SAN ONOFRE
NUCLEAR GENERATING STATION

SEMIANNUAL EFFLUENT REPORT
JANUARY-JUNE 1989

Southern California Edison Company

SAN ONOFRE NUCLEAR GENERATING STATION

P.O. BOX 128

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SCE

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 (1989)

SECTION A. INTRODUCTION

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

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

SECTION B. GASEOUS EFFLUENTS

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

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

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

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

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

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

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

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

TABLE 1A

S.O.N.G.S. 1

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1989)
GASEOUS EFFLUENTS-SUMMATION OF ALL RELEASES

		Unit	First Quarter	Second Quarter	Estimated Total Error, %
A.	Fission and activation gases				
1.	Total release	Ci	1.35E-2	4.55E+1	3.00E+1
2.	Average release rate for period	μCi/sec	1.74E-3	5.79E+0	
3.	Percent of technical specification limit	%	7.51E-6	4.39E-2	
B.	Iodines				
1.	Total iodine-131	Ci	6.64E-4	4.11E-5	1.90E+1
2.	Average release rate for period	μCi/sec	8.54E-5	5.23E-6	
3.	Percent of technical specification limit	%	1.11E-3	6.80E-5	
C.	Particulates				
1.	Particulates with half-lives > 8 days	Ci	4.45E-5	3.99E-5	1.60E+1
2.	Average release rate for period	μCi/sec	5.72E-6	5.08E-6	
3.	Percent of technical specification limit	%	1.62E-5	1.45E-5	
4.	Gross alpha radioactivity	Ci	<LLD	*	5.00E+1
D.	Tritium				
1.	Total release	Ci	1.00E+0	5.11E-1	2.50E+1
2.	Average release rate for period	μCi/sec	1.29E-1	6.50E-2	
3.	Percent of technical specification limit	%	8.36E-4	4.22E-4	

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 (1989)
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	<LLD	<LLD	<LLD	4.78E-3
krypton-85	Ci	<LLD	<LLD	1.32E-2	2.88E-1
krypton-85m	Ci	<LLD	<LLD	<LLD	5.67E-1
krypton-87	Ci	<LLD	<LLD	<LLD	2.57E-1
krypton-88	Ci	<LLD	<LLD	<LLD	8.71E-1
xenon-131m	Ci	<LLD	<LLD	<LLD	2.42E-3
xenon-133	Ci	<LLD	3.21E+1	2.72E-4	2.82E+0
xenon-133m	Ci	<LLD	<LLD	<LLD	1.46E-1
xenon-135	Ci	<LLD	1.58E+0	<LLD	6.82E+0
xenon-135m	Ci	<LLD	<LLD	<LLD	4.82E-2
xenon-138	Ci	<LLD	<LLD	<LLD	<LLD
Total for period	Ci	<LLD	3.37E+1	1.35E-2	1.18E+1
2. Iodines					
iodine-131	Ci	6.64E-4	4.11E-5	NA	NA
iodine-133	Ci	<LLD	5.29E-5	NA	NA
iodine-135	Ci	<LLD	<LLD	NA	NA
Total for period	Ci	6.64E-4	9.41E-5	NA	NA
3. Particulates					
barium-140	Ci	<LLD	<LLD	NA	NA
cesium-134	Ci	1.36E-5	1.29E-5	NA	NA
cesium-137	Ci	2.75E-5	2.55E-5	NA	NA
cobalt-58	Ci	9.86E-7	9.37E-8	NA	NA
cobalt-60	Ci	2.25E-6	1.39E-6	NA	NA
lanthanum-140	Ci	<LLD	<LLD	NA	NA
manganese-54	Ci	1.43E-7	<LLD	NA	NA
molybdenum-99	Ci	<LLD	1.49E-7	NA	NA
strontium-89	Ci	<LLD	*	NA	NA
strontium-90	Ci	<LLD	*	NA	NA
technicium-99m	Ci	<LLD	1.52E-7	NA	NA
tin-113	Ci	2.27E-7	<LLD	NA	NA

LLD Lower Limit of Detection; See Table 1D.

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

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

TABLE 1D

S.O.N.G.S. 1

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1989)
GASEOUS EFFLUENTS-LOWER LIMIT OF DETECTION

RADIONUCLIDES	CONTINUOUS MODE LLD (μCi/cc)	BATCH MODE LLD (μCi/cc)
1. Fission and activation gases		
argon-41	1.20E-7	3.40E-6
krypton-85	1.00E-5	*
krypton-85m	5.80E-8	3.30E-6
krypton-87	1.20E-7	8.20E-6
krypton-88	2.20E-7	1.30E-5
xenon-131m	2.10E-6	1.20E-4
xenon-133	9.80E-8	*
xenon-133m	3.80E-7	2.50E-5
xenon-135	5.30E-8	3.20E-6
xenon-135m	4.60E-7	2.40E-5
xenon-138	1.70E-6	7.10E-5
2. Iodines		
iodine-133	3.70E-13	NA
iodine-135	8.80E-12	NA
3. Particulates		
barium-140	9.00E-14	NA
lanthanum-140	1.60E-13	NA
manganese-54	3.20E-14	NA
molybdenum-99	4.80E-14	NA
strontium-89	1.00E-14	NA
strontium-90	1.00E-15	NA
technicium-99m	4.90E-14	NA
tin-113	4.10E-14	NA

NA Iodines and particulates are not analyzed 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 (1989)
GASEOUS EFFLUENTS-RADIATION DOSES AT THE SITE BOUNDARY

		Unit	First Quarter	Second Quarter*
A.	Noble Gas			
	1. Gamma air dose	mrad	1.33E-7	1.82E-2
	2. Percent Technical Specification Limit	%	2.66E-6	3.64E-1
	3. Beta air dose	mrad	1.07E-5	2.66E-2
	4. Percent Technical Specification Limit	%	1.07E-4	2.66E-1
B.	Tritium, Iodine, Particulate (at the nearest receptor)			
	1. Organ dose	mrem	1.90E-3	1.11E-4
	2. Percent Technical Specification Limit	%	2.53E-2	1.48E-3

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

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

TABLE 1F

S.O.N.G.S. 1

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1989)
GASEOUS EFFLUENTS-BATCH RELEASE SUMMARY

		6-MONTH PERIOD
1.	Number of batch releases:	19 releases
2.	Total time period for batch releases:	7898 minutes
3.	Maximum time period for a batch release:	1000 minutes
4.	Average time period for a batch release:	416 minutes
5.	Minimum time period for a batch release:	49 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 (1989)
LIQUID EFFLUENTS-SUMMATION OF ALL RELEASES

		Unit	First Quarter	Second Quarter	Estimated Total Error, %
A.	Fission and activation products				
1.	Total release (not including tritium, gases, alpha)	Ci	1.43E-1	1.22E-1	1.90E+1
2.	Average diluted concentration during period	µCi/ml	3.63E-9	1.62E-9	
3.	Percent of applicable limit	%	3.54E-2	1.06E-2	
B.	Tritium				
1.	Total release	Ci	6.05E+1	2.17E+1	1.90E+1
2.	Average diluted concentration during period	µCi/ml	1.54E-6	2.88E-7	
3.	Percent of applicable limit	%	5.13E-2	9.60E-3	
C.	Dissolved and entrained gases				
1.	Total release	Ci	1.64E-2	1.92E-1	1.90E+1
2.	Average diluted concentration during period	µCi/ml	4.16E-10	2.55E-9	
3.	Percent of applicable limit	%	2.08E-4	1.28E-3	
D.	Gross alpha radioactivity				
1.	Total release	Ci	1.77E-3	*	5.00E+1
E.	Volume of waste released (prior to dilution)	liters	1.52E+6	5.22E+6	5.00E+0
F.	Volume of dilution water used during period	liters	3.94E+10	7.53E+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 (1989)
LIQUID EFFLUENTS

		Continuous Mode		Batch Mode	
Nuclides Released	Unit	First Quarter	Second Quarter	First Quarter	Second Quarter
antimony-124	Ci	6.33E-5	<LLD	1.42E-3	9.45E-4
antimony-125	Ci	<LLD	4.40E-5	3.09E-4	8.30E-4
barium-140	Ci	<LLD	<LLD	2.29E-6	<LLD
cerium-141	Ci	2.13E-4	<LLD	2.86E-4	2.11E-5
cerium-143	Ci	<LLD	<LLD	<LLD	2.64E-5
cerium-144	Ci	7.02E-4	<LLD	5.49E-4	9.96E-5
cesium-134	Ci	2.81E-2	3.20E-2	4.04E-3	7.57E-3
cesium-136	Ci	1.06E-4	<LLD	7.19E-7	<LLD
cesium-137	Ci	3.47E-2	4.79E-2	8.59E-3	1.10E-2
chromium-51	Ci	1.65E-3	<LLD	1.50E-3	2.69E-4
cobalt-57	Ci	<LLD	<LLD	1.48E-5	1.40E-5
cobalt-58	Ci	2.52E-2	2.47E-3	5.14E-3	4.34E-3
cobalt-60	Ci	1.08E-2	1.86E-3	9.45E-3	1.14E-2
iodine-131	Ci	8.93E-5	<LLD	1.66E-3	<LLD
iron-55	Ci	<LLD	<LLD	5.52E-3	<LLD
iron-59	Ci	<LLD	<LLD	<LLD	<LLD
lanthanum-140	Ci	2.40E-4	<LLD	5.03E-4	<LLD
manganese-54	Ci	6.68E-4	5.27E-5	5.03E-5	4.34E-4
molybdenum-99	Ci	<LLD	3.68E-5	<LLD	1.15E-5
niobium-95	Ci	<LLD	<LLD	3.53E-5	6.86E-5
ruthenium-103	Ci	<LLD	<LLD	6.98E-5	5.74E-5
ruthenium-106	Ci	<LLD	<LLD	<LLD	6.14E-4
silver-110m	Ci	<LLD	<LLD	1.02E-4	8.66E-5
strontium-89	Ci	<LLD	<LLD	6.10E-4	<LLD
strontium-90	Ci	<LLD	<LLD	2.53E-4	<LLD
technetium-99m	Ci	<LLD	3.76E-5	<LLD	1.17E-5
zinc-65	Ci	<LLD	<LLD	<LLD	<LLD
zirconium-95	Ci	<LLD	<LLD	<LLD	<LLD
Total for period (above)	Ci	1.03E-1	8.44E-2	4.01E-2	3.78E-2
krypton-85	Ci	<LLD	<LLD	1.80E-3	2.08E-4
krypton-85m	Ci	<LLD	<LLD	<LLD	3.76E-4
krypton-88	Ci	<LLD	<LLD	<LLD	2.38E-4
xenon-131m	Ci	<LLD	<LLD	1.24E-2	<LLD
xenon-133	Ci	<LLD	1.85E-4	2.24E-3	1.40E-1
xenon-133m	Ci	<LLD	<LLD	<LLD	4.29E-3
xenon-135	Ci	<LLD	<LLD	<LLD	2.63E-2

LLD Lower Limit of Detection; see Table 2C.

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

TABLE 2C

S.O.N.G.S. 1

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1989)
LIQUID EFFLUENTS-LOWER LIMIT OF DETECTION

RADIONUCLIDES	CONTINUOUS MODE LLD (μCi/ml)	BATCH MODE LLD (μCi/ml)
1. Fission and activation products		
antimony-124	1.40E-7	*
antimony-125	1.90E-7	*
barium-140	2.10E-7	3.00E-7
cerium-141	9.70E-8	*
cerium-143	3.10E-7	2.40E-7
cerium-144	4.00E-7	*
cesium-136	7.70E-8	9.30E-8
chromium-51	5.50E-7	*
cobalt-57	5.20E-8	*
iodine-131	7.00E-8	8.90E-8
iron-55	1.00E-6	1.00E-6
iron-59	8.00E-8	1.40E-7
lanthanum-140	1.40E-7	5.10E-8
molybdenum-99	8.00E-8	7.60E-8
niobium-95	3.30E-8	*
ruthenium-103	6.70E-8	*
ruthenium-106	3.80E-7	9.00E-7
silver-110m	6.90E-8	*
strontium-89	5.00E-8	5.00E-8
strontium-90	1.00E-8	1.00E-8
technetium-99m	8.10E-8	7.70E-8
zinc-65	1.20E-7	1.50E-7
zirconium-95	6.30E-8	1.40E-7
2. Dissolved and entrained gases		
krypton-85	1.20E-5	*
krypton-85m	6.40E-8	1.30E-7
krypton-88	2.00E-7	4.90E-7
xenon-131m	2.10E-6	4.00E-6
xenon-133	1.40E-7	*
xenon-133m	4.30E-7	9.50E-7
xenon-135	5.40E-8	1.10E-7

* Nuclide detected in Table 2B.

TABLE 2D

S.O.N.G.S. 1

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1989)
LIQUID EFFLUENTS-RADIATION DOSES AT THE LIQUID SITE BOUNDARY

		Unit	First Quarter	Second Quarter*
A.				
1.	Total body dose	mrem	2.55E-2	2.01E-2
2.	Percent Technical Specification Limit	%	1.70E+0	1.34E+0
B.				
1.	Limiting organ dose	mrem	3.84E-2	2.62E-2
2.	Percent Technical Specification Limit	%	7.68E-1	5.24E-1

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

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

TABLE 2E

S.O.N.G.S. 1

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1989)
LIQUID EFFLUENTS-BATCH RELEASE SUMMARY

		6-MONTH PERIOD
1.	Number of batch releases:	53 releases
2.	Total time period for batch releases:	41000 minutes
3.	Maximum time period for a batch release:	2773 minutes
4.	Average time period for a batch release:	774 minutes
5.	Minimum time period for a batch release:	4 minutes
6.	Average saltwater flow during batch releases:	164350 gpm

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

- Gaseous effluent releases, excluding tritium, totaled 4.55E+1 curies with Xe-133 77% of the total.

- The radiation doses from gaseous releases are: (a) gamma air dose: 1.82E-2 mrad at the site boundary, (b) beta air dose: 2.66E-2 mrad at the site boundary, (c) organ dose: 2.01E-3 mrem at the nearest receptor.

- Liquid releases totaled 8.29E+1 curies of which tritium was 8.22E+1 Ci, noble gases were 2.08E-1 Ci, and particulates and iodines were 2.65E-1 Ci.

- The radiation doses from liquid releases are: (a) total body: 4.56E-2 mrem, (b) limiting organ: 6.46E-2 mrem.

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

January 1, 1989 - June 30, 1989

EFFLUENT RADIATION MONITORS OUT OF SERVICE FOR GREATER THAN 30 DAYS
(Continued)

S.O.N.G.S. 1

Monitor	Inoperability Period	Inoperability Cause	Explanation
R-1221 Vent Stack Iodine	02/28/89 - 03/31/89	Iodine pump tripping	LCOAR 1-89-022 Out of service due to material procurement problem for replacement pump and design deficiency of pump circuit.
R-1218 Liquid Effluent	04/04/89 - 04/19/89 04/19/89 - 05/19/89	CCB/CFT Calib. Ops, operability test	LCOAR 1-89-036 Waiting for operations operability test.

January 1, 1989 - June 30, 1989

EFFLUENT RADIATION MONITORS OUT OF SERVICE FOR GREATER THAN 30 DAYS

S.O.N.G.S. 1

Monitor	Inoperability Period	Inoperability Cause	Explanation
R-1214 Plant Vent Noble Gas	06/13/86 - Present	Removed from service	EDMR 1-86-271
R-1254 Stack Effluent WRGM	08/12/88 - Present	Rework monitor per PFC	LCOAR 1-88-106 Plant vent stack flow data measurement by project to evaluate proposed design change
R-1216 Steam Generator Blowdown	11/28/88 - 03/20/89	Reading and back ground is higher than set points	LCOAR 1-88-189 Declared inoperative by Chemistry. There was no sample flow from the steam gen.
	03/20/89 - 04/04/89	Low steam generator pressure	EDMR 1-89-139 Declared inoperative by Chemistry. There was no sample flow from the steam gen.
	04/04/89 - Present	Low steam generator pressure, and sample flow problems, 18 mo. ccb	LCOAR 1-89-035 Getting initial valve line ups after installation of PFC 1-89-002 and channel calibration.
R-1211 Cont. Stack Particulate	05/31/89 - Present	6 Month Channel Functional Testing/ 18 Month Complete Channel Calibration	EDMR 1-89-247 Procedure and high-background problems. Work delayed for Unit 1 start up.
R-1212 Cont. Stack Particulate	01/07/89 - 02/09/89	MCC #1 Outage, Rework of particulate drive on R-1211, 31 day & LLRT	EDMR 1-89-019 Bus outage, LLRT, rework & surveillance testing.

SECTION J. MISCELLANEOUS

o Description of and Events Leading to Unplanned Liquid Release, Unit 1

During the evening of January 5, 1989, an unplanned liquid release occurred when the Unit 1 Yard Drain Sump overflowed. Water from this sump backed up into the Yard Drain System and overflowed to the South Forebay (Circulating Water Intake System). The water entering the Forebay constituted an unplanned release to the Circulating Water System.

The Yard Drain Sump became contaminated when several drums of E-1 μCi/cc water were mistakenly dumped into a drain in the New Resin Slurry Room, on the afternoon of the January 5. It was initially believed that the drums contained only E-5 μCi/cc water and that the drain emptied into Radwaste; this however was not the case. In fact the E-1 μCi/cc water drained to the Yard Drain Sump with the assistance of yard drain water from rain storms on that same evening. As the Yard Drain Sump pumps cycled, Radiation Monitor R-2100 detected the excess activity and isolated the Sump. Confirmatory samples were taken (4E-4 μCi/cc) and plans were made to send the water to radwaste. This was necessary as only 3500 gpm was available for dilution in the Circulating Water System and the installed sump pumps are rated at 1000 gpm, too great a discharge rate. As a suitable temporary submersible pump and hose were being gathered to pump the sump into Radwaste the rain storms overflowed the sump. Contaminated water flooded part of the backyard and overflowed into the South Forebay (Circulating Water System intake). This overflow constituted an unplanned release to the environment as the water in the intake was discharged continuously to the ocean.

The unplanned release (overflow) occurred from approximately 21:00 to 22:30 at which time the submersible pump was functioning. The flow estimate of the overflow is 30 gpm based on the submersible pump flow and the fact that the pump was able to handle the overflow. A Release Permit was written using flow, concentration, and dilution available from the South Forebay. The permit shows a discharge concentration of 0.33 MPCs and a total of 4E-4 Curies released.

The corrective action currently underway is testing and confirming via dye tests the routing of all outlying drains in the plant. If unrecognized routes to the Yard Drain Sump are identified they will be labeled. Additionally procedural steps will be instituted to avoid contamination entering the system via these pathways.

(11) addition of Deer Consumer in Sector A, p. 2-39

(12) addition of Deer Consumer in Sector B, p. 2-42

(13) revision of Adult Inhalation, Food & Ground Pathways values for Sanitary Landfill, Sector B, p.2-43

(14) revision of Adult Inhalation and Food & Ground Pathways values for Camp San Onofre Fire Station in Sector C, p. 2-44.

(15) revision of Child, Teen, and Adult Inhalation and Food & Ground Pathways values for Sheep Meat in Sector C, p. 2-46

(16) addition of Deer Consumer in Sector C, p. 2-47

(17) revision of Child, Teen, and Adult and Food & Ground Pathways values for Sheep Meat in Sector D, p. 2-49

(18) addition of Deer Consumer in Sector D, p. 2-50

(19) revision of Child, Teen, and Adult and Food & Ground Pathway values for Sheep Meat in Sector E, p. 2-52

(20) addition of Deer Consumer in Sector E, p. 2-53

(21) deletion of Motor Pool in Sector E

(22) revision of Child, Teen and Adult and Food & Ground Pathways values for Sheep Meat in Sector F, p. 2-55

(23) addition of Deer Consumer in Sector F, p. 2-56

(24) revision of Adult Inhalation & Food & Ground Pathways values for Border Patrol Check Point in Sector F, p. 2-58

(25) revision of Adult Inhalation and Food & Ground Pathways for San Onofre State Park Beach Campground in Sector G, p. 2-59

(26) revision of Child, Teen, Food & Ground Pathway factors for Sheep (Meat), Sector G, p.2-61

5-2 Footnote added for locations 11, 12, 13, 15, and 16 to indicate that these locations are not required by Technical Specifications.

5-4 Locations #68 (Range 210C (MCB, Camp Pendleton)) and #99 (Transit Dose) added. Footnote added indicating locations #55 through #59 are not required by the Technical Specifications.

SECTION I. CHANGES TO OFFSITE DOSE CALCULATION MANUAL

S.O.N.G.S 1

SUBJECT: Revision 5 to Unit 1 Offsite Dose Calculation Manual (ODCM)

On March 1, 1989, Revision 5 to the Offsite Dose Calculation Manual (ODCM) was adopted and published. This revision was occasioned by the 1988 Land Use Census which contained several minor changes in receptor locations and land uses. The following is a detailed explanation of the revision to support the changes incorporated without benefit of additional or supplemental information. A determination has been made that these changes do not reduce the accuracy or reliability of the dose calculations and setpoint determinations. Documentation of the fact that this change has been reviewed and found acceptable is by inclusion of a letter dated March 1, 1989, signed by the Station Manager.

Explanations of changes are listed below. Copies of the affected pages are contained in Appendix B of the report.

