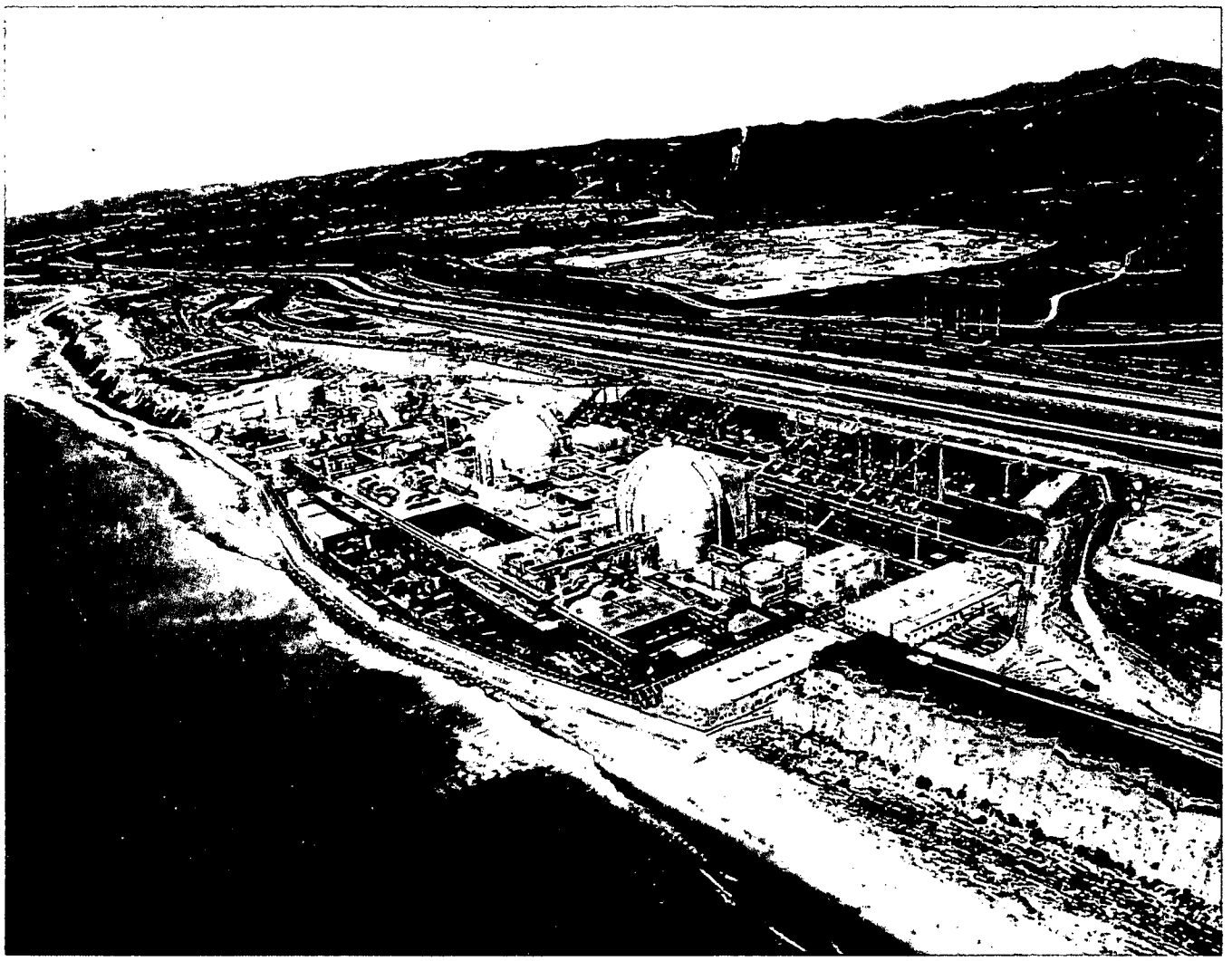

SAN ONOFRE NUCLEAR GENERATING STATION

Annual Radioactive Effluent Release Report

2006

January - December

SOUTHERN CALIFORNIA
EDISON®
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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. By August 31, 2004, all fuel was transferred to the Independent Spent Fuel Storage Installation (ISFSI). Unit 1 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%).

Effective December 29, 2006, the City of Anaheim has transferred its ownership interests in San Onofre Units 2 and 3 and the entitlement to the Units 2 and 3 output, to Southern California Edison Company, except that it retains its ownership interests in its spent nuclear fuel and Units 2 and 3's independent spent fuel storage installation located on the facility's site. In addition, the City of Anaheim retains financial responsibility for its spent fuel and for a portion of the Units 2 and 3 decommissioning costs. The City of Anaheim remains a licensee for purposes of its retained interests and liabilities.

P.O. Box 128
San Clemente, CA 92674-0128

S.O.N.G.S. 1

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ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2006)

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

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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

Unit 1 is undergoing decommissioning and all of the fuel is stored in the ISFSI. Batch releases were stopped on 8/4/1993 and continuous releases were terminated on 11/27/2006. The last Offsite Dose Calculation Manual (ODCM) credited airborne release point, the Plant Vent Stack (PVS), was removed from the ODCM on 11/27/2006.

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.

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.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2006)

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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	N/A	N/A	N/A
2. Average release rate for period	μCi/sec	N/A	N/A	
3. Percent of applicable limit	% MPC	N/A	N/A	
4. Percent Effluent Concentration Limit	% ECL	N/A	N/A	
B. Iodines				
1. Total iodine-131	Ci	N/A	N/A	N/A
2. Average release rate for period	μCi/sec	N/A	N/A	
3. Percent of applicable limit	% MPC	N/A	N/A	
4. Percent Effluent Concentration Limit	% ECL	N/A	N/A	
C. Particulates				
1. Particulates with half-lives >8 days	Ci	1.15E-6(1)	2.70E-6	1.60E+1
2. Average release rate for period	μCi/sec	1.48E-7	3.43E-7	
3. Percent of applicable limit	% MPC	3.85E-7	1.15E-6	
4. Percent Effluent Concentration Limit	% ECL	9.61E-7	5.12E-6	
5. Gross alpha activity	Ci	<LLD	<LLD	5.00E+1
D. Tritium				
1. Total release	Ci	<LLD	8.08E-1	2.50E+1
2. Average release rate for period	μCi/sec	0.00E+0	1.03E-1	
3. Percent of applicable limit	% MPC	0.00E+0	6.68E-4	
4. Percent Effluent Concentration Limit	% ECL	0.00E+0	1.34E-3	

(1) On 3/7/2006, plant vent stack particulate samples were not collected for 68 minutes. During this time, there was no work being performed in the building. The prior and subsequent sample results were <LLD. There were no dose consequences to a member of the public as a result of this event which is documented in AR #060300357.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2006)

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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	N/A	N/A	N/A
2. Average release rate for period	μCi/sec	N/A	N/A	
3. Percent of applicable limit	% MPC	N/A	N/A	
4. Percent Effluent Concentration Limit	% ECL	N/A	N/A	
B. Iodines				
1. Total iodine-131	Ci	N/A	N/A	N/A
2. Average release rate for period	μCi/sec	N/A	N/A	
3. Percent of applicable limit	% MPC	N/A	N/A	
4. Percent Effluent Concentration Limit	% ECL	N/A	N/A	
C. Particulates				
1. Particulates with half-lives >8 days	Ci	1.97E-8	4.92E-9	1.60E+1
2. Average release rate for period	μCi/sec	2.48E-9	6.19E-10	
3. Percent of applicable limit	% MPC	6.44E-9	1.61E-9	
4. Percent Effluent Concentration Limit	% ECL	1.61E-8	4.02E-9	
5. Gross alpha activity	Ci	<LLD	<LLD	5.00E+1
D. Tritium				
1. Total release	Ci	<LLD	7.73E-2	2.50E+1
2. Average release rate for period	μCi/sec	0.00E+0	9.72E-3	
3. Percent of applicable limit	% MPC	0.00E+0	6.32E-5	
4. Percent Effluent Concentration Limit	% ECL	0.00E+0	1.26E-4	

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2006)

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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	N/A	N/A	N/A	N/A
krypton-85m	Ci	N/A	N/A	N/A	N/A
krypton-87	Ci	N/A	N/A	N/A	N/A
krypton-88	Ci	N/A	N/A	N/A	N/A
xenon-133	Ci	N/A	N/A	N/A	N/A
xenon-133m	Ci	N/A	N/A	N/A	N/A
xenon-135	Ci	N/A	N/A	N/A	N/A
xenon-135m	Ci	N/A	N/A	N/A	N/A
xenon-138	Ci	N/A	N/A	N/A	N/A
Total for period	Ci	N/A	N/A	N/A	N/A
2. Iodines					
iodine-131	Ci	N/A	N/A	N/A	N/A
iodine-133	Ci	N/A	N/A	N/A	N/A
iodine-135	Ci	N/A	N/A	N/A	N/A
Total for period	Ci	N/A	N/A	N/A	N/A
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	1.15E-6	1.54E-6	1.97E-8	4.92E-9
cobalt-58	Ci	<LLD	<LLD	<LLD	<LLD
cobalt-60	Ci	<LLD	1.17E-6	<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
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 (2006)

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	N/A
krypton-85m	N/A
krypton-87	N/A
krypton-88	N/A
xenon-133	N/A
xenon-133m	N/A
xenon-135	N/A
xenon-135m	N/A
xenon-138	N/A
2. Iodines	
iodine-131	N/A
iodine-133	N/A
iodine-135	N/A
3. Particulates	
barium-140	4.30E-13
cerium-141	5.50E-14
cerium-144	2.20E-13
cesium-134	1.20E-13
cobalt-58	1.10E-13
cobalt-60	1.70E-13
iron-59	2.70E-13
lanthanum-140	8.50E-13
manganese-54	1.10E-13
molybdenum-99	6.50E-14
strontium-89	1.00E-11
strontium-90	1.00E-11
zinc-65	2.90E-13
4. alpha	1.00E-11
5. tritium	7.20E-8

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 (2006)

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	N/A	N/A	N/A	N/A
2. Percent Applicable Limit	%	N/A	N/A	N/A	N/A
3. Beta Air Dose	mrad	N/A	N/A	N/A	N/A
4. Percent Applicable Limit	%	N/A	N/A	N/A	N/A
B. Tritium, Iodine, Particulates (at the nearest receptor)					
1. Organ Dose	mrem	4.94E-6	6.17E-5	7.25E-8	4.48E-6
2. Percent Applicable Limit	%	6.59E-5	8.23E-4	9.67E-7	5.97E-5

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.

S.O.N.G.S. 1

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

Unit 1 is undergoing decommissioning and all of the fuel is stored in the ISFSI. As of the third quarter 2005, batch releases are no longer being conducted due to the demolition of the liquid radwaste system.

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 "continuous" mode of release. Continuous releases through the Unit 1 outfall were terminated on 10/16/2006. The new North Industrial Area (NIA) yard drain sump discharges through either the Unit 2 or Unit 3 outfall.

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," has been deleted.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2006)

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	<LLD	2.04E-6	1.90E+1
2. Average diluted concentration during period	μCi/ml	0.00E+0	1.31E-12	
3. Percent of applicable limit	% MPC	0.00E+0	6.54E-6	
4. Percent Effluent Concentration Limit	% ECL	0.00E+0	1.31E-4	
B. Tritium				
1. Total release	Ci	7.34E-3	1.87E-4	1.90E+1
2. Average diluted concentration during period	μCi/ml	7.48E-9	1.20E-10	
3. Percent of applicable limit	% MPC	2.49E-4	4.00E-6	
4. Percent Effluent Concentration Limit	% ECL	7.48E-4	1.20E-5	
C. Dissolved and entrained gases				
1. Total release	Ci	N/A	N/A	N/A
2. Average diluted concentration during period	μCi/ml	N/A	N/A	
3. Percent of applicable limit	% MPC	N/A	N/A	
4. Percent Effluent Concentration Limit	% ECL	N/A	N/A	
D. Gross alpha radioactivity				
1. Total release	Ci	<LLD	<LLD	5.00E+1
E. Volume of waste released (batch & continuous, prior to dilution)	liters	3.42E+6	1.75E+4	5.00E+0
F. Volume of dilution water used during period	liters	9.81E+8	1.56E+9	5.00E+0

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2006)

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. Total release (not including tritium, gases, alpha)	Ci	4.19E-5	<LLD	1.90E+1
2. Average diluted concentration during period	μCi/ml	2.24E-11	0.00E+0	
3. Percent of applicable limit	% MPC	1.12E-4	0.00E+0	
4. Percent Effluent Concentration Limit	% ECL	2.24E-3	0.00E+0	
B. Tritium				
1. Total release	Ci	3.46E-1	4.73E-2	1.90E+1
2. Average diluted concentration during period	μCi/ml	1.85E-7	4.01E-8	
3. Percent of applicable limit	% MPC	6.17E-3	1.34E-3	
4. Percent Effluent Concentration Limit	% ECL	1.85E-2	4.01E-3	
C. Dissolved and entrained gases				
1. Total release	Ci	N/A	N/A	N/A
2. Average diluted concentration during period	μCi/ml	N/A	N/A	
3. Percent of applicable limit	% MPC	N/A	N/A	
4. Percent Effluent Concentration Limit	% ECL	N/A	N/A	
D. Gross alpha radioactivity				
1. Total release	Ci	<LLD	<LLD	5.00E+1
E. Volume of waste released (batch & continuous, prior to dilution)	liters	8.44E+5	3.03E+7	5.00E+0
F. Volume of dilution water used during period	liters	1.87E+9	1.18E+9	5.00E+0

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2006)

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	<LLD	2.04E-6	4.19E-5	<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	<LLD	2.04E-6	4.19E-5	<LLD
2. Dissolved and entrained gases					
xenon-133	Ci	N/A	N/A	N/A	N/A
xenon-135	Ci	N/A	N/A	N/A	N/A
Total for period	Ci	N/A	N/A	N/A	N/A

LLD Lower Limit of Detection; see Table 2C.

NOTE: Due to the removal of the Liquid Radwaste System at S.O.N.G.S. 1, "BATCH MODE" releases are no longer conducted.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2006)

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	2.90E-7
cerium-141	4.30E-8
cerium-144	1.70E-7
cesium-134	7.50E-8
cesium-137	6.40E-8
chromium-51	3.30E-7
cobalt-58	6.80E-8
cobalt-60	1.00E-7
iodine-131	5.70E-8
iron-55	1.00E-6
iron-59	1.60E-7
lanthanum-140	5.60E-7
manganese-54	6.70E-8
molybdenum-99	5.60E-8
niobium-95	6.80E-8
strontium-89	5.00E-8
strontium-90	5.00E-8
technetium-99m	5.70E-8
zinc-65	1.70E-7
zirconium-95	1.20E-7
2. Dissolved and entrained gases	
xenon-133	N/A
xenon-135	N/A
3. gross alpha	1.00E-7

NOTE: Due to the removal of the Liquid Radwaste System at S.O.N.G.S. 1, "BATCH MODE" releases are no longer conducted.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2006)

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	4.56E-6	3.54E-5	8.67E-4	8.40E-6
2. Percent Applicable Limit	%	3.04E-4	2.36E-3	5.78E-2	5.60E-4
B.					
1. Limiting organ dose	mrem	4.56E-6	5.41E-5	1.22E-3	8.40E-6
2. Percent Applicable Limit	%	9.12E-5	1.08E-3	2.44E-2	1.68E-4
3. Limiting organ for period		GI-LLI *	Liver	Liver	GI-LLI *

*All organs except bone

TABLE 2E

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 D. PREVIOUS RADIOACTIVE EFFLUENT RELEASE REPORT ADDENDUM

None.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2006)

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	N/A
	Ci	N/A	
b. Dry active waste (DAW), compactable and non-compactable (incl. demolition rubble) *	m^3	9.50E+3	3.00E+1
	Ci	5.08E+1	
c. Irradiated components (Structural members & reactor piping) *	m^3	9.63E+0	3.00E+1
	Ci	3.07E+0	
d. Other: (Mechanical filters)#	m^3	8.43E+1	3.00E+1
	Ci	1.42E-1	

NOTE: Total curie content estimated.

