



SAN ONOFRE NUCLEAR GENERATING STATION

SEMIANNUAL EFFLUENT REPORT

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JANUARY-JUNE, 1988

Southern California Edison Company

SAN ONOFRE NUCLEAR GENERATING STATION

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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 three pressurized Water Reactors with a total rated capacity of 2664 net megawatts electrical.

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

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

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SEMIANNUAL EFFLUENT REPORT

January - June (1988)

SECTION A. INTRODUCTION

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

1. Quarterly summaries of gaseous and liquid effluents for "continuous" and "batch" modes of release;
2. Percent of Technical Specification Limits;
3. Percent of Applicable Limits;
4. Estimated Total Percent Error;
5. Lower Limit of Detection concentrations;
6. Batch release summaries;
7. Previous Semiannual Report Addendum;
8. Radwaste Shipments;
9. 10 CFR 50 Appendix I Requirements;
10. Changes to Offsite Dose Calculation Manual.

SECTION B. GASEOUS EFFLUENTS

Table 1A, "Gaseous Effluents-Summation of All Releases," provides a detailed listing of gaseous effluents released quarterly in four categories: fission and activation gases, iodine-131, particulates with half-lives greater than eight days, and tritium. Listed for each of the four categories are: (1) the total curies released, (2) the average release rate, (3) the percent of Technical Specification Limit (TSL), and (4) the estimated total error. In addition, the particulate category lists the gross alpha radioactivity released for each quarter.

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

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

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

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

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

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

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

TABLE 1A
S.O.N.G.S. 1

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1988)
GASEOUS EFFLUENTS-SUMMATION OF ALL RELEASES

	Unit	First Quarter	Second Quarter	Estimated Total Error, %
A. Fission and activation gases				
1. Total release	Ci	9.60E+2	0.00E+0	3.00E+1
2. Average release rate for period	uCi/sec	1.22E+2	0.00E+0	
3. Percent of technical specification limit	%	5.45E-1	0.00E+0	
=====				
B. Iodines				
1. Total iodine-131	Ci	9.76E-4	7.24E-7	1.90E+1
2. Average release rate for period	uCi/sec	1.24E-4	9.21E-8	
3. Percent of technical specification limit	%	1.61E-3	1.20E-6	
=====				
C. Particulates				
1. Particulates with half-lives > 8 days	Ci	1.71E-5	1.74E-6	1.60E+1
2. Average release rate for period	uCi/sec	2.17E-6	2.21E-7	
3. Percent of technical specification limit	%	1.70E-6	2.61E-7	
4. Gross alpha radioactivity	Ci	<LLD	*	5.00E+1
=====				
D. Tritium				
1. Total release	Ci	3.62E+0	1.16E+1	2.50E+1
2. Average release rate for period	uCi/sec	4.60E-1	1.48E+0	
3. Percent of technical specification limit	%	2.99E-3	9.59E-3	
=====				

LLD - Lower Limit of Detection; See Table 1D.

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

TABLE 1C

S.O.N.G.S. 1

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1988)
GASEOUS EFFLUENTS-GROUND LEVEL RELEASES

Nuclides Released	Unit	Continuous Mode		Batch Mode	
		First Quarter	Second Quarter	First Quarter	Second Quarter
1. <u>Fission gases</u>					
krypton-85	Ci	<LLD	<LLD	5.63E+0	<LLD
krypton-85m	Ci	7.79E-1	<LLD	1.36E-2	<LLD
krypton-87	Ci	<LLD	<LLD	<LLD	<LLD
krypton-88	Ci	<LLD	<LLD	<LLD	<LLD
xenon-131m	Ci	<LLD	<LLD	1.11E+0	<LLD
xenon-133	Ci	6.82E+2	<LLD	2.54E+2	<LLD
xenon-133m	Ci	8.63E-2	<LLD	2.78E+0	<LLD
xenon-135	Ci	1.04E+1	<LLD	3.50E+0	<LLD
xenon-135m	Ci	<LLD	<LLD	<LLD	<LLD
xenon-138	Ci	<LLD	<LLD	<LLD	<LLD
Total for period	Ci	6.93E+2	<LLD	2.67E+2	<LLD
=====					
2. <u>Iodines</u>					
iodine-131	Ci	9.76E-4	7.24E-7	NA	NA
iodine-132	Ci	1.30E-4	<LLD	NA	NA
iodine-133	Ci	1.83E-6	<LLD	NA	NA
iodine-135	Ci	<LLD	<LLD	NA	NA
Total for period	Ci	1.11E-3	7.24E-7	NA	NA
=====					
3. <u>Particulates</u>					
barium-140	Ci	<LLD	4.52E-7	NA	NA
bromine-82	Ci	1.27E-5	<LLD	NA	NA
cesium-134	Ci	<LLD	<LLD	NA	NA
cesium-137	Ci	5.00E-7	2.09E-7	NA	NA
cesium-138	Ci	4.31E-4	<LLD	NA	NA
chromium-51	Ci	8.33E-7	2.15E-7	NA	NA
cobalt-58	Ci	1.54E-5	7.65E-7	NA	NA
cobalt-60	Ci	<LLD	9.65E-8	NA	NA
lanthanum-140	Ci	<LLD	<LLD	NA	NA
rubidium-88	Ci	2.78E-4	<LLD	NA	NA
strontium-89	Ci	3.41E-7	*	NA	NA
strontium-90	Ci	1.26E-8	*	NA	NA

LLD - Lower Limit of Detection; See Table 1D.

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

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

TABLE 1D

S.O.N.G.S. 1

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1988)
GASEOUS EFFLUENTS-LOWER LIMIT OF DETECTION

RADIONUCLIDES	CONTINUOUS MODE LLD (uCi/cc)	BATCH MODE LLD (uCi/cc)
<u>1. Fission and activation gases</u>		
krypton-85	<1.00E-5	<9.20E-4
krypton-85m	<5.30E-8	<3.30E-6
krypton-87	<1.20E-7	<8.20E-6
krypton-88	<2.20E-7	<1.30E-5
xenon-131m	<2.10E-6	<1.20E-4
xenon-133	<9.80E-8	<5.70E-6
xenon-133m	<3.80E-7	<2.50E-5
xenon-135	<5.30E-8	<3.20E-6
xenon-135m	<4.60E-7	<2.40E-5
xenon-138	<1.70E-6	<7.10E-5
<u>2. Iodines</u>		
iodine-132	<1.60E-13	NA
iodine-133	<6.60E-14	NA
iodine-135	<5.00E-13	NA
<u>3. Particulates</u>		
barium-140	<7.50E-14	NA
bromine-82	<9.80E-14	NA
cesium-134	<5.50E-14	NA
cesium-138	<8.90E-13	NA
cobalt-60	<3.80E-14	NA
lanthanum-140	<4.90E-14	NA
rubidium-88	<3.70E-11	NA
strontium-89	<1.00E-14	NA
strontium-90	<1.00E-15	NA

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

TABLE 1E
S.O.N.G.S. 1

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1988)
GASEOUS EFFLUENTS-RADIATION DOSES AT THE SITE BOUNDARY

	Unit	First Quarter	Second Quarter*
A. Noble Gas			
1. Gamma air dose	mrad	1.49E-1	0.00E+0
2. Percent Technical Specification Limit	%	2.98E+0	0.00E+0
3. Beta air dose	mrad	4.27E-1	0.00E+0
4. Percent Technical Specification Limit	%	4.27E+0	0.00E+0
B. Tritium, Iodine, Particulate (at the nearest receptor)			
1. Organ dose	mrem	2.79E-3	4.08E-4
2. Percent Technical Specification Limit	%	3.72E-2	5.44E-3

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

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

TABLE 1F
S.O.N.G.S. 1

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1988)
GASEOUS EFFLUENTS-BATCH RELEASE SUMMARY

			6-MONTH PERIOD
1.	Number of batch releases:	19	releases
2.	Total time period for batch releases:	5510	minutes
3.	Maximum time period for a batch release:	462	minutes
4.	Average time period for a batch release:	290	minutes
5.	Minimum time period for a batch release:	58	minutes

SECTION C. LIQUID EFFLUENTS

Table 2A, "Liquid Effluents-Summation of All Releases," provides a detailed summary of liquid effluents released quarterly in three categories: fission and activation products, tritium, and dissolved and entrained gases. Listed for each of the three categories are: (1) the total curies released, (2) the average diluted concentration, (3) the percent of applicable limit and (4) the estimated total error. In addition, Table 2A lists: (1) the gross alpha radioactivity, (2) the volume of waste released (prior to dilution), and (3) the volume of the dilution water.

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

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

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

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

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

TABLE 2A

S.O.N.G.S. 1

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1988)
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	3.67E-1	1.16E-1	1.90E+1
2. Average diluted concentration during period	uCi/ml	4.11E-9	1.90E-9	
3. Percent of applicable limit	%	4.58E-1	1.08E-2	
=====				
B. Tritium				
1. Total release	Ci	4.73E+2	1.44E+2	1.90E+1
2. Average diluted concentration during period	uCi/ml	5.30E-6	2.36E-6	
3. Percent of applicable limit	%	1.77E-1	7.87E-2	
=====				
C. Dissolved and entrained gases				
1. Total release	Ci	2.81E+0	6.52E-3	1.90E+1
2. Average diluted concentration during period	uCi/ml	3.15E-8	1.07E-10	
3. Percent of applicable limit	%	1.58E-2	5.35E-5	
=====				
D. Gross alpha radioactivity				
1. Total release	Ci	<LLD	*	5.00E+1
=====				
E. Volume of waste released (prior to dilution)				
	liters	1.07E+6	1.28E+6	5.00E+0
=====				
F. Volume of dilution water used during period				
	liters	8.93E+10	6.09E+10	5.00E+0
=====				
* - Second quarter analyses not available at report time; values will be included in the following Semiannual Report.				

TABLE 2B

S.O.N.G.S. 1

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1988)
LIQUID EFFLUENTS

Nuclides Released	Unit	Continuous Mode		Batch Mode	
		First Quarter	Second Quarter	First Quarter	Second Quarter
antimony-125	Ci	<LLD	<LLD	2.12E-5	3.13E-4
barium-140	Ci	2.18E-5	4.74E-5	2.82E-4	<LLD
cerium-144	Ci	<LLD	<LLD	<LLD	3.06E-6
cesium-134	Ci	6.16E-2	4.84E-3	1.81E-2	2.87E-2
cesium-136	Ci	2.96E-3	<LLD	<LLD	<LLD
cesium-137	Ci	5.71E-2	6.28E-3	2.28E-2	3.44E-2
cesium-138	Ci	2.08E-4	<LLD	<LLD	<LLD
chromium-51	Ci	<LLD	<LLD	<LLD	1.62E-3
cobalt-57	Ci	<LLD	<LLD	<LLD	2.00E-5
cobalt-58	Ci	3.38E-5	7.67E-3	1.78E-3	2.46E-2
cobalt-60	Ci	9.67E-5	4.36E-4	3.56E-3	5.54E-3
iodine-131	Ci	9.14E-2	<LLD	4.04E-3	2.77E-5
iodine-133	Ci	6.48E-2	<LLD	3.63E-4	1.35E-4
iodine-135	Ci	3.62E-2	<LLD	<LLD	<LLD
iron-55	Ci	<LLD	*	3.17E-5	*
iron-59	Ci	<LLD	<LLD	<LLD	2.75E-6
lanthanum-140	Ci	<LLD	<LLD	2.98E-5	2.21E-8
manganese-54	Ci	<LLD	<LLD	1.63E-4	1.97E-4
molybdenum-99	Ci	7.94E-4	<LLD	6.73E-5	<LLD
niobium-95	Ci	<LLD	<LLD	<LLD	7.73E-5
ruthenium-103	Ci	<LLD	<LLD	<LLD	1.62E-4
ruthenium-106	Ci	<LLD	<LLD	<LLD	4.24E-4
silver-110m	Ci	<LLD	<LLD	<LLD	2.11E-4
strontium-89	Ci	<LLD	*	<LLD	*
strontium-90	Ci	<LLD	*	2.46E-5	*
technetium-99m	Ci	3.13E-4	<LLD	1.09E-5	<LLD
zinc-65	Ci	<LLD	<LLD	4.12E-5	<LLD
zirconium-95	Ci	1.89E-4	<LLD	<LLD	1.36E-5
Total for period (above)	Ci	3.16E-1	1.93E-2	5.13E-2	9.64E-2
=====					
krypton-85	Ci	<LLD	<LLD	4.89E-2	<LLD
krypton-85m	Ci	3.60E-5	<LLD	<LLD	<LLD
xenon-131m	Ci	<LLD	<LLD	3.44E-2	1.90E-3
xenon-133	Ci	1.18E-2	<LLD	2.69E+0	4.62E-3
xenon-133m	Ci	8.97E-3	<LLD	1.26E-2	<LLD
xenon-135	Ci	<LLD	<LLD	9.04E-4	<LLD

LLD - Lower Limit of Detection; see Table 2C.

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

TABLE 2C
S.O.N.G.S. 1

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1988)
LIQUID EFFLUENTS-LOWER LIMIT OF DETECTION

RADIONUCLIDES	CONTINUOUS MODE LLD (uCi/ml)	BATCH MODE LLD (uCi/ml)
<u>1. Fission and activation products</u>		
antimony-125	<1.90E-7	*
barium-140	*	<3.00E-7
cerium-144	<4.00E-7	<5.00E-7
cesium-136	<6.90E-8	<9.30E-8
cesium-138	**	**
chromium-51	<5.20E-7	<6.60E-7
cobalt-57	<5.10E-7	<6.40E-8
iodine-131	<5.90E-8	*
iodine-133	<6.70E-8	*
iodine-135	<2.90E-7	<1.90E-6
iron-55	<1.00E-6	*
iron-59	<7.70E-8	<1.40E-7
lanthanum-140	<6.80E-8	*
manganese-54	<4.50E-8	*
molybdenum-99	<5.00E-8	<7.60E-8
niobium-95	<3.10E-8	<8.60E-8
ruthenium-103	<6.40E-8	<1.00E-7
ruthenium-106	<3.70E-7	<9.00E-7
silver-110m	<6.90E-8	<1.50E-7
strontium-89	<5.00E-8	<5.00E-8
strontium-90	<1.00E-8	*
technetium-99m	<5.10E-8	<7.70E-8
zinc-65	<1.10E-7	<1.50E-7
zirconium-95	<8.30E-8	<1.40E-7

2. Dissolved and entrained gases

krypton-85	<1.20E-5	<5.20E-5
krypton-85m	<6.40E-8	<1.30E-7
xenon-131m	<2.10E-6	*
xenon-133	<1.40E-7	*
xenon-133m	<4.30E-7	<9.50E-7
xenon-135	<5.40E-8	<1.10E-7

- * - Nuclide detected in Table 2B.
 ** - Nuclide is too short-lived to be detected in routine sampling and analysis.

TABLE 2D
S.O.N.G.S. 1

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1988)
LIQUID EFFLUENTS-RADIATION DOSES AT THE LIQUID SITE BOUNDARY

	Unit	First Quarter	Second Quarter*
A.			
1. Total body dose	mrem	2.83E-1	3.71E-2
2. Percent Technical Specification Limit	%	1.89E+1	2.47E+0
B.			
1. Limiting organ dose	mrem	4.77E-1	4.82E-2
2. Percent Technical Specification Limit	%	9.54E+0	9.64E-1

NOTE: The limiting organ for the first quarter is the thyroid,
for the second quarter the liver.

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

TABLE 2E
S.O.N.G.S. 1

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1988)
LIQUID EFFLUENTS-BATCH RELEASE SUMMARY

	6-MONTH PERIOD
1. Number of batch releases:	32 releases
2. Total time period for a batch release:	25,504 minutes
3. Maximum time period for a batch release:	2,648 minutes
4. Average time period for a batch release:	797 minutes
5. Minimum time period for a batch release:	1 minute
6. Average saltwater flow during batch releases:	250,980 gpm

SECTION D. PREVIOUS SEMIANNUAL REPORT ADDENDUM

S.O.N.G.S. 1

1. The July - December 1987 Semiannual Report values for composite gross alpha, Sr-89, Sr-90, and Fe-55 (Tables 1A and 1C, Gaseous Effluents, Tables 2A and 2B, Liquid Effluents) were incomplete due to data not available at report time. The values not reported were for the fourth quarter of 1987. The values are as follows:

GASEOUS EFFLUENTS

Fourth Quarter			
Nuclides Released	Unit	Continuous Mode	Batch Mode
strontium-89	Ci	4.62E-6	*
strontium-90	Ci	<LLD	*
gross alpha	Ci	1.11E-7	*

Sr-90 LLD = <1.00E-15 uCi/cc

LIQUID EFFLUENTS

Fourth Quarter			
Nuclides Released	Unit	Continuous Mode	Batch Mode
iron-55	Ci	<LLD	1.37E-3
strontium-89	Ci	<LLD	<LLD
strontium-90	Ci	<LLD	7.19E-6
gross alpha	Ci	<LLD	<LLD

Fe-55 LLD = <1.00E-6 uCi/ml

Sr-89 LLD = <5.00E-8 uCi/ml

Sr-90 LLD = <1.00E-8 uCi/ml

gross alpha = <1.00E-7 uCi/ml

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

SECTION D. PREVIOUS SEMIANNUAL REPORT ADDENDUM (Continued)

S.O.N.G.S. 1

2. GASEOUS EFFLUENT-RADIATION DOSES AT THE SITE BOUNDARY

For the fourth quarter of 1987 Semiannual Report, Sr-89, and Sr-90.

	Unit	Fourth Quarter
A. Tritium, Iodine, Particulate (at the nearest receptor)		
1. Organ dose	mrem	9.23E-6
2. Percent Applicable Limit	%	1.23E-4

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

3. LIQUID EFFLUENT-RADIATION DOSES AT THE SITE BOUNDARY

For the fourth quarter of 1987 Semiannual Report, Sr-89, Sr-90, and Fe-55.

	Unit	Fourth Quarter
A.		
1. Total body dose	mrem	1.78E-4
2. Percent Applicable Limit	%	1.19E-2
B.		
1. Limit organ dose	mrem	1.10E-3
2. Percent Applicable Limit	%	2.20E-2

NOTE: The limiting organ is the bone.