Page	
2-22	Table 2-4, Controlling location factors for several isotopes have been revised. These reflect changes in Dose Parameter R_i tables as a result of the new Land Use Census.
2-24 through 2-61	Entire Dose Parameter R_i table section were reprinted due to several receptor changes. Receptors that change due to the Land Use Census were:

(1) deletion of Enlisted Beach Campground Check-in Sector P

(2) deletion of Trestles Beach Tower in Sector P

(3) deletion of State Park Office Trailer in Sector Q

(4) deletion of Enlisted Beach Recreational Building in Sector Q

(5) deletion of San Onofre Heights in Sector Q

(6) addition of Enlisted Beach Check-In in Sector Q, p. 2-28

(7) addition of San Onofre Mobile Homes Sector Q, p. 2-29

(8) renaming of Garden (Ave. Montalvo) to SC Residence with Garden in Sector Q, p. 2-32,

(9) revision of the distance, X/Q and D/Q for San Onofre Mobile Homes, Sector R, p. 2-33

(10) addition of Deer Consumer in Sector R, p. 2-35

S.O.N.G.S. 1

TABLE 2

	% TSL	
SOURCE	1st Quarter	2nd Quarter
LIQUID EFFLUENTS Whole body	1.70E+0	1.34E+0
Organ	7.68E-1	5.24E-1
AIRBORNE EFFLUENTS Tritium, Iodines, and Particulates	8.37E-2	1.33E-2
NOBLE GASES Gamma	3.56E-6	5.40E-1
Beta	1.68E-4	3.57E-1

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

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 liver received the maximum dose primarily by the saltwater fish pathway.

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

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

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

7. A maximum air dose of 4.27E-7 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. The maximum air dose for gamma radiation was located in the NW sector, at the exclusion area boundary, and calculated with the assumptions of the USNRC Regulatory Guide 1.109.

9. A maximum air dose of 3.08E-5 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. The maximum air dose for gamma radiation was located in the NW 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 1

	Dose* (millirems)	
SOURCE	1st Quarter	2nd Quarter
LIQUID EFFLUENTS Whole body	1) 2.55E-2	2) 2.01E-2
Organ	3) 3.84E-2	4) 2.62E-2
AIRBORNE EFFLUENTS Tritium, Iodines, and Particulates	5) 6.28E-3	6) 9.95E-4
NOBLE GASES** Gamma	7) 1.78E-7	8) 2.70E-2
Beta	9) 1.68E-5	10) 3.57E-2
DIRECT RADIATION	11) 2.94E+0	12) 2.65E+0

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

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

SECTION H. 10 CFR 50 APPENDIX I REQUIREMENTS

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 G. ESTIMATION OF ERROR

S.O.N.G.S. 1

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

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

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

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

Where: σ_i = Error associated with each component.

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:

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

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

The MPC_{eff} is defined as:

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

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

n = total number of radionuclides identified

MPC_i = MPC of the ith radionuclide

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

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:

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

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 = 1.30E-5 sec/m^3 and is the annual average atmospheric dispersion defined in the ODCM, Rev. 3.

The MPC_{eff} is defined as:

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

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

n = total number of radionuclides identified

MPC_i = MPC of the ith radionuclide

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

SECTION E. RADWASTE SHIPMENTS (Continued)

S.O.N.G.S. 1

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1989)
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.	americium-241	%	9.31E-3
	antimony-124	%	4.18E-5
	carbon-14	%	6.38E-3
	cerium-141	%	2.91E-9
	cerium-144	%	6.40E-2
	cesium-134	%	6.19E-1
	cesium-137	%	2.31E+0
	chromium-51	%	4.12E-8
	cobalt-57	%	1.00E-2
	cobalt-58	%	3.08E-2
	cobalt-60	%	3.14E+1
	curium-242	%	9.77E-2
	curium-243/244	%	1.06E-2
	iodine-129	%	2.37E-3
	iron-55	%	3.83E+1
	iron-59	%	1.19E-7
	manganese-54	%	6.30E-1
	nickel-63	%	9.69E+0
	niobium-95	%	1.40E-7
	plutonium-238	%	1.09E-2
	plutonium-239/240	%	4.43E-3
	plutonium-241	%	3.83E-1
	strontium-89	%	3.60E-8
	strontium-90	%	2.27E-2
	technetium-99	%	1.36E-3
	tritium	%	1.63E+1

3. Solid Waste Disposition

See COMMON section of this report

B. IRRADIATED FUEL SHIPMENTS (Disposition)

See COMMON section of this report

S.O.N.G.S. 1

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1989)
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.

americium-241	%	9.63E-4
antimony-124	%	1.42E-2
carbon-14	%	8.16E-5
cerium-144	%	1.33E-3
cesium-134	%	2.30E+1
cesium-137	%	2.97E+1
cobalt-57	%	7.65E-2
cobalt-58	%	1.97E+1
cobalt-60	%	1.57E+1
curium-242	%	1.48E-3
iodine-129	%	4.41E-5
iron-55	%	4.10E+0
iron-59	%	3.70E-2
manganese-54	%	2.21E+0
nickel-59	%	2.63E-2
nickel-63	%	5.18E+0
plutonium-238	%	1.38E-3
plutonium-241	%	6.42E-2
strontium-89	%	5.97E-2
strontium-90	%	9.97E-2
technetium-99	%	5.09E-5
tritium	%	6.29E-2
zirconium-95	%	2.11E-3

b.

carbon-14	%	5.75E-3
cesium-134	%	1.04E+1
cesium-137	%	2.02E+1
cobalt-58	%	3.35E+0
cobalt-60	%	1.04E+1
iodine-129	%	6.37E-4
iron-55	%	3.11E+1
manganese-54	%	1.15E+0
nickel-63	%	2.92E+0
technetium-99	%	1.79E-4
tritium	%	2.04E+1

SECTION E. RADWASTE SHIPMENTS

S.O.N.G.S. 1

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1989)
SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

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

1. Type of waste	Unit	6-month Period	Est. Total Error, %
a. Spent resins, filter sludges, evaporator bottoms, etc.	m^3	1.61E+1*	
	Ci	6.73E+2	3.00E+1
b. Dry compressible waste, contaminated equip. etc.	m^3	4.37E+1**	
	Ci	2.33E+0	3.00E+1
c. Irradiated components, control rods, etc.	m^3	NA	
	Ci	NA	NA
d. Other (absorbed liquids, sand building rubble, biological waste.)	m^3	2.69E+0#	
	Ci	5.20E+0	3.00E+1

* Shipped in Type A Cask (C of C 9176), 5 - 142 cu. ft. High Integrity Containers, 4 - 210 cu. ft. High Integrity Containers. Shipped in Type B Cask (C of C 9208), 3 - 142 cu. ft. High Integrity Containers. The number of containers reflect from all three Units at SONGS. See page 68 for details.

** Material packaged in 55-gallon DOT 7A drums (7.5 cu. ft. each), or strong, tight containers (steel boxes 98 cu. ft. each). The number of containers reflect from all three Units at SONGS. See page 68 for details.

\# Shipped in Type A Cask (C of C 9176), 6 - 50 cu. ft. High Integrity Containers. Shipped in Type B Cask (C of C 9208), 1 - 50 cu. ft. High Integrity Container. The number of containers reflect from all three Units at SONGS. See page 68 for details.

2. GASEOUS EFFLUENT-RADIATION DOSES AT THE SITE BOUNDARY

For the fourth quarter of 1988 Semiannual Report, Sr-89, and Sr-90.

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

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

3. LIQUID EFFLUENT-RADIATION DOSES AT THE SITE BOUNDARY

For the fourth quarter of 1988 Semiannual Report, Sr-89, Sr-90, and Fe-55.

		Unit	Fourth Quarter
A.			
1.	Total body dose	mrem	2.04E-4
2.	Percent Applicable Limit	%	1.36E-2
B.			
1.	Limit organ dose	mrem	1.20E-3
2.	Percent Applicable Limit	%	2.40E-2

NOTE: The limiting organ is the bone.

SECTION D. PREVIOUS SEMIANNUAL REPORT ADDENDUM

S.O.N.G.S. 1

1. The July - December 1988 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 1988. The values are as follows:

GASEOUS EFFLUENTS (4th Quarter 1988)

Nuclides Released	Unit	Continuous Mode	Batch Mode
strontium-89	Ci	<LLD	*
strontium-90	Ci	<LLD	*
Gross alpha	Ci	1.25E-7	*

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

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

LIQUID EFFLUENTS (4th Quarter 1988)

Nuclides Released	Unit	Continuous Mode	Batch Mode
iron-55	Ci	<LLD	5.71E-4
strontium-89	Ci	<LLD	6.62E-6
strontium-90	Ci	<LLD	3.06E-5
tritium	Ci	<LLD	1.25E-4*
Gross alpha	Ci	<LLD	2.98E-6

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

* In addition to previously reported values.

SEMIANNUAL EFFLUENT REPORT

January - June (1989)

SECTION A. INTRODUCTION

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

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

SECTION B. GASEOUS EFFLUENTS

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

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

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

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

Waste gas decay tank and calibration releases are considered to be "batch" releases. Containment purges, steam jet air ejector, and plant stack releases are considered to be "continuous" releases.

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

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

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

TABLE 1A

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

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1989)
GASEOUS EFFLUENTS-SUMMATION OF ALL RELEASES

	Unit	First Quarter	Second Quarter	Estimated Total Error, %
A. Fission and activation gases				
1. Total release	Ci	4.76E+2	8.95E+2	2.50E+1
2. Average release rate for period	μCi/sec	6.12E+1	1.14E+2	
3. Percent of technical specification limit	%	1.26E-1	1.99E-1	
B. Iodines				
1. Total iodine-131	Ci	6.24E-3	2.15E-2	1.90E+1
2. Average release rate for period	μCi/sec	8.02E-4	2.74E-3	
3. Percent of technical specification limit	%	3.85E-3	1.31E-2	
C. Particulates				
1. Particulates with half-lives > 8 days	Ci	8.10E-5	1.89E-4	1.60E+1
2. Average release rate for period	μCi/sec	1.04E-5	2.40E-5	
3. Percent of technical specification limit	%	7.97E-6	1.15E-5	
4. Gross alpha radioactivity	Ci	<LLD	*	5.00E+1
D. Tritium				
1. Total release	Ci	5.20E+0	1.27E+1	2.50E+1
2. Average release rate for period	μCi/sec	6.69E-1	1.62E+0	
3. Percent of technical specification limit	%	1.60E-3	3.88E-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. 2 - 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1989)
GASEOUS EFFLUENTS-GROUND LEVEL RELEASES

Nuclides Released	Unit	Continuous Mode First Quarter	Continuous Mode Second Quarter	Batch Mode First Quarter	Batch Mode Second Quarter
1. Fission gases					
argon-41	Ci	1.24E+0	1.84E+0	<LLD	<LLD
krypton-85	Ci	9.34E-2	2.56E-1	1.44E+0	9.70E+0
krypton-85m	Ci	2.04E+0	3.91E+0	<LLD	8.19E-4
krypton-87	Ci	1.83E+0	4.89E-1	<LLD	<LLD
krypton-88	Ci	2.15E+0	8.17E-1	<LLD	<LLD
xenon-131m	Ci	3.62E-1	1.75E+0	9.45E-2	9.84E-1
xenon-133	Ci	4.41E+2	8.45E+2	1.05E+0	4.84E+0
xenon-133m	Ci	7.77E-1	5.89E+0	5.98E-3	6.28E-3
xenon-135	Ci	2.13E+1	1.72E+1	5.04E-3	3.39E-2
xenon-135m	Ci	2.95E+0	1.31E+0	<LLD	<LLD
xenon-138	Ci	1.39E-1	3.30E-2	<LLD	<LLD
Total for period	Ci	4.73E+2	8.79E+2	2.60E+0	1.56E+1
2. Iodines					
iodine-131	Ci	6.24E-3	2.15E-2	NA	NA
iodine-132	Ci	1.32E-5	2.53E-3	NA	NA
iodine-133	Ci	1.82E-3	2.73E-3	NA	NA
iodine-134	Ci	3.34E-8	<LLD	NA	NA
iodine-135	Ci	6.00E-5	3.32E-4	NA	NA
Total for period	Ci	8.13E-3	2.71E-2	NA	NA

TABLE 1C (Continued)

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

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1989)
GASEOUS EFFLUENTS-GROUND LEVEL RELEASES

Nuclides Released	Unit	Continuous Mode First Quarter	Continuous Mode Second Quarter	Batch Mode First Quarter	Batch Mode Second Quarter
3. Particulates					
barium-139	Ci	7.66E-5	6.65E-5	NA	NA
barium-140	Ci	<LLD	<LLD	NA	NA
bromine-82	Ci	2.30E-5	5.79E-5	NA	NA
cerium-141	Ci	1.72E-7	5.84E-7	NA	NA
cerium-143	Ci	4.24E-8	<LLD	NA	NA
cerium-144	Ci	<LLD	1.77E-6	NA	NA
cesium-134	Ci	<LLD	1.17E-5	NA	NA
cesium-136	Ci	<LLD	8.48E-6	NA	NA
cesium-137	Ci	1.21E-5	5.37E-5	NA	NA
cesium-138	Ci	4.13E-2	1.60E-2	NA	NA
cobalt-58	Ci	4.23E-5	9.55E-5	NA	NA
cobalt-60	Ci	2.32E-5	1.54E-5	NA	NA
lanthanum-140	Ci	<LLD	3.10E-7	NA	NA
manganese-54	Ci	1.96E-6	2.02E-6	NA	NA
molybdenum-99	Ci	<LLD	2.11E-5	NA	NA
niobium-95	Ci	7.53E-9	<LLD	NA	NA
rubidium-88	Ci	1.67E-1	6.39E-2	NA	NA
rubidium-89	Ci	1.21E-3	**	NA	NA
strontium-89	Ci	1.35E-6	*	NA	NA
strontium-90	Ci	<LLD	*	NA	NA
strontium-92	Ci	2.00E-6	2.23E-7	NA	NA
technetium-99m	Ci	<LLD	2.15E-5	NA	NA
tellurium-132	Ci	1.99E-7	1.89E-8	NA	NA
yttrium-92	Ci	1.41E-6	1.47E-7	NA	NA

LLD Lower Limit of Detection; See Table 1D.

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

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

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

TABLE 1D

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

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1989)
GASEOUS EFFLUENTS-LOWER LIMIT OF DETECTION

RADIONUCLIDES	CONTINUOUS MODE LLD (μCi/cc)	BATCH MODE LLD (μCi/cc)
1. Fission and activation gases		
argon-41	*	6.60E-6
krypton-85m	*	1.70E-6
krypton-87	*	5.90E-6
krypton-88	*	5.10E-6
xenon-135m	*	1.90E-5
xenon-138	*	3.90E-5
2. Iodines		
3. Particulates		
barium-140	6.00E-13	NA
cerium-141	2.30E-13	NA
cerium-143	9.00E-13	NA
cesium-134	1.90E-13	NA
cesium-136	1.90E-13	NA
lanthanum-140	1.00E-12	NA
molybdenum-99	2.40E-13	NA
niobium-95	1.60E-13	NA
strontium-89	1.00E-13	NA
strontium-90	1.00E-14	NA
technetium-99m	2.40E-13	NA
gross alpha	1.00E-13	NA

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

* Nuclides were detected in Table 1C.

TABLE 1E

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

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1989)
GASEOUS EFFLUENTS-RADIATION DOSES AT THE SITE BOUNDARY

		Unit	First Quarter	Second Quarter*
A.	Noble Gas			
	1. Gamma air dose	mrad	3.95E-2	5.84E-2
	2. Percent Technical Specification Limit	%	3.95E-1	5.84E-1
	3. Beta air dose	mrad	8.30E-2	1.52E-1
	4. Percent Technical Specification Limit	%	4.15E-1	7.60E-1
B.	Tritium, Iodine, Particulate (at the nearest receptor)			
	1. Organ dose	mrem	4.93E-3	1.55E-2
	2. Percent Technical Specification Limit	%	3.29E-2	1.03E-1

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

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

TABLE 1F

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

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1989)
GASEOUS EFFLUENTS-BATCH RELEASE SUMMARY

	6-MONTH PERIOD
1. Number of batch releases:	9 releases
2. Total time period for batch releases:	3038 minutes
3. Maximum time period for a batch:	438 minutes
4. Average time period for a batch release:	338 minutes
5. Minimum time period for a batch release:	225 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 (1989)
LIQUID EFFLUENTS-SUMMATION OF ALL RELEASES

		Unit	First Quarter	Second Quarter	Estimated Total Error, %
A.	Fission and activation products				
1.	Total release (not including tritium, gases, alpha)	Ci	4.40E-2	4.67E-1	1.90E+1
2.	Average diluted concentration during period	μCi/ml	1.20E-10	6.60E-10	
3.	Percent of applicable limit	%	3.71E-3	3.32E-2	
B.	Tritium				
1.	Total release	Ci	4.42E+2	3.86E+2	1.90E+1
2.	Average diluted concentration during period	μCi/ml	1.21E-6	5.45E-7	
3.	Percent of applicable limit	%	4.03E-2	1.82E-2	
C.	Dissolved and entrained gases				
1.	Total release	Ci	6.56E-1	9.91E-2	1.90E+1
2.	Average diluted concentration during period	μCi/ml	1.79E-9	1.40E-10	
3.	Percent of applicable limit	%	8.95E-4	7.00E-5	
D.	Gross alpha radioactivity				
1.	Total release	Ci	<LLD	*	5.00E+1
E.	Volume of waste released (prior to dilution)	liters	1.04E+7	1.25E+7	5.00E+0
F.	Volume of dilution water used during period	liters	3.66E+11	7.08+11	5.00E+0

LLD Lower Limit of Detection; see Table 2C.

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

TABLE 2B

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

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1989)
LIQUID EFFLUENTS

		Continuous Mode		Batch Mode	
Nuclides Released	Unit	First Quarter	Second Quarter	First Quarter	Second Quarter
antimony-124	Ci	<LLD	<LLD	1.01E-4	1.79E-3
antimony-125	Ci	<LLD	<LLD	4.92E-4	4.94E-3
barium-140	Ci	<LLD	9.38E-4	<LLD	2.46E-4
cerium-141	Ci	<LLD	<LLD	5.77E-6	2.15E-4
cerium-143	Ci	9.63E-4	<LLD	<LLD	<LLD
cerium-144	Ci	<LLD	<LLD	1.88E-4	1.32E-3
cesium-134	Ci	4.27E-4	1.73E-2	8.17E-4	4.16E-2
cesium-136	Ci	<LLD	3.09E-3	<LLD	9.13E-4
cesium-137	Ci	1.93E-3	1.88E-2	1.84E-3	4.63E-2
chromium-51	Ci	<LLD	<LLD	2.95E-3	1.24E-2
cobalt-57	Ci	<LLD	<LLD	3.44E-5	5.13E-4
cobalt-58	Ci	<LLD	3.06E-4	1.71E-2	1.70E-1
cobalt-60	Ci	5.28E-6	7.51E-6	3.57E-3	2.71E-2
iodine-131	Ci	2.36E-3	5.50E-2	1.30E-3	4.78E-3
iodine-133	Ci	4.56E-4	2.17E-2	1.55E-4	7.69E-5
iron-55	Ci	<LLD	<LLD	3.09E-3	<LLD
iron-59	Ci	<LLD	<LLD	1.40E-4	9.22E-4
lanthanum-140	Ci	<LLD	5.29E-3	9.88E-5	1.28E-4
manganese-54	Ci	<LLD	7.82E-4	9.45E-4	4.90E-3
molybdenum-99	Ci	2.17E-4	1.92E-3	1.09E-5	7.15E-5
niobium-95	Ci	<LLD	<LLD	2.27E-3	1.14E-2
ruthenium-103	Ci	<LLD	<LLD	9.18E-6	5.30E-4
ruthenium-106	Ci	<LLD	<LLD	1.60E-4	6.52E-4
silver-110m	Ci	<LLD	<LLD	5.95E-4	1.32E-3
strontium-89	Ci	<LLD	<LLD	<LLD	<LLD
strontium-90	Ci	<LLD	<LLD	<LLD	<LLD
technetium-99m	Ci	2.21E-4	1.95E-3	1.11E-5	7.28E-5
tin-113	Ci	<LLD	<LLD	1.46E-4	8.63E-4
zinc-65	Ci	<LLD	<LLD	4.58E-6	8.31E-5
zirconium-95	Ci	<LLD	<LLD	1.40E-3	7.00E-3
zirconium-97	Ci	<LLD	<LLD	<LLD	5.33E-6
Total for period (above)	Ci	6.58E-3	1.27E-1	3.74E-2	3.40E-1

LLD Lower Limit of Detection; see Table 2C.

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

TABLE 2B (Continued)

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

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1989)
LIQUID EFFLUENTS

		Continuous Mode		Batch Mode	
Nuclides Released	Unit	First Quarter	Second Quarter	First Quarter	Second Quarter
argon-41	Ci	<LLD	<LLD	<LLD	8.31E-6
krypton-85	Ci	<LLD	<LLD	1.03E-3	<LLD
krypton-85m	Ci	<LLD	<LLD	<LLD	4.57E-5
xenon-131m	Ci	<LLD	<LLD	1.32E-2	1.73E-3
xenon-133	Ci	<LLD	1.58E-2	6.32E-1	7.94E-2
xenon-133m	Ci	<LLD	<LLD	5.05E-3	5.51E-4
xenon-135	Ci	1.35E-3	<LLD	3.01E-3	1.56E-3

LLD Lower Limit of Detection; see Table 2C.