* Material packaged in various General Design, IP-1, USA DOT 7A Type A, and Type A packaging.

\# Material packaged in General Design Packaging.

N/A No Shipment made

2. Estimate of major nuclide composition (by type of waste)			
a.	Not applicable	%	N/A
b.	americium-241	%	3.63E-2
	carbon-14	%	2.40E+0
	cerium-144	%	2.25E-1
	cesium-134	%	7.55E-1
	cesium-137	%	3.35E+1
	cobalt-60	%	1.59E+1
	curium-242	%	6.96E-5
	curium-243/244	%	1.22E-2
	europium-152	%	7.31E+0
	europium-154	%	5.09E-1
	iron-55	%	1.38E+1
	nickel-59	%	2.72E-3
	nickel-63	%	1.53E+1
	niobium-94	%	9.98E-4
	plutonium-238	%	3.52E-3
	plutonium-239/240	%	1.90E-3
	plutonium-241	%	8.41E-2
	plutonium-242	%	2.07E-5
	silver-110m	%	7.15E-3
	strontium-89	%	1.50E-3
	strontium-90	%	1.25E-1
	technetium-99	%	2.49E-2
	tritium	%	1.03E+1

2. Estimate of major nuclide composition (by type of waste)			
c.	carbon-14	%	8.60E-2
	cobalt-60	%	6.09E+1
	iron-55	%	1.16E+1
	manganese-54	%	6.42E-4
	nickel-59	%	3.07E-1
	nickel-63	%	2.69E+1
	niobium-94	%	1.13E-3
	technetium-99	%	2.09E-2
d.	americium-241	%	4.65E-1
	carbon-14	%	3.96E-2
	cerium-144	%	4.10E-2
	cesium-134	%	8.36E-1
	cesium-137	%	5.78E+1
	cobalt-60	%	6.67E+0
	curium-242	%	2.68E-3
	curium-243/244	%	9.04E-2
	europium-154	%	8.31E-3
	iron-55	%	1.83E+0
	nickel-63	%	2.13E+1
	niobium-94	%	1.16E-2
	plutonium-238	%	3.78E-1
	plutonium-239/240	%	1.54E-1
	plutonium-241	%	9.49E+0
	plutonium-242	%	2.98E-3
	strontium-89	%	2.91E-1
	strontium-90	%	4.57E-1
	technetium-99	%	3.54E-2
	tritium	%	1.44E-2

S.O.N.G.S. 1

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

3. Solid Waste Disposition		
Number of Shipments	Mode of Transportation	Destination
3 *	Hittman Trucking Company Truck	EnergySolutions, UT
1 *	TAG Transport Truck	EnergySolutions, UT
2 *	TRIAD Transport Inc. Truck	EnergySolutions, UT
31	TAG Transport Truck	EnergySolutions, UT
303 **	MHF Logistical Solutions Rail	EnergySolutions, UT

* SONGS maintains contracts with vendors (Alaron and EnergySolutions, formerly known as Duratek) that provide volume reduction services. The processed volume was shipped from the vendor's facility to EnergySolutions in Clive, UT using 7 shipments. Those 7 shipments included waste from other generators. SCE's waste volume was a fraction of the total waste volume of these shipments.

** Three of these shipments contained irradiated components.

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

S.O.N.G.S. 1

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** = $\dfrac{\text{(Rel Rate) (X/Q) (100)}}{MPC_{eff}}$

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 = 1.30E-5 sec/m^3; the annual average atmospheric dispersion defined in the 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 = 1.30E-5 sec/m^3; the annual average atmospheric dispersion defined in the 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.

S.O.N.G.S. 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** = $\dfrac{\text{(Dil Conc) (100)}}{MPC_{eff}}$

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

    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 2.

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

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

    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 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; these data are also presented in Table 2D. Categories 3, 4, and 5 were calculated utilizing RETDAS (Radioactive Effluent Tracking and Dose Assessment 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 1-2 and 2-2.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2006)

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	4.56E-6	3.54E-5	8.67E-4	8.40E-6	9.15E-4
	6)	7)	8)	9)	10)
Organ	4.56E-6	5.41E-5	1.22E-3	8.40E-6	1.29E-3
AIRBORNE EFFLUENTS	11)	12)	13)	14)	15)
Tritium, Iodines, and Particulates	9.33E-5	1.18E-3	1.14E-6	1.13E-4	1.38E-3
NOBLE GASES	16)	17)	18)	19)	20)
Gamma	N/A	N/A	N/A	N/A	N/A
	21)	22)	23)	24)	25)
Beta	N/A	N/A	N/A	N/A	N/A
	26)	27)	28)	29)	30)
DIRECT RADIATION	1.95E-1	1.78E-1	1.44E-1	8.78E-2	5.74E-1

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

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; GI-LLI, (all organs, except bone) 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; GI-LLI, (all organs, except bone) received the maximum dose primarily by the saltwater fish pathway.

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

11. The maximum organ dose was to the skin (all age groups) and was located in the NNE sector. This was calculated using the assumptions of USNRC Regulatory Guide 1.109 .

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

13. The maximum organ dose was to the skin (all age groups) and was located in the NNE sector. This was calculated using the assumptions of USNRC Regulatory Guide 1.109.

14. The maximum organ dose was to the teen's liver and was located in the NNE sector. This was calculated using the assumptions of USNRC Regulatory Guide 1.109.

15. The maximum organ dose was to the teen's lung and was located in the NNE sector. This was calculated using the assumptions of USNRC Regulatory Guide 1.109.

16. Noble Gas is no longer generated.

17. Noble Gas is no longer generated.

18. Noble Gas is no longer generated.

19. Noble Gas is no longer generated.

20. Noble Gas is no longer generated.

21. Noble Gas is no longer generated.

22. Noble Gas is no longer generated.

23. Noble Gas is no longer generated.

24. Noble Gas is no longer generated .

25. Noble Gas is no longer generated.

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 W 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	3.04E-4	2.36E-3	5.78E-2	5.60E-4	3.05E-2
Organ	9.12E-5	1.08E-3	2.44E-2	1.68E-4	1.29E-2
AIRBORNE EFFLUENTS Tritium, Iodines, and Particulates	1.24E-3	1.58E-2	1.52E-5	1.50E-3	9.17E-3
NOBLE GASES Gamma	N/A	N/A	N/A	N/A	N/A
Beta	N/A	N/A	N/A	N/A	N/A

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

S.O.N.G.S. 1

SECTION I. CHANGES TO THE OFFSITE DOSE CALCULATION MANUAL

On February 24, 2006, Revision 24 to the Unit 1 Offsite Dose Calculation Manual (ODCM)was adopted and published. This change incorporated updates from the 2004-2005 Land Use Census (LUC).

Per NRC Generic Letter 89-01, no 50.59 or EOE reviews were required or performed for editorial changes made to reflect actual plant operation.

None of the changes impacted the accuracy or reliability of effluent dose or setpoint calculations. The level of radioactive effluent control required by 10CFR20, 40CFR190, 10CFR50.35a and Appendix I to 10CFR50 will be maintained.

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

A Addition
D Deletion
F Editorial/Format change
R Revision

New Page #	Change	Reason
ii	Modified to reflect added page	R
2-21	Modified Controlling Location Factors per LUC	R
2-22	Revised Ri values per LUC	R
2-24	Revised Ri values and changed name of pathway per LUC	R
2-27	Revised Ri values per LUC	R
2-30	Revised Ri values per LUC	R
2-31	Revised Ri values per LUC	R
2-38	Modified Sector G page numbers due to added page	F
2-39	Added page of Ri values per LUC	A

On November 27, 2006, Revision 25 to the Unit 1 Offsite Dose Calculation Manual (ODCM) was adopted and published. This change incorporated 1) the removal of the plant vent stack (PVS) system from service and 2) the earlier removal of the yard drain sump (YDS) implementing licensing change PCN 560. Both of these changes were in support of the Unit 1 demolition process. With these changes, there will be no longer be liquid or gaseous effluent release pathways credited to Unit 1.

An approved Effluent/ODCM Evaluation (EOE) was generated for each change. No 50.59 or EOE reviews were required or performed for editorial changes made to reflect actual plant operation.

None of the changes impacted the accuracy or reliability of effluent dose or setpoint calculations. The level of radioactive effluent control required by 10CFR20, 40CFR190, 10CFR50.35a and Appendix I to 10CFR50 will be maintained.

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

A Addition
D Deletion
F Editorial/Format change
R Revision

New Page #	Change	Reason
ix	Added note detailing the removal of the yard drain sump (YDS) and the plant vent stack (PVS) from Unit 1	A
1-1	Added note detailing specification 1.0 as no longer applicable.	A
1-3	Deleted batch release types, and sampling and analysis frequencies that are no longer required.	D
1-10	Added note detailing specification 1.4 as no longer applicable	A
1-20	Added note detailing specification 1.5 as no longer applicable	A
1-23	Added note detailing specification 1.6 as no longer applicable	A
2-1	Added note detailing specification 2.0 as no longer applicable	A
2-2	Added note detailing specification 2.1 as no longer applicable	A

2-3	Deleted batch release types and sampling and analysis frequencies that are no longer required	D
2-8	Added note detailing specification 2.3 as no longer applicable	A
4-1	Added note detailing specification 4.0 as no longer applicable.	A
4-2	Deleted instrument monitoring requirements	D
4-5	Deleted instrument surveillance requirements	D
4-7	Added note detailing specification 4.2 as no longer applicable.	A
4-8	Deleted monitoring requirements	D
4-9	Deleted action table	D
4-10	Added note detailing specification 4.2.2 as no longer applicable.	A
4-11	Deleted instrument surveillance requirements	D
4-12	Deleted reference to Figure 4-1 and Figure 4-2	D
4-13	Deleted Figure 4-1; there are no longer any liquid release pathways at Unit 1.	D
4-14	Deleted Figure 4-2; there are no longer any gaseous release pathways at Unit 1	D

SECTION J. CHANGES TO RADIOACTIVE WASTE TREATMENT SYSTEMS

Demolition of the Yard Drain Sump System

On October 16, 2006, the Unit 1 Yard Drain Sump (YDS) was permanently removed from service per PCN 560. The sump pumps, piping, and radiation monitoring system skid (RT-2101) were removed from service for demolition, a result of the ongoing decommissioning activities at Unit 1.

The Unit 1 YDS system was designed to collect the drains from the backyard area, and surface runoff from the Unit 1 footprint (now known as the North Industrial Area) and the AWS complex/area. Due to the pending removal from service of the Unit 1 outfall and its associated pumps, a new, larger sump, now known as the North Industrial Area (NIA) YDS, has been built. The new NIA YDS performs the functions of the old YDS, in that it collects all the same drains and surface runoff. On 10/16/2006, the NIA YDS was placed in service, with its discharge being directed either to the Unit 2 or to the Unit 3 outfall. As a result, there are no longer any releases from the Unit 1 YDS which was the sole remaining ODCM-credited liquid release point.

Releases from the NIA YDS are controlled under Units 2/3 ODCM. All of the sampling and monitoring provisions that were in the Unit 1 ODCM were transferred to the Units 2/3 ODCM Revision 42. Releases from the NIA YDS will be included in the Unit 2/3 totals. Similarly, existing Unit 2/3 dose and concentration limits will apply to the NIA YDS. All radioactive releases from SONGS will continue to meet all regulatory requirements, including dose limits and concentrations requirements for liquid releases.

This change does not adversely affect the effluent control program; the resultant doses or curies will continue to be ALARA and to meet all applicable regulatory requirements. Any radioactive waste liquid from the site will now be discharged through the Unit 2 or the Unit 3 outfall and be controlled by the Units 2&3 ODCM.

See also Section J of Units 2/3 ARERR (2006).

Demolition of the Plant Vent Stack System

Per ECP 050200988, the Plant Vent Stack (PVS) system, including the associated particulate sampler R-1254 was removed from service upon completion of the Unit 1 containment dome internal decontamination and demolition. This change is a result of the ongoing decommissioning activities at Unit 1.

The PVS was designed to provide a controlled ventilation exhaust pathway from various buildings at Unit 1 and to provide a means of sampling and monitoring prior to release to the environment. Radiation monitoring and sampling instrumentation was installed to satisfy regulations and control releases from the PVS system as an ODCM-credited release point. Following the Unit 1 permanent shut down and the decay of any airborne source term, the requirement to monitor for noble gas or to sample for iodine at Unit 1 was removed from the ODCM when all the fuel was transferred to the Independent Spent Fuel Storage Installation (ISFSI) (see AR 040501435-2). Subsequently, the only remaining required feature of R-1254 was the PVS particulate sampler.

As part of decommissioning, several buildings have already been demolished. The remaining building internals have, to the extent practical, been decontaminated to below the established administrative values requiring airborne effluent controls during decommissioning(see AR 061000193). For work on areas above the established administrative values, one or more contamination control measures are required to minimize the potential for unmonitored releases of airborne radioactive effluents. The contamination control method employed for demolishing the remaining buildings has been the use of coating/paints (see AR 061000193-2). The use of portable enclosures and local ventilation controls would be impractical for the demolition of the buildings themselves. Further, while it is unlikely that any radioactive particulate matter will actually be released from the site during these evolutions due to the use of prudent contamination control measures, continuous local air samples will be taken during building demolition.

Prior to demolishing the remaining buildings, the PVS needed to be removed since it was an obstruction to the safe and controlled demolition of the buildings. The demolition of the PVS and sampler included removing the fans, ducting, stack, and sampler skid.

Existing site procedures and programs are in place to sample the final building demolition process. Based on historical air sample data, no airborne radioactivity was expected during this last phase of work, and indeed to date, none has been found.

RG 1.21 reiterates that licensees must comply with the requirements in 10 CFR 20.106 and 10 CFR 50 Appendix A, General Design Criteria 60 and 64. All sources of airborne activity to the PVS have been removed or contained (as explained above) and the PVS was removed as part of the decommissioning effort. The PVS was removed from service and eliminated as a Unit 1 ODCM credited release point. Demolition of the remaining buildings is not expected to result in measurable releases of airborne radioactive material. Local air samples are being taken during demolition in support of that expectation. SCE continues to meet the regulatory requirements through the Unit 1 ODCM and the effluent control program.

SECTION K. MISCELLANEOUS

- Incorrect Monitor Sample Flow

On 2/10/2006 at 0330, the plant vent stack fan A-22 was secured to allow for a belt adjustment. The sample flow for RT-1254 should have been adjusted when the fan configuration changed. Flow remained at 1.75 scfm instead of the procedurally required 1.20 scfm. The result was that for 348 minutes during a one week sampling period, the sample flow was outside of the procedural guidance. There was no work identified during this period of time that created a potential for an airborne release. The results of the sample analysis for the particulate filter, as well as the filter for the week before and after were <LLD. Therefore, there was no dose consequence to a member of the public as a result of this event which is documented in AR 060200615.

- Incorrect Sample Preparation for the Off-Site Analysis

In May 2006, it was discovered that the off-site liquid and gaseous composite samples were being prepared using an equal aliquot rather than relative proportions. Upon notification, the vendor immediately modified their procedures to use proportional sampling to prepare the composites for analysis. The affected time period was 2000 through 2005. Evaluation of all results for those years showed that the reported totals were conservative or within the error of analysis while still being an insignificant percent of any dose limit. There were no dose consequences to a member of the public as a result of this event which is documented in AR 060901296.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2006)

S.O.N.G.S. 1

EFFLUENT RADIATION MONITORS OUT OF SERVICE GREATER THAN 30 DAYS

January 1, 2006 - December 31, 2006

None.

