	1.29E-4	1.06E-4	
B. Tritium				
1. Total release	Ci	1.02E+2	8.34E+1	1.90E+1
2. Average diluted concentration during period	μCi/ml	2.05E-7	1.33E-7	
3. Percent of applicable limit	% MPC	6.84E-3	4.45E-3	
4. Percent Effluent Concentration Limit	% ECL	2.05E-2	1.33E-2	
C. Dissolved and entrained gases				
1. Total release	Ci	4.51E-1	1.49E-2	1.90E+1
2. Average diluted concentration during period	μCi/ml	9.07E-10	2.38E-11	
3. Percent of applicable limit	% MPC	4.53E-4	1.19E-5	
4. Percent Effluent Concentration Limit	% ECL	4.53E-4	1.19E-5	
D. Gross alpha radioactivity				
1. Total release	Ci	1.39E-5	<LLD	5.00E+1
E. Volume of waste released (batch & continuous, prior to dilution)	liters	7.56E+7	9.02E+7	5.00E+0
F. Volume of dilution water used during period	liters	4.97E+11	6.25E+11	5.00E+0

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 2 and 3

TABLE 2A (Continued)

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	2.62E-3	5.01E-3	1.90E+1
2. Average diluted concentration during period	μCi/ml	3.41E-12	6.77E-12	
3. Percent of applicable limit	% MPC	7.05E-6	1.25E-5	
4. Percent Effluent Concentration Limit	% ECL	7.64E-5	1.29E-4	
B. Tritium				
1. Total release	Ci	1.42E+2	6.31E+2	1.90E+1
2. Average diluted concentration during period	μCi/ml	1.85E-7	8.52E-7	
3. Percent of applicable limit	% MPC	6.16E-3	2.84E-2	
4. Percent Effluent Concentration Limit	% ECL	1.85E-2	8.52E-2	
C. Dissolved and entrained gases				
1. Total release	Ci	1.46E-2	1.17E-1	1.90E+1
2. Average diluted concentration during period	μCi/ml	1.90E-11	1.58E-10	
3. Percent of applicable limit	% MPC	9.51E-6	7.90E-5	
4. Percent Effluent Concentration Limit	% ECL	9.51E-6	7.90E-5	
D. Gross alpha radioactivity				
1. Total release	Ci	1.29E-5	1.21E-4	5.00E+1
E. Volume of waste released (batch & continuous, prior to dilution)	liters	8.58E+7	1.09E+8	5.00E+0
F. Volume of dilution water used during period	liters	7.68E+11	7.41E+11	5.00E+0

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 2 and 3

TABLE 2B

LIQUID EFFLUENTS
CONTINUOUS MODE

Radionuclides Released	Unit	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
1. Fission and activation products					
barium-140	Ci	<LLD	<LLD	<LLD	<LLD
cerium-141	Ci	<LLD	<LLD	<LLD	<LLD
cerium-144	Ci	<LLD	<LLD	<LLD	<LLD
cesium-134	Ci	<LLD	<LLD	<LLD	<LLD
cesium-137	Ci	1.52E-4	5.01E-5	<LLD	<LLD
chromium-51	Ci	<LLD	<LLD	<LLD	<LLD
cobalt-58	Ci	<LLD	<LLD	<LLD	<LLD
cobalt-60	Ci	<LLD	<LLD	<LLD	<LLD
iodine-131	Ci	<LLD	<LLD	<LLD	<LLD
iron-55	Ci	<LLD	<LLD	<LLD	<LLD
iron-59	Ci	<LLD	<LLD	<LLD	<LLD
lanthanum-140	Ci	<LLD	<LLD	<LLD	<LLD
manganese-54	Ci	<LLD	<LLD	<LLD	<LLD
molybdenum-99	Ci	<LLD	<LLD	<LLD	<LLD
niobium-95	Ci	<LLD	<LLD	<LLD	<LLD
strontium-89	Ci	<LLD	<LLD	<LLD	<LLD
strontium-90	Ci	<LLD	<LLD	<LLD	<LLD
technetium-99m	Ci	<LLD	<LLD	<LLD	<LLD
zinc-65	Ci	<LLD	<LLD	<LLD	<LLD
zirconium-95	Ci	<LLD	<LLD	<LLD	<LLD
Total for period	Ci	1.52E-4	5.01E-5	<LLD	<LLD
2. Dissolved and entrained gases					
xenon-133	Ci	<LLD	<LLD	<LLD	<LLD
xenon-135	Ci	<LLD	<LLD	<LLD	<LLD
Total for period	Ci	<LLD	<LLD	<LLD	<LLD

LLD Lower Limit of Detection; see Table 2C.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 2 and 3

TABLE 2B (Continued)

LIQUID EFFLUENTS
BATCH MODE

Radionuclides Released	Unit	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
1. Fission and activation products					
antimony-125	Ci	1.10E-3	2.35E-3	1.92E-3	3.41E-3
barium-140	Ci	<LLD	<LLD	<LLD	<LLD
cerium-141	Ci	<LLD	<LLD	<LLD	<LLD
cerium-144	Ci	<LLD	<LLD	<LLD	<LLD
cesium-134	Ci	7.55E-5	8.23E-5	9.38E-5	1.76E-4
cesium-137	Ci	1.14E-4	3.74E-4	3.54E-4	6.00E-4
chromium-51	Ci	4.56E-4	4.33E-5	<LLD	1.59E-4
cobalt-58	Ci	8.37E-4	1.30E-4	4.87E-5	5.89E-4
cobalt-60	Ci	5.35E-4	1.68E-4	1.85E-4	3.46E-5
iodine-131	Ci	<LLD	<LLD	<LLD	<LLD
iron-55	Ci	1.12E-3	3.40E-4	<LLD	<LLD
iron-59	Ci	<LLD	<LLD	<LLD	<LLD
lanthanum-140	Ci	<LLD	<LLD	<LLD	<LLD
manganese-54	Ci	6.18E-5	5.07E-6	<LLD	7.13E-6
molybdenum-99	Ci	<LLD	<LLD	<LLD	<LLD
niobium-95	Ci	1.51E-4	3.02E-6	1.38E-5	<LLD
niobium-97	Ci	5.30E-6	9.05E-6	4.83E-6	6.15E-6
silver-110m	Ci	6.10E-5	<LLD	<LLD	3.19E-5
strontium-89	Ci	<LLD	<LLD	<LLD	<LLD
strontium-90	Ci	<LLD	<LLD	<LLD	<LLD
technetium-99m	Ci	<LLD	<LLD	<LLD	<LLD
tin-117m	Ci	<LLD	2.27E-5	<LLD	<LLD
zinc-65	Ci	<LLD	<LLD	<LLD	<LLD
zirconium-95	Ci	1.12E-4	<LLD	<LLD	<LLD
Total for period	Ci	4.63E-3	3.53E-3	2.62E-3	5.01E-3
2. Dissolved and entrained gases					
krypton-85	Ci	1.42E-1	1.49E-2	1.16E-2	9.63E-2
xenon-131m	Ci	1.77E-2	<LLD	<LLD	5.17E-3
xenon-133	Ci	2.91E-1	<LLD	3.01E-3	1.56E-2
xenon-135	Ci	<LLD	<LLD	<LLD	<LLD
Total for period	Ci	4.51E-1	1.49E-2	1.46E-2	1.17E-1

LLD Lower Limit of Detection; see Table 2C.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 2 and 3

TABLE 2C

LIQUID EFFLUENTS-LOWER LIMIT OF DETECTION
CONTINUOUS MODE

Radionuclides	LLD (μCi/cc)
1. Fission and activation products	
barium-140	3.90E-7
cerium-141	5.80E-8
cerium-144	2.30E-7
cesium-134	1.00E-7
cesium-137	8.60E-8
chromium-51	4.60E-7
cobalt-58	9.00E-8
cobalt-60	1.30E-7
iodine-131	8.00E-8
iron-55	1.00E-6
iron-59	2.10E-7
lanthanum-140	7.20E-7
manganese-54	8.90E-8
molybdenum-99	7.50E-8
niobium-95	9.10E-8
strontium-89	5.00E-8
strontium-90	1.00E-8
technetium-99m	7.70E-8
zinc-65	2.20E-7
zirconium-95	1.60E-7
2. Dissolved and entrained gases	
xenon-133	3.10E-7
xenon-135	1.20E-7
3. gross alpha	1.00E-7

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 2 and 3

TABLE 2C (Continued)

LIQUID EFFLUENTS-LOWER LIMIT OF DETECTION
BATCH MODE

Radionuclides	LLD (μCi/cc)
1. Fission and activation products	
barium-140	3.30E-7
cerium-141	5.30E-8
cerium-144	2.30E-7
chromium-51	4.20E-7
iodine-131	6.00E-8
iron-55	1.00E-6
iron-59	2.00E-7
lanthanum-140	2.40E-7
manganese-54	8.80E-8
molybdenum-99	3.50E-8
niobium-95	8.50E-8
silver-110m	1.30E-7
strontium-89	5.00E-8
strontium-90	1.00E-8
technetium-99m	3.60E-8
tin-117m	3.10E-8
zinc-65	2.20E-7
zirconium-95	1.50E-7
2. Dissolved and entrained gases	
xenon-131m	4.00E-6
xenon-133	3.10E-7
xenon-135	1.20E-7
3. gross alpha	1.00E-7

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 2 and 3

TABLE 2D

LIQUID EFFLUENTS-RADIATION DOSES AT THE LIQUID SITE BOUNDARY

	Unit	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
A.					
1. Total body dose	mrem	2.68E-4	1.90E-4	2.68E-4	1.11E-3
2. Percent Applicable Limit	%	8.95E-3	6.32E-3	8.92E-3	3.69E-2
B.					
1. Limiting organ dose	mrem	7.07E-4	2.82E-4	3.01E-4	1.25E-3
2. Percent Applicable Limit	%	7.07E-3	2.82E-3	3.01E-3	1.25E-2
3. Limiting organ for period		GI/LLI	GI/LLI	GI/LLI	GI/LLI

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 2 and 3

TABLE 2E

LIQUID EFFLUENTS-BATCH RELEASE SUMMARY

	12 month period
1. Number of batch releases:	146 releases
2. Total time period for batch releases:	21855 minutes
3. Maximum time period for a batch release:	478 minutes
4. Average time period for a batch release:	150 minutes
5. Minimum time period for a batch release:	7 minutes
6. Average saltwater flow during batch releases:	726000 gpm

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 2 and 3

SECTION D. PREVIOUS RADIOACTIVE EFFLUENT RELEASE REPORT ADDENDUM

1. The fourth quarter 2000 values for composite Sr-89, Sr-90 and Fe-55 were incomplete due to data not available at report time. The values are as follows:

TABLE 1C (2000)
GASEOUS EFFLUENTS-GROUND LEVEL RELEASES
CONTINUOUS MODE

Radionuclides Released	Unit	Fourth Quarter
3. Particulates		
strontium-89	Ci	<LLD
strontium-90	Ci	<LLD