TABLE 2C

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

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1989)
LIQUID EFFLUENTS-LOWER LIMIT OF DETECTION

RADIONUCLIDES	CONTINUOUS MODE LLD (μCi/ml)	BATCH MODE LLD (μCi/ml)
1. Fission and activation products		
antimony-124	3.10E-7	*
antimony-125	1.80E-7	*
barium-140	3.00E-7	2.00E-7
cerium-141	8.90E-8	*
cerium-143	4.90E-7	9.10E-8
cerium-144	3.90E-7	*
cesium-136	1.40E-7	3.20E-8
chromium-51	6.60E-7	*
cobalt-57	5.30E-8	*
cobalt-58	1.10E-7	*
iron-55	1.00E-6	1.00E-6
iron-59	1.80E-7	*
lanthanum-140	4.90E-7	*
manganese-54	7.20E-8	*
niobium-95	7.10E-8	*
ruthenium-103	5.60E-8	*
ruthenium-106	7.10E-7	*
silver-110m	1.10E-7	*
strontium-89	5.00E-8	5.00E-8
strontium-90	1.00E-8	1.00E-8
tin-113	6.40E-8	*
zinc-65	1.90E-7	*
zirconium-95	1.40E-7	*
zirconium-97	7.80E-7	3.80E-8
gross alpha	1.00E-7	1.00E-7

* Nuclide detected in Table 2B.

TABLE 2C (Continued)

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

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1989)
LIQUID EFFLUENTS-LOWER LIMIT OF DETECTION

RADIONUCLIDES	CONTINUOUS MODE LLD (μCi/ml)	BATCH MODE LLD (μCi/ml)
2. Dissolved and entrained gases		
argon-41	1.20E-7	3.70E-8
krypton-85	4.70E-5	2.00E-5
krypton-85m	1.30E-7	5.00E-8
xenon-131m	4.00E-6	*
xenon-133	3.80E-7	*
xenon-133m	9.30E-7	*
xenon-135	2.30E-8	*

* Nuclide detected in Table 2B.

TABLE 2D

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

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1989)
LIQUID EFFLUENTS-RADIATION DOSES AT THE LIQUID SITE BOUNDARY

		Unit	First Quarter	Second Quarter*
A.	Noble Gas			
	1. Total body dose	mrem	6.60E-4	1.32E-2
	2. Percent Technical Specification Limit	%	2.20E-2	4.40E-1
B.	Tritium, Iodine, Particulate (at the nearest receptor)			
	1. Limiting organ dose	mrem	5.12E-3	6.70E-2
	2. Percent Technical Specification Limit	%	5.12E-2	6.70E-1

NOTE: The limiting organ for the first quarter is the GI/LLI, and for the second quarter, 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 (1989)
LIQUID EFFLUENTS-BATCH RELEASE SUMMARY

		6-MONTH PERIOD
1.	Number of batch releases:	127 releases
2.	Total time period for batch releases:	34,879 minutes
3.	Maximum time period for a batch release:	928 minutes
4.	Average time period for a batch release:	275 minutes
5.	Minimum time period for a batch release:	25 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. The July - December 1988 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 1988. The values are as follows:

GASEOUS EFFLUENTS (4th Quarter 1988)

Nuclides Released	Unit	Continuous Mode	Batch Mode
strontium-89	Ci	2.03E-8	*
strontium-90	Ci	<LLD	*
gross alpha	Ci	<LLD	*

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

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

LIQUID EFFLUENTS (4th Quarter 1988)

Nuclides Released	Unit	Continuous Mode	Batch Mode
iron-55	Ci	2.32E-2	2.08E-3
strontium-89	Ci	<LLD	5.24E-5
strontium-90	Ci	<LLD	1.48E-5
gross alpha	Ci	<LLD	<LLD

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

2. GASEOUS EFFLUENTS-RADIATION DOSES AT THE SITE BOUNDARY

For the fourth quarter of 1988 Semiannual Report, Sr-89, and Sr-90.

		Unit	Fourth Quarter
A.	Tritium, Iodine, Particulate (at the nearest receptor)		
1.	Organ dose	mrem	2.79E-8
2.	Percent Applicable Limit	%	1.86E-7

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

3. LIQUID EFFLUENT-RADIATION DOSES AT THE SITE BOUNDARY

For the fourth quarter of 1988 Semiannual Report, Sr-89, Sr-90, and Fe-55.

		Unit	Fourth Quarter
A.			
1.	Total body dose	mrem	7.30E-5
2.	Percent Applicable Limit	%	2.43E-3
B.			
1.	Limit organ dose	mrem	4.51E-4
2.	Percent Applicable Limit	%	4.51E-3

NOTE: The limiting organ is the bone.

SECTION E. RADWASTE SHIPMENTS

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

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1989)
SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

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

1. Type of waste	Unit	6-Month Period	Est. Total Error, %
a. Spent resins, filter sludges, evaporator bottoms, etc.	m^3	3.99E+1*	
	Ci	1.34E+3	3.00E+1
b. Dry compressible waste, contaminated equip. etc.	m^3	6.54E+1**	
	Ci	1.49E+0	3.00E+1
c. Irradiated components, control rods, etc.	m^3	NA	
	Ci	NA	NA
d. Other (filters, sludge sand/rubble, wet trash)	m^3	1.26E+1#	
	Ci	1.12E+2	3.00E+1

* Shipped in Type A Cask (C of C 9176), 5 - 142 cu. ft. High Integrity Containers, 4 - 210 cu. ft. High Integrity Containers. Shipped in Type B Cask (C of C 9208), 3 -142 cu. ft. High Integrity Containers. The number of containers reflect from all three Units at SONGS. See page 68 for details.

** Material packaged in 55-gallon DOT 7A drums (7.5 cu. ft. each), or strong, tight containers (steel boxes 98 cu. ft. each). The number of containers reflect from all three Units at SONGS. See page 68 for details.

\# Shipped in Type A Cask (C of C 9176), 6 - 50 cu. ft. High Integrity Containers. Shipped in Type B Cask (C of C 9208), 1 - 50 cu. ft. High Integrity Container. The number of containers reflect from all three Units at SONGS. See page 68 for details.

SECTION E. RADWASTE SHIPMENTS (Continued)

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

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1989)
SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

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

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

a.

antimony-125	%	9.22E-2
carbon-14	%	2.66E-2
cerium-144	%	9.34E-4
cesium-134	%	1.71E+1
cesium-137	%	6.32E+1
cobalt-57	%	2.38E-2
cobalt-58	%	2.31E+0
cobalt-60	%	6.37E+0
iodine-129	%	2.26E-5
iron-55	%	3.39E+0
manganese-54	%	7.64E-1
nickel-59	%	8.69E-2
nickel-63	%	6.40E+0
niobium-95	%	1.13E-2
plutonium-241	%	1.03E-2
strontium-89	%	6.60E-3
strontium-90	%	1.86E-1
technetium-99	%	4.96E-5
tritium	%	2.86E-2

b.

antimony-125	%	1.52E-2
carbon-14	%	3.33E-3
cesium-134	%	7.28E+0
cesium-137	%	1.40E+1
cobalt-58	%	3.24E+0
cobalt-60	%	1.29E+1
iodine-129	%	4.77E-3
iron-55	%	3.26E+1
manganese-54	%	1.82E+0
nickel-63	%	3.64E+0
niobium-95	%	1.19E+0
technetium-99	%	3.43E-3
tritium	%	2.32E+1
zirconium-95	%	9.67E-2

SECTION E. RADWASTE SHIPMENTS (Continued)

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

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1989)
SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

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

c. Not applicable	%	0.00E+0

d. americium-241	%	5.79E-4
antimony-124	%	1.87E-3
antimony-125	%	3.12E-1
barium-140	%	1.16E-2
carbon-14	%	1.83E-2
cerium-141	%	4.89E-4
cerium-144	%	9.67E-2
cesium-134	%	1.54E-1
cesium-136	%	7.68E-3
cesium-137	%	4.62E-1
chromium-51	%	1.08E+0
cobalt-57	%	2.88E-2
cobalt-58	%	1.17E+0
cobalt-60	%	2.31E+1
curium-242	%	1.19E-2
curium-243/244	%	7.83E-4
iodine-129	%	2.14E-3
iron-55	%	6.36E+1
iron-59	%	4.46E-2
manganese-54	%	1.30E+0
nickel-59	%	8.80E-3
nickel-63	%	7.15E+0
niobium-95	%	1.85E-1
plutonium-238	%	1.44E-3
plutonium-239/240	%	2.02E-3
plutonium-241	%	1.58E-1
ruthenium-103	%	4.35E-4
ruthenium-106	%	1.05E-3
silver-110m	%	6.76E-3
strontium-89	%	2.29E-3
strontium-90	%	8.59E-2
technetium-99	%	4.87E-3
tritium	%	7.96E-1
zinc-65	%	1.02E-2
zirconium-95	%	1.20E-1

SECTION E. RADWASTE SHIPMENTS (Continued)

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

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1989)
SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

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

3. Solid Waste Disposition

See COMMON section of this report

B. IRRADIATED FUEL SHIPMENTS (Disposition)

See COMMON section of this report

SECTION F. TECHNICAL SPECIFICATION LIMITS AND APPLICABLE LIMITS

Gaseous Effluents - Technical Specification Limits

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

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

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

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

The MPC_{eff} is defined as:

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

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

n = total number of radionuclides identified

MPC_i = MPC of the ith radionuclide

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

SECTION F. TECHNICAL SPECIFICATION LIMITS AND APPLICABLE LIMITS (Continued)

Liquid Effluents - Applicable Limits

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

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

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

The MPC_{eff} is defined as:

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

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

n = total number of radionuclides identified

MPC_i = MPC of the ith radionuclide

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

SECTION G. ESTIMATION OF ERROR

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

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

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

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

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

Where: σ_i = Error associated with each component.

SECTION H. 10 CFR 50 APPENDIX I REQUIREMENTS

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

Table 1 in Section H presents the quarterly 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.

TABLE 1

SOURCE	Dose* (millirems)	
	1st Quarter	2nd Quarter
LIQUID EFFLUENTS Whole Body	1) 6.60E-4	2) 1.32E-2
Organ	3) 5.12E-3	4) 6.70E-2
AIRBORNE EFFLUENTS Tritium Iodines and Particulates	5) 7.20E-3	6) 3.00E-2
NOBLE GASES** Gamma	7) 3.16E-2	8) 1.63E-2
Beta	9) 6.48E-2	10) 3.94E-2
DIRECT RADIATION	11) 2.94E+0	12) 2.65E+0

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

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

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

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

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

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

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

4. This data was calculated using the methodology of the ODCM; the thyroid 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 1989 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 1989 Semiannual Report with the assumptions of USNRC Regulatory Guide 1.109.

7. The maximum air dose of 1.09E-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 2.39E-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 ENE 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 1.31E-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, at the exclusion area boundary and calculated with the assumptions of USNRC Regulatory Guide 1.109.

10. A maximum air dose for beta radiation was located in the ENE 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

	% TSL	
SOURCE	1st Quarter	2nd Quarter
LIQUID EFFLUENTS		
Whole Body	2.20E-2	4.40E-1
Organ	5.12E-2	6.70E-1
AIRBORNE EFFLUENTS		
Tritium, Iodines and Particulates	4.80E-2	2.00E-1
NOBLE GASES		
Gamma	3.16E-1	1.63E-1
Beta	3.24E-1	1.97E-1

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

SECTION I. CHANGES TO OFFSITE DOSE CALCULATION MANUAL

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

- There was a revision to Units 2/3 Offsite Dose Calculation Manual (Rev. 20) during the reporting period, January 1, 1989 to June 30, 1989. A complete package documenting this revision was included in the April, 1989, Monthly Operating Report per Technical Specification 6.9.1.10.

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

- Description of and Events Leading to an Unplanned, Unmonitored Release From Gaseous Waste Decay Tank T-087

Incident

On April 24, 1989, at 1400, nitrogen was introduced to the condensers at Unit 3 to lower condensate dissolved oxygen. Almost immediately 3-7870, the wide range gas monitor for the air ejectors, showed a two hundred-fold increase in activity. Verification samples were obtained from the air ejectors and leak rate calculations performed implied that the source was not fresh RCS gas. This was substantiated by the fact that the steam generator blowdown monitor, 3-6753, showed no change. Operations secured the nitrogen overpressure at 1322 on April 25 per Chemistry's request. The air ejector release considered an unplanned but monitored release.

The investigation to locate the source of the increased activity involved isolating the waste gas nitrogen supply header from the rest of the system; pressure on the waste gas decay tank side was observed to have increased after isolating the nitrogen header. On graveyards, April 26, 1989, Operations checked the nitrogen isolation valves on the waste gas decay tanks and found that isolation valve SA1902MU082 on T-087 was cracked open. The isolation valve was fully closed and nitrogen overpressure re-established on the condensers by 0222 on April 26. Air ejector activity initially increased slightly but subsequently returned to more typical values. Additionally, between 4/26 and 5/1/89 the pressure in T087 (from CFMS) did not decrease any further.

The nitrogen supplies for Unit 3 containment, Unit 3 turbine building, and CCW surge tank, 3T003 are located downstream of where the waste gas supply header connects to the main nitrogen header. A sample taken from T003 head space showed 2.8E-4 μCi/cc activity, mostly Xe-133. The nitrogen supplies for the BPS sulfuric acid tank and the feedwater heaters draw off the turbine building nitrogen header. Of these pathways, only the BPS sulfuric acid tank can release directly to the environment. On January 13, 1989, a

Maintenance Order was written on the nitrogen relief valve for the BPS sulfuric acid tank. Inordinate quantities of nitrogen were being consumed and operators felt that this was due to nitrogen leaking by the relief valve continuously. Given the overall plant status, it was determined that an unplanned, unmonitored release via the BPS acid tank relief valve was a probable means of egress for the contaminated nitrogen.

Unmonitored Release

Data regarding waste gas decay tank pressure was obtained from the CFMS historical files. The calculation for the total number of probable curies released via the BPS acid tank was divided into two parts, release before and after T087 pressurization and isolation. Prior to this, on March 5 and 6, nitrogen had been introducted to the condensers and no increase in air ejector activity was observed. It is therefore unlikely that any release directly to the environment via an unmonitored pathway occurred prior to T087 being put in service.

T087 was last released on December 30. Typically, this would be the last time that SA1902MU082 was manipulated. In the first part of the calculation, it was assumed that leakage which occurred while the tank was in service (ie. being pressurized) was at the same rate observed once the tank had been isolated. On March 13, T087 was placed in service. On April 4, T087 was isolated and over the next twenty-three days, a drop in pressure was recorded. A sample was taken of T087 on May 5. Correcting for decay, the activity in the tank was back calculated to April 4 when the T087 was isolated. Because of it's short half life, xenon-135 was not detected in the May 5 T087 sample. Assuming that tank activity on April 4 would reflect fresh input from the RCS, the xenon-133/-135 ratio should be identical to that in the RCS. Using an "average" RCS Xe-133/-135 ratio and Xe-133 activity in T087, the contribution from Xe-135 was calculated. From March 13 to April 4, prior to T087 being isolated, it was determined 25.4 Curies could have been released via the BPS sulfuric acid tank relief valve.

The second part of the calculation covered leakage from T087 after the tank was isolated on April 4. On April 24, the BPS acid tank nitrogen supply from the nitrogen header was cleared for work. Any subsequent leakoff from T087 is assumed to have gone into the condensers and then out, monitored, via the air ejectors. Using a time-averaged activity for the tank, it was determined, that 4.58 Curies could have been released between April 4 and April 24.

The assumptions used in the calculations above were chosen to reflect the most conservative, worst case situation. Although there are other sources of gases other than the RCS to the waste gas system, the RCS ratio to calculate the Xe-135 contribution was used since it would result in higher specific activity values. Additionally, it is unlikely that leakage directly from the RCS to the nitrogen supply header occurred at the same rate as post-isolation of the tank. The isolated tank at full pressure should leak more rapidly.

Based on the above assumptions, between March 13 and April 24, a total of 30.0 Ci of noble gases may have been released via the BPS sulfuric acid tank relief valve, constituting an unplanned, unmonitored release.

o Description of Events Leading to an Unplanned, Unmonitored Release from the Units 2/3 Secondary Plant Pressure Reduction Rack

The Units 2/3 Secondary Plant Pressure Reduction Rack, 2/3 L-231, samples various secondary plant systems as well as Steam Generator Blowdown. There has been a long term problem of leak-by on several of the pressure relief valves which drain to a trough under the rack. It has always been assumed that this trough emptied into the Turbine Plant Sumps, a monitored pathway. It was discovered on May 5, 1989, that in fact the trough emptied into the Unit 2 Intake Structure Sump. This is an unmonitored pathway.

During periods of primary to secondary leakage, water sampled by the rack and leaked off to the trough is radioactively contaminated. In order to quantify releases from the rack all periods of primary to secondary leakage going back to initial criticality for Units 2 and 3 were reviewed for activity levels. Nine primary to secondary leakage periods were identified. Assuming relief valve leak-by during all these periods, a total release of 0.25 Curies has been determined. Since the maximum flow postulated is two gallons per minute there was no possibility of approaching concentration limits (MPCs) in the discharge structures.

Corrective action was immediately taken to reroute the trough to the Turbine Plant Sump, a monitored pathway. Nonconformance Report (NCR) G-956 was generated to assure permanent rerouting of the trough discharge.

January 1, 1989 - June 30, 1989

EFFLUENT RADIATION MONITORS OUT OF SERVICE FOR GREATER THAN 30 DAYS

S.O.N.G.S. 2

Monitor	Inoperability Period	Inoperability Cause	Explanation
2RE-7865 Process Flow	11/05/88 - 03/22/89	Substitute Process Flow Value Installed	LCOAR C-88-472 Testing/evaluation and implementation for the flow conversion values.
2RT-7818 A/B Condenser Air Ejector	01/25/88 - Present	Detector Design Deficiency	EDMR C-88-029 Design flaw in 2RI-7818 Channel B causes entire monitor to be inoperable.
2RT-7870 Condenser Air Ejector-WRGM	02/18/89 - Present	Substitute Flow Value Installed	LCOAR C-89-064 Testing/evaluation of the process flow values.

S.O.N.G.S. 3

Monitor	Inoperability Period	Inoperability Cause	Explanation
3RI-7818 A/B Condenser Air Ejector	01/25/88 - Present	Detector Design Deficiency	EDMR C-88-028 Design flaw in 3RI-7818 Channel B causes entire monitor to be inoperable.
3RT-7865 Process Flow	07/20/88 - 03/24/89	Simulated Flow Signal Installed	LCOAR C-88-305 Testing/evaluation and implementation of flow conversion values.
3RT-7828 Process Flow	11/25/88 - 03/30/89	Substitute Process Flow Value Installed	LCOAR C-88-496 Probe recalibration, testing and evaluation of process flow value.
3RT-7870 Condenser Air Ejector-WRGM	03/03/89 - Present	Simulated Flow Signal Installed	LCOAR C-89-088 Testing/evaluation of process flow values.

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

- Gaseous effluent releases, excluding tritium, totaled 1.37E+3 curies with Xe-133 94% of the total.

- The radiation doses from gaseous releases are: (a) gamma air dose: 9.79E-2 mrad at the site boundary, (b) beta air dose: 2.35E-1 mrad at the site boundary, (c) organ dose: 2.04E-2 mrem at the nearest receptor.

- Liquid releases totaled 8.29E+2 curies of which tritium was 8.28E+2 Ci, noble gases were 7.55E-1 Ci, and particulates and iodines were 5.11E-1 Ci.

- The radiation doses from liquid releases are: (a) total body: 1.38E-2 mrem, (b) limiting organ: 7.21E-2 mrem.

- 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 (1989)
SOLID WASTE AND IRRADIATED FUEL SHIPMENT

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

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

** Material packaged in 55-gallon Dot 7A Type A drums (7.5 ft^3 ea.) and steel boxes (strong tight containers 98 ft^3 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
d. Not Applicable		%	0.00E+0

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1989)
SOLID WASTE AND IRRADIATED FUEL SHIPMENT

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

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

Number of Shipments*	Mode of Transportation	Destination
18	Tri-State Motor Transit Truck/Cask	Richland, WA
6	Tri-State Motor Transit Truck/Trailer	Beatty, NV
1	Tri-State Motor Transit Truck/Cask	Barnwell, SC

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

B. IRRADIATED FUEL SHIPMENTS (Disposition)

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

C. DEWATERING

Number of Containers	Solidification Agent
12	N/A

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (1989)
SOLID WASTE AND IRRADIATED FUEL SHIPMENT

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

1. A revision to the Process Control Program procedure, SO123-VII-8.5.1 was made during this period. See the following two pages for details.

REFERENCES:

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

PK048908

April 18, 1989

CHARLES B. MCCARTHY
RUSS KRIEGER
MARK MEDFORD

SUBJECT: Notification of Revision to SO123-VII-8.5.1, Process Control Program for San Onofre Units 1, 2 and 3

In accordance with Technical Specifications 6.5.2.9, 6.5.2.10 and 6.13.2, a revision to the Process Control Program, via procedure SO123-VII-8.5.1, has been approved for implementation. Please find attached a description of the approved change, and a discussion of the rationale for making the change.

If you require any additional information, please contact me.

P. J. KNAPP

RMorgan:mjk
HPE175

cc: K. Helm
G. Morgan

PK048907

MEMORANDUM FOR FILE

April 18, 1989

SUBJECT: Notification of Change to the Process Control Program for San Onofre Units 1, 2 and 3

Health Physics has initiated changes to the Process Control Program via procedure SO123-VII-8.5.1. The following provides an explanation of the revision and justification for the change(s).

Description of Change: This change transfers procedural details on solid radwaste requirements within the Technical Specifications related to the Solid Radwaste System to the solidification Process Control Program (PCP) procedure SO123-VII-8.5.1.

Rationale for Change: The NRC has determined that some details in the Technical Specifications related to Solid Radwaste may be deleted and inserted in the Process Control Program governed by the administrative section of the Technical Specifications as permitted by U.S. NRC Generic Letter 89-01.

Justification That the Change Does Not Reduce Conformance of the Solidified Waste to Existing Criteria: The change transfers intact, word for word, the Technical Specification requirement to the Process Control Program procedure.