S.O.N.G.S. 1

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

- Gaseous releases totaled 8.85E-1 curies of which particulates were 3.88E-6 curies, and tritium was 8.85E-1 curies. (Noble gases and iodines are no longer released)

- The radiation doses from gaseous releases were: organ dose: 1.38E-3 mrem at the nearest receptor. (No dose was attributed to gamma and beta radiation since noble gases and iodines are no longer released)

- Liquid releases totaled 4.01E-1 curies of which particulates and iodines were 4.39E-5 curies, tritium was 4.01E-1 curies, and noble gases were 0.00E+0 curies.

- The radiation doses from liquid releases were: (a) total body: 9.15E-4 mrem, (b) limiting organ: 1.29E-3 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 (2006)

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

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 (2006)

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

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	5.43E+1	2.27E+1	3.00E+1
2. Average release rate for period	μCi/sec	6.98E+0	2.89E+0	
3. Percent of applicable limit	% MPC	1.38E-2	6.34E-3	
4. Percent Effluent Concentration Limit	% ECL	1.85E-2	1.05E-2	
B. Iodines				
1. Total iodine-131	Ci	1.23E-3	1.03E-4	1.90E+1
2. Average release rate for period	μCi/sec	1.58E-4	1.31E-5	
3. Percent of applicable limit	% MPC	7.59E-4	6.29E-5	
4. Percent Effluent Concentration Limit	% ECL	3.80E-4	3.14E-5	
C. Particulates				
1. Particulates with half-lives >8 days	Ci	4.64E-4	3.28E-4	1.60E+1
2. Average release rate for period	μCi/sec	5.97E-5	4.18E-5	
3. Percent of applicable limit	% MPC	2.91E-5	1.62E-5	
4. Percent Effluent Concentration Limit	% ECL	1.05E-4	4.76E-5	
5. Gross alpha activity	Ci	<LLD	<LLD	5.00E+1
D. Tritium				
1. Total release	Ci	1.26E+1	5.41E+0	2.50E+1
2. Average release rate for period	μCi/sec	1.62E+0	6.88E-1	
3. Percent of applicable limit	% MPC	3.89E-3	1.65E-3	
4. Percent Effluent Concentration Limit	% ECL	7.78E-3	3.30E-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	3.51E+1	5.49E+1	3.00E+1
2. Average release rate for period	μCi/sec	4.42E+0	6.91E+0	
3. Percent of applicable limit	% MPC	9.55E-3	1.47E-2	
4. Percent Effluent Concentration Limit	% ECL	1.53E-2	2.21E-2	
B. Iodines				
1. Total iodine-131	Ci	9.72E-5(1)	1.10E-3(2)	1.90E+1
2. Average release rate for period	μCi/sec	1.22E-5	1.38E-4	
3. Percent of applicable limit	% MPC	5.87E-5	6.64E-4	
4. Percent Effluent Concentration Limit	% ECL	2.93E-5	3.32E-4	
C. Particulates				
1. Particulates with half-lives >8 days	Ci	4.37E-4(1)	2.25E-3(2)	1.60E+1
2. Average release rate for period	μCi/sec	5.50E-5	2.83E-4	
3. Percent of applicable limit	% MPC	5.76E-5	1.13E-4	
4. Percent Effluent Concentration Limit	% ECL	2.03E-4	4.44E-4	
5. Gross alpha activity	Ci	<LLD	<LLD	5.00E+1
D. Tritium				
1. Total release	Ci	4.98E+0	1.76E+1	2.50E+1
2. Average release rate for period	μCi/sec	6.27E-1	2.21E+0	
3. Percent of applicable limit	% MPC	1.50E-3	5.31E-3	
4. Percent Effluent Concentration Limit	% ECL	3.01E-3	1.06E-2	

(1) On 7/13/2006,particulate and iodine samples were not taken from the condenser air ejector for 504 minutes. The iodine sample data results were consistent with the sample results before, 8.19E-14 uCi/cc, and after the event, 3.15E-14 uCi/cc. Prior and subsequent particulate samples were <LLD. There were no dose consequences to a member of the public from this event and is documented in AR 060700517.

(2) From 10/10/2006 to 10/11/2006, particulate and iodine samples were not taken from the South Yard Facility,for 1452 minutes. There was no work performed in contaminated areas that may have created an airborne source term. Prior and subsequent samples were <LLD. There were no dose consequences to a member of the public due to this event which is documented in AR 061000990.

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	1.96E+0	1.30E+0	1.86E+0	2.48E+0
krypton-85	Ci	1.92E+0	1.18E+0	4.80E-1	<LLD
krypton-85m	Ci	<LLD	<LLD	<LLD	4.17E-2
krypton-87	Ci	<LLD	<LLD	<LLD	<LLD
krypton-88	Ci	<LLD	<LLD	<LLD	2.43E-2
xenon-131m	Ci	<LLD	8.69E-2	<LLD	1.16E-1
xenon-133	Ci	5.02E+1	1.86E+1	2.65E+1	5.12E+1
xenon-133m	Ci	2.08E-1	4.82E-4	3.75E-2	1.35E-1
xenon-135	Ci	1.03E-3	1.83E-2	7.22E-2	9.08E-1
xenon-135m	Ci	<LLD	<LLD	<LLD	<LLD
xenon-138	Ci	<LLD	<LLD	<LLD	<LLD
Total for period	Ci	5.43E+1	2.11E+1	2.90E+1	5.49E+1
2. Iodines					
iodine-131	Ci	1.23E-3	1.03E-4	9.72E-5	1.10E-3
iodine-132	Ci	9.99E-4	<LLD	<LLD	6.94E-5
iodine-133	Ci	2.14E-5	8.81E-5	2.59E-4	1.63E-4
iodine-135	Ci	<LLD	2.21E-6	5.94E-6	5.21E-6
Total for period	Ci	2.26E-3	1.93E-4	3.62E-4	1.34E-3

LLD Lower Limit of Detection; see Table 1D.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2006)

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

TABLE 1C (Continued)

GASEOUS EFFLUENTS-GROUND LEVEL RELEASES
CONTINUOUS MODE

Radionuclides Released	Unit	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
3. Particulates					
antimony-125	Ci	<LLD	<LLD	<LLD	1.77E-5
barium-140	Ci	<LLD	<LLD	<LLD	<LLD
bromine-82	Ci	4.20E-5	3.61E-5	1.05E-4	4.77E-5
cerium-141	Ci	<LLD	<LLD	<LLD	<LLD
cerium-144	Ci	<LLD	<LLD	<LLD	<LLD
cesium-134	Ci	<LLD	<LLD	<LLD	<LLD
cesium-137	Ci	7.18E-5	3.43E-5	3.31E-4	5.37E-5
chromium-51	Ci	6.14E-6	<LLD	<LLD	2.98E-4
cobalt-57	Ci	<LLD	<LLD	<LLD	6.50E-6
cobalt-58	Ci	2.59E-4	2.70E-4	2.16E-5	1.30E-3
cobalt-60	Ci	4.69E-5	1.66E-5	8.43E-5	2.67E-4
iron-59	Ci	6.56E-5	1.12E-7	<LLD	4.85E-5
lanthanum-140	Ci	<LLD	<LLD	<LLD	<LLD
manganese-54	Ci	1.34E-6	4.91E-6	<LLD	6.07E-5
molybdenum-99	Ci	<LLD	<LLD	<LLD	<LLD
niobium-95	Ci	8.74E-6	2.54E-6	<LLD	1.29E-4
rubidium-88	Ci	<LLD	<LLD	1.56E-4	<LLD
strontium-89	Ci	<LLD	<LLD	<LLD	<LLD
strontium-90	Ci	<LLD	<LLD	<LLD	<LLD
tin-113	Ci	2.10E-7	<LLD	<LLD	<LLD
zinc-65	Ci	<LLD	<LLD	<LLD	<LLD
zirconium-95	Ci	4.40E-6	<LLD	<LLD	7.04E-5

LLD Lower Limit of Detection; see Table 1D .

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2006)

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	<LLD	8.89E-1	1.77E+0	**
krypton-85m	Ci	<LLD	<LLD	1.69E-3	**
krypton-87	Ci	<LLD	<LLD	<LLD	**
krypton-88	Ci	<LLD	<LLD	<LLD	**
xenon-131m	Ci	<LLD	1.80E-2	6.33E-2	**
xenon-133	Ci	2.35E-3	6.11E-1	4.21E+0	**
xenon-133m	Ci	<LLD	<LLD	6.08E-2	**
xenon-135	Ci	<LLD	<LLD	5.90E-2	**
xenon-135m	Ci	<LLD	<LLD	<LLD	**
xenon-138	Ci	<LLD	<LLD	<LLD	**
Total for period	Ci	2.35E-3	1.52+0	6.17E+0	**

LLD Lower Limit of Detection; see Table 1D.

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

** No batch releases were conducted in the last quarter of 2006.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2006)

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	1.50E-5
krypton-85m	3.80E-8
krypton-87	1.90E-7
krypton-88	1.40E-7
xenon-131m	1.30E-6
xenon-135m	1.50E-6
xenon-138	2.60E-6
2. Iodines	
iodine-132	1.30E-9
iodine-135	1.40E-10
3. Particulates	
antimony-125	2.00E-13
barium-140	4.60E-13
cerium-141	5.80E-14
cerium-144	2.30E-13
cesium-134	1.30E-13
chromium-51	5.10E-13
cobalt-57	2.90E-14
iron-59	2.90E-13
lanthanum-140	9.00E-13
manganese-54	1.20E-13
molybdenum-99	7.00E-14
niobium-95	1.20E-13
rubidium-88	6.30E-9
strontium-89	1.00E-11
strontium-90	1.00E-11
tin-113	8.70E-14
zinc-65	3.10E-13
zirconium-95	2.00E-13
4. alpha	1.00E-11

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2006)

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	9.00E-4
krypton-85m	2.10E-6
krypton-87	9.10E-6
krypton-88	7.30E-6
xenon-131m	7.50E-5
xenon-133m	1.80E-5
xenon-135	2.30E-6
xenon-135m	2.80E-5
xenon-138	4.40E-5

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2006)

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	5.48E-3	2.88E-3	4.33E-3	6.60E-3
2. Percent Applicable Limit	%	5.48E-2	2.88E-2	4.33E-2	6.60E-2
3. Beta Air Dose	mrad	9.61E-3	4.35E-3	6.59E-3	9.83E-3
4. Percent Applicable Limit	%	4.81E-2	2.17E-2	3.29E-2	4.91E-2
B. Tritium, Iodine, Particulates (at the nearest receptor)					
1. Organ Dose	mrem	4.25E-3	7.59E-4	1.92E-3	5.48E-3
2. Percent Applicable Limit	%	2.84E-2	5.06E-3	1.28E-2	3.65E-2

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

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2006)

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

TABLE 1F

GASEOUS EFFLUENTS-BATCH RELEASE SUMMARY

	12 month period
1. Number of batch releases:	11 releases
2. Total time period for batch releases:	4164 minutes
3. Maximum time period for a batch release:	547 minutes
4. Average time period for a batch release:	379 minutes
5. Minimum time period for a batch release:	206 minutes

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2006)

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 (2006)

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	1.12E-2	1.50E-2[1]	1.90E+1
2. Average diluted concentration during period	μCi/ml	1.99E-11	1.99E-11	
3. Percent of applicable limit	% MPC	3.69E-5	2.20E-5	
4. Percent Effluent Concentration Limit	% ECL	2.75E-4	1.52E-4	
B. Tritium				
1. Total release	Ci	2.38E+2	3.78E+2	1.90E+1
2. Average diluted concentration during period	μCi/ml	4.21E-7	5.00E-7	
3. Percent of applicable limit	% MPC	1.40E-2	1.67E-2	
4. Percent Effluent Concentration Limit	% ECL	4.21E-2	5.00E-2	
C. Dissolved and entrained gases				
1. Total release	Ci	3.81E-3	3.81E-2	1.90E+1
2. Average diluted concentration during period	μCi/ml	6.75E-12	5.04E-11	
3. Percent of applicable limit	% MPC	3.37E-6	2.52E-5	
4. Percent Effluent Concentration Limit	% ECL	3.37E-6	2.52E-5	
D. Gross alpha radioactivity				
1. Total release	Ci	<LLD	<LLD[1]	5.00E+1
E. Volume of waste released (batch & continuous, prior to dilution)	liters	3.45E+7	5.11E+7	5.00E+0
F. Volume of dilution water used during period	liters	5.65E+11	7.56E+11	5.00E+0

(1) Two U3 Steam Generator Blowdown samples were discarded prior to use in the April monthly composite for offsite analysis for alpha, Fe-55 and Sr-89/90. The pre release samples were <LLD for gamma and tritium. There was no dose impact to a member of the public from this event which is documented in AR 060500859.

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	4.63E-3	8.03E-3	1.90E+1
2. Average diluted concentration during period	μCi/ml	6.06E-12	1.35E-11	
3. Percent of applicable limit	% MPC	1.31E-5	2.96E-5	
4. Percent Effluent Concentration Limit	% ECL	1.11E-4	1.92E-4	
B. Tritium				
1. Total release	Ci	1.43E+2	9.04E+1	1.90E+1
2. Average diluted concentration during period	μCi/ml	1.87E-7	1.52E-7	
3. Percent of applicable limit	% MPC	6.24E-3	5.08E-3	
4. Percent Effluent Concentration Limit	% ECL	1.87E-2	1.52E-2	
C. Dissolved and entrained gases				
1. Total release	Ci	4.92E-2	3.01E-1	1.90E+1
2. Average diluted concentration during period	μCi/ml	6.44E-11	5.08E-10	
3. Percent of applicable limit	% MPC	3.22E-5	2.54E-4	
4. Percent Effluent Concentration Limit	% ECL	3.22E-5	2.54E-4	
D. Gross alpha radioactivity				
1. Total release	Ci	<LLD	<LLD	5.00E+1
E. Volume of waste released (batch & continuous, prior to dilution)	liters	5.38E+7	1.02+9	5.00E+0
F. Volume of dilution water used during period	liters	7.64E+11	5.93E+11	5.00E+0

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2006)

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	<LLD	<LLD	<LLD	3.14E-5
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	<LLD	<LLD	<LLD	3.14E-5
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 (2006)

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-124	Ci	<LLD	<LLD	<LLD	5.13E-5
antimony-125	Ci	1.55E-3	4.45E-4	6.48E-4	1.38E-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	8.83E-5	1.87E-5	<LLD	7.61E-5
cesium-137	Ci	8.06E-4	2.09E-4	2.42E-5	1.79E-4
chromium-51	Ci	6.71E-4	7.95E-4	<LLD	4.90E-4
cobalt-57	Ci	<LLD	<LLD	<LLD	<LLD
cobalt-58	Ci	4.33E-3	6.22E-3	1.26E-3	3.01E-3
cobalt-60	Ci	9.45E-4	1.34E-3	2.13E-3	1.60E-3
iodine-131	Ci	1.37E-5	<LLD	<LLD	7.94E-6
iron-55	Ci	2.33E-3	3.79E-3[1]	<LLD	<LLD
iron-59	Ci	2.83E-5	7.37E-5	<LLD	8.97E-5
lanthanum-140	Ci	<LLD	<LLD	<LLD	<LLD
manganese-54	Ci	1.76E-4	4.81E-4	2.45E-4	2.39E-4
molybdenum-99	Ci	<LLD	<LLD	<LLD	<LLD
niobium-95	Ci	1.51E-4	9.15E-4	1.84E-4	2.87E-4
niobium-97	Ci	7.43E-6	2.06E-5	3.15E-5	3.04E-5
silver-110m	Ci	3.98E-5	1.70E-4	9.87E-5	3.73E-4
strontium-89	Ci	<LLD	<LLD[1]	<LLD	<LLD
strontium-90	Ci	<LLD	<LLD[1]	<LLD	<LLD
technetium-99m	Ci	<LLD	<LLD	<LLD	<LLD
tin-113	Ci	<LLD	1.85E-5	<LLD	<LLD
tin-117m	Ci	2.33E-5	<LLD	<LLD	1.16E-5
zinc-65	Ci	<LLD	<LLD	<LLD	<LLD
zirconium-95	Ci	7.42E-5	5.31E-4	1.42E-5	1.55E-4
zirconium-97	Ci	<LLD	<LLD	<LLD	1.22E-5
Total for period	Ci	1.12E-2	1.50E-2	4.63E-3	8.00E-3
2. Dissolved and entrained gases					
krypton-85	Ci	<LLD	2.68E-2	<LLD	8.16E-3
xenon-131m	Ci	<LLD	1.78E-3	1.50E-3	5.42E-3
xenon-133	Ci	3.81E-3	9.51E-3	4.75E-2	2.86E-1
xenon-133m	Ci	<LLD	<LLD	2.42E-4	1.70E-3
xenon-135	Ci	<LLD	<LLD	<LLD	<LLD
Total for period	Ci	3.81E-3	3.81E-2	4.92E-2	3.01E-1

LLD Lower Limit of Detection; see Table 2C.