Sr-89 LLD = 1.00E-13
Sr-90 LLD = 1.00E-14

Table 2A (2000)

LIQUID EFFLUENTS-SUMMATION OF ALL RELEASES

	Unit	Fourth Quarter
A. Fission and activation products		
1. Total release (not including tritium, gases, alpha)	Ci	4.42E-2
2. Average diluted concentration during period	μCi/ml	7.09E-11
3. Percent of applicable limit	% MPC	7.66E-5
4. Percent of Effluent Concentration Limit	% ECL	5.93E-4

SECTION D. PREVIOUS RADIOACTIVE EFFLUENT RELEASE REPORT ADDENDUM (cont'd)

TABLE 2B (2000)
LIQUID EFFLUENTS
CONTINUOUS MODE

Radionuclides Released	Unit	Fourth Quarter
2. Fission an activation products		
iron-55	Ci	<LLD
strontium-89	Ci	<LLD
strontium-90	Ci	<LLD

Fe-55 LLD = 1.00E-6
Sr-89 LLD = 5.00E-8
Sr-90 LLD = 1.00E-8

TABLE 2B (2000)
LIQUID EFFLUENTS
BATCH MODE

Radionuclides Released	Unit	Fourth Quarter
2. Fission an activation products		
iron-55	Ci	9.77E-3
strontium-89	Ci	<LLD
strontium-90	Ci	<LLD
Total for period	Ci	4.42E-2

Fe-55 LLD = 1.00E-6
Sr-89 LLD = 5.00E-8
Sr-90 LLD = 1.00E-8

SECTION D. PREVIOUS RADIOACTIVE EFFLUENT RELEASE REPORT ADDENDUM (cont'd)

2. The following information was not included in the 2000 report.

SECTION K. MISCELLANEOUS (2000)

- Non-isokinetic Particulate and Iodine Sampling on Condenser Air Ejector Monitors

On 1/21/00, it was determined that the Unit 2 and Unit 3 Condenser Air Ejector (CAE) radiation monitoring systems' sample flow was outside the design range for isokinetic flow (11.3-18.7 scfm). The process flow was immediately adjusted to ensure sampling within the allowable range. Based on testing of the actual plant configuration and equipment, it was determined that isokinetic flow could actually be maintained between 7.0 scfm to 22.5 scfm. From 2/21/99 to 1/21/00, Unit 2 CAE monitor sample flow was outside the allowable range 30% of the time while Unit 3, from 5/6/99, was outside 80% of the time. For the entire year, no particulate and iodine sample showed any detectable activity. The noble gas monitor was in service for the entire time period. This event is documented in AR 000101252.

- Missed Process Flow Estimate

On 5/2/00 the Unit 3 Full Flow Condensate Polishing Demineralizer Holdup Tank was released with the process flow instrument, 3FQI3772, out of service. The one hour flow check required by the ODCM under these conditions was missed. The flow estimate was completed at 66 minutes. There were no dose consequences to the public as a result of this event that is documented in AR 000500145.

- Loss of Heat Tracing on Plant Vent Stack Monitor (2RT-7865)

On 5/10/00, the heat tracing for the sample lines for 2RT-7865 was identified as inoperable due to a failed breaker. The last time the heat tracing had been verified operable was on 3/7/00 during a Channel Functional Test. During the period of 3/7/00 to 5/10/00, particulate and iodine samples from 2RT-7865 were only used for dose calculations from 3/15/00 to 3/29/00. Sample results of the weeks previous and following this time period, from different monitors, showed similar or lower iodine activity. There was no particulate activity during this time. There were no dose consequences to the public as a result of this event that is documented in AR 000400609.

SECTION D. PREVIOUS RADIOACTIVE EFFLUENT RELEASE REPORT ADDENDUM (cont'd)

3. Dose calculations for Table 1 Airborne Effluents and Noble Gases of this report are performed using concurrent meteorological data. On 10/27/00, it was determined a conversion factor of 2 had incorrectly been applied to wind speeds collected from 07/27/98 to 12/31/99 subsequent to a hard drive failure. This event is documented in AR 001002318.

   On 12/7/01, it was determined the computer program used to perform airborne dose calculations did not have the current controlling location receptor parameters. In August 1998, during system repair, the file was replaced but the contents were not verified prior to use. This event is documented in AR 010201705. The operating procedure has been revised to verify file data prior to use.

   The dose data have been reprocessed for the years 1998, 1999 and 2000. In no case did the percent of the dose limit exceed 1%. The revised data are provided in the following tables.

SECTION D. PREVIOUS RADIOACTIVE EFFLUENT RELEASE REPORT ADDENDUM (cont'd)

Section H. 10CFR50 Appendix I Requirments

TABLE 1 (1998)

SOURCE	Dose * (millirems)				
	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Year
AIRBORNE EFFLUENTS Tritium, Iodines, and Particulates	11) 1.58E-2	12) 1.42E-3	13) 2.02E-3	14) 5.71E-4	15) 1.88E-2
NOBLE GASES ** Gamma	16) 6.64E-3	17) 1.42E-3	18) 2.44E-3	19) 5.38E-3	20) 1.46E-2
Beta	21) 1.23E-2	22) 3.97E-3	23) 6.92E-3	24) 7.96E-3	25) 2.95E-2

* 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 effluent are in units of mrad, reflecting the air dose.

11-25 These values were calculated using the assumptions of USNRC Regulatory Guide 1.109.
11. The maximum organ dose was to a child's thyroid and was located in the ESE sector.
12. The maximum organ dose was to a child's thyroid and was located in the NNW sector.
13-15. The maximum organ dose was to a child's thyroid and was located in the ESE sector.
16. The maximum air dose for gamma radiation was located in the E sector, at the exclusion area boundary.
17. The maximum air dose for gamma radiation was located in the E sector, at the exclusion area boundary.
18-20. The maximum air dose for gamma radiation was located in the ENE sector, at the exclusion area boundary.
21. The maximum air dose for beta radiation was located in the ENE sector, at the exclusion area boundary.
22. The maximum air dose for beta radiation was located in the E sector, at the exclusion area boundary.
23-25. The maximum air dose for beta radiation was located in the ENE sector, at the exclusion area boundary.

TABLE 2 (1998)

SOURCE	Percent Applicable Limit				
	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Year
AIRBORNE EFFLUENTS Tritium, Iodines, and Particulates	1.05E-1	9.48E-3	1.35E-2	3.80E-3	6.25E-2
NOBLE GASES ** Gamma	6.64E-2	1.42E-2	2.44E-2	5.38E-2	7.30E-2
Beta	6.13E-2	1.98E-2	3.46E-2	3.98E-2	7.37E-2

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 2 and 3

SECTION D. PREVIOUS RADIOACTIVE EFFLUENT RELEASE REPORT ADDENDUM (cont'd)

Section H. 10CFR50 Appendix I Requirments

TABLE 1 (1999)

SOURCE	Dose * (millirems)				
	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Year
AIRBORNE EFFLUENTS Tritium, Iodines, and Particulates	11) 1.35E-2	12) 3.84E-3	13) 8.62E-4	14) 6.78E-3	15) 1.94E-2
NOBLE GASES ** Gamma	16) 5.59E-3	17) 1.92E-3	18) 1.06E-3	19) 2.60E-3	20) 1.04E-2
Beta	21) 1.07E-2	22) 1.80E-3	23) 1.16E-3	24) 3.30E-3	25) 1.67E-2

* 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 effluent are in units of mrad, reflecting the air dose.

11-25 These were calculated using the assumptions of USNRC Regulatory Guide 1.109.
11. The maximum organ dose was to a child's thyroid and was located in the ESE sector.
12-15. The maximum organ dose was to a child's thyroid and was located in the NNW sector.
16. The maximum air dose for gamma radiation was located in the E sector, at the exclusion area boundary.
17. The maximum air dose for gamma radiation was located in the ENE sector, at the exclusion area boundary.
18. The maximum air dose for gamma radiation was located in the ESE sector, at the exclusion area boundary.
19. The maximum air dose for gamma radiation was located in the ENE sector, at the exclusion area boundary.
20. The maximum air dose for gamma radiation was located in the ENE sector, at the exclusion area boundary.
21. The maximum air dose for beta radiation was located in the E sector, at the exclusion area boundary.
22. The maximum air dose for beta radiation was located in the ENE sector, at the exclusion area boundary.
23-25. The maximum air dose for beta radiation was located in the E sector, at the exclusion area boundary.

TABLE 2 (1999)

SOURCE	Percent Applicable Limit				
	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Year
AIRBORNE EFFLUENTS Tritium, Iodines, and Particulates	9.03E-2	2.56E-2	5.74E-3	4.52E-2	6.45E-2
NOBLE GASES Gamma	5.59E-2	1.92E-2	1.06E-2	2.60E-2	5.18E-2
Beta	5.35E-2	9.02E-3	5.81E-3	1.65E-2	4.18E-2

SECTION D. PREVIOUS RADIOACTIVE EFFLUENT RELEASE REPORT ADDENDUM (cont'd)

Section H. 10CFR50 Appendix I Requirements

TABLE 1 (2000)

SOURCE	Dose * (millirems)				
	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Year
AIRBORNE EFFLUENTS Tritium, Iodines, and Particulates	11) 6.13E-3	12) 2.97E-3	13) 3.66E-3	14) 3.94E-3	15) 1.58E-2
NOBLE GASES ** Gamma	16) 1.51E-3	17) 3.45E-3	18) 1.82E-3	19) 1.94E-3	20) 7.18E-3
Beta	21) 1.39E-3	22) 3.26E-3	23) 1.56E-3	24) 2.12E-3	25) 8.08E-3

* 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 effluent are in units of mrad, reflecting the air dose.

11-25 These were calculated using the assumptions of USNRC Regulatory Guide 1.109.

11-12. The maximum organ dose was to a child's thyroid and was located in the NNW sector.

13. The maximum organ dose was to a child's thyroid and was located in the E sector.

14. The maximum organ dose was to a child's thyroid and was located in the ESE sector.

15. The maximum organ dose was to a child's thyroid and was located in the NNW sector.

16. The maximum air dose for gamma radiation was located in the E sector, at the exclusion area boundary.

17. The maximum air dose for gamma radiation was located in the ENE sector, at the exclusion area boundary.

18-20. The maximum air dose for gamma radiation was located in the E sector, at the exclusion area boundary.

21. The maximum air dose for beta radiation was located in the E sector, at the exclusion area boundary.

22-23. The maximum air dose for beta radiation was located in the ENE sector, at the exclusion area boundary.