SECTION E. RADWASTE SHIPMENTS

S.O.N.G.S. 1

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1988)
SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

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

1.	Type of waste	Unit	6-month Period	Est. Total Error, %
a.	Spent resins, filter sludges, evaporator bottoms, etc.	m ³ Ci	0.00E+0 0.00E+0	3.00E+1
b.	Dry compressible waste, contaminated equip. etc.	m ³ Ci	1.53E+1** 8.46E-1	3.00E+1
c.	Irradiated components, control rods, etc.	m ³ Ci	NA NA	3.00E+1
d.	Other (absorbed liquids, sand, building rubble, biological waste.)	m ³ Ci	1.70E+0** 1.25E+0	3.00E+1

* - All material shipped in 55 gal. D.O.T. 7A Type A Drums (7.5 ft³ each) and steel boxes (strong tight containers, 98 ft³ each).

SECTION E. RADWASTE SHIPMENTS (Continued)

S.O.N.G.S. 1

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1988)
SOLID WASTE AND IRRADIATED FUEL SHIPMENT

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

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

a.	Not applicable	%	0.00E+0
b.	carbon-14	%	7.35E-3
	cesium-134	%	3.81E+0
	cesium-137	%	1.68E+1
	cobalt-58	%	1.09E+0
	cobalt-60	%	6.37E+0
	iodine-129	%	1.54E-1
	iodine-131	%	2.72E+0
	iron-55	%	2.01E+1
	manganese-54	%	5.63E-1
	nickel-63	%	4.80E+0
	plutonium-241	%	1.17E+0
	strontium-90	%	1.19E-1
	technetium-99	%	2.55E-1
	tritium	%	4.21E+1

SECTION E. RADWASTE SHIPMENTS (Continued)

S.O.N.G.S. 1

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1988)
SOLID WASTE AND IRRADIATED FUEL SHIPMENT

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

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

c. Not applicable	%	0.00E+0
-------------------	---	---------

d. carbon-14	%	1.28E-3
cesium-134	%	1.08E-1
cesium-137	%	3.42E-1
cobalt-58	%	3.14E-2
cobalt-60	%	1.38E-1
iodine-129	%	3.12E-3
iodine-131	%	7.72E-2
iron-55	%	4.09E-1
manganese-54	%	1.62E-2
nickel-63	%	1.04E-1
plutonium-241	%	4.51E-2
technetium-99	%	5.19E-3
tritium	%	9.87E+1

3. Solid Waste Disposition

See COMMON section of this report

B. IRRADIATED FUEL SHIPMENTS (Disposition)

See COMMON section of this report

SECTION F. TECHNICAL SPECIFICATION LIMITS AND APPLICABLE LIMITS

Gaseous Effluents - Technical Specification Limits

The percent of Technical Specification Limit, tabulated in Table 1A, was determined by calculation of the following parameter:

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

Where: Rel Rate = total curies released in each category and each quarter, divided by the seconds in a quarter; this is the value in Parts A.2, B.2, C.2 and D.2 of Table 1A, converted to microcuries.

X/Q = $1.30\text{E-}5 \text{ sec/m}^3$ and is the annual average atmospheric dispersion defined in the ODCM, Rev. 3.

The MPC_{eff} is defined as:

$$\frac{1}{\sum_{i=1}^n \frac{F_i}{\text{MPC}_i}}$$

Where: F_i = fractional abundance of the i th radionuclide obtained by dividing the activity in curies for each radionuclide, $\sum C_i$, by the sum of all such activities, C_T .

n = total number of radionuclides identified

MPC_i = MPC of the i th radionuclide

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

SECTION F. TECHNICAL SPECIFICATION LIMITS AND APPLICABLE LIMITS

Liquid Effluents - Applicable Limits

The percent of applicable limit, tabulated in Table 2A, was determined by calculation of the following parameter:

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

Where: Dil Conc = total curies released in each category and each quarter, converted to microcuries, divided by the total volume released (sum of Parts E and F in Table 2A) converted to milliliters. This number is the value in Part A.2, B.2 and C.2 of Table 2A.

The MPC_{eff} is defined as:

$$\sum_{i=1}^n \frac{F_i}{\text{MPC}_i}$$

Where: F_i = fractional abundance of the i th radionuclide obtained by dividing the activity in curies for each radionuclide, C_i , by the sum of all such activities, C_T .

n = total number of radionuclides identified

MPC_i = MPC of the i th radionuclide

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

SECTION G. ESTIMATION OF ERROR

S.O.N.G.S. 1

Estimations of the error in reported values of gaseous and liquid effluents releases have been made. Sources of error considered for gaseous effluents - batch releases are: (1) tank volumes, (2) sampling, (3) counting, and (4) calibration. Sources of error for gaseous effluents - continuous releases are: (1) fan flow rate, (2) sampling, (3) counting, (4) calibration and (5) differential pressure drop.

Sources of error for liquid effluents - batch releases are: (1) tank volumes, (2) sampling, (3) counting and (4) calibration. Sources of error for liquid effluents - continuous releases are: (1) dilution water flow rate, (2) sampling, (3) counting and (4) calibration.

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

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

Where: σ_i = Error associated with each component.

SECTION H. 10 CFR 50 APPENDIX I REQUIREMENTS

S.O.N.G.S. 1

Table 1 in Section H presents the quarterly 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, and (6) Direct Radiation.

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

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

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

S.O.N.G.S. 1

TABLE 1

SOURCE	Dose* (millirems)	
	1st Quarter	2nd Quarter
LIQUID EFFLUENTS		
Whole body	1) 2.83E-1	2) 3.71E-2
Organ	3) 4.77E-1	4) 4.82E-2
AIRBORNE EFFLUENTS		
Tritium, Iodines, and Particulates	5) 8.27E-3	6) 8.09E-3
NOBLE GASES**		
Gamma	7) 8.51E-2	8) 0.00E+0
Beta	9) 2.48E-1	10) 0.00E+0
DIRECT RADIATION	11) 1.23E+0	12) 1.05E+0

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

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

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

S.O.N.G.S. 1

1. This data was calculated using the methodology of the ODCM.
2. This data was calculated using the methodology of the ODCM.
3. This data was calculated using the methodology of the ODCM; the thyroid received the maximum dose primarily by the saltwater fish pathway.
4. This data was calculated using the methodology of the ODCM; the liver received the maximum dose primarily by the saltwater fish pathway.
5. The maximum organ dose was to a child's thyroid and was located in the NW sector. This was calculated using the activity reported in the January - June Semiannual Report with the assumptions of USNRC Regulatory Guide 1.109.
6. The maximum organ dose was to a child's thyroid and was located in the NW sector. This was calculated using the activity reported in the January - June Semiannual Report with the assumptions of USNRC Regulatory Guide 1.109.
7. A maximum air dose of $7.09\text{E}-1$ mrad for gamma radiation was located in the SSW sector, a seaward direction. The reported maximum air dose for gamma radiation was located in the NW sector, a landward sector, at the exclusion area boundary and calculated with the assumptions of the USNRC Regulatory Guide 1.109.
8. A gaseous dose of 0.0 was calculated since the Unit was shut down during the entire second quarter.
9. A maximum air dose of $2.04\text{E}+0$ mrad for beta radiation was located in the SSW sector, a seaward direction. The reported maximum air dose for beta radiation was located in the NW sector, a landward sector, at the exclusion area boundary and calculated with the assumptions of the USNRC Regulatory Guide 1.109.
10. A gaseous dose of 0.0 was calculated since the Unit was shut down during the entire second quarter.
11. 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 SE sector.
12. 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 SE sector.

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

S.O.N.G.S. 1

TABLE 2

SOURCE	% TSL	
	1st Quarter	2nd Quarter
LIQUID EFFLUENTS		
Whole body	1.89E+1	2.47E+0
Organ	9.54E+0	9.64E-1
AIRBORNE EFFLUENTS		
Tritium, Iodines, and Particulates	1.10E-1	1.08E-1
NOBLE GASES		
Gamma	1.70E+0	0.00E+0
Beta	2.48E+0	0.00E+0

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

SECTION I. CHANGES TO OFFSITE DOSE CALCULATION MANUAL

S.O.N.G.S 1

- o Revision 4 to the Unit 1 ODCM was adopted May 5, 1988, after preparation and review pursuant to Technical Specification 6.5.2.9. This report is submitted to satisfy Technical Specification 6.9.1.9 in the format required by Technical Specification 6.14.2.

Overview:

Revision 4 contains changes in four areas:

- (1) Tables 2-4 (Controlling Location Factors) and the 2-5 through 2-15 (Dose Parameter R_i) were altered to reflect the 1987 Land Use Census changes around the site.
- (2) Tables 1-1 (Liquid Effluent Radiation Monitor Calibration Constants) and 2-1 (Gaseous Effluent Radiation Monitor Calibration Constants) were updated with the most current experimentally determined calibration constants for various radiation monitors.
- (3) Constant administrative factors used in the setpoint calculations to assign percentages of site discharges to specific pathways have been changed to variables. This change allows more flexibility in assigning discharge emphasis around the plant as required.

Explanation: Detailed

I. Tables 2-4 and 2-5 through 2-15, Gaseous Dose Parameters

Table 2-4 (Controlling Location Factors) is a compilation of the 35 pages of Tables 2-5 through 2-15 and contains the maximum value, per isotope, of the term $\sum_k R_{ik} W_k$. When changes occur anywhere in the R_i Tables (2-5 through 2-15) they are scanned for a maximum value isotope by isotope. Therefore, changes may or may not appear in Table 2-4, depending on which R_i tables are affected. Changes occasioned by the 1987 Land Use Census in Tables 2-5 through 2-15 (Dose Parameter R_i) were scanned for changes and the following isotopes' maximum value changed:

<u>Isotope</u>	<u>Rev. 3</u>	<u>Rev. 4</u>
H-3	1.15E-3	8.84E-4
Mn-54	5.50E+0	3.67E+0
Co-57	1.35E+0	9.09E-1
Co-58	1.56E+0	1.10E+0
Co-60	8.40E+1	5.63E+1
Cs-136	7.01E-1	5.06E-1

II. Tables 2-5 through 2-15 (Dose Parameter R_i) are changed as a

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

S.O.N.G.S 1

function of their location from the plant and land use dictate. The tables represent land uses and specific locations in all landward sectors (G through P). Listed below are tables that have been added and deleted as required by the 1987 Land Use Census:

Rev. 4

Sector R, Table 2-8	Changed "Sheep (Meat) and Shepherd" to read "Sheep (Meat)" and changed distance from 1.4 miles to 0.9 miles, D/Q from $2.5E-9 \text{ m}^{-2}$ to $5.4E-9 \text{ m}^{-2}$ and X/Q from $4.5E-7 \text{ sec/m}^3$ to $8.9E-7 \text{ sec/m}^3$.
Sector A, Table 2-9	Changed "Sheep (Meat) and Shepherd" to read "Sheep (Meat)"
Sector B, Table 2-10	Changed "Sheep (Meat) and Shepherd" to read "Sheep (Meat)"
Sector C, Table 2-11	Changed "Sheep (Meat) and Shepherd" to read "Sheep (Meat)"
Sector D, Table 2-12	Changed "Sheep (Meat) and Shepherd" to read "Sheep (Meat)"
Sector E, Table 2-13	Changed "Sheep (Meat) and Shepherd" to read "Sheep (Meat)" Added "Motor Pool" at 4.2 miles
Sector F, Table 2-14	Changed "Sheep (Meat) and Shepherd" to read "Sheep (Meat)" Changed "Highway Patrol Weight Station" to read "Border-Highway Patrol Weight Station"
Sector G, Table 2-15	Changed "Sheep (Meat) and Shepherd" to read "Sheep (Meat)"

III. Table 2-16 listing the input parameters for the "PARTS" code has been deleted. This table was only a convenient method of listing parameter inputs to the code. These inputs are more formally controlled in software documents.

IV. Table 5-1 (Radiological Environmental Monitoring Sample Locations) has been reordered so that sample locations are listed in numerical order rather than by sector. Locations added to the list for Direct Radiation readings were:

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

S.O.N.G.S 1

	<u>Location</u>	<u>Distance (Miles)</u>	<u>Direction</u>
#60	Transit Control Storage Area	-	-
#61	Adjacent to Pressurized Ion Chamber No. S4	0.7	N
#62	Adjacent to Pressurized Ion Chamber No. S5	0.6	NNE
#63	Adjacent to Pressurized Ion Chamber No. S6	0.6	NE
#64	Adjacent to Pressurized Ion Chamber No. S7	0.5	ENE
#65	Adjacent to Pressurized Ion Chamber No. S8	0.7	E
#66	Adjacent to Pressurized Ion Chamber No. S9	0.6	ESE
#67	Adjacent to Pressurized Ion Chamber No. S2	0.6	NW

The following distances to airborne sampling locations have been refined as a result of a field verification study. The changes were:

	<u>Location</u>	<u>Rev. 3 (Miles)</u>	<u>Rev. 4 (Miles)</u>
#9	State Beach Park	0.4	0.6
#10	Bluff	0.5	0.7
#11	Mesa EOF	0.5	0.7
#12	SONGS Evaporation Pond	0.4	0.6

Sediment from Shoreline (Beach Sand) location #3, San Onofre State Beach, distance has been changed from 3.5 miles to 3.1 miles.

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

S.O.N.G.S 1

V. Liquid Setpoint Calculations

- (1) Administrative factors for each liquid discharge pathway have been changed so that they are variable from 0 to 1.0. Previously their variability had been limited so that each always retained a minimum value.

	<u>Admin. Factor</u>	
	<u>Rev. 3</u>	<u>Rev. 4</u>
Liquid Radwaste Effluent line (RW)	0 to 0.8	0 to 1.0
Steam Generator Blowdown Effluent Line (SG ₁₂₁₆)	0 to 0.8	0 to 1.0

	<u>Admin. Factor</u>	
	<u>Rev. 3</u>	<u>Rev. 4</u>
Reheater Pit Sump (S ₂₁₀₀)	0 to 0.2	0 to 1.0
Yard Sump Effluent (S ₂₁₀₁)	0 to 0.2	0 to 1.0

Each setpoint equation now is accompanied by the following statement to distribute the Administrative Factors.

RW, SG₁₂₁₆, S₂₁₀₀, and S₂₁₀₁ are administrative values used for simultaneous releases from the Radwaste Effluent discharge and Steam Generators, the Turbine Bld. Sump, and the Yard Drain Sump. The fractions RW and SG₁₂₁₆, S₂₁₀₀, and S₂₁₀₁ will be assigned such that $RW + SG_{1216} + S_{2100} + S_{2101} \leq 1.0$. The 1.0 is an administrative value used to account for the potential activity for all release pathways. This assures that the total concentration from all release points to the plant discharge will not result in a release of concentrations exceeding the limits of 10CFR20, Appendix B, Table II, Column 2 from the site.

All changes to the Unit 1 Offsite Dose Calculation Manual, Rev. 4, have been determined not to reduce the accuracy or reliability of dose calculations or setpoint determinations.

The attached letter of revision documents that these changes have been reviewed and found acceptable pursuant to Technical Specification 6.5.2.

May 3, 1988

MR. H. E. MORGAN

SUBJECT: Revision 4 to the Unit 1 Offsite Dose Calculation Manual (ODCM)

In accordance with Technical Specification 6.5.2.9 and 6.14.2, Revision 4 to the Unit 1 ODCM has been prepared and reviewed for adoption on May 4, 1988. This revision incorporates the newest dose parameter tables occasioned by the latest Land Use Census, as well as a change to the manner in which administrative factors are used for liquid releases. Your approval of this change is requested.

Copies of this letter are being forwarded to the Site Manager-Vice President, ~~Manager of Nuclear Operations~~^{can}, and the Nuclear Safety Group required by Technical Specification 6.5.2.10 (Units 2/3) and 6.5.2.9 (Unit 1).

If there are any questions, please don't hesitate to call.


J. T. REILLY

Approved by:


H. E. MORGAN

450KH:cas

cc: C. B. McCarthy
P. Penseyres
W. W. Strom
K. Helm
R. Plappert
Chem File
CDM

SECTION J. S.O.N.G.S. 1 MISCELLANEOUS

- o There were no unplanned releases of radioactive gases or liquid from Unit 1 during the reporting period, January 1, 1988 to June 30, 1988.

January 1, 1988 - June 30, 1988

EFFLUENT RADIATION MONITORS OUT OF SERVICE FOR GREATER THAN 30 DAYS

S.O.N.G.S. 1

Monitor	Inoperability Period	Inoperability Cause	Explanation
1211 Containment Particulate	01/22/88 - 04/01/88	18 month and 92 day surveillances.	Failed surveillances due to purge valve problems.
1212 Containment Noble Gas	02/01/88 - 04/01/88	18 month and 92 day surveillances.	Failed surveillances due to purge valve problems.
1214 Plant Vent Noble Gas	06/13/86 - Present	Removed from service.	
1254 Plant Vent Stack-WRGM	08/27/85 - Present	Process Flow Monitor Out of Service.	Project is evaluating a design flaw.
1216 Steam Generator Blowdown	02/14/88 - Present	18 month surveillance. Low sample flow.	Not required and no sample flow, unit shut down for entire period.

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

- o Gaseous effluent releases, excluding tritium, totaled 960 curies with Xe-133 97.5% of the total.
- o The radiation doses from gaseous releases are: (a) gamma air dose: $1.49\text{E-}1$ mrad at the site boundary, (b) beta air dose: $4.27\text{E-}1$ mrad at the site boundary, (c) organ dose: $3.20\text{E-}3$ mrem at the nearest receptor.
- o Liquid releases totaled $6.20\text{E+}2$ curies of which tritium was $6.17\text{E+}2$ Ci, noble gases were $2.81\text{E+}0$ Ci, and particulates and iodines were $4.83\text{E-}1$ Ci.
- o The radiation doses from liquid releases are: (a) total body: $3.20\text{E-}1$ mrem, (b) limiting organ: $5.25\text{E-}1$ mrem.
- o The radioactive releases and resulting doses generated from Unit 1 were below the Technical Specification Limits for both gaseous and liquid effluents.

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SEMIANNUAL EFFLUENT REPORT

January - June (1988)

SECTION A. INTRODUCTION

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

1. Quarterly summaries of gaseous and liquid effluents for "continuous" and "batch" modes of release;
2. Percent of Technical Specification Limits;
3. Percent of Applicable Limits;
4. Estimated Total Percent Error;
5. Lower Limit of Detection concentrations;
6. Batch release summaries;
7. Previous Semiannual Report Addendum;
8. Radwaste Shipments;
9. 10 CFR 50 Appendix I Requirements.

SECTION B. GASEOUS EFFLUENTS

Table 1A, "Gaseous Effluents-Summation of All Releases," provides a detailed listing of gaseous effluents released quarterly in four categories: fission and activation gases, iodine-131, particulates with half-lives greater than eight days, and tritium. Listed for each of the four categories are: (1) the total curies released, (2) the average release rate, (3) the percent of Technical Specification Limit (TSL), and (4) the estimated total error. In addition, the particulate category lists the gross alpha radioactivity released for each quarter.

