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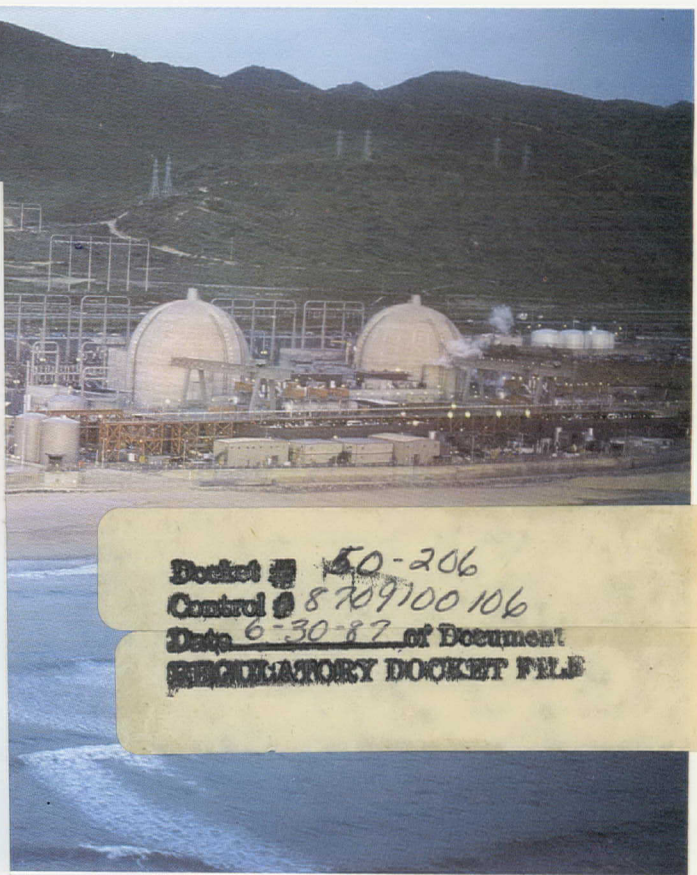
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# SAN ONOFRE NUCLEAR GENERATING STATION

## SEMIANNUAL EFFLUENT REPORT

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JANUARY - JUNE 1987

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# *Southern California Edison Company*



SAN ONOFRE NUCLEAR GENERATING STATION

P.O. BOX 128

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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 (1987)

### 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 Table 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 (1987)  
GASEOUS EFFLUENTS-SUMMATION OF ALL RELEASES

	Unit	First Quarter	Second Quarter	Estimated Total Error, %
A. Fission and activation gases				
1. Total release	Ci	1.89E+2	2.08E+2	3.00E+1
2. Average release rate for period	uCi/sec	2.43E+1	2.65E+1	
3. Percent of technical specification limit	%	1.06E-1	1.24E-1	
=====				
B. Iodines				
1. Total iodine-131	Ci	3.46E-6	3.54E-4	1.90E+1
2. Average release rate for period	uCi/sec	4.45E-7	4.50E-5	
3. Percent of technical specification limit	%	5.84E-6	5.85E-4	
=====				
C. Particulates				
1. Particulates with half-lives > 8 days	Ci	7.06E-7	5.22E-6	1.60E+1
2. Average release rate for period	uCi/sec	9.08E-8	6.64E-7	
3. Percent of technical specification limit	%	2.72E-7	1.10E-6	
4. Gross alpha radioactivity	Ci	1.39E-7	*	5.00E+1
=====				
D. Tritium				
1. Total release	Ci	2.34E-1	1.07E+1	2.50E+1
Average release rate for period	uCi/sec	3.01E-2	1.36E+0	
3. Percent of technical specification limit	%	1.96E-4	8.85E-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 (1987)  
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	<LLD	<LLD	<LLD	1.73E-3
krypton-85	Ci	<LLD	2.15E-1	1.69E-1	3.47E-1
krypton-85m	Ci	<LLD	<LLD	<LLD	1.84E-1
krypton-87	Ci	<LLD	<LLD	<LLD	8.64E-3
krypton-88	Ci	<LLD	<LLD	<LLD	1.35E-1
xenon-131m	Ci	<LLD	3.64E-1	3.43E-1	2.31E-1
xenon-133	Ci	1.66E+2	1.38E+2	2.26E+1	6.07E+1
xenon-133m	Ci	<LLD	1.22E-1	8.49E-2	8.96E-1
xenon-135	Ci	1.56E-1	2.49E+0	4.88E-3	4.47E+0
xenon-135m	Ci	<LLD	<LLD	<LLD	<LLD
xenon-138	Ci	<LLD	<LLD	<LLD	<LLD
Total for period	Ci	1.66E+2	1.41E+2	2.32E+1	6.70E+1
=====					
2. Iodines					
iodine-131	Ci	3.46E-6	3.54E-4	NA	NA
iodine-133	Ci	1.27E-7	1.44E-5	NA	NA
iodine-135	Ci	<LLD	<LLD	NA	NA
Total for period	Ci	3.59E-6	3.68E-4	NA	NA
=====					
3. Particulates					
barium-140	Ci	<LLD	8.81E-7	NA	NA
bromine-82	Ci	2.32E-5	1.99E-5	NA	NA
cesium-134	Ci	<LLD	<LLD	NA	NA
cesium-137	Ci	5.43E-7	2.41E-6	NA	NA
cobalt-58	Ci	<LLD	1.93E-6	NA	NA
cobalt-60	Ci	1.63E-7	<LLD	NA	NA
lanthanum-140	Ci	<LLD	<LLD	NA	NA
strontium-89	Ci	<LLD	*	NA	NA
strontium-90	Ci	<LLD	*	NA	NA

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

NA - Iodines and particulates 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.

TABLE 1D

S.O.N.G.S. 1

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1987)  
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	<1.20E-7	<1.40E-5
krypton-85	<1.50E-5	*
krypton-85m	<6.50E-8	<7.30E-6
krypton-87	<1.90E-7	<1.20E-5
krypton-88	<2.10E-7	<2.00E-5
xenon-131m	<2.20E-6	*
xenon-133m	<4.20E-7	*
xenon-135m	<9.30E-7	<1.40E-5
xenon-138	<3.70E-6	<3.00E-5
<u>2. Iodines</u>		
iodine-135	<6.00E-13	NA
<u>3. Particulates</u>		
barium-140	<1.40E-13	NA
cesium-134	<4.70E-14	NA
cobalt-58	<4.60E-14	NA
cobalt-60	<6.90E-14	NA
lanthanum-140	<6.00E-14	NA
strontium-89	<1.00E-14	NA
strontium-90	<1.00E-15	NA

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

\* - Nuclide detected in Table 1C.



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

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1987)  
GASEOUS EFFLUENTS-RADIATION DOSES AT THE SITE BOUNDARY

	Unit	First Quarter	Second Quarter
A. Noble Gas			
1. Gamma air dose	mrad	3.03E-2	3.56E-2
2. Percent Technical Specification Limit	%	6.06E-1	7.12E-1
3. Beta air dose	mrad	9.02E-2	9.46E-2
4. Percent Technical Specification Limit	%	9.02E-1	9.46E-1
B. Tritium, Iodine, Particulate (at the nearest receptor)			
1. Organ dose	mrem	2.16E-5	1.37E-3*
2. Percent Technical Specification Limit	%	2.88E-4	1.83E-2

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 (1987)  
GASEOUS EFFLUENTS-BATCH RELEASE SUMMARY

	6-MONTH PERIOD
1. Number of batch releases:	22 releases
2. Total time period for batch releases:	6626 minutes
3. Maximum time period for a batch release:	473 minutes
4. Average time period for a batch release:	301 minutes
5. Minimum time period for a batch release:	109 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 (1987)  
LIQUID EFFLUENTS-SUMMATION OF ALL RELEASES

	Unit	First Quarter	Second Quarter	Estimated Total Error, %
A. Fission and activation products				
1. Total release (not including tritium, gases, alpha)	Ci	2.52E-1	3.05E-2	1.90E+1
2. Average diluted concentration during period	uCi/ml	1.69E-9	3.35E-10	
3. Percent of applicable limit	%	1.01E-2	1.95E-3	
=====				
B. Tritium				
1. Total release	Ci	8.23E+2	4.25E+2	1.90E+1
2. Average diluted concentration during period	uCi/ml	5.52E-6	4.67E-6	
3. Percent of applicable limit	%	1.84E-1	1.56E-1	
=====				
C. Dissolved and entrained gases				
1. Total release	Ci	1.08E+0	2.06E-1	1.90E+1
2. Average diluted concentration during period	uCi/ml	7.25E-9	2.26E-9	
3. Percent of applicable limit	%	3.63E-3	1.13E-3	
=====				
D. Gross alpha radioactivity				
1. Total release	Ci	<LLD	*	5.00E+1
=====				
E. Volume of waste released (prior to dilution)				
	liters	1.11E+6	1.01E+6	5.00E+0
=====				
F. Volume of dilution water used during period				
	liters	1.49E+11	9.10E+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 (1987)  
LIQUID EFFLUENTS

Nuclides Released	Unit	Continuous Mode		Batch Mode	
		First Quarter	Second Quarter	First Quarter	Second Quarter
antimony-124	Ci	<LLD	<LLD	<LLD	3.66E-4
barium-140	Ci	<LLD	<LLD	<LLD	<LLD
cerium-141	Ci	<LLD	<LLD	<LLD	<LLD
cesium-134	Ci	5.23E-3	2.36E-3	8.42E-5	1.05E-3
cesium-137	Ci	2.16E-1	7.27E-3	5.83E-4	3.31E-3
chromium-51	Ci	<LLD	<LLD	3.23E-3	<LLD
cobalt-58	Ci	5.17E-3	5.79E-4	1.15E-2	5.90E-3
cobalt-60	Ci	1.08E-4	6.79E-3	5.15E-3	2.73E-3
iodine-131	Ci	9.83E-4	1.07E-4	<LLD	3.44E-5
iron-55	Ci	<LLD	*	2.51E-3	*
iron-59	Ci	<LLD	<LLD	9.88E-5	<LLD
Lanthanum-140	Ci	<LLD	<LLD	1.26E-5	<LLD
manganese-54	Ci	1.65E-4	<LLD	1.56E-4	3.04E-5
molybdenum-99	Ci	<LLD	<LLD	<LLD	<LLD
niobium-95	Ci	<LLD	<LLD	9.94E-5	<LLD
ruthenium-103	Ci	<LLD	<LLD	1.39E-4	<LLD
strontium-89	Ci	<LLD	*	<LLD	*
strontium-90	Ci	<LLD	*	<LLD	*
technetium-99m	Ci	<LLD	<LLD	<LLD	<LLD
zinc-65	Ci	<LLD	<LLD	1.99E-4	<LLD
zirconium-95	Ci	<LLD	<LLD	6.07E-5	<LLD
Total for period (above)	Ci	2.28E-1	1.71E-2	2.38E-2	1.34E-2

xenon-131m	Ci	<LLD	<LLD	2.51E-2	1.22E-2
xenon-133	Ci	<LLD	4.39E-4	1.05E+0	1.93E-1
xenon-133m	Ci	<LLD	<LLD	8.91E-4	1.78E-4
xenon-135	Ci	<LLD	<LLD	<LLD	2.10E-5

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

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

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

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1987)  
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	<7.50E-8	<2.50E-7
barium-140	<1.90E-7	<6.00E-7
cerium-141	<8.10E-8	<1.90E-7
chromium-51	<4.40E-7	<1.20E-6
iodine-131	<5.40E-8	<1.60E-7
iron-55	<1.00E-6	*
iron-59	<1.30E-7	<5.00E-7
lanthanum-140	<1.10E-7	<1.00E-7
manganese-54	<5.80E-8	*
molybdenum-99	<4.40E-7	<1.40E-6
niobium-95	<3.60E-8	<1.90E-7
ruthenium-103	<5.40E-8	<1.70E-7
strontium-89	<5.00E-8	<5.00E-8
strontium-90	<1.00E-8	<1.00E-8
technetium-99m	<6.40E-8	<1.00E-7
zinc-65	<1.10E-7	<5.40E-7
zirconium-95	<5.80E-8	<3.30E-7

\* - Nuclide detected in Table 2B.

TABLE 2C (Continued)

S.O.N.G.S. 1

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1987)  
 LIQUID EFFLUENTS-LOWER LIMIT OF DETECTION

RADIONUCLIDES	CONTINUOUS MODE LLD (uCi/ml)	BATCH MODE LLD (uCi/ml)
<u>(2) Dissolved and entrained gases</u>		
xenon-131m	<2.00E-6	*
xenon-133	<1.20E-7	*
xenon-133m	<3.70E-7	*
xenon-135	<4.50E-8	<3.00E-7

\* - Nuclide detected in Table 2B.

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

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1987)  
LIQUID EFFLUENTS-RADIATION DOSES AT THE LIQUID SITE BOUNDARY

	Unit	First Quarter	Second Quarter
A.			
1. Total body dose	mrem	7.45E-3	6.54E-2*
2. Percent Technical Specification Limit	%	4.96E-1	4.36E+0
B.			
1. Limiting organ dose	mrem	1.44E-2	1.69E-1*
2. Percent Technical Specification Limit	%	2.88E-1	3.38E+0

NOTE: The limiting organ for this report period is the GI-LLI.