23. The maximum air dose for beta radiation was located in the ENE sector, at the exclusion area boundary.

24. The maximum air dose for beta radiation was located in the E sector, at the exclusion area boundary.

25. The maximum air dose for beta radiation was located in the ENE sector, at the exclusion area boundary.

TABLE 2 (2000)

SOURCE	Percent Applicable Limit				
	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Year
AIRBORNE EFFLUENTS Tritium, Iodines, and Particulates	4.09E-2	1.98E-2	2.44E-2	2.63E-2	5.27E-2
NOBLE GASES Gamma	1.51E-2	3.45E-2	1.82E-2	1.94E-2	3.59E-2
Beta	6.95E-3	1.63E-2	7.79E-3	1.06E-2	2.02E-2

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 2 and 3

SECTION E. RADWASTE SHIPMENTS

TABLE 3

SOLID WASTE AND IRRADIATED FUEL SHIPMENT

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

1. Type of waste	Unit	12 month period	Estimated total error (%)
a. Spent resins, filter sludges, evaporator bottoms	m^3	N/A	N/A
	Ci	N/A	
b. Dry active waste (DAW), compactable and non-compactable*	m^3	1.29E+1	3.00E+1
	Ci	2.30E-2	
c. Irradiated components, control rods	m^3	N/A	N/A
	Ci	N/A	
d. Other	m^3	N/A	N/A
	Ci	N/A	

Note: Total curie content estimated.

(*) Material packaged in strong, tight containers of various sizes.

N/A No shipment made.

2. Estimate of major nuclide composition (by type of waste) (Cont'd)		
a. not applicable	%	N/A
b. americium-241	%	1.63E-3
antimony-124	%	2.78E-1
antimony-125	%	7.49E-1
carbon-14	%	1.26E+0
cerium-141	%	6.75E-2
cerium-144	%	8.97E-2
cesium-134	%	1.85E+0
cesium-137	%	1.64E+1
chromium-51	%	1.17E+1
cobalt-57	%	1.11E-1
cobalt-58	%	2.53E+1
cobalt-60	%	7.01E+0
curium-242	%	1.29E-3
curium-243/244	%	2.06E-3
iodine-129	%	3.34E-2
iron-55	%	1.92E+1
iron-59	%	1.17E+0
manganese-54	%	1.32E+0
nickel-63	%	8.25E+0
niobium-95	%	3.09E+0
plutonium-238	%	1.12E-3
plutonium-239/240	%	1.03E-3
plutonium-241	%	1.06E-1
silver-110m	%	1.60E-2
strontium-89	%	1.06E-2
strontium-90	%	1.04E-2
technetium-99	%	3.84E-3
tin-113	%	2.60E-1
tritium	%	1.13E-1
zirconium-95	%	1.59E+0
c. not applicable	%	0.00E+0
d. not applicable	%	0.00E+0

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 2 and 3

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

3. Solid Waste Disposition		
Number of Shipments	Mode of Transportation	Destination
4 *	Hitman Trucking Company Truck/Trailer	EnviroCare, UT

* SONGS maintains a contract with vendor (GTS) that provides volume reduction services. These shipments were made from their processing facility. The 4 shipments made from this facility included waste from other generators. SCE's waste volume was a small fraction of the total waste volume of these shipments.

B. IRRADIATED FUEL SHIPMENTS (Disposition)

Number of Shipments	Mode of Transportation	Destination
None	No shipments were made	N/A

C. DEWATERING

Number of Containers	Solidification Agent
None	N/A

SECTION F. APPLICABLE LIMITS

Gaseous Effluents - Applicable Limits

The percent of Applicable Limits, tabulated in Sections A, B, C, and D of Table 1A, were calculated using the following equation:

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

  where: Rel Rate = total curies released in each category and each quarter, divided by the seconds in a quarter; the value in Sections 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 Units 2&3 ODCM.

- $MPC_{eff} = \dfrac{1}{\sum_{i=1}^{n} \dfrac{F_i}{MPC_i}}$

  where: F_i = fractional abundance of the i^{th} 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 = Maximum Permissible Concentration (MPC) of the i^{th} radionuclide from 10 CFR 20 (20.1-20.602), Appendix B, Table II, Column 1.

- % ECL $= \dfrac{(\text{Rel Rate})\ (X/Q)\ (100)}{ECL_{eff}}$

  where: Rel Rate = total curies released in each category and each quarter, divided by the seconds in a quarter; the value in Sections 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 Units 2&3 ODCM.

- $ECL_{eff} = \dfrac{1}{\sum_{i=1}^{n} \dfrac{F_i}{ECL_i}}$

  where: F_i = fractional abundance of the i^{th} 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

  ECL_i = Effluent Concentration Limit (ECL) of the i^{th} radionuclide from 10 CFR 20 (20.1001-20.2402), Appendix B, Table 2, Column 1.

Liquid Effluents - Applicable Limits

The percent of Applicable Limits, tabulated in Sections A, B, and C of Table 2A, were calculated using the following equations:

- % 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 Sections E and F in Table 2A); the value in Sections A.2, B.2, and C.2 of Table 2A, μCi/ml.

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

    where: F_i = fractional abundance of the i^{th} 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 = Maximum Permissible Concentration (MPC) of the i^{th} radionuclide from 10 CFR 20 (20.1-20.602), Appendix B, Table II, Column 2.

- % ECL $= \frac{(\text{Dil Conc})\ (100)}{ECL_{eff}}$

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

  - $ECL_{eff} = \frac{1}{\sum_{i=1}^{n} \frac{F_i}{ECL_i}}$

    where: F_i = fractional abundance of the i^{th} 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

    ECL_i = Effluent Concentration Limit (ECL) of the i^{th} radionuclide from 10 CFR 20 (20.1001-20.2402), Appendix B, Table 2, Column 2.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 2 and 3

SECTION G. ESTIMATION OF ERROR

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:

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

where: σ_i = Error associated with each component.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 2 and 3

SECTION H. 10 CFR 50 APPENDIX I REQUIREMENTS

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; these data are also presented in Table 2D. 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 members of the public, per the ODCM, who may at times be within the site boundary[1], 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 shall be considered negligible and hence the dose "0".

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

1. ODCM Figures 2-1 & 2-2.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 2 and 3

TABLE 1

SOURCE	Dose * (millirems) First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Year
LIQUID EFFLUENTS	1)	2)	3)	4)	5)
Whole Body	2.68E-4	1.90E-4	2.68E-4	1.11E-3	1.83E-3
	6)	7)	8)	9)	10)
Organ	7.07E-4	2.82E-4	3.01E-4	1.25E-3	2.54E-3
AIRBORNE EFFLUENTS	11)	12)	13)	14)	15)
Tritium, Iodines, and Particulates	9.26E-3	3.09E-3	1.39E-3	7.99E-3	1.97E-2
NOBLE GASES **	16)	17)	18)	19)	20)
Gamma	2.43E-3	7.19E-4	1.73E-3	2.12E-3	6.18E-3
	21)	22)	23)	24)	25)
Beta	2.88E-3	6.13E-4	1.28E-3	2.95E-3	7.05E-3
	26)	27)	28)	29)	30)
DIRECT RADIATION	9.39E-2	1.24E-1	6.86E-2	1.11E-1	3.53E-1

* 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 effluent are in units of mrad, reflecting the air dose.

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

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

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

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

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

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

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

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

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

10. This value 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 assumptions of USNRC Regulatory Guide 1.109.

12. The maximum organ dose was to a child's thyroid and was located in the NNW sector. This was calculated using 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 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 assumptions of USNRC Regulatory Guide 1.109.

15. The maximum organ dose was to a child's thyroid and was located in the NNW sector. This was calculated using 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 using 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 using the assumptions of the USNRC Regulatory Guide 1.109.

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

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

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

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

25. The maximum air dose for beta radiation was located in the ENE sector, at the exclusion area boundary, and calculated using 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 W 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 W 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 WSW 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 WSW 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 W sector.

TABLE 2

SOURCE	Percent Applicable Limit				
	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Year
LIQUID EFFLUENTS Whole Body	8.95E-3	6.32E-3	8.92E-3	3.69E-2	3.05E-2
Organ	7.07E-3	2.82E-3	3.01E-3	1.25E-2	1.27E-2
AIRBORNE EFFLUENTS Tritium, Iodines, and Particulates	6.17E-2	2.06E-2	9.28E-3	5.33E-2	6.57E-2
NOBLE GASES Gamma	2.43E-2	7.19E-3	1.73E-2	2.12E-2	3.09E-2
Beta	1.44E-2	3.06E-3	6.39E-3	1.48E-2	1.76E-2

NOTE: Direct Radiation is not specifically addressed in the Applicable Limits.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 2 and 3

SECTION I. CHANGES TO THE OFFSITE DOSE CALCULATION MANUAL

On February 28, 2001, Revision 36 to the Units 2/3 Offsite Dose Calculation Manual was adopted and published. This change incorporated the following:

1. Update to SYF flowrates,
2. Addition of liquid composite samplers to Section 4,
3. Change to 6.3.1.a to require ODCM updates be made in accordance with applicable regulations rather than 10CFR50.59, {*due to changes in the 10CFR50.59 program*}
4. Deleted the Investigative Report definition, and
5. Changes related to the Land Use Census update.

Safety Evaluations were provided for items 2 and 3. The requirement for an Investigative Report was added to the ODCM at the time that the RETS were transferred from the Technical Specifications. There existed a need to document each occurrence of failure to meet Surveillance Requirements and/or Action Statements related to the ODCM. The ODCM will now require performance of an evaluation based on the significance of the event in accordance with the site Corrective Action Program.

Per NRC Generic Letter 89-01, no safety reviews were required or performed for editorial changes or changes made to reflect actual plant operation.

Minor format changes, correction of typographical errors, and removal of previously blank pages have been made and are described in the attached List of Affected Pages.

None of the changes impact the accuracy or reliability of effluent dose or setpoint calculations. The level of radioactive effluent control required by 10CFR20, 40CFR190, 10CFR50.36a, and Appendix I to 10CFR50 will be maintained.