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

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

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

Waste gas decay tank and calibration releases are considered to be "batch" releases. Containment purges, steam jet air ejector, 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 2-3.

TABLE 1A
S.O.N.G.S 2 - 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1988)
GASEOUS EFFLUENTS-SUMMATION OF ALL RELEASES

	Unit	First Quarter	Second Quarter	Estimated Total Error, %
A. Fission and activation gases				
1. Total release	Ci	2.44E+3	1.23E+3	2.50E+1
2. Average release rate for period	uCi/sec	3.10E+2	1.56E+2	
3. Percent of technical specification limit	%	6.08E-1	2.80E-1	
=====				
B. Iodines				
1. Total iodine-131	Ci	2.93E-2	3.09E-2	1.90E+1
2. Average release rate for period	uCi/sec	3.73E-3	3.93E-3	
3. Percent of technical specification limit	%	1.79E-2	1.89E-2	
=====				
C. Particulates				
1. Particulates with half-lives > 8 days	Ci	1.46E-3	3.28E-4	1.60E+1
2. Average release rate for period	uCi/sec	1.86E-4	4.17E-5	
3. Percent of technical specification limit	%	1.09E-4	2.52E-5	
4. Gross alpha radioactivity	Ci	<LLD	*	5.00E+1
=====				
D. Tritium				
1. Total release	Ci	1.46E+1	1.10E-1	2.50E+1
2. Average release rate for period	uCi/sec	1.86E+0	1.40E-2	
3. Percent of technical specification limit	%	4.46E-3	3.36E-5	
=====				

LLD - Lower Limit of Detection; See Table 1D.

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

TABLE 1C
S.O.N.G.S. 2 - 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1988)
GASEOUS EFFLUENTS-GROUND LEVEL RELEASES

Nuclides Released	Unit	Continuous Mode		Batch Mode	
		First Quarter	Second Quarter	First Quarter	Second Quarter
1. Fission gases					
argon-41	Ci	7.72E+0	3.10E+0	<LLD	<LLD
krypton-85	Ci	<LLD	2.36E+0	4.02E+0	2.20E+0
krypton-85m	Ci	5.75E+0	1.26E+0	9.79E-3	2.79E-2
krypton-87	Ci	5.11E+0	9.72E-4	<LLD	<LLD
krypton-88	Ci	8.41E+0	<LLD	<LLD	<LLD
xenon-131m	Ci	1.80E+0	2.42E+0	1.40E-1	1.81E+0
xenon-133	Ci	2.26E+3	1.06E+3	4.25E+0	8.03E+1
xenon-133m	Ci	4.03E+0	1.44E+0	7.34E-2	5.37E-1
xenon-135	Ci	1.34E+2	6.61E+1	2.64E-1	4.24E-1
xenon-135m	Ci	2.99E+0	3.62E-2	<LLD	<LLD
xenon-138	Ci	9.84E-1	<LLD	<LLD	<LLD
Total for period	Ci	2.43E+3	1.14E+3	8.75E+0	8.53E+1

<u>2. Iodines</u>					
iodine-131	Ci	2.93E-2	3.09E-2	NA	NA
iodine-132	Ci	1.90E-4	1.84E-4	NA	NA
iodine-133	Ci	9.42E-3	2.00E-3	NA	NA
iodine-135	Ci	1.18E-3	1.86E-4	NA	NA
Total for period	Ci	4.01E-2	3.33E-2	NA	NA

TABLE 1C (Continued)

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

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1988)
GASEOUS EFFLUENTS-GROUND LEVEL RELEASES

Nuclides Released	Unit	Continuous Mode		Batch Mode	
		First Quarter	Second Quarter	First Quarter	Second Quarter
3. Particulates					
barium-139	Ci	1.01E-5	<LLD	NA	NA
barium-140	Ci	<LLD	<LLD	NA	NA
bromine-82	Ci	3.91E-5	1.22E-5	NA	NA
cesium-134	Ci	2.33E-6	3.11E-6	NA	NA
cesium-136	Ci	2.94E-7	<LLD	NA	NA
cesium-137	Ci	7.14E-5	7.95E-5	NA	NA
cesium-138	Ci	1.11E-3	4.41E-5	NA	NA
chromium-51	Ci	8.07E-5	<LLD	NA	NA
cobalt-57	Ci	8.38E-11	<LLD	NA	NA
cobalt-58	Ci	7.54E-4	1.81E-4	NA	NA
cobalt-60	Ci	3.35E-4	4.10E-5	NA	NA
lanthanum-140	Ci	<LLD	<LLD	NA	NA
manganese-54	Ci	6.10E-5	1.59E-5	NA	NA
molybdenum-99	Ci	1.68E-6	6.42E-7	NA	NA
niobium-95	Ci	1.18E-4	7.49E-6	NA	NA
niobium-95m	Ci	1.98E-6	1.18E-6	NA	NA
niobium-97	Ci	6.69E-6	<LLD	NA	NA
rubidium-88	Ci	3.61E-3	6.40E-4	NA	NA
ruthenium-103	Ci	1.22E-6	<LLD	NA	NA
sodium-24	Ci	1.55E-7	<LLD	NA	NA
strontium-89	Ci	**	*	NA	NA
strontium-90	Ci	2.99E-9	*	NA	NA
strontium-92	Ci	4.05E-9	7.73E-7	NA	NA
technetium-99m	Ci	1.72E-6	6.54E-7	NA	NA
tellurium-132	Ci	2.23E-7	<LLD	NA	NA
tin-113	Ci	3.51E-6	<LLD	NA	NA
yttrium-92	Ci	1.77E-6	<LLD	NA	NA
zirconium-95	Ci	3.15E-5	<LLD	NA	NA

LLD - Lower Limit of Detection; See Table 1D.

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

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

** - First quarter Sr-89 values appear to be in error. They are currently being investigated. Findings will be reported in the July-December 1988 Semiannual Report.

TABLE 1D

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

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1988)
GASEOUS EFFLUENTS-LOWER LIMIT OF DETECTION

RADIONUCLIDES	CONTINUOUS MODE LLD (uCi/cc)	BATCH MODE LLD (uCi/cc)
<u>1. Fission and activation gases</u>		
argon-41	*	<6.60E-6
krypton-85m	<2.10E-5	*
krypton-87	*	<5.90E-6
krypton-88	<4.50E-7	<5.10E-6
xenon-135m	*	<1.90E-5
xenon-138	<2.30E-6	<3.90E-5

2. Iodines3. Particulates

barium-139	<1.40E-12	NA
barium-140	<5.00E-13	NA
cesium-136	<1.60E-13	NA
chromium-51	<1.60E-12	NA
cobalt-57	<9.30E-14	NA
lanthanum-140	<3.30E-13	NA
niobium-97	<4.80E-13	NA
ruthenium-103	<1.50E-13	NA
sodium-24	<2.90E-13	NA
strontium-89	<1.00E-13	NA
strontium-90	<1.00E-14	NA
tellurium-132	<1.40E-13	NA
tin-113	<1.90E-13	NA
yttrium-92	<2.00E-12	NA
zirconium-95	<2.70E-13	NA
gross alpha	<1.00E-13	NA

* - Nuclides were detected in Table 1C.

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

TABLE 1E
S.O.N.G.S. 2 - 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1988)
GASEOUS EFFLUENTS-RADIATION DOSES AT THE SITE BOUNDARY

	Unit	First Quarter	Second Quarter*
A. Noble Gas			
1. Gamma air dose	mrad	2.00E-1	8.61E-2
2. Percent Technical Specification Limit	%	2.00E+0	8.61E-1
3. Beta air dose	mrad	4.32E-1	2.13E-1
4. Percent Technical Specification Limit	%	2.16E+0	1.07E+0
B. Tritium, Iodine, Particulate (at the nearest receptor)			
1. Organ dose	mrem	6.40E-2	2.99E-2
2. Percent Technical Specification Limit	%	4.27E-1	1.99E-1

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

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

TABLE 1F
S.O.N.G.S 2 - 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1988)
GASEOUS EFFLUENTS-BATCH RELEASE SUMMARY

	6-MONTH PERIOD
1. Number of batch releases:	7 releases
2. Total time period for batch releases:	2683 minutes
3. Maximum time period for a batch:	530 minutes
4. Average time period for a batch release:	383 minutes
5. Minimum time period for a batch release:	315 minutes

SECTION C. LIQUID EFFLUENTS

Table 2A, "Liquid Effluents-Summation of All Releases," provides a detailed summary of liquid effluents released quarterly in three categories: fission and activation products, tritium, and dissolved and entrained gases. Listed for each of the three categories are: (1) the total curies released, (2) the average diluted concentration, (3) the percent of applicable limit, and (4) the estimated total error. In addition, Table 2A lists: (1) the gross alpha radioactivity, (2) the volume of waste released (prior to dilution), and (3) the volume of the 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 Tables 2A and 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 2-3.

TABLE 2A

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

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1988)
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	6.28E-1	3.88E-1	1.90E+1
2. Average diluted concentration during period	uCi/ml	8.31E-10	7.29E-10	
3. Percent of applicable limit	%	1.86E-1	6.14E-2	
=====				
B. Tritium				
1. Total release	Ci	2.86E+2	1.85E+2	1.90E+1
2. Average diluted concentration during period	uCi/ml	3.78E-7	3.48E-7	
3. Percent of applicable limit	%	1.26E-2	1.16E-2	
=====				
C. Dissolved and entrained gases				
1. Total release	Ci	1.53E+1	6.82E-1	1.90E+1
2. Average diluted concentration during period	uCi/ml	2.02E-8	1.28E-9	
3. Percent of applicable limit	%	1.01E-2	6.40E-4	
=====				
D. Gross alpha radioactivity				
1. Total release	Ci	<LLD	*	5.00E+1
=====				
E. Volume of waste released (prior to dilution)				
	liters	1.29E+7	1.44E+7	5.00E+0
=====				
F. Volume of dilution water used during period				
	liters	7.56E+11	5.32E+11	5.00E+0
=====				

LLD - Lower Limit of Detection; see Table 2C.

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

TABLE 2B
S.O.N.G.S. 2 - 3
EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1988)
LIQUID EFFLUENTS

Nuclides Released	Unit	Continuous Mode		Batch Mode	
		First Quarter	Second Quarter	First Quarter	Second Quarter
antimony-124	Ci	<LLD	<LLD	1.60E-4	2.67E-3
antimony-125	Ci	<LLD	<LLD	1.50E-3	1.05E-2
barium-139	Ci	<LLD	<LLD	7.85E-5	<LLD
barium-140	Ci	2.43E-3	<LLD	2.12E-3	4.85E-5
bromine-84	Ci	<LLD	<LLD	<LLD	4.35E-5
cerium-141	Ci	<LLD	<LLD	3.94E-6	2.77E-5
cerium-143	Ci	<LLD	<LLD	1.93E-5	<LLD
cerium-144	Ci	<LLD	1.83E-4	2.12E-4	1.19E-4
cesium-134	Ci	7.18E-3	2.28E-3	3.78E-3	3.52E-2
cesium-136	Ci	2.08E-3	<LLD	1.93E-3	1.16E-3
cesium-137	Ci	1.62E-2	4.48E-3	9.44E-3	6.76E-2
chromium-51	Ci	<LLD	<LLD	4.39E-3	6.50E-3
cobalt-57	Ci	1.40E-4	<LLD	3.86E-5	2.54E-4
cobalt-58	Ci	4.83E-3	2.12E-3	1.47E-2	1.43E-1
cobalt-60	Ci	1.74E-4	<LLD	6.75E-3	5.95E-3
iodine-131	Ci	3.12E-1	6.64E-2	7.38E-2	2.88E-2
iodine-132	Ci	<LLD	<LLD	2.84E-6	9.73E-6
iodine-133	Ci	1.11E-1	<LLD	3.54E-3	7.07E-6
iron-55	Ci	<LLD	*	<LLD	*
iron-59	Ci	<LLD	<LLD	3.12E-4	3.81E-4
lanthanum-140	Ci	1.32E-3	1.10E-3	1.07E-3	2.52E-4
manganese-54	Ci	6.92E-3	9.03E-4	5.78E-3	4.14E-3
molybdenum-99	Ci	8.42E-3	1.21E-4	2.68E-3	6.21E-5
niobium-95	Ci	<LLD	5.96E-6	5.10E-3	2.27E-3
niobium-97	Ci	<LLD	<LLD	3.11E-5	3.43E-5
ruthenium-103	Ci	<LLD	<LLD	1.34E-4	1.55E-4
ruthenium-106	Ci	<LLD	<LLD	6.81E-4	<LLD
silver-110m	Ci	<LLD	<LLD	2.53E-4	3.08E-4
sodium-24	Ci	3.88E-4	<LLD	<LLD	<LLD
strontium-89	Ci	2.06E-3	*	6.63E-5	*
strontium-90	Ci	2.33E-5	*	<LLD	*
technetium-99m	Ci	8.55E-3	1.23E-4	2.73E-3	6.33E-5
tellurium-132	Ci	1.05E-4	<LLD	4.00E-6	3.52E-5
tin-113	Ci	<LLD	<LLD	1.22E-4	1.27E-4
yttrium-92	Ci	<LLD	<LLD	1.04E-5	<LLD
zinc-65	Ci	<LLD	<LLD	<LLD	1.38E-5
zirconium-95	Ci	<LLD	<LLD	2.59E-3	1.26E-3
Total for period (above)	Ci	4.84E-1	7.77E-2	1.44E-1	3.11E-1

LLD - Lower Limit of Detection; see Table 2C.

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

TABLE 2B (Continued)

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

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1988)
LIQUID EFFLUENTS

Nuclides Released	Unit	Continuous Mode		Batch Mode	
		First Quarter	Second Quarter	First Quarter	Second Quarter
krypton-85	Ci	<LLD	<LLD	4.07E-3	3.02E-3
krypton-85m	Ci	<LLD	<LLD	1.16E-5	1.74E-6
xenon-131m	Ci	<LLD	7.03E-3	7.38E-2	1.32E-2
xenon-133	Ci	3.24E-2	1.81E-3	1.49E+1	6.52E-1
xenon-133m	Ci	5.86E-3	<LLD	1.87E-1	3.27E-3
xenon-135	Ci	<LLD	3.97E-4	7.76E-2	1.52E-3

LLD - Lower Limit of Detection; see Table 2C.

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

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1988)
LIQUID EFFLUENTS-LOWER LIMIT OF DETECTION

RADIONUCLIDES	CONTINUOUS MODE LLD (uCi/ml)	BATCH MODE LLD (uCi/ml)
<u>1. Fission and activation products</u>		
antimony-124	<2.90E-7	*
antimony-125	<1.80E-7	*
barium-139	**	<2.80E-7
barium-140	<2.50E-7	*
bromine-84	**	<3.50E-7
cerium-141	<8.20E-7	*
cerium-143	<1.30E-7	<9.10E-8
cerium-144	<3.80E-7	<3.20E-7
cesium-136	<1.10E-7	*
chromium-51	<6.00E-7	*
cobalt-57	<5.20E-7	*
cobalt-58	<1.00E-7	*
cobalt-60	<1.10E-7	*
iodine-132	<2.40E-6	*
iodine-133	<1.00E-7	*
iron-55	<1.00E-6	<1.00E-6
iron-59	<1.60E-7	*
niobium-95	<6.60E-8	*
niobium-97	**	*
ruthenium-103	<4.70E-8	*
ruthenium-106	<7.00E-7	<5.10E-7
silver-110m	<1.00E-7	*
sodium-24	<1.90E-7	<3.30E-8
strontium-90	*	<1.00E-8
tellurium-132	<5.30E-8	*
tin-113	<6.20E-8	*
yttrium-92	<6.90E-6	<3.90E-7
zinc-65	<1.80E-7	<6.90E-8
zirconium-95	<1.20E-7	*
gross alpha	<1.00E-7	<1.00E-7

- * - Nuclide detected in Table 2B.
** - Weekly composite analysis will not detect this isotope.

TABLE 2C (Continued)

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

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1988)
LIQUID EFFLUENTS-LOWER LIMIT OF DETECTION

RADIONUCLIDES	CONTINUOUS MODE LLD (uCi/ml)	BATCH MODE LLD (uCi/ml)
<u>2. Dissolved and entrained gases</u>		
krypton-85	<4.70E-5	*
krypton-85m	<1.30E-7	*
xenon-131m	<4.00E-6	*
xenon-133	*	*
xenon-133m	<9.30E-7	*
xenon-135	<2.30E-8	*

* - Nuclide detected in Table 2B.

TABLE 2D

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

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1988)
LIQUID EFFLUENTS-RADIATION DOSES AT THE LIQUID SITE BOUNDARY

	Unit	First Quarter	Second Quarter*
A. Noble Gas			
1. Total body dose	mrem	3.68E-3	1.09E-2
2. Percent Technical Specification Limit	%	1.23E-1	3.63E-1
B. Tritium, Iodine, Particulate (at the nearest receptor)			
1. Limiting organ dose	mrem	2.51E-1	5.85E-2
2. Percent Technical Specification Limit	%	2.51E+0	5.85E-1

NOTE: The limiting organ for the first and second quarters is the thyroid.