\* 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 (1987)  
LIQUID EFFLUENTS-BATCH RELEASE SUMMARY

	6-MONTH PERIOD
1. Number of batch releases:	20 releases
2. Total time period for a batch release:	23,760 minutes
3. Maximum time period for a batch release:	2,820 minutes
4. Average time period for a batch release:	1,188 minutes
5. Minimum time period for a batch release:	65 minutes
6. Average saltwater flow during batch releases:	196,000 gpm

## SECTION D. PREVIOUS SEMIANNUAL REPORT ADDENDUM

### S.O.N.G.S. 1

1. The July - December 1986 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 1986. 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	3.67E-7**	

Sr-89 LLD = <1.00E-14 uCi/cc

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

#### LIQUID EFFLUENTS

Fourth Quarter			
Nuclides Released	Unit	Continuous Mode	Batch Mode
iron-55	Ci	<LLD	3.64E-3
strontium-89	Ci	<LLD	<LLD
strontium-90	Ci	7.91E-5	8.36E-5
Gross alpha	Ci	<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

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

\*\* - Gross alpha is reported as total activity released per quarter. See Tables 1A & 2A.

SECTION D. PREVIOUS SEMIANNUAL REPORT ADDENDUM (Continued)

S.O.N.G.S. 1

2. LIQUID EFFLUENT-RADIATION DOSES AT THE SITE BOUNDARY  
For the fourth quarter of 1986 Semiannual Report,  
Sr-89, Sr-90, and Fe-55.

	Unit	Fourth Quarter
A.		
1. Total body dose	mrem	5.37E-4
2. Percent Applicable Limit	%	3.58E-2
B.		
1. Limit organ dose	mrem	3.18E-4
2. Percent Applicable Limit	%	6.36E-3

NOTE: The limiting organ is the Bone.

3. Correction to Solid Radwaste Shipment Data, July - December 1986 Report.
- o An error was made in the distribution of solid radwaste shipments between Unit 1 and Units 2/3. The shipping footnote on table 3, Unit 1 should read: "Shipped in Type B cask (C of C 9208), 1-142 ft<sup>3</sup> High Integrity Container".

SECTION E. RADWASTE SHIPMENTS

S.O.N.G.S. 1

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1987)  
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 <sup>3</sup> Ci	0.00E+0 0.00E+0	3.00E+1
b.	Dry compressible equip. etc.	m <sup>3</sup> Ci	3.18E+0 1.05E+1	3.00E+1
c.	Irradiated components, control rods, etc.	m <sup>3</sup> Ci	0.00E+0 0.00E+0	3.00E+1
d.	Other (absorbed liquids, sand, building rubble, biological waste.)	m <sup>3</sup> Ci	2.90E+0 1.64E+0	3.00E+1

All Material shipped in 55 gal. D.O.T. 7A Type A Drums (7.5 ft<sup>3</sup> each)  
and steel boxes (strong tight containers - 98 ft<sup>3</sup> each).

SECTION E. RADWASTE SHIPMENTS (Continued)

S.O.N.G.S. 1

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1987)  
SOLID WASTE AND IRRADIATED FUEL SHIPMENT

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

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

a. Not applicable	%	0.00E+0
b. antimony-125	%	1.06E-1
carbon-14	%	1.24E-3
cerium-144	%	7.27E+1
cesium-134	%	5.07E-1
cesium-137	%	2.38E+0
cobalt-57	%	1.40E-2
cobalt-58	%	1.67E+0
cobalt-60	%	4.32E+0
chromium-51	%	2.73E-1
iodine-129	%	3.46E-3
iron-55	%	4.09E+0
iron-59	%	7.73E+0
manganese-54	%	3.92E-1
nickel-59	%	3.04E-2
nickel-63	%	1.93E+0
niobium-95	%	1.01E+0
plutonium-241	%	1.23E-1
ruthenium-103	%	1.13E-1
strontium-90	%	1.29E-2
technetium-99	%	1.78E-2
tritium	%	1.96E+0
zinc-65	%	1.94E-2
zirconium-95	%	3.64E-1

SECTION E. RADWASTE SHIPMENTS (Continued)

S.O.N.G.S. 1

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1987)  
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. antimony-125	%	6.75E-1
cerium-144	%	7.34E-1
carbon-14	%	9.23E-3
cesium-134	%	2.35E+0
cesium-137	%	1.16E+1
cobalt-57	%	8.85E-2
cobalt-58	%	9.28E+0
cobalt-60	%	2.51E+1
chromium-51	%	1.66E+0
iodine-129	%	1.97E-2
iron-55	%	2.45E+1
iron-59	%	4.91E-2
manganese-54	%	2.43E+0
nickel-59	%	1.94E-1
nickel-63	%	1.09E+1
niobium-95	%	6.41E+0
plutonium-241	%	7.00E-1
ruthenium-103	%	7.16E-1
strontium-90	%	7.34E-2
technetium-99	%	1.09E-1
tritium	%	3.17E-2
zinc-65	%	1.24E-1
zirconium-95	%	2.32E+0

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  $\text{MPC}_{\text{eff}}$  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

$\text{MPC}_i$  = 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  $\text{MPC}_{\text{eff}}$  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

$\text{MPC}_i$  = 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 errors, (3) counting errors, and (4) calibration errors. 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:  $\sigma_i$  = 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) 7.45E-3	2) 6.54E-2
Organ	3) 1.44E-2	4) 1.69E-1
AIRBORNE EFFLUENTS		
Tritium, Iodines, and Particulates	5) 1.18E-4	6) 1.07E-2
NOBLE GASES**		
Gamma	7) 1.46E-2	8) 3.38E-2
Beta	9) 4.35E-2	10) 8.79E-2
DIRECT RADIATION	11) 2.60E-1	12) 4.64E-1

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

\*\* - Noble gas doses due to airborne 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 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 NW sector. This was calculated using the activity reported in the January - June 1987 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 1987 Semiannual Report with the assumptions of USNRC Regulatory Guide 1.109.
7. A maximum air dose of  $1.26\text{E}-1$  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 maximum air dose of  $6.27\text{E}-2$  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 NNW sector, a landward sector, at the exclusion area boundary and calculated with the assumptions of the USNRC Regulatory Guide 1.109.
9. A maximum air dose of  $3.75\text{E}-1$  mrad for beta radiation was located in the SSW sector, a seaward direction. The reported maximum air dose for beta radiation was located in the NW sector, a landward sector, at the exclusion area boundary and calculated with the assumptions of the USNRC Regulatory Guide 1.109.
10. A maximum air dose of  $1.67\text{E}-1$  mrad for beta radiation was located in the SSW sector, a seaward direction. The reported maximum air dose for beta radiation was located in the NNW sector, a landward sector, at the exclusion area boundary and calculated with the assumptions of the USNRC Regulatory Guide 1.109.
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	4.96E-1	4.36E+0
Organ	2.88E-1	3.38E-2
AIRBORNE EFFLUENTS		
Tritium, Iodines, and Particulates	1.57E-3	1.43E-1
NOBLE GASES		
Gamma	2.92E-1	6.76E-1
Beta	4.35E-1	8.79E-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 1

- o There were no changes to the Unit 1 Offsite Dose Calculation Manual during the reporting period, January 1, 1987 to June 30, 1987.

## 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, 1987 to June 30, 1987.

January 1, 1987 - June 30, 1987

EFFLUENT RADIATION MONITORS OUT OF SERVICE FOR GREATER THAN 30 DAYS

S.O.N.G.S. 1

Monitor	Inoperability Period	Inoperability Cause	Explanation
1254	8/27/85 to present	Process flow indicator held out of service	Continued study of Vent Stack Flow characteristics for correction of flow indication. Permanent Facility Change failed and Station Engineering evaluating problem. Work request being generated.

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

- o Gaseous effluent releases totaled 397.2 curies with Xe-133 97.5% of the total.
- o The radiation doses from gaseous releases are: (a) gamma air dose:  $6.59\text{E-}2$  mrad at the site boundary, (b) beta air dose:  $1.85\text{E-}1$  mrad at the site boundary, (c) organ dose:  $1.39\text{E-}3$  mrem at the nearest receptor.
- o Liquid releases totaled  $1.25\text{E+}3$  curies of which tritium was  $1.25\text{E+}3$  Ci, noble gases were  $1.29\text{E+}0$  Ci and particulates and iodines were  $2.82\text{E-}1$  Ci. This contrasts with particulate and iodine releases of  $5.17\text{E-}1$  Ci during the same period of 1986. This reduction is due to a continued aggressive Liquid Effluent Activity Reduction program instituted January 1986.
- o The radiation doses from liquid releases are: (a) total body:  $7.29\text{E-}2$  mrem, (b) limiting organ:  $1.83\text{E-}1$  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 (1987)

### 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 Table 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 (1987)  
GASEOUS EFFLUENTS-SUMMATION OF ALL RELEASES

	Unit	First Quarter	Second Quarter	Estimated Total Error, %
A. Fission and activation gases				
1. Total release	Ci	6.27E+3	4.94E+3	2.50E+1
2. Average release rate for period	uCi/sec	8.06E+2	6.27E+2	
3. Percent of technical specification limit	%	1.48E+0	1.35E+0	
=====				
B. Iodines				
1. Total iodine-131	Ci	6.40E-2	3.24E-2	1.90E+1
2. Average release rate for period	uCi/sec	8.23E-3	4.12E-3	
3. Percent of technical specification limit	%	3.95E-2	1.98E-2	
=====				
C. Particulates				
1. Particulates with half-lives > 8 days	Ci	3.55E-4	9.16E-5	1.60E+1
2. Average release rate for period	uCi/sec	4.56E-5	1.16E-5	
3. Percent of technical specification limit	%	3.43E-5	1.23E-5	
4. Gross alpha radioactivity	Ci	<LLD	*	5.00E+1
=====				
D. Tritium				
1. Total release	Ci	3.28E+0	9.85E+0	2.50E+1
2. Average release rate for period	uCi/sec	4.21E-1	1.25E+0	
3. Percent of technical specification limit	%	1.01E-3	3.01E-3	
=====				

\* - 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 (1987)  
GASEOUS EFFLUENTS - GROUND LEVEL RELEASES

		Continuous Mode		Batch Mode	
Nuclides Released	Unit	First Quarter	Second Quarter	First Quarter	Second Quarter
1. Fission gases					
argon-41	Ci	4.29E+0	1.21E+1	<LLD	<LLD
krypton-85	Ci	3.99E+0	1.19E-1	2.37E+1	1.82E+1
krypton-85m	Ci	2.36E+1	3.86E+1	1.10E-1	<LLD
krypton-87	Ci	2.45E-1	2.25E+1	<LLD	<LLD
krypton-88	Ci	3.86E-2	2.33E+1	<LLD	<LLD
xenon-131m	Ci	4.64E+0	7.45E+0	1.11E+1	1.69E+0
xenon-133	Ci	5.63E+3	4.36E+3	1.31E+2	5.95E+0
xenon-133m	Ci	4.41E+0	1.75E+1	6.40E-1	<LLD
xenon-135	Ci	4.27E+2	4.18E+2	1.80E+0	1.57E-2
xenon-135m	Ci	6.88E-4	6.44E+0	<LLD	<LLD
xenon-138	Ci	<LLD	1.19E+0	<LLD	<LLD
Total for period	Ci	6.10E+3	4.91E+3	1.68E+2	2.59E+1
=====					
2. Iodines					
iodine-131	Ci	6.40E-2	3.24E-2	NA	NA
iodine-132	Ci	4.57E-4	6.45E-4	NA	NA
iodine-133	Ci	6.58E-3	1.26E-2	NA	NA
iodine-134	Ci	<LLD	6.74E-5	NA	NA
iodine-135	Ci	6.40E-4	2.90E-3	NA	NA
Total for period	Ci	7.17E-2	4.86E-2	NA	NA
=====					

TABLE 1C (Continued)

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

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1987)  
GASEOUS EFFLUENTS - GROUND-LEVEL RELEASES

Nuclides Released	Unit	Continuous Mode		Batch Mode	
		First Quarter	Second Quarter	First Quarter	Second Quarter
3. Particulates					
antimony-125	Ci	2.23E-7	<LLD	NA	NA
barium-139	Ci	<LLD	3.70E-9	NA	NA
barium-140	Ci	<LLD	<LLD	NA	NA
bromine-82	Ci	3.64E-5	6.13E-5	NA	NA
cesium-134	Ci	6.76E-5	3.91E-5	NA	NA
cesium-136	Ci	4.64E-6	<LLD	NA	NA
cesium-137	Ci	1.30E-4	4.57E-5	NA	NA
cesium-138	Ci	2.25E-4	2.36E-3	NA	NA
chromium-51	Ci	3.41E-5	<LLD	NA	NA
cobalt-58	Ci	7.38E-5	<LLD	NA	NA
cobalt-60	Ci	2.19E-5	2.07E-6	NA	NA
iron-59	Ci	4.13E-6	<LLD	NA	NA
lanthanum-140	Ci	<LLD	<LLD	NA	NA
manganese-54	Ci	4.26E-6	4.74E-6	NA	NA
molybdenum-99	Ci	<LLD	7.36E-8	NA	NA
niobium-95	Ci	6.85E-6	<LLD	NA	NA
rubidium-88	Ci	8.54E-2	7.38E-2	NA	NA
ruthenium-103	Ci	9.93E-7	<LLD	NA	NA
sodium-24	Ci	1.30E-6	1.78E-6	NA	NA
strontium-89	Ci	<LLD	*	NA	NA
strontium-90	Ci	<LLD	*	NA	NA
strontium-92	Ci	<LLD	2.23E-6	NA	NA
technetium-99m	Ci	<LLD	7.50E-8	NA	NA
tellurium-132	Ci	<LLD	3.11E-7	NA	NA
tin-113	Ci	1.06E-6	<LLD	NA	NA
zirconium-95	Ci	5.25E-6	<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.