APPROVED BY: _____ 4-20-89
Health Physics Manager Date

RMorgan:mjk
HPE168

cc: CDM Files

COMMON CONCLUSIONS

- Radioactive releases from S.O.N.G.S. 1, 2 and 3 totaled 1.42E+3 curies for gaseous effluents, 94% of which was Xe-133. Curies discharged for liquid effluents were: tritium, 9.10E+2 curies; noble gases, 9.63E-1 curies; particulates and iodines, 7.74E-1 curies.

- 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.

- S.O.N.G.S. 1, 2 and 3 made eighteen radwaste shipments to Richland, Washington, six to Beatty, Nevada, and one to Barnwell, South Carolina. Total volume was 1.80E+2 cubic meters containing 2.13E+3 curies of radioactivity.

- 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 39% of the time and poor 27% of the time.

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

APPENDIX A

GASEOUS EFFLUENTS - TECHNICAL SPECIFICATION LIMITS

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

1. The dose rate limit for noble gases shall be ≤ 500 mrem/year to the total body and ≤ 3000 mrem/year to the skin.

2. The dose rate limit for iodines, tritium, and all radionuclides in particulate form with half lives greater than eight days shall be ≤ 1500 mrem/year to any organ.

B. The air dose due to noble gases released in gaseous effluents from S.O.N.G.S. (per reactor) to areas at and beyond the site boundary shall be limited to the following values:

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

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

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

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

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

LIQUID EFFLUENTS - TECHNICAL SPECIFICATION LIMITS

A. The concentration of radioactive material released in liquid effluents to Unrestricted Areas shall be limited to the concentrations specified in 10 CFR 20, Appendix B, Table II, Column 2 for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration shall be limited to 2.00E-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, 1989 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, 1989. 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.

SOUTHERN CALIFORNIA EDISON COMPANY
SAN ONOFRE NUCLEAR GENERATING STATION
1ST QUARTER 1989
DAMES AND MOORE JOB NO.- 00377-137-09
DATA PERIOD- 01/01/89 TO 03/31/89
STABILITY CLASS #A# (10-40 METERS)
WINDS AT 10 METER LEVEL

20-JUL-89

Table 4A

WIND FREQUENCY DISTRIBUTION
(FREQUENCY IN NUMBER OF OCCURRENCES)

WIND DIRECTION	UPPER CLASS INTERVALS OF WIND SPEED (MPH) 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.	1.	1.	13.40
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.	1.	0.	0.	2.	1.	1.	1.	2.	8.	16.	10.99
SSE	0.	0.	0.	0.	0.	0.	0.	1.	1.	4.	2.	3.	11.	10.18
S	0.	0.	1.	3.	8.	10.	11.	9.	7.	3.	3.	2.	57.	6.82
SSW	0.	0.	0.	5.	7.	13.	4.	2.	2.	2.	1.	0.	36.	5.76
SW	0.	0.	3.	9.	17.	15.	7.	2.	2.	1.	0.	1.	57.	5.24
WSW	0.	0.	1.	13.	11.	23.	23.	13.	8.	5.	2.	2.	101.	6.29
W	0.	0.	1.	2.	9.	27.	26.	24.	15.	8.	6.	1.	119.	7.02
WNW	0.	0.	0.	0.	2.	2.	1.	3.	7.	6.	1.	9.	31.	10.24
NW	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	0.	1.	11.00
NNW	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
N	0.	0.	0.	1.	1.	0.	0.	0.	0.	0.	0.	2.	4.	8.95
VARIABLE													0.	0.00
CALM													0.	0.00
TOTAL	0.	0.	6.	34.	55.	90.	74.	55.	43.	30.	18.	29.	434.	6.98

WIND FREQUENCY DISTRIBUTION
(FREQUENCY IN PERCENT OF TOTAL)

WIND DIRECTION	UPPER CLASS INTERVALS OF WIND SPEED (MPH) 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	0.05	0.05	13.40
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	0.05	0.00	0.00	0.10	0.05	0.05	0.05	0.10	0.39	0.79	10.99
SSE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.20	0.10	0.15	0.54	10.18
S	0.00	0.00	0.05	0.15	0.39	0.49	0.54	0.44	0.34	0.15	0.15	0.10	2.80	6.82
SSW	0.00	0.00	0.00	0.25	0.34	0.64	0.20	0.10	0.10	0.10	0.05	0.00	1.77	5.76
SW	0.00	0.00	0.15	0.44	0.83	0.74	0.34	0.10	0.10	0.05	0.00	0.05	2.80	5.24
WSW	0.00	0.00	0.05	0.64	0.54	1.13	1.13	0.64	0.39	0.25	0.10	0.10	4.96	6.29
W	0.00	0.00	0.05	0.10	0.44	1.32	1.28	1.18	0.74	0.39	0.29	0.05	5.84	7.02
WNW	0.00	0.00	0.00	0.00	0.10	0.10	0.05	0.15	0.34	0.29	0.05	0.44	1.52	10.24
NW	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.05	11.00
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	0.00	0.00
N	0.00	0.00	0.00	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.20	8.95
VARIABLE													0.00	0.00
CALM													0.00	0.00
TOTAL	0.00	0.00	0.29	1.67	2.70	4.42	3.63	2.70	2.11	1.47	0.88	1.42	21.30	6.98

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2160
TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2038

SOUTHERN CALIFORNIA EDISON COMPANY
SAN ONOFRE NUCLEAR GENERATING STATION
1ST QUARTER 1999
DAMES AND MOORE JOB NO. - 00377-137-09
DATA PERIOD- 01/01/99 TO 03/31/99
STABILITY CLASS #D# (10-40 METERS)
WINDS AT 10 METER LEVEL

20-JUL-99

WIND FREQUENCY DISTRIBUTION
(FREQUENCY IN NUMBER OF OCCURRENCES)

WIND DIRECTION	UPPER CLASS INTERVALS OF WIND SPEED (MPH) 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.	1.	1.	14.50
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.	1.	0.	2.	0.	0.	1.	1.	3.	8.	10.99
SSE	0.	0.	0.	0.	0.	0.	3.	0.	1.	0.	2.	1.	7.	8.61
S	0.	0.	0.	0.	0.	1.	0.	0.	0.	1.	0.	0.	2.	7.65
SSW	0.	0.	0.	1.	0.	0.	0.	0.	0.	0.	1.	0.	2.	7.05
SW	0.	0.	0.	2.	0.	0.	0.	0.	0.	0.	1.	0.	3.	5.93
WSW	0.	0.	0.	2.	1.	0.	0.	0.	0.	0.	0.	0.	3.	4.00
W	0.	0.	0.	1.	1.	0.	0.	0.	0.	0.	0.	0.	2.	3.90
WNW	0.	0.	0.	0.	0.	1.	2.	0.	0.	0.	0.	0.	3.	6.37
NW	0.	0.	0.	0.	0.	1.	0.	0.	0.	0.	0.	2.	3.	10.60
NNW	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
N	0.	0.	0.	0.	0.	2.	0.	0.	0.	0.	0.	0.	2.	5.65
VARIABLE													0.	0.00
CALM													0.	0.00
TOTAL	0.	0.	0.	6.	3.	5.	7.	0.	1.	2.	5.	7.	36.	8.09

WIND FREQUENCY DISTRIBUTION
(FREQUENCY IN PERCENT OF TOTAL)

WIND DIRECTION	UPPER CLASS INTERVALS OF WIND SPEED (MPH) 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	0.05	0.05	14.50
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	0.05	0.00	0.10	0.00	0.00	0.05	0.05	0.15	0.39	10.99
SSE	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.05	0.00	0.10	0.05	0.34	8.61
S	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.05	0.00	0.00	0.10	7.65
SSW	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.10	7.05
SW	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.15	5.93
WSW	0.00	0.00	0.00	0.10	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	4.00
W	0.00	0.00	0.00	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	3.90
WNW	0.00	0.00	0.00	0.00	0.00	0.05	0.10	0.00	0.00	0.00	0.00	0.00	0.15	6.37
NW	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.10	0.15	10.60
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	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.10	5.65
VARIABLE													0.00	0.00
CALM													0.00	0.00
TOTAL	0.00	0.00	0.00	0.29	0.15	0.25	0.34	0.00	0.05	0.10	0.25	0.34	1.77	8.09

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2160
TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2038

Table 4A

SOUTHERN CALIFORNIA EDISON COMPANY
SAN ONOFRE NUCLEAR GENERATING STATION
1ST QUARTER 1989
DAMES AND MOORE JOB NO. - 00377-137-09
DATA PERIOD- 01/01/89 TO 03/31/89
STABILITY CLASS #C# (10-40 METERS)
WINDS AT 10 METER LEVEL

20-JUL-89

WIND FREQUENCY DISTRIBUTION
(FREQUENCY IN NUMBER OF OCCURRENCES)

WIND DIRECTION	UPPER CLASS INTERVALS OF WIND SPEED (MPH) 1	2	3	4	5	6	7	8	9	10	11	>11	TOTAL	MEAN SPEED
NNE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
NE	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	1.	13.90
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.	1.	0.	0.	0.	0.	0.	1.	6.50
SE	0.	0.	0.	0.	1.	0.	0.	1.	2.	2.	3.	7.	16.	12.41
SSE	0.	0.	0.	0.	3.	1.	3.	1.	2.	4.	1.	3.	18.	8.74
S	0.	0.	0.	1.	1.	1.	1.	0.	0.	0.	0.	0.	4.	5.03
SSW	0.	0.	0.	1.	0.	0.	0.	1.	0.	0.	0.	0.	2.	5.55
SW	0.	0.	1.	2.	0.	0.	0.	0.	0.	0.	0.	1.	4.	5.25
WSW	0.	0.	0.	2.	1.	0.	0.	0.	0.	1.	0.	0.	4.	5.40
W	0.	0.	0.	2.	2.	1.	1.	0.	0.	0.	0.	0.	6.	4.70
WNW	0.	0.	0.	0.	1.	1.	0.	2.	1.	0.	0.	2.	7.	8.36
NW	0.	0.	0.	0.	0.	3.	0.	0.	1.	0.	0.	0.	4.	6.68
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.	8.	9.	7.	6.	5.	6.	7.	4.	14.	67.	8.41

WIND FREQUENCY DISTRIBUTION
(FREQUENCY IN PERCENT OF TOTAL)

WIND DIRECTION	UPPER CLASS INTERVALS OF WIND SPEED (MPH) 1	2	3	4	5	6	7	8	9	10	11	>11	TOTAL	MEAN SPEED
NNE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05	13.90
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	0.05	0.00	0.00	0.00	0.00	0.00	0.05	6.50
SE	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.05	0.10	0.10	0.15	0.34	0.79	12.41
SSE	0.00	0.00	0.00	0.00	0.15	0.05	0.15	0.05	0.10	0.20	0.05	0.15	0.88	8.74
S	0.00	0.00	0.00	0.05	0.05	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.20	5.03
SSW	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.10	5.55
SW	0.00	0.00	0.05	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.20	5.25
WSW	0.00	0.00	0.00	0.10	0.05	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.20	5.40
W	0.00	0.00	0.00	0.10	0.10	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.29	4.70
WNW	0.00	0.00	0.00	0.00	0.05	0.05	0.00	0.10	0.05	0.00	0.00	0.10	0.34	8.36
NW	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.00	0.05	0.00	0.00	0.00	0.20	6.68
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	0.39	0.44	0.34	0.29	0.25	0.29	0.34	0.20	0.69	3.29	8.41

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2160
TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2038

Table 4A

SOUTHERN CALIFORNIA EDISON COMPANY
SAN ONOFRE NUCLEAR GENERATING STATION
1ST QUARTER 1989
DAMES AND MOORE JOB NO. - 00377-137-09
DATA PERIOD- 01/01/89 TO 03/31/89
STABILITY CLASS #G# (10-40 METERS)
WINDS AT 10 METER LEVEL

20-JUL-89

Table 4A

WIND FREQUENCY DISTRIBUTION
(FREQUENCY IN NUMBER OF OCCURRENCES)

WIND DIRECTION	UPPER CLASS INTERVALS OF WIND SPEED (MPH) 1	2	3	4	5	6	7	8	9	10	11	>11	TOTAL	MEAN SPEED
NNE	0.	3.	6.	9.	16.	13.	32.	38.	46.	33.	25.	35.	256.	8.17
NE	0.	1.	5.	2.	1.	4.	2.	1.	0.	1.	0.	0.	17.	4.56
ENE	0.	0.	4.	0.	1.	0.	0.	0.	0.	0.	0.	0.	5.	3.20
E	0.	0.	0.	1.	0.	1.	0.	0.	0.	0.	0.	0.	2.	4.30
ESE	0.	0.	3.	0.	1.	0.	0.	0.	0.	0.	0.	0.	4.	2.95
SE	0.	0.	1.	3.	1.	0.	0.	0.	0.	0.	0.	0.	5.	3.72
SSE	0.	1.	1.	5.	1.	0.	0.	0.	0.	0.	0.	0.	8.	3.36
S	0.	1.	0.	0.	0.	0.	0.	0.	1.	0.	0.	0.	2.	5.20
SSW	0.	0.	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	2.75
SW	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.00
WSW	0.	0.	2.	0.	0.	0.	0.	0.	0.	0.	0.	0.	2.	2.95
W	0.	0.	3.	2.	2.	3.	1.	0.	0.	0.	0.	0.	11.	4.32
WNW	0.	0.	0.	1.	0.	2.	1.	3.	0.	0.	0.	0.	7.	6.29
NW	0.	1.	0.	0.	2.	1.	0.	0.	0.	0.	0.	0.	4.	4.28
NNW	0.	0.	0.	1.	1.	1.	0.	1.	0.	0.	0.	0.	4.	5.35
N	0.	1.	3.	5.	5.	4.	16.	20.	15.	13.	9.	23.	114.	8.56
VARIABLE													0.	0.00
CALM													0.	0.00
TOTAL	0.	8.	30.	29.	31.	29.	52.	63.	62.	47.	34.	58.	443.	7.62

WIND FREQUENCY DISTRIBUTION
(FREQUENCY IN PERCENT OF TOTAL)

WIND DIRECTION	UPPER CLASS INTERVALS OF WIND SPEED (MPH) 1	2	3	4	5	6	7	8	9	10	11	>11	TOTAL	MEAN SPEED
NNE	0.00	0.15	0.29	0.44	0.79	0.64	1.57	1.86	2.26	1.62	1.23	1.72	12.56	8.17
NE	0.00	0.05	0.25	0.10	0.05	0.20	0.10	0.05	0.00	0.05	0.00	0.00	0.83	4.56
ENE	0.00	0.00	0.20	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	3.20
E	0.00	0.00	0.00	0.05	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.10	4.30
ESE	0.00	0.00	0.15	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	2.95
SE	0.00	0.00	0.05	0.15	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	3.72
SSE	0.00	0.05	0.05	0.25	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.39	3.36
S	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.10	5.20
SSW	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	2.75
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	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	2.85
W	0.00	0.00	0.15	0.10	0.10	0.15	0.05	0.00	0.00	0.00	0.00	0.00	0.54	4.32
WNW	0.00	0.00	0.00	0.05	0.00	0.10	0.05	0.15	0.00	0.00	0.00	0.00	0.34	6.29
NW	0.00	0.05	0.00	0.00	0.10	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.20	4.28
NNW	0.00	0.00	0.00	0.05	0.05	0.05	0.00	0.05	0.00	0.00	0.00	0.00	0.20	5.35
N	0.00	0.05	0.15	0.25	0.25	0.20	0.79	0.98	0.74	0.64	0.44	1.13	5.59	8.56
VARIABLE													0.00	0.00
CALM													0.00	0.00
TOTAL	0.00	0.39	1.47	1.42	1.52	1.42	2.55	3.09	3.04	2.31	1.67	2.85	21.74	7.62

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2160
TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2038

SOUTHERN CALIFORNIA EDISON COMPANY
SAN ONOFRE NUCLEAR GENERATING STATION
1ST QUARTER 1989
DAMES AND MOORE JOB NO.- 00377-137-09
DATA PERIOD- 01/01/89 TO 03/31/89
STABILITY CLASS #D# (10-40 METERS)
WINDS AT 10 METER LEVEL

20-JUL-89

Table 4A

WIND FREQUENCY DISTRIBUTION
(FREQUENCY IN NUMBER OF OCCURRENCES)

WIND DIRECTION	UPPER CLASS INTERVALS OF WIND SPEED (MPH) 1	2	3	4	5	6	7	8	9	10	11	>11	TOTAL	MEAN SPEED
NNE	0.	1.	1.	0.	0.	1.	1.	1.	1.	0.	0.	3.	9.	8.26
NE	0.	0.	0.	2.	2.	0.	0.	0.	0.	0.	0.	0.	4.	4.17
ENE	0.	0.	1.	0.	2.	1.	1.	0.	0.	1.	0.	0.	6.	5.50
E	0.	0.	0.	0.	2.	4.	3.	0.	0.	0.	0.	3.	12.	6.93
ESE	0.	0.	0.	2.	10.	9.	9.	6.	0.	0.	0.	0.	36.	5.76
SE	0.	0.	1.	2.	8.	10.	17.	20.	19.	15.	6.	17.	115.	8.39
SSE	0.	0.	6.	3.	7.	7.	5.	3.	5.	4.	3.	9.	52.	7.58
S	0.	0.	4.	6.	2.	0.	1.	1.	1.	1.	0.	2.	18.	5.56
SSW	0.	0.	4.	3.	1.	2.	0.	4.	1.	0.	1.	3.	19.	6.76
SW	0.	0.	7.	0.	1.	3.	1.	0.	1.	2.	0.	2.	17.	5.65
WSW	0.	2.	1.	3.	2.	2.	1.	0.	0.	2.	0.	5.	18.	7.58
W	0.	0.	3.	1.	3.	2.	0.	1.	0.	1.	1.	17.	29.	11.14
WNW	0.	1.	1.	6.	5.	3.	1.	2.	1.	1.	1.	8.	30.	8.18
NW	0.	1.	4.	3.	10.	4.	6.	10.	5.	1.	1.	1.	46.	6.27
NNW	0.	0.	3.	5.	3.	1.	0.	0.	0.	0.	0.	1.	13.	4.31
N	0.	1.	1.	3.	4.	4.	1.	1.	0.	1.	0.	0.	16.	4.91
VARIABLE													0.	0.00
CALM													0.	0.00
TOTAL	0.	6.	37.	39.	62.	53.	47.	49.	34.	29.	13.	71.	440.	7.33

WIND FREQUENCY DISTRIBUTION
(FREQUENCY IN PERCENT OF TOTAL)

WIND DIRECTION	UPPER CLASS INTERVALS OF WIND SPEED (MPH) 1	2	3	4	5	6	7	8	9	10	11	>11	TOTAL	MEAN SPEED
NNE	0.00	0.05	0.05	0.00	0.00	0.05	0.05	0.05	0.05	0.00	0.00	0.15	0.44	8.26
NE	0.00	0.00	0.00	0.10	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	4.17
ENE	0.00	0.00	0.05	0.00	0.10	0.05	0.05	0.00	0.00	0.05	0.00	0.00	0.29	5.50
E	0.00	0.00	0.00	0.00	0.10	0.20	0.15	0.00	0.00	0.00	0.00	0.15	0.59	6.93
ESE	0.00	0.00	0.00	0.10	0.49	0.44	0.44	0.29	0.00	0.00	0.00	0.00	1.77	5.76
SE	0.00	0.00	0.05	0.10	0.39	0.49	0.83	0.98	0.93	0.74	0.29	0.83	5.64	8.39
SSE	0.00	0.00	0.29	0.15	0.34	0.34	0.25	0.15	0.25	0.20	0.15	0.44	2.55	7.58
S	0.00	0.00	0.20	0.29	0.10	0.00	0.05	0.05	0.05	0.05	0.00	0.10	0.88	5.56
SSW	0.00	0.00	0.20	0.15	0.05	0.10	0.00	0.20	0.05	0.00	0.05	0.15	0.93	6.76
SW	0.00	0.00	0.34	0.00	0.05	0.15	0.05	0.00	0.05	0.10	0.00	0.10	0.83	5.65
WSW	0.00	0.10	0.05	0.15	0.10	0.10	0.05	0.00	0.00	0.10	0.00	0.25	0.88	7.58
W	0.00	0.00	0.15	0.05	0.15	0.10	0.00	0.05	0.00	0.05	0.05	0.83	1.42	11.14
WNW	0.00	0.05	0.05	0.29	0.25	0.15	0.05	0.10	0.05	0.05	0.05	0.39	1.47	8.18
NW	0.00	0.05	0.20	0.15	0.49	0.20	0.29	0.49	0.25	0.05	0.05	0.05	2.26	6.27
NNW	0.00	0.00	0.15	0.25	0.15	0.05	0.00	0.00	0.00	0.00	0.00	0.05	0.64	4.31
N	0.00	0.05	0.05	0.15	0.20	0.20	0.05	0.05	0.00	0.05	0.00	0.00	0.79	4.91
VARIABLE													0.00	0.00
CALM													0.00	0.00
TOTAL	0.00	0.29	1.82	1.91	3.04	2.60	2.31	2.40	1.67	1.42	0.64	3.48	21.59	7.33

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2160
TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2038

SOUTHERN CALIFORNIA EDISON COMPANY
SAN ONOFRE NUCLEAR GENERATING STATION
1ST QUARTER 1989
DAMES AND MOORE JOB NO.- 00377-137-09
DATA PERIOD- 01/01/89 TO 03/31/89
STABILITY CLASS #F# (10-40 METERS)
WINDS AT 10 METER LEVEL

20-JUL-89

WIND FREQUENCY DISTRIBUTION
(FREQUENCY IN NUMBER OF OCCURRENCES)