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

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

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1988)
LIQUID EFFLUENTS-BATCH RELEASE SUMMARY

		6-MONTH PERIOD
1. Number of batch releases:	185	releases
2. Total time period for batch releases:	31,635	minutes
3. Maximum time period for a batch release:	920	minutes
4. Average time period for a batch release:	171	minutes
5. Mimium time period for a batch release:	20	minutes
6. Average saltwater flow during batch releases:	740,000	gpm

SECTION D. PREVIOUS SEMIANNUAL REPORT ADDENDUM

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

1. Data presented in the previous Semiannual Report (July-December 1987) issued an improper correction to the 4th Quarter of 1986. The proper correction should read:

GASEOUS EFFLUENTS (4th Quarter 1986)

Fourth Quarter			
Nuclides Released	Unit	Continuous Mode	Batch Mode
strontium-89	Ci	5.20E-10	*
strontium-90	Ci	<LLD	*
gross alpha	Ci	3.03E-6	*

Sr-90 LLD = <1.00E-14 uCi/cc

2. In the July - December 1987 Semiannual Report, values for composite gross alpha, Sr-89, Sr-90, (Tables 1A and 1C) were incomplete due to data not available at report time. The values not reported were for the fourth quarter of 1987. The values are as follows:

GASEOUS EFFLUENTS

Fourth Quarter			
Nuclides Released	Unit	Continuous Mode	Batch Mode
strontium-89	Ci	<LLD	*
strontium-90	Ci	<LLD	*
gross alpha	Ci	<LLD	*

Sr-89 LLD = <5.00E-13 uCi/cc

Sr-90 LLD = <3.00E-14 uCi/cc

gross alpha LLD = <5.00E-14 uCi/cc

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

SECTION D. PREVIOUS SEMIANNUAL REPORT ADDENDUM (Continued)

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

3. In the July - December 1987 Semiannual Report curie values and resulting doses for composite gross alpha, Sr-89, Sr-90, and Fe-55 (Tables 2A and 2B) were incomplete due to data not available at report time. The values are as follows:

Fourth Quarter			
Nuclides Released	Unit	Continuous Mode	Batch Mode
iron-55	Ci	<LLD	6.67E-3
strontium-89	Ci	<LLD	<LLD
strontium-90	Ci	<LLD	<LLD
gross alpha	Ci	<LLD	<LLD

Fe-55 LLD = $<1.00\text{E-}6$ uCi/ml

Sr-89 LLD = $<4.00\text{E-}8$ uCi/ml

Sr-90 LLD = $<2.00\text{E-}8$ uCi/ml

gross alpha LLD = $<1.00\text{E-}7$ uCi/ml

SECTION D. PREVIOUS SEMIANNUAL REPORT ADDENDUM (Continued)

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

4. GASEOUS EFFLUENTS-RADIATION DOSES AT THE SITE BOUNDARY

For the second quarter of 1987 Semiannual Report, Sr-89, and Sr-90.

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

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

5. LIQUID EFFLUENT-RADIATION DOSES AT THE SITE BOUNDARY

For the fourth quarter of 1987 Semiannual Report, Sr-89, Sr-90, and Fe-55.

	Unit	Fourth Quarter
A.		
1. Total body dose	mrem	4.53E-4
2. Percent Applicable Limit	%	1.51E-2
B.		
1. Limit organ dose	mrem	2.82E-3
2. Percent Applicable Limit	%	2.82E-2

NOTE: The limiting organ is the bone.

SECTION E. RADWASTE SHIPMENTS

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

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1988) SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

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

1. Type of waste	Unit	6-Month Period	Est. Total Error, %
a. Spent resins, filter sludges, evaporator bottoms, etc.	m ³ Ci	2.41E+1* 1.54E+3	3.00E+1
b. Dry compressible waste, contaminated equip. etc.	m ³ Ci	8.13E+1** 2.22E+0	3.00E+1
c. Irradiated components, control rods, etc.	m ³ Ci	NA NA	3.00E+1
d. Other (filters, sludge sand/rubble, wet trash)	m ³ Ci	2.76E+0** 1.64E-1	3.00E+1

* - Shipped in Type A Cask (C of C 9176), 4 - 142 ft³ High Integrity containers. Shipped in Type B Cask (C of C 9208), 2 - 142 ft³ High Integrity Containers. (Reported volume is for burial volume of container).

** - Material shipped in 55 gal. D.O.T. 7A Type A Drums (7.5 ft³ each) and steel boxes (strong tight containers - 98 ft³ each).

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

a. Not applicable.

SECTION E. RADWASTE SHIPMENTS (Continued)

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

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1988)
SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

a.	carbon-14	%	1.99E-5
	cerium-144	%	2.19E-2
	cesium-134	%	3.21E+1
	cesium-137	%	5.48E+1
	cobalt-58	%	1.81E+0
	cobalt-60	%	2.08E+0
	curium-242	%	1.46E-7
	iodine-129	%	2.53E-4
	iron-55	%	5.69E+0
	manganese-54	%	2.13E+0
	nickel-63	%	1.37E+0
	plutonium-241	%	1.24E-2
	strontium-89	%	9.93E-2
	strontium-90	%	8.24E-2
	technetium-99	%	4.59E-4
	tritium	%	2.52E-2

b.	carbon-14	%	7.79E-3
	cesium-134	%	3.34E+1
	cesium-137	%	3.23E+1
	curium-242	%	1.40E+0
	iodine-129	%	1.39E-1
	iodine-131	%	1.55E+0
	iron-55	%	1.92E+1
	nickel-63	%	4.27E+0
	niobium-94	%	1.46E-1
	plutonium-241	%	1.60E+0
	technetium-99	%	3.40E-1
	tritium	%	5.68E+0

SECTION E. RADWASTE SHIPMENTS (Continued)

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

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1988)
SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

c. Not applicable	%	0.00E+0
-------------------	---	---------

d. carbon-14	%	7.34E-3
cesium-134	%	1.19E+1
cesium-137	%	1.37E+1
iodine-129	%	5.93E-2
iron-55	%	8.13E+0
technetium-99	%	1.42E-1
tritium	%	6.60E+1

3. Solid Waste Disposition

See COMMON section of this report

B. IRRADIATED FUEL SHIPMENTS (Disposition)

See COMMON section of this report

SECTION F. TECHNICAL SPECIFICATION LIMITS AND APPLICABLE LIMITS

Gaseous Effluents - Technical Specification Limits

The percent of Technical Specification Limit, tabulated in Table 1A, was determined by calculation of the following parameter:

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

Where: Rel Rate = total curies released in each category and each quarter, divided by the seconds in a quarter; this is the value in Parts A.2, B.2, C.2 and D.2 of converted to microcuries.

X/Q = $4.80\text{E-}6 \text{ sec/m}^3$ and is the annual average atmospheric dispersion defined in the ODCM, Rev. 17.

The MPC_{eff} is defined as:

$$\frac{1}{\sum_{i=1}^n \frac{F_i}{\text{MPC}_i}}$$

Where: F_i = fractional abundance of the i th radionuclide obtained by dividing the activity in curies for each radionuclide, C_i , by the sum of all such activities, C_T .

n = total number of radionuclides identified

MPC_i = MPC of the i th radionuclide

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

SECTION F. TECHNICAL SPECIFICATION LIMITS AND APPLICABLE LIMITS

Liquid Effluents - Applicable Limits

The percent of applicable limit, tabulated in Table 2A, was determined by calculation of the following parameter:

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

Where: Dil Conc = total curies released in each category and each quarter, converted to microcuries, divided by the total volume released (sum of Parts E and F in Table 2A) converted to milliliters. This number is the value in Part A.2, B.2 and C.2 of Table 2A.

The MPC_{eff} is defined as:

$$\sum_{i=1}^n \frac{F_i}{\text{MPC}_i}$$

Where: F_i = fractional abundance of the i th radionuclide obtained by dividing the activity in curies for each radionuclide, C_i , by the sum of all such activities, C_T .

n = total number of radionuclides identified

MPC_i = MPC of the i th radionuclide

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

SECTION G. ESTIMATION OF ERROR

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

Estimations of the error in reported values of gaseous and liquid effluents releases have been made. Sources of error considered for gaseous effluents - batch releases are: (1) tank volumes, (2) sampling, (3) counting, and (4) calibration. Sources of error for gaseous effluents - continuous releases are: (1) fan flow rate, (2) sampling, (3) counting, (4) calibration and (5) differential pressure drop.

Sources of error for liquid effluents - batch releases are: (1) tank volumes, (2) sampling, (3) counting, and (4) calibration. Sources of error for liquid effluents - continuous releases are: (1) dilution water flow rate, (2) sampling, (3) counting, and (4) calibration.

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

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

Where: σ_i = Error associated with each component.

SECTION H. 10 CFR 50 APPENDIX I REQUIREMENTS

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

Table 1 in Section H presents the quarterly 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, and (6) Direct Radiation.

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

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

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

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

TABLE 1

SOURCE	Dose* (millirems)	
	1st Quarter	2nd Quarter
LIQUID EFFLUENTS	1)	2)
Whole Body	3.68E-3	1.09E-2
Organ	3)	4)
	2.51E-1	5.85E-2
AIRBORNE EFFLUENTS	5)	6)
Tritium Iodines and Particulates	4.44E-2	3.91E-2
NOBLE GASES**	7)	8)
Gamma	1.50E-1	3.20E-2
Beta	9)	10)
	3.55E-1	7.93E-2
DIRECT RADIATION	11)	12)
	1.23E+0	1.05E+0

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

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

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

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

1. This data was calculated using the methodology of the ODCM.
2. This data was calculated using the methodology of the ODCM.
3. This data was calculated using the methodology of the ODCM; the GI-LLI received the maximum dose primarily by the saltwater fish pathway.
4. This data was calculated using the methodology of the ODCM; the GI-LLI received the maximum dose primarily by the saltwater fish pathway.
5. The maximum organ dose was to a child's thyroid and was located in the NNW sector. This was calculated using the activity reported in the January - June 1988 Semiannual Report with the assumptions of USNRC Regulatory Guide 1.109.
6. The maximum organ dose was to a child's thyroid and was located in the NNW sector. This was calculated using the activity reported in the January - June 1988 Semiannual Report with the assumptions of USNRC Regulatory Guide 1.109.
7. The maximum air dose of $5.54E-1$ mrad for gamma radiation was located in the SSW sector, a seaward direction. The reported maximum air dose for gamma radiation was located in the ENE sector, at the exclusion area boundary and calculated with the assumptions of USNRC Regulatory Guide 1.109.
8. A maximum air dose of $7.20E-2$ mrad for gamma radiation was located in the SSW sector, a seaward direction. The reported maximum air dose for gamma radiation was located in the E sector, a landward sector, at the exclusion area boundary and calculated with the assumptions of USNRC Regulatory Guide 1.109.
9. The maximum air dose of $8.63E-1$ mrad for beta radiation was located in the SSW sector, a seaward direction. The reported maximum air dose for beta radiation was located in the ENE sector, at the exclusion area boundary and calculated with the assumptions of USNRC Regulatory Guide 1.109.
10. A maximum air dose of $1.78E-1$ mrad for beta radiation was located in the SSW sector, a seaward direction. The reported maximum air dose for beta radiation was located in the E sector, a landward sector, at the exclusion area boundary and calculated with the assumptions of the USNRC Regulatory Guide 1.109.

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

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

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

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

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

TABLE 2

SOURCE	% TSL	
	1st Quarter	2nd Quarter
LIQUID EFFLUENTS		
Whole Body	1.23E-1	3.63E-1
Organ	2.51E+0	5.85E-1
AIRBORNE EFFLUENTS		
Tritium, Iodines and Particulates	2.96E-1	2.61E-1
NOBLE GASES		
Gamma	1.50E+0	3.20E-1
Beta	1.78E+0	3.97E-1

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

SECTION I. CHANGES TO OFFSITE DOSE CALCULATION MANUAL

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

- o There was a revision to Units 2/3 Offsite Dose Calculation Manual (Rev. 19) during the reporting period, January 1, 1988 to June 30, 1988. A complete package documenting this revision was included in the June Monthly Operating Report per Technical Specification 6.9.1.10.

SECTION J. S.O.N.G.S. 2-3 MISCELLANEOUS

- o There were three unplanned releases during the reporting period, one gaseous and two liquid.

UNPLANNED GASEOUS RELEASE

Shortly after 18:35 on May 11th, the Unit 3 Equipment Hatch was opened and remained open to support activities for the refueling outage. Late on swing shift exhaust fans were still shut down from the opening of the Equipment Hatch as well as having a surveillance on the Purge Valves. Normal operation during periods such as this is to have the Main Exhaust Purge Fans running (no supply fans) in order to cause a continuous inward flow of air through the Equipment Hatch. At 02:00 Main Purge (exhaust) was re-established. At that time a particulate/iodine cartridge was pulled which was located just outside the Equipment Hatch and had been run for 10 minutes. The results were:

Xe-133	5.93E-10 uCi/cc
I-131	5.30E-9 uCi/cc
I-132	7.48E-10 uCi/cc

A sampler that had been running continuously since 19:00 on May 10th results were:

Xe-133	3.87E-11 uCi/cc
I-131	5.35E-10 uCi/cc
I-132	3.08E-11 uCi/cc

SECTION J. S.O.N.G.S. 2-3 MISCELLANEOUS (Continued)

Once Main Purge was firmly established another sample was taken. Its results were all less than lower limit of detection.

Conservatively assuming highest concentrations and the longest release period creditable, the release is:

- 19 foot diameter Equipment Hatch
- air flows out at 1/2 inch per second

Iodines $2.01\text{E}+7 \text{ cc/min} \times 6.05\text{E}-9 \text{ uCi/cc (Iodines)} \times 390 \text{ minutes} = 47 \text{ uCi}$
Noble Gas $2.01\text{E}+7 \text{ cc/min} \times 5.93\text{E}-10 \text{ uCi/cc} \times 390 \text{ minutes} = 4.6 \text{ uCi}$

Concentrations at the site boundary would have been:

	<u>Concentration</u>	<u>MPC</u>	<u>%MPC</u>
Iodines	$9.64\text{E}-15 \text{ uCi/cc}$	$1.0\text{E}-10 \text{ uCi/cc}$	$9.64\text{E}-3\%$
Noble Gas	$9.44\text{E}-16 \text{ uCi/cc}$	$3.0\text{E}-7 \text{ uCi/cc}$	$3.14\text{E}-7\%$

It is concluded that this release has negligible significance.

UNPLANNED LIQUID RELEASE #1

On June 10th water was observed seeping out of a drain outside Unit 2's Equipment Hatch. This water then ran across about 4 feet of concrete and down a storm drain. A sample of the water showed $1.5\text{E}-5 \text{ uCi/ml}$ and since it was leaving the plant via a Storm Drain it is an Unplanned, Unmonitored release. Upon confirmation of activity the drain was capped and the pathway across the concrete cleaned up.

Investigation of the leak yielded the following:

1. The drain is part of the Fuel Handling Building Sump and was backing up.
2. The 4 foot long drainage pathway had moss growing on it and several people felt it had existed for about two months.
3. A sample of the water showed:

Mn-54	$2.03\text{E}-7 \text{ uCi/ml}$
Cs-134	$6.09\text{E}-6 \text{ uCi/ml}$
Cs-137	$9.07\text{E}-6 \text{ uCi/ml}$

SECTION J. S.O.N.G.S. 2-3 MISCELLANEOUS (Continued)

4. Flow into the Storm Drain was estimated at 3 drops/min.

Therefore: The leak probably went on for 2 months, which resulted in approximately 200 gallons discharged and a total activity of 11.6 uCi. This release has no significant concentration or dose consequence.

The P&ID's carry this drain on both Units as "normally capped". Investigation revealed that the same drain on the Unit 3 side is also uncapped. A Maintenance Order has been written to cap this drain (MO #88061086), and is being tracked by the SOCR system to completion.

UNPLANNED LIQUID RELEASE #2

On June 11th operator Harley Bickford noticed water leaking out of Unit 3's transfer pad drain, down the side of the RWST building and into a Storm Drain near the Diesel Generator Building.

The discharge rate at the time was estimated at 0.5 gallons per minute. Because of the recent attention drawn to water going down Storm Drains, Mr. Bickford reported this situation. Samples were taken, the drain was pumped down and sealed with plastic on the 14th by Health Physics. The samples showed: Cs-137 at $1.57\text{E-}6$ uCi/ml. A 12 hour discharge at a rate of 0.5 gpm yields 2.14 uCi discharged.

Twelve hours was picked because the previous day Operations had taken pictures of area since they recalled that this drain had been a "geyser" in the past. At that time there was no flow. A Maintenance Order #88061079 has been written to cap the drain to prevent recurrence. This Maintenance Order is being tracked to completion by the SOCR system.

This release has no significant concentration or dose consequences.

January 1, 1988 - June 30, 1988

EFFLUENT RADIATION MONITORS OUT OF SERVICE FOR GREATER THAN 30 DAYS

S.O.N.G.S. 2

Monitor	Inoperability Period	Inoperability Cause	Explanation
2-7865 Plant Vent Stack-WRGM	01/28/88 - Present	Process Flow Monitor Out of Service	Process flow measurement under investigation.
2-7870 Condenser Ejector-WRGM	12/10/87 - 03/08/88 04/15/88 - 06/10/88	Process Flow Monitor Out of Service	Process flow measurement under investigation.
2-7818A Condenser Air Ejector	09/03/87 - 01/25/88 02/29/88 - Present	18 month and 92 day surveillances DCP-2-6460; Install new alarm circuit	Design flaw in 2-7818B makes entire monitor inoperative.
2-7818B Condenser Air Ejector	09/03/87 - 01/25/88 01/25/88 - Present 02/29/88 - Present	18 month and 92 day surveillances SPR # CU-871273, Design Flaw, DCP-2-6460; Install new alarm circuit	Design flaw in 2-7818B makes entire monitor inoperative.
2-7828 Containment Purge-WRGM	02/12/88 - 03/19/88	Check source failed. 18 month and 92 day surveillances	Process flow measurement under investigation.

January 1, 1988 - June 30, 1988

EFFLUENT RADIATION MONITORS OUT OF SERVICE FOR GREATER THAN 30 DAYS

S.O.N.G.S. 3

Monitor	Inoperability Period	Inoperability Cause	Explanation
3-7865 Plant Vent Stack-WRGM	11/23/88 - 02/02/88 05/03/88 - Present 05/26/88 - Present	Process Flow Monitor Out of Service. 18 month calibration.	Process flow measurement under investigation. Unit 3 outage.
3-7870 Condenser Ejector-WRGM	09/03/87 - 04/12/88 05/01/88 - Present 05/17/88 - Present	Process Flow Monitor Out of Service. 18 month calibration.	Process flow measurement under investigation. Unit 3 outage.
3-7818A Condenser Air Ejector	07/15/87 - 01/25/88 02/29/88 - Present 05/18/88 - Present	Blower tripping 92 day surveillance. Heat tracing check.	Design flaw in 3-7818B makes entire monitor inoperative. Unit 3 outage.
3-7818B Condenser Air Ejector	06/18/87 - 01/25/88 07/15/87 - 01/25/88 01/25/88 - Present 04/26/88 - Present 05/18/88 - Present	Does not track 3-7870 and 3-7818A. Blower tripping SPR # CU-871273, Design Flaw. 92 day surveillance. Heat tracing check.	Design flaw in 3-7818B makes entire monitor inoperative. Unit 3 outage.
3-7828 Containment Purge-WRGM	02/18/88 - Present	Main purge flow monitor inoperable. surveillances	Process flow measurement under investigation.
3-6753 SGBD Bypass (E-089)	05/18/88 - Present	18 month calibration.	Not required and no sample flow, unit shut down for entire period.