TABLE 1D

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

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1987)  
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	*	<1.40E-5
krypton-85m	*	<7.30E-6
krypton-87	*	<1.20E-5
krypton-88	*	<2.00E-5
xenon-133m	*	<7.40E-5
xenon-135m	*	<1.40E-5
xenon-138	<9.70E-7	<3.00E-5
<u>2. Iodines</u>		
iodine-134	<5.00E-12	NA
<u>3. Particulates</u>		
antimony-125	<1.47E-12	NA
barium-139	<6.40E-12	NA
barium-140	<1.60E-12	NA
cesium-136	<4.50E-13	NA
chromium-51	<3.40E-12	NA
cobalt-58	<5.00E-13	NA
iron-59	<1.10E-12	NA
lanthanum-140	<9.50E-12	NA
molybdenum-99	<3.70E-13	NA
niobium-95	<4.50E-13	NA

\* - Nuclides were detected in Table 1C.

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

TABLE 1D (Continued)

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

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1987)  
 GASEOUS EFFLUENTS - LOWER LIMIT OF DETECTION

RADIONUCLIDES	CONTINUOUS MODE LLD (uCi/cc)	BATCH MODE LLD (uCi/cc)
3. <u>Particulates</u> (Continued)		
ruthenium-103	<3.90E-13	NA
strontium-89	<1.00E-14	NA
strontium-90	<1.00E-15	NA
strontium-92	<1.50E-12	NA
technetium-99m	<3.70E-13	NA
tellurium-132	<3.90E-13	NA
tin-113	<5.80E-13	NA
zirconium-95	<7.40E-13	NA
gross alpha	<1.00E-14	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 (1987)  
GASEOUS EFFLUENTS-RADIATION DOSES AT THE SITE BOUNDARY

	Unit	First Quarter	Second Quarter
<hr/>			
A. Noble Gas			
1. Gamma air dose	mrads	4.56E-1	4.63E-1
2. Percent Technical Specification Limit	%	4.56	4.63
3. Beta air dose	mrads	1.07	9.30E-1
4. Percent Technical Specification Limit	%	5.35	4.65
<hr/>			
B. Tritium, Iodine, Particulate (at the nearest receptor)			
1. Organ dose	mrem	1.37E-1	7.05E-2*
2. Percent Technical Specification Limit	%	9.13E-1	4.70E-1
<hr/>			

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 (1987)  
GASEOUS EFFLUENTS-BATCH RELEASE SUMMARY

	6-MONTH PERIOD
1. Number of batch releases:	11 releases
2. Total time period for batch releases:	3,999 minutes
3. Maximum time period for a batch:	548 minutes
4. Average time period for a batch release:	363 minutes
5. Minimum time period for a batch release:	265 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 (1987)  
LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

	Unit	First Quarter	Second Quarter	Estimated Total Error, %
<b>A. Fission and activation products</b>				
1. Total release (not including tritium, gases, alpha)	Ci	9.23E-2	2.08E-1	1.90E+1
2. Average diluted concentration during period	uCi/ml	1.70E-10	2.74E-10	
3. Percent of applicable limit	%	3.78E-3	2.02E-2	
=====				
<b>B. Tritium</b>				
1. Total release	Ci	1.77E+2	2.64E+2	1.90E+1
2. Average diluted concentration during period	uCi/ml	3.25E-7	3.47E-7	
3. Percent of applicable limit	%	1.08E-2	1.16E-2	
=====				
<b>C. Dissolved and entrained gases</b>				
1. Total release	Ci	1.08E+2	3.44E+1	1.90E+1
2. Average diluted concentration during period	uCi/ml	1.99E-7	4.53E-8	
3. Percent of applicable limit	%	9.95E-2	2.27E-2	
=====				
<b>D. Gross alpha radioactivity</b>				
1. Total release	Ci	<LLD	*	5.00E+1
=====				
<b>E. Volume of waste released (prior to dilution)</b>				
	liters	4.01E+6	3.94E+6	5.00E+0
=====				
<b>F. Volume of dilution water used during period</b>				
	liters	5.44E+11	7.60E+11	5.00E+0
=====				

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

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

TABLE 2B

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

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1987)  
LIQUID EFFLUENTS

Nuclides Released	Unit	Continuous Mode		Batch Mode	
		First Quarter	Second Quarter	First Quarter	Second Quarter
antimony-125	Ci	<LLD	<LLD	5.17E-3	1.66E-3
barium-140	Ci	<LLD	<LLD	<LLD	<LLD
cerium-141	Ci	<LLD	<LLD	2.31E-4	<LLD
cerium-144	Ci	<LLD	<LLD	5.26E-4	<LLD
cesium-134	Ci	8.41E-4	7.10E-3	4.78E-3	3.95E-2
cesium-136	Ci	<LLD	<LLD	1.13E-5	5.71E-3
cesium-137	Ci	1.71E-3	1.07E-2	8.65E-3	4.60E-2
cesium-138	Ci	<LLD	<LLD	1.49E-5	<LLD
chromium-51	Ci	<LLD	<LLD	7.90E-3	3.57E-2
cobalt-57	Ci	<LLD	<LLD	1.09E-5	<LLD
cobalt-58	Ci	3.40E-3	<LLD	1.95E-2	1.50E-3
cobalt-60	Ci	<LLD	<LLD	9.58E-3	1.47E-3
iodine-131	Ci	7.82E-4	3.23E-2	4.63E-3	9.87E-3
iodine-132	Ci	<LLD	<LLD	1.11E-4	<LLD
iodine-133	Ci	<LLD	1.33E-2	1.32E-4	4.88E-4
iron-55	Ci	<LLD	*	3.84E-4	*
iron-59	Ci	<LLD	<LLD	2.54E-4	<LLD
Lanthanum-140	Ci	<LLD	<LLD	9.95E-4	1.37E-3
manganese-54	Ci	<LLD	<LLD	2.21E-3	2.73E-4
molybdenum-99	Ci	<LLD	<LLD	<LLD	<LLD
niobium-95	Ci	<LLD	<LLD	1.01E-2	4.97E-4
niobium-97	Ci	<LLD	<LLD	2.54E-4	1.28E-5
rubidium-88	Ci	<LLD	<LLD	2.48E-4	2.25E-4
ruthenium-103	Ci	<LLD	<LLD	9.62E-4	5.74E-6
ruthenium-106	Ci	<LLD	<LLD	1.84E-3	<LLD
silver-110m	Ci	<LLD	<LLD	2.76E-4	4.16E-5
strontium-89	Ci	<LLD	*	<LLD	*
strontium-90	Ci	<LLD	*	<LLD	*
technetium-99m	Ci	<LLD	<LLD	1.70E-5	5.46E-5
tellurium-132	Ci	<LLD	<LLD	1.39E-4	<LLD
tin-113	Ci	<LLD	<LLD	6.49E-4	9.94E-6
zinc-65	Ci	<LLD	<LLD	2.89E-5	<LLD
zirconium-95	Ci	<LLD	<LLD	5.42E-3	1.37E-4
zirconium-97	Ci	<LLD	<LLD	6.04E-4	<LLD
Total for period (above)	Ci	6.73E-3	6.34E-2	8.56E-2	1.45E-1

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

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

TABLE 2B (Continued)

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

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1987)  
LIQUID EFFLUENTS

Nuclides Released	Unit	Continuous Mode		Batch Mode	
		First Quarter	Second Quarter	First Quarter	Second Quarter
krypton-85	Ci	<LLD	<LLD	2.13E-1	1.52E-1
krypton-85m	Ci	<LLD	<LLD	1.70E-3	<LLD
xenon-131m	Ci	<LLD	<LLD	8.61E-1	1.81E-1
xenon-133	Ci	<LLD	<LLD	1.06E+2	3.35E+1
xenon-133m	Ci	<LLD	<LLD	9.55E-1	4.65E-1
xenon-135	Ci	<LLD	<LLD	2.91E-1	9.25E-2
xenon-135m	Ci	<LLD	<LLD	<LLD	5.75E-4

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

TABLE 2C

S.O.N.G. 2 - 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1987)  
LIQUID EFFLUENTS - LOWER LIMIT OF DETECTION

RADIONUCLIDES	CONTINUOUS MODE LLD ( $\mu\text{Ci/ml}$ )	BATCH MODE LLD ( $\mu\text{Ci/ml}$ )
<u>(1) Fission and activation products</u>		
antimony-125	$<4.10\text{E-}7$	*
barium-140	$<3.20\text{E-}7$	$<5.00\text{E-}7$
cerium-141	$<1.10\text{E-}7$	$<1.90\text{E-}7$
cerium-144	$<5.00\text{E-}7$	$<9.00\text{E-}7$
cesium-136	$<1.70\text{E-}7$	*
cesium-138	**	$<2.00\text{E-}7$
cobalt-57	$<6.90\text{E-}7$	$<1.10\text{E-}7$
cobalt-58	$<1.10\text{E-}7$	*
cobalt-60	$<1.60\text{E-}7$	*
iodine-132	$<2.00\text{E-}6$	$<2.00\text{E-}7$
iodine-133	$<1.40\text{E-}7$	*
iron-55	$<1.00\text{E-}6$	*
iron-59	$<2.40\text{E-}7$	$<3.00\text{E-}7$

\* - Nuclide detected in Table 2B.

\*\* - Weekly composite analysis will not detect this isotope.

TABLE 2C (Continued)

S.O.N.G. 2 - 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1987)  
LIQUID EFFLUENTS - LOWER LIMIT OF DETECTION

RADIONUCLIDES	CONTINUOUS MODE LLD (uCi/ml)	BATCH MODE LLD (uCi/ml)
1) Fission and activation products (Continued)		
lanthanum-140	<3.20E-7	*
manganese-54	<1.10E-7	*
molybdenum-99	<8.50E-7	<9.80E-7
niobium-95	<1.10E-7	*
niobium-97	**	*
rubidium-88	**	*
ruthenium-103	<9.00E-8	*
ruthenium-106	<1.40E-7	<1.40E-6
silver-110m	<1.60E-7	*
strontium-89	<5.00E-8	<5.00E-8
strontium-90	<1.00E-8	<1.00E-8
technetium-99m	<8.20E-8	*
tellurium-132	<7.10E-8	<1.10E-7
tin-113	<1.20E-7	*
zinc-65	<2.30E-7	<3.40E-7
zirconium-95	<1.90E-7	*
zirconium-97	<1.70E-7	<1.30E-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 (1987)  
LIQUID EFFLUENTS - LOWER LIMIT OF DETECTION

<u>RADIONUCLIDES</u>	<u>CONTINUOUS MODE LLD (uCi/ml)</u>	<u>BATCH MODE LLD (uCi/ml)</u>
<u>(2) Dissolved and entrained gases</u>		
krypton-85	<2.10E-5	*
krypton-85m	<9.00E-8	<1.40E-7
xenon-131m	<2.70E-6	*
xenon-133	<2.70E-7	*
xenon-133m	<5.40E-7	*
xenon-135	<5.50E-8	*
xenon-135m	<2.30E-7	<2.20E-6

\* - Nuclide detected in Table 2B.

TABLE 2D

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

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1987)  
LIQUID EFFLUENTS-RADIATION DOSES AT THE LIQUID SITE BOUNDARY

	Unit	First Quarter	Second Quarter
A.			
1. Total body dose	mrem	1.82E-3	6.83E-3*
2. Percent Technical Specification Limit	%	6.06E-2	2.28E-1
B.			
1. Limiting organ dose	mrem	9.93E-3	2.75E-2*
2. Percent Technical Specification Limit	%	9.93E-2	2.75E-1

NOTE: The limiting organ for the first quarter is the GI-LLI, and for the second quarter 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 (1987)  
LIQUID EFFLUENTS-BATCH RELEASE SUMMARY

	6-MONTH PERIOD
1. Number of batch releases:	84 releases
2. Total time period for batch releases:	2.18E+4 minutes
3. Maximum time period for a batch release:	1,033 minutes
4. Average time period for a batch release:	259 minutes
5. Minimum time period for a batch release:	21 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. In the July - December 1986 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 1986. 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, Sr-89 and Sr-90 are analyzed by "continuous" mode only.

\*\* - Gross alpha is reported as total activity released per quarter. See Table 1A.

2. Correction to Solid Radwaste Shipment Data, July - December 1986 Report.

o An error was made in the distribution of solid radwaste shipments between Unit 1 and Units 2/3. The shipping footnote should read: "Shipped in Type A cask (C of C 9176), 1-190 ft<sup>3</sup> High Integrity Container and 1-142 ft<sup>3</sup> High Integrity Container. (Reported volume is for burial volume of the container.)"

SECTION D. PREVIOUS SEMIANNUAL REPORT ADDENDUM (Continued)

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

LIQUID EFFLUENTS

3. In the July - December 1986 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:

Nuclides Released	Unit	Fourth Quarter	
		Continuous Mode	Batch Mode
iron-55	Ci	<LLD	1.29E-3
strontium-89	Ci	<LLD	<LLD
strontium-90	Ci	<LLD	<LLD
Gross alpha	Ci	<LLD*	

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

Sr-89 LLD = <4.00E-8 uCi/ml

Sr-90 LLD = <2.00E-8 uCi/ml

Gross alpha LLD = <1.00E-7 uCi/ml

4. Radiation Doses at the Site Boundary	Unit	Fourth Quarter
A.		
1. Total body dose	mrem	3.22E-5
2. Percent Applicable Limit	%	1.07E-3
B.		
1. Limit organ dose	mrem	2.00E-4
2. Percent Applicable Limit	%	2.00E-3

NOTE: The limiting organ is the Bone.

\* - Gross alpha is reported as total activity released per quarter. See Table 2A.