Throughout the document, change bars are marked in one of four ways as follows:

A	Addition
D	Deletion
F	Editorial/Format change
R	Revision

The following is a complete list of the changes:

Old page	New page	CHANGE	REASON
TOC		Renumbered pages as necessary based on changes in the body of the ODCM.	F
1-10		Lined up equation definitions.	F
1-14		Lined up equation definitions.	F
1-25		Changed procedure reference name.	R
2-8		Added placeholder for Step 2.5 which was previously deleted.	F
2-21		Updated SYF process flow rates per NEDO Calculation N-0320-007.	R

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 2 and 3

Old page	New page	CHANGE	REASON
2-31		Updated Controlling Location Factors per LUC update.	R
2-32		Renumbered Table page number due to deletion of one page.	F
2-33		Moved San Mateo Pt Homes from Sector P to Sector Q. Page intentionally left blank.	D
2-34		Renumbered Table page number due to deletion of one page.	F
2-35		Renumbered Table page number due to addition of one page.	F
2-36		Renumbered Table page number due to addition of one page.	F
2-37		Renumbered Table page number due to addition of one page.	F
2-38		Renumbered Table page number due to addition of one page.	F
Section 2		Renumbered Section 2 pages from 2-39 on to reflect the addition of pages.	F
	2-39	Moved San Mateo Pt Homes from Sector P to Sector Q.	A
2-39	2-40	Renumbered Table page number due to addition of one page.	F
2-40	2-41	Renumbered Table page number due to addition of one page.	F
	2-42	Added Outage Worker to Sector R.	A
4-1		Changed 4.1.1.c from Investigative Report to Corrective Action Program	R
Section 4		Renumbered Section 4 pages from 4-3 on to reflect the addition of pages.	F
	4-3	Added composite samplers to Table 4-1.	A
4-4	4-5	Added Action 33 for composite samplers.	A
	4-7	Added composite samplers to Table 4-2.	A
4-6	4-8	Added Note 5 for composite samplers.	A
4-7	4-9	Changed 4.2.1.c from Investigative Report to Corrective Action Program.	R
5-2		Removed Table 5-5 as sample location per AR #000400602.	R
5-14		Removed Table 5-5 as sample location per AR #000400602.	R
5-21		Corrected mileage for PIC S7.	R
6-2		Deleted INVESTIGATIVE REPORT definition.	R
6-10		Changed "10CFR50.59" to "applicable regulations".	R

SECTION J. CHANGES TO RADIOACTIVE WASTE TREATMENT SYSTEMS

- There were no changes to the Units 2&3 Radioactive Waste Treatment Systems during the reporting period, January 1, 2001 to December 31, 2001.

SECTION K. MISCELLANEOUS

- Leaking Unit 2 Steam Generator Blowdown Valves

  In December 2000, Unit 2 Steam Generators were estimated to be leaking past their blowdown isolation valves to the outfall at 1 gpm, with a maximum leak rate of 2 gpm. Compensatory sampling was performed all year (samples indicated no detectable gamma activity for the year with trace amount of tritium). Valve repair is planned for the outage in 2002. A recent engineering evaluation has determined there is minimal leakage, less than can be accurately measured (less than 1 gpm). This event is documented in AR 001200733.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

S.O.N.G.S. 2 and 3

EFFLUENT RADIATION MONITORS OUT OF SERVICE GREATER THAN 30 DAYS

January 1, 2001 - December 31, 2001

S.O.N.G.S. 2			
Monitor	Inoperability Period	Inoperability Cause	Explanation
2RT-7870 Condenser Air Ejector Process Flow Monitor	04/17/00 - present	Inoperable process flow measuring device whenever vacuum pump is running.	Design deficiency causes process flow instrument to be inoperable while the vacuum pump is running. Substitute flow value is automatically inserted whenever the vacuum pump is running as high flow values are not sensed. Flow monitor works properly during normal operations. This event is documented in ARs 000101252 and 000400960.

S.O.N.G.S. 3			
Monitor	Inoperability Period	Inoperability Cause	Explanation
3RT-7870 Condenser Air Ejector Process Flow Monitor	04/17/00 - present	Inoperable process flow measuring device whenever vacuum pump is running.	Design deficiency causes process flow instrument to be inoperable while the vacuum pump is running. Substitute flow value is automatically inserted whenever the vacuum pump is running as high flow values are not sensed. Flow monitor works properly during normal operations. This event is documented in ARs 000101252 and 000400960.

S.O.N.G.S. 2/3			
Monitor	Inoperability Period	Inoperability Cause	Explanation
2/3FIT-7202 Waste Gas Holdup System Process Flow Rate Monitoring Device	08/22/01 - 01/12/02	Suspected process flow measuring device	Investigation during two subsequent releases showed no instrument or component error. The system was verified to be properly functioning. This event is documented in AR 010801138.

SECTION L. S.O.N.G.S. 2 and 3 CONCLUSIONS

- Gaseous releases totaled 1.68E+2 curies of which noble gases were 8.68E+1 curies, iodines were 4.56E-2 curies, particulates were 1.77E-3 curies, and tritium was 8.08E+1 curies.

- The radiation doses from gaseous releases were: (a) gamma air dose: 6.18E-3 mrad at the site boundary, (b) beta air dose: 7.05E-3 mrad at the site boundary, (c) organ dose: 1.96E-2 mrem at the nearest receptor.

- Liquid releases totaled 9.59E+2 curies of which particulates and iodines were 1.60E-2 curies, tritium was 9.58E+2 curies, and noble gases were 5.98E-1 curies.

- The radiation doses from liquid releases were: (a) total body: 1.83E-3 mrem, (b) limiting organ: 2.54E-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

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

COMMON

COMMON RADWASTE SHIPMENTS

TABLE 3

SOLID WASTE AND IRRADIATED FUEL SHIPMENT

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

1. Type of waste	Unit	12 month period	Estimated total error (%)
a. Spent resins, filter sludges, evaporator bottoms	m^3	N/A	N/A
	Ci	N/A	
b. Dry active waste (DAW), compactable and non-compactable *	m^3	1.19E+1	3.00E+1
	Ci	9.00E-3	
c. Irradiated components, control rods	m^3	N/A	N/A
	Ci	N/A	
d. Other (filters)	m^3	N/A	N/A
	Ci	N/A	

Note: Total curie content estimated.

(*) Material packaged in strong, tight containers of various sizes.

N/A No shipment made.

COMMON

2. Estimate of major nuclide composition (by type of waste) (Cont'd)		
a. not applicable	%	N/A
b. americium-241	%	1.63E-3
antimony-124	%	2.78E-1
antimony-125	%	7.49E-1
carbon-14	%	1.26E+0
cerium-141	%	6.75E-2
cerium-144	%	8.97E-2
cesium-134	%	1.85E+0
cesium-137	%	1.64E+1
chromium-51	%	1.17E+1
cobalt-57	%	1.11E-1
cobalt-58	%	2.53E+1
cobalt-60	%	7.01E+0
curium-242	%	1.29E-3
curium-243/244	%	2.06E-3
iodine-129	%	3.34E-2
iron-55	%	1.92E+1
iron-59	%	1.17E+0
manganese-54	%	1.32E+0
nickel-63	%	8.25E+0
niobium-95	%	3.09E+0
plutonium-238	%	1.12E-3
plutonium-239/240	%	1.03E-3
plutonium-241	%	1.06E-1
silver-110m	%	1.60E-2
strontium-89	%	1.06E-2
strontium-90	%	1.04E-2
technetium-99	%	3.84E-3
tin-113	%	2.60E-1
tritium	%	1.13E-1
zirconium-95	%	1.59E+0
c. not applicable	%	
d. not applicable	%	

COMMON

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

3. Solid Waste Disposition (S.O.N.G.S. 1, 2, and 3)		
Number of Shipments	Mode of Transportation	Destination
2	Kindrick Trucking Company Flatbed Trailer	EnviroCare, UT

B. IRRADIATED FUEL SHIPMENTS (Disposition)

Number of Shipments	Mode of Transportation	Destination
None	No shipments were made	N/A

C. DEWATERING

See Units 2/3 section of this report.

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

During the reporting period January 1, 2001 through December 31, 2001, a change to the Process Control Program (PCP) procedure SO123-VII-8.5.1 was issued but did not result in a change to the PCP itself. The following page has an explanation of the administrative changes and the justification of their nature.

REFERENCES:

1. Unit 1 Technical Specifications, section D6.13.2.

2. Units 2 and 3 Licensee Controlled Specifications, Section 5.0.103.2.2.

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

February 28, 2001

RUSS KRIEGER, Site Manager and VP Nuclear
DARYL DICK, Supervisor of Effluent Engineering
BILL STROM, Nuclear Safety Group Supervisor

SUBJECT: Process Control Program (PCP) Procedure Revision

Health Physics is issuing a comprehensive revision of SO123-VII-8.5.1, *Process Control Program*. The purpose of this memorandum is to inform you, as required by procedure, of changes made to the PCP and their bases.

Revision 7 of the PCP procedure contains changes that are only administrative in nature. Changes principally include:

1. A restatement of the procedure objective to more concisely link general objectives to specific references.
2. Updated and expanded references, including the Unit 1 DSAR.
3. Reorganized and restated procedure steps to more clearly link requirements to references.
4. Revised statements of administrative controls that quote, rather than paraphrase, requirements imposed by the TQAM, LCSs, etc.
5. Deletion of record requirements duplicated in other Health Physics procedures and not required to meet PCP objectives.

The changes made to the PCP procedure are justified as administrative in nature. The core PCP objective, ensuring all solid radioactive waste processing conform to form, stability, and free-standing water requirements, remains intact.

With the core requirements of the procedure unchanged, overall conformance of SONGS solid radioactive waste products with applicable requirements is maintained. Implementing procedures, such as those controlling the actual processing and packaging of radioactive wastes, are unaffected.

Please contact me if I can be of assistance.

JIM MADIGAN
Health Physics Manager

MLewis:PCP:mjk

cc: E. Goldin
P. Elliott
ITA File 95-325
CDM Files

COMMON

COMMON 40 CFR 190 REQUIREMENTS

Table 1 below presents the annual site-wide doses and percent of ODCM Specification limits to members of the public. These values were 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.

Dose Category	Units	Year
1. Total Body		
a. Total Body Dose	mrem	3.90E-1
b. Percent ODCM Specification Limit	%	1.56E+0
2. Limiting Organ		
a. Organ Dose (GI-LLI)	mrem	4.36E-2
b. Percent ODCM Specification Limit	%	1.75E-1
3. Thyroid		
a. Thyroid Dose	mrem	8.71E-3
b. Percent ODCM Specification Limit	%	1.16E-2

COMMON CONCLUSIONS

- Gaseous releases from S.O.N.G.S. 1, 2 and 3 totaled 1.71E+2 curies of which noble gases were 8.68E+1 curies, iodines were 4.56E-2 curies, particulates were 2.00E-3 curies, and tritium was 8.36E+1 curies.

- Liquid releases form S.O.N.G.S. 1, 2 and 3 totaled 9.61E+2 curies of which particulates and iodines were 1.95E-2 curies, tritium was 9.60E+2 curies, and noble gases were 5.98E-1 curies.

- Radioactive releases and resulting doses generated from S.O.N.G.S. 1, 2 and 3 were below the Applicable Limits for both gaseous and liquid effluents.

- S.O.N.G.S. 1, 2 and 3 made 134 radwaste shipments to Envirocare, UT. Total volume was 2.54E+3 cubic meters containing 1.32E+0 curies of radioactivity.

- Meteorological conditions during the year were typical for S.O.N.G.S. Meteorological dispersion was good 30% of the time, fair 47% of the time and poor 23% 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 applicable regulations and therefore has not resulted in any detrimental effects to a member of the public.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

COMMON

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 the concentrations specified in 10 CFR 20, Appendix B, Table II, Column 2 for radionuclides other than dissolved or entrained 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

METEOROLOGY

The meteorology of the San Onofre Nuclear Generating Station for each of the four quarters, 2001 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. These data are available, as well as the hourly data for the Annual Report, but have not been included in this report because of the bulk of data records.