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

- o Gaseous effluent releases, excluding tritium, totaled 3670.1 curies with Xe-133 92.8% of the total.
- o The radiation doses from gaseous releases are: (a) gamma air dose: $2.86\text{E-}1$ mrad at the site boundary, (b) beta air dose: $6.45\text{E-}1$ mrad at the site boundary, (c) organ dose: $9.39\text{E-}2$ mrem at the nearest receptor.
- o Liquid releases totaled $4.88\text{E+}2$ curies of which tritium was $4.71\text{E+}2$ Ci, noble gases were $1.60\text{E+}1$ Ci, and particulates and iodines were $1.02\text{E+}0$ Ci.
- o The radiation doses from liquid releases are: (a) total body: $1.46\text{E-}2$ mrem, (b) limiting organ: $3.10\text{E-}1$ mrem.
- o The radioactive releases and resulting doses generated from Units 2 and 3 were below the Technical Specification Limits for both gaseous and liquid effluents.

COMMON RADWASTE SHIPMENTS

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1988) SOLID WASTE AND IRRADIATED FUEL SHIPMENT

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

1.	Type of waste	Unit	6-month Period	Est. Total Error, %
a.	Spent resins, filter sludges, evaporate bottoms, etc.	m ³ Ci	NA NA	3.00E+1 3.00E+1
b.	Dry compressible waste, contaminated equip, etc.	m ³ Ci	NA NA	3.00E+1 3.00E+1
c.	Irradiated components, control rods, etc.	m ³ Ci	NA NA	3.00E+1 3.00E+1
d.	Other (filters, sludge, sand/rubble, wet trash)	m ³ Ci	2.12E-1** 1.09E-2	3.00E+1 3.00E+1

** - Material packaged in 55-gallon Dot 7A Type A drums (7.5 ft³ ea.) and steel boxes (strong tight containers 98 ft³ ea).

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

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

COMMON RADWASTE SHIPMENTS (Continued)

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1988)
SOLID WASTE AND IRRADIATED FUEL SHIPMENT

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

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

d. carbon-14	%	6.42E-2
cesium-134	%	5.73E+0
cesium-137	%	6.57E+0
iodine-129	%	2.75E-2
iron-55	%	3.91E+0
nickel-63	%	8.62E-1
technetium-99	%	6.42E-2
tritium	%	8.26E+1

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

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
6	Tri-State Motor Transit Truck/Cask	Richland, WA
1	Tri-State Motor Transit Truck/Trailer	Richland, WA
4	Tri-State Motor Transit Truck/Trailer	Beatty, NV

* - The number of shipments, reflects shipments made from all three Units at SONGS. All waste generated is packaged and delivered to a control staging area for shipment. There are no independent shipments made of dry active waste for Unit 1, or Units 2/3, and are not reported separately.

COMMON RADWASTE SHIPMENTS (Continued)

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1988)
SOLID WASTE AND IRRADIATED FUEL SHIPMENT

B. IRRADIATED FUEL SHIPMENTS (Disposition)

<u>Number of Shipments</u>	<u>Mode of Transportation</u>	<u>Destination</u>
None	N/A	N/A

C. DEWATERING

<u>Number of Containers</u>	<u>Solidification Agent</u>
6	N/A

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

There were no changes to the Process Control Program during this reporting period, January 1, 1988 to June 30, 1988.

REFERENCES:

1. Unit 2 & 3 Technical Specifications, Section 6.13.2
2. Unit 1 Technical Specifications, Section 3.19

COMMON CONCLUSIONS

- o Radioactive releases from S.O.N.G.S. 1, 2 and 3 totaled 4630 curies for gaseous effluents, 93.8% of which was Xe-133. Curies discharged for liquid effluents were: tritium, 1088 curies; noble gases, 18.8 curies; particulates and iodines, 1.50 curies.
- o Radioactive releases and resulting doses generated from S.O.N.G.S. 1, 2 and 3 were below the Technical Specification Limits for both gaseous and liquid effluents.
- o S.O.N.G.S. 1, 2 and 3 made radwaste shipments to Richland, Washington, and to Beatty, Nevada. Total volume was $1.25\text{E}+2$ cubic meters containing $1.54\text{E}+3$ curies of radioactivity.
- o Meteorological conditions during the year were typical of the meteorology at S.O.N.G.S. Meteorological dispersion was good 35% of the time, fair 37% of the time and poor 28% of the time.
- o The net result from the analysis of these effluent releases indicates that the operation of S.O.N.G.S. 1, 2 and 3 has met all the requirements of the Technical Specifications and other applicable regulatory requirements and therefore has not produced any detrimental effect on the environment.

APPENDIX

GASEOUS EFFLUENTS - TECHNICAL SPECIFICATION LIMITS

A. The dose rate due to radioactive materials released in gaseous effluents from the site to areas at and beyond the site boundary shall be limited to the following values:

1. The dose rate limit for noble gases shall be ≤ 500 mrem/year to the total body and ≤ 3000 mrem/year to the skin.
2. The dose rate limit for iodines, tritium, and all radionuclides in particulate form with half lives greater than eight days shall be ≤ 1500 mrem/year to any organ.

B. 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 (Continued)

LIQUID EFFLUENTS - TECHNICAL SPECIFICATION LIMITS

- A. The concentration of radioactive material released in liquid effluents to Unrestricted Areas shall be limited to the concentrations specified in 10 CFR 20, Appendix B, Table II, Column 2 for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to $2.00\text{E-}4$ uCi/ml.
- B. 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: ≤ 1.5 mrem to the total body and ≤ 5 mrem to any organ.
 2. During any calendar year: ≤ 3 mrem to the total body and ≤ 10 mrem to any organ.

METEOROLOGY

The meteorology of the San Onofre Nuclear Generating Station for the first and second quarter, 1988 is described in this section. Meteorological measurements have been made according to the guidance set forth in USNRC Regulatory Guide 1.23, "Onsite Meteorological Programs." A summary report of the meteorological measurements taken during each calendar quarter are presented in Table 4A as joint frequency distribution (JFD) of wind direction and wind speed by atmospheric stability class.

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

Table 4A lists the joint frequency distribution for the first and second quarter, 1987. Each page of Table 4A represents the data for the stability Classes: A, B, C, D, E, F, and G; the last page of each table is the JFD with the combined stability classes. Each page is also divided into two parts; the upper part lists the number of hourly periods when each meteorology condition occurred, and the lower part lists the frequency of each classification by percent. The wind speeds have been measured at the 10-meter level, and the stability classes are defined by the temperature differential between the 10- and 40-meter levels.

Table 4A

SOUTHERN CALIFORNIA EDISON COMPANY
 SAN ONOFRE NUCLEAR GENERATING STATION
 1ST QUARTER 1988
 DAMES AND MOORE JOB NO. - 00377-120-09
 DATA PERIOD- 01/01/88 TO 03/31/88
 STABILITY CLASS #A# (10-40 METERS)
 WINDS AT 10 METER LEVEL

21-JUL-88

WIND FREQUENCY DISTRIBUTION
 (FREQUENCY IN NUMBER OF OCCURRENCES)

WIND DIRECTION	UPPER CLASS INTERVALS OF WIND SPEED (MPH)												TOTAL	MEAN SPEED
	1	2	3	4	5	6	7	8	9	10	11	>11		
NNE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	2.	16.55
NE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
ENE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.	2.	11.45
E	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
ESE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
SE	0.	0.	0.	0.	0.	0.	0.	1.	1.	2.	0.	6.	10.	11.47
SSE	0.	0.	0.	1.	1.	4.	5.	3.	6.	5.	3.	13.	41.	9.38
S	0.	0.	1.	7.	5.	4.	4.	8.	6.	5.	3.	7.	50.	7.62
SSW	0.	0.	0.	6.	6.	7.	7.	4.	4.	0.	1.	3.	38.	6.47
SW	0.	0.	4.	4.	11.	15.	9.	2.	1.	1.	1.	3.	51.	6.21
WSW	0.	0.	1.	6.	17.	16.	6.	6.	2.	1.	0.	0.	55.	5.49
W	0.	0.	0.	5.	18.	25.	22.	21.	8.	0.	0.	0.	99.	6.18
WNW	0.	0.	0.	0.	3.	8.	10.	14.	11.	6.	5.	8.	65.	8.47
NW	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	0.	0.	2.	9.50
NNW	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
N	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
VARIABLE													0.	0.00
CALM													0.	0.00
TOTAL	0.	0.	6.	29.	61.	79.	63.	59.	39.	22.	14.	43.	415.	7.19

WIND FREQUENCY DISTRIBUTION
 (FREQUENCY IN PERCENT OF TOTAL)

WIND DIRECTION	UPPER CLASS INTERVALS OF WIND SPEED (MPH)												TOTAL	MEAN SPEED
	1	2	3	4	5	6	7	8	9	10	11	>11		
NNE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.09	16.55
NE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ENE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.09	11.45
E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ESE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.09	0.00	0.28	0.46	11.47
SSE	0.00	0.00	0.00	0.05	0.05	0.18	0.23	0.14	0.28	0.23	0.14	0.60	1.87	9.38
S	0.00	0.00	0.05	0.32	0.23	0.18	0.18	0.37	0.28	0.23	0.14	0.32	2.30	7.62
SSW	0.00	0.00	0.00	0.28	0.28	0.32	0.32	0.18	0.18	0.00	0.05	0.14	1.75	6.47
SW	0.00	0.00	0.18	0.18	0.51	0.69	0.41	0.09	0.05	0.05	0.05	0.14	2.34	6.21
WSW	0.00	0.00	0.05	0.28	0.78	0.74	0.28	0.28	0.09	0.05	0.00	0.00	2.53	5.49
W	0.00	0.00	0.00	0.23	0.83	1.15	1.01	0.97	0.37	0.00	0.00	0.00	4.55	6.18
WNW	0.00	0.00	0.00	0.00	0.14	0.37	0.46	0.64	0.51	0.28	0.23	0.37	2.97	8.47
NW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.07	9.50
NNW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
N	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VARIABLE													0.00	0.00
CALM													0.00	0.00
TOTAL	0.00	0.00	0.28	1.33	2.80	3.63	2.90	2.71	1.79	1.01	0.64	1.98	19.08	7.19

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2184

TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2175

Table 4A

SOUTHERN CALIFORNIA EDISON COMPANY
 SAN ONOFRE NUCLEAR GENERATING STATION
 1ST QUARTER 1988
 DAMES AND MOORE JOB NO. - 00377-120-09
 DATA PERIOD- 01/01/88 TO 03/31/88
 STABILITY CLASS #B* (10-40 METERS)
 WINDS AT 10 METER LEVEL

21-JUL-88

WIND FREQUENCY DISTRIBUTION
 (FREQUENCY IN NUMBER OF OCCURRENCES)

WIND DIRECTION	UPPER CLASS INTERVALS OF WIND SPEED (MPH)												TOTAL	MEAN SPEED
	1	2	3	4	5	6	7	8	9	10	11	>11		
NNE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.	12.20
NE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.	14.40
ENE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
E	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
ESE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
SE	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	1.	2.	9.95
SSE	0.	0.	0.	1.	1.	1.	2.	0.	1.	1.	2.	2.	11.	8.51
S	0.	0.	0.	0.	0.	2.	0.	0.	1.	0.	0.	0.	3.	6.50
SSW	0.	0.	0.	2.	0.	1.	0.	0.	0.	0.	0.	0.	3.	4.07
SW	0.	0.	0.	0.	2.	0.	0.	0.	0.	0.	0.	0.	2.	4.95
WSW	0.	0.	0.	0.	1.	2.	0.	0.	0.	0.	0.	0.	3.	5.37
W	0.	0.	0.	2.	1.	0.	0.	1.	0.	0.	0.	0.	4.	5.10
WNW	0.	0.	0.	0.	1.	2.	3.	1.	1.	1.	0.	0.	9.	6.74
NW	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	1.	7.90
NNW	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
N	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
VARIABLE													0.	0.00
CALM													0.	0.00
TOTAL	0.	0.	0.	5.	6.	9.	5.	3.	3.	2.	2.	5.	40.	7.20

WIND FREQUENCY DISTRIBUTION
 (FREQUENCY IN PERCENT OF TOTAL)

WIND DIRECTION	UPPER CLASS INTERVALS OF WIND SPEED (MPH)												TOTAL	MEAN SPEED
	1	2	3	4	5	6	7	8	9	10	11	>11		
NNE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05	12.20
NE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05	14.40
ENE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ESE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SE	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.05	0.09	9.95
SSE	0.00	0.00	0.00	0.05	0.05	0.05	0.09	0.00	0.05	0.05	0.09	0.09	0.51	8.51
S	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.05	0.00	0.00	0.00	0.14	6.50
SSW	0.00	0.00	0.00	0.09	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.14	4.07
SW	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	4.95
WSW	0.00	0.00	0.00	0.00	0.05	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.14	5.37
W	0.00	0.00	0.00	0.09	0.05	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.19	5.10
WNW	0.00	0.00	0.00	0.00	0.05	0.09	0.14	0.05	0.05	0.05	0.00	0.00	0.41	6.74
NW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.05	7.90
NNW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
N	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VARIABLE													0.00	0.00
CALM													0.00	0.00
TOTAL	0.00	0.00	0.00	0.23	0.28	0.41	0.23	0.14	0.14	0.09	0.09	0.23	1.84	7.20

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2184

TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2175

Table 4A

SOUTHERN CALIFORNIA EDISON COMPANY
 SAN ONOFRE NUCLEAR GENERATING STATION
 1ST QUARTER 1988
 DAMES AND MOORE JOB NO. - 00377-120-09
 DATA PERIOD- 01/01/88 TO 03/31/88
 STABILITY CLASS #C# (10-40 METERS)
 WINDS AT 10 METER LEVEL

21-JUL-88

WIND FREQUENCY DISTRIBUTION
 (FREQUENCY IN NUMBER OF OCCURRENCES)

WIND DIRECTION	UPPER CLASS INTERVALS OF WIND SPEED (MPH)											TOTAL	MEAN SPEED
	1	2	3	4	5	6	7	8	9	10	11	>11	
NNE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
NE	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	7.00
ENE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	12.10
E	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
ESE	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	3.50
SE	0.	0.	0.	0.	1.	0.	1.	0.	0.	0.	1.	6.	13.74
SSE	0.	0.	0.	0.	1.	1.	0.	0.	0.	1.	1.	0.	7.63
S	0.	0.	0.	0.	1.	1.	0.	0.	0.	0.	0.	0.	5.10
SSW	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	1.	0.	6.63
SW	0.	0.	1.	3.	0.	0.	1.	0.	0.	1.	0.	0.	4.78
WSW	0.	0.	0.	0.	0.	1.	0.	0.	0.	1.	0.	0.	7.35
W	0.	0.	2.	2.	1.	0.	1.	0.	0.	0.	0.	0.	3.95
WNW	0.	0.	0.	1.	0.	0.	1.	0.	0.	0.	1.	0.	7.00
NW	0.	0.	0.	0.	0.	1.	2.	1.	0.	1.	0.	2.	9.30
NNW	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
N	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
VARIABLE													0.00
CALM													0.00
TOTAL	0.	0.	3.	8.	4.	4.	7.	1.	0.	4.	4.	9.	8.04

WIND FREQUENCY DISTRIBUTION
 (FREQUENCY IN PERCENT OF TOTAL)

WIND DIRECTION	UPPER CLASS INTERVALS OF WIND SPEED (MPH)											TOTAL	MEAN SPEED
	1	2	3	4	5	6	7	8	9	10	11	>11	
NNE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NE	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	7.00
ENE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	12.10
E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ESE	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.50
SE	0.00	0.00	0.00	0.00	0.05	0.00	0.05	0.00	0.00	0.00	0.05	0.28	13.74
SSE	0.00	0.00	0.00	0.00	0.05	0.05	0.00	0.00	0.00	0.05	0.05	0.00	7.63
S	0.00	0.00	0.00	0.00	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00	5.10
SSW	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	6.63
SW	0.00	0.00	0.05	0.14	0.00	0.00	0.05	0.00	0.00	0.05	0.00	0.00	4.78
WSW	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.05	0.00	0.00	7.35
W	0.00	0.00	0.09	0.09	0.05	0.00	0.05	0.00	0.00	0.00	0.00	0.00	3.95
WNW	0.00	0.00	0.00	0.05	0.00	0.00	0.05	0.00	0.00	0.00	0.05	0.00	7.00
NW	0.00	0.00	0.00	0.00	0.00	0.05	0.09	0.05	0.00	0.05	0.00	0.09	9.30
NNW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
N	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VARIABLE													0.00
CALM													0.00
TOTAL	0.00	0.00	0.14	0.37	0.18	0.18	0.32	0.05	0.00	0.18	0.18	0.41	8.04

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2184

TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2175

Table 4A

SOUTHERN CALIFORNIA EDISON COMPANY
 SAN ONOFRE NUCLEAR GENERATING STATION
 2ND QUARTER 1988
 DAMES AND MOORE JOB NO. - 00377-120-09
 DATA PERIOD- 04/01/88 TO 06/30/88
 STABILITY CLASS #A# (10-40 METERS)
 WINDS AT 10 METER LEVEL

21-JUL-88

WIND FREQUENCY DISTRIBUTION
 (FREQUENCY IN NUMBER OF OCCURRENCES)

WIND DIRECTION	1	2	3	4	5	6	7	8	9	10	11	>11	TOTAL	MEAN SPEED
NNE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
NE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
ENE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
E	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
ESE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.	11.80
SE	0.	0.	0.	0.	0.	0.	1.	0.	1.	1.	1.	2.	6.	10.72
SSE	0.	0.	0.	0.	2.	2.	1.	2.	6.	6.	3.	6.	28.	9.52
S	0.	0.	0.	5.	3.	10.	14.	13.	9.	12.	12.	18.	96.	8.54
SSW	0.	0.	2.	8.	10.	17.	15.	18.	20.	12.	6.	7.	115.	7.33
SW	0.	0.	0.	13.	14.	23.	34.	16.	12.	7.	2.	4.	125.	6.71
WSW	0.	0.	1.	14.	19.	32.	39.	31.	12.	2.	0.	4.	154.	6.47
W	0.	0.	0.	6.	33.	35.	36.	38.	24.	10.	2.	8.	192.	6.93
WNW	0.	0.	0.	1.	6.	13.	14.	16.	15.	8.	4.	24.	101.	9.18
NW	0.	0.	0.	0.	0.	0.	2.	0.	2.	2.	0.	9.	15.	12.35
NNW	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
N	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
VARIABLE													0.	0.00
CALM													0.	0.00
TOTAL	0.	0.	3.	47.	87.	132.	156.	134.	101.	60.	30.	83.	833.	7.54