SECTION E. RADWASTE SHIPMENTS

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

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1987)  
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 <sup>3</sup> Ci	8.04E+0* 1.19E+2	3.00E+1
b.	Dry compressible waste, contaminated equip. etc.	m <sup>3</sup> Ci	7.29E+1** 1.16E+1	3.00E+1
c.	Irradiated components, control rods, etc.	m <sup>3</sup> Ci	0.00E+0 0.00E+0	3.00E+1
d.	Other (filters, sludge sand/rubble, wet trash)	m <sup>3</sup> Ci	2.12E-1** 4.73E-3	3.00E+1

\* Shipped in Type A Cask (C of C 9176), 2 - 142 ft<sup>3</sup> 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 ft<sup>3</sup> each) and steel boxes (strong tight containers - 98 ft<sup>3</sup> 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 (1987)  
SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

a.	carbon-14	%	8.40E-4
	cerium-144	%	2.03E-2
	cesium-134	%	3.25E+1
	cesium-137	%	5.59E+1
	cobalt-58	%	5.03E-1
	cobalt-60	%	2.14E+0
	iodine-129	%	8.99E-4
	iron-55	%	5.82E+0
	manganese-54	%	1.99E+0
	nickel-63	%	1.40E+0
	plutonium-241	%	1.01E-2
	strontium-89	%	1.40E-2
	strontium-90	%	8.39E-2
	technetium-99	%	9.58E-4
	tritium	%	1.63E-3

b.	antimony-125	%	9.73E-1
	carbon-14	%	2.56E-3
	cerium-144	%	4.23E-1
	cesium-134	%	8.84E-1
	cesium-137	%	4.30E+0
	cobalt-57	%	1.09E-1
	cobalt-58	%	1.27E+1
	cobalt-60	%	1.85E+1
	chromium-51	%	2.24E+0
	iodine-129	%	8.19E-3
	iron-55	%	3.56E+1
	iron-59	%	4.12E-2
	manganese-54	%	3.39E+0
	nickel-59	%	7.08E-2
	nickel-63	%	5.77E+0
	niobium-95	%	9.82E+0
	plutonium-241	%	3.22E-1
	ruthenium-103	%	2.61E-1
	ruthenium-106	%	7.70E-1
	strontium-90	%	3.97E-2
	technetium-99	%	4.18E-2
	tritium	%	2.84E-1
	zinc-65	%	1.44E-1
	zirconium-95	%	3.34E+0

SECTION E. RADWASTE SHIPMENTS (Continued)

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

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1987)  
SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

c. Not applicable	%	0.00E+0
d. carbon-14	%	2.81E+0
cobalt-58	%	1.92E+1
cobalt-60	%	3.34E+0
chromium-51	%	1.70E+1
iodine-129	%	2.92E-1
manganese-54	%	2.64E+0
nickel-63	%	2.53E+1
niobium-95	%	9.24E+0
technetium-99	%	4.90E-1
tritium	%	1.27E+1
zirconium-95	%	6.95E+0

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.

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

The  $\text{MPC}_{\text{eff}}$  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

$\text{MPC}_i$  = 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  $\text{MPC}_{\text{eff}}$  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

$\text{MPC}_i$  = 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 errors, (3) counting errors, and (4) calibration errors. 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:  $\sigma_i$  = 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	1.82E-3	6.83E-3
Organ	3)	4)
	9.93E-3	2.75E-2
AIRBORNE EFFLUENTS	5)	6)
Tritium Iodines and Particulates	4.43E-2	4.36E-2
NOBLE GASES**	7)	8)
Gamma	2.93E-1	1.95E-1
Beta	9)	10)
	7.09E-1	3.75E-1
DIRECT RADIATION	11)	12)
	2.60E-1	4.64E-1

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

\*\* - Noble gas doses due to airborne 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 1987 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 1987 Semiannual Report with the assumptions of USNRC Regulatory Guide 1.109.
7. The maximum air dose of  $6.74\text{E-}1$  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 E sector, at the exclusion area boundary and calculated with the assumptions of USNRC Regulatory Guide 1.109.
8. A maximum air dose of  $3.32\text{E-}1$  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 USNRC Regulatory Guide 1.109.
9. The maximum air dose of  $1.67\text{E+}0$  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 E sector, at the exclusion area boundary and calculated with the assumptions of USNRC Regulatory Guide 1.109.
10. A maximum air dose of  $5.15\text{E-}1$  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.
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	6.06E-2	2.28E-1
Organ	9.93E-2	2.75E-1
AIRBORNE EFFLUENTS		
Tritium, Iodines and Particulates	2.95E-1	2.91E-1
NOBLE GASES		
Gamma	2.93E+0	1.95E+0
Beta	3.54E+0	1.88E+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. 2 - 3

- o There were no changes to Units 2/3 Offsite Dose Calculation Manual during the reporting period, January 1, 1987 to June 30, 1987.

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

- o There were no unplanned releases of radioactive gases or liquids from Units 2/3 during the reporting period, January 1, 1987 to June 30, 1987.



January 1, 1987 - June 30, 1987

EFFLUENT RADIATION MONITORS OUT OF SERVICE FOR GREATER THAN 30 DAYS

S.O.N.G.S. 2

Monitor	Inoperability Period	Inoperability Cause	Explanation
2-7818A	05/14/87 to present	Out of Service to work on 2-7818B	This monitor is out of service to work on 2-7818B which has a design problem and does not track radiation properly. See explana- tion on 2-7818B below.
2-7818B	04/18/87 to present	Reads high/spiking	See SPR 2U870717, 2RI- 7818 is not tracking actual radiation during the Unit 2 tube leak. It is believed to be a design problem which would mean that 3RI- 7818B will not work under the same condi- tion.
2-7821	Possibly greater than 30 days	Clogged sample line	Sample line was discover- ed clogged. The last observable monitor response was June 19, 1986. (This pathway is not normally radiologi- cally contaminated.) See LER #87-002 for complete details.
2-7865	03/24/86 to 03/23/87	Process flow indicator	Flow probe testing was being conducted by Station Technical during this time frame. Stack profiles were found to change during different fan align- ments. Center points had to be established, probes calibrated, test results obtained, and reports made. Monitor was restored when Station Technical criteria were met.

January 1, 1987 - June 30, 1987

EFFLUENT RADIATION MONITORS OUT OF SERVICE FOR GREATER THAN 30 DAYS

S.O.N.G.S. 3

Monitor	Inoperability Period	Inoperability Cause	Explanation
3-7818A	01/07/87 to 02/12/87	18 month surv/DCP	18 month calibration was conducted during this time. Also a series of DCP's, #6017 and #6460. DCP acceptance and work caused monitor to exceed time frame.
3-7818B	01/07/87 to 02/12/87	18 month surv/DCP	18 month calibration was conducted during this time. Also a series of DCP's, #6017 and #6460. DCP acceptance and work caused monitor to exceed time frame.
3-7821	Possibly greater than 30 days	Clogged sample line	Sample line was discovered clogged. The last observable monitor response was November 17, 1986. (This pathway is not normally radiologically contaminated.) See LER #87-002 for complete details.
3-7828	01/03/87 to present	Mini flow controller out of service	Mini purge flow probe is broken and monitor has a substitute value installed. The reason for delay has been with Station Technical's report for the repair and procurement of parts. Also there has been a delay by Procurement in arranging to return parts (Parts are now at vendor under repair 8-18-87.)
3-7865	01/22/87 to 03/07/87	18 month surv/DCP	Monitor out of service for 18 month calibration. CM's and NCR #3-1772.
3-7865	03/04/86 to 03/27/87	Process flow indicator	Flow probe testing in progress by Station Technical.

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

- o Gaseous effluent releases totaled  $1.12\text{E}+4$  curies with Xe-133 90.4% of the total.
- o The radiation doses from gaseous releases are: (a) gamma air dose:  $9.19\text{E}-1$  mrad at the site boundary, (b) beta air dose:  $2.00\text{E}+0$  mrad at the site boundary, (c) organ dose:  $2.08\text{E}-1$  mrem at the nearest receptor.
- o Liquid releases totaled  $5.83\text{E}+2$  curies of which tritium was  $4.41\text{E}+2$  Ci, noble gases were  $1.42\text{E}+2$  Ci and particulates and iodines were  $3.00\text{E}-1$  Ci. This contrasts with particulate and iodine releases of  $6.06\text{E}-1$  Ci during the same period of 1986. This reduction is due to a continued aggressive Liquid Effluent Activity Reduction program instituted January 1986.
- o The radiation doses from liquid releases are: (a) total body:  $8.65\text{E}-3$  mrem, (b) limiting organ:  $3.74\text{E}-2$  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 (1987)  
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, evaporat bottoms, etc.	m <sup>3</sup> Ci	0.00E+0 0.00E+0	3.00E+1
b.	Dry compressible waste, contaminated equip, etc.	m <sup>3</sup> Ci	0.00E+0 0.00E+0	3.00E+1
c.	Irradiated components, control rods, etc.	m <sup>3</sup> Ci	0.00E+0 0.00E+0	3.00E+1
d.	Other (filters, sludge, sand/rubble, wet trash	m <sup>3</sup> Ci	2.55E+0 4.29E-1	3.00E+1

Material packaged in 55-gallon Dot 7A Type A drums (7.5 ft<sup>3</sup> ea.) and steel boxes (strong tight containers 98 ft<sup>3</sup> 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 (1987)  
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	%	1.17E-2
cesium-137	%	2.59E-1
cobalt-58	%	9.77E-2
cobalt-60	%	1.55E+0
iodine-129	%	7.21E-3
iron-55	%	2.94E+0
nickel-63	%	5.85E-1
plutonium-241	%	3.06E-1
strontium-90	%	8.75E-3
technetium-99	%	6.30E-3
tritium	%	9.42E+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>
3	Tri-State Motor Transit Cask/Truck	Richland, WA
3	Tri-State Motor Transit Trailer/Truck	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 Unit 2/3, and are not reported separately.

COMMON RADWASTE SHIPMENTS (Continued)

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1987)  
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>
2	N/A

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

During the reporting period of January 1, 1987, to June 30, 1987, the Process Control Program (PCP) was changed to agree with changes to the Technical Specifications relating to PCP procedure review requirements. Station Procedure S0123-VII-8.5.1, "Process Control Program for San Onofre Units 1,2 and 3" now allows those procedures, which supplement the Process Control Program, to be reviewed by the Station Health Physics Manager. In the past, the procedures were submitted to the On-Site Review Committee for approval.

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  $1.16\text{E}+4$  curies for gaseous effluents, 90.6% of which was Xe-133. Curies discharged for liquid effluents were: tritium,  $1.69\text{E}+3$  curies; noble gases,  $1.43\text{E}+2$  curies; particulates and iodines,  $5.82\text{E}-1$  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 6 radwaste shipments; 3 to Richland, Washington, and 3 to Beatty, Nevada. Total volume was 89.9 cubic meters containing 143 curies of radioactivity.
- o Meteorological conditions during the year were typical of the meteorology at S.O.N.G.S. Meteorological dispersion was good 34% of the time, fair 41% of the time and poor 25% 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  $\leq 500$  mrem/year to the total body and  $\leq 3000$  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  $\leq 1500$  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:  $\leq 5$  mrad for gamma radiation and  $\leq 10$  mrad for beta radiation.
  2. During any calendar year:  $\leq 10$  mrad for gamma radiation and  $\leq 20$  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:  $\leq 7.5$  mrem to any organ.
  2. During any calendar year:  $\leq 15$  mrem to any organ.



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 10CFR20, 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:  $\leq 1.5$  mrem to the total body and  $\leq 5$  mrem to any organ.
  2. During any calendar year:  $\leq 3$  mrem to the total body and  $\leq 10$  mrem to any organ.

## METEOROLOGY

The meteorology of the San Onofre Nuclear Generating Station for the first and second quarter, 1987 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 1987  
 DAMES AND MOORE JOB NO. - 00377-116-09  
 DATA PERIOD- 01/01/87 TO 03/31/87  
 STABILITY CLASS #A# (10-40 METERS )  
 WINDS AT 10 METER LEVEL

21-JUL-87

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.	2.	2.	12.05
NE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.	13.00
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.	0.	0.	0.00
SE	0.	0.	0.	0.	0.	0.	1.	0.	0.	1.	0.	0.	2.	8.25
SSE	0.	0.	0.	1.	2.	3.	6.	2.	5.	1.	2.	3.	25.	8.46
S	0.	0.	2.	1.	5.	7.	11.	9.	12.	11.	1.	4.	63.	7.94
SSW	0.	0.	4.	6.	8.	8.	8.	10.	2.	0.	2.	0.	48.	5.96
SW	0.	0.	3.	10.	16.	9.	8.	5.	0.	0.	0.	0.	51.	5.03
WSW	0.	0.	3.	11.	14.	8.	10.	8.	4.	2.	0.	2.	62.	6.10
W	0.	0.	0.	4.	8.	18.	36.	21.	16.	4.	2.	4.	113.	7.02
WNW	0.	0.	0.	0.	3.	7.	10.	6.	7.	13.	5.	35.	86.	10.56
NW	0.	0.	0.	0.	0.	1.	1.	0.	0.	1.	1.	1.	5.	9.00
NNW	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.	11.30
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.	12.	33.	56.	61.	91.	61.	46.	33.	13.	53.	459.	7.48

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	0.09	12.05
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	0.03	13.00
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	0.00	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	0.09	8.25
SSE	0.00	0.00	0.00	0.03	0.09	0.14	0.28	0.09	0.23	0.03	0.09	0.14	1.16	8.46
S	0.00	0.00	0.09	0.05	0.23	0.32	0.51	0.42	0.56	0.51	0.03	0.19	2.92	7.94
SSW	0.00	0.00	0.19	0.28	0.37	0.37	0.37	0.46	0.09	0.00	0.09	0.00	2.23	5.96
SW	0.00	0.00	0.14	0.46	0.74	0.42	0.37	0.23	0.00	0.00	0.00	0.00	2.37	5.03
WSW	0.00	0.00	0.14	0.51	0.65	0.37	0.46	0.37	0.19	0.09	0.00	0.09	2.89	6.10
W	0.00	0.00	0.00	0.19	0.37	0.83	1.67	0.97	0.74	0.19	0.09	0.19	5.24	7.02
WNW	0.00	0.00	0.00	0.00	0.14	0.32	0.46	0.28	0.32	0.60	0.23	1.62	3.99	10.56
NW	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.00	0.00	0.05	0.05	0.05	0.23	9.00
NNW	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	11.30
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	0.56	1.53	2.60	2.83	4.22	2.83	2.13	1.53	0.60	2.46	21.29	7.48