(1) Two U3 Steam Generator Blowdown samples were discarded prior to use in the April monthly composite for offsite analysis for alpha, Fe-55 and Sr-89/90. The pre release samples were <LLD for gamma and tritium. There was no dose impact to a member of the public from this event which is documented in AR 060500859.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2006)

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	2.90E-7
cerium-141	4.30E-8
cerium-144	1.70E-7
cesium-134	7.50E-8
cesium-137	6.40E-8
chromium-51	3.30E-7
cobalt-58	6.80E-8
cobalt-60	1.00E-7
iodine-131	5.70E-8
iron-55	1.00E-6
iron-59	1.60E-7
lanthanum-140	5.60E-7
manganese-54	6.70E-8
molybdenum-99	5.60E-8
niobium-95	6.80E-8
strontium-89	5.00E-8
strontium-90	5.00E-8
technetium-99m	5.70E-8
zinc-65	1.70E-7
zirconium-95	1.20E-7
2. Dissolved and entrained gases	
xenon-133	1.90E-7
xenon-135	8.90E-8
3. gross alpha	1.00E-7

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2006)

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	
antimony-124	2.40E-7
barium-140	2.40E-7
cerium-141	4.00E-8
cerium-144	1.70E-7
cesium-134	7.50E-8
chromium-51	3.00E-7
cobalt-57	2.20E-8
iodine-131	4.30E-8
iron-55	1.00E-6
iron-59	1.50E-7
lanthanum-140	1.80E-7
molybdenum-99	2.70E-8
strontium-89	5.00E-8
strontium-90	5.00E-8
technetium-99m	2.70E-8
tin-113	5.30E-8
tin-117m	2.30E-8
zinc-65	1.70E-7
zirconium-97	1.70E-7
2. Dissolved and entrained gases	
krypton-85	2.90E-5
xenon-131m	3.00E-6
xenon-133m	6.90E-7
xenon-135	8.90E-8
3. gross alpha	1.00E-7

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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	6.28E-4	9.65E-4	3.02E-4	2.71E-4
2. Percent Applicable Limit	%	2.09E-2	3.22E-2	1.01E-2	9.03E-3
B.					
1. Limiting organ dose	mrem	1.50E-3	2.93E-3	1.11E-3	2.31E-3
2. Percent Applicable Limit	%	1.50E-2	2.93E-2	1.11E-2	2.31E-2
3. Limiting organ for period		GI-LLI	GI-LLI	GI-LLI	GI-LLI

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TABLE 2E

LIQUID EFFLUENTS-BATCH RELEASE SUMMARY

	12 month period
1. Number of batch releases:	132 releases
2. Total time period for batch releases:	20275 minutes
3. Maximum time period for a batch release:	522 minutes
4. Average time period for a batch release:	154 minutes
5. Minimum time period for a batch release:	1 minute
6. Average saltwater flow during batch releases:	737197 gpm

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SECTION D. PREVIOUS RADIOACTIVE EFFLUENT RELEASE REPORT ADDENDUM

None.

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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 *	m^3	4.28E+0	
	Ci	1.94E+2	3.00E+1
b. Dry active waste (DAW), compactable and non-compactable *	m^3	4.31E+1	
	Ci	2.01E+2	3.00E+1
c. Irradiated components	m^3	N/A	
	Ci	N/A	N/A
d. Other: Filters	m^3	N/A	
	Ci	N/A	N/A

Note: Total curie content estimated.

* Material packaged in containers that meet the General Design requirements and/or USA Type IP-1 of various sizes.

N/A No shipment made.

2. Estimate of major nuclide composition (by type of waste)		
a. americium-241	%	5.00E-04
antimony-124	%	1.05E-02
antimony-125	%	1.10E+00
carbon-14	%	8.00E-01
cerium-144	%	1.39E-02
cesium-134	%	1.78E+00
cesium-137	%	1.11E+01
cobalt-57	%	4.62E-02
cobalt-58	%	4.56E-02
cobalt-60	%	5.98E+00
curium-243/44	%	5.00E-04
iodine-129	%	2.60E-03
iron-55	%	1.46E+01
manganese-54	%	2.96E-01
nickel-63	%	6.41E+01
niobium-94	%	2.00E-03
niobium-95	%	2.90E-03
plutonium-238	%	4.00E-04
plutonium-239/240	%	1.00E-04
plutonium-241	%	3.60E-03
strontium-89	%	4.40E-03
strontium-90	%	5.77E-02
technetium-99	%	7.00E-03
tritium	%	3.40E-02

2. Estimate of major nuclide composition (by type of waste)		
b. americium-241	%	3.00E-04
antimony-124	%	6.00E-04
antimony-125	%	3.75E-01
carbon-14	%	3.82E-01
cerium-144	%	8.70E-03
cesium-134	%	1.96E+00
cesium-137	%	1.42E+01
chromium-51	%	1.73E-02
cobalt-57	%	2.55E-02
cobalt-58	%	6.96E-02
cobalt-60	%	7.10E+00
curium-243/44	%	3.00E-04
Iodine-129	%	4.59E-02
iron-55	%	1.33E+01
iron-59	%	4.30E-03
manganese-54	%	3.90E-01
nickel-59	%	3.00E-04
nickel-63	%	6.20E+01
niobium-95	%	7.60E-03
plutonium-238	%	3.00E-04
plutonium-239/40	%	1.00E-04
plutonium-241	%	7.70E-03
strontium-89	%	1.00E-04
strontium-90	%	5.34E-02
technetium-99	%	9.70E-03
tritium	%	2.17E-02
zirconium-95	%	3.90E-03
c. not applicable	%	N/A
d. not applicable	%	N/A

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

3. Solid Waste Disposition		
Number of Shipments	Mode of Transportation	Destination
5 *	TAG Transport Truck/Flatbed Trailer	EnergySolutions, UT
2 *	R&R Transport Truck/Flatbed Trailer	Barnwell, SC and EnergySolutions, UT **
2	TAG Transport Truck/Flatbed Trailer	EnergySolutions, UT

* SONGS maintains contracts with vendors (EnergySolutions, formerly known as Duratek and Studsvik) that provide volume reduction services. The processed volume was shipped from EnergySolutions (Duratek) and Studsvik facilities to EnergySolutions in Clive, UT and Barnwell using 20 shipments. Those 20 shipments included waste from other generators. SCE's waste volume was a fraction of the total waste volume of these shipments.

** After processing, class B/C material was buried at Barnwell, S.C. Class A material was disposed of at EnergySolutions, UT

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 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 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.

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.

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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 RETDAS (Radioactive Effluent Tracking and Dose Assessment 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 1-2 & 2-2.

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TABLE 1

SOURCE	Dose * (millirems) First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Year
LIQUID EFFLUENTS	1)	2)	3)	4)	5)
Whole Body	6.28E-4	9.65E-4	3.02E-4	2.71E-4	2.17E-3
	6)	7)	8)	9)	10)
Organ	1.50E-3	2.93E-3	1.11E-3	2.31E-3	7.84E-3
AIRBORNE EFFLUENTS	11)	12)	13)	14)	15)
Tritium, Iodines, and Particulates	2.56E-3	8.68E-4	2.59E-3	6.61E-3	1.26E-2
NOBLE GASES **	16)	17)	18)	19)	20)
Gamma	2.15E-2	7.12E-3	9.26E-3	3.57E-2	7.35E-2
	21)	22)	23)	24)	25)
Beta	3.60E-2	1.38E-2	1.72E-2	5.20E-2	1.19E-1
	26)	27)	28)	29)	30)
DIRECT RADIATION	1.95E-1	1.78E-1	1.44E-1	8.78E-2	5.74E-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 teen's thyroid and was located in the N sector. This was calculated using the assumptions of USNRC Regulatory Guide 1.109.

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

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

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

15. The maximum organ dose was to a teen's thyroid and was located in the N 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 NNE 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 NNE 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 NNE 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 NNE 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 NNE 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 NNE 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 NNE 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 NNE 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 NNE 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 NNE 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 W 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	2.09E-2	3.22E-2	1.01E-2	9.03E-3	3.61E-2
Organ	1.50E-2	2.93E-2	1.11E-2	2.31E-2	3.92E-2
AIRBORNE EFFLUENTS					
Tritium, Iodines, and Particulates	1.71E-2	5.79E-3	1.73E-2	4.40E-2	4.21E-2
NOBLE GASES					
Gamma	2.15E-1	7.12E-2	9.26E-2	3.57E-1	3.68E-1
Beta	1.80E-1	6.88E-2	8.58E-2	2.60E-1	2.97E-1

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

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SECTION I. CHANGES TO THE OFFSITE DOSE CALCULATION MANUAL

On February 24, 2006, Revision 41 to the Units 2/3 Offsite Dose Calculation Manual (ODCM) was adopted and published. This change incorporated updates related to the 2004-2005 Land Use Census (LUC), and replaced environmental sampling maps; (no information was changed).

Per NRC Generic Letter 89-01, no 50.59 or EOE reviews were required or performed for editorial changes made to reflect actual plant operation.

None of the changes impacted the accuracy or reliability of effluent dose or setpoint calculations. The level of radioactive effluent control required by 10CFR20, 40CFR190, 10CFR50.35a and Appendix I to 10CFR50 will be maintained.

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

- A Addition
- D Deletion
- F Editorial/Format change
- R Revision

Page #	Change	Reason
2-31	Modified Controlling Location Factors per LUC	R
2-33	Revised Ri values per LUC	R
2-36	Revised Ri values and changed name of pathway per LUC	R
2-39	Revised Ri values per LUC	R
2-41	Revised Ri values and changed name of pathway per LUC	R
2-42	Revised Ri values per LUC	R
2-45	Revised Ri values per LUC	R
2-53	Modified Sector G page numbers due to added page	F
2-53a	Added page of Ri values per LUC	A
5-23	Replaced Figure 5-1 with a copy with better depiction of the shoreline.	R
5-24	Replaced Figure 5-2 with a copy with better depiction of the shoreline.	R
5-25	Replaced Figure 5-3 with a copy with better depiction of the shoreline.	R
5-26	Replaced Figure 5-4 with a copy with better depiction of the shoreline.	R
5-27	Replaced Figure 5-5 with a copy with better depiction of the shoreline.	R

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On October 5, 2006, Revision 42 to the Units 2/3 Offsite Dose Calculation Manual (ODCM) was adopted and published. This change incorporated the addition of the North Industrial Area Yard Drain Sump (YDS) in support of the Unit 1 demolition and in accordance with the approved licensing change PCN 560 and ECPs 050401085 and 040401753. This revision implemented the NRC licensing change.

An Effluent/ODCM Evaluation (EOE) was performed for this change. No 50.59 or EOE reviews were required or performed for editorial changes.

None of the changes impacted the accuracy or reliability of effluent dose or setpoint calculations. The level of radioactive effluent control required by 10CFR20, 40CFR190, 10CFR50.35a and Appendix I to 10CFR50 will be maintained.

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

A Addition
D Deletion
F Editorial/Format change
R Revision

New Page #	Change	Reason
i	Modified page numbers to account for added pages	R
v	Modified page numbers to account for added pages	R
1-3	Added page for new section "C" in Table 1-1, listing YDS sample & analysis requirements	A
1-4 thru 1-27	All pages renumbered to accommodate the two new added pages for the YDS	F
1-5	Added note "g" to Table 1-1	A
1-10	Added YDS administrative factor and revised paragraph to no longer limit the requirement to only Unit 2/3	A/R
1-15	Added YDS to step 1	A
1-16	Added YDS to step 2	A
1-22	Added YDS section to section 1.4.2.4	A
4-2	Added YDS radiation monitor and process flow device to Table 4-1	A
4-3	Added Plant Computer System to Table 4-1	A/F
4-5	Added Action 44 to Table 4-1 and added the word "the" to Action 33.	A/F
4-6	Added YDS radiation monitor and process flow device to Table 4-2	A
4-7	Added Plant Computer System to Table 4-2 and moved line item 3 from page 4-6.	A/F
6-4	Added RT-2101 to and removed SYFRT 7904 and SYFRT 7905 from step 6.1.15	R

SECTION J. CHANGES TO RADIOACTIVE WASTE TREATMENT SYSTEMS

On October 5, 2006, the North Industrial Area (formerly the Unit 1) Yard Drain Sump (YDS) was put into service. The North Industrial Area YDS is located in a slightly different location and with a larger volume capacity and discharge rate than the old Unit 1 YDS. The NIA YDS is released through either the Unit 2 or Unit 3 outfall. The NIA YDS will not use the Unit 1 outfall or any other portion of the Unit 1 circulating water system. A radiation monitor is installed on the new system that will alarm and automatically terminate the discharge if the setpoint is exceeded. Corresponding with this change was the removal of the Unit 1 YDS from service and from the Unit 1 ODCM.

This design change incorporates the recently approved licensing amendment PCN 560. The approved Technical Specification amendment allows San Onofre to release the yard drain sump via the Unit 2 or Unit 3 outfall. The sampling and maintenance requirements were transferred from the Unit 1 ODCM to the Unit 2/3 ODCM with only two modifications. The first, a minor surveillance change concerns the testing of the automatic isolation feature. As explained below, the increased sump capacity makes a single test for auto isolation of the sump pumps by the radiation monitor impractical. Rather, the different circuits are tested independently with overlap and shown to accomplish the requirement. The second item, the YDS process flow integrator, was added to the Unit 2/3 ODCM Chapter 4 Tables 4-1 and 4-2 to be consistent with NUREG-0472, Rev. 3, Draft 7 and NUREG CR-1301.

The original YDS was designed to collect drainage from the back yard area where tanks and systems containing radioactive (non-primary) liquids were located. The replacement sump and its associated radiation monitoring system and pumps will continue to collect and discharge mostly rainwater, and, occasionally, dewatering from other demolition activities.