WIND FREQUENCY DISTRIBUTION
 (FREQUENCY IN PERCENT OF TOTAL)

WIND DIRECTION	1	2	3	4	5	6	7	8	9	10	11	>11	TOTAL	MEAN SPEED
NNE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ENE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ESE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05	11.80
SE	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.05	0.05	0.05	0.09	0.27	10.72
SSE	0.00	0.00	0.00	0.00	0.09	0.09	0.05	0.09	0.27	0.27	0.14	0.27	1.28	9.52
S	0.00	0.00	0.00	0.23	0.14	0.46	0.64	0.60	0.41	0.55	0.55	0.82	4.40	8.54
SSW	0.00	0.00	0.09	0.37	0.46	0.78	0.69	0.82	0.92	0.55	0.27	0.32	5.27	7.33
SW	0.00	0.00	0.00	0.60	0.64	1.05	1.56	0.73	0.55	0.32	0.09	0.18	5.72	6.71
WSW	0.00	0.00	0.05	0.64	0.87	1.47	1.79	1.42	0.55	0.09	0.00	0.18	7.05	6.47
W	0.00	0.00	0.00	0.27	1.51	1.60	1.65	1.74	1.10	0.46	0.09	0.37	8.79	6.93
WNW	0.00	0.00	0.00	0.05	0.27	0.60	0.64	0.73	0.69	0.37	0.18	1.10	4.62	9.18
NW	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.09	0.09	0.00	0.41	0.69	12.35
NNW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
N	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VARIABLE													0.00	0.00
CALM													0.00	0.00
TOTAL	0.00	0.00	0.14	2.15	3.98	6.04	7.14	6.14	4.62	2.75	1.37	3.80	38.14	7.54

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2184

TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2184

Table 4A

SOUTHERN CALIFORNIA EDISON COMPANY
 SAN ONOFRE NUCLEAR GENERATING STATION
 2ND QUARTER 1988
 DAMES AND MOORE JOB NO. - 00377-120-09
 DATA PERIOD- 04/01/88 TO 06/30/88
 STABILITY CLASS #B# (10-40 METERS)
 WINDS AT 10 METER LEVEL

21-JUL-88

WIND FREQUENCY DISTRIBUTION
 (FREQUENCY IN NUMBER OF OCCURRENCES)

WIND DIRECTION	1	2	3	4	5	6	7	8	9	10	11	>11	TOTAL	MEAN SPEED
NNE	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	1.	6.30
NE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
ENE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
E	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
ERE	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	1.	9.70
SE	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.	0.	0.	2.	8.95
SSE	0.	0.	0.	3.	2.	1.	1.	1.	0.	0.	2.	3.	13.	7.75
S	0.	0.	0.	1.	0.	0.	2.	4.	2.	0.	1.	2.	12.	8.18
SSW	0.	0.	0.	0.	2.	0.	3.	2.	0.	0.	0.	1.	8.	7.20
SW	0.	0.	1.	2.	1.	1.	0.	0.	0.	0.	0.	0.	5.	4.04
WSW	0.	0.	0.	1.	0.	2.	1.	1.	0.	0.	1.	0.	6.	6.68
W	0.	0.	1.	2.	0.	2.	0.	0.	0.	0.	0.	0.	5.	4.06
WNW	0.	0.	0.	2.	1.	1.	2.	1.	0.	0.	0.	0.	7.	5.41
NW	0.	0.	0.	0.	0.	1.	0.	0.	0.	1.	0.	2.	4.	10.20
NNW	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
N	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	1.	8.70
VARIABLE													0.	0.00
CALM													0.	0.00
TOTAL	0.	0.	2.	11.	6.	8.	10.	9.	4.	3.	4.	8.	65.	7.05

WIND FREQUENCY DISTRIBUTION
 (FREQUENCY IN PERCENT OF TOTAL)

WIND DIRECTION	1	2	3	4	5	6	7	8	9	10	11	>11	TOTAL	MEAN SPEED
NNE	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.05	6.30
NE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ENE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ERE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.05	9.70
SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.00	0.00	0.09	8.95
SSE	0.00	0.00	0.00	0.14	0.09	0.05	0.05	0.05	0.00	0.00	0.09	0.14	0.60	7.75
S	0.00	0.00	0.00	0.05	0.00	0.00	0.09	0.18	0.09	0.00	0.05	0.09	0.55	8.18
SSW	0.00	0.00	0.00	0.00	0.09	0.00	0.14	0.09	0.00	0.00	0.00	0.05	0.37	7.20
SW	0.00	0.00	0.05	0.09	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.23	4.04
WSW	0.00	0.00	0.00	0.05	0.00	0.09	0.05	0.05	0.00	0.00	0.05	0.00	0.27	6.68
W	0.00	0.00	0.05	0.09	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.23	4.06
WNW	0.00	0.00	0.00	0.09	0.05	0.05	0.09	0.05	0.00	0.00	0.00	0.00	0.32	5.41
NW	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.05	0.00	0.09	0.18	10.20
NNW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
N	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.05	8.70
VARIABLE													0.00	0.00
CALM													0.00	0.00
TOTAL	0.00	0.00	0.09	0.50	0.27	0.37	0.46	0.41	0.18	0.14	0.18	0.37	2.98	7.05

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2184

TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2184

Table 4A

SOUTHERN CALIFORNIA EDISON COMPANY
 SAN ONOFRE NUCLEAR GENERATING STATION
 2ND QUARTER 1988
 DAMES AND MOORE JOB NO. - 00377-120-09
 DATA PERIOD- 04/01/88 TO 06/30/88
 STABILITY CLASS #C# (10-40 METERS)
 WINDS AT 10 METER LEVEL

21-JUL-88

WIND FREQUENCY DISTRIBUTION
 (FREQUENCY IN NUMBER OF OCCURRENCES)

WIND DIRECTION	1	2	3	4	5	6	7	8	9	10	11	>11	TOTAL	MEAN SPEED
NNE	0.	0.	0.	0.	0.	2.	0.	1.	0.	0.	0.	0.	3.	5.90
NE	0.	0.	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	2.40
ENE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
E	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
EE	0.	0.	0.	0.	1.	2.	0.	0.	0.	0.	0.	0.	3.	5.17
SE	0.	0.	0.	0.	0.	1.	0.	1.	1.	4.	0.	1.	8.	9.01
SSE	0.	0.	1.	0.	3.	2.	3.	1.	1.	3.	2.	8.	24.	9.02
S	0.	0.	1.	2.	1.	5.	3.	2.	2.	0.	1.	6.	23.	8.06
SSW	0.	0.	3.	1.	0.	2.	2.	0.	0.	1.	0.	2.	11.	7.47
SW	0.	1.	2.	4.	2.	1.	1.	0.	0.	0.	0.	0.	11.	3.80
WSW	0.	0.	1.	2.	2.	0.	1.	0.	0.	0.	1.	0.	7.	5.26
W	0.	0.	3.	5.	2.	2.	1.	0.	0.	0.	0.	2.	15.	5.57
WNW	0.	0.	0.	2.	0.	2.	0.	3.	0.	1.	0.	2.	10.	8.82
NW	0.	0.	0.	0.	1.	0.	3.	2.	4.	1.	0.	3.	14.	9.16
NNW	0.	0.	0.	1.	0.	2.	0.	1.	0.	0.	0.	0.	4.	5.40
N	0.	0.	0.	1.	0.	0.	1.	0.	0.	0.	0.	0.	2.	5.05
VARIABLE													0.	0.00
CALM													0.	0.00
TOTAL	0.	1.	13.	18.	12.	21.	15.	11.	8.	10.	4.	24.	137.	7.33

WIND FREQUENCY DISTRIBUTION
 (FREQUENCY IN PERCENT OF TOTAL)

WIND DIRECTION	1	2	3	4	5	6	7	8	9	10	11	>11	TOTAL	MEAN SPEED
NNE	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.05	0.00	0.00	0.00	0.00	0.14	5.90
NE	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	2.40
ENE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EE	0.00	0.00	0.00	0.00	0.05	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.14	5.17
SE	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.05	0.05	0.18	0.00	0.05	0.37	9.01
SSE	0.00	0.00	0.05	0.00	0.14	0.09	0.14	0.05	0.05	0.14	0.09	0.37	1.10	9.02
S	0.00	0.00	0.05	0.09	0.05	0.23	0.14	0.09	0.09	0.00	0.05	0.27	1.05	8.06
SSW	0.00	0.00	0.14	0.05	0.00	0.09	0.09	0.00	0.00	0.05	0.00	0.09	0.50	7.47
SW	0.00	0.05	0.09	0.18	0.09	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.50	3.80
WSW	0.00	0.00	0.05	0.09	0.09	0.00	0.05	0.00	0.00	0.00	0.05	0.00	0.32	5.26
W	0.00	0.00	0.14	0.23	0.09	0.09	0.05	0.00	0.00	0.00	0.00	0.09	0.67	5.57
WNW	0.00	0.00	0.00	0.09	0.00	0.09	0.00	0.14	0.00	0.05	0.00	0.09	0.46	8.82
NW	0.00	0.00	0.00	0.00	0.05	0.00	0.14	0.09	0.18	0.05	0.00	0.14	0.64	9.16
NNW	0.00	0.00	0.00	0.05	0.00	0.09	0.00	0.05	0.00	0.00	0.00	0.00	0.18	5.40
N	0.00	0.00	0.00	0.05	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.07	5.05
VARIABLE													0.00	0.00
CALM													0.00	0.00
TOTAL	0.00	0.05	0.60	0.82	0.55	0.96	0.69	0.50	0.37	0.46	0.18	1.10	6.27	7.33

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2184

TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2184

Table 4A

SOUTHERN CALIFORNIA EDISON COMPANY
 SAN ONOFRE NUCLEAR GENERATING STATION
 2ND QUARTER 1988
 DAMES AND MOORE JOB NO. - 00377-120-09
 DATA PERIOD- 04/01/88 TO 06/30/88
 STABILITY CLASS #D# (10-40 METERS)
 WINDS AT 10 METER LEVEL

21-JUL-88

WIND FREQUENCY DISTRIBUTION
 (FREQUENCY IN NUMBER OF OCCURRENCES)

WIND DIRECTION	UPPER CLASS INTERVALS OF WIND SPEED (MPH)											TOTAL	MEAN SPEED	
	1	2	3	4	5	6	7	8	9	10	11	>11		
NNE	0.	1.	4.	11.	7.	10.	2.	0.	4.	2.	0.	0.	41.	4.98
NE	0.	0.	6.	6.	5.	2.	0.	0.	0.	0.	0.	1.	20.	4.15
ENE	0.	0.	3.	1.	5.	1.	0.	0.	0.	0.	0.	0.	10.	4.02
E	0.	0.	1.	2.	3.	1.	6.	0.	1.	2.	0.	0.	16.	6.04
ESE	0.	0.	3.	3.	8.	6.	7.	8.	3.	2.	0.	0.	40.	6.00
SE	0.	1.	5.	11.	14.	17.	29.	18.	19.	10.	6.	5.	135.	6.82
SSE	0.	1.	7.	10.	17.	10.	12.	6.	7.	5.	6.	12.	93.	6.91
S	0.	0.	6.	15.	10.	5.	5.	3.	1.	2.	0.	7.	54.	6.32
SSW	0.	3.	4.	5.	7.	2.	3.	2.	1.	0.	0.	2.	29.	5.33
SW	0.	1.	6.	8.	5.	3.	1.	1.	0.	2.	0.	3.	30.	5.38
WSW	0.	2.	8.	5.	2.	1.	1.	0.	1.	0.	0.	3.	23.	4.96
W	0.	3.	5.	3.	6.	2.	2.	0.	4.	1.	2.	7.	35.	6.93
WNW	0.	0.	4.	4.	0.	4.	1.	1.	4.	0.	0.	6.	24.	7.87
NW	0.	2.	2.	8.	8.	4.	1.	0.	0.	1.	3.	4.	33.	6.05
NNW	0.	1.	5.	2.	2.	7.	4.	1.	1.	4.	1.	2.	30.	6.21
N	0.	1.	5.	9.	3.	5.	0.	0.	1.	0.	0.	0.	24.	4.06
VARIABLE													0.	0.00
CALM													0.	0.00
TOTAL	0.	16.	74.	103.	102.	80.	74.	40.	47.	31.	18.	52.	637.	6.14

WIND FREQUENCY DISTRIBUTION
 (FREQUENCY IN PERCENT OF TOTAL)

WIND DIRECTION	UPPER CLASS INTERVALS OF WIND SPEED (MPH)											TOTAL	MEAN SPEED	
	1	2	3	4	5	6	7	8	9	10	11	>11		
NNE	0.00	0.05	0.18	0.90	0.32	0.46	0.09	0.00	0.18	0.09	0.00	0.00	1.88	4.98
NE	0.00	0.00	0.27	0.27	0.23	0.09	0.00	0.00	0.00	0.00	0.00	0.05	0.92	4.15
ENE	0.00	0.00	0.14	0.05	0.23	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.46	4.02
E	0.00	0.00	0.05	0.09	0.14	0.05	0.27	0.00	0.05	0.09	0.00	0.00	0.73	6.04
ESE	0.00	0.00	0.14	0.14	0.37	0.27	0.32	0.37	0.14	0.09	0.00	0.00	1.83	6.00
SE	0.00	0.05	0.23	0.90	0.64	0.78	1.33	0.82	0.87	0.46	0.27	0.23	6.18	6.82
SSE	0.00	0.05	0.32	0.46	0.78	0.46	0.55	0.27	0.32	0.23	0.27	0.55	4.25	6.91
S	0.00	0.00	0.27	0.69	0.46	0.23	0.23	0.14	0.05	0.09	0.00	0.32	2.47	6.32
SSW	0.00	0.14	0.18	0.23	0.32	0.09	0.14	0.09	0.05	0.00	0.00	0.09	1.33	5.33
SW	0.00	0.05	0.27	0.37	0.23	0.14	0.05	0.05	0.00	0.09	0.00	0.14	1.37	5.38
WSW	0.00	0.09	0.37	0.23	0.09	0.05	0.05	0.00	0.05	0.00	0.00	0.14	1.05	4.96
W	0.00	0.14	0.23	0.14	0.27	0.09	0.09	0.00	0.18	0.05	0.09	0.32	1.60	6.93
WNW	0.00	0.00	0.18	0.18	0.00	0.18	0.05	0.05	0.18	0.00	0.00	0.27	1.10	7.87
NW	0.00	0.09	0.09	0.37	0.37	0.18	0.05	0.00	0.00	0.05	0.14	0.18	1.51	6.05
NNW	0.00	0.05	0.23	0.09	0.09	0.32	0.18	0.05	0.05	0.18	0.05	0.09	1.37	6.21
N	0.00	0.05	0.23	0.41	0.14	0.23	0.00	0.00	0.05	0.00	0.00	0.00	1.10	4.06
VARIABLE													0.00	0.00
CALM													0.00	0.00
TOTAL	0.00	0.73	3.39	4.72	4.67	3.66	3.39	1.83	2.15	1.42	0.82	2.38	29.17	6.14

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2184

TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2184

Table 4A

SOUTHERN CALIFORNIA EDISON COMPANY
 SAN ONOFRE NUCLEAR GENERATING STATION
 2ND QUARTER 1988
 DAMES AND MOORE JOB NO. - 00377-120-09
 DATA PERIOD- 04/01/88 TO 06/30/88
 STABILITY CLASS #E# (10-40 METERS)
 WINDS AT 10 METER LEVEL

21-JUL-88

WIND FREQUENCY DISTRIBUTION
 (FREQUENCY IN NUMBER OF OCCURRENCES)

WIND DIRECTION	1	2	3	4	5	6	7	8	9	10	11	>11	TOTAL	MEAN SPEED
NNE	0.	2.	10.	23.	14.	16.	11.	1.	1.	1.	0.	0.	79.	4.53
NE	0.	2.	5.	5.	2.	2.	1.	0.	0.	0.	0.	0.	17.	3.42
ENE	0.	2.	3.	2.	4.	0.	1.	1.	0.	0.	0.	0.	13.	3.97
E	0.	2.	3.	3.	2.	1.	1.	2.	0.	0.	0.	1.	15.	4.67
ESE	0.	0.	5.	7.	3.	0.	0.	0.	0.	0.	0.	0.	15.	3.45
SE	0.	1.	4.	7.	9.	4.	1.	4.	1.	0.	0.	0.	31.	4.78
SSE	0.	1.	5.	4.	2.	0.	0.	0.	0.	1.	1.	1.	15.	4.60
S	0.	1.	4.	1.	0.	0.	0.	0.	0.	0.	0.	0.	6.	2.63
SSW	1.	0.	0.	2.	0.	0.	0.	0.	0.	0.	0.	0.	3.	2.50
SW	0.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	2.05
WSW	0.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	2.25
W	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	1.	3.40
WNW	0.	1.	2.	1.	1.	0.	0.	3.	0.	0.	0.	0.	8.	4.53
NW	0.	0.	2.	0.	0.	0.	0.	1.	1.	0.	0.	0.	4.	4.78
NNW	1.	1.	3.	1.	0.	1.	0.	0.	0.	0.	1.	0.	8.	3.80
N	1.	1.	0.	2.	3.	4.	2.	2.	2.	1.	1.	0.	19.	5.79
VARIABLE													0.	0.00
CALM													0.	0.00
TOTAL	3.	16.	48.	59.	40.	28.	17.	14.	5.	3.	3.	2.	238.	4.37

WIND FREQUENCY DISTRIBUTION
 (FREQUENCY IN PERCENT OF TOTAL)