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2160

TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2156

Table 4A

SOUTHERN CALIFORNIA EDISON COMPANY  
 SAN ONOFRE NUCLEAR GENERATING STATION  
 1ST QUARTER 1987  
 DAMES AND MOORE JOB NO. - 00377-116-09  
 DATA PERIOD- 01/01/87 TO 03/31/87  
 STABILITY CLASS BBN (10-40 METERS )  
 WINDS AT 10 METER LEVEL

21-JUL-87

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.	1.	0.	1.	0.	0.	0.	2.	7.50
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.	0.	0.	0.00
SE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.	11.60
SSE	0.	0.	0.	0.	0.	0.	2.	1.	1.	0.	0.	0.	4.	7.08
S	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	1.	2.	9.60
SSW	0.	0.	0.	0.	0.	0.	1.	1.	1.	0.	0.	0.	3.	7.43
SW	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	1.	2.	11.00
WSW	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	1.	1.	3.	13.07
W	0.	0.	1.	0.	2.	1.	0.	0.	1.	0.	0.	0.	5.	5.12
WNW	0.	0.	0.	0.	1.	2.	1.	0.	4.	0.	0.	1.	9.	7.54
NW	0.	0.	0.	0.	0.	0.	0.	2.	0.	0.	0.	0.	2.	7.30
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.	1.	1.	3.	4.	5.	5.	8.	0.	1.	5.	33.	8.05

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	0.05	0.00	0.05	0.00	0.00	0.00	0.09	7.50
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	0.00	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	0.05	0.05	11.60
SSE	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.05	0.05	0.00	0.00	0.00	0.19	7.08
S	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	9.60
SSW	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.05	0.00	0.00	0.00	0.14	7.43
SW	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.09	11.00
WSW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.05	0.05	0.14	13.07
W	0.00	0.00	0.05	0.00	0.09	0.05	0.00	0.00	0.05	0.00	0.00	0.00	0.23	5.12
WNW	0.00	0.00	0.00	0.00	0.05	0.09	0.05	0.00	0.19	0.00	0.00	0.05	0.42	7.54
NW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.09	7.30
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	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	0.05	0.05	0.14	0.19	0.23	0.23	0.37	0.00	0.05	0.23	1.53	8.05

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2160

TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2156

Table 4A

SOUTHERN CALIFORNIA EDISON COMPANY  
 SAN ONOFRE NUCLEAR GENERATING STATION  
 1ST QUARTER 1987  
 DAMES AND MOORE JOB NO. - 00377-116-09  
 DATA PERIOD- 01/01/87 TO 03/31/87  
 STABILITY CLASS #C# (10-40 METERS )  
 WINDS AT 10 METER LEVEL

21-JUL-87

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.	1.	0.	0.	0.	0.	1.	3.	5.	10.20
NE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	3.	4.	11.88
ENE	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	1.	8.50
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.	1.	0.	0.	0.	1.	8.10
SE	0.	0.	0.	0.	0.	0.	0.	0.	3.	1.	0.	0.	4.	9.03
SSE	0.	0.	0.	1.	1.	2.	1.	1.	3.	0.	1.	2.	12.	8.36
S	0.	0.	1.	1.	2.	2.	0.	0.	0.	1.	0.	2.	9.	8.78
SSW	0.	0.	0.	0.	3.	0.	4.	0.	0.	0.	0.	1.	8.	7.29
SW	0.	0.	1.	0.	0.	1.	0.	0.	0.	0.	0.	2.	4.	8.43
WSW	0.	0.	0.	2.	3.	0.	1.	0.	0.	0.	0.	1.	7.	6.43
W	0.	0.	0.	1.	1.	2.	0.	0.	0.	0.	0.	0.	4.	4.70
WNW	0.	0.	0.	0.	2.	2.	11.	2.	0.	0.	0.	2.	9.	8.64
NW	0.	0.	0.	0.	1.	2.	1.	2.	1.	0.	0.	2.	9.	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.	2.	5.	13.	12.	8.	5.	9.	2.	3.	18.	77.	8.25

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	0.05	0.00	0.00	0.00	0.00	0.05	0.14	0.23	10.20
NE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.14	0.19	11.88
ENE	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	8.50
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	0.05	0.00	0.00	0.00	0.05	8.10
SE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.05	0.00	0.00	0.19	9.03
SSE	0.00	0.00	0.00	0.05	0.05	0.09	0.05	0.05	0.14	0.00	0.05	0.09	0.56	8.36
S	0.00	0.00	0.05	0.05	0.09	0.09	0.00	0.00	0.00	0.05	0.00	0.09	0.42	8.78
SSW	0.00	0.00	0.00	0.00	0.14	0.00	0.19	0.00	0.00	0.00	0.00	0.05	0.37	7.29
SW	0.00	0.00	0.05	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.09	0.19	8.43
WSW	0.00	0.00	0.00	0.09	0.14	0.00	0.05	0.00	0.00	0.00	0.00	0.05	0.32	6.43
W	0.00	0.00	0.00	0.05	0.05	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.19	4.70
WNW	0.00	0.00	0.00	0.00	0.09	0.09	0.05	0.09	0.00	0.00	0.00	0.09	0.42	8.64
NW	0.00	0.00	0.00	0.00	0.05	0.09	0.05	0.09	0.05	0.00	0.00	0.09	0.42	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	0.09	0.23	0.60	0.56	0.37	0.23	0.42	0.09	0.14	0.83	3.57	8.25

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2160

TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2156

Table 4A

SOUTHERN CALIFORNIA EDISON COMPANY  
 SAN ONOFRE NUCLEAR GENERATING STATION  
 1ST QUARTER 1987  
 DAMES AND MOORE JOB NO. - 00377-116-09  
 DATA PERIOD- 01/01/87 TO 03/31/87  
 STABILITY CLASS #D\* (10-40 METERS )  
 WINDS AT 10 METER LEVEL

21-JUL-87

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.	1.	3.	4.	3.	3.	2.	1.	0.	3.	5.	25.	7.51
NE	0.	1.	0.	1.	0.	0.	0.	1.	2.	0.	1.	3.	9.	9.08
ENE	0.	0.	0.	1.	1.	0.	0.	0.	2.	1.	0.	3.	8.	9.05
E	0.	0.	0.	1.	0.	1.	0.	3.	2.	1.	1.	2.	11.	8.65
ESE	0.	0.	0.	1.	1.	2.	2.	0.	4.	5.	0.	1.	16.	7.93
SE	0.	1.	2.	3.	0.	2.	6.	4.	5.	5.	3.	10.	41.	9.03
SSE	0.	0.	2.	3.	3.	2.	3.	6.	1.	3.	1.	6.	30.	8.15
S	0.	0.	4.	2.	3.	0.	2.	1.	1.	0.	1.	2.	16.	6.21
SSW	0.	0.	0.	1.	1.	2.	1.	2.	3.	2.	0.	3.	15.	8.93
SW	0.	0.	5.	1.	0.	0.	2.	1.	0.	1.	0.	3.	13.	6.68
WSW	0.	0.	4.	1.	4.	3.	3.	0.	0.	0.	1.	11.	27.	10.05
W	0.	0.	1.	5.	1.	3.	0.	3.	0.	1.	0.	7.	21.	8.56
WNW	0.	0.	0.	5.	4.	4.	5.	3.	3.	4.	0.	16.	44.	9.73
NW	0.	0.	0.	6.	8.	4.	5.	4.	3.	2.	1.	3.	36.	6.79
NNW	0.	2.	4.	6.	5.	7.	6.	4.	1.	0.	0.	1.	36.	5.32
N	0.	1.	4.	9.	5.	2.	1.	3.	1.	0.	2.	2.	30.	5.50
VARIABLE													0.	0.00
CALM													0.	0.00
TOTAL	0.	5.	27.	49.	40.	35.	39.	37.	29.	25.	14.	78.	378.	7.92

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	0.05	0.14	0.19	0.14	0.14	0.09	0.05	0.00	0.14	0.23	1.16	7.51
NE	0.00	0.05	0.00	0.05	0.00	0.00	0.00	0.05	0.09	0.00	0.05	0.14	0.42	9.08
ENE	0.00	0.00	0.00	0.05	0.05	0.00	0.00	0.00	0.09	0.05	0.00	0.14	0.37	9.05
E	0.00	0.00	0.00	0.05	0.00	0.05	0.00	0.14	0.09	0.05	0.05	0.09	0.51	8.65
EE	0.00	0.00	0.00	0.05	0.05	0.09	0.09	0.00	0.19	0.23	0.00	0.05	0.74	7.93
SE	0.00	0.05	0.09	0.14	0.00	0.09	0.28	0.19	0.23	0.23	0.14	0.46	1.90	9.03
SSE	0.00	0.00	0.09	0.14	0.14	0.09	0.14	0.28	0.05	0.14	0.05	0.28	1.39	8.15
S	0.00	0.00	0.19	0.09	0.14	0.00	0.09	0.05	0.05	0.00	0.05	0.09	0.74	6.21
SSW	0.00	0.00	0.00	0.05	0.05	0.09	0.05	0.09	0.14	0.09	0.00	0.14	0.70	8.93
SW	0.00	0.00	0.23	0.05	0.00	0.00	0.09	0.05	0.00	0.05	0.00	0.14	0.60	6.68
WSW	0.00	0.00	0.19	0.05	0.19	0.14	0.14	0.00	0.00	0.00	0.05	0.31	1.25	10.05
W	0.00	0.00	0.05	0.23	0.05	0.14	0.00	0.14	0.00	0.05	0.00	0.32	0.97	8.56
WNW	0.00	0.00	0.00	0.23	0.19	0.19	0.23	0.14	0.14	0.19	0.00	0.74	2.04	9.73
NW	0.00	0.00	0.00	0.28	0.37	0.19	0.23	0.19	0.14	0.09	0.05	0.14	1.67	6.79
NNW	0.00	0.09	0.19	0.28	0.23	0.32	0.28	0.19	0.05	0.00	0.00	0.05	1.67	5.32
N	0.00	0.05	0.19	0.42	0.23	0.09	0.05	0.14	0.05	0.00	0.09	0.09	1.39	5.50
VARIABLE													0.00	0.00
CALM													0.00	0.00
TOTAL	0.00	0.23	1.25	2.27	1.86	1.62	1.81	1.72	1.35	1.16	0.65	3.62	17.53	7.92

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2160

TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2156

Table 4A

SOUTHERN CALIFORNIA EDISON COMPANY  
 SAN ONOFRE NUCLEAR GENERATING STATION  
 1ST QUARTER 1987  
 DAMES AND MOORE JOB NO. - 00377-116-09  
 DATA PERIOD- 01/01/87 TO 03/31/87  
 STABILITY CLASS #E# (10-40 METERS )  
 WINDS AT 10 METER LEVEL

21-JUL-87

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.	6.	8.	15.	15.	15.	14.	10.	6.	1.	12.	103.	7.31
NE	0.	1.	3.	1.	7.	4.	1.	2.	2.	0.	1.	6.	28.	7.23
ENE	0.	0.	1.	1.	2.	6.	1.	1.	5.	2.	1.	3.	23.	7.60
E	0.	0.	2.	1.	3.	3.	2.	3.	2.	0.	1.	2.	19.	6.61
ESE	0.	0.	1.	4.	1.	4.	3.	1.	2.	1.	0.	0.	17.	5.79
SE	0.	0.	0.	4.	5.	3.	3.	3.	2.	1.	1.	0.	22.	6.14
SSE	0.	0.	1.	4.	2.	1.	0.	1.	0.	2.	0.	1.	12.	5.98
S	0.	0.	1.	1.	0.	2.	1.	0.	0.	1.	0.	0.	6.	5.57
SSW	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	1.	3.20
SW	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	1.	2.	7.93
WSW	0.	0.	3.	1.	0.	0.	0.	0.	0.	0.	0.	1.	5.	4.98
W	0.	0.	1.	2.	0.	1.	1.	0.	1.	0.	0.	2.	8.	8.03
WNW	0.	0.	2.	2.	2.	1.	3.	1.	0.	0.	1.	4.	16.	8.31
NW	0.	0.	1.	5.	1.	2.	1.	4.	2.	2.	0.	1.	19.	6.41
NNW	0.	1.	1.	1.	4.	2.	3.	0.	0.	1.	2.	1.	16.	6.16
N	0.	0.	4.	4.	9.	9.	7.	5.	2.	0.	0.	5.	45.	6.40
VARIABLE													0.	0.00
CALM													0.	0.00
TOTAL	0.	3.	28.	40.	51.	53.	41.	35.	28.	16.	8.	39.	342.	6.96