A larger yard drain sump with a capacity of approximately 51,300 gallons was installed per ECPs 050401085 and 040401753, and is routed to Unit 2 or Unit 3 outfall. The NIA YDS design includes new pumps (typical flows approximately 4000 gpm with pump P-1060 or 2300 gpm with pump P-1059), a radmonitor identical to the Unit 1 YDS R-2101, and new discharge piping and valves. The operation of the NIA YDS is controlled by Unit 2 Operations. The two new pumps are rated at different flow rates and are prevented from operating simultaneously by controlling circuitry. The radiation monitor instrument reading is shown on the Unit 2 Plant Computer System (PCS), a site-wide network. The auto termination function of the radiation monitor is not affected by the PCS and is controlled by the monitor alone. The control room alarm feature is through the PCS with the signal originating at the monitor. Should the PCS become inoperable, the control room alarm will be lost and appropriate compensatory actions will be performed. Additional system status shown on PCS includes: sump level, pump on/off status, flow rates, radiation monitor reading, and total volume pumped. The existing Unit 1 ODCM sampling requirements remain unchanged in the Unit 2/3 ODCM. This change involves no reduction in regulatory control as sampling requirements in effect for the Unit 1 YDS are in the Unit 2/3 ODCM and now pertain to the NIA YDS.

In addition to the NIA YDS addition, there is also the potential for Unit 1 wastewater to be transferred to the Unit 2/3 radwaste system for processing and release. This would generally occur only if the water could not be treated to below 2E-5 uCi/ml using a temporary processing system. If the wastewater can be processed to below 2E-5 uCi/ml, the water could then be released to the Unit 2 or 3 outfall via the YDS. As another possibility, the wastewater can be shipped to an offsite vendor for treatment and disposal at an appropriately licensed facility (see AR 060102024).

This new design does not introduce a new source of radioactivity for the site. The ongoing demolition of Unit 1 systems, structures and components continues to reduce and remove possible source terms. The new YDS will be controlled under the Effluent Program and be discharged into the Unit 2 or 3 outfall each of which has a significantly higher dilution flow rate. Given the higher release flow rates from this new system, any trace amounts of activity released via the new NIA YDS will be more diluted than the previous Unit 1 releases resulting in a lower dose to the public.

NUREG-0133, NUREG-0472, Rev.3 Draft 7, and NUREG-1301 provide licensees with acceptable means to implement the regulatory requirements in 10 CFR 20 and 10 CFR 50 for control of radioactive effluents. All Part 50 licensees regardless of operating status are subject to those requirements unless the NRC has granted them an explicit waiver.

As discussed in the description above, the North Industrial Area YDS system will be released through either the Unit 2 or 3 outfall. The primary purpose of the YDS is now to collect rainwater from the North Industrial Area (formerly Unit 1) and release it through the Unit 2 or Unit 3 outfall.

This change reflects the physical re-routing of the YDS system. Regulatory approval for this change has been received in PCN 560 in the letter from N. Kalyanam to R. Rosenblum "San Onofre Nuclear Generating Station, Units 2 and 3 - Issuance of Amendments Re: Revision of Facility Operating License Condition 2.B(6) Special Nuclear Materials (TAC Nos. MC7777 and MC7778), dated February 28, 2006. SCE continues to meet the regulatory requirements, including those described in NUREG-0133, NUREG-0472, Rev.3 Draft 7, and NUREG-1301, through the Unit 2/3 ODCM and the effluent control program. All curies and dose released from the YDS are now included in the Unit 2/3 totals since the release is via Unit 2 or 3 outfall. The 10CFR50 App I dose limits for Unit 2/3 have not been changed. The admin factor for the YDS has been taken from other Unit 2/3 systems so the same control of potential simultaneous releases is in effect.

This change does not adversely impact the interface between any contaminated and non-contaminated systems. The North Industrial Area sewage treatment plant overflow line is routed to the new YDS just as it was in the old design. The overflow line is a gravity drain from the sewage plant to the oily waste section of the YDS and has two check valves to prevent back flow from the YDS into the sewage plant. A new check valve was installed at the YDS; this valve will be checked periodically per AR 061201195 to ensure functionality. Further, the sewage plant is at a higher elevation than is the YDS connection to this overflow that will reduce the challenge to the check valves.

RG 1.21 reiterates that licensees must comply with the requirements in 10 CFR 20.106 and 10 CFR 50 Appendix A, General Design Criteria 60 and 64. The YDS system is being routed to Unit 2 or 3 as part of the decommissioning effort. The Unit 1 outfall is to be abandoned and therefore all sources of water into the outfall must be isolated. SCE continues to meet the regulatory requirements through the Unit 1 and Unit 2/3 ODCMs and the effluent control program. The new NIA YDS has the same mode of release termination as did the Unit 1 YDS. Upon alarming, the radiation monitor terminates the release by securing the pumps. This methodology is considered equivalent to closure of the discharge valve. The discharge piping is an up-hill non-siphon arrangement and the securing of the pumps provides automatic termination of the release should the radiation monitor alarm.

PCN 560 was approved by the NRC, on February 28, 2006, to allow for the transfer of the North Industrial Area YDS to either Unit 2 or Unit 3 for release. The NRC also approved the transfer of Unit 1 generated wastewater to the Unit 2/3 radwaste system for processing and release as necessary. The requirements for continuous monitoring and periodic and compensatory sampling and analysis of the yard drain sump are maintained as was previously described in the Unit 1 ODCM. Effectively, with these changes to the ODCMs, there is now a site-wide administrative factor for all liquid radioactive release points to ensure that the limits of 10CFR20 App B are not exceeded, and the existing Unit 2/3 10CFR50 App I dose limits will accommodate U1 releases. There will be no reduction in the margin of safety.

SECTION K. MISCELLANEOUS

- Broken Pressure Gauge at Unit 2 FFCPD

On 8/29/06, during the recirculation of the Unit 2 FFCPD HUT for release, an instrument line to a pressure gauge separated and an estimated volume of 78 gallons spilled in the area which was then released via the Unit 2/3 outfall as an unplanned, unmonitored release. The water flowed into a nearby yard area drain. Analysis of the water indicated 3.6E-6 uCi/ml of tritium. No other isotopes were identified. Any dose received by a member of the public due to this event was minimal and bounded by the subsequent release of the HUT. This event is documented in AR 060801279.

- Incorrect Sample Preparation for the Off-Site Analysis

In May 2006, it was discovered that the off-site liquid and gaseous composite samples were being prepared using an equal aliquot rather than relative proportions. Upon notification, the vendor immediately modified their procedures to use proportional sampling to prepare the composites for analysis. The affected time period was 2000 through 2005. Evaluation of all results for those years showed that the reported totals were conservative or within the error of analysis while still being an insignificant percent of any dose limit. There were no dose consequences to a member of the public as a result of this event which is documented in AR 060901296.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2006)

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

EFFLUENT RADIATION MONITORS OUT OF SERVICE GREATER THAN 30 DAYS

January 1, 2006 - December 31, 2006

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, as high flow values are not sensed. Flow monitor works properly during normal operations. The monitor is isokinetic during the vacuum pump operation due to the substitute flow value that is automatically inserted whenever the vacuum pump is running. The issue is summarized and evaluated for corrective work in AR 060900207-4.
2RT-7817 BPS/FFCPD Discharge Monitor	01/20/06 - 05/04/06	Electrical outage and inoperable flow transmitter	Following an electrical outage on the common power supply, the root valves to the flow meter were blocked due to the accumulation of debris. During the investigation, the age and condition of the system components warranted replacing the sensing lines prior to returning the flow meter to service. This event is documented in AR 060300157 and 060201216.
2RT-7821 Turbine Plant Sump Monitor	01/13/06 - 04/02/06 06/11/06 - 08/30/06	Monitor was removed from service to support engineering investigation of a system pipe leak Monitor was removed from service to support replacing Oily Waste Sump pumps, 2MP097 and 2MP098.	System required investigation and piping replacement to resolve pipe leakage. During this time period Unit 2 TPS was routed to Unit 3 TPS. This event is documented in WAR 2-R4ML338. Work on unrelated downstream system forced TPS outage. During this time period Unit 2 TPS was routed to Unit 3 TPS. This event is documented in WAR 2-0600959.
2RT-7828 Containment Purge Monitor	01/24/06 - 03/02/06	Monitor unavailable due to electrical outage	An extensive electrical system outage during Unit 2 refueling outage caused unavailability of radmonitor. 2RT-7865 used for containment purges. This event is documented EDMR E2-06-0052.

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, as high flow values are not sensed. Flow monitor works properly during normal operations. The monitor is isokinetic during the vacuum pump operation due to the substitute flow value that is automatically inserted whenever the vacuum pump is running. The issue is summarized and evaluated for corrective work in AR 060900207-4.

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

- Gaseous releases totaled 2.08E+2 curies of which noble gases were 1.67E+2 curies, iodines were 4.15E-3 curies, particulates were 3.48E-3 curies, and tritium was 4.06E+1 curies.

- The radiation doses from gaseous releases were: (a) gamma air dose: 7.35E-2 mrad at the site boundary, (b) beta air dose: 1.19E-1 mrad at the site boundary, (c) organ dose: 1.26E-2 mrem at the nearest receptor.

- Liquid releases totaled 8.49E+2 curies of which particulates and iodines were 3.89E-2 curies, tritium was 8.49E+2 curies, and noble gases were 3.92E-1 curies.

- The radiation doses from liquid releases were: (a) total body: 2.17E-3 mrem, (b) limiting organ: 7.84E-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 (2006)

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	N/A	N/A
	Ci	N/A	
c. Irradiated components	m^3	N/A	N/A
	Ci	N/A	
d. Other (filters)	m^3	N/A	N/A
	Ci	N/A	

N/A No shipment made.

2. Estimate of major nuclide composition (by type of waste)		
a. not applicable	%	N/A
b. not applicable	%	N/A
c. not applicable	%	N/A
d. not applicable	%	N/A

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
None	No shipments were made	N/A

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

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

None.

REFERENCES:

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

2. Units 2 and 3 License Controlled Specifications, section 5.0.103.2.2.

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	6.01E-1
b. Percent ODCM Specification Limit	%	2.40E+0
2. Limiting Organ		
a. Organ Dose (GI-LLI)	mrem	2.05E-2
b. Percent ODCM Specification Limit	%	8.22E-2
3. Thyroid		
a. Thyroid Dose	mrem	1.41E-2
b. Percent ODCM Specification Limit	%	1.88E-2

COMMON

Onsite Groundwater Samples
January 1, 2006 - December 31, 2006

This section provides results of on-site samples of groundwater in accordance with Action 2.1 of the voluntary Nuclear Energy Institute (NEI) Groundwater Protection Initiative. The sample locations and the frequency of sampling are likely to change as the Groundwater Protection Initiative is implemented. For those few sample data that are not <LLD, the levels are near the analytical sensitivity for the laboratory techniques. They do not indicate that there has been an inadvertent release of radioactive material beyond the site boundaries.

Sample Date	Location	Tritium Activity, uCi/ml	Gamma Activity, (uCi/ml)
08/07/2006	CTMT DOME	3.30E-4	7.96E-8
08/09/2006	CTMT DOME	4.98E-5	<LLD
08/14/2006	CTMT DOME	7.51E-5	<LLD
08/18/2006	CTMT DOME	6.01E-5	<LLD
08/23/2006	CTMT DOME	2.92E-5	<LLD
10/11/2006	U1 DW 5	2.58E-5	<LLD
	U1 DW 4	<LLD	<LLD
	U1 DW 8	3.77E-6	<LLD
	U1 DW 1	<LLD	<LLD
	U1 DW 2	<LLD	<LLD
	U1 DW 3	<LLD	<LLD
10/13/2006	Composite	2.96E-6	<LLD
10/14/2006	Composite	3.60E-6	<LLD
	U1 DW 5	4.57E-6	<LLD
	U1 DW 6	5.70E-6	<LLD
	U1 DW 4	3.50E-6	<LLD
	Composite	6.77E-6	<LLD
10/15/2006	Composite	<LLD	<LLD
	U1 DW 4	3.54E-6	<LLD
	U1 DW 5	5.90E-6	<LLD
	U1 DW 6	7.86E-6	<LLD
	U1 DW 8	5.82E-6	<LLD
	Composite	7.49E-6	<LLD
	Composite	3.98E-6	<LLD
10/16/2006	Composite	7.01E-6	<LLD
	Composite	4.79E-6	<LLD
	U1 DW 4	<LLD	<LLD
	U1 DW 8	<LLD	<LLD
	U1 DW 6	4.24E-6	<LLD
	U1 DW 5	<LLD	<LLD
	U1 DW 8	6.02E-6	<LLD
	Composite	<LLD	<LLD

COMMON

Onsite Groundwater Samples
January 1, 2006 - December 31, 2006

Sample Date	Location	Tritium Activity, uCi/ml	Gamma Activity, (uCi/ml)
10/17/2006	Composite	<LLD	<LLD
	Composite	<LLD	<LLD
	U1 DW 4	<LLD	<LLD
	U1 DW 5	<LLD	<LLD
	U1 DW 6	<LLD	<LLD
	U1 DW 8	<LLD	<LLD
	Composite	2.98E-6	<LLD
	Composite	<LLD	<LLD
10/18/2006	Composite	<LLD	<LLD
	U1 DW 4	<LLD	<LLD
	U1 DW 5	<LLD	<LLD
	U1 DW 6	<LLD	<LLD
	U1 DW 8	3.42E-6	<LLD
	NIA South DW	<LLD	<LLD
	Composite	<LLD	<LLD
	Composite	<LLD	<LLD
10/19/2006	Composite	<LLD	<LLD
	U1 DW 4	<LLD	<LLD
	U1 DW 6	<LLD	<LLD
	U1 DW 8	3.63E-6	<LLD
	U1 DW 5	3.23E-6	<LLD
	Composite	<LLD	1.05E-7
	Composite	<LLD	7.38E-8
10/20/2006	Composite	<LLD	5.88E-8
	U1 DW 4	<LLD	<LLD
	U1 DW 5	<LLD	<LLD
	U1 DW 6	<LLD	<LLD
	U1 DW 8	<LLD	<LLD
	Composite	<LLD	9.97E-8
	Composite	<LLD	7.38E-8
10/21/2006	Composite	<LLD	<LLD
	U1 DW 4	<LLD	<LLD
	U1 DW 5	<LLD	<LLD
	U1 DW 6	<LLD	<LLD
	U1 DW 8	<LLD	<LLD
	Composite	<LLD	5.07E-8
	Composite	<LLD	<LLD
10/22/2006	Composite	<LLD	<LLD
	Composite	<LLD	<LLD
	Composite	<LLD	<LLD
	U1 DW 4	<LLD	<LLD
	U1 DW 5	<LLD	<LLD
	U1 DW 6	<LLD	<LLD
	U1 DW 8	<LLD	<LLD

COMMON

Onsite Groundwater Samples
January 1, 2006 - December 31, 2006

Sample Date	Location	Tritium Activity, uCi/ml	Gamma Activity, (uCi/ml)
10/23/2006	Composite	<LLD	<LLD
	U1 DW 5	<LLD	<LLD
	U1 DW 6	<LLD	<LLD
	U1 DW 8	5.40E-6	<LLD
	U1 DW 4	<LLD	<LLD
	Composite	<LLD	<LLD
	Composite	<LLD	<LLD
10/24/2006	U1 DW 4	<LLD	<LLD
	U1 DW 5	<LLD	<LLD
	U1 DW 6	<LLD	<LLD
	U1 DW 8	<LLD	<LLD
	Composite	<LLD	<LLD
10/25/2006	Composite	<LLD	<LLD
	U1 DW 4	<LLD	<LLD
	U1 DW 5	<LLD	<LLD
	U1 DW 6	<LLD	<LLD
	U1 DW 8	<LLD	<LLD
	Composite	<LLD	<LLD
10/26/2006	Composite	<LLD	<LLD
	U1 DW 4	<LLD	<LLD
	U1 DW 5	<LLD	<LLD
	U1 DW 6	<LLD	<LLD
10/27/2006	Composite	<LLD	<LLD
	U1 DW 4	<LLD	<LLD
	U1 DW 5	<LLD	<LLD
	U1 DW 6	<LLD	<LLD
10/28/2006	Composite	<LLD	<LLD
	U1 DW 4	<LLD	<LLD
	U1 DW 5	<LLD	<LLD
	U1 DW 6	<LLD	<LLD
	U1 DW 8	<LLD	<LLD
10/29/2006	U1 DW 4	<LLD	<LLD
	U1 DW 5	<LLD	<LLD
	U1 DW 6	<LLD	<LLD
	U1 DW 8	<LLD	<LLD
	Composite	<LLD	<LLD
10/30/2006	Composite	<LLD	<LLD
	U1 DW 1	<LLD	<LLD
	U1 DW 2	<LLD	<LLD
	U1 DW 3	<LLD	<LLD
	U1 DW 4	<LLD	<LLD
	U1 DW 6	<LLD	<LLD
	U1 DW 7	<LLD	<LLD
	U1 DW 8	<LLD	<LLD
	U1 DW 8	<LLD	<LLD