WIND DIRECTION	UPPER CLASS INTERVALS OF WIND SPEED (MPH) 1	2	3	4	5	6	7	8	9	10	11	>11	TOTAL	MEAN SPEED
NNE	0.	4.	14.	22.	19.	33.	22.	14.	4.	6.	0.	3.	141.	5.49
NE	0.	2.	5.	6.	3.	4.	1.	2.	0.	0.	1.	0.	24.	4.40
ENE	0.	3.	4.	3.	3.	1.	1.	0.	0.	0.	0.	0.	15.	3.43
E	0.	1.	3.	2.	1.	2.	0.	0.	0.	0.	0.	0.	9.	3.59
ESE	0.	3.	4.	2.	0.	2.	0.	0.	0.	0.	0.	0.	11.	3.11
SE	0.	1.	5.	2.	1.	1.	0.	0.	0.	0.	0.	0.	10.	3.13
SSE	0.	1.	4.	2.	0.	1.	0.	0.	1.	0.	0.	0.	9.	3.58
S	0.	0.	1.	0.	0.	0.	1.	0.	0.	0.	0.	0.	2.	4.55
SSW	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	2.40
SW	0.	0.	1.	1.	0.	0.	0.	0.	0.	0.	0.	0.	2.	3.05
WSW	0.	0.	1.	0.	0.	0.	0.	0.	0.	0.	0.	0.	1.	2.40
W	0.	1.	0.	2.	4.	1.	2.	0.	1.	0.	0.	0.	11.	4.95
WNW	0.	0.	1.	0.	3.	2.	3.	1.	0.	1.	0.	0.	11.	5.93
NW	0.	0.	1.	2.	0.	2.	1.	0.	1.	0.	0.	0.	7.	5.34
NNW	0.	1.	5.	3.	3.	1.	3.	2.	1.	0.	0.	0.	19.	4.58
N	0.	1.	5.	9.	8.	12.	11.	9.	3.	6.	1.	2.	67.	6.05
VARIABLE													0.	0.00
CALM													0.	0.00
TOTAL	0.	18.	55.	56.	45.	62.	45.	28.	11.	13.	2.	5.	340.	5.09

WIND FREQUENCY DISTRIBUTION
(FREQUENCY IN PERCENT OF TOTAL)

WIND DIRECTION	UPPER CLASS INTERVALS OF WIND SPEED (MPH) 1	2	3	4	5	6	7	8	9	10	11	>11	TOTAL	MEAN SPEED
NNE	0.00	0.20	0.69	1.08	0.93	1.62	1.08	0.69	0.20	0.29	0.00	0.15	6.92	5.49
NE	0.00	0.10	0.25	0.29	0.15	0.20	0.05	0.10	0.00	0.00	0.05	0.00	1.19	4.40
ENE	0.00	0.15	0.20	0.15	0.15	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.74	3.43
E	0.00	0.05	0.15	0.10	0.05	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.44	3.59
ESE	0.00	0.15	0.20	0.10	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.54	3.11
SE	0.00	0.05	0.25	0.10	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.49	3.13
SSE	0.00	0.05	0.20	0.10	0.00	0.05	0.00	0.00	0.05	0.00	0.00	0.00	0.44	3.58
S	0.00	0.00	0.05	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.10	4.55
SSW	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	2.40
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	0.10	3.05
WSW	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	2.40
W	0.00	0.05	0.00	0.10	0.20	0.05	0.10	0.00	0.05	0.00	0.00	0.00	0.54	4.95
WNW	0.00	0.00	0.05	0.00	0.15	0.10	0.15	0.05	0.00	0.05	0.00	0.00	0.54	5.93
NW	0.00	0.00	0.05	0.10	0.00	0.10	0.05	0.00	0.05	0.00	0.00	0.00	0.34	5.34
NNW	0.00	0.05	0.25	0.15	0.15	0.05	0.15	0.10	0.05	0.00	0.00	0.00	0.93	4.58
N	0.00	0.05	0.25	0.44	0.39	0.59	0.54	0.44	0.15	0.29	0.05	0.10	3.29	6.05
VARIABLE													0.00	0.00
CALM													0.00	0.00
TOTAL	0.00	0.88	2.70	2.75	2.21	3.04	2.21	1.37	0.54	0.64	0.10	0.25	15.69	5.09

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2160
TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2038

Table 4A

SOUTHERN CALIFORNIA EDISON COMPANY
SAN ONOFRE NUCLEAR GENERATING STATION
1ST QUARTER 1989
DAMES AND MOORE JOB NO. - 00377-137-09
DATA PERIOD- 01/01/89 TO 03/31/89
STABILITY CLASS "E" (10-40 METERS)
WINDS AT 10 METER LEVEL

20-JUL-89

WIND FREQUENCY DISTRIBUTION
(FREQUENCY IN NUMBER OF OCCURRENCES)

WIND DIRECTION	UPPER CLASS INTERVALS OF WIND SPEED (MPH) 1	2	3	4	5	6	7	8	9	10	11	>11	TOTAL	MEAN SPEED
NNE	0.	1.	11.	10.	10.	5.	3.	3.	2.	0.	2.	7.	54.	5.96
NE	0.	1.	7.	1.	0.	1.	0.	0.	0.	0.	1.	1.	12.	4.28
ENE	0.	0.	0.	2.	5.	2.	0.	0.	0.	0.	1.	0.	10.	5.02
E	0.	0.	2.	3.	2.	4.	3.	1.	0.	1.	0.	0.	16.	5.17
ESE	0.	0.	3.	3.	3.	2.	3.	1.	0.	0.	0.	1.	16.	5.11
SE	0.	1.	4.	6.	10.	4.	6.	3.	4.	0.	1.	3.	42.	5.80
SSE	0.	0.	1.	2.	1.	2.	0.	2.	0.	0.	1.	1.	10.	6.33
S	1.	0.	3.	3.	0.	0.	0.	0.	1.	0.	0.	0.	8.	3.63
SSW	0.	1.	3.	1.	1.	0.	0.	0.	0.	0.	0.	0.	6.	2.87
SW	0.	0.	1.	0.	1.	0.	0.	0.	0.	0.	0.	0.	2.	3.80
WSW	1.	0.	1.	3.	1.	0.	0.	0.	1.	0.	0.	0.	7.	3.87
W	0.	2.	1.	0.	0.	0.	2.	3.	0.	0.	0.	1.	9.	6.04
WNW	0.	0.	1.	1.	1.	6.	1.	1.	1.	0.	0.	1.	13.	6.04
NW	0.	2.	1.	1.	0.	3.	2.	3.	1.	0.	0.	0.	13.	5.34
NNW	0.	0.	2.	3.	6.	3.	2.	0.	1.	0.	0.	0.	17.	4.86
N	0.	1.	4.	11.	7.	6.	5.	4.	1.	0.	3.	1.	43.	5.44
VARIABLE													0.	0.00
CALM													0.	0.00
TOTAL	2.	9.	45.	50.	48.	38.	27.	21.	12.	1.	9.	16.	278.	5.38

WIND FREQUENCY DISTRIBUTION
(FREQUENCY IN PERCENT OF TOTAL)

WIND DIRECTION	UPPER CLASS INTERVALS OF WIND SPEED (MPH) 1	2	3	4	5	6	7	8	9	10	11	>11	TOTAL	MEAN SPEED
NNE	0.00	0.05	0.54	0.49	0.49	0.25	0.15	0.15	0.10	0.00	0.10	0.34	2.65	5.96
NE	0.00	0.05	0.34	0.05	0.00	0.05	0.00	0.00	0.00	0.00	0.05	0.05	0.59	4.28
ENE	0.00	0.00	0.00	0.10	0.25	0.10	0.00	0.00	0.00	0.00	0.05	0.00	0.49	5.02
E	0.00	0.00	0.10	0.15	0.10	0.20	0.15	0.05	0.00	0.05	0.00	0.00	0.79	5.17
ESE	0.00	0.00	0.15	0.15	0.15	0.10	0.15	0.05	0.00	0.00	0.00	0.05	0.79	5.11
SE	0.00	0.05	0.20	0.29	0.49	0.20	0.29	0.15	0.20	0.00	0.05	0.15	2.06	5.80
SSE	0.00	0.00	0.05	0.10	0.05	0.10	0.00	0.10	0.00	0.00	0.05	0.05	0.49	6.33
S	0.05	0.00	0.15	0.15	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.39	3.63
SSW	0.00	0.05	0.15	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.29	2.87
SW	0.00	0.00	0.05	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	3.80
WSW	0.05	0.00	0.05	0.15	0.05	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.34	3.87
W	0.00	0.10	0.05	0.00	0.00	0.00	0.10	0.15	0.00	0.00	0.00	0.05	0.44	6.04
WNW	0.00	0.00	0.05	0.05	0.05	0.29	0.05	0.05	0.05	0.00	0.00	0.05	0.64	6.04
NW	0.00	0.10	0.05	0.05	0.00	0.15	0.10	0.15	0.05	0.00	0.00	0.00	0.64	5.34
NNW	0.00	0.00	0.10	0.15	0.29	0.15	0.10	0.00	0.05	0.00	0.00	0.00	0.83	4.86
N	0.00	0.05	0.20	0.54	0.34	0.29	0.25	0.20	0.05	0.00	0.15	0.05	2.11	5.44
VARIABLE													0.00	0.00
CALM													0.00	0.00
TOTAL	0.10	0.44	2.21	2.45	2.36	1.86	1.32	1.03	0.59	0.05	0.44	0.79	13.64	5.38

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2160
TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2038

Table 4A

SOUTHERN CALIFORNIA EDISON COMPANY
SAN ONOFRE NUCLEAR GENERATING STATION
1ST QUARTER 1989
DAMES AND MOORE JOB NO. - 00377-137-09
DATA PERIOD- 01/01/89 TO 03/31/89
STABILITY CLASS ALL (10-40 METERS)
WINDS AT 10 METER LEVEL

20-JUL-89

Table 4A

WIND FREQUENCY DISTRIBUTION
(FREQUENCY IN NUMBER OF OCCURRENCES)

WIND DIRECTION	UPPER CLASS INTERVALS OF WIND SPEED (MPH) 1	2	3	4	5	6	7	8	9	10	11	>11	TOTAL	MEAN SPEED
NNE	0.	9.	32.	41.	45.	52.	58.	56.	53.	39.	27.	50.	462.	7.12
NE	0.	4.	17.	11.	6.	9.	3.	3.	0.	1.	2.	2.	58.	4.57
ENE	0.	3.	9.	5.	11.	4.	2.	0.	0.	1.	1.	0.	36.	4.19
E	0.	1.	5.	6.	5.	11.	6.	1.	0.	1.	0.	3.	39.	5.30
ESE	0.	3.	10.	7.	14.	13.	13.	7.	0.	0.	0.	1.	68.	5.02
SE	0.	2.	11.	14.	22.	15.	27.	25.	26.	19.	13.	38.	212.	8.11
SSE	0.	2.	12.	12.	12.	11.	11.	7.	10.	13.	10.	17.	117.	7.41
S	1.	1.	9.	13.	11.	12.	14.	10.	10.	5.	3.	5.	94.	6.23
SSW	0.	1.	10.	11.	9.	15.	4.	7.	3.	2.	3.	3.	68.	5.68
SW	0.	0.	13.	14.	19.	18.	8.	2.	3.	3.	1.	4.	85.	5.26
WSW	1.	2.	6.	23.	16.	25.	24.	13.	9.	8.	2.	7.	136.	6.18
W	0.	3.	8.	10.	22.	34.	32.	28.	16.	9.	7.	19.	188.	7.21
WNW	0.	1.	3.	8.	12.	17.	9.	12.	10.	8.	2.	20.	102.	8.11
NW	0.	4.	6.	6.	12.	14.	9.	13.	8.	1.	2.	3.	78.	6.18
NNW	0.	1.	10.	12.	13.	6.	5.	3.	2.	0.	0.	1.	53.	4.66
N	0.	4.	13.	29.	25.	28.	33.	34.	19.	20.	13.	28.	246.	7.07
VARIABLE													0.	0.00
CALM													0.	0.00
TOTAL	2.	41.	174.	222.	254.	284.	258.	221.	169.	130.	86.	201.	2042.	6.73

WIND FREQUENCY DISTRIBUTION
(FREQUENCY IN PERCENT OF TOTAL)

WIND DIRECTION	UPPER CLASS INTERVALS OF WIND SPEED (MPH) 1	2	3	4	5	6	7	8	9	10	11	>11	TOTAL	MEAN SPEED
NNE	0.00	0.44	1.57	2.01	2.20	2.55	2.84	2.74	2.60	1.91	1.32	2.45	22.62	7.12
NE	0.00	0.20	0.83	0.54	0.29	0.44	0.15	0.15	0.00	0.05	0.10	0.10	2.84	4.57
ENE	0.00	0.15	0.44	0.24	0.54	0.20	0.10	0.00	0.00	0.05	0.05	0.00	1.76	4.19
E	0.00	0.05	0.24	0.29	0.24	0.54	0.29	0.05	0.00	0.05	0.00	0.15	1.91	5.30
ESE	0.00	0.15	0.49	0.34	0.69	0.64	0.64	0.34	0.00	0.00	0.00	0.05	3.33	5.02
SE	0.00	0.10	0.54	0.69	1.08	0.73	1.32	1.22	1.27	0.93	0.64	1.86	10.38	8.11
SSE	0.00	0.10	0.59	0.59	0.59	0.54	0.54	0.34	0.49	0.64	0.49	0.83	5.73	7.41
S	0.05	0.05	0.44	0.64	0.54	0.59	0.69	0.49	0.49	0.24	0.15	0.24	4.60	6.23
SSW	0.00	0.05	0.49	0.54	0.44	0.73	0.20	0.34	0.15	0.10	0.15	0.15	3.33	5.68
SW	0.00	0.00	0.64	0.69	0.93	0.88	0.39	0.10	0.15	0.15	0.05	0.20	4.16	5.26
WSW	0.05	0.10	0.29	1.13	0.78	1.22	1.18	0.64	0.44	0.39	0.10	0.34	6.66	6.18
W	0.00	0.15	0.39	0.49	1.08	1.67	1.57	1.37	0.78	0.44	0.34	0.93	9.21	7.21
WNW	0.00	0.05	0.15	0.39	0.59	0.83	0.44	0.59	0.49	0.39	0.10	0.98	5.00	8.11
NW	0.00	0.20	0.29	0.29	0.59	0.69	0.44	0.64	0.39	0.05	0.10	0.15	3.82	6.18
NNW	0.00	0.05	0.49	0.59	0.64	0.29	0.24	0.15	0.10	0.00	0.00	0.05	2.60	4.66
N	0.00	0.20	0.64	1.42	1.22	1.37	1.62	1.67	0.93	0.98	0.64	1.37	12.05	7.07
VARIABLE													0.00	0.00
CALM													0.00	0.00
TOTAL	0.10	2.01	8.52	10.87	12.44	13.91	12.63	10.82	8.28	6.37	4.21	9.84	100.00	6.73

TOTAL NUMBER OF POSSIBLE OBSERVATIONS - 2160
TOTAL NUMBER OF OBSERVATIONS WITH VALID SPEED, DIRECTION AND STABILITY - 2038

1

SITE: SAN ONOFRE

08/15/89 14:49

PERIOD OF RECORD 89040101-89063022
EXTREMELY UNSTABLE (DT/DZ LESS THAN -1.9 DEG.C/100 M)
PASQUILL A
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT.
N	0	0	0	0	2	0	0	0	0	0	0	0	2
NNE	0	0	0	0	0	0	0	0	0	0	0	0	0
NE	0	0	0	0	0	1	0	0	0	0	0	0	1
ENE	0	0	0	0	0	0	0	0	0	0	0	0	0
E	0	0	0	1	0	0	0	0	0	0	0	0	1
ESE	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	0	0	0	0	0	2	4	1	0	0	0	0	7
SSE	0	0	0	1	1	3	7	7	3	0	0	0	22
S	0	0	0	2	5	30	62	7	0	1	0	0	107
SSW	0	0	0	2	10	37	48	1	1	0	0	0	99
SW	0	0	0	2	19	70	61	1	0	0	0	0	153
WSW	0	0	0	1	4	59	85	4	2	0	0	0	155
W	0	0	0	4	5	46	110	11	0	0	0	0	176
WNW	0	0	0	0	1	0	24	13	3	0	0	0	41
NW	0	0	0	0	0	0	1	2	0	0	0	0	3
NNW	0	0	0	1	0	0	0	0	0	0	0	0	1
TOTALS	0	0	0	14	47	248	402	47	9	1	0	0	768

NUMBER OF CALMS 1
NUMBER OF INVALID HOURS 5
NUMBER OF VALID HOURS 768
TOTAL HOURS FOR THE PERIOD 2182
ENTER: [RETURN] CONTINUE, [SO] START OVER, [EX] TO EXIT

SITE: SAN ONOFRE

08/15/89 14:41

PERIOD OF RECORD 89040101-89063022
MODERATELY UNSTABLE (-1.9 < DT/DZ <= -1.7 DEG.C/100 M)
PASQUILL B
WIND SPEED (M/S) AT 10 M LEVEL

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

NUMBER OF CALMS 1
NUMBER OF INVALID HOURS 5
NUMBER OF VALID HOURS 0
TOTAL HOURS FOR THE PERIOD 2182
ENTER: [RETURN] CONTINUE, [SO] START OVER, [EX] TO EXIT

Table 4A

SITE: SAN ONOFRE

08/15/89 14:42

PERIOD OF RECORD 89040101-89063022
SLIGHTLY UNSTABLE (-1.7 < DT/TZ <= -1.5 DEG.C/100 M)
PASQUILL C
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT.
N	0	0	0	0	1	3	0	0	0	0	0	0	4
NNE	0	0	0	2	0	2	1	0	0	0	0	0	5
NE	0	0	0	0	1	0	1	0	0	0	0	0	2
ENE	0	0	0	0	0	0	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0	0	0	0	0	0	0
ESE	0	0	1	0	0	0	0	0	0	0	0	0	1
SE	0	0	1	0	0	3	12	3	0	0	0	0	19
SSE	0	0	1	1	3	8	14	4	0	0	0	0	31
S	0	0	0	1	3	8	10	0	0	0	0	0	22
SSW	0	0	0	2	3	6	6	0	0	0	0	0	17
SW	0	0	0	2	4	8	3	0	0	0	0	0	17
WSW	0	0	0	1	4	6	3	1	1	0	0	0	16
W	0	0	0	1	1	8	2	0	0	0	0	0	12
WNW	0	0	0	2	1	5	9	4	0	0	0	0	21
NW	0	0	0	0	0	2	8	2	0	0	0	0	12
NNW	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTALS	0	0	3	12	21	59	69	14	1	0	0	0	179

NUMBER OF CALMS 1
NUMBER OF INVALID HOURS 5
NUMBER OF VALID HOURS 179
TOTAL HOURS FOR THE PERIOD 2182
ENTER: [RETURN] CONTINUE, [SO] START OVER, [EX] TO EXIT

SITE: SAN ONOFRE 08/15/89 14:43

PERIOD OF RECORD 89040101-89063022
NEUTRAL(-1.5 < DT/DZ <= -0.5 DEG.C/100 M)
PASQUILL D
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT.
N	1	1	0	9	12	9	4	0	0	0	0	0	36
NNE	0	3	4	2	6	15	7	0	0	0	0	0	37
NE	0	2	6	9	2	1	0	0	0	0	0	0	20
ENE	0	1	2	1	1	3	1	0	0	0	0	0	9
E	0	0	1	3	7	7	7	0	0	0	0	0	25
ESE	1	0	0	4	6	12	8	0	0	0	0	0	31
SE	0	0	1	7	25	61	63	12	2	0	0	0	171
SSE	0	1	1	10	13	49	56	12	1	0	0	0	143
S	0	2	2	17	10	24	16	3	0	0	0	0	74
SSW	1	3	1	8	8	13	2	1	0	0	0	0	37
SW	1	3	2	8	11	9	2	0	0	0	0	0	36
WSW	0	2	3	4	7	3	3	5	1	0	0	0	28
W	0	1	4	8	4	7	10	4	0	0	0	0	38
WNW	0	2	2	3	9	19	17	1	0	0	0	0	53
NW	0	1	0	5	5	12	13	4	0	0	0	0	40
NNW	1	1	5	6	12	11	6	0	0	0	0	0	42
TOTALS	5	23	34	104	138	255	215	42	4	0	0	0	820

NUMBER OF CALMS 1
NUMBER OF INVALID HOURS 5
NUMBER OF VALID HOURS 820
TOTAL HOURS FOR THE PERIOD 2182
ENTER: [RETURN] CONTINUE, [SO] START OVER, [EX] TO EXIT

5

SITE: SAN ONOFRE

08/15/89 14:50

PERIOD OF RECORD 89040101-89063022
SLIGHTLY STABLE (-0.5 < DT/DZ <= -1.5 DEG.C/100 M)
PASQUILL E
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT.
N	0	1	1	2	10	15	9	0	0	0	0	0	38
NNE	0	2	2	9	10	15	6	0	0	0	0	0	44
NE	1	2	2	1	2	1	0	0	0	0	0	0	9
ENE	1	0	0	1	2	0	0	0	0	0	0	0	4
E	0	0	4	2	0	1	1	0	0	0	0	0	8
ESE	0	0	1	1	2	0	0	0	0	0	0	0	4
SE	0	0	0	0	0	2	2	0	0	0	0	0	4
SSE	0	0	0	1	0	0	0	0	0	0	0	0	1
S	0	1	0	2	1	0	0	0	0	0	0	0	4
SSW	0	0	0	0	0	0	0	0	0	0	0	0	0
SW	0	0	0	1	0	0	0	0	0	0	0	0	1
WSW	0	0	0	0	1	0	0	0	0	0	0	0	1
W	0	0	0	0	3	0	0	1	0	0	0	0	4
WNW	0	0	1	1	0	3	1	0	0	0	0	0	6
NW	0	0	1	0	0	2	0	0	0	0	0	0	3
NNW	0	0	1	3	1	2	1	0	0	0	0	0	8
TOTALS	2	6	13	24	32	41	20	1	0	0	0	0	139