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	0.03	0.28	0.37	0.70	0.70	0.70	0.63	0.46	0.28	0.03	0.56	4.79	7.31
NE	0.00	0.03	0.14	0.03	0.32	0.19	0.03	0.09	0.09	0.00	0.03	0.28	1.30	7.23
ENE	0.00	0.00	0.03	0.03	0.09	0.28	0.03	0.03	0.23	0.09	0.03	0.14	1.07	7.60
E	0.00	0.00	0.09	0.03	0.14	0.14	0.09	0.14	0.09	0.00	0.03	0.09	0.89	6.61
ESE	0.00	0.00	0.03	0.19	0.03	0.19	0.14	0.03	0.09	0.03	0.00	0.00	0.79	5.79
SE	0.00	0.00	0.00	0.19	0.23	0.14	0.14	0.14	0.09	0.03	0.03	0.00	1.02	6.14
SSE	0.00	0.00	0.03	0.19	0.09	0.03	0.00	0.03	0.00	0.09	0.00	0.03	0.56	5.98
S	0.00	0.00	0.03	0.03	0.00	0.09	0.03	0.00	0.00	0.03	0.00	0.00	0.29	5.57
SSW	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	3.20
SW	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.09	7.93
WSW	0.00	0.00	0.14	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.23	4.98
W	0.00	0.00	0.03	0.09	0.00	0.03	0.03	0.00	0.03	0.00	0.00	0.09	0.37	8.03
WNW	0.00	0.00	0.09	0.09	0.09	0.03	0.14	0.03	0.00	0.00	0.03	0.19	0.74	8.31
NW	0.00	0.00	0.03	0.23	0.03	0.09	0.03	0.19	0.09	0.09	0.00	0.03	0.89	6.41
NNW	0.00	0.03	0.03	0.03	0.19	0.09	0.14	0.00	0.00	0.03	0.09	0.03	0.74	6.16
N	0.00	0.00	0.19	0.19	0.42	0.42	0.32	0.23	0.09	0.00	0.00	0.23	2.09	6.40
VARIABLE													0.00	0.00
CALM													0.00	0.00
TOTAL	0.00	0.14	1.30	1.86	2.37	2.46	1.90	1.62	1.30	0.74	0.37	1.81	15.85	6.96

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2160

TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2156

Table 4A

SOUTHERN CALIFORNIA EDISON COMPANY  
 SAN ONOFRE NUCLEAR GENERATING STATION  
 1ST QUARTER 1987  
 DAMES AND MOORE JOB NO. - 00377-116-09  
 DATA PERIOD- 01/01/87 TO 03/31/87  
 STABILITY CLASS #F# (10-40 METERS )  
 WINDS AT 10 METER LEVEL

21-JUL-87

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.	27.	37.	44.	25.	20.	23.	8.	4.	2.	198.	6.02
NE	0.	1.	5.	8.	10.	5.	3.	0.	0.	0.	1.	1.	34.	4.75
ENE	0.	0.	2.	4.	0.	0.	0.	0.	1.	6.	0.	0.	13.	6.61
E	0.	0.	2.	3.	2.	0.	0.	0.	0.	0.	1.	0.	8.	4.60
ESE	0.	0.	0.	1.	0.	1.	1.	0.	0.	1.	0.	0.	4.	6.10
SE	0.	1.	1.	1.	2.	0.	0.	0.	0.	0.	0.	0.	5.	3.46
SSE	0.	0.	0.	0.	2.	0.	0.	0.	0.	0.	0.	1.	3.	7.03
S	0.	0.	1.	2.	1.	0.	0.	0.	0.	0.	0.	0.	4.	3.50
SSW	0.	0.	1.	2.	0.	0.	0.	0.	0.	0.	0.	0.	3.	3.40
SW	0.	0.	1.	0.	1.	0.	0.	0.	0.	0.	0.	0.	2.	3.40
WSW	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	1.	3.40
W	0.	0.	0.	0.	1.	2.	0.	0.	0.	0.	0.	0.	3.	5.07
WNW	0.	0.	0.	3.	1.	2.	0.	1.	0.	0.	0.	0.	7.	4.86
NW	0.	0.	0.	0.	0.	2.	0.	0.	0.	0.	0.	0.	2.	5.30
NNW	0.	0.	0.	0.	3.	0.	2.	1.	0.	0.	0.	0.	6.	5.72
N	0.	0.	3.	2.	1.	8.	4.	7.	4.	0.	1.	1.	31.	6.63
VARIABLE													0.	0.00
CALM													0.	0.00
TOTAL	0.	2.	24.	54.	61.	64.	35.	29.	28.	15.	7.	5.	324.	5.78

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	0.37	1.25	1.72	2.04	1.16	0.93	1.07	0.37	0.19	0.09	9.18	6.02
NE	0.00	0.03	0.23	0.37	0.46	0.23	0.14	0.00	0.00	0.00	0.03	0.03	1.58	4.75
ENE	0.00	0.00	0.09	0.19	0.00	0.00	0.00	0.00	0.03	0.28	0.00	0.00	0.60	6.61
E	0.00	0.00	0.09	0.14	0.09	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.37	4.60
ESE	0.00	0.00	0.00	0.03	0.00	0.03	0.03	0.00	0.00	0.03	0.00	0.00	0.19	6.10
SE	0.00	0.03	0.03	0.03	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	3.46
SSE	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.14	7.03
S	0.00	0.00	0.03	0.09	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	3.50
SSW	0.00	0.00	0.03	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	3.40
SW	0.00	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	3.40
WSW	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	3.40
W	0.00	0.00	0.00	0.00	0.03	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.14	5.07
WNW	0.00	0.00	0.00	0.14	0.03	0.09	0.00	0.03	0.00	0.00	0.00	0.00	0.32	4.86
NW	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.09	5.30
NNW	0.00	0.00	0.00	0.00	0.14	0.00	0.09	0.03	0.00	0.00	0.00	0.00	0.28	5.72
N	0.00	0.00	0.14	0.09	0.03	0.37	0.19	0.32	0.19	0.00	0.03	0.03	1.44	6.63
VARIABLE													0.00	0.00
CALM													0.00	0.00
TOTAL	0.00	0.09	1.11	2.50	2.83	2.97	1.62	1.35	1.30	0.70	0.32	0.23	15.03	5.78

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2160

TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2156



Table 4A

SOUTHERN CALIFORNIA EDISON COMPANY  
 SAN ONOFRE NUCLEAR GENERATING STATION  
 1ST QUARTER 1987  
 DAMES AND MOORE JOB NO. - 00377-116-09  
 DATA PERIOD- 01/01/87 TO 03/31/87  
 STABILITY CLASS #C# (10-40 METERS )  
 WINDS AT 10 METER LEVEL

21-JUL-87

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.	16	21	32.	46	68.	67.	61.	52.	76.	442.	8.66
NE	0.	0.	3.	5	4.	8.	11.	4.	2.	2.	0.	0.	41.	5.73
ENE	0.	1.	3.	4.	2.	1.	3.	0.	0.	0.	0.	0.	14.	4.31
E	0.	1.	1.	0.	1.	0	0	0	0.	0.	0.	0.	3.	3.00
ESE	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.	0.	0.	2.	9.05
SE	0.	0.	0.	1.	0.	0.	0	0	0.	0.	1	0.	2.	7.10
SSE	0.	2.	1.	0.	0.	0.	0	0	0.	0	0	0.	3.	1.93
S	0.	0.	1.	1.	0.	0.	0.	0.	0.	0	0.	0.	2.	3.40
SSW	0.	0.	1.	0	0.	0.	0	0.	0.	0.	0	0	1.	2.50
SW	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	2.40
WSW	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	1.	3.40
W	0.	0.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.	2.	2.95
WNW	0.	0.	0.	0.	0.	0.	1)	0.	0.	0.	0.	0.	1.	6.10
NW	0.	0.	0.	0	0.	0.	1.	0.	0.	0.	0.	0.	1.	6.40
NNW	0.	0.	0.	0.	2.	2.	0.	1.	0.	0.	0	0.	5.	5.66
N	0.	0.	1.	1.	2.	1.	3.	4.	3.	1	3	1.	22.	7.40
VARIABLE													0.	0.00
CALM													0.	0.00
TOTAL	0.	4.	18.	30.	32.	44.	67.	77.	73.	65	56.	77.	543.	8.09

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	0.74	0.97	1.48	2.13	3.13	3.11	2.83	2.41	3.53	20.50	8.66
NE	0.00	0.00	0.23	0.23	0.19	0.37	0.51	0.19	0.09	0.09	0.00	0.00	1.90	5.73
ENE	0.00	0.03	0.14	0.19	0.09	0.05	0.14	0.00	0.00	0.00	0.00	0.00	0.65	4.31
E	0.00	0.03	0.03	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	3.00
ESE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.09	9.05
SE	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.09	7.10
SSE	0.00	0.09	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	1.93
S	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	3.40
SSW	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	2.50
SW	0.00	0.00	0.03	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	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	3.40
W	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	2.95
WNW	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.05	6.10
NW	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	6.40
NNW	0.00	0.00	0.00	0.00	0.09	0.09	0.00	0.05	0.00	0.00	0.00	0.00	0.23	5.66
N	0.00	0.00	0.05	0.05	0.09	0.05	0.23	0.19	0.14	0.05	0.14	0.05	1.02	7.40
VARIABLE													0.00	0.00
CALM													0.00	0.00
TOTAL	0.00	0.19	0.83	1.39	1.48	2.04	3.11	3.57	3.39	3.01	2.60	3.57	25.19	8.09

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2160

TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2156

Table 4A

SOUTHERN CALIFORNIA EDISON COMPANY  
 SAN ONOFRE NUCLEAR GENERATING STATION  
 1ST QUARTER 1987  
 DAMES AND MOORE JOB NO. - 00377-116-09  
 DATA PERIOD- 01/01/87 TO 03/31/87  
 STABILITY CLASS ALL (10-40 METERS )  
 WINDS AT 10 METER LEVEL

21-JUL-87

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.	18.	34.	77.	95.	90.	104.	102.	75.	61.	100.	777.	7.79
NE	0.	3.	13.	15.	21.	17.	15.	7.	6.	2.	4.	14.	117.	6.40
ENE	0.	1.	6.	10.	5.	7.	4.	1.	9.	9.	1.	6.	59.	6.81
E	0.	1.	5.	5.	6.	4.	2.	6.	4.	1.	3.	4.	41.	6.50
ESE	0.	0.	1.	6.	2.	7.	6.	1.	8.	8.	0.	1.	40.	6.70
SE	0.	2.	3.	9.	7.	5.	10.	7.	10.	8.	5.	11.	77.	7.01
SSE	0.	2.	4.	9.	10.	8.	12.	11.	10.	6.	4.	13.	89.	7.68
S	0.	0.	10.	8.	11.	12.	14.	10.	13.	13.	2.	9.	102.	7.31
SSW	0.	0.	6.	10.	12.	10.	14.	13.	6.	2.	2.	4.	79.	6.48
SW	0.	0.	12.	12.	17.	10.	10.	6.	0.	1.	0.	7.	75.	5.65
WSW	0.	0.	10.	17.	21.	11.	14.	9.	4.	2.	2.	16.	106.	7.22
W	0.	0.	4.	13.	13.	27.	37.	24.	18.	5.	2.	13.	156.	7.07
WNW	0.	0.	2.	10.	13.	18.	22.	14.	16.	17.	6.	58.	176.	9.65
NW	0.	0.	1.	11.	10.	11.	9.	12.	6.	5.	2.	7.	74.	6.74
NNW	0.	3.	5.	7.	14.	11.	11.	6.	1.	1.	2.	3.	64.	5.69
N	0.	1.	12.	16.	17.	20.	17.	19.	10.	1.	6.	9.	128.	6.41
VARIABLE													0.	0.00
CALM													0.	0.00
TOTAL	0.	14.	112.	212.	256.	273.	287.	250.	223.	156.	102.	275.	2160.	7.40

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	0.83	2.50	3.56	4.40	4.17	4.81	4.72	3.47	2.82	4.63	35.97	7.79
NE	0.00	0.14	0.60	0.69	0.97	0.79	0.69	0.32	0.28	0.09	0.19	0.65	5.42	6.40
ENE	0.00	0.05	0.28	0.46	0.23	0.32	0.19	0.05	0.42	0.42	0.05	0.28	2.73	6.81
E	0.00	0.05	0.23	0.23	0.28	0.19	0.09	0.28	0.19	0.05	0.14	0.19	1.90	6.50
ESE	0.00	0.00	0.05	0.28	0.09	0.32	0.28	0.05	0.37	0.37	0.00	0.05	1.85	6.70
SE	0.00	0.09	0.14	0.42	0.32	0.23	0.46	0.32	0.46	0.37	0.23	0.51	3.56	7.01
SSE	0.00	0.09	0.19	0.42	0.46	0.37	0.56	0.51	0.46	0.28	0.19	0.60	4.12	7.68
S	0.00	0.00	0.46	0.37	0.51	0.56	0.65	0.46	0.60	0.60	0.09	0.42	4.72	7.31
SSW	0.00	0.00	0.28	0.46	0.56	0.46	0.65	0.60	0.28	0.09	0.09	0.19	3.66	6.48
SW	0.00	0.00	0.56	0.56	0.79	0.46	0.46	0.28	0.00	0.05	0.00	0.32	3.47	5.65
WSW	0.00	0.00	0.46	0.79	0.97	0.51	0.65	0.42	0.19	0.09	0.09	0.74	4.91	7.22
W	0.00	0.00	0.19	0.60	0.60	1.25	1.71	1.11	0.83	0.23	0.09	0.60	7.22	7.07
WNW	0.00	0.00	0.09	0.46	0.60	0.83	1.02	0.65	0.74	0.79	0.28	2.69	8.15	9.65
NW	0.00	0.00	0.05	0.51	0.46	0.51	0.42	0.56	0.28	0.23	0.09	0.32	3.43	6.74
NNW	0.00	0.14	0.23	0.32	0.65	0.51	0.51	0.28	0.05	0.05	0.09	0.14	2.96	5.69
N	0.00	0.05	0.56	0.74	0.79	0.93	0.79	0.88	0.46	0.05	0.28	0.42	5.93	6.41
VARIABLE													0.00	0.00
CALM													0.00	0.00
TOTAL	0.00	0.65	5.19	9.81	11.85	12.64	13.29	11.57	10.32	7.22	4.72	12.73	100.00	7.40