COMMON

Onsite Groundwater Samples
January 1, 2006 - December 31, 2006

Sample Date	Location	Tritium Activity, uCi/ml	Gamma Activity, (uCi/ml)
10/31/2006	Composite	<LLD	<LLD
	U1 DW 4	<LLD	<LLD
	U1 DW 5	<LLD	<LLD
	U1 DW 6	<LLD	<LLD
	U1 DW 8	<LLD	<LLD
11/01/2006	Composite	<LLD	<LLD
	U1 DW 4	<LLD	<LLD
	U1 DW 5	<LLD	<LLD
	U1 DW 6	<LLD	<LLD
	U1 DW 8	<LLD	<LLD
11/02/2006	Composite	<LLD	<LLD
	U1 DW 4	<LLD	<LLD
	U1 DW 5	<LLD	<LLD
	U1 DW 6	<LLD	<LLD
	U1 DW 8	<LLD	<LLD
11/04/2006	Composite	<LLD	<LLD
	U1 DW 4	<LLD	<LLD
	U1 DW 5	<LLD	<LLD
	U1 DW 6	<LLD	<LLD
	U1 DW 8	<LLD	<LLD
11/05/06	Composite	<LLD	<LLD
	U1 DW 4	<LLD	<LLD
	U1 DW 5	<LLD	<LLD
	U1 DW 6	<LLD	<LLD
	U1 DW 8	<LLD	<LLD
11/06/2006	Composite	<LLD	<LLD
	U1 DW 4	<LLD	<LLD
	U1 DW 5	<LLD	<LLD
	U1 DW 6	<LLD	<LLD
	U1 DW 8	<LLD	<LLD
11/13/2006	U1 DW 1	<LLD	<LLD
	U1 DW 2	<LLD	<LLD
	U1 DW 3	<LLD	<LLD
	U1 DW 4	<LLD	<LLD
	U1 DW 5	<LLD	<LLD
	U1 DW 6	<LLD	<LLD
	U1 DW 7	<LLD	<LLD
	U1 DW 8	<LLD	<LLD
11/20/2006	U1 DW 1	<LLD	<LLD
	U1 DW 2	<LLD	<LLD
	U1 DW 3	<LLD	<LLD
	U1 DW 4	<LLD	<LLD
	U1 DW 5	<LLD	<LLD
	U1 DW 6	<LLD	<LLD
	U1 DW 7	<LLD	<LLD
	U1 DW 8	<LLD	<LLD

COMMON

Sample Date	Location	Tritium Activity, uCi/ml	Gamma Activity, (uCi/ml)
11/27/2006	U1 DW 1	<LLD	<LLD
	U1 DW 2	<LLD	<LLD
	U1 DW 3	<LLD	<LLD
	U1 DW 4	<LLD	<LLD
	U1 DW 5	<LLD	<LLD
	U1 DW 6	<LLD	<LLD
	U1 DW 7	<LLD	<LLD
	U1 DW 8	<LLD	<LLD
12/04/2006	U1 DW 1	<LLD	<LLD
	U1 DW 2	<LLD	<LLD
	U1 DW 3	<LLD	<LLD
	U1 DW 4	<LLD	<LLD
	U1 DW 5	<LLD	<LLD
	U1 DW 6	<LLD	<LLD
	U1 DW 7	<LLD	<LLD
	U1 DW 8	<LLD	<LLD
12/11/2006	U1 DW 1	<LLD	<LLD
	U1 DW 2	<LLD	<LLD
	U1 DW 3	<LLD	<LLD
	U1 DW 4	<LLD	<LLD
	U1 DW 5	<LLD	<LLD
	U1 DW 6	<LLD	<LLD
	U1 DW 7	<LLD	<LLD
	U1 DW 8	<LLD	<LLD
12/18/2006	U1 DW 1	<LLD	<LLD
	U1 DW 2	<LLD	<LLD
	U1 DW 3	<LLD	<LLD
	U1 DW 4	<LLD	<LLD
	U1 DW 5	<LLD	<LLD
	U1 DW 6	<LLD	<LLD
	U1 DW 7	<LLD	<LLD
	U1 DW 8	<LLD	<LLD
12/19/2006	U1 DW 5	<LLD	<LLD
	U1 DW 6	<LLD	<LLD
12/26/2006	U1 DW 1	<LLD	<LLD
	U1 DW 2	<LLD	<LLD
	U1 DW 3	<LLD	<LLD
	U1 DW 4	<LLD	<LLD
	U1 DW 5	<LLD	<LLD
	U1 DW 6	<LLD	<LLD
	U1 DW 7	<LLD	<LLD
	U1 DW 8	<LLD	<LLD

DW = Dewatering Wells to support U1 decommissioning.
Composite = Weekly composite of the dewatering wells.
CTMT DOME = In the containment sphere, holes were drilled and tapped in order to remove the groundwater beneath the U1 containment sphere.
LLD = H-3: 1.0 E-5 uCi/ml, Cs-137: 5.0 E-7 uCi/ml

COMMON CONCLUSIONS

- Gaseous releases from S.O.N.G.S. 1, 2 and 3 totaled 2.09E+2 curies of which noble gases were 1.67E+2 curies, iodines were 4.15E-3 curies, particulates were 3.48E-3 curies, and tritium was 4.15E+1 curies.

- Liquid releases from S.O.N.G.S. 1, 2 and 3 totaled 8.49E+2 curies of which particulates and iodines were 3.89E-2 curies, tritium was 8.49E+2 curies, and noble gases were 3.92E-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 348 radwaste shipments to EnergySolutions, UT and 1 shipment to Barnwell, SC. Total volume was 9.64E+3 cubic meters containing 4.51E+2 curies of radioactivity.

- Meteorological conditions during the year were typical for S.O.N.G.S. Meteorological dispersion was good 39% of the time, fair 33% of the time and poor 28% of the time.

- Groundwater initiative releases contained 1.22E-1 curies of tritium and 1.51E-6 curies of particulates. Total volume was 2.62E+8 gallons which consisted of dewatering at Unit 1. All these releases were through an ODCM credited release point and the dose impact was insignificant. All these groundwater initiative totals are reported elsewhere in this document.

- 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.

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, 2006 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, 2006. 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 06010100-06033123
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	1	0	0	0	0	0	1
NNE	0	0	0	1	0	0	0	1	0	0	0	0	2
NE	0	0	0	0	0	0	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0	0	0	0	0	0	0
E	0	0	0	0	1	0	0	0	0	0	0	0	1
ESE	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	0	0	0	1	0	0	2	2	0	0	0	0	5
SSE	0	0	0	0	1	9	9	4	2	0	0	0	25
S	0	0	0	3	7	16	13	6	1	0	0	0	46
SSW	0	0	0	1	9	18	11	0	0	0	0	0	39
SW	0	1	0	3	14	28	19	2	0	0	0	0	67
WSW	0	0	0	5	16	29	24	2	4	0	0	0	80
W	0	1	1	0	3	47	72	2	0	0	0	0	126
WNW	0	0	0	1	5	20	68	12	0	0	0	0	106
NW	0	0	0	1	2	4	6	1	0	0	0	0	14
NNW	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	0	2	1	16	58	171	225	32	7	0	0	0	512

NUMBER OF VALID HOURS	512	NUMBER OF CALMS	0
NUMBER OF INVALID HOURS	0	TOTAL HOURS FOR THE PERIOD	512

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	2	0	0	0	0	3
NE	0	0	0	0	0	0	1	0	0	0	0	0	1
ENE	0	0	0	0	0	0	1	0	0	0	0	0	1
E	0	1	0	0	0	1	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	0	0	0	0	1	0	0	0	0	1
SSE	0	0	0	0	0	5	6	4	0	0	0	0	15
S	0	0	0	2	0	2	2	1	2	0	0	0	9
SSW	0	0	0	0	1	3	2	1	0	0	0	0	7
SW	0	0	0	0	1	4	2	1	0	0	0	0	8
WSW	0	0	0	0	1	2	0	1	1	0	0	0	5
W	0	0	0	0	3	3	1	2	0	0	0	0	9
WNW	0	0	0	1	0	3	1	0	0	0	0	0	5
NW	0	0	0	0	1	2	4	2	0	0	0	0	9
NNW	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	0	1	0	4	7	25	21	15	3	0	0	0	76

NUMBER OF VALID HOURS	76	NUMBER OF CALMS	0
NUMBER OF INVALID HOURS	0	TOTAL HOURS FOR THE PERIOD	76

METEOROLOGY
January - March
Table 4A

SITE: SAN ONOFRE
PERIOD OF RECORD 06010100-06033123
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	0	2	0	0	0	0	0	0	2
NE	0	0	0	0	0	0	0	0	0	0	0	0	0
ENE	0	0	0	0	1	0	0	0	0	0	0	0	1
E	0	0	0	0	0	1	0	0	0	0	0	0	1
ESE	0	0	0	0	0	0	1	1	0	0	0	0	2
SE	0	0	0	0	0	1	2	0	0	0	0	0	3
SSE	0	0	0	0	3	2	1	3	2	0	0	0	11
S	0	0	0	2	0	3	1	1	0	0	0	0	7
SSW	0	0	0	0	2	2	3	0	0	0	0	0	7
SW	0	0	0	1	2	1	5	0	0	0	0	0	9
WSW	0	0	0	1	6	3	0	0	0	0	0	0	10
W	0	0	0	1	2	2	0	0	1	0	0	0	6
WNW	0	0	0	0	0	3	1	1	0	0	0	0	5
NW	0	0	0	0	0	3	5	1	0	0	0	0	9
NNW	0	0	1	0	2	0	0	0	0	0	0	0	3
TOTALS	0	0	1	5	18	23	19	7	3	0	0	0	76

NUMBER OF VALID HOURS 76
NUMBER OF INVALID HOURS 0
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 76

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	1	3	4	6	3	0	0	0	0	0	17
NNE	0	0	1	2	6	15	6	1	0	0	0	0	31
NE	0	0	0	2	1	3	5	2	0	0	0	0	13
ENE	0	0	0	1	0	0	0	0	0	0	0	0	1
E	0	0	0	2	0	2	1	0	0	0	0	0	5
ESE	0	0	0	1	3	3	2	0	0	0	0	0	9
SE	0	0	0	0	1	12	24	12	13	0	0	0	62
SSE	0	0	0	2	0	13	18	5	4	1	2	0	45
S	0	0	0	0	6	3	7	10	3	0	1	0	30
SSW	0	0	0	4	2	2	5	2	0	0	1	0	16
SW	0	0	0	5	4	3	4	4	2	1	0	0	23
WSW	0	0	1	2	5	2	5	3	4	0	0	0	22
W	0	0	1	7	2	5	5	14	11	0	0	0	45
WNW	0	0	0	2	5	8	14	3	2	0	0	0	34
NW	0	0	1	1	4	9	8	5	1	0	0	0	29
NNW	0	0	0	4	4	12	1	0	0	0	0	0	21
TOTALS	0	0	5	38	47	98	108	61	40	2	4	0	403

NUMBER OF VALID HOURS 403
NUMBER OF INVALID HOURS 0
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 403

METEOROLOGY
January - March
Table 4A

SITE: SAN ONOFRE
PERIOD OF RECORD 06010100-06033123
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	1	13	10	5	0	0	0	0	0	29
NNE	0	1	0	10	9	28	27	1	0	0	0	0	76
NE	0	0	0	2	5	2	3	2	1	0	0	0	15
ENE	0	0	0	2	4	2	2	0	0	0	0	0	10
E	0	0	1	5	2	4	2	0	0	0	0	0	14
ESE	0	0	0	0	2	2	3	0	0	0	0	0	7
SE	0	0	1	0	1	3	2	1	1	0	0	0	9
SSE	0	0	0	1	3	3	5	0	1	0	0	0	13
S	0	0	0	1	1	0	1	2	0	0	0	0	5
SSW	0	0	0	0	2	0	1	0	0	0	0	0	3
SW	0	0	0	2	1	2	0	0	0	0	0	0	5
WSW	0	1	1	2	1	1	0	1	1	0	0	0	8
W	0	1	0	1	1	3	2	0	0	0	0	0	8
WNW	0	1	0	3	6	3	4	0	2	0	0	0	19
NW	0	0	1	2	2	3	4	0	0	0	0	0	12
NNW	0	0	0	3	2	6	5	0	0	0	0	0	16
TOTALS	0	4	4	35	55	72	66	7	6	0	0	0	249

NUMBER OF VALID HOURS	249	NUMBER OF CALMS	0
NUMBER OF INVALID HOURS	0	TOTAL HOURS FOR THE PERIOD	249

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	0	4	11	2	0	0	0	0	0	17
NNE	0	1	1	7	43	56	25	3	0	0	0	0	136
NE	0	0	0	6	7	11	7	1	1	0	0	0	33
ENE	0	0	2	3	4	2	0	0	0	0	0	0	11
E	0	0	1	5	3	1	0	0	0	0	0	0	10
ESE	0	0	0	0	2	0	0	0	0	0	0	0	2
SE	0	1	1	2	0	1	0	0	0	0	0	0	5
SSE	0	0	0	3	2	1	0	0	0	0	0	0	6
S	0	0	1	2	1	1	0	0	0	0	0	0	5
SSW	0	0	1	2	1	0	0	0	0	0	0	0	4
SW	0	0	1	2	2	0	1	0	0	0	0	0	6
WSW	0	0	0	2	0	0	1	0	0	0	0	0	3
W	0	0	0	2	4	0	0	0	0	0	0	0	6
WNW	0	0	1	0	8	7	0	0	0	0	0	0	16
NW	0	0	1	1	4	2	0	0	0	0	0	0	8
NNW	0	0	1	2	2	4	0	0	0	0	0	0	9
TOTALS	0	2	11	39	87	97	36	4	1	0	0	0	277

NUMBER OF VALID HOURS	277	NUMBER OF CALMS	0
NUMBER OF INVALID HOURS	0	TOTAL HOURS FOR THE PERIOD	277

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2006)

METEOROLOGY
January - March
Table 4A

SITE: SAN ONOFRE
PERIOD OF RECORD 06010100-06033123
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	4	6	3	0	0	0	0	0	16
NNE	0	0	1	8	16	196	187	9	0	0	0	0	417
NE	0	0	0	7	15	13	7	1	0	0	0	0	43
ENE	0	0	1	7	6	3	1	0	0	0	0	0	18
E	1	0	1	3	4	3	1	0	0	0	0	0	13
ESE	0	0	0	4	0	1	0	0	0	0	0	0	5
SE	0	0	0	1	0	1	0	0	0	0	0	0	2
SSE	0	0	1	4	0	4	0	0	0	0	0	0	9
S	0	0	0	3	1	1	0	1	0	0	0	0	6
SSW	0	0	0	1	0	1	0	0	0	0	0	0	2
SW	0	0	0	2	0	1	1	0	0	0	0	0	4
WSW	0	0	1	0	1	0	0	0	0	0	0	0	2
W	0	0	1	1	3	1	1	0	0	0	0	0	7
WNW	0	0	1	1	2	3	2	0	0	0	0	0	9
NW	0	0	0	1	1	2	2	0	0	0	0	0	6
NNW	0	0	0	0	1	6	1	0	0	0	0	0	8
TOTALS	1	0	8	45	54	242	206	11	0	0	0	0	567