NUMBER OF CALMS 1
NUMBER OF INVALID HOURS 5
NUMBER OF VALID HOURS 139
TOTAL HOURS FOR THE PERIOD 2182
ENTER: [RETURN] CONTINUE, [SO] START OVER, [EX] TO EXIT

Table 4A

SITE: SAN ONOFRE 08/15/89 14:45

PERIOD OF RECORD 89040101-89063022
MODERATELY STABLE (1.5 <= DT/DZ <= -0.5 DEG.C/100 M)
PASQUILL F
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT.
N	0	1	0	2	1	11	14	0	0	0	0	0	29
NNE	0	0	1	4	10	35	21	1	0	0	0	0	72
NE	0	1	1	2	0	0	0	1	0	0	0	0	5
ENE	0	0	1	1	0	0	0	0	0	0	0	0	2
E	0	0	0	0	0	0	0	0	0	0	0	0	0
ESE	0	0	1	1	0	0	0	0	0	0	0	0	2
SE	0	0	0	0	1	3	1	0	0	0	0	0	5
SSE	0	0	0	0	0	1	0	0	0	0	0	0	1
S	0	0	0	0	0	0	0	0	0	0	0	0	0
SSW	0	0	0	0	0	0	0	0	0	0	0	0	0
SW	0	0	0	0	0	0	0	0	0	0	0	0	0
WSW	0	0	1	1	0	0	0	0	0	0	0	0	2
W	0	0	0	1	0	0	0	0	0	0	0	0	1
WNW	0	0	0	1	0	1	0	0	0	0	0	0	2
NW	0	0	0	0	0	1	0	0	0	0	0	0	1
NNW	1	0	0	0	0	1	2	0	0	0	0	0	4
TOTALS	1	2	5	13	12	53	38	2	0	0	0	0	126

NUMBER OF CALMS 1
NUMBER OF INVALID HOURS 5
NUMBER OF VALID HOURS 126
TOTAL HOURS FOR THE PERIOD 2182
ENTER: [RETURN] CONTINUE, [SO] START OVER, [EX] TO EXIT

Table 4A

SITE: SAN ONOFRE

08/15/89 14:47

PERIOD OF RECORD 89040101-89063022
EXTREMELY STABLE(DT/DZ EXCEEDS 4.0 DEG.C/100 M)
PASQUILL G
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT.
N	0	0	0	0	2	4	11	5	0	0	0	0	22
NNE	0	0	1	4	3	11	59	2	1	0	0	0	81
NE	0	0	0	1	0	0	2	0	0	0	0	0	3
ENE	0	0	0	0	0	0	0	0	0	0	0	0	0
E	0	0	0	1	0	0	1	0	0	0	0	0	2
ESE	0	0	0	0	0	0	0	0	0	0	0	0	0
SE	0	2	0	0	2	0	0	0	0	0	0	0	4
SSE	0	0	0	1	0	1	0	0	0	0	0	0	2
S	1	1	0	1	0	0	0	0	0	0	0	0	3
SSW	0	3	1	2	0	0	0	0	0	0	0	0	6
SW	0	0	0	0	0	0	0	0	0	0	0	0	0
WSW	0	1	2	1	1	1	0	0	0	0	0	0	6
W	0	2	0	0	2	2	1	0	0	0	0	0	7
WNW	0	0	1	0	0	2	2	0	0	0	0	0	5
NW	0	0	0	2	0	0	1	0	0	0	0	0	3
NNW	0	1	0	0	0	0	0	0	0	0	0	0	1
TOTALS	1	10	5	13	10	21	77	7	1	0	0	0	145

NUMBER OF CALMS 1
NUMBER OF INVALID HOURS 5
NUMBER OF VALID HOURS 145
TOTAL HOURS FOR THE PERIOD 2182
ENTER: [RETURN] CONTINUE, [SO] START OVER, [EX] TO EXIT

Table 4A

SITE: SAN ONOFRE

08/15/89 14:48

PERIOD OF RECORD 89040101-89063022
ALL STABILITY, ALL DT/DZ
WIND SPEED (M/S) AT 10 M LEVEL

WIND DIR	.22-.50	.51-.75	.76-1.0	1.1-1.5	1.6-2.0	2.1-3.0	3.1-5.0	5.1-7.0	7.1-10.0	10.1-13.0	13.1-18.0	>18	TOT.
N	1	3	1	13	28	42	38	5	0	0	0	0	131
NNE	0	5	8	21	29	78	94	3	1	0	0	0	239
NE	1	5	9	13	5	3	3	1	0	0	0	0	40
ENE	1	1	3	3	3	3	1	0	0	0	0	0	15
E	0	0	5	7	7	8	9	0	0	0	0	0	36
ESE	1	0	3	6	8	12	8	0	0	0	0	0	38
SE	0	2	2	7	28	71	82	16	2	0	0	0	210
SSE	0	1	2	14	17	62	77	23	4	0	0	0	200
S	1	4	2	23	19	62	88	10	0	1	0	0	210
SSW	1	6	2	14	21	56	56	2	1	0	0	0	159
SW	1	3	2	13	34	87	66	1	0	0	0	0	207
WSW	0	3	6	8	17	69	91	10	4	0	0	0	208
W	0	3	4	14	15	63	123	16	0	0	0	0	238
WNW	0	2	4	7	11	30	53	18	3	0	0	0	128
NW	0	1	1	7	5	17	23	8	0	0	0	0	62
NNW	2	2	6	10	13	14	9	0	0	0	0	0	56
TOTALS	9	41	60	180	260	677	821	113	15	1	0	0	2177

NUMBER OF CALMS 1
NUMBER OF INVALID HOURS 5
NUMBER OF VALID HOURS 2177
TOTAL HOURS FOR THE PERIOD 2182
ENTER: [RETURN] CONTINUE, [SO] START OVER, [EX] TO EXIT

Table 4A

APPENDIX B

March 1, 1989

MR. H. E. MORGAN

SUBJECT: Revision 5 to the Unit 1 Offsite Dose Calculation Manual (ODCM)

In accordance with Technical Specification 6.5.2.9 and 6.14.2, Revision 5 to the Unit 1 ODCM has been prepared and reviewed for adoption on March 1, 1989. This revision incorporates the newest dose parameter tables occasioned by the latest Land Use Census, as well as a changes to the Radiological Environmental Monitoring Section clarifying sampling locations. Your approval of this change is requested.

Copies of this letter are being forwarded to the Site Manager Vice President, and the Nuclear Safety Group as required by Technical Specification 6.5.2.9 (Unit 1).

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

J. T. REILLY

Approved by: H. E. MORGAN
Station Manager

450KH:cas

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

TABLE 2-4

CONTROLLING LOCATION FACTORS

Radionuclide	$\sum_k R_{ik}W_k$ mrem/yr per μCi/sec
H -3	1.12E-3
Cr-51	1.80E-2
Mn-54	4.58E0
Co-57	1.13E0
Co-58	1.32E0
Co-60	6.99E1
Sr-89	5.58E1
Sr-90	2.34E3
Zr-95	1.98E0
Nb-95	4.92E0
Te-129m	4.14E0
Cs-134	4.32E1
Cs-136	6.55E-1
Cs-137	3.96E1
Ba-140	2.63E-1
Ce-141	7.38E-1
Ce-144	2.16E1
I -131	2.50E1
I -133	3.28E0
I -135	6.88E-1
UN-ID	4.50E0

Footnote: These values to be used in manual calculations are the maximum $\sum_k R_{ik}W_k$ for all locations based on the most restrictive age group.

APPROVED MAR 0 1 1989

TABLE 2-6

DOSE PARAMETER R_i FOR SECTOR P

Pathway = Surf Beach
X/Q = 6.4E-6 sec/m³

Distance = 0.2 miles
D/Q = 2.7E-8 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	-0-	-0-	1.2E1	-0-	5.1E1	-0-	8.7E1	-0-
Cr-51	-0-	-0-	1.1E1	2.2E4	1.2E2	1.1E5	2.3E2	3.2E5
Mn-54	-0-	-0-	4.5E2	6.6E6	2.7E3	3.2E7	5.3E3	9.5E7
Co-57	-0-	-0-	1.4E2	1.6E6	1.3E3	7.9E6	2.2E3	2.3E7
Co-58	-0-	-0-	3.6E2	1.8E6	3.8E3	8.7E6	7.3E3	2.6E7
Co-60	-0-	-0-	1.0E3	1.0E8	1.0E4	4.9E8	2.0E4	1.5E9
Sr-89	-0-	-0-	6.2E3	1.0E2	1.8E4	4.9E2	2.1E4	1.5E3
Sr-90	-0-	-0-	1.1E6	-0-	4.4E6	-0-	6.8E6	-0-
Zr-95	-0-	-0-	6.3E2	1.2E6	6.0E3	5.8E6	1.0E4	1.7E7
Nb-95	-0-	-0-	3.8E2	6.6E5	3.9E3	3.1E6	7.1E3	9.8E6
Te-129m	-0-	-0-	5.2E2	9.4E4	2.1E3	4.5E5	2.5E3	1.4E6
Cs-134	-0-	-0-	1.1E4	3.3E7	4.5E4	1.6E8	5.8E4	4.3E8
Cs-136	-0-	-0-	1.8E3	7.2E5	7.8E3	3.4E6	1.0E4	1.7E7
Cs-137	-0-	-0-	8.6E3	4.9E7	3.4E4	2.4E8	4.3E4	7.0E8
Ba-140	-0-	-0-	7.7E2	9.9E4	9.2E3	4.7E5	1.5E4	1.1E6
Ce-141	-0-	-0-	5.9E2	6.6E4	5.1E3	3.1E5	8.2E3	9.4E5
Ce-144	-0-	-0-	4.0E3	3.3E5	3.5E4	1.6E6	5.6E4	4.8E6
I -131	-0-	-0-	1.7E5	8.3E4	5.9E5	3.9E5	8.2E5	1.2E6
I -133	-0-	-0-	4.0E4	1.2E4	1.2E5	5.6E4	1.5E5	1.7E5
I -135	-0-	-0-	8.2E3	1.2E4	2.5E4	5.8E4	3.1E4	1.7E5
UN-ID	-0-	-0-	1.2E3	3.6E6	5.4E3	1.7E7	7.1E3	5.1E7

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

APPROVED MAR 0 1 1989

TABLE 2-6

DOSE PARAMETER R_i FOR SECTOR P

Pathway = Former Nixon Estate (no garden) Distance = 2.6 miles
X/Q = 1.4E-7 sec/m³ D/Q = 4.2E-10 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	6.5E2	-0-	1.1E3	-0-	1.3E3	-0-	1.3E3	-0-
Cr-51	3.6E2	3.7E6	1.1E3	3.7E6	3.0E3	3.7E6	3.3E3	3.7E6
Mn-54	2.5E4	1.1E9	4.3E4	1.1E9	6.7E4	1.1E9	7.7E4	1.1E9
Co-57	4.9E3	2.7E8	1.3E4	2.7E8	3.1E4	2.7E8	3.1E4	2.7E8
Co-58	1.1E4	3.0E8	3.4E4	3.0E8	9.5E4	3.0E8	1.1E5	3.0E8
Co-60	3.2E4	1.7E10	9.6E4	1.7E10	2.6E5	1.7E10	2.8E5	1.7E10
Sr-89	4.0E5	1.7E4	6.0E5	1.7E4	4.3E5	1.7E4	3.0E5	1 7E4
Sr-90	4.1E7	-0-	1.0E8	-0-	1.1E8	-0-	9.9E7	-0-
Zr-95	2.2E4	2.0E8	6.1E4	2.0E8	1.5E5	2.0E8	1.5E5	2.0E8
Nb-95	1.3E4	1.1E8	3.7E4	1.1E8	9.7E4	1.1E8	1.0E5	1.1E8
Te-129m	3.2E4	1.6E7	5.0E4	1.6E7	5.2E4	1.6E7	3.7E4	1.6E7
Cs-134	7.0E5	5.5E9	1.0E6	5.5E9	1.1E6	5.5E9	8.5E5	5.5E9
Cs-136	1.3E5	1.2E8	1.7E5	1.2E8	1.9E5	1.2E8	1.5E5	1.2E8
Cs-137	6.1E5	8.2E9	8.3E5	8.2E9	8.5E5	8.2E9	6.2E5	8.2E9
Ba-140	5.6E4	1.6E7	7.4E4	1.6E7	2.3E5	1.6E7	2.2E5	1.6E7
Ce-141	2.2E4	1.1E7	5.7E4	1.1E7	1.3E5	1.1E7	1.2E5	1.1E7
Ce-144	1.5E5	5.6E7	3.9E5	5.6E7	8.6E5	5.6E7	8.2E5	5.6E7
I -131	1.5E7	1.4E7	1.6E7	1.4E7	1.5E7	1.4E7	1.2E7	1.4E7
I -133	3.6E6	2.0E6	3.8E6	2.0E6	2.9E6	2.0E6	2.2E6	2.0E6
I -135	7.0E5	2.0E6	7.9E5	2.0E6	6.2E5	2.0E6	4.5E5	2.0E6
UN-ID	6.3E4	6.0E8	1.1E5	6.0E8	1.3E5	6.0E8	1.0E5	6.0E8

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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TABLE 2-7

DOSE PARAMETER R_i FOR SECTOR Q

Pathway = Surf Beach Guard Shack
X/Q = 3.3E-6 sec/m³

Distance = 0.5 miles
D/Q = 1.7E-8 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	-0-	-0-	-0-	-0-	-0-	-0-	7.2E1	-0-
Cr-51	-0-	-0-	-0-	-0-	-0-	-0-	1.9E2	2.7E5
Mn-54	-0-	-0-	-0-	-0-	-0-	-0-	4.4E3	7.9E7
Co-57	-0-	-0-	-0-	-0-	-0-	-0-	1.8E3	2.0E7
Co-58	-0-	-0-	-0-	-0-	-0-	-0-	6.1E3	2.2E7
Co-60	-0-	-0-	-0-	-0-	-0-	-0-	1.6E4	1.2E9
Sr-89	-0-	-0-	-0-	-0-	-0-	-0-	1.7E4	1.2E3
Sr-90	-0-	-0-	-0-	-0-	-0-	-0-	5.7E6	-0-
Zr-95	-0-	-0-	-0-	-0-	-0-	-0-	8.6E3	1.4E7
Nb-95	-0-	-0-	-0-	-0-	-0-	-0-	5.9E3	7.8E6
Te-129m	-0-	-0-	-0-	-0-	-0-	-0-	2.1E3	1.1E6
Cs-134	-0-	-0-	-0-	-0-	-0-	-0-	4.8E4	3.9E8
Cs-136	-0-	-0-	-0-	-0-	-0-	-0-	8.4E3	8.6E6
Cs-137	-0-	-0-	-0-	-0-	-0-	-0-	3.5E4	5.9E8
Ba-140	-0-	-0-	-0-	-0-	-0-	-0-	1.2E4	1.2E6
Ce-141	-0-	-0-	-0-	-0-	-0-	-0-	6.9E3	7.8E5
Ce-144	-0-	-0-	-0-	-0-	-0-	-0-	4.7E4	4.0E6
I -131	-0-	-0-	-0-	-0-	-0-	-0-	6.8E5	9.8E5
I -133	-0-	-0-	-0-	-0-	-0-	-0-	1.2E5	1.4E5
I -135	-0-	-0-	-0-	-0-	-0-	-0-	2.6E4	1.4E5
UN-ID	-0-	-0-	-0-	-0-	-0-	-0-	5.9E3	4.3E7

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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TABLE 2-7

DOSE PARAMETER R_i FOR SECTOR Q

Pathway = Enlisted Beach
X/Q = 1.1E-6 sec/m³

Distance = 1.0 miles
D/Q = 5.5E-9 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	-0-	-0-	1.2E1	-0-	5.1E1	-0-	1.6E1	-0-
Cr-51	-0-	-0-	1.1E1	2.2E4	1.2E2	1.1E5	4.1E1	1.9E4
Mn-54	-0-	-0-	4.5E2	6.6E6	2.7E3	3.2E7	9.5E2	5.7E6
Co-57	-0-	-0-	1.4E2	1.6E6	1.3E3	7.9E6	3.9E2	1.4E6
Co-58	-0-	-0-	3.6E2	1.8E6	3.8E3	8.7E6	1.3E3	1.6E6
Co-60	-0-	-0-	1.0E3	1.0E8	1.0E4	4.9E8	3.5E3	8.8E7
Sr-89	-0-	-0-	6.2E3	1.0E2	1.8E4	4.9E2	3.7E3	8.9E1
Sr-90	-0-	-0-	1.1E6	-0-	4.4E6	-0-	1.2E6	-0-
Zr-95	-0-	-0-	6.3E2	1.2E6	6.0E3	5.8E6	1.8E3	1.0E6
Nb-95	-0-	-0-	3.8E2	6.6E5	3.9E3	3.1E6	1.3E3	5.6E5
Te-129m	-0-	-0-	5.2E2	9.4E4	2.1E3	4.5E5	4.5E2	8.1E4
Cs-134	-0-	-0-	1.1E4	3.3E7	4.5E4	1.6E8	1.0E4	2.8E7
Cs-136	-0-	-0-	1.8E3	7.2E5	7.8E3	3.4E6	1.8E3	6.2E5
Cs-137	-0-	-0-	8.6E3	4.9E7	3.4E4	2.4E8	7.6E3	4.2E7
Ba-140	-0-	-0-	7.7E2	9.9E4	9.2E3	4.7E5	2.7E3	8.4E4
Ce-141	-0-	-0-	5.9E2	6.6E4	5.1E3	3.1E5	1.5E3	5.6E4
Ce-144	-0-	-0-	4.0E3	3.3E5	3.5E4	1.6E6	1.0E4	2.9E5
I -131	-0-	-0-	1.7E5	8.3E4	5.9E5	3.9E5	1.5E5	7.1E4
I -133	-0-	-0-	4.0E4	1.2E4	1.2E5	5.6E4	2.6E4	1.0E4
I -135	-0-	-0-	8.2E3	1.2E4	2.5E4	5.8E4	5.5E3	1.0E4
UN-ID	-0-	-0-	1.2E3	3.6E6	5.4E3	1.7E7	1.3E3	3.1E6

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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TABLE 2-7

DOSE PARAMETER R_i FOR SECTOR Q

Pathway = Enlisted Beach Check-In — Distance = 1.2 miles
X/Q = 8.6E-6 sec/m³ — D/Q = 4.1E-9 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	-0-	-0-	-0-	-0-	-0-	-0-	2.9E2	-0-
Cr-51	-0-	-0-	-0-	-0-	-0-	-0-	7.6E2	1.1E6
Mn-54	-0-	-0-	-0-	-0-	-0-	-0-	1.8E4	3.2E8
Co-57	-0-	-0-	-0-	-0-	-0-	-0-	7.2E3	7.8E7
Co-58	-0-	-0-	-0-	-0-	-0-	-0-	2.4E4	8.7E7
Co-60	-0-	-0-	-0-	-0-	-0-	-0-	6.5E4	4.9E9
Sr-89	-0-	-0-	-0-	-0-	-0-	-0-	6.9E4	4.9E3
Sr-90	-0-	-0-	-0-	-0-	-0-	-0-	2.3E7	-0-
Zr-95	-0-	-0-	-0-	-0-	-0-	-0-	3.4E4	5.7E7
Nb-95	-0-	-0-	-0-	-0-	-0-	-0-	2.4E4	3.1E7
Te-129m	-0-	-0-	-0-	-0-	-0-	-0-	8.3E3	4.5E6
Cs-134	-0-	-0-	-0-	-0-	-0-	-0-	1.9E5	1.6E9
Cs-136	-0-	-0-	-0-	-0-	-0-	-0-	3.3E4	3.4E7
Cs-137	-0-	-0-	-0-	-0-	-0-	-0-	1.4E5	2.3E9
Ba-140	-0-	-0-	-0-	-0-	-0-	-0-	5.0E4	4.7E6
Ce-141	-0-	-0-	-0-	-0-	-0-	-0-	2.7E4	3.1E6
Ce-144	-0-	-0-	-0-	-0-	-0-	-0-	1.9E5	1.6E7
I -131	-0-	-0-	-0-	-0-	-0-	-0-	2.7E6	3.9E6
I -133	-0-	-0-	-0-	-0-	-0-	-0-	4.9E5	5.6E5
I -135	-0-	-0-	-0-	-0-	-0-	-0-	1.0E5	5.8E5
UN-ID	-0-	-0-	-0-	-0-	-0-	-0-	2.4E4	1.7E8

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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TABLE 2-7