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2160

TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2156

Table 4A

SOUTHERN CALIFORNIA EDISON COMPANY  
 SAN ONOFRE NUCLEAR GENERATING STATION  
 2ND QUARTER 1987  
 DAMES AND MOORE JOB NO - 00377-116-09  
 DATA PERIOD- 04/01/87 TO 06/30/87  
 STABILITY CLASS MAX (10-40 METERS )  
 WINDS AT 10 METER LEVEL

21-JUL-87

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.	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.	0.	0.	0.00
SE	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	1.	6.30
SSE	0.	0.	0.	1.	1.	2.	2.	3.	3.	1.	0.	4.	17.	8.55
S	0.	0.	0.	3.	6.	6.	10.	6.	9.	11.	8.	1.	60.	7.69
SSW	0.	0.	0.	13.	12.	19.	12.	12.	16.	8.	4.	0.	96.	6.57
SW	0.	0.	3.	13.	14.	43.	32.	30.	15.	1.	0.	0.	151.	6.15
WSW	0.	0.	0.	7.	19.	32.	28.	29.	26.	14.	3.	6.	164.	7.15
W	0.	0.	0.	3.	5.	21.	45.	38.	46.	27.	1.	9.	195.	7.71
WNW	0.	0.	0.	1.	0.	8.	13.	11.	18.	7.	7.	7.	72.	8.33
NW	0.	0.	0.	0.	0.	1.	1.	1.	1.	0.	0.	3.	7.	9.64
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 CALM													0.	0.00
TOTAL	0.	0.	3.	41.	57.	132.	144.	130.	134.	69.	23.	30.	763.	7.23

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	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	0.00	0.00	0.00
SE	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
SSE	0.00	0.00	0.00	0.05	0.05	0.09	0.09	0.14	0.14	0.05	0.00	0.18	0.78	8.55
S	0.00	0.00	0.00	0.14	0.28	0.28	0.46	0.28	0.41	0.51	0.37	0.05	2.76	7.69
SSW	0.00	0.00	0.00	0.60	0.55	0.88	0.55	0.55	0.74	0.37	0.18	0.00	4.42	6.57
SW	0.00	0.00	0.14	0.60	0.64	1.98	1.47	1.38	0.69	0.05	0.00	0.00	6.96	6.15
WSW	0.00	0.00	0.00	0.32	0.88	1.47	1.29	1.34	1.20	0.64	0.14	0.28	7.55	7.15
W	0.00	0.00	0.00	0.14	0.23	0.97	2.07	1.75	2.12	1.24	0.05	0.41	8.98	7.71
WNW	0.00	0.00	0.00	0.05	0.00	0.37	0.60	0.51	0.83	0.32	0.32	0.32	3.32	8.33
NW	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.05	0.05	0.00	0.00	0.14	0.32	9.64
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 CALM													0.00	0.00
TOTAL	0.00	0.00	0.14	1.09	2.63	6.08	6.63	5.99	6.17	3.18	1.06	1.38	35.15	7.23

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2184

TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2171

Table 4A

SOUTHERN CALIFORNIA EDISON COMPANY  
 SAN GINOFRE NUCLEAR GENERATING STATION  
 2ND QUARTER 1987  
 DAMES AND MOORE JOB NO - 00377-116-09  
 DATA PERIOD- 04/01/87 TO 06/30/87  
 STABILITY CLASS NO# (10-40 METERS )  
 WINDS AT 10 METER LEVEL

21-JUL-87

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	13.90
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	0	0	0.00
SE	0	0.	0.	0	0.	0	0	2	0	0	0	0	2	7.60
SSE	0	0.	1.	0	0.	1.	1.	1	1	2	0	0	7	7.11
S	0	0	1.	2	2.	3.	0.	1	1.	2	1	0	13.	6.25
SSW	0.	0.	1.	0	1.	0	3	1.	1.	0.	0	0	7	6.19
SW	0.	0.	1.	2	1.	1	0	1	0	0.	0	0	6.	4.58
WSW	0.	0.	0.	5.	4.	2.	0	0	1.	0.	0	0	12	4.58
W	0.	0.	0.	3	2.	0	0	0	0	0	0	0	5	3.90
WNW	0.	0.	2.	0.	0.	1	1	1.	0.	3	0	0	8	6.85
NW	0.	0	0.	0	0.	0	0	0	0	0.	0	1	1	12.90
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.	6.	12	10.	8	5	7.	4.	7.	1.	2	62.	6.02

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	13.90
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
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
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	0.00	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	0.09	0.00	0.00	0.00	0.09	7.60
SSE	0.00	0.00	0.05	0.00	0.00	0.05	0.05	0.05	0.05	0.09	0.00	0.00	7.11
S	0.00	0.00	0.05	0.09	0.09	0.14	0.00	0.05	0.05	0.09	0.05	0.00	6.25
SSW	0.00	0.00	0.05	0.00	0.05	0.00	0.14	0.05	0.05	0.00	0.00	0.00	6.19
SW	0.00	0.00	0.05	0.09	0.05	0.05	0.00	0.05	0.00	0.00	0.00	0.00	4.58
WSW	0.00	0.00	0.00	0.23	0.18	0.09	0.00	0.00	0.05	0.00	0.00	0.00	4.58
W	0.00	0.00	0.00	0.14	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.90
WNW	0.00	0.00	0.09	0.00	0.00	0.05	0.05	0.05	0.00	0.14	0.00	0.00	6.85
NW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	12.90
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
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	0.00
CALM												0.00	0.00
TOTAL	0.00	0.00	0.28	0.55	0.46	0.37	0.23	0.32	0.18	0.32	0.05	0.09	6.02

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2184

TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2171

Table 4A

SOUTHERN CALIFORNIA EDISON COMPANY  
 SAN ONOFRE NUCLEAR GENERATING STATION  
 2ND QUARTER 1987  
 DAMES AND MOORE JOB NO. - 00377-116-09  
 DATA PERIOD- 04/01/87 TO 06/30/87  
 STABILITY CLASS #C# (10-40 METERS )  
 WINDS AT 10 METER LEVEL

21-JUL-87

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.	1.	1.	0.	0.	0.	0.	1.	3.	7.77
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.	0.	0.	0.00
SE	0.	0.	0.	0.	0.	0.	1.	0.	2.	1.	2.	0.	6.	9.02
SSE	0.	0.	0.	1.	2.	1.	2.	3.	5.	1.	1.	2.	18.	7.72
S	0.	0.	2.	0.	2.	2.	4.	6.	1.	3.	0.	2.	22.	7.12
SSW	0.	0.	0.	3.	2.	2.	2.	0.	2.	0.	0.	1.	12.	6.03
SW	0.	0.	2.	0.	5.	0.	2.	1.	2.	0.	0.	0.	12.	5.53
WSW	0.	0.	2.	1.	3.	2.	2.	0.	0.	0.	0.	0.	10.	4.60
W	0.	0.	2.	3.	2.	2.	0.	0.	0.	0.	0.	0.	9.	3.70
WNW	0.	0.	0.	1.	4.	7.	3.	3.	0.	1.	1.	0.	20.	6.11
NW	0.	0.	0.	0.	1.	0.	0.	3.	0.	2.	0.	1.	7.	8.43
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.	8.	9.	21.	17.	17.	16.	12.	8.	4.	7.	119.	6.51

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	0.03	0.03	0.00	0.00	0.00	0.00	0.05	0.14	7.77
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	0.00	0.00	0.00
SE	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.09	0.05	0.09	0.00	0.20	9.02
SSE	0.00	0.00	0.00	0.05	0.09	0.05	0.09	0.14	0.23	0.05	0.05	0.09	0.83	7.72
S	0.00	0.00	0.09	0.00	0.09	0.09	0.18	0.28	0.05	0.14	0.00	0.09	1.01	7.12
SSW	0.00	0.00	0.00	0.14	0.09	0.09	0.09	0.00	0.09	0.00	0.00	0.05	0.55	6.03
SW	0.00	0.00	0.09	0.00	0.23	0.00	0.09	0.05	0.09	0.00	0.00	0.00	0.55	5.53
WSW	0.00	0.00	0.09	0.05	0.14	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.46	4.60
W	0.00	0.00	0.09	0.14	0.09	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.41	3.70
WNW	0.00	0.00	0.00	0.05	0.18	0.32	0.14	0.14	0.00	0.05	0.05	0.00	0.92	6.11
NW	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.14	0.00	0.09	0.00	0.05	0.32	8.43
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	0.37	0.41	0.97	0.78	0.78	0.74	0.55	0.37	0.18	0.32	5.40	6.51

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2184

TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2171

Table 4A

SOUTHERN CALIFORNIA EDISON COMPANY  
 SAN ONOFRE NUCLEAR GENERATING STATION  
 2ND QUARTER 1987  
 DAMES AND MOORE JOB NO - 00377-116-09  
 DATA PERIOD- 04/01/87 TO 06/30/87  
 STABILITY CLASS #00 (10-40 METERS )  
 WINDS AT 10 METER LEVEL

21-JUL-87

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.	9.	11.	14.	2.	9.	1.	0.	1.	0.	0.	51.	4.29
NE	0.	2.	5.	5.	6.	0.	0.	0.	0.	0.	0.	0.	18.	3.39
ENE	0.	0.	1.	5.	2.	1.	0.	0.	0.	0.	0.	0.	9.	3.54
E	0.	0.	1.	7.	4.	1.	2.	0.	0.	0.	0.	0.	15.	4.28
ESE	0.	0.	1.	6.	7.	6.	7.	1.	0.	1.	0.	0.	29.	5.34
SE	0.	1.	6.	13.	19.	21.	19.	8.	11.	3.	4.	5.	110.	6.17
SSE	0.	0.	12.	14.	16.	18.	19.	8.	15.	7.	5.	8.	122.	6.44
S	0.	2.	7.	16.	20.	13.	13.	4.	3.	4.	2.	1.	85.	5.33
SSW	0.	1.	5.	15.	10.	10.	5.	8.	6.	6.	2.	1.	69.	5.96
SW	0.	4.	9.	11.	5.	6.	3.	2.	3.	3.	1.	5.	52.	5.37
WSW	0.	0.	7.	8.	6.	1.	2.	4.	2.	2.	2.	6.	40.	6.31
W	0.	2.	9.	15.	7.	5.	3.	0.	0.	0.	0.	1.	42.	4.00
WNW	0.	3.	8.	9.	9.	8.	4.	3.	2.	1.	0.	1.	50.	4.97
NW	0.	3.	9.	10.	5.	7.	11.	6.	0.	1.	2.	1.	55.	5.20
NNW	0.	0.	6.	8.	4.	7.	1.	2.	1.	0.	0.	0.	29.	4.53
N	0.	2.	8.	9.	15.	2.	1.	0.	0.	0.	1.	1.	39.	4.16
VARIABLE													0.	0.00
CALM													0.	0.00
TOTAL	0.	24.	103.	152.	149.	108.	101.	47.	43.	29.	19.	30.	915.	5.39

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	0.41	0.51	0.64	0.09	0.41	0.03	0.00	0.03	0.00	0.00	2.35	4.29
NE	0.00	0.09	0.23	0.23	0.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.83	3.39
ENE	0.00	0.00	0.05	0.23	0.09	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.41	3.54
E	0.00	0.00	0.05	0.32	0.18	0.05	0.09	0.00	0.00	0.00	0.00	0.00	0.69	4.28
ESE	0.00	0.00	0.05	0.28	0.32	0.28	0.32	0.03	0.00	0.03	0.00	0.00	1.34	5.34
SE	0.00	0.05	0.28	0.60	0.88	0.97	0.88	0.37	0.51	0.14	0.18	0.23	5.07	6.17
SSE	0.00	0.00	0.55	0.64	0.74	0.83	0.88	0.37	0.69	0.32	0.23	0.37	5.62	6.44
S	0.00	0.09	0.32	0.74	0.92	0.60	0.60	0.18	0.14	0.18	0.09	0.05	3.92	5.33
SSW	0.00	0.05	0.23	0.69	0.46	0.46	0.23	0.37	0.28	0.28	0.09	0.05	3.19	5.96
SW	0.00	0.18	0.41	0.51	0.23	0.28	0.14	0.09	0.14	0.14	0.05	0.23	2.40	5.37
WSW	0.00	0.00	0.32	0.37	0.28	0.05	0.09	0.18	0.09	0.09	0.09	0.28	1.84	6.31
W	0.00	0.09	0.41	0.69	0.32	0.23	0.14	0.00	0.00	0.00	0.00	0.05	1.93	4.00
WNW	0.00	0.14	0.37	0.41	0.41	0.37	0.28	0.14	0.09	0.05	0.00	0.05	2.30	4.97
NW	0.00	0.14	0.41	0.46	0.23	0.32	0.51	0.28	0.00	0.05	0.09	0.05	2.53	5.20
NNW	0.00	0.00	0.28	0.37	0.18	0.32	0.05	0.09	0.05	0.00	0.00	0.00	1.34	4.53
N	0.00	0.09	0.37	0.41	0.69	0.09	0.05	0.00	0.00	0.00	0.05	0.05	1.80	4.16
VARIABLE													0.00	0.00
CALM													0.00	0.00
TOTAL	0.00	1.11	4.74	7.46	6.86	4.97	4.65	2.16	1.98	1.34	0.88	1.38	37.54	5.39

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2184

TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2171

Table 4A

SOUTHERN CALIFORNIA EDISON COMPANY  
 SAN ONOFRE NUCLEAR GENERATING STATION  
 2ND QUARTER 1987  
 DAMES AND MOORE JOB NO - 00377-116-09  
 DATA PERIOD- 04/01/87 TO 06/30/87  
 STABILITY CLASS NEW (10-40 METERS )  
 WINDS AT 10 METER LEVEL