WIND DIRECTION	1	2	3	4	5	6	7	8	9	10	11	>11	TOTAL	MEAN SPEED
NNE	0.00	0.09	0.46	1.05	0.64	0.73	0.50	0.05	0.05	0.05	0.00	0.00	3.62	4.53
NE	0.00	0.09	0.23	0.23	0.09	0.09	0.05	0.00	0.00	0.00	0.00	0.00	0.78	3.42
ENE	0.00	0.09	0.14	0.09	0.18	0.00	0.05	0.05	0.00	0.00	0.00	0.00	0.60	3.97
E	0.00	0.09	0.14	0.14	0.09	0.05	0.05	0.09	0.00	0.00	0.00	0.05	0.69	4.67
ESE	0.00	0.00	0.23	0.32	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.67	3.45
SE	0.00	0.05	0.18	0.32	0.41	0.18	0.05	0.18	0.05	0.00	0.00	0.00	1.42	4.78
SSE	0.00	0.05	0.23	0.18	0.09	0.00	0.00	0.00	0.00	0.05	0.05	0.05	0.69	4.60
S	0.00	0.05	0.18	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27	2.53
SSW	0.05	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	2.50
SW	0.00	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	2.05
WSW	0.00	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	2.25
W	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	3.40
WNW	0.00	0.05	0.09	0.05	0.05	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.37	4.53
NW	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.05	0.05	0.00	0.00	0.00	0.18	4.78
NNW	0.05	0.05	0.14	0.05	0.00	0.05	0.00	0.00	0.00	0.00	0.05	0.00	0.37	3.80
N	0.05	0.05	0.00	0.09	0.14	0.18	0.09	0.09	0.09	0.05	0.05	0.00	0.87	5.79
VARIABLE													0.00	0.00
CALM													0.00	0.00
TOTAL	0.14	0.73	2.20	2.70	1.83	1.28	0.78	0.64	0.23	0.14	0.14	0.09	10.90	4.37

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2184

TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2184

Table 4A

SOUTHERN CALIFORNIA EDISON COMPANY
 SAN ONOFRE NUCLEAR GENERATING STATION
 2ND QUARTER 1988
 DAMES AND MOORE JOB NO. - 00377-120-09
 DATA PERIOD- 04/01/88 TO 06/30/88
 STABILITY CLASS #F# (10-40 METERS)
 WINDS AT 10 METER LEVEL

21-JUL-88

WIND FREQUENCY DISTRIBUTION
 (FREQUENCY IN NUMBER OF OCCURRENCES)

WIND DIRECTION	UPPER CLASS INTERVALS OF WIND SPEED (MPH)											TOTAL	MEAN SPEED	
	1	2	3	4	5	6	7	8	9	10	11	>11		
NNE	0.	0.	3.	10.	16.	25.	18.	12.	5.	3.	0.	0.	92.	5.80
NE	0.	0.	3.	7.	1.	4.	0.	0.	0.	0.	0.	0.	15.	3.95
ENE	0.	0.	4.	4.	4.	1.	0.	0.	0.	0.	0.	0.	13.	3.69
E	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	2.90
EBE	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	2.70
SE	0.	0.	3.	0.	0.	0.	0.	0.	0.	0.	0.	0.	3.	2.77
SSE	0.	1.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.	3.	2.77
S	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	2.10
SSW	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
SW	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
WSW	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	2.40
W	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.70
WNW	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	1.	7.90
NW	0.	0.	0.	0.	1.	0.	0.	1.	0.	1.	0.	0.	3.	7.00
NNW	0.	0.	0.	0.	0.	0.	1.	1.	0.	0.	0.	0.	2.	7.10
N	0.	0.	0.	1.	2.	4.	1.	2.	1.	0.	0.	0.	11.	5.89
VARIABLE													0.	0.00
CALM													0.	0.00
TOTAL	0.	2.	18.	23.	24.	34.	20.	17.	6.	4.	0.	0.	148.	5.24

WIND FREQUENCY DISTRIBUTION
 (FREQUENCY IN PERCENT OF TOTAL)

WIND DIRECTION	UPPER CLASS INTERVALS OF WIND SPEED (MPH)											TOTAL	MEAN SPEED	
	1	2	3	4	5	6	7	8	9	10	11	>11		
NNE	0.00	0.00	0.14	0.46	0.73	1.14	0.82	0.55	0.23	0.14	0.00	0.00	4.21	5.90
NE	0.00	0.00	0.14	0.32	0.05	0.18	0.00	0.00	0.00	0.00	0.00	0.00	0.69	3.95
ENE	0.00	0.00	0.18	0.18	0.18	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.60	3.69
E	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	2.90
ESE	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	2.70
SE	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	2.77
SSE	0.00	0.05	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	2.77
S	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	2.10
SSW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WSW	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	2.40
W	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	1.70
WNW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.05	7.90
NW	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.05	0.00	0.05	0.00	0.00	0.14	7.00
NNW	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.00	0.00	0.00	0.00	0.09	7.10
N	0.00	0.00	0.00	0.05	0.09	0.18	0.05	0.09	0.05	0.00	0.00	0.00	0.50	5.99
VARIABLE													0.00	0.00
CALM													0.00	0.00
TOTAL	0.00	0.09	0.82	1.05	1.10	1.56	0.92	0.78	0.27	0.18	0.00	0.00	6.79	5.24

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2184

TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2184

Table 4A

SOUTHERN CALIFORNIA EDISON COMPANY
 SAN ONOFRE NUCLEAR GENERATING STATION
 2ND QUARTER 1988
 DAMES AND MOORE JOB NO. - 00377-120-09
 DATA PERIOD- 04/01/88 TO 06/30/88
 STABILITY CLASS #00 (10-40 METERS)
 WINDS AT 10 METER LEVEL

21-JUL-88

WIND FREQUENCY DISTRIBUTION
 (FREQUENCY IN NUMBER OF OCCURRENCES)

WIND DIRECTION	UPPER CLASS INTERVALS OF WIND SPEED (MPH)											TOTAL	MEAN SPEED	
	1	2	3	4	5	6	7	8	9	10	11	>11		
NNE	0.	0.	0.	1.	4.	13.	19.	18.	27.	16.	7.	3.	108.	7.87
NE	0.	0.	0.	0.	2.	0.	0.	1.	0.	0.	0.	0.	3.	5.60
ENE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
E	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	1.	3.30
ESE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
SE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
SSE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
S	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
SSW	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	2.80
SW	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
WSW	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
W	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
WNW	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	1.	8.60
NW	0.	0.	0.	0.	1.	0.	1.	0.	1.	1.	1.	0.	5.	7.84
NNW	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	1.	6.30
N	0.	0.	0.	0.	0.	0.	0.	3.	1.	0.	1.	1.	6.	8.78
VARIABLE													0.	0.00
CALM													0.	0.00
TOTAL	0.	0.	1.	2.	7.	13.	21.	22.	30.	17.	9.	4.	126.	7.78

WIND FREQUENCY DISTRIBUTION
 (FREQUENCY IN PERCENT OF TOTAL)

WIND DIRECTION	UPPER CLASS INTERVALS OF WIND SPEED (MPH)											TOTAL	MEAN SPEED	
	1	2	3	4	5	6	7	8	9	10	11	>11		
NNE	0.00	0.00	0.00	0.05	0.18	0.60	0.87	0.82	1.24	0.73	0.32	0.14	4.95	7.87
NE	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.14	5.60
ENE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
E	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	3.30
ESE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SSE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
S	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SSW	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	2.80
SW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WSW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
W	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WNW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.05	8.60
NW	0.00	0.00	0.00	0.00	0.05	0.00	0.05	0.00	0.05	0.05	0.05	0.00	0.23	7.84
NNW	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.05	6.30
N	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.05	0.00	0.05	0.05	0.27	8.78
VARIABLE													0.00	0.00
CALM													0.00	0.00
TOTAL	0.00	0.00	0.05	0.09	0.32	0.60	0.96	1.01	1.37	0.78	0.41	0.18	5.77	7.78

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2184

TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2184

Table 4A

SOUTHERN CALIFORNIA EDISON COMPANY
 SAN ONOFRE NUCLEAR GENERATING STATION
 2ND QUARTER 1988
 DAMES AND MOORE JOB NO. - 00377-120-09
 DATA PERIOD- 04/01/88 TO 06/30/88
 STABILITY CLASS ALL (10-40 METERS)
 WINDS AT 10 METER LEVEL

21-JUL-88

WIND FREQUENCY DISTRIBUTION
 (FREQUENCY IN NUMBER OF OCCURRENCES)

WIND DIRECTION	UPPER CLASS INTERVALS OF WIND SPEED (MPH)											TOTAL	MEAN SPEED	
	1	2	3	4	5	6	7	8	9	10	11	>11		
NNE	0.	3.	17.	45.	41.	66.	51.	32.	37.	22.	7.	3.	324.	6.08
NE	0.	2.	16.	18.	10.	8.	1.	1.	0.	0.	0.	1.	57.	3.87
ENE	0.	2.	10.	7.	13.	2.	1.	1.	0.	0.	0.	0.	36.	3.88
E	0.	2.	5.	6.	5.	2.	7.	2.	1.	2.	0.	1.	33.	5.23
ESE	0.	0.	9.	10.	12.	8.	7.	8.	3.	3.	0.	1.	61.	5.44
SE	0.	2.	12.	18.	23.	22.	31.	23.	23.	16.	7.	8.	185.	6.65
SSE	0.	3.	14.	18.	26.	15.	17.	10.	14.	15.	14.	30.	176.	7.41
S	0.	1.	12.	24.	14.	20.	24.	22.	14.	14.	14.	33.	192.	7.62
SSW	1.	3.	10.	16.	19.	21.	23.	22.	21.	13.	6.	12.	167.	6.87
SW	0.	3.	10.	27.	22.	28.	36.	17.	12.	9.	2.	7.	173.	6.16
WSW	0.	3.	12.	22.	23.	35.	42.	32.	13.	2.	2.	7.	193.	6.18
W	0.	4.	9.	17.	41.	41.	39.	38.	28.	11.	4.	17.	249.	6.75
WNW	0.	1.	6.	10.	8.	20.	17.	25.	20.	9.	4.	32.	152.	8.52
NW	0.	2.	4.	8.	11.	5.	7.	4.	8.	7.	4.	18.	78.	8.13
NNW	1.	2.	8.	4.	2.	10.	6.	3.	1.	4.	2.	2.	45.	5.75
N	1.	2.	5.	13.	8.	13.	4.	7.	6.	1.	2.	1.	63.	5.46
VARIABLE													0.	0.00
CALM													0.	0.00
TOTAL	3.	35.	159.	263.	278.	316.	313.	247.	201.	128.	68.	173.	2184.	6.62

WIND FREQUENCY DISTRIBUTION
 (FREQUENCY IN PERCENT OF TOTAL)

WIND DIRECTION	UPPER CLASS INTERVALS OF WIND SPEED (MPH)												TOTAL	MEAN SPEED
	1	2	3	4	5	6	7	8	9	10	11	>11		
NNE	0.00	0.14	0.78	2.06	1.88	3.02	2.34	1.47	1.69	1.01	0.32	0.14	14.84	6.08
NE	0.00	0.09	0.73	0.82	0.46	0.37	0.05	0.05	0.00	0.00	0.00	0.05	2.61	3.87
ENE	0.00	0.09	0.46	0.32	0.60	0.09	0.05	0.05	0.00	0.00	0.00	0.00	1.63	3.88
E	0.00	0.09	0.23	0.27	0.23	0.09	0.32	0.09	0.05	0.09	0.00	0.05	1.51	5.23
ESE	0.00	0.00	0.41	0.46	0.55	0.37	0.32	0.37	0.14	0.14	0.00	0.05	2.79	5.44
SE	0.00	0.09	0.55	0.82	1.05	1.01	1.42	1.05	1.05	0.73	0.32	0.37	8.47	6.65
SSE	0.00	0.14	0.64	0.82	1.19	0.69	0.78	0.46	0.64	0.69	0.64	1.37	8.06	7.41
S	0.00	0.05	0.55	1.10	0.64	0.92	1.10	1.01	0.64	0.64	0.64	1.51	8.79	7.62
SSW	0.05	0.14	0.46	0.73	0.87	0.96	1.05	1.01	0.96	0.60	0.27	0.55	7.65	6.87
SW	0.00	0.14	0.46	1.24	1.01	1.28	1.65	0.78	0.55	0.41	0.09	0.32	7.92	6.16
WSW	0.00	0.14	0.55	1.01	1.05	1.60	1.92	1.47	0.60	0.09	0.09	0.32	8.84	6.18
W	0.00	0.18	0.41	0.78	1.88	1.88	1.79	1.74	1.28	0.50	0.18	0.78	11.40	6.75
WNW	0.00	0.05	0.27	0.46	0.37	0.92	0.78	1.14	0.92	0.41	0.18	1.47	6.96	8.52
NW	0.00	0.09	0.18	0.37	0.50	0.23	0.32	0.18	0.37	0.32	0.18	0.82	3.57	8.13
NNW	0.05	0.09	0.37	0.18	0.09	0.46	0.27	0.14	0.05	0.18	0.09	0.09	2.06	5.75
N	0.05	0.09	0.23	0.60	0.37	0.60	0.18	0.32	0.27	0.05	0.09	0.05	2.88	5.46
VARIABLE													0.00	0.00
CALM													0.00	0.00
TOTAL	0.14	1.60	7.28	12.04	12.73	14.47	14.33	11.31	9.20	5.86	3.11	7.92	100.00	6.62

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2184

TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2184

Table 4A

SOUTHERN CALIFORNIA EDISON COMPANY
 SAN ONOFRE NUCLEAR GENERATING STATION
 1ST QUARTER 1988
 DAMES AND MOORE JOB NO. - 00377-120-09
 DATA PERIOD- 01/01/88 TO 03/31/88
 STABILITY CLASS #D# (10-40 METERS)
 WINDS AT 10 METER LEVEL

21-JUL-88

WIND FREQUENCY DISTRIBUTION
 (FREQUENCY IN NUMBER OF OCCURRENCES)

WIND DIRECTION	1	2	3	4	5	6	7	8	9	10	11	>11	TOTAL	MEAN SPEED
NNE	0.	0.	2.	3.	2.	3.	1.	1.	1.	1.	1.	2.	17.	7.39
NE	0.	0.	0.	0.	2.	1.	0.	1.	1.	0.	0.	5.	10.	14.23
ENE	0.	0.	0.	0.	1.	0.	0.	0.	0.	1.	0.	1.	3.	8.63
E	0.	0.	0.	0.	3.	4.	2.	2.	0.	0.	1.	0.	12.	6.14
ESE	0.	1.	0.	0.	3.	7.	3.	4.	0.	0.	0.	2.	20.	6.73
SE	0.	0.	0.	1.	3.	11.	11.	13.	7.	10.	10.	24.	90.	9.21
SSE	0.	2.	2.	4.	2.	5.	2.	3.	1.	2.	4.	15.	42.	10.38
S	0.	0.	1.	7.	5.	3.	0.	0.	1.	0.	2.	0.	19.	5.21
SSW	0.	1.	1.	0.	0.	2.	0.	2.	1.	0.	0.	1.	8.	8.73
SW	0.	1.	1.	2.	0.	0.	1.	1.	1.	4.	0.	3.	14.	8.95
WSW	0.	0.	7.	4.	2.	0.	2.	1.	4.	0.	1.	4.	25.	7.96
W	0.	0.	3.	5.	8.	4.	1.	1.	1.	0.	2.	2.	27.	5.64
WNW	0.	1.	2.	2.	5.	6.	3.	2.	3.	3.	0.	3.	30.	6.74
NW	0.	0.	2.	3.	6.	6.	5.	6.	3.	2.	0.	3.	36.	6.71
NNW	0.	3.	1.	2.	3.	0.	2.	0.	1.	2.	0.	0.	14.	4.92
N	0.	0.	5.	3.	3.	2.	0.	0.	0.	0.	1.	2.	16.	6.96
VARIABLE													0.	0.00
CALM													0.	0.00
TOTAL	0.	9.	27.	36.	48.	54.	33.	37.	25.	25.	22.	67.	383.	7.92

WIND FREQUENCY DISTRIBUTION
 (FREQUENCY IN PERCENT OF TOTAL)

WIND DIRECTION	1	2	3	4	5	6	7	8	9	10	11	>11	TOTAL	MEAN SPEED
NNE	0.00	0.00	0.09	0.14	0.09	0.14	0.05	0.05	0.05	0.05	0.05	0.09	0.79	7.39
NE	0.00	0.00	0.00	0.00	0.09	0.05	0.00	0.05	0.05	0.00	0.00	0.23	0.46	14.23
ENE	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.05	0.00	0.05	0.14	8.63
E	0.00	0.00	0.00	0.00	0.14	0.18	0.09	0.09	0.00	0.00	0.05	0.00	0.55	6.14
ESE	0.00	0.05	0.00	0.00	0.14	0.32	0.14	0.18	0.00	0.00	0.00	0.09	0.92	6.73
SE	0.00	0.00	0.00	0.05	0.14	0.51	0.51	0.60	0.32	0.46	0.46	1.10	4.14	9.21
SSE	0.00	0.09	0.09	0.18	0.09	0.23	0.09	0.14	0.05	0.09	0.18	0.69	1.93	10.38
S	0.00	0.00	0.05	0.32	0.23	0.14	0.00	0.00	0.05	0.00	0.09	0.00	0.87	5.21
SSW	0.00	0.05	0.05	0.00	0.00	0.09	0.00	0.09	0.05	0.00	0.00	0.05	0.37	8.73
SW	0.00	0.05	0.05	0.09	0.00	0.00	0.05	0.05	0.05	0.18	0.00	0.14	0.64	8.95
WSW	0.00	0.00	0.32	0.18	0.09	0.00	0.09	0.05	0.18	0.00	0.05	0.18	1.15	7.96
W	0.00	0.00	0.14	0.23	0.37	0.18	0.05	0.05	0.05	0.00	0.09	0.09	1.24	5.64
WNW	0.00	0.05	0.09	0.09	0.23	0.28	0.14	0.09	0.14	0.00	0.14	0.00	1.39	6.74
NW	0.00	0.00	0.09	0.14	0.28	0.28	0.23	0.28	0.14	0.09	0.00	0.14	1.65	6.71
NNW	0.00	0.14	0.05	0.09	0.14	0.00	0.09	0.00	0.05	0.09	0.00	0.00	0.64	4.92
N	0.00	0.00	0.23	0.14	0.14	0.09	0.00	0.00	0.00	0.00	0.05	0.09	0.74	6.96
VARIABLE													0.00	0.00
CALM													0.00	0.00
TOTAL	0.00	0.41	1.24	1.66	2.21	2.48	1.52	1.70	1.15	1.15	1.01	3.08	17.61	7.92

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2184

TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2175

Table 4A

SOUTHERN CALIFORNIA EDISON COMPANY
 SAN ONOFRE NUCLEAR GENERATING STATION
 1ST QUARTER 1988
 DAMES AND MOORE JOB NO. - 00377-120-09
 DATA PERIOD- 01/01/88 TO 03/31/88
 STABILITY CLASS #E# (10-40 METERS)
 WINDS AT 10 METER LEVEL

21-JUL-88

WIND FREQUENCY DISTRIBUTION
 (FREQUENCY IN NUMBER OF OCCURRENCES)