Table 4A lists the joint frequency distribution for each quarter, 2001. 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-meter and 40-meter levels.

METEOROLOGY

January - March
TABLE 4A

SITE: SAN ONOFRE
PERIOD OF RECORD 00123124-01033123
WIND SPEED (M/S) AT 10 METER LEVEL

PASQUILL A
EXTREMELY UNSTABLE (DT/DZ < -1.9 °C/100 METERS)

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	TOTAL
N	0	0	0	0	0	1	0	0	0	0	0	0	1
NNE	0	0	0	2	1	1	0	0	0	0	0	0	4
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	6	1	0	0	0	0	8
SSE	0	0	0	0	0	5	10	8	1	0	0	0	24
S	0	0	0	2	4	13	18	7	0	0	1	0	45
SSW	0	0	0	5	5	11	12	0	0	0	0	0	33
SW	0	0	1	3	7	15	13	1	0	1	0	0	41
WSW	0	0	0	3	13	29	19	5	0	0	0	0	69
W	0	0	0	0	5	43	57	3	1	0	0	0	109
WNW	0	0	0	0	4	9	28	11	0	0	0	0	52
NW	0	0	0	0	1	0	4	0	0	0	0	0	5
NNW	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	0	0	1	15	40	128	167	36	2	1	1	0	391

NUMBER OF VALID HOURS 391
NUMBER OF INVALID HOURS 1
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 2160

PASQUILL B
MODERATELY UNSTABLE (-1.9 < DT/DZ ≤ -1.7 °C/100 METERS)

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	TOTAL
N	0	0	0	0	0	0	0	0	0	0	0	0	0
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	1	0	0	0	0	0	0	1
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	1	0	0	0	0	0	1
SW	0	0	0	0	0	1	0	0	0	0	0	0	1
WSW	0	0	0	0	1	0	0	0	0	0	0	0	1
W	0	0	0	0	1	0	0	0	0	0	0	0	1
WNW	0	0	0	0	0	1	1	0	0	0	0	0	2
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	2	3	3	0	0	0	0	0	8

NUMBER OF VALID HOURS 8
NUMBER OF INVALID HOURS 1
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 2160

METEOROLOGY

January - March
TABLE 4A

SITE: SAN ONOFRE
PERIOD OF RECORD 00123124-01033123
WIND SPEED (M/S) AT 10 METER LEVEL

PASQUILL C
SLIGHTLY UNSTABLE (-1.7 < DT/DZ ≤ -1.5 °C/100 METERS)

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	TOTAL
N	4	0	0	0	1	0	0	0	0	0	0	0	5
NNE	0	0	0	0	1	0	0	0	0	0	0	0	1
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	1	0	0	0	0	0	1
ESE	0	0	0	0	0	0	2	1	0	0	0	0	3
SE	0	0	0	0	0	1	2	6	1	0	0	0	10
SSE	0	0	0	0	2	2	4	6	0	0	0	0	14
S	0	0	0	0	2	4	4	2	1	0	0	0	13
SSW	0	0	0	1	1	2	4	1	0	0	0	0	9
SW	0	1	1	1	3	7	0	0	0	0	0	0	13
WSW	0	0	1	2	3	5	2	0	1	0	0	0	14
W	0	0	0	2	5	6	1	0	0	0	0	0	14
WNW	0	0	0	0	2	1	6	1	0	0	0	0	10
NW	0	0	0	0	1	2	3	1	0	0	0	0	7
NNW	0	0	0	0	1	1	0	0	0	0	0	0	2
TOTALS	4	1	2	6	22	31	30	18	3	0	0	0	117

NUMBER OF VALID HOURS 117
NUMBER OF INVALID HOURS 1
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 2160

PASQUILL D
NEUTRAL (-1.5 < DT/DZ ≤ -0.5 °C/100 METERS)

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	TOTAL
N	0	0	0	5	7	4	2	0	0	0	0	0	18
NNE	0	2	1	8	7	9	2	0	0	0	0	0	29
NE	0	0	0	3	3	2	1	1	0	0	0	0	10
ENE	0	0	0	0	1	2	1	0	0	0	0	0	4
E	0	2	1	2	0	3	7	2	0	0	0	0	17
ESE	0	0	2	1	1	13	23	10	6	0	0	0	56
SE	0	0	0	1	3	23	56	41	24	2	1	0	151
SSE	0	1	1	6	10	22	26	19	7	7	2	0	101
S	0	2	0	4	10	13	12	5	2	1	0	0	49
SSW	0	1	5	2	10	12	6	1	1	0	0	0	38
SW	0	0	2	8	7	9	1	4	2	0	0	0	33
WSW	0	0	2	6	1	4	3	3	3	2	0	0	24
W	0	0	0	3	7	2	6	6	5	1	0	0	30
WNW	0	0	1	2	8	3	12	4	2	0	0	0	32
NW	0	1	1	3	1	13	5	5	0	0	0	0	29
NNW	0	0	1	7	0	10	5	0	0	0	0	0	23
TOTALS	0	9	17	61	76	144	168	101	52	13	3	0	644

NUMBER OF VALID HOURS 644
NUMBER OF INVALID HOURS 1
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 2160

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

METEOROLOGY

January - March
TABLE 4A

SITE: SAN ONOFRE
PERIOD OF RECORD 00123124-01033123
WIND SPEED (M/S) AT 10 METER LEVEL

PASQUILL E
SLIGHTLY STABLE (-0.5 < DT/DZ ≤ 1.5 °C/100 METERS)

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	TOTAL
N	0	0	0	4	7	9	4	0	0	0	0	0	24
NNE	0	1	2	10	9	16	8	0	0	0	0	0	46
NE	0	0	6	6	5	5	3	0	0	0	0	0	25
ENE	0	3	1	2	2	3	0	1	0	1	0	0	13
E	2	0	2	5	4	9	4	1	0	0	0	0	27
ESE	0	0	2	3	3	9	5	1	0	0	0	0	23
SE	0	0	0	3	2	2	9	2	0	0	0	0	18
SSE	0	0	1	0	1	0	2	4	1	0	0	0	9
S	0	1	1	4	0	0	1	3	0	0	0	0	10
SSW	0	0	1	1	1	0	0	0	0	0	0	0	3
SW	0	0	0	1	1	0	0	0	0	0	0	0	2
WSW	0	0	1	2	0	0	0	0	0	0	0	0	3
W	0	0	0	0	1	3	1	0	0	0	0	0	5
WNW	0	0	0	2	2	3	5	0	2	0	0	0	14
NW	0	1	0	4	1	4	3	1	0	0	0	0	14
NNW	0	2	1	2	1	5	3	0	0	0	0	0	14
TOTALS	2	8	18	49	40	68	48	13	3	1	0	0	250

NUMBER OF VALID HOURS 250
NUMBER OF INVALID HOURS 1
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 2160

PASQUILL F
MODERATELY STABLE (1.5 ≤ DT/DZ ≤ 4.0 °C/100 METERS)

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	TOTAL
N	0	0	0	4	4	11	2	0	0	0	0	0	21
NNE	0	0	6	17	43	64	26	2	0	0	0	0	158
NE	0	0	3	5	12	4	5	4	0	0	0	0	33
ENE	0	0	2	5	2	1	0	0	0	0	0	0	10
E	0	1	1	1	2	1	1	0	0	0	0	0	7
ESE	0	0	0	4	1	0	1	0	0	0	0	0	6
SE	0	0	1	1	1	2	5	0	0	0	0	0	10
SSE	0	1	0	2	0	1	0	0	0	0	0	0	4
S	2	0	1	1	2	0	0	0	0	0	0	0	6
SSW	0	1	0	0	0	1	0	0	0	0	0	0	2
SW	0	0	0	1	0	0	0	0	0	0	0	0	1
WSW	0	0	0	1	0	0	0	0	0	0	0	0	1
W	0	0	0	2	2	2	2	0	0	0	0	0	8
WNW	0	0	0	0	1	0	0	0	0	0	0	0	1
NW	1	0	0	2	4	0	1	0	0	0	0	0	8
NNW	0	0	1	1	0	1	2	0	0	0	0	0	5
TOTALS	3	3	15	47	74	88	45	6	0	0	0	0	281

NUMBER OF VALID HOURS 281
NUMBER OF INVALID HOURS 1
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 2160

METEOROLOGY

January - March
TABLE 4A

SITE: SAN ONOFRE
PERIOD OF RECORD 00123124-01033123
WIND SPEED (M/S) AT 10 METER LEVEL

PASQUILL G
EXTREMELY STABLE (DT/DZ > 4.0 °C/100 METERS)

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	TOTAL
N	6	0	1	0	1	7	12	0	0	0	0	0	27
NNE	0	1	0	6	20	163	128	3	0	0	0	0	321
NE	5	0	1	8	11	15	8	3	0	0	0	0	51
ENE	0	2	1	4	0	2	6	0	0	0	0	0	15
E	0	0	1	1	0	1	0	0	0	0	0	0	3
ESE	0	0	1	0	2	1	0	0	0	0	0	0	4
SE	0	0	0	1	0	1	1	0	0	0	0	0	3
SSE	0	0	0	0	1	0	0	0	0	0	0	0	1
S	0	0	1	0	0	0	0	0	0	0	0	0	1
SSW	0	0	2	0	1	2	0	0	0	0	0	0	0
SW	0	0	1	0	0	0	0	0	0	0	0	0	1
WSW	0	0	1	0	1	1	0	0	0	0	0	0	3
W	0	0	0	1	1	1	0	0	0	0	0	0	3
WNW	0	0	0	2	2	4	7	0	0	0	0	0	15
NW	0	0	0	0	0	2	0	0	0	0	0	0	2
NNW	0	0	0	0	1	2	10	0	0	0	0	0	13
TOTALS	11	3	10	23	41	202	172	6	0	0	0	0	468

NUMBER OF VALID HOURS 468
NUMBER OF INVALID HOURS 1
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 2160

ALL STABILITY CLASSES, ALL DT/DZ
WIND SPEED (M/S) AT 10 METER 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	TOTAL
N	10	0	1	13	20	32	20	0	0	0	0	0	96
NNE	0	4	9	43	81	253	165	5	0	0	0	0	560
NE	5	0	10	22	31	26	18	8	0	0	0	0	120
ENE	0	5	4	11	5	8	7	1	0	1	0	0	42
E	2	3	5	9	6	14	13	3	0	0	0	0	55
ESE	0	0	5	8	7	23	31	12	6	0	0	0	92
SE	0	0	1	6	6	31	79	50	25	2	1	0	201
SSE	0	2	2	8	14	30	42	37	9	7	2	0	153
S	2	3	3	11	18	30	35	17	3	1	1	0	124
SSW	0	2	8	9	18	28	23	2	1	0	0	0	91
SW	0	1	5	14	18	32	14	5	2	1	0	0	92
WSW	0	0	5	14	19	39	24	8	4	2	0	0	115
W	0	0	0	8	22	57	67	9	6	1	0	0	170
WNW	0	0	1	6	19	21	59	16	4	0	0	0	126
NW	1	2	1	9	8	21	16	7	0	0	0	0	65
NNW	0	2	3	10	3	19	20	0	0	0	0	0	57
TOTALS	20	24	63	201	295	664	633	180	60	15	4	0	2159