21-JUL-87

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	6	19	13	5	7	5	1	2	0	0	0	58	3.83
NE	0	1	1	1	3	0	0	0	0	0	0	0	6	3.47
ENE	0	0	1	0	1	0	0	0	0	0	0	0	2	3.75
E	1	0	0	3	1	2	0	0	0	0	0	0	9	3.79
ESE	0	0	1	5	0	0	0	0	0	0	0	0	6	3.42
SE	0	1	3	3	3	0	1	1	0	0	0	0	12	4.12
SSE	0	0	4	3	0	1	0	0	0	0	1	0	9	4.04
S	0	0	0	1	0	0	1	0	0	0	0	0	2	3.05
SSW	0	0	2	1	0	0	0	0	0	0	0	0	3	2.83
SW	0	0	1	1	0	0	0	0	0	0	0	0	2	2.80
WSW	0	0	0	1	1	0	0	0	0	0	0	1	3	7.80
W	0	0	0	0	1	0	1	0	0	0	0	0	2	3.45
WNW	0	0	0	0	0	1	1	1	1	0	0	0	4	6.72
NW	0	1	0	1	0	1	0	0	1	4	0	1	9	7.51
NNW	0	0	1	2	1	0	0	0	0	0	0	0	4	3.55
N	0	3	1	4	12	1	1	1	0	0	0	0	23	4.17
VARIABLE													0	0.00
CALM													0	0.00
TOTAL	1	12	34	41	28	13	10	4	4	4	1	2	154	4.25

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	0.28	0.88	0.60	0.23	0.32	0.23	0.05	0.09	0.00	0.00	0.00	2.67	3.83
NE	0.00	0.05	0.05	0.05	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.28	3.47
ENE	0.00	0.00	0.05	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	3.75
E	0.05	0.00	0.00	0.23	0.05	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.41	3.79
ESE	0.00	0.00	0.05	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.28	3.42
SE	0.00	0.05	0.14	0.14	0.14	0.00	0.05	0.05	0.00	0.00	0.00	0.00	0.55	4.12
SSE	0.00	0.00	0.18	0.14	0.00	0.05	0.00	0.00	0.00	0.00	0.05	0.00	0.41	4.04
S	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	3.05
SSW	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	2.83
SW	0.00	0.00	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	2.80
WSW	0.00	0.00	0.00	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.14	7.80
W	0.00	0.00	0.00	0.00	0.05	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.07	3.45
WNW	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.05	0.05	0.00	0.00	0.00	0.18	6.72
NW	0.00	0.05	0.00	0.05	0.00	0.05	0.00	0.00	0.05	0.18	0.00	0.05	0.41	7.51
NNW	0.00	0.00	0.05	0.09	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	3.55
N	0.00	0.14	0.05	0.18	0.55	0.05	0.05	0.05	0.00	0.00	0.00	0.00	1.06	4.17
VARIABLE													0.00	0.00
CALM													0.00	0.00
TOTAL	0.05	0.55	1.57	1.87	1.27	0.60	0.46	0.18	0.18	0.18	0.05	0.09	7.07	4.25

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2184

TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2171

Table 4A

SOUTHERN CALIFORNIA EDISON COMPANY  
 SAN ONOFRE NUCLEAR GENERATING STATION  
 2ND QUARTER 1987  
 DAMES AND MOORE JOB NO - 00377-116-02  
 DATA PERIOD- 04/01/87 TO 06/30/87  
 STABILITY CLASS #F# (10-40 METERS )  
 WINDS AT 10 METER LEVEL

21-JUL-87

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	6	23	14	28	18	9	5	1	0	0	105	5.25
NE	0	3	2	3	1	1	0	0	0	0	0	0	10	3.13
ENE	0	0	2	1	1	0	0	0	0	0	0	0	4	3.10
E	0	0	2	0	0	1	0	0	0	0	0	0	3	3.70
ESE	0	0	0	3	0	0	0	0	0	0	0	0	3	3.47
SE	0	0	0	0	1	0	1	0	0	0	0	0	2	5.35
SSE	0	0	1	0	1	0	0	1	0	0	0	0	3	4.87
S	0	0	1	0	0	0	0	0	0	0	0	0	1	2.40
SSW	0	0	1	1	0	0	0	0	0	0	0	0	2	2.90
SW	0	0	0	1	0	0	0	0	0	0	0	0	1	3.70
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	0	0	0	0	0	0.00
NW	0	0	0	0	0	0	1	1	1	0	0	0	3	7.60
NNW	0	0	1	0	0	0	0	0	0	0	0	0	1	2.80
N	0	1	5	0	5	3	1	1	1	0	0	0	17	4.65
VARIABLE													0	0.00
CALM													0	0.00
TOTAL	0	5	21	32	23	33	21	12	7	1	0	0	155	4.89

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	0.03	0.28	1.06	0.64	1.29	0.83	0.41	0.23	0.03	0.00	0.00	4.84	5.25
NE	0.00	0.14	0.09	0.14	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.46	3.13
ENE	0.00	0.00	0.09	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	3.10
E	0.00	0.00	0.09	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.14	3.70
ESE	0.00	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	3.47
SE	0.00	0.00	0.00	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.09	5.35
SSE	0.00	0.00	0.03	0.00	0.03	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.14	4.87
S	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	2.40
SSW	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	2.90
SW	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	3.70
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	0.03	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	0.03	0.00
WNW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00
NW	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.03	0.00	0.00	0.00	0.14	7.60
NNW	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	2.80
N	0.00	0.03	0.23	0.00	0.23	0.14	0.03	0.03	0.03	0.00	0.00	0.00	0.79	4.65
VARIABLE													0.03	0.00
CALM													0.03	0.00
TOTAL	0.00	0.23	0.97	1.47	1.06	1.52	0.97	0.55	0.32	0.05	0.00	0.00	7.14	4.89

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2184

TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2171



Table 4A

SOUTHERN CALIFORNIA EDISON COMPANY  
 SAN ONOFRE NUCLEAR GENERATING STATION  
 2ND QUARTER 1987  
 DAMES AND MOORE JOB NO. - 00377-116-09  
 DATA PERIOD - 04/01/87 TO 06/30/87  
 STABILITY CLASS #C# (10-40 METERS )  
 WINDS AT 10 METER LEVEL

21-JUL-87

WIND FREQUENCY DISTRIBUTION  
 (FREQUENCY IN NUMBER OF OCCURRENCES)

UPPER CLASS INTERVALS OF WIND SPEED (MPH)													MEAN SPEED	
WIND DIRECTION	1	2	3	4	5	6	7	8	9	10	11	>11	TOTAL	
NNE	0.	0	1.	4.	2	6.	20	15	22	8	7	7	92.	7.88
NE	0.	0	0.	0.	0.	0.	1.	0	1	0	0.	0.	2.	7.70
ENE	0.	0.	0.	1.	0.	0.	0	0	0	0	0	0.	1.	3.50
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.	0	0	0.	0.	0.	1.	3.00
SSE	0.	0.	1.	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.	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.	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.	1.	0.	0.	0.	0	0	1.	7.00
NW	0.	0.	0.	0	0.	0.	0.	0.	0.	0.	0	0	0.	0.00
NNW	0.	0.	0.	0	0.	0.	0.	0.	0.	0.	0	0	0.	0.00
N	0.	0.	0	0	0.	1.	0.	2	0	0	0	3	6.	9.75
VARIABLE													0.	0.00
CALM													0.	0.00
TOTAL	0.	0.	2.	5.	2.	7.	22	17	23	8.	7	10.	103.	7.89

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	0.03	0.18	0.09	0.28	0.92	0.69	1.01	0.37	0.32	0.32	4.24	7.88
NE	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.03	0.00	0.00	0.00	0.07	7.70
ENE	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	3.50
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	0.00	0.00	0.00	0.00	0.00	0.03	3.00
SSE	0.00	0.00	0.03	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	0.00	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	0.00	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	0.00	0.00	0.00	0.00	0.05	7.00
NW	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
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	0.20	9.75
N	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.09	0.00	0.00	0.00	0.14	0.00	0.00
VARIABLE													0.00	0.00
CALM													0.00	0.00
TOTAL	0.00	0.00	0.09	0.23	0.09	0.32	1.01	0.78	1.06	0.37	0.32	0.46	4.74	7.89

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2184  
 TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2171

Table 4A

SOUTHERN CALIFORNIA EDISON COMPANY  
 SAN ONOFRE NUCLEAR GENERATING STATION  
 2ND QUARTER 1987  
 DAMES AND MOORE JOB NO - 00377-116-09  
 DATA PERIOD- 04/01/87 TO 06/30/87  
 STABILITY CLASS ALL 110-40 METERS  
 WINDS AT 10 METER LEVEL

21-JUL-87

WIND FREQUENCY DISTRIBUTION  
 (FREQUENCY IN NUMBER OF OCCURRENCES)

WIND		UPPER CLASS INTERVALS OF WIND SPEED (MPH)											MEAN	
DIRECTION	1	2	3	4	5	6	7	8	9	10	11	>11	TOTAL	SPEED
NNE	0.	11.	35.	51.	35.	44.	53.	26.	29.	10.	7.	9.	310.	5.56
NE	0.	6.	8.	9.	10.	1.	1.	0.	1.	0.	0.	0.	36.	3.57
ENE	0.	0.	4.	7.	4.	1.	0.	0.	0.	0.	0.	0.	16.	3.51
E	1.	0.	3.	12.	5.	4.	2.	0.	0.	0.	0.	0.	27.	4.05
ESE	0.	0.	2.	14.	7.	6.	7.	1.	0.	1.	0.	0.	38.	4.99
SE	0.	2.	9.	16.	23.	21.	23.	11.	13.	4.	6.	5.	133.	6.13
SSE	0.	0.	19.	19.	20.	23.	24.	16.	24.	11.	7.	14.	177.	6.53
S	0.	2.	11.	22.	30.	24.	28.	17.	14.	20.	11.	4.	183.	6.37
SSW	0.	1.	9.	33.	25.	31.	22.	21.	25.	14.	6.	2.	189.	6.17
SW	0.	4.	16.	28.	25.	50.	37.	34.	20.	4.	1.	5.	224.	5.90
WSW	0.	0.	9.	24.	33.	38.	32.	33.	29.	16.	5.	13.	232.	6.77
W	0.	2.	11.	24.	17.	28.	51.	38.	46.	28.	2.	10.	257.	6.99
WNW	0.	3.	10.	11.	13.	25.	24.	19.	21.	12.	8.	8.	154.	6.91
NW	0.	4.	9.	11.	6.	9.	14.	11.	3.	7.	2.	7.	83.	6.30
NNW	0.	0.	8.	10.	5.	7.	1.	2.	1.	0.	0.	0.	34.	4.36
N	0.	6.	14.	13.	32.	8.	3.	4.	1.	0.	1.	4.	86.	4.56
VARIABLE													0.	0.00
CALM													0.	0.00
TOTAL	1.	41.	177.	304.	290.	320.	322.	233.	227.	127.	56.	91.	2179.	6.12

WIND FREQUENCY DISTRIBUTION  
 (FREQUENCY IN PERCENT OF TOTAL)

WIND		UPPER CLASS INTERVALS OF WIND SPEED (MPH)											MEAN	
DIRECTION	1	2	3	4	5	6	7	8	9	10	11	>11	TOTAL	SPEED
NNE	0.00	0.50	1.61	2.34	1.61	2.02	2.43	1.19	1.33	0.46	0.32	0.41	14.23	5.56
NE	0.00	0.28	0.37	0.41	0.46	0.05	0.05	0.00	0.05	0.00	0.00	0.00	1.65	3.57
ENE	0.00	0.00	0.18	0.32	0.18	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.73	3.51
E	0.05	0.00	0.14	0.55	0.23	0.18	0.09	0.00	0.00	0.00	0.00	0.00	1.24	4.05
ESE	0.00	0.00	0.09	0.64	0.32	0.28	0.32	0.05	0.00	0.05	0.00	0.00	1.74	4.99
SE	0.00	0.09	0.41	0.73	1.06	0.96	1.06	0.50	0.60	0.18	0.28	0.23	5.10	6.13
SSE	0.00	0.00	0.87	0.87	0.92	1.06	1.10	0.73	1.10	0.50	0.32	0.64	9.12	6.53
S	0.00	0.09	0.50	1.01	1.38	1.10	1.28	0.78	0.64	0.92	0.50	0.18	9.40	6.37
SSW	0.00	0.03	0.41	1.51	1.15	1.42	1.01	0.96	1.15	0.64	0.28	0.09	9.67	6.17
SW	0.00	0.18	0.73	1.28	1.15	2.29	1.70	1.56	0.92	0.18	0.05	0.23	10.29	5.90
WSW	0.00	0.00	0.41	1.10	1.51	1.74	1.47	1.51	1.33	0.73	0.23	0.60	10.65	6.77
W	0.00	0.09	0.50	1.10	0.78	1.28	2.34	1.74	2.11	1.28	0.09	0.46	11.79	6.99
WNW	0.00	0.14	0.46	0.50	0.60	1.15	1.10	0.87	0.96	0.55	0.37	0.37	7.07	6.91
NW	0.00	0.18	0.41	0.50	0.28	0.41	0.64	0.50	0.14	0.32	0.09	0.32	3.81	6.30
NNW	0.00	0.00	0.37	0.46	0.23	0.32	0.05	0.09	0.05	0.00	0.00	0.00	1.55	4.36
N	0.00	0.28	0.64	0.60	1.47	0.37	0.14	0.18	0.05	0.00	0.05	0.18	3.95	4.56
VARIABLE													0.00	0.00
CALM													0.00	0.00
TOTAL	0.05	1.88	8.12	13.95	13.31	14.69	14.78	10.69	10.42	5.83	2.57	3.72	100.00	6.12

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2184

TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2171