NUMBER OF VALID HOURS	567	NUMBER OF CALMS	0
NUMBER OF INVALID HOURS	0	TOTAL HOURS FOR THE PERIOD	567

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	0	2	6	25	33	14	0	0	0	0	0	80
NNE	0	2	3	28	74	297	246	17	0	0	0	0	667
NE	0	0	0	17	28	29	23	6	2	0	0	0	105
ENE	0	0	3	13	15	7	4	0	0	0	0	0	42
E	1	1	3	15	10	12	4	0	0	0	0	0	46
ESE	0	0	0	6	7	6	6	1	0	0	0	0	26
SE	0	1	2	4	2	18	30	16	14	0	0	0	87
SSE	0	0	1	10	9	37	39	16	9	1	2	0	124
S	0	0	1	13	16	26	24	21	6	0	1	0	108
SSW	0	0	1	8	17	26	22	3	0	0	1	0	78
SW	0	1	1	15	24	39	32	7	2	1	0	0	122
WSW	0	1	3	12	30	37	30	7	10	0	0	0	130
W	0	2	3	12	18	61	81	18	12	0	0	0	207
WNW	0	1	2	8	26	47	90	16	4	0	0	0	194
NW	0	0	3	6	14	25	29	9	1	0	0	0	87
NNW	0	0	2	9	11	28	7	0	0	0	0	0	57
TOTALS	1	9	30	182	326	728	681	137	60	2	4	0	2160

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

METEOROLOGY
April - June
TABLE 4A

SITE: SAN ONOFRE
PERIOD OF RECORD 06040100-06063023
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	1	0	0	1	0	0	0	0	0	0	2
NNE	0	0	0	1	1	2	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	1	0	1	0	0	0	0	0	2
SSE	0	0	0	1	2	0	7	1	1	0	0	0	12
S	0	0	0	3	7	15	28	6	0	0	0	0	59
SSW	0	0	0	2	6	17	33	0	0	0	0	0	58
SW	0	0	0	6	9	43	43	0	0	0	0	0	101
WSW	0	0	0	4	20	53	66	1	4	0	0	0	148
W	0	0	0	2	10	62	101	2	1	0	0	0	178
WNW	0	0	0	2	6	36	83	7	2	0	0	0	136
NW	0	0	0	0	0	5	5	4	3	0	0	0	17
NNW	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	0	0	1	21	62	234	367	21	11	0	0	0	717

NUMBER OF VALID HOURS 717
NUMBER OF INVALID HOURS 0
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 717

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	1	1	0	0	0	0	0	0	0	2
NNE	0	0	0	1	0	0	0	0	0	0	0	0	1
NE	0	0	0	1	0	0	0	0	0	0	0	0	1
ENE	0	0	0	1	0	0	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	1	1	0	0	0	0	0	0	0	2
SE	0	0	0	0	0	0	1	1	0	0	0	0	2
SSE	0	0	1	2	0	7	6	8	2	0	0	0	26
S	0	0	0	0	3	6	3	4	0	0	0	0	16
SSW	0	0	0	4	1	4	11	0	1	0	0	0	21
SW	0	0	0	2	4	12	8	0	0	0	0	0	26
WSW	0	0	0	2	3	4	4	0	1	0	0	0	14
W	0	0	0	1	3	4	1	0	2	0	0	0	11
WNW	0	0	1	2	2	3	1	0	0	0	0	0	9
NW	0	0	0	0	1	4	2	1	0	0	0	0	8
NNW	0	0	0	0	1	0	0	0	0	0	0	0	1
TOTALS	0	0	2	18	20	44	37	14	6	0	0	0	141

NUMBER OF VALID HOURS 141
NUMBER OF INVALID HOURS 0
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 141

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2006)

METEOROLOGY
April - June
TABLE 4A

SITE: SAN ONOFRE
PERIOD OF RECORD 06040100-06063023
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	1	2	0	0	0	0	0	0	0	3
NNE	0	0	0	1	1	5	0	0	0	0	0	0	7
NE	0	0	0	0	2	1	0	0	0	0	0	0	3
ENE	0	0	0	1	0	0	0	0	0	0	0	0	1
E	0	0	0	0	0	1	0	0	0	0	0	0	1
ESE	0	0	0	0	1	0	0	0	0	0	0	0	1
SE	0	0	0	1	1	10	1	0	0	0	0	0	13
SSE	0	1	0	2	6	14	11	7	1	0	0	0	42
S	0	0	1	5	4	8	11	3	0	0	0	0	32
SSW	0	1	1	3	7	8	10	2	1	0	0	0	33
SW	0	0	0	3	4	9	8	1	0	0	0	0	25
WSW	0	0	0	2	7	2	2	0	0	0	0	0	13
W	0	0	0	4	1	2	0	0	0	0	0	0	7
WNW	0	1	0	3	4	4	1	0	0	0	0	0	13
NW	0	0	0	2	6	9	4	1	0	0	0	0	22
NNW	0	0	0	0	2	2	0	0	0	0	0	0	4
TOTALS	0	3	2	28	48	75	48	14	2	0	0	0	220

NUMBER OF VALID HOURS 220
NUMBER OF INVALID HOURS 0
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 220

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	1	10	4	11	0	0	0	0	0	0	26
NNE	0	0	3	8	5	6	0	0	0	0	0	0	22
NE	0	0	1	2	10	3	0	0	0	0	0	0	16
ENE	0	1	2	0	4	5	0	0	0	0	0	0	12
E	0	0	0	2	3	1	0	0	0	0	0	0	6
ESE	0	2	0	2	5	5	2	0	0	0	0	0	16
SE	0	0	1	6	10	24	26	5	0	0	0	0	72
SSE	0	0	0	4	13	27	20	14	2	0	0	0	80
S	0	1	0	5	15	14	11	3	6	0	0	0	55
SSW	0	0	0	11	8	16	11	1	1	0	0	0	48
SW	0	0	2	8	4	12	9	1	2	0	0	0	38
WSW	0	1	2	8	8	10	12	2	2	0	0	0	45
W	0	0	2	6	3	8	5	3	0	0	0	0	27
WNW	0	1	2	7	6	4	4	6	0	0	0	0	30
NW	0	0	0	8	6	9	7	0	0	0	0	0	30
NNW	0	0	4	7	7	5	1	2	0	0	0	0	26
TOTALS	0	6	20	94	111	160	108	37	13	0	0	0	549

NUMBER OF VALID HOURS 549
NUMBER OF INVALID HOURS 0
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 549

METEOROLOGY
April - June
TABLE 4A

SITE: SAN ONOFRE
PERIOD OF RECORD 06040100-06063023
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	13	4	9	3	0	1	0	0	0	31
NNE	0	0	2	9	23	16	4	0	0	0	0	0	54
NE	0	0	3	3	4	1	0	0	0	0	0	0	11
ENE	0	0	0	5	3	1	0	0	0	0	0	0	9
E	0	1	0	1	4	2	0	0	0	0	0	0	8
ESE	0	0	0	0	1	0	0	0	0	0	0	0	1
SE	0	0	1	0	1	1	4	1	0	0	0	0	8
SSE	0	0	1	4	2	5	8	3	0	0	0	0	23
S	0	0	0	1	0	3	2	0	0	0	0	0	6
SSW	0	1	1	3	1	1	0	0	0	0	0	0	7
SW	0	3	1	4	2	0	1	0	0	0	0	0	11
WSW	0	0	0	1	1	0	0	0	0	0	0	0	2
W	0	0	3	3	4	5	1	0	0	0	0	0	16
WNW	0	0	1	0	1	1	3	0	0	0	0	0	6
NW	0	0	0	3	1	3	2	0	0	0	0	0	9
NNW	0	0	0	3	3	2	0	0	0	0	0	0	8
TOTALS	0	5	14	53	55	50	28	4	1	0	0	0	210

NUMBER OF VALID HOURS 210
NUMBER OF INVALID HOURS 0
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 210

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	1	3	2	1	0	0	0	0	0	7
NNE	0	0	1	12	49	34	5	0	0	0	0	0	101
NE	0	0	1	6	1	2	0	0	0	0	0	0	10
ENE	0	0	0	1	2	2	0	0	0	0	0	0	5
E	0	0	0	3	0	0	0	0	0	0	0	0	3
ESE	0	0	0	1	1	1	0	0	0	0	0	0	3
SE	0	0	0	1	0	0	0	0	0	0	0	0	1
SSE	0	0	1	3	0	1	2	0	0	0	0	0	7
S	0	1	0	2	1	0	0	0	0	0	0	0	4
SSW	0	0	0	1	0	0	0	0	0	0	0	0	1
SW	0	0	0	1	0	0	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	1	3	2	1	0	0	0	0	0	7
WNW	0	0	0	0	1	2	4	0	0	0	0	0	7
NW	0	0	0	1	1	0	1	0	0	0	0	0	3
NNW	0	0	0	0	0	0	1	0	0	0	0	0	1
TOTALS	0	1	3	34	63	46	15	0	0	0	0	0	162

NUMBER OF VALID HOURS 162
NUMBER OF INVALID HOURS 0
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 162

METEOROLOGY
April - June
TABLE 4A

SITE: SAN ONOFRE
PERIOD OF RECORD 06040100-06063023
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	2	10	86	67	3	0	0	0	0	168
NE	0	0	0	1	1	2	0	0	0	0	0	0	4
ENE	0	0	0	0	0	0	1	0	0	0	0	0	1
E	0	0	0	1	0	1	0	0	0	0	0	0	2
ESE	0	0	0	0	0	1	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	0	0	0	1	0	0	0	0	1
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	0	0	0	0	0	0	0	0
W	0	0	0	0	0	0	1	0	0	0	0	0	1
WNW	0	0	0	0	0	1	0	0	0	0	0	0	1
NW	0	0	0	0	0	0	1	0	0	0	0	0	1
NNW	0	0	0	0	1	0	0	0	0	0	0	0	1
TOTALS	0	0	0	5	12	93	71	4	0	0	0	0	185

NUMBER OF VALID HOURS 185
NUMBER OF INVALID HOURS 0
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 185

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	0	3	26	14	24	5	0	1	0	0	0	73
NNE	0	0	6	34	89	149	76	3	0	0	0	0	357
NE	0	0	5	13	18	9	0	0	0	0	0	0	45
ENE	0	1	2	8	9	8	1	0	0	0	0	0	29
E	0	1	0	7	7	5	0	0	0	0	0	0	20
ESE	0	2	0	4	9	7	2	0	0	0	0	0	24
SE	0	0	2	8	13	36	33	7	0	0	0	0	99
SSE	0	1	3	16	23	54	54	34	6	0	0	0	191
S	0	2	1	16	30	46	55	16	6	0	0	0	172
SSW	0	2	2	25	23	46	65	3	3	0	0	0	169
SW	0	3	3	24	23	76	69	2	2	0	0	0	202
WSW	0	1	2	17	40	69	84	3	7	0	0	0	223
W	0	0	5	17	24	83	110	5	3	0	0	0	247
WNW	0	2	4	14	20	51	96	13	2	0	0	0	202
NW	0	0	0	14	15	30	22	6	3	0	0	0	90
NNW	0	0	4	10	14	9	2	2	0	0	0	0	41
TOTALS	0	15	42	253	371	702	674	94	33	0	0	0	2184

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

METEOROLOGY
July - September
TABLE 4A

SITE: SAN ONOFRE
PERIOD OF RECORD 06070100-06093023
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	1	0	0	0	0	0	0	0	0	1
NE	0	0	0	0	0	0	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0	0	0	0	0	0	0
E	0	0	0	1	1	0	0	0	0	0	0	0	2
ESE	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	0	0	0	1	0	0	0	0	0	0	0	0	1
SSE	0	0	0	1	0	4	10	4	0	0	0	0	19
S	0	0	0	1	2	19	41	6	0	0	0	0	69
SSW	0	0	0	5	8	27	19	0	0	0	0	0	59
SW	0	0	1	1	16	38	33	0	0	0	0	0	89
WSW	1	0	0	2	19	62	44	0	0	0	0	0	128
W	0	0	0	1	21	78	111	0	0	0	0	0	211
WNW	0	0	0	1	6	47	156	11	0	0	0	0	221
NW	1	0	0	1	3	1	13	8	1	0	0	0	28
NNW	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	2	0	1	16	76	277	427	29	1	0	0	0	829

NUMBER OF VALID HOURS 829
NUMBER OF INVALID HOURS 0
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 829

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	1	1	0	0	0	0	0	0	2
NNE	2	0	0	0	0	2	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	0	0	0	0	0	0	0	0
SSE	0	0	1	0	2	5	5	1	0	0	0	0	14
S	0	0	0	1	0	2	3	2	0	0	0	0	8
SSW	0	0	0	1	4	4	0	0	0	0	0	0	9
SW	0	0	0	1	0	2	3	0	0	0	0	0	6
WSW	0	0	0	2	1	2	0	0	0	0	0	0	5
W	0	0	0	3	1	1	3	0	0	0	0	0	8
WNW	0	0	2	1	7	10	3	0	0	0	0	0	23
NW	0	0	0	1	1	3	6	0	0	0	0	0	11
NNW	0	0	1	0	0	0	0	0	0	0	0	0	1
TOTALS	2	0	4	10	17	32	23	3	0	0	0	0	91

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

METEOROLOGY
July - September
TABLE 4A

SITE: SAN ONOFRE
PERIOD OF RECORD 06070100-06093023
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	1	1	0	0	0	0	0	0	0	2
NNE	0	0	0	2	1	3	0	0	0	0	0	0	6
NE	0	0	0	0	1	2	0	0	0	0	0	0	3
ENE	0	0	0	0	1	0	0	0	0	0	0	0	1
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	0	0	0	0	0	1	0	0	0	0	0	0	1
SSE	0	1	0	0	3	0	4	2	0	0	0	0	10
S	0	0	0	0	4	7	4	1	0	0	0	0	16
SSW	0	0	0	5	4	8	2	0	0	0	0	0	19
SW	0	0	0	2	4	10	9	0	0	0	0	0	25
WSW	0	0	0	0	3	4	3	0	0	0	0	0	10
W	0	0	1	0	1	3	5	1	0	0	0	0	11
WNW	0	0	0	0	3	3	2	0	0	0	0	0	8
NW	0	0	0	1	2	12	13	2	0	0	0	0	30
NNW	0	0	0	2	1	0	0	0	0	0	0	0	3
TOTALS	0	1	1	14	29	53	42	6	0	0	0	0	146

NUMBER OF VALID HOURS	146	NUMBER OF CALMS	0
NUMBER OF INVALID HOURS	0	TOTAL HOURS FOR THE PERIOD	146

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	10	12	5	0	0	0	0	0	0	30
NNE	4	0	1	11	11	11	1	0	0	0	0	0	39
NE	0	1	0	2	4	3	0	0	0	0	0	0	10
ENE	0	0	1	7	3	0	0	0	0	0	0	0	11
E	0	0	3	7	7	2	0	0	0	0	0	0	19
ESE	0	0	3	2	3	1	8	0	0	0	0	0	17
SE	0	0	1	4	13	22	23	1	0	0	0	0	64
SSE	0	2	3	10	18	27	42	6	0	0	0	0	108
S	0	0	1	7	10	11	16	0	0	0	0	0	45
SSW	0	0	5	6	13	8	6	0	0	0	0	0	38
SW	0	6	4	6	5	9	3	0	0	0	0	0	33
WSW	1	1	2	7	2	6	6	0	0	0	0	0	25
W	0	1	5	13	8	6	12	1	0	0	0	0	46
WNW	2	0	1	9	7	3	4	3	0	0	0	0	29
NW	0	1	1	12	4	18	5	2	0	0	0	0	43
NNW	0	1	2	10	10	3	2	0	0	0	0	0	28
TOTALS	7	14	35	123	130	135	128	13	0	0	0	0	585