NUMBER OF VALID HOURS 2159
NUMBER OF INVALID HOURS 1
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 2160

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

METEOROLOGY

April - June
TABLE 4A

SITE: SAN ONOFRE
PERIOD OF RECORD 01033124-01063023
WIND SPEED (M/S) AT 10 METER LEVEL

PASQUILL A
EXTREMELY UNSTABLE (DT/DZ < -1.9 °C/100 METERS)

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	TOTAL
N	0	0	0	0	0	0	0	0	0	0	0	0	0
NNE	0	0	0	0	0	1	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	1	0	0	0	0	0	0	1
SE	0	0	0	0	1	1	1	2	0	0	0	0	5
SSE	0	0	0	0	3	5	17	3	2	0	0	0	30
S	0	0	1	3	7	22	49	18	2	0	0	0	102
SSW	0	0	2	2	6	17	27	3	0	0	0	0	57
SW	0	0	0	2	9	58	42	1	1	0	0	0	113
WSW	0	0	0	3	22	106	52	0	0	0	0	0	183
W	0	0	0	3	15	83	99	0	0	0	0	0	200
WNW	0	0	0	0	2	8	43	5	0	0	0	0	58
NW	0	0	0	0	0	1	3	1	0	0	0	0	5
NNW	0	0	0	0	0	1	0	0	0	0	0	0	1
TOTALS	0	0	3	13	65	304	333	33	5	0	0	0	756

NUMBER OF VALID HOURS 756
NUMBER OF INVALID HOURS 0
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 2184

PASQUILL B
MODERATELY UNSTABLE (-1.9 < DT/DZ ≤ -1.7 °C/100

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	TOTAL
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	1	0	0	0	0	0	0	0	0	1
SW	0	0	0	0	0	0	0	0	0	0	0	0	0
WSW	0	0	0	0	0	1	0	0	0	0	0	0	1
W	0	0	0	1	0	0	0	0	0	0	0	0	1
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	2	0	1	0	0	0	0	0	0	3

NUMBER OF VALID HOURS 3
NUMBER OF INVALID HOURS 0
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 2184

METEOROLOGY

April - June
TABLE 4A

SITE: SAN ONOFRE
PERIOD OF RECORD 01033124-01063023
WIND SPEED (M/S) AT 10 METER LEVEL

PASQUILL C
SLIGHTLY UNSTABLE (-1.7 < DT/DZ ≤ -1.5 °C/100 METERS)

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	TOTAL
N	0	0	0	0	1	0	0	0	0	0	0	0	1
NNE	0	0	0	1	1	1	1	0	0	0	0	0	4
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	2	2	2	0	0	0	0	0	6
SSE	0	0	1	0	3	2	11	4	1	0	0	0	22
S	0	0	1	1	1	4	10	5	6	2	0	0	30
SSW	0	0	0	0	2	6	3	0	3	0	0	0	14
SW	0	0	0	2	7	8	9	2	0	0	0	0	28
WSW	0	0	0	3	7	9	2	1	0	0	0	0	22
W	0	0	0	3	4	7	4	1	0	0	0	0	19
WNW	0	0	0	3	5	2	5	3	0	0	0	0	18
NW	0	0	0	0	0	0	6	0	0	0	0	0	6
NNW	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	0	0	2	13	33	41	53	16	10	2	0	0	170

NUMBER OF VALID HOURS 170
NUMBER OF INVALID HOURS 0
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 2184

PASQUILL D
NEUTRAL (-1.5 < DT/DZ ≤ -0.5 °C/100 METERS)

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	TOTAL
N	0	2	2	5	13	4	1	0	0	0	0	0	27
NNE	0	0	2	10	9	15	0	0	0	0	0	0	36
NE	0	0	2	11	10	0	0	0	0	0	0	0	23
ENE	0	0	2	3	1	4	0	0	0	0	0	0	10
E	0	1	3	1	1	14	7	0	0	0	0	0	27
ESE	0	1	3	6	5	11	15	0	0	0	0	0	41
SE	0	0	2	5	15	26	31	6	0	0	0	0	85
SSE	0	1	1	11	21	25	44	11	3	0	0	0	117
S	0	1	5	10	30	37	26	13	0	0	0	0	122
SSW	0	1	4	10	13	20	27	1	0	0	0	0	76
SW	0	3	6	14	15	20	12	3	1	0	0	0	74
WSW	0	0	2	11	10	7	3	2	0	0	0	0	35
W	1	1	3	17	5	2	5	2	1	0	0	0	37
WNW	0	0	6	7	6	7	12	5	0	0	0	0	43
NW	1	2	0	5	3	15	13	1	2	0	0	0	42
NNW	1	1	4	5	6	4	2	0	0	0	0	0	23
TOTALS	3	14	47	131	163	211	198	44	7	0	0	0	818

NUMBER OF VALID HOURS 818
NUMBER OF INVALID HOURS 0
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 2184

METEOROLOGY

April - June
TABLE 4A

SITE: SAN ONOFRE
PERIOD OF RECORD 01033124-01063023
WIND SPEED (M/S) AT 10 METER LEVEL

PASQUILL E
SLIGHTLY STABLE (-0.5 < DT/DZ ≤ 1.5 °C/100 METERS)

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	TOTAL
N	0	0	1	3	0	3	1	0	0	0	0	0	8
NNE	0	1	5	15	16	8	7	1	0	0	0	0	53
NE	0	2	3	4	2	1	1	0	0	0	0	0	13
ENE	0	0	1	2	1	0	0	0	0	0	0	0	4
E	0	0	1	2	2	2	0	0	0	0	0	0	7
ESE	1	0	1	2	1	0	0	0	0	0	0	0	5
SE	0	0	0	1	1	3	0	0	0	0	0	0	5
SSE	0	0	0	1	0	1	0	0	0	0	0	0	2
S	1	0	2	0	1	0	1	0	0	0	0	0	5
SSW	0	0	0	0	1	0	0	0	0	0	0	0	1
SW	0	0	0	2	1	1	0	0	0	0	0	0	4
WSW	0	2	0	0	0	0	0	0	0	0	0	0	2
W	0	0	0	0	0	3	1	0	0	0	0	0	4
WNW	1	0	0	0	0	1	5	2	0	0	0	0	9
NW	0	0	0	0	1	3	0	1	0	0	0	0	5
NNW	0	0	2	1	2	1	0	0	0	0	0	0	6
TOTALS	3	5	16	33	29	27	16	4	0	0	0	0	133

NUMBER OF VALID HOURS 133
NUMBER OF INVALID HOURS 0
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 2184

PASQUILL F
MODERATELY STABLE (1.5 ≤ DT/DZ ≤ 4.0 °C/100 METERS)

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	TOTAL
N	0	0	0	2	1	1	3	0	0	0	0	0	7
NNE	0	2	2	19	33	46	4	0	0	0	0	0	106
NE	0	1	4	5	2	0	0	0	0	0	0	0	12
ENE	0	0	1	4	0	2	0	0	0	0	0	0	7
E	0	1	0	1	0	0	0	0	0	0	0	0	2
ESE	0	0	0	1	0	0	0	0	0	0	0	0	1
SE	0	0	0	1	0	0	1	0	0	0	0	0	2
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	1	0	0	0	0	0	0	0	1
SW	0	0	0	0	0	0	0	0	0	0	0	0	0
WSW	0	0	0	1	1	0	0	0	0	0	0	0	2
W	0	0	0	0	0	0	0	0	0	0	0	0	0
WNW	0	0	0	0	1	0	0	0	0	0	0	0	1
NW	0	0	0	1	0	1	0	0	0	0	0	0	2
NNW	0	0	1	0	0	0	0	0	0	0	0	0	1
TOTALS	0	4	8	35	39	51	8	0	0	0	0	0	145

NUMBER OF VALID HOURS 145
NUMBER OF INVALID HOURS 0
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 2184

METEOROLOGY

April - June
TABLE 4A

SITE: SAN ONOFRE
PERIOD OF RECORD 01033124-01063023
WIND SPEED (M/S) AT 10 METER LEVEL

PASQUILL G
EXTREMELY STABLE (DT/DZ > 4.0 °C/100 METERS)

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	TOTAL
N	0	0	1	0	2	1	5	0	0	0	0	0	9
NNE	0	0	0	3	10	73	43	3	0	0	0	0	132
NE	0	0	1	1	2	4	1	0	0	0	0	0	9
ENE	0	0	1	0	0	1	0	0	0	0	0	0	2
E	0	0	0	0	1	0	0	0	0	0	0	0	1
ESE	0	1	0	0	0	0	0	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	1	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	1	0	0	0	0	0	0	1
WNW	0	0	0	0	0	0	0	0	0	0	0	0	0
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	1	3	5	16	81	50	3	0	0	0	0	159

NUMBER OF VALID HOURS 159
NUMBER OF INVALID HOURS 0
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 2184

ALL STABILITY CLASSES, ALL DT/DZ
WIND SPEED (M/S) AT 10 METER 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	TOTAL
N	0	2	4	10	17	9	10	0	0	0	0	0	52
NNE	0	3	9	48	69	144	55	4	0	0	0	0	332
NE	0	3	10	21	16	5	2	0	0	0	0	0	57
ENE	0	0	5	9	2	7	0	0	0	0	0	0	23
E	0	2	4	4	4	16	7	0	0	0	0	0	37
ESE	1	2	4	9	6	12	15	0	0	0	0	0	49
SE	0	0	2	7	19	33	35	8	0	0	0	0	104
SSE	0	1	2	12	28	34	72	18	6	0	0	0	173
S	1	1	9	15	39	63	86	36	8	2	0	0	260
SSW	0	1	6	13	23	43	57	4	3	0	0	0	150
SW	0	3	6	20	32	87	63	6	2	0	0	0	219
WSW	0	2	2	18	40	123	57	3	0	0	0	0	245
W	1	1	3	24	24	96	109	3	1	0	0	0	262
WNW	1	0	6	10	14	18	65	15	0	0	0	0	129
NW	1	2	0	6	4	20	23	3	2	0	0	0	61
NNW	1	1	7	6	8	6	2	0	0	0	0	0	31
TOTALS	6	24	79	232	345	716	658	100	22	2	0	0	2184