WIND DIRECTION	1	2	3	4	5	6	7	8	9	10	11	>11	TOTAL	MEAN SPEED
NNE	0.	1.	9.	14.	11.	6.	7.	4.	2.	2.	2.	5.	63.	6.15
NE	0.	2.	5.	8.	2.	1.	1.	2.	1.	1.	1.	15.	39.	9.58
ENE	0.	0.	2.	2.	1.	0.	1.	2.	0.	2.	0.	0.	10.	5.72
E	0.	0.	1.	3.	3.	3.	0.	1.	1.	1.	0.	0.	13.	5.29
ESE	0.	0.	1.	5.	5.	4.	2.	0.	0.	0.	0.	0.	17.	4.59
SE	0.	0.	2.	6.	3.	5.	3.	1.	1.	1.	2.	2.	26.	6.47
SSE	0.	0.	4.	0.	3.	3.	0.	0.	0.	0.	0.	1.	11.	5.07
S	0.	1.	2.	1.	1.	0.	0.	0.	0.	0.	0.	1.	6.	7.80
SSW	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	1.	2.	16.30
SW	0.	1.	5.	0.	0.	0.	0.	0.	0.	0.	0.	1.	7.	5.13
WSW	0.	0.	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	2.90
W	0.	1.	1.	8.	11.	3.	1.	1.	0.	0.	0.	0.	26.	4.25
WNW	0.	0.	2.	3.	6.	9.	4.	2.	1.	0.	0.	0.	27.	5.29
NW	0.	0.	1.	9.	7.	5.	1.	1.	1.	0.	0.	1.	26.	5.13
NNW	0.	1.	2.	2.	1.	3.	3.	1.	0.	0.	0.	1.	14.	5.32
N	0.	1.	6.	7.	3.	6.	4.	7.	5.	1.	6.	4.	50.	6.94
VARIABLE													0.	0.00
CALM													0.	0.00
TOTAL	0.	8.	46.	68.	57.	48.	27.	22.	12.	8.	11.	32.	339.	6.25

WIND FREQUENCY DISTRIBUTION
 (FREQUENCY IN PERCENT OF TOTAL)

WIND DIRECTION	1	2	3	4	5	6	7	8	9	10	11	>11	TOTAL	MEAN SPEED
NNE	0.00	0.05	0.41	0.64	0.51	0.28	0.32	0.18	0.09	0.09	0.09	0.23	2.90	6.15
NE	0.00	0.09	0.23	0.37	0.09	0.05	0.05	0.09	0.05	0.05	0.05	0.69	1.79	9.58
ENE	0.00	0.00	0.09	0.09	0.05	0.00	0.05	0.09	0.00	0.09	0.00	0.00	0.46	5.72
E	0.00	0.00	0.05	0.14	0.14	0.14	0.00	0.05	0.05	0.05	0.00	0.00	0.60	5.29
ESE	0.00	0.00	0.05	0.23	0.23	0.18	0.09	0.00	0.00	0.00	0.00	0.00	0.78	4.59
SE	0.00	0.00	0.09	0.28	0.14	0.23	0.14	0.05	0.05	0.05	0.09	0.09	1.20	6.47
SSE	0.00	0.00	0.18	0.00	0.14	0.14	0.00	0.00	0.00	0.00	0.00	0.05	0.51	5.07
S	0.00	0.05	0.09	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.28	7.80
SSW	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.09	16.30
SW	0.00	0.05	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.32	5.13
WSW	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	2.90
W	0.00	0.05	0.05	0.37	0.51	0.14	0.05	0.05	0.00	0.00	0.00	0.00	1.20	4.25
WNW	0.00	0.00	0.09	0.14	0.28	0.41	0.18	0.09	0.05	0.00	0.00	0.00	1.24	5.29
NW	0.00	0.00	0.05	0.41	0.32	0.23	0.05	0.05	0.05	0.00	0.00	0.05	1.20	5.13
NNW	0.00	0.05	0.09	0.09	0.05	0.14	0.14	0.05	0.00	0.00	0.00	0.05	0.64	5.32
N	0.00	0.05	0.28	0.32	0.14	0.28	0.18	0.32	0.23	0.05	0.28	0.18	2.30	6.94
VARIABLE													0.00	0.00
CALM													0.00	0.00
TOTAL	0.00	0.37	2.11	3.13	2.62	2.21	1.24	1.01	0.55	0.37	0.51	1.47	15.59	6.25

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2184

TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2175

Table 4A

SOUTHERN CALIFORNIA EDISON COMPANY
 SAN ONOFRE NUCLEAR GENERATING STATION
 1ST QUARTER 1988
 DAMES AND MOORE JOB NO. - 00377-120-09
 DATA PERIOD- 01/01/88 TO 03/31/88
 STABILITY CLASS #F# (10-40 METERS)
 WINDS AT 10 METER LEVEL

21-JUL-88

WIND FREQUENCY DISTRIBUTION
 (FREQUENCY IN NUMBER OF OCCURRENCES)

WIND DIRECTION	1	2	3	4	5	6	7	8	9	10	11	>11	TOTAL	MEAN SPEED
NNE	0.	3.	12.	31.	40.	38.	23.	13.	5.	5.	4.	5.	179.	5.48
NE	0.	4.	20.	19.	9.	8.	1.	2.	1.	1.	0.	1.	66.	4.08
ENE	0.	3.	8.	3.	2.	2.	0.	0.	0.	0.	0.	0.	18.	3.08
E	0.	2.	7.	0.	2.	1.	1.	0.	1.	0.	0.	0.	14.	3.61
ESE	0.	2.	1.	6.	3.	2.	3.	0.	2.	0.	0.	0.	19.	4.62
SE	0.	0.	3.	2.	0.	1.	0.	1.	0.	0.	0.	0.	7.	4.16
SSE	0.	1.	2.	1.	0.	0.	0.	2.	0.	0.	0.	1.	7.	5.44
S	0.	0.	2.	2.	0.	0.	0.	0.	0.	0.	0.	0.	4.	3.28
SSW	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
SW	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	1.	3.90
WSW	0.	2.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	3.	1.97
W	1.	0.	2.	2.	3.	1.	1.	0.	0.	0.	0.	0.	10.	3.98
WNW	0.	1.	0.	3.	5.	6.	2.	4.	0.	1.	0.	0.	22.	5.52
NW	0.	1.	0.	0.	2.	1.	0.	0.	1.	0.	0.	0.	5.	4.84
NNW	0.	0.	1.	1.	3.	2.	2.	2.	0.	0.	0.	0.	11.	5.16
N	0.	0.	3.	5.	4.	4.	5.	5.	0.	2.	1.	1.	30.	5.97
VARIABLE													0.	0.00
CALM													0.	0.00
TOTAL	1.	19.	62.	76.	73.	66.	38.	29.	10.	9.	5.	8.	396.	4.94

WIND FREQUENCY DISTRIBUTION
 (FREQUENCY IN PERCENT OF TOTAL)

WIND DIRECTION	1	2	3	4	5	6	7	8	9	10	11	>11	TOTAL	MEAN SPEED
NNE	0.00	0.14	0.35	1.43	1.84	1.75	1.06	0.60	0.23	0.23	0.18	0.23	8.23	5.48
NE	0.00	0.18	0.92	0.87	0.41	0.37	0.05	0.09	0.05	0.05	0.00	0.05	3.03	4.08
ENE	0.00	0.14	0.37	0.14	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.83	3.08
E	0.00	0.09	0.32	0.00	0.09	0.05	0.05	0.00	0.05	0.00	0.00	0.00	0.64	3.61
ESE	0.00	0.09	0.05	0.28	0.14	0.09	0.14	0.00	0.09	0.00	0.00	0.00	0.87	4.62
SE	0.00	0.00	0.14	0.09	0.00	0.05	0.00	0.05	0.00	0.00	0.00	0.00	0.32	4.16
SSE	0.00	0.05	0.09	0.05	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.05	0.32	5.44
S	0.00	0.00	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	3.28
SSW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SW	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	3.90
WSW	0.00	0.09	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	1.97
W	0.05	0.00	0.09	0.09	0.14	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.46	3.98
WNW	0.00	0.05	0.00	0.14	0.23	0.28	0.09	0.18	0.00	0.05	0.00	0.00	1.01	5.52
NW	0.00	0.05	0.00	0.00	0.09	0.05	0.00	0.00	0.05	0.00	0.00	0.00	0.23	4.84
NNW	0.00	0.00	0.05	0.05	0.14	0.09	0.09	0.09	0.00	0.00	0.00	0.00	0.51	5.16
N	0.00	0.00	0.14	0.23	0.18	0.18	0.23	0.23	0.00	0.09	0.05	0.05	1.38	5.97
VARIABLE													0.00	0.00
CALM													0.00	0.00
TOTAL	0.05	0.87	2.85	3.49	3.36	3.03	1.75	1.33	0.46	0.41	0.23	0.37	18.21	4.94

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2184

TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2175

Table 4A

SOUTHERN CALIFORNIA EDISON COMPANY
 SAN ONOFRE NUCLEAR GENERATING STATION
 1GT QUARTER 1988
 DAMES AND MOORE JOB NO. - 00377-120-09
 DATA PERIOD- 01/01/88 TO 03/31/88
 STABILITY CLASS #G# (10-40 METERS)
 WINDS AT 10 METER LEVEL

21-JUL-88

WIND FREQUENCY DISTRIBUTION
 (FREQUENCY IN NUMBER OF OCCURRENCES)

WIND DIRECTION	UPPER CLASS INTERVALS OF WIND SPEED (MPH)											TOTAL	MEAN SPEED	
	1	2	3	4	5	6	7	8	9	10	11	>11		
NNE	0.	0.	8.	8.	20.	26.	53.	66.	73.	58.	33.	62.	407.	8.42
NE	0.	2.	5.	18.	13.	6.	1.	6.	4.	3.	5.	2.	65.	5.70
ENE	0.	0.	1.	3.	1.	4.	1.	1.	0.	0.	0.	0.	11.	5.05
E	0.	0.	2.	2.	0.	0.	0.	0.	0.	1.	0.	0.	5.	4.38
ESE	0.	0.	1.	0.	1.	1.	0.	0.	0.	0.	0.	0.	3.	4.43
SE	0.	1.	3.	1.	0.	0.	0.	0.	0.	0.	0.	0.	5.	2.64
SSE	0.	1.	1.	2.	3.	0.	0.	0.	0.	0.	0.	0.	7.	3.53
S	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	1.	3.60
SSW	0.	0.	3.	1.	0.	0.	0.	0.	0.	0.	0.	0.	4.	2.85
SW	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	2.40
WSW	0.	0.	2.	1.	0.	0.	0.	0.	0.	0.	0.	0.	3.	2.87
W	0.	0.	1.	2.	2.	2.	0.	0.	0.	0.	0.	0.	7.	4.36
WNW	0.	0.	0.	0.	4.	4.	0.	1.	0.	0.	0.	0.	9.	5.30
NW	0.	0.	1.	0.	1.	2.	1.	1.	0.	0.	1.	0.	7.	6.09
NNW	0.	0.	1.	0.	0.	0.	0.	1.	0.	0.	0.	0.	2.	5.00
N	0.	0.	2.	0.	1.	1.	2.	5.	2.	2.	3.	3.	21.	7.78
VARIABLE													0.	0.00
CALM													0.	0.00
TOTAL	0.	4.	32.	39.	46.	46.	58.	81.	79.	64.	42.	67.	558.	7.62

WIND FREQUENCY DISTRIBUTION
 (FREQUENCY IN PERCENT OF TOTAL)

WIND DIRECTION	UPPER CLASS INTERVALS OF WIND SPEED (MPH)												TOTAL	MEAN SPEED
	1	2	3	4	5	6	7	8	9	10	11	>11		
NNE	0.00	0.00	0.37	0.37	0.92	1.20	2.44	3.03	3.36	2.67	1.52	2.85	18.71	8.42
NE	0.00	0.09	0.23	0.83	0.60	0.28	0.05	0.28	0.18	0.14	0.23	0.09	2.97	5.70
ENE	0.00	0.00	0.05	0.14	0.05	0.18	0.05	0.05	0.00	0.00	0.00	0.00	0.51	5.05
E	0.00	0.00	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.23	4.38
ESE	0.00	0.00	0.05	0.00	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.14	4.43
SE	0.00	0.05	0.14	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	2.64
SSE	0.00	0.05	0.05	0.09	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.32	3.53
S	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	3.60
SSW	0.00	0.00	0.14	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	2.85
SW	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	2.40
WSW	0.00	0.00	0.09	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	2.87
W	0.00	0.00	0.05	0.09	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.32	4.36
WNW	0.00	0.00	0.00	0.00	0.18	0.18	0.00	0.05	0.00	0.00	0.00	0.00	0.41	5.30
NW	0.00	0.00	0.05	0.00	0.05	0.09	0.05	0.05	0.00	0.00	0.05	0.00	0.32	6.09
NNW	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.09	5.00
N	0.00	0.00	0.09	0.00	0.05	0.05	0.09	0.23	0.09	0.09	0.14	0.14	0.97	7.78
VARIABLE													0.00	0.00
CALM													0.00	0.00
TOTAL	0.00	0.18	1.47	1.79	2.11	2.11	2.67	3.72	3.63	2.94	1.93	3.08	25.66	7.62

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2184

TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2175

Table 4A

SOUTHERN CALIFORNIA EDISON COMPANY
 SAN ONOFRE NUCLEAR GENERATING STATION
 1ST QUARTER 1988
 DAMES AND MOORE JOB NO. - 00377-120-09
 DATA PERIOD- 01/01/88 TO 03/31/88
 STABILITY CLASS ALL (10-40 METERS)
 WINDS AT 10 METER LEVEL

21-JUL-88

WIND FREQUENCY DISTRIBUTION
 (FREQUENCY IN NUMBER OF OCCURRENCES)

WIND DIRECTION	1	2	3	4	5	6	7	8	9	10	11	>11	TOTAL	MEAN SPEED
NNE	0.	4.	31.	36.	73.	73.	94.	84.	91.	66.	40.	77.	669.	7.42
NE	0.	8.	30.	45.	26.	16.	4.	11.	7.	5.	6.	24.	182.	6.47
ENE	0.	3.	11.	8.	5.	6.	2.	3.	0.	3.	1.	3.	45.	5.09
E	0.	2.	10.	5.	8.	8.	3.	3.	2.	2.	1.	0.	44.	4.99
ESE	0.	3.	3.	12.	12.	14.	8.	4.	2.	0.	0.	2.	60.	5.29
SE	0.	1.	8.	10.	7.	18.	15.	16.	9.	13.	13.	39.	149.	8.71
SSE	0.	4.	9.	9.	11.	14.	9.	8.	8.	9.	10.	32.	123.	8.65
S	0.	1.	6.	18.	12.	10.	4.	8.	8.	6.	5.	8.	86.	6.77
SSW	0.	1.	5.	10.	6.	10.	8.	6.	6.	0.	2.	5.	59.	6.77
SW	0.	2.	12.	10.	14.	15.	11.	3.	2.	6.	1.	7.	83.	6.33
WSW	0.	2.	13.	11.	21.	19.	8.	7.	6.	2.	1.	4.	94.	5.99
W	1.	1.	9.	26.	44.	35.	26.	24.	9.	0.	2.	2.	179.	5.53
WNW	0.	2.	4.	9.	24.	35.	23.	24.	16.	11.	6.	11.	165.	6.95
NW	0.	1.	4.	12.	16.	15.	9.	10.	5.	5.	1.	6.	84.	6.36
NNW	0.	4.	5.	5.	7.	5.	7.	4.	1.	2.	0.	1.	41.	5.13
N	0.	1.	16.	15.	11.	13.	11.	17.	7.	5.	11.	10.	117.	6.96
VARIABLE													0.	0.00
CALM													0.	0.00
TOTAL	1.	40.	176.	251.	297.	306.	232.	232.	159.	135.	100.	231.	2180.	6.99

WIND FREQUENCY DISTRIBUTION
 (FREQUENCY IN PERCENT OF TOTAL)

WIND DIRECTION	1	2	3	4	5	6	7	8	9	10	11	>11	TOTAL	MEAN SPEED
NNE	0.00	0.18	1.42	2.97	3.35	3.35	3.85	3.85	3.72	3.03	1.83	3.53	30.69	7.42
NE	0.00	0.37	1.38	2.06	1.19	0.73	0.18	0.50	0.32	0.23	0.28	1.10	9.35	6.47
ENE	0.00	0.14	0.50	0.37	0.23	0.28	0.09	0.14	0.00	0.14	0.05	0.14	2.06	5.09
E	0.00	0.09	0.46	0.23	0.37	0.37	0.14	0.14	0.09	0.09	0.05	0.00	2.02	4.99
ESE	0.00	0.14	0.14	0.55	0.55	0.64	0.37	0.18	0.09	0.00	0.00	0.09	2.75	5.29
SE	0.00	0.05	0.37	0.46	0.32	0.83	0.69	0.73	0.41	0.60	0.60	1.79	6.83	8.71
SSE	0.00	0.18	0.41	0.41	0.50	0.64	0.41	0.37	0.37	0.41	0.46	1.47	5.64	8.65
S	0.00	0.05	0.28	0.83	0.55	0.46	0.18	0.37	0.37	0.28	0.23	0.37	3.94	6.77
SSW	0.00	0.05	0.23	0.46	0.28	0.46	0.37	0.28	0.28	0.00	0.09	0.23	2.71	6.77
SW	0.00	0.09	0.55	0.46	0.64	0.69	0.50	0.14	0.09	0.28	0.05	0.32	3.81	6.33
WSW	0.00	0.09	0.60	0.50	0.96	0.87	0.37	0.32	0.28	0.09	0.05	0.18	4.31	5.99
W	0.05	0.05	0.41	1.19	2.02	1.61	1.19	1.10	0.41	0.00	0.09	0.09	9.21	5.53
WNW	0.00	0.09	0.18	0.41	1.10	1.61	1.06	1.10	0.73	0.50	0.28	0.50	7.57	6.95
NW	0.00	0.05	0.18	0.55	0.73	0.69	0.41	0.46	0.23	0.23	0.05	0.28	3.85	6.36
NNW	0.00	0.18	0.23	0.23	0.32	0.23	0.32	0.18	0.05	0.09	0.00	0.05	1.89	5.13
N	0.00	0.05	0.73	0.69	0.50	0.60	0.50	0.78	0.32	0.23	0.50	0.46	5.37	6.96
VARIABLE													0.00	0.00
CALM													0.00	0.00
TOTAL	0.05	1.83	8.07	11.97	13.62	14.04	10.64	10.64	7.75	6.19	4.59	10.60	100.00	6.99

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2184

TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2175