NUMBER OF VALID HOURS	585	NUMBER OF CALMS	0
NUMBER OF INVALID HOURS	0	TOTAL HOURS FOR THE PERIOD	585

METEOROLOGY
July - September
TABLE 4A

SITE: SAN ONOFRE
PERIOD OF RECORD 06070100-06093023
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	2	10	4	1	0	0	0	0	0	18
NNE	5	0	5	18	30	16	1	0	0	0	0	0	75
NE	0	1	3	9	1	1	0	0	0	0	0	0	15
ENE	0	1	1	11	2	1	1	0	0	0	0	0	17
E	1	1	1	5	3	0	0	0	0	0	0	0	11
ESE	0	1	1	3	4	2	0	0	0	0	0	0	11
SE	0	0	1	3	3	3	2	1	0	0	0	0	13
SSE	0	1	2	2	4	4	13	2	0	0	0	0	28
S	0	2	1	2	2	1	0	0	0	0	0	0	8
SSW	0	1	1	1	1	0	0	0	0	0	0	0	4
SW	0	1	1	0	1	0	0	0	0	0	0	0	3
WSW	2	0	3	0	1	1	0	0	0	0	0	0	7
W	1	1	1	3	4	3	0	0	0	0	0	0	13
WNW	1	1	2	6	2	3	1	0	0	0	0	0	16
NW	0	1	2	3	0	3	2	0	0	0	0	0	11
NNW	0	2	2	5	2	2	0	0	0	0	0	0	13
TOTALS	10	14	28	73	70	44	21	3	0	0	0	0	263

NUMBER OF VALID HOURS 263
NUMBER OF INVALID HOURS 0
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 263

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	1	1	0	3	2	0	0	0	0	0	0	7
NNE	0	1	2	7	30	42	4	0	0	0	0	0	86
NE	0	0	3	5	11	1	0	0	0	0	0	0	20
ENE	0	0	0	2	1	3	1	0	0	0	0	0	7
E	0	0	0	3	1	2	0	0	0	0	0	0	6
ESE	0	0	0	0	1	0	0	0	0	0	0	0	1
SE	0	0	0	2	2	0	0	0	0	0	0	0	4
SSE	0	0	0	0	0	0	2	0	0	0	0	0	2
S	0	0	0	1	0	0	0	0	0	0	0	0	1
SSW	0	0	1	0	0	1	0	0	0	0	0	0	2
SW	0	0	1	2	0	1	0	0	0	0	0	0	4
WSW	0	0	0	0	1	0	0	0	0	0	0	0	1
W	0	0	0	1	1	0	0	0	0	0	0	0	2
WNW	0	0	0	4	0	1	1	0	0	0	0	0	6
NW	0	0	1	1	2	0	0	0	0	0	0	0	4
NNW	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	0	2	9	28	53	53	8	0	0	0	0	0	153

NUMBER OF VALID HOURS 153
NUMBER OF INVALID HOURS 0
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 153

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (2006)

METEOROLOGY
July - September
TABLE 4A

SITE: SAN ONOFRE
PERIOD OF RECORD 06070100-06093023
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	0	1	0	0	0	0	0	1
NNE	1	0	1	0	13	60	37	0	0	0	0	0	112
NE	0	0	0	2	2	5	0	0	0	0	0	0	9
ENE	0	0	0	1	1	1	0	0	0	0	0	0	3
E	1	0	0	2	0	0	0	0	0	0	0	0	3
ESE	1	0	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	1	0	0	0	1	0	1	0	0	0	0	0	3
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	4	0	0	0	0	0	0	0	0	0	0	0	4
W	0	0	0	0	0	0	0	0	0	0	0	0	0
WNW	2	0	1	0	0	0	0	0	0	0	0	0	3
NW	0	0	0	0	0	0	0	0	0	0	0	0	0
NNW	0	0	0	0	1	0	0	0	0	0	0	0	1
TOTALS	10	0	2	5	18	67	39	0	0	0	0	0	141

NUMBER OF VALID HOURS 141
NUMBER OF INVALID HOURS 0
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 141

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	13	27	13	2	0	0	0	0	0	61
NNE	12	1	9	39	85	134	43	0	0	0	0	0	323
NE	0	2	6	18	19	12	0	0	0	0	0	0	57
ENE	0	1	2	21	8	5	2	0	0	0	0	0	39
E	2	1	4	19	12	4	0	0	0	0	0	0	42
ESE	1	1	4	5	8	3	8	0	0	0	0	0	30
SE	0	0	2	10	18	27	25	2	0	0	0	0	84
SSE	1	4	6	13	28	40	77	15	0	0	0	0	184
S	0	2	2	12	18	40	64	9	0	0	0	0	147
SSW	0	1	7	18	30	48	27	0	0	0	0	0	131
SW	0	7	7	12	26	60	48	0	0	0	0	0	160
WSW	8	1	5	11	27	75	53	0	0	0	0	0	180
W	1	2	7	21	36	91	131	2	0	0	0	0	291
WNW	5	1	6	21	25	67	167	14	0	0	0	0	306
NW	1	2	4	19	12	37	39	12	1	0	0	0	127
NNW	0	3	5	17	14	5	2	0	0	0	0	0	46
TOTALS	31	31	80	269	393	661	688	54	1	0	0	0	2208

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

METEOROLOGY
October - December
TABLE 4A

SITE: SAN ONOFRE
PERIOD OF RECORD 06100100-06123123
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	4	1	0	0	0	5
ENE	0	0	0	0	0	0	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0	0	0	0	0	0	0
ESE	0	0	0	0	0	1	0	0	0	0	0	0	1
SE	0	0	0	0	2	1	3	1	0	0	0	0	7
SSE	0	0	0	0	1	4	10	0	0	0	0	0	15
S	0	0	0	1	1	19	13	0	0	0	0	0	34
SSW	0	0	0	5	8	16	14	0	0	0	0	0	43
SW	0	0	1	3	13	24	19	0	0	0	0	0	60
WSW	0	0	0	4	18	35	11	1	0	0	0	0	69
W	0	0	0	3	22	78	31	1	0	0	0	0	135
WNW	0	0	0	0	8	23	67	10	0	3	0	0	111
NW	0	0	0	0	0	2	4	0	0	0	0	0	6
NNW	0	0	0	0	2	0	0	0	0	0	0	0	2
TOTALS	0	0	1	16	75	203	172	17	1	3	0	0	488

NUMBER OF VALID HOURS	488	NUMBER OF CALMS	0
NUMBER OF INVALID HOURS	0	TOTAL HOURS FOR THE PERIOD	488

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	1	0	0	0	1	0	0	0	2
NE	0	0	0	0	0	0	0	0	0	0	0	0	0
ENE	0	0	0	0	0	0	0	0	0	0	0	0	0
E	0	0	0	0	0	1	0	0	0	0	0	0	1
ESE	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	0	0	0	0	0	0	1	1	0	0	0	0	2
SSE	0	0	0	0	2	1	3	1	0	0	0	0	7
S	0	0	0	0	0	1	2	1	0	0	0	0	4
SSW	0	0	0	0	2	1	0	0	0	0	0	0	3
SW	0	0	0	1	0	3	3	0	1	0	0	0	8
WSW	0	0	0	1	2	1	0	0	0	0	0	0	4
W	0	0	1	1	2	3	1	0	0	0	0	0	8
WNW	0	0	0	1	1	2	3	0	0	0	1	0	8
NW	0	0	0	0	0	0	5	0	0	0	0	0	5
NNW	0	0	0	0	0	1	0	0	0	0	0	0	1
TOTALS	0	0	1	4	10	14	18	3	2	0	1	0	53

NUMBER OF VALID HOURS	53	NUMBER OF CALMS	0
NUMBER OF INVALID HOURS	0	TOTAL HOURS FOR THE PERIOD	53

METEOROLOGY
October - December
TABLE 4A

SITE: SAN ONOFRE
PERIOD OF RECORD 06100100-06123123
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	1	0	0	1	0	0	0	0	0	0	2
NE	0	0	0	0	1	0	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	0	1	1	0	0	0	0	2
SSE	0	0	0	1	1	1	5	2	0	0	0	0	10
S	0	0	1	1	0	0	1	2	0	0	0	0	5
SSW	0	0	1	0	1	4	1	0	0	0	0	0	7
SW	0	0	1	0	0	1	0	0	1	0	0	0	3
WSW	0	0	1	0	0	0	0	1	0	0	0	0	2
W	0	0	0	1	3	1	0	0	0	0	0	0	5
WNW	0	0	0	0	3	3	1	0	0	1	0	0	8
NW	0	0	0	0	1	1	3	0	0	0	0	0	5
NNW	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	0	0	5	3	10	13	12	6	1	1	0	0	51

NUMBER OF VALID HOURS 51
NUMBER OF INVALID HOURS 0
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 51

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	1	3	5	3	0	0	0	0	0	0	13
NNE	0	0	3	3	4	2	2	1	0	0	0	0	15
NE	0	0	0	0	1	1	1	1	0	0	0	0	4
ENE	0	0	0	0	1	0	0	0	0	0	0	0	1
E	0	0	0	0	2	2	5	0	0	0	0	0	9
ESE	0	0	1	2	1	6	6	0	0	0	0	0	16
SE	0	0	1	3	2	13	23	6	0	0	0	0	48
SSE	0	0	1	0	6	14	18	6	0	0	0	0	45
S	0	0	1	7	1	6	5	0	0	0	0	0	20
SSW	0	1	1	2	3	3	6	2	2	0	0	0	20
SW	0	1	0	4	1	5	6	1	3	0	0	0	21
WSW	0	0	1	5	3	2	2	2	0	0	0	0	15
W	0	0	2	1	8	3	8	9	1	0	0	0	32
WNW	0	0	0	2	4	7	4	4	2	1	0	0	24
NW	0	0	1	3	14	9	15	2	1	0	0	0	45
NNW	0	0	1	6	1	12	2	0	0	0	0	0	22
TOTALS	0	3	14	41	57	88	103	34	9	1	0	0	350

NUMBER OF VALID HOURS 350
NUMBER OF INVALID HOURS 0
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 350

METEOROLOGY
October - December
TABLE 4A

SITE: SAN ONOFRE
PERIOD OF RECORD 06100100-06123123
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	5	7	6	4	0	0	0	0	0	23
NNE	0	0	2	25	25	21	8	1	1	0	0	0	83
NE	0	0	1	3	3	3	4	8	1	2	0	0	25
ENE	0	0	0	4	6	2	1	0	0	0	0	0	13
E	0	2	3	6	2	3	0	0	0	0	0	0	16
ESE	0	0	1	3	3	9	1	0	0	0	0	0	17
SE	0	0	1	2	3	2	2	0	0	0	0	0	10
SSE	0	0	1	3	2	5	2	0	0	0	0	0	13
S	0	0	1	3	1	3	1	1	0	0	0	0	10
SSW	0	0	1	2	0	0	1	0	0	0	0	0	4
SW	0	0	2	4	0	0	0	1	0	0	0	0	7
WSW	0	1	1	3	0	0	0	0	0	0	0	0	5
W	0	0	1	3	4	9	1	0	0	0	0	0	18
WNW	1	0	2	3	4	12	2	1	1	0	0	0	26
NW	0	0	1	5	5	2	3	0	0	0	0	0	16
NNW	0	3	2	3	3	3	3	0	0	0	0	0	17
TOTALS	1	6	21	77	68	80	33	12	3	2	0	0	303

NUMBER OF VALID HOURS 303
NUMBER OF INVALID HOURS 0
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 303

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	2	2	4	5	5	2	0	0	0	0	0	20
NNE	0	0	4	12	44	72	11	1	0	0	0	0	144
NE	0	1	4	28	17	8	5	0	0	0	0	0	63
ENE	0	0	3	10	3	3	0	0	0	0	0	0	19
E	0	1	0	1	4	2	1	0	0	0	0	0	9
ESE	0	0	0	2	2	0	1	0	0	0	0	0	5
SE	0	0	0	0	0	0	1	0	0	0	0	0	1
SSE	0	0	1	1	2	1	1	0	0	0	0	0	6
S	0	0	0	2	2	0	0	0	0	0	0	0	4
SSW	0	1	2	2	1	1	0	0	0	0	0	0	7
SW	0	0	0	2	0	0	0	0	0	0	0	0	2
WSW	0	0	1	1	2	1	0	0	0	0	0	0	5
W	0	0	0	3	2	3	0	0	0	0	0	0	8
WNW	0	0	0	1	2	7	4	0	0	0	0	0	14
NW	2	2	3	1	5	2	1	0	0	0	0	0	16
NNW	0	1	3	2	5	5	1	0	0	0	0	0	17
TOTALS	2	8	23	72	96	110	28	1	0	0	0	0	340

NUMBER OF VALID HOURS 340
NUMBER OF INVALID HOURS 0
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 340

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METEOROLOGY
October - December
TABLE 4A

SITE: SAN ONOFRE
PERIOD OF RECORD 06100100-06123123
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	5	0	0	1	2	7	4	0	0	0	0	0	19
NNE	0	0	0	2	48	199	176	0	0	0	0	0	425
NE	0	0	0	12	16	32	12	0	0	0	0	0	72
ENE	0	0	1	10	6	2	0	0	0	0	0	0	19
E	0	0	1	3	1	3	0	0	0	0	0	0	8
ESE	0	0	0	1	0	4	0	0	0	0	0	0	5
SE	0	0	2	0	3	0	0	0	0	0	0	0	5
SSE	0	0	0	2	2	0	0	0	0	0	0	0	4
S	0	0	1	3	3	0	0	0	0	0	0	0	7
SSW	0	0	1	4	4	1	0	0	0	0	0	0	10
SW	0	0	0	4	1	1	4	0	0	0	0	0	10
WSW	0	0	0	2	0	0	1	0	0	0	0	0	3
W	10	0	0	1	5	0	0	0	0	0	0	0	16
WNW	0	0	0	1	1	4	0	0	0	0	0	0	6
NW	0	0	0	1	1	3	3	0	0	0	0	0	8
NNW	0	0	1	0	0	4	1	0	0	0	0	0	6
TOTALS	15	0	7	47	93	260	201	0	0	0	0	0	623

NUMBER OF VALID HOURS 623
NUMBER OF INVALID HOURS 0
NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 623

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	5	3	4	13	19	21	10	0	0	0	0	0	75
NNE	0	0	10	42	122	295	197	3	2	0	0	0	671
NE	0	1	5	43	38	44	22	13	2	2	0	0	170
ENE	0	0	4	24	16	8	1	0	0	0	0	0	53
E	0	3	4	10	9	11	6	0	0	0	0	0	43
ESE	0	0	2	8	6	20	8	0	0	0	0	0	44
SE	0	0	4	5	10	16	31	9	0	0	0	0	75
SSE	0	0	3	7	16	26	39	9	0	0	0	0	100
S	0	0	4	17	8	29	22	4	0	0	0	0	84
SSW	0	2	6	15	19	26	22	2	2	0	0	0	94
SW	0	1	4	18	15	34	32	2	5	0	0	0	111
WSW	0	1	4	16	25	39	14	4	0	0	0	0	103
W	10	0	4	13	46	97	41	10	1	0	0	0	222
WNW	1	0	2	8	23	58	81	15	3	5	1	0	197
NW	2	2	5	10	26	19	34	2	1	0	0	0	101
NNW	0	4	7	11	11	25	7	0	0	0	0	0	65
TOTALS	18	17	72	260	409	768	567	73	16	7	1	0	2208

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