NUMBER OF VALID HOURS 2184
NUMBER OF INVALID HOURS 0
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 2184

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

METEOROLOGY

July - September
TABLE 4A

SITE: SAN ONOFRE
PERIOD OF RECORD 01063024-00093023
WIND SPEED (M/S) AT 10 METER LEVEL

PASQUILL A
EXTREMELY UNSTABLE (DT/DZ < -1.9 °C/100 METERS)

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	TOTAL
N	0	0	0	0	0	0	0	0	0	0	0	0	0
NNE	0	0	0	0	0	1	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	2	0	2	0	0	0	0	0	4
S	0	0	0	0	2	12	17	2	0	0	0	0	33
SSW	0	0	0	1	2	10	18	0	0	0	0	0	31
SW	0	0	0	0	10	35	14	0	0	0	0	0	59
WSW	0	0	1	3	13	76	66	1	0	0	0	0	160
W	0	0	0	0	7	62	157	1	0	0	0	0	227
WNW	0	0	0	0	3	22	65	4	0	0	0	0	94
NW	0	0	0	0	1	3	5	1	0	0	0	0	10
NNW	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	0	0	1	4	40	221	344	9	0	0	0	0	619

NUMBER OF VALID HOURS 619
NUMBER OF INVALID HOURS 2
NUMBER OF CALMS 2
TOTAL HOURS FOR THE PERIOD 2208

PASQUILL B
MODERATELY UNSTABLE (-1.9 < DT/DZ ≤ -1.7 °C/100 METERS)

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	TOTAL
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	1	1	0	0	0	0	2
SSW	0	0	0	0	3	0	0	0	0	0	0	0	3
SW	0	0	0	0	0	5	0	0	0	0	0	0	5
WSW	0	0	0	0	1	8	1	0	0	0	0	0	10
W	0	0	0	1	3	6	1	0	0	0	0	0	11
WNW	0	0	0	0	1	2	1	1	0	0	0	0	5
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	8	21	5	2	0	0	0	0	37

NUMBER OF VALID HOURS 37
NUMBER OF INVALID HOURS 2
NUMBER OF CALMS 2
TOTAL HOURS FOR THE PERIOD 2208

METEOROLOGY

July - September
TABLE 4A

SITE: SAN ONOFRE
PERIOD OF RECORD 01063024-01093023
WIND SPEED (M/S) AT 10 METER LEVEL

PASQUILL C
SLIGHTLY UNSTABLE (-1.7 < DT/DZ ≤ -1.5 °C/100 METERS)

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	TOTAL
N	0	0	0	0	0	0	0	0	0	0	0	0	0
NNE	0	0	0	0	1	1	0	0	0	0	0	0	2
NE	0	0	0	0	0	1	0	0	0	0	0	0	1
ENE	0	0	0	0	0	1	0	0	0	0	0	0	1
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	0	0	0	0	0	0	1
SSE	0	0	0	0	1	2	2	0	0	0	0	0	5
S	0	0	1	2	0	3	0	2	0	0	0	0	8
SSW	0	0	0	1	2	6	2	0	0	0	0	0	11
SW	0	0	0	1	1	10	7	0	0	0	0	0	19
WSW	0	0	0	2	1	7	2	0	0	0	0	0	12
W	0	0	0	2	3	7	2	0	0	0	0	0	14
WNW	0	0	0	0	2	6	2	0	0	0	0	0	10
NW	0	0	0	0	0	2	4	0	0	0	0	0	6
NNW	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	0	0	1	8	11	47	21	2	0	0	0	0	90

NUMBER OF VALID HOURS 90
NUMBER OF INVALID HOURS 2
NUMBER OF CALMS 2
TOTAL HOURS FOR THE PERIOD 2208

PASQUILL D
NEUTRAL (-1.5 < DT/DZ ≤ -0.5 °C/100 METERS)

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	TOTAL
N	0	1	2	24	9	6	0	0	0	0	0	0	42
NNE	0	1	2	19	21	22	2	0	0	0	0	0	67
NE	0	1	4	16	13	8	0	0	0	0	0	0	42
ENE	0	0	2	2	2	6	0	0	0	0	0	0	12
E	1	0	2	3	5	11	2	0	0	0	0	0	24
ESE	0	0	0	3	3	7	2	0	0	0	0	0	15
SE	1	0	2	5	10	32	29	1	0	0	0	0	80
SSE	0	1	2	12	20	50	41	1	0	0	0	0	127
S	0	0	2	13	23	39	48	4	0	0	0	0	129
SSW	1	1	5	14	27	30	24	1	0	0	0	0	103
SW	0	1	14	18	31	24	17	0	0	0	0	0	105
WSW	0	2	8	16	19	19	6	0	0	0	0	0	70
W	0	1	9	23	19	11	9	0	0	0	0	0	72
WNW	0	1	5	10	18	20	12	0	0	0	0	0	66
NW	0	2	2	15	10	9	12	2	0	0	0	0	52
NNW	0	1	3	13	8	4	1	0	0	0	0	0	30
TOTALS	3	13	64	206	238	298	205	9	0	0	0	0	1036

NUMBER OF VALID HOURS 1036
NUMBER OF INVALID HOURS 2
NUMBER OF CALMS 2
TOTAL HOURS FOR THE PERIOD 2208

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

METEOROLOGY

July - September
TABLE 4A

SITE: SAN ONOFRE
PERIOD OF RECORD 01063024-01093023
WIND SPEED (M/S) AT 10 METER LEVEL

PASQUILL E
SLIGHTLY STABLE (-0.5 < DT/DZ ≤ 1.5 °C/100 METERS)

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	TOTAL
N	1	3	1	10	8	15	2	0	0	0	0	0	40
NNE	1	5	8	19	25	20	4	0	0	0	0	0	82
NE	0	1	4	9	2	0	0	0	0	0	0	0	16
ENE	0	2	3	2	2	0	0	0	0	0	0	0	9
E	1	1	1	3	1	1	2	0	0	0	0	0	10
ESE	1	1	3	4	0	0	2	0	0	0	0	0	11
SE	0	2	2	3	1	10	1	2	1	0	0	0	22
SSE	0	0	2	3	7	10	2	0	0	0	0	0	24
S	0	2	0	3	5	1	0	0	0	0	0	0	11
SSW	0	1	1	0	0	2	1	0	0	0	0	0	5
SW	0	0	0	0	0	2	0	0	0	0	0	0	2
WSW	1	0	2	3	1	2	0	0	0	0	0	0	9
W	0	0	1	2	2	0	0	0	0	0	0	0	5
WNW	0	1	1	0	0	3	6	0	0	0	0	0	11
NW	0	0	1	1	2	2	4	2	0	0	0	0	12
NNW	0	0	3	6	1	1	0	0	0	0	0	0	11
TOTALS	5	19	33	68	57	69	24	4	1	0	0	0	280

NUMBER OF VALID HOURS 280
NUMBER OF INVALID HOURS 2
NUMBER OF CALMS 2
TOTAL HOURS FOR THE PERIOD 2208

PASQUILL F
MODERATELY STABLE (1.5 ≤ DT/DZ ≤ 4.0 °C/100 METERS)

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	TOTAL
N	1	1	1	5	4	7	1	0	0	0	0	0	20
NNE	0	0	1	7	10	28	1	0	0	0	0	0	47
NE	0	1	0	1	0	2	0	0	0	0	0	0	4
ENE	0	0	1	0	0	1	0	0	0	0	0	0	2
E	0	0	0	1	0	0	0	0	0	0	0	0	1
ESE	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	1	0	0	0	0	0	0	0	0	0	0	0	1
SSE	0	0	0	0	1	1	0	0	0	0	0	0	2
S	0	1	0	1	0	1	0	0	0	0	0	0	3
SSW	0	0	0	0	0	0	0	0	0	0	0	0	0
SW	0	0	1	0	1	0	0	0	0	0	0	0	2
WSW	0	0	0	0	0	0	0	0	0	0	0	0	0
W	0	0	0	0	0	2	0	0	0	0	0	0	2
WNW	0	0	0	2	0	1	1	0	0	0	0	0	4
NW	0	0	0	0	2	0	1	0	0	0	0	0	3
NNW	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	2	3	4	17	18	43	4	0	0	0	0	0	91

NUMBER OF VALID HOURS 91
NUMBER OF INVALID HOURS 2
NUMBER OF CALMS 2
TOTAL HOURS FOR THE PERIOD 2208

METEOROLOGY

July - September
TABLE 4A

SITE: SAN ONOFRE
PERIOD OF RECORD 01063024-01093023
WIND SPEED (M/S) AT 10 METER LEVEL

PASQUILL G
EXTREMELY STABLE (DT/DZ > 4.0 °C/100 METERS)

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	TOTAL
N	0	0	0	0	0	1	1	0	0	0	0	0	2
NNE	0	0	0	0	7	28	9	1	0	0	0	0	45
NE	0	0	0	2	0	0	0	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	0	0	0	1	0	0	0	0	0	0	1
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	0	0	0	0	0	0	0	0	0
W	0	0	1	0	0	0	0	0	0	0	0	0	1
WNW	0	0	0	1	0	0	0	0	0	0	0	0	1
NW	0	0	0	0	0	0	0	0	0	0	0	0	0
NNW	0	0	0	1	0	0	0	0	0	0	0	0	1
TOTALS	0	0	1	4	7	30	10	1	0	0	0	0	53

NUMBER OF VALID HOURS 53
NUMBER OF INVALID HOURS 2
NUMBER OF CALMS 2
TOTAL HOURS FOR THE PERIOD 2208

ALL STABILITY CLASSES, ALL DT/DZ
WIND SPEED (M/S) AT 10 METER 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	TOTAL
N	2	5	4	39	21	29	4	0	0	0	0	0	104
NNE	1	6	11	45	64	100	16	1	0	0	0	0	244
NE	0	3	8	28	15	11	0	0	0	0	0	0	65
ENE	0	2	6	4	4	8	0	0	0	0	0	0	24
E	2	1	3	7	6	12	4	0	0	0	0	0	35
ESE	1	1	3	7	3	7	4	0	0	0	0	0	26
SE	2	2	4	8	11	44	30	3	1	0	0	0	105
SSE	0	1	4	15	31	63	47	1	0	0	0	0	162
S	0	3	3	19	30	56	66	9	0	0	0	0	186
SSW	1	2	6	16	34	48	45	1	0	0	0	0	153
SW	0	1	15	19	43	76	38	0	0	0	0	0	192
WSW	1	2	11	24	35	112	75	1	0	0	0	0	261
W	0	1	11	28	34	88	169	1	0	0	0	0	332
WNW	0	2	6	13	24	54	87	5	0	0	0	0	191
NW	0	2	3	16	15	16	27	5	0	0	0	0	84
NNW	0	1	6	20	9	5	1	0	0	0	0	0	42
TOTALS	10	35	104	308	379	729	613	27	1	0	0	0	2206