DOSE PARAMETER R_i FOR SECTOR Q

Pathway = San Onofre Mobile Homes — Distance = 1.2 miles
X/Q = 8.6E-7 sec/m³ — D/Q = 4.1E-9 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	6.5E2	-0-	1.1E3	-0-	1.3E3	-0-	1.3E3	-0-
Cr-51	3.6E2	3.7E6	1.1E3	3.7E6	3.0E3	3.7E6	3.3E3	3.7E6
Mn-54	2.5E4	1.1E9	4.3E4	1.1E9	6.7E4	1.1E9	7.7E4	1.1E9
Co-57	4.9E3	2.7E8	1.3E4	2.7E8	3.1E4	2.7E8	3.1E4	2.7E8
Co-58	1.1E4	3.0E8	3.4E4	3.0E8	9.5E4	3.0E8	1.1E5	3.0E8
Co-60	3.2E4	1.7E10	9.6E4	1.7E10	2.6E5	1.7E10	2.8E5	1.7E10
Sr-89	4.0E5	1.7E4	6.0E5	1.7E4	4.3E5	1.7E4	3.0E5	1.7E4
Sr-90	4.1E7	-0-	1.0E8	-0-	1.1E8	-0-	9.9E7	-0-
Zr-95	2.2E4	2.0E8	6.1E4	2.0E8	1.5E5	2.0E8	1.5E5	2.0E8
Nb-95	1.3E4	1.1E8	3.7E4	1.1E8	9.7E4	1.1E8	1.0E5	1.1E8
Te-129m	3.2E4	1.6E7	5.0E4	1.6E7	5.2E4	1.6E7	3.7E4	1.6E7
Cs-134	7.0E5	5.5E9	1.0E6	5.5E9	1.1E6	5.5E9	8.5E5	5.5E9
Cs-136	1.3E5	1.2E8	1.7E5	1.2E8	1.9E5	1.2E8	1.5E5	1.2E8
Cs-137	6.1E5	8.2E9	8.3E5	8.2E9	8.5E5	8.2E9	6.2E5	8.2E9
Ba-140	5.6E4	1.6E7	7.4E4	1.6E7	2.3E5	1.6E7	2.2E5	1.6E7
Ce-141	2.2E4	1.1E7	5.7E4	1.1E7	1.3E5	1.1E7	1.2E5	1.1E7
Ce-144	1.5E5	5.6E7	3.9E5	5.6E7	8.6E5	5.6E7	8.2E5	5.6E7
I -131	1.5E7	1.4E7	1.6E7	1.4E7	1.5E7	1.4E7	1.2E7	1.4E7
I -133	3.6E6	2.0E6	3.8E6	2.0E6	2.9E6	2.0E6	2.2E6	2.0E6
I -135	7.0E5	2.0E6	7.9E5	2.0E6	6.2E5	2.0E6	4.5E5	2.0E6
UN-ID	6.3E4	6.0E8	1.1E5	6.0E8	1.3E5	6.0E8	1.0E5	6.0E8

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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TABLE 2-7

DOSE PARAMETER R_i FOR SECTOR Q

Pathway = San Clemente Ranch (No Residents) Distance = 1.9 miles
X/Q = 4.4E-7 sec/m³ D/Q = 1.8E-9 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	-0-	-0-	-0-	3.8E3	-0-	2.4E3	-0-	1.9E3
Cr-51	-0-	-0-	-0-	4.8E6	-0-	7.4E6	-0-	6.7E6
Mn-54	-0-	-0-	-0-	6.1E8	-0-	8.3E8	-0-	8.0E8
Co-57	-0-	-0-	-0-	2.2E8	-0-	2.9E8	-0-	2.4E8
Co-58	-0-	-0-	-0-	3.3E8	-0-	5.1E8	-0-	4.7E8
Co-60	-0-	-0-	-0-	2.0E9	-0-	3.0E9	-0-	2.7E9
Sr-89	-0-	-0-	-0-	3.1E10	-0-	1.2E10	-0-	7.2E9
Sr-90	-0-	-0-	-0-	1.3E12	-0-	7.7E11	-0-	5.8E11
Zr-95	-0-	-0-	-0-	7.8E8	-0-	1.1E9	-0-	9.1E8
Nb-95	-0-	-0-	-0-	2.4E8	-0-	3.5E8	-0-	3.1E8
Te-129m	-0-	-0-	-0-	2.3E9	-0-	1.4E9	-0-	7.9E8
Cs-134	-0-	-0-	-0-	2.4E10	-0-	1.5E10	-0-	9.2E9
Cs-136	-0-	-0-	-0-	9.0E8	-0-	5.7E7	-0-	3.6E7
Cs-137	-0-	-0-	-0-	2.2E10	-0-	1.3E10	-0-	7.8E9
Ba-140	-0-	-0-	-0-	1.1E8	-0-	6.8E7	-0-	5.3E7
Ce-141	-0-	-0-	-0-	3.3E8	-0-	4.1E8	-0-	3.2E8
Ce-144	-0-	-0-	-0-	9.2E9	-0-	1.2E10	-0-	9.0E9
I -131	-0-	-0-	-0-	4.1E9	-0-	2.1E9	-0-	1.4E9
I -133	-0-	-0-	-0-	4.0E-11	-0-	1.7E-11	-0-	1.1E-11
I -135	-0-	-0-	-0-	6.9E-35	-0-	3.0E-35	-0-	1.9E-35
UN-ID	-0-	-0-	-0-	2.5E9	-0-	1.7E9	-0-	1.1E9

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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TABLE 2-7

DOSE PARAMETER R_i FOR SECTOR Q

Pathway = S. C. Ranch Adm. Offices — Distance = 2.3 miles
X/Q = 3.3E-7 sec/m³ — D/Q = 1.3E-9 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhala-tion Pathway	Food & Ground Pathway	Inhala-tion Pathway	Food & Ground Pathway	Inhala-tion Pathway	Food & Ground Pathway	Inhala-tion Pathway	Food & Ground Pathway
H -3	-0-	-0-	-0-	-0-	-0-	-0-	2.9E2	1.9E3
Cr-51	-0-	-0-	-0-	-0-	-0-	-0-	7.6E2	7.8E6
Mn-54	-0-	-0-	-0-	-0-	-0-	-0-	1.8E4	1.1E9
Co-57	-0-	-0-	-0-	-0-	-0-	-0-	7.2E3	3.2E8
Co-58	-0-	-0-	-0-	-0-	-0-	-0-	2.4E4	5.6E8
Co-60	-0-	-0-	-0-	-0-	-0-	-0-	6.5E4	7.6E9
Sr-89	-0-	-0-	-0-	-0-	-0-	-0-	6.9E4	7.2E9
Sr-90	-0-	-0-	-0-	-0-	-0-	-0-	2.3E7	5.8E11
Zr-95	-0-	-0-	-0-	-0-	-0-	-0-	3.4E4	9.7E8
Nb-95	-0-	-0-	-0-	-0-	-0-	-0-	2.4E4	3.4E8
Te-129m	-0-	-0-	-0-	-0-	-0-	-0-	8.3E3	7.9E8
Cs-134	-0-	-0-	-0-	-0-	-0-	-0-	1.9E5	1.1E10
Cs-136	-0-	-0-	-0-	-0-	-0-	-0-	3.3E4	7.0E7
Cs-137	-0-	-0-	-0-	-0-	-0-	-0-	1.4E5	1.0E10
Ba-140	-0-	-0-	-0-	-0-	-0-	-0-	5.0E4	5.8E7
Ce-141	-0-	-0-	-0-	-0-	-0-	-0-	2.7E4	3.2E8
Ce-144	-0-	-0-	-0-	-0-	-0-	-0-	1.9E5	9.0E9
I -131	-0-	-0-	-0-	-0-	-0-	-0-	2.7E6	1.4E9
I -133	-0-	-0-	-0-	-0-	-0-	-0-	4.9E5	5.6E5
I -135	-0-	-0-	-0-	-0-	-0-	-0-	1.0E5	5.8E5
UN-ID	-0-	-0-	-0-	-0-	-0-	-0-	2.4E4	1.2E9

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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TABLE 2-7

DOSE PARAMETER R_i FOR SECTOR Q

Pathway = SC Res. with Garden
X/Q = 1.5E-7 sec/m³

Distance = 3.7 miles
D/Q = 5.2E-10 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	-0-	-0-	-0-	4.0E3	-0-	2.6E3	1.3E3	2.3E3
Cr-51	-0-	-0-	-0-	6.1E6	-0-	1.0E7	3.3E3	1.5E7
Mn-54	-0-	-0-	-0-	6.5E8	-0-	9.2E8	7.7E4	2.0E9
Co-57	-0-	-0-	-0-	2.4E8	-0-	3.2E8	3.1E4	5.6E8
Co-58	-0-	-0-	-0-	3.7E8	-0-	5.9E8	1.1E5	9.1E8
Co-60	-0-	-0-	-0-	2.1E9	-0-	3.2E9	2.8E5	2.0E10
Sr-89	-0-	-0-	-0-	3.5E10	-0-	1.5E10	3.0E5	9.8E9
Sr-90	-0-	-0-	-0-	1.4E12	-0-	8.3E11	9.9E7	6.7E11
Zr-95	-0-	-0-	-0-	8.8E8	-0-	1.2E9	1.5E5	1.4E9
Nb-95	-0-	-0-	-0-	2.9E8	-0-	4.5E8	1.0E5	5.8E8
Te-129m	-0-	-0-	-0-	2.9E9	-0-	1.8E9	3.7E4	1.2E9
Cs-134	-0-	-0-	-0-	2.6E10	-0-	1.6E10	8.5E5	1.6E10
Cs-136	-0-	-0-	-0-	2.2E8	-0-	1.7E8	1.5E5	2.9E8
Cs-137	-0-	-0-	-0-	2.4E10	-0-	1.4E10	6.2E5	1.7E10
Ba-140	-0-	-0-	-0-	2.8E8	-0-	2.1E8	2.2E5	2.8E8
Ce-141	-0-	-0-	-0-	4.0E8	-0-	5.3E8	1.2E5	5.1E8
Ce-144	-0-	-0-	-0-	1.0E10	-0-	1.3E10	8.2E5	1.1E10
I -131	-0-	-0-	-0-	4.8E10	-0-	3.1E10	1.2E7	3.8E10
I -133	-0-	-0-	-0-	8.1E8	-0-	4.6E8	2.2E6	5.3E8
I -135	-0-	-0-	-0-	9.8E6	-0-	5.7E6	4.5E5	8.6E6
UN-ID	-0-	-0-	-0-	2.7E9	-0-	1.9E9	1.0E5	1.9E9

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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TABLE 2-8

DOSE PARAMETER R_i FOR SECTOR R

Pathway = San Onofre Mobile Homes — Distance = 1.1 miles
X/Q = 6.6E-7 sec/m³ — D/Q = 3.8E-9 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	6.5E2	-0-	1.1E3	-0-	1.3E3	-0-	1.3E3	-0-
Cr-51	3.6E2	3.7E6	1.1E3	3.7E6	3.0E3	3.7E6	3.3E3	3.7E6
Mn-54	2.5E4	1.1E9	4.3E4	1.1E9	6.7E4	1.1E9	7.7E4	1.1E9
Co-57	4.9E3	2.7E8	1.3E4	2.7E8	3.1E4	2.7E8	3.1E4	2.7E8
Co-58	1.1E4	3.0E8	3.4E4	3.0E8	9.5E4	3.0E8	1.1E5	3.0E8
Co-60	3.2E4	1.7E10	9.6E4	1.7E10	2.6E5	1.7E10	2.8E5	1.7E10
Sr-89	4.0E5	1.7E4	6.0E5	1.7E4	4.3E5	1.7E4	3.0E5	1.7E4
Sr-90	4.1E7	-0-	1.0E8	-0-	1.1E8	-0-	9.9E7	-0-
Zr-95	2.2E4	2.0E8	6.1E4	2.0E8	1.5E5	2.0E8	1.5E5	2.0E8
Nb-95	1.3E4	1.1E8	3.7E4	1.1E8	9.7E4	1.1E8	1.0E5	1.1E8
Te-129m	3.2E4	1.6E7	5.0E4	1.6E7	5.2E4	1.6E7	3.7E4	1.6E7
Cs-134	7.0E5	5.5E9	1.0E6	5.5E9	1.1E6	5.5E9	8.5E5	5.5E9
Cs-136	1.3E5	1.2E8	1.7E5	1.2E8	1.9E5	1.2E8	1.5E5	1.2E8
Cs-137	6.1E5	8.2E9	8.3E5	8.2E9	8.5E5	8.2E9	6.2E5	8.2E9
Ba-140	5.6E4	1.6E7	7.4E4	1.6E7	2.3E5	1.6E7	2.2E5	1.6E7
Ce-141	2.2E4	1.1E7	5.7E4	1.1E7	1.3E5	1.1E7	1.2E5	1.1E7
Ce-144	1.5E5	5.6E7	3.9E5	5.6E7	8.6E5	5.6E7	8.2E5	5.6E7
I -131	1.5E7	1.4E7	1.6E7	1.4E7	1.5E7	1.4E7	1.2E7	1.4E7
I -133	3.6E6	2.0E6	3.8E6	2.0E6	2.9E6	2.0E6	2.2E6	2.0E6
I -135	7.0E5	2.0E6	7.9E5	2.0E6	6.2E5	2.0E6	4.5E5	2.0E6
UN-ID	6.3E4	6.0E8	1.1E5	6.0E8	1.3E5	6.0E8	1.0E5	6.0E8

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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TABLE 2-8

DOSE PARAMETER R_i FOR SECTOR R

Pathway = Sheep (Meat) — Distance = 0.9 miles
X/Q = 8.9E-7 sec/m³ — D/Q = 5.4E-9 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	-0-	-0-	-0-	1.5E0	-0-	1.2E0	7.0E0	2.1E0
Cr-51	-0-	-0-	-0-	5.1E1	-0-	1.0E2	1.8E1	2.6E4
Mn-54	-0-	-0-	-0-	7.8E2	-0-	1.4E3	4.3E2	7.6E6
Co-57	-0-	-0-	-0-	4.7E3	-0-	8.1E3	1.7E2	1.9E6
Co-58	-0-	-0-	-0-	9.7E3	-0-	2.0E4	5.9E2	2.1E6
Co-60	-0-	-0-	-0-	3.7E4	-0-	7.3E4	1.6E3	1.2E8
Sr-89	-0-	-0-	-0-	5.0E4	-0-	2.6E4	1.7E3	3.1E4
Sr-90	-0-	-0-	-0-	1.0E6	-0-	8.1E5	5.5E5	1.3E6
Zr-95	-0-	-0-	-0-	6.3E4	-0-	1.1E5	8.3E2	1.6E6
Nb-95	-0-	-0-	-0-	3.4E5	-0-	4.5E5	5.7E2	1.6E6
Te-129m	-0-	-0-	-0-	6.0E5	-0-	4.5E5	2.0E2	6.5E5
Cs-134	-0-	-0-	-0-	1.4E5	-0-	1.2E5	4.7E3	3.8E7
Cs-136	-0-	-0-	-0-	5.1E3	-0-	4.3E3	8.1E2	8.3E5
Cs-137	-0-	-0-	-0-	1.3E5	-0-	9.5E4	3.4E3	5.7E7
Ba-140	-0-	-0-	-0-	5.1E3	-0-	4.3E3	1.2E3	1.2E5
Ce-141	-0-	-0-	-0-	1.5E3	-0-	2.4E3	6.6E2	7.9E4
Ce-144	-0-	-0-	-0-	1.8E4	-0-	3.0E4	4.5E3	4.3E5
I -131	-0-	-0-	-0-	6.6E5	-0-	4.4E5	6.6E4	7.0E5
I -133	-0-	-0-	-0-	1.6E-2	-0-	8.7E-3	1.2E4	1.3E4
I -135	-0-	-0-	-0-	1.1E-18	-0-	6.4E-19	2.5E3	1.4E4
UN-ID	-0-	-0-	-0-	1.1E5	-0-	9.5E4	5.7E2	4.2E6

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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TABLE 2-8

DOSE PARAMETER R_i FOR SECTOR R

Pathway = Deer Consumer — Distance = 2.4 miles
X/Q = 1.9E-7 sec/m³ — D/Q = 1.6E-10 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	-0-	-0-	-0-	2.8E1	-0-	2.3E1	3.5E1	3.9E1
Cr-51	-0-	-0-	-0-	5.0E4	-0-	1.0E5	9.1E1	3.2E5
Mn-54	-0-	-0-	-0-	7.7E5	-0-	1.4E6	2.1E3	4.1E7
Co-57	-0-	-0-	-0-	4.6E6	-0-	8.0E6	8.6E6	2.3E7
Co-58	-0-	-0-	-0-	9.6E6	-0-	1.9E7	2.9E3	4.7E7
Co-60	-0-	-0-	-0-	3.6E7	-0-	7.2E7	7.8E3	7.2E8
Sr-89	-0-	-0-	-0-	4.9E7	-0-	2.6E7	8.3E3	3.1E7
Sr-90	-0-	-0-	-0-	1.0E9	-0-	8.0E8	2.7E6	1.2E9
Zr-95	-0-	-0-	-0-	6.2E7	-0-	1.1E8	4.1E3	2.0E8
Nb-95	-0-	-0-	-0-	2.3E8	-0-	4.5E8	2.8E3	8.2E8
Te-129m	-0-	-0-	-0-	5.9E8	-0-	4.5E8	1.0E3	5.3E8
Cs-134	-0-	-0-	-0-	1.4E8	-0-	1.2E8	2.3E4	3.4E8
Cs-136	-0-	-0-	-0-	5.1E6	-0-	4.2E6	4.0E3	9.5E6
Cs-137	-0-	-0-	-0-	1.2E8	-0-	9.3E7	1.7E4	4.0E8
Ba-140	-0-	-0-	-0-	5.0E6	-0-	4.2E6	6.0E3	7.4E6
Ce-141	-0-	-0-	-0-	1.5E6	-0-	2.4E6	3.3E3	4.2E6
Ce-144	-0-	-0-	-0-	1.8E7	-0-	2.9E7	2.2E4	4.9E7
I -131	-0-	-0-	-0-	6.5E8	-0-	4.3E8	3.3E5	5.9E8
I -133	-0-	-0-	-0-	1.6E-1	-0-	8.6E0	5.9E4	6.7E4
I -135	-0-	-0-	-0-	1.1E-15	-0-	6.3E-16	1.2E4	6.9E4
UN-ID	-0-	-0-	-0-	1.1E1	-0-	9.4E7	2.8E3	1.4E8

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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TABLE 2-8

DOSE PARAMETER R_i FOR SECTOR R

Pathway = San Clemente Ranch (No Residents) Distance = 2.0 miles
X/Q = 2.5E-7 sec/m³ D/Q = 1.3E-9 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	-0-	-0-	-0-	3.8E3	-0-	2.4E3	-0-	1.9E3
Cr-51	-0-	-0-	-0-	4.8E6	-0-	7.4E6	-0-	6.7E6
Mn-54	-0-	-0-	-0-	6.1E8	-0-	8.3E8	-0-	8.0E8
Co-57	-0-	-0-	-0-	2.2E8	-0-	2.9E8	-0-	2.4E8
Co-58	-0-	-0-	-0-	3.3E8	-0-	5.1E8	-0-	4.7E8
Co-60	-0-	-0-	-0-	2.0E9	-0-	3.0E9	-0-	2.7E9
Sr-89	-0-	-0-	-0-	3.1E10	-0-	1.2E10	-0-	7.2E9
Sr-90	-0-	-0-	-0-	1.3E12	-0-	7.7E11	-0-	5.8E11
Zr-95	-0-	-0-	-0-	7.8E8	-0-	1.1E9	-0-	9.1E8
Nb-95	-0-	-0-	-0-	2.4E8	-0-	3.5E8	-0-	3.1E8
Te-129m	-0-	-0-	-0-	2.3E9	-0-	1.4E9	-0-	7.9E8
Cs-134	-0-	-0-	-0-	2.4E10	-0-	1.5E10	-0-	9.2E9
Cs-136	-0-	-0-	-0-	9.0E8	-0-	5.7E7	-0-	3.6E7
Cs-137	-0-	-0-	-0-	2.2E10	-0-	1.3E10	-0-	7.8E9
Ba-140	-0-	-0-	-0-	1.1E8	-0-	6.8E7	-0-	5.3E7
Ce-141	-0-	-0-	-0-	3.3E8	-0-	4.1E8	-0-	3.2E8
Ce-144	-0-	-0-	-0-	9.2E9	-0-	1.2E10	-0-	9.0E9
I -131	-0-	-0-	-0-	4.1E9	-0-	2.1E9	-0-	1.4E9
I -133	-0-	-0-	-0-	4.0E-11	-0-	1.7E-11	-0-	1.1E-11
I -135	-0-	-0-	-0-	6.9E-35	-0-	3.0E-35	-0-	1.9E-35
UN-ID	-0-	-0-	-0-	2.5E9	-0-	1.7E9	-0-	1.1E9

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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TABLE 2-8

DOSE PARAMETER R_i FOR SECTOR R

Pathway = S.C. Ranch Pac. W. Res. Distance = 2.4 miles
X/Q = 1.9E-7 sec/m³ D/Q = 9.5E-9 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	-0-	-0-	-0-	3.8E3	-0-	2.4E3	1.2E3	1.9E3
Cr-51	-0-	-0-	-0-	4.8E6	-0-	7.4E6	3.0E3	1.0E7
Mn-54	-0-	-0-	-0-	6.1E8	-0-	8.3E8	7.1E4	1.939
Co-57	-0-	-0-	-0-	2.2E8	-0-	2.9E8	2.9E4	5.2E8
Co-58	-0-	-0-	-0-	3.3E8	-0-	5.1E8	9.8E4	7.8E8
Co-60	-0-	-0-	-0-	2.0E9	-0-	3.0E9	2.6E5	2.0E10
Sr-89	-0-	-0-	-0-	3.1E10	-0-	1.2E10	2.8E5	6.2E9
Sr-90	-0-	-0-	-0-	1.3E12	-0-	7.7E11	9.1E7	5.8E11
Zr-95	-0-	-0-	-0-	7.8E8	-0-	1.1E9	1.4E5	1.1E9
Nb-95	-0-	-0-	-0-	2.4E8	-0-	3.5E8	9.5E4	4.2E8
Te-129m	-0-	-0-	-0-	2.3E9	-0-	1.4E9	3.4E4	8.0E8
Cs-134	-0-	-0-	-0-	2.4E10	-0-	1.5E10	7.8E5	1.5E10
Cs-136	-0-	-0-	-0-	9.0E8	-0-	5.7E7	1.3E5	1.6E8
Cs-137	-0-	-0-	-0-	2.2E10	-0-	1.3E10	5.7E5	1.6E10
Ba-140	-0-	-0-	-0-	1.1E8	-0-	6.8E7	2.0E5	7.0E7
Ce-141	-0-	-0-	-0-	3.3E8	-0-	4.1E8	1.1E5	3.3E8
Ce-144	-0-	-0-	-0-	9.2E9	-0-	1.2E10	7.5E5	9.0E9
I -131	-0-	-0-	-0-	4.1E9	-0-	2.1E9	1.1E7	1.4E9
I -133	-0-	-0-	-0-	4.0E-11	-0-	1.7E-11	2.0E6	2.0E6
I -135	-0-	-0-	-0-	6.9E-35	-0-	3.0E-35	4.1E5	2.0E6
UN-ID	-0-	-0-	-0-	2.5E9	-0-	1.7E9	9.5E4	1.7E9