NUMBER OF VALID HOURS 2206
NUMBER OF INVALID HOURS 2
NUMBER OF CALMS 2
TOTAL HOURS FOR THE PERIOD 2208

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

METEOROLOGY

October - December
TABLE 4A

SITE: SAN ONOFRE
PERIOD OF RECORD 01093024-01123123
WIND SPEED (M/S) AT 10 METER LEVEL

PASQUILL A
EXTREMELY UNSTABLE (DT/DZ < -1.9 °C/100 METERS)

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	TOTAL
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	1	0	0	0	0	0	2
SSE	0	0	0	1	3	2	1	1	0	0	0	0	8
S	0	0	0	1	3	8	6	1	0	0	0	0	19
SSW	0	0	0	4	3	5	2	0	0	0	0	0	14
SW	0	0	0	6	10	13	3	0	0	0	0	0	32
WSW	0	0	0	3	20	32	12	0	0	0	0	0	67
W	0	0	0	2	14	102	45	2	0	0	0	0	165
WNW	0	0	0	0	2	21	53	10	0	0	0	0	86
NW	0	0	0	0	2	0	0	1	0	0	0	0	3
NNW	0	0	1	0	0	0	0	0	0	0	0	0	1
TOTALS	0	0	1	17	57	184	123	15	0	0	0	0	397

NUMBER OF VALID HOURS 397
NUMBER OF INVALID HOURS 1
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 2208

PASQUILL B
MODERATELY UNSTABLE (-1.9 < DT/DZ ≤ -1.7 °C/100 METERS)

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	TOTAL
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	2	1	0	0	0	0	0	3
S	0	0	0	0	0	3	1	0	0	0	0	0	4
SSW	0	0	0	0	0	4	3	0	0	0	0	0	7
SW	0	1	0	0	1	4	0	0	0	0	0	0	6
WSW	0	0	0	0	4	0	0	0	0	0	0	0	4
W	0	0	1	0	0	4	2	0	0	0	0	0	7
WNW	0	0	0	1	2	5	3	1	0	0	0	0	12
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	1	1	7	22	10	1	0	0	0	0	43

NUMBER OF VALID HOURS 43
NUMBER OF INVALID HOURS 1
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 2208

METEOROLOGY

October - December
TABLE 4A

SITE: SAN ONOFRE
PERIOD OF RECORD 01093024-01123123
WIND SPEED (M/S) AT 10 METER LEVEL

PASQUILL C
SLIGHTLY UNSTABLE (-1.7 < DT/DZ ≤ -1.5 °C/100 METERS)

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	TOTAL
N	0	0	0	0	0	0	0	0	0	0	0	0	0
NNE	0	0	0	0	1	0	1	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	0	0	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	0	1	0	0	0	0	1
SSE	0	0	0	0	0	0	1	0	0	0	0	0	1
S	0	0	0	0	1	4	0	0	0	0	0	0	5
SSW	0	0	0	0	1	1	4	1	0	0	0	0	7
SW	0	0	0	0	1	1	0	1	0	0	0	0	3
WSW	0	0	0	1	0	2	1	0	0	0	0	0	4
W	0	0	0	0	2	1	0	0	0	0	0	0	3
WNW	0	0	0	0	0	0	3	0	0	0	0	0	3
NW	0	0	0	1	0	1	1	0	1	0	0	0	4
NNW	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	0	0	0	2	6	10	12	3	1	0	0	0	34

NUMBER OF VALID HOURS 34
NUMBER OF INVALID HOURS 1
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 2208

PASQUILL D
NEUTRAL (-1.5 < DT/DZ ≤ -0.5 °C/100 METERS)

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	TOTAL
N	0	0	2	4	6	2	3	1	0	0	0	0	18
NNE	0	1	0	4	4	7	9	2	0	0	0	0	27
NE	0	0	1	1	2	2	1	1	0	0	0	0	8
ENE	0	0	1	1	0	1	0	0	0	0	0	0	3
E	0	2	0	2	0	0	0	0	0	0	0	0	4
ESE	0	2	0	0	1	2	1	0	1	0	0	0	7
SE	0	0	0	0	1	9	13	3	3	0	0	0	29
SSE	0	0	1	6	10	19	23	5	3	0	0	0	67
S	0	1	2	7	7	15	13	2	0	0	0	0	47
SSW	0	0	1	7	7	17	9	0	0	0	0	0	41
SW	0	0	2	4	6	14	4	0	0	0	0	0	30
WSW	0	0	1	3	4	4	3	0	0	0	0	0	15
W	0	1	1	7	4	4	2	3	0	0	0	0	22
WNW	0	1	1	7	5	16	10	1	0	0	0	0	41
NW	0	0	1	1	4	11	16	4	0	0	0	0	37
NNW	0	0	0	3	5	7	4	1	0	0	0	0	20
TOTALS	0	8	14	57	66	130	111	23	7	0	0	0	416

NUMBER OF VALID HOURS 416
NUMBER OF INVALID HOURS 1
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 2208

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

METEOROLOGY

October - December
TABLE 4A

SITE: SAN ONOFRE
PERIOD OF RECORD 01093024-01123123
WIND SPEED (M/S) AT 10 METER LEVEL

PASQUILL E
SLIGHTLY STABLE (-0.5 < DT/DZ ≤ 1.5 °C/100 METERS)

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	TOTAL
N	1	2	4	17	13	23	6	1	0	0	0	0	67
NNE	2	2	8	12	29	28	27	2	0	0	0	0	110
NE	0	1	8	4	5	6	2	0	2	0	0	0	28
ENE	0	3	2	5	2	4	0	0	0	0	0	0	16
E	0	0	2	4	2	5	0	0	0	0	0	0	13
ESE	1	0	2	2	2	5	3	2	0	0	0	0	17
SE	0	1	0	5	8	24	19	6	1	0	0	0	64
SSE	1	1	2	6	11	14	5	1	1	0	1	0	43
S	0	1	3	3	5	7	4	0	0	0	0	0	23
SSW	0	0	3	4	2	0	2	0	3	0	0	0	14
SW	0	0	2	4	2	3	0	2	1	0	0	0	14
WSW	0	2	1	3	2	2	0	0	1	0	0	0	11
W	0	2	3	1	3	3	1	1	2	0	0	0	16
WNW	1	0	4	9	2	8	3	8	0	0	0	0	35
NW	0	2	1	6	5	12	9	3	0	0	0	0	38
NNW	0	1	2	6	4	12	5	0	0	0	0	0	30
TOTALS	6	18	47	91	97	156	86	26	11	0	1	0	539

NUMBER OF VALID HOURS 539
NUMBER OF INVALID HOURS 1
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 2208

PASQUILL F
MODERATELY STABLE (1.5 ≤ DT/DZ ≤ 4.0 °C/100 METERS)

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	TOTAL
N	0	0	3	6	6	13	8	0	0	0	0	0	36
NNE	0	0	4	26	41	55	21	4	1	0	0	0	152
NE	0	3	7	8	12	4	2	2	0	0	0	0	38
ENE	0	1	0	2	1	2	0	0	0	0	0	0	6
E	0	1	0	3	1	0	0	0	0	0	0	0	5
ESE	0	1	0	0	0	3	0	0	0	0	0	0	4
SE	0	1	0	3	0	0	3	0	0	0	0	0	7
SSE	0	0	0	2	0	1	1	0	0	0	0	0	4
S	0	0	0	0	1	0	0	0	0	0	0	0	1
SSW	0	0	0	1	0	0	0	0	0	0	0	0	1
SW	0	0	0	0	0	0	0	0	0	0	0	0	0
WSW	0	0	0	1	0	0	0	0	0	0	0	0	1
W	0	0	0	1	1	1	1	0	0	1	0	0	5
WNW	0	0	0	0	0	2	0	0	0	0	0	0	2
NW	0	0	0	0	0	1	1	0	0	0	0	0	2
NNW	0	1	0	3	2	5	0	0	0	0	0	0	11
TOTALS	0	8	14	56	65	87	37	6	1	1	0	0	275

NUMBER OF VALID HOURS 275
NUMBER OF INVALID HOURS 1
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 2208

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2001)

METEOROLOGY

October - December
TABLE 4A

SITE: SAN ONOFRE
PERIOD OF RECORD 01093024-01123123
WIND SPEED (M/S) AT 10 METER LEVEL

PASQUILL G
EXTREMELY STABLE (DT/DZ > 4.0 °C/100 METERS)

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	TOTAL
N	0	0	1	2	1	13	8	0	0	0	0	0	25
NNE	0	0	1	4	25	181	206	14	0	0	0	0	431
NE	0	0	1	4	7	9	5	0	0	0	0	0	26
ENE	0	0	0	2	2	1	0	0	0	0	0	0	5
E	0	0	0	1	1	0	0	0	0	0	0	0	2
ESE	0	0	0	1	1	0	0	0	0	0	0	0	2
SE	0	0	0	0	0	0	0	0	0	0	0	0	0
SSE	0	0	0	0	1	2	1	0	0	0	0	0	4
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	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	1	2	1	0	0	0	0	0	4
NW	0	0	0	1	1	0	0	0	0	0	0	0	2
NNW	0	0	0	0	1	1	0	0	0	0	0	0	2
TOTALS	0	0	3	15	41	209	221	14	0	0	0	0	503

NUMBER OF VALID HOURS 503
NUMBER OF INVALID HOURS 1
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 2208

ALL STABILITY CLASSES, ALL DT/DZ
WIND SPEED (M/S) AT 10 METER 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	TOTAL
N	1	2	10	29	26	51	25	2	0	0	0	0	146
NNE	2	3	13	46	100	271	264	22	1	0	0	0	722
NE	0	4	17	17	26	21	11	3	2	0	0	0	101
ENE	0	4	3	10	5	8	0	0	0	0	0	0	30
E	0	3	2	10	4	5	0	0	0	0	0	0	24
ESE	1	3	2	3	4	10	4	2	1	0	0	0	51
SE	0	2	0	8	9	34	36	10	4	0	0	0	103
SSE	1	1	3	15	25	40	33	7	4	0	1	0	130
S	0	2	5	11	17	37	24	3	0	0	0	0	99
SSW	0	0	4	16	13	27	20	1	3	0	0	0	84
SW	0	1	4	14	20	35	7	3	1	0	0	0	85
WSW	0	2	2	11	30	40	16	0	1	0	0	0	102
W	0	3	5	11	24	115	51	6	2	1	0	0	218
WNW	1	1	5	17	12	54	73	20	0	0	0	0	183
NW	0	2	2	9	12	25	27	8	1	0	0	0	86
NNW	0	2	3	12	12	25	9	1	0	0	0	0	64
TOTALS	6	35	80	239	339	798	600	88	20	1	1	0	2207

NUMBER OF VALID HOURS 2207
NUMBER OF INVALID HOURS 1
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 2208