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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TABLE 2-9

DOSE PARAMETER R_i FOR SECTOR A

Pathway = Sheep (Meat) — Distance = 0.7 miles
X/Q = 9.5E-7 sec/m³ — D/Q = 7.4E-9 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	-0-	-0-	-0-	1.5E0	-0-	1.2E0	7.0E0	2.1E0
Cr-51	-0-	-0-	-0-	5.1E1	-0-	1.0E2	1.8E1	2.6E4
Mn-54	-0-	-0-	-0-	7.8E2	-0-	1.4E3	4.3E2	7.6E6
Co-57	-0-	-0-	-0-	4.7E3	-0-	8.1E3	1.7E2	1.9E6
Co-58	-0-	-0-	-0-	9.7E3	-0-	2.0E4	5.9E2	2.1E6
Co-60	-0-	-0-	-0-	3.7E4	-0-	7.3E4	1.6E3	1.2E8
Sr-89	-0-	-0-	-0-	5.0E4	-0-	2.6E4	1.7E3	3.1E4
Sr-90	-0-	-0-	-0-	1.0E6	-0-	8.1E5	5.5E5	1.3E6
Zr-95	-0-	-0-	-0-	6.3E4	-0-	1.1E5	8.3E2	1.6E6
Nb-95	-0-	-0-	-0-	3.4E5	-0-	4.5E5	5.7E2	1.6E6
Te-129m	-0-	-0-	-0-	6.0E5	-0-	4.5E5	2.0E2	6.5E5
Cs-134	-0-	-0-	-0-	1.4E5	-0-	1.2E5	4.7E3	3.8E7
Cs-136	-0-	-0-	-0-	5.1E3	-0-	4.3E3	8.1E2	8.3E5
Cs-137	-0-	-0-	-0-	1.3E5	-0-	9.5E4	3.4E3	5.7E7
Ba-140	-0-	-0-	-0-	5.1E3	-0-	4.3E3	1.2E3	1.2E5
Ce-141	-0-	-0-	-0-	1.5E3	-0-	2.4E3	6.6E2	7.9E4
Ce-144	-0-	-0-	-0-	1.8E4	-0-	3.0E4	4.5E3	4.3E5
I -131	-0-	-0-	-0-	6.6E5	-0-	4.4E5	6.6E4	7.0E5
I -133	-0-	-0-	-0-	1.6E-2	-0-	8.7E-3	1.2E4	1.3E4
I -135	-0-	-0-	-0-	1.1E-18	-0-	6.4E-19	2.5E3	1.4E4
UN-ID	-0-	-0-	-0-	1.1E5	-0-	9.5E4	5.7E2	4.2E6

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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TABLE 2-9

DOSE PARAMETER R_i FOR SECTOR A

Pathway = Deer Consumer
X/Q = 2.8E-7 sec/m³

Distance = 1.6 miles
D/Q = 1.0E-10 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	-0-	-0-	-0-	2.8E1	-0-	2.3E1	3.5E1	3.9E1
Cr-51	-0-	-0-	-0-	5.0E4	-0-	1.0E5	9.1E1	3.2E5
Mn-54	-0-	-0-	-0-	7.7E5	-0-	1.4E6	2.1E3	4.1E7
Co-57	-0-	-0-	-0-	4.6E6	-0-	8.0E6	8.6E6	2.3E7
Co-58	-0-	-0-	-0-	9.6E6	-0-	1.9E7	2.9E3	4.7E7
Co-60	-0-	-0-	-0-	3.6E7	-0-	7.2E7	7.8E3	7.2E8
Sr-89	-0-	-0-	-0-	4.9E7	-0-	2.6E7	8.3E3	3.1E7
Sr-90	-0-	-0-	-0-	1.0E9	-0-	8.0E8	2.7E6	1.2E9
Zr-95	-0-	-0-	-0-	6.2E7	-0-	1.1E8	4.1E3	2.0E8
Nb-95	-0-	-0-	-0-	2.3E8	-0-	4.5E8	2.8E3	8.2E8
Te-129m	-0-	-0-	-0-	5.9E8	-0-	4.5E8	1.0E3	5.3E8
Cs-134	-0-	-0-	-0-	1.4E8	-0-	1.2E8	2.3E4	3.4E8
Cs-136	-0-	-0-	-0-	5.1E6	-0-	4.2E6	4.0E3	9.5E6
Cs-137	-0-	-0-	-0-	1.2E8	-0-	9.3E7	1.7E4	4.0E8
Ba-140	-0-	-0-	-0-	5.0E6	-0-	4.2E6	6.0E3	7.4E6
Ce-141	-0-	-0-	-0-	1.5E6	-0-	2.4E6	3.3E3	4.2E6
Ce-144	-0-	-0-	-0-	1.8E7	-0-	2.9E7	2.2E4	4.9E7
I -131	-0-	-0-	-0-	6.5E8	-0-	4.3E8	3.3E5	5.9E8
I -133	-0-	-0-	-0-	1.6E-1	-0-	8.6E0	5.9E4	6.7E4
I -135	-0-	-0-	-0-	1.1E-15	-0-	6.3E-16	1.2E4	6.9E4
UN-ID	-0-	-0-	-0-	1.1E1	-0-	9.4E7	2.8E3	1.4E8

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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TABLE 2-9

DOSE PARAMETER R_i FOR SECTOR A

Pathway = Camp San Mateo
X/Q = 7.6E-8 sec/m³

Distance = 3.5 miles
D/Q = 4.3E-10 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	-0-	-0-	-0-	-0-	-0-	-0-	1.3E3	-0-
Cr-51	-0-	-0-	-0-	-0-	-0-	-0-	3.3E3	3.7E6
Mn-54	-0-	-0-	-0-	-0-	-0-	-0-	7.7E4	1.1E9
Co-57	-0-	-0-	-0-	-0-	-0-	-0-	3.1E4	2.7E8
Co-58	-0-	-0-	-0-	-0-	-0-	-0-	1.1E5	3.0E8
Co-60	-0-	-0-	-0-	-0-	-0-	-0-	2.8E5	1.7E10
Sr-89	-0-	-0-	-0-	-0-	-0-	-0-	3.0E5	1.7E4
Sr-90	-0-	-0-	-0-	-0-	-0-	-0-	9.9E7	-0-
Zr-95	-0-	-0-	-0-	-0-	-0-	-0-	1.5E5	2.0E8
Nb-95	-0-	-0-	-0-	-0-	-0-	-0-	1.0E5	1.1E8
Te-129m	-0-	-0-	-0-	-0-	-0-	-0-	3.7E4	1.6E7
Cs-134	-0-	-0-	-0-	-0-	-0-	-0-	8.5E5	5.5E9
Cs-136	-0-	-0-	-0-	-0-	-0-	-0-	1.5E5	1.2E8
Cs-137	-0-	-0-	-0-	-0-	-0-	-0-	6.2E5	8.2E9
Ba-140	-0-	-0-	-0-	-0-	-0-	-0-	2.2E5	1.6E7
Ce-141	-0-	-0-	-0-	-0-	-0-	-0-	1.2E5	1.1E7
Ce-144	-0-	-0-	-0-	-0-	-0-	-0-	8.2E5	5.6E7
I -131	-0-	-0-	-0-	-0-	-0-	-0-	1.2E7	1.4E7
I -133	-0-	-0-	-0-	-0-	-0-	-0-	2.2E6	2.0E6
I -135	-0-	-0-	-0-	-0-	-0-	-0-	4.5E5	2.0E6
UN-ID	-0-	-0-	-0-	-0-	-0-	-0-	1.0E5	6.0E8

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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TABLE 2-10

DOSE PARAMETER R_i FOR SECTOR B

Pathway = Sheep (Meat) Distance = 0.7 miles
X/Q = 7.9E-7 sec/m³ D/Q = 7.8E-09 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	-0-	-0-	-0-	1.5E0	-0-	1.2E0	7.0E0	2.1E0
Cr-51	-0-	-0-	-0-	5.1E1	-0-	1.0E2	1.8E1	2.6E4
Mn-54	-0-	-0-	-0-	7.8E2	-0-	1.4E3	4.3E2	7.6E6
Co-57	-0-	-0-	-0-	4.7E3	-0-	8.1E3	1.7E2	1.9E6
Co-58	-0-	-0-	-0-	9.7E3	-0-	2.0E4	5.9E2	2.1E6
Co-60	-0-	-0-	-0-	3.7E4	-0-	7.3E4	1.6E3	1.2E8
Sr-89	-0-	-0-	-0-	5.0E4	-0-	2.6E4	1.7E3	3.1E4
Sr-90	-0-	-0-	-0-	1.0E6	-0-	8.1E5	5.5E5	1.3E6
Zr-95	-0-	-0-	-0-	6.3E4	-0-	1.1E5	8.3E2	1.6E6
Nb-95	-0-	-0-	-0-	3.4E5	-0-	4.5E5	5.7E2	1.6E6
Te-129m	-0-	-0-	-0-	6.0E5	-0-	4.5E5	2.0E2	6.5E5
Cs-134	-0-	-0-	-0-	1.4E5	-0-	1.2E5	4.7E3	3.8E7
Cs-136	-0-	-0-	-0-	5.1E3	-0-	4.3E3	8.1E2	8.3E5
Cs-137	-0-	-0-	-0-	1.3E5	-0-	9.5E4	3.4E3	5.7E7
Ba-140	-0-	-0-	-0-	5.1E3	-0-	4.3E3	1.2E3	1.2E5
Ce-141	-0-	-0-	-0-	1.5E3	-0-	2.4E3	6.6E2	7.9E4
Ce-144	-0-	-0-	-0-	1.8E4	-0-	3.0E4	4.5E3	4.3E5
I -131	-0-	-0-	-0-	6.6E5	-0-	4.4E5	6.6E4	7.0E5
I -133	-0-	-0-	-0-	1.6E-2	-0-	8.7E-3	1.2E4	1.3E4
I -135	-0-	-0-	-0-	1.1E-18	-0-	6.4E-19	2.5E3	1.4E4
UN-ID	-0-	-0-	-0-	1.1E5	-0-	9.5E4	5.7E2	4.2E6

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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TABLE 2-10

DOSE PARAMETER R_i FOR SECTOR B

Pathway = Deer Consumer
X/Q = 2.2E-7 sec/m³

Distance = 0.7 miles
D/Q = 7.8E-9 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	-0-	-0-	-0-	2.8E1	-0-	2.3E1	3.5E1	3.9E1
Cr-51	-0-	-0-	-0-	5.0E4	-0-	1.0E5	9.1E1	3.2E5
Mn-54	-0-	-0-	-0-	7.7E5	-0-	1.4E6	2.1E3	4.1E7
Co-57	-0-	-0-	-0-	4.6E6	-0-	8.0E6	8.6E6	2.3E7
Co-58	-0-	-0-	-0-	9.6E6	-0-	1.9E7	2.9E3	4.7E7
Co-60	-0-	-0-	-0-	3.6E7	-0-	7.2E7	7.8E3	7.2E8
Sr-89	-0-	-0-	-0-	4.9E7	-0-	2.6E7	8.3E3	3.1E7
Sr-90	-0-	-0-	-0-	1.0E9	-0-	8.0E8	2.7E6	1.2E9
Zr-95	-0-	-0-	-0-	6.2E7	-0-	1.1E8	4.1E3	2.0E8
Nb-95	-0-	-0-	-0-	2.3E8	-0-	4.5E8	2.8E3	8.2E8
Te-129m	-0-	-0-	-0-	5.9E8	-0-	4.5E8	1.0E3	5.3E8
Cs-134	-0-	-0-	-0-	1.4E8	-0-	1.2E8	2.3E4	3.4E8
Cs-136	-0-	-0-	-0-	5.1E6	-0-	4.2E6	4.0E3	9.5E6
Cs-137	-0-	-0-	-0-	1.2E8	-0-	9.3E7	1.7E4	4.0E8
Ba-140	-0-	-0-	-0-	5.0E6	-0-	4.2E6	6.0E3	7.4E6
Ce-141	-0-	-0-	-0-	1.5E6	-0-	2.4E6	3.3E3	4.2E6
Ce-144	-0-	-0-	-0-	1.8E7	-0-	2.9E7	2.2E4	4.9E7
I -131	-0-	-0-	-0-	6.5E8	-0-	4.3E8	3.3E5	5.9E8
I -133	-0-	-0-	-0-	1.6E-1	-0-	8.6E0	5.9E4	6.7E4
I -135	-0-	-0-	-0-	1.1E-15	-0-	6.3E-16	1.2E4	6.9E4
UN-ID	-0-	-0-	-0-	1.1E1	-0-	9.4E7	2.8E3	1.4E8

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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TABLE 2-10

DOSE PARAMETER R_i FOR SECTOR B

Pathway = Sanitary Landfill — Distance = 2.1 miles
X/Q = 1.4E-7 sec/m³ — D/Q = 1.2E-09 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	-0-	-0-	-0-	-0-	-0-	-0-	2.9E2	-0-
Cr-51	-0-	-0-	-0-	-0-	-0-	-0-	7.6E2	1.1E6
Mn-54	-0-	-0-	-0-	-0-	-0-	-0-	1.8E4	3.2E8
Co-57	-0-	-0-	-0-	-0-	-0-	-0-	7.2E3	7.8E7
Co-58	-0-	-0-	-0-	-0-	-0-	-0-	2.4E4	8.7E7
Co-60	-0-	-0-	-0-	-0-	-0-	-0-	6.5E4	4.9E9
Sr-89	-0-	-0-	-0-	-0-	-0-	-0-	6.9E4	4.9E3
Sr-90	-0-	-0-	-0-	-0-	-0-	-0-	2.3E7	-0-
Zr-95	-0-	-0-	-0-	-0-	-0-	-0-	3.4E4	5.7E7
Nb-95	-0-	-0-	-0-	-0-	-0-	-0-	2.4E4	3.1E7
Te-129m	-0-	-0-	-0-	-0-	-0-	-0-	8.3E3	4.5E6
Cs-134	-0-	-0-	-0-	-0-	-0-	-0-	1.9E5	1.6E9
Cs-136	-0-	-0-	-0-	-0-	-0-	-0-	3.3E4	3.4E7
Cs-137	-0-	-0-	-0-	-0-	-0-	-0-	1.4E5	2.3E9
Ba-140	-0-	-0-	-0-	-0-	-0-	-0-	5.0E4	4.7E6
Ce-141	-0-	-0-	-0-	-0-	-0-	-0-	2.7E4	3.1E6
Ce-144	-0-	-0-	-0-	-0-	-0-	-0-	1.9E5	1.6E7
I -131	-0-	-0-	-0-	-0-	-0-	-0-	2.7E6	3.9E6
I -133	-0-	-0-	-0-	-0-	-0-	-0-	4.9E5	5.6E5
I -135	-0-	-0-	-0-	-0-	-0-	-0-	1.0E5	5.8E5
UN-ID	-0-	-0-	-0-	-0-	-0-	-0-	2.4E4	1.7E8

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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TABLE 2-11

DOSE PARAMETER R_i FOR SECTOR C

Pathway = Camp San Onofre Fr. Stn — Distance = 2.4 miles
X/Q = 1.1E-7 sec/m³ — D/Q = 1.0E-9 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	-0-	-0-	-0-	-0-	-0-	-0-	5.2E2	-0-
Cr-51	-0-	-0-	-0-	-0-	-0-	-0-	1.4E3	1.9E6
Mn-54	-0-	-0-	-0-	-0-	-0-	-0-	3.2E4	5.7E8
Co-57	-0-	-0-	-0-	-0-	-0-	-0-	1.3E4	1.4E8
Co-58	-0-	-0-	-0-	-0-	-0-	-0-	4.4E4	1.6E8
Co-60	-0-	-0-	-0-	-0-	-0-	-0-	1.2E5	8.8E9
Sr-89	-0-	-0-	-0-	-0-	-0-	-0-	1.2E5	8.9E3
Sr-90	-0-	-0-	-0-	-0-	-0-	-0-	4.1E6	-0-
Zr-95	-0-	-0-	-0-	-0-	-0-	-0-	6.2E4	1.0E8
Nb-95	-0-	-0-	-0-	-0-	-0-	-0-	4.3E4	5.6E7
Te-129m	-0-	-0-	-0-	-0-	-0-	-0-	1.5E4	8.1E6
Cs-134	-0-	-0-	-0-	-0-	-0-	-0-	3.5E5	2.8E9
Cs-136	-0-	-0-	-0-	-0-	-0-	-0-	6.0E4	6.2E7
Cs-137	-0-	-0-	-0-	-0-	-0-	-0-	2.6E5	4.2E9
Ba-140	-0-	-0-	-0-	-0-	-0-	-0-	9.0E4	8.4E6
Ce-141	-0-	-0-	-0-	-0-	-0-	-0-	4.9E4	5.6E6
Ce-144	-0-	-0-	-0-	-0-	-0-	-0-	3.4E5	2.9E7
I -131	-0-	-0-	-0-	-0-	-0-	-0-	4.9E6	7.1E6
I -133	-0-	-0-	-0-	-0-	-0-	-0-	8.8E5	1.0E6
I -135	-0-	-0-	-0-	-0-	-0-	-0-	1.8E5	1.0E6
UN-ID	-0-	-0-	-0-	-0-	-0-	-0-	4.2E4	3.1E8

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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TABLE 2-11

DOSE PARAMETER R_i FOR SECTOR C

Pathway = Camp San Onofre — Distance = 2.7 miles
X/Q = 9.1E-8 sec/m³ — D/Q = 8.1E-10 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	-0-	-0-	-0-	-0-	-0-	-0-	1.3E3	2.6E3
Cr-51	-0-	-0-	-0-	-0-	-0-	-0-	3.3E3	1.3E7
Mn-54	-0-	-0-	-0-	-0-	-0-	-0-	7.7E4	2.2E9
Co-57	-0-	-0-	-0-	-0-	-0-	-0-	3.1E4	5.9E8
Co-58	-0-	-0-	-0-	-0-	-0-	-0-	1.1E5	9.2E8
Co-60	-0-	-0-	-0-	-0-	-0-	-0-	2.8E5	2.1E10
Sr-89	-0-	-0-	-0-	-0-	-0-	-0-	3.0E5	9.4E9
Sr-90	-0-	-0-	-0-	-0-	-0-	-0-	9.9E7	7.6E11
Zr-95	-0-	-0-	-0-	-0-	-0-	-0-	1.5E5	1.4E9
Nb-95	-0-	-0-	-0-	-0-	-0-	-0-	1.0E5	5.2E8
Te-129m	-0-	-0-	-0-	-0-	-0-	-0-	3.7E4	1.1E9
Cs-134	-0-	-0-	-0-	-0-	-0-	-0-	8.5E5	1.8E10
Cs-136	-0-	-0-	-0-	-0-	-0-	-0-	1.5E5	1.7E8
Cs-137	-0-	-0-	-0-	-0-	-0-	-0-	6.2E5	1.9E10
Ba-140	-0-	-0-	-0-	-0-	-0-	-0-	2.2E5	8.7E7
Ce-141	-0-	-0-	-0-	-0-	-0-	-0-	1.2E5	4.3E8
Ce-144	-0-	-0-	-0-	-0-	-0-	-0-	8.2E5	1.2E10
I -131	-0-	-0-	-0-	-0-	-0-	-0-	1.2E7	1.8E9
I -133	-0-	-0-	-0-	-0-	-0-	-0-	2.2E6	2.0E6
I -135	-0-	-0-	-0-	-0-	-0-	-0-	4.5E5	2.0E6
UN-ID	-0-	-0-	-0-	-0-	-0-	-0-	1.0E5	2.0E9

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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TABLE 2-11

DOSE PARAMETER R_i FOR SECTOR C

Pathway = Sheep (Meat) — Distance = 0.3 miles
X/Q = 3.2E-6 sec/m³ — D/Q = 3.3E-8 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	-0-	-0-	-0-	1.5E0	-0-	1.2E0	7.0E0	2.1E0
Cr-51	-0-	-0-	-0-	5.1E1	-0-	1.0E2	1.8E1	2.6E4
Mn-54	-0-	-0-	-0-	7.8E2	-0-	1.4E3	4.3E2	7.6E6
Co-57	-0-	-0-	-0-	4.7E3	-0-	8.1E3	1.7E2	1.9E6
Co-58	-0-	-0-	-0-	9.7E3	-0-	2.0E4	5.9E2	2.1E6
Co-60	-0-	-0-	-0-	3.7E4	-0-	7.3E4	1.6E3	1.2E8
Sr-89	-0-	-0-	-0-	5.0E4	-0-	2.6E4	1.7E3	3.1E4
Sr-90	-0-	-0-	-0-	1.0E6	-0-	8.1E5	5.5E5	1.3E6
Zr-95	-0-	-0-	-0-	6.3E4	-0-	1.1E5	8.3E2	1.6E6
Nb-95	-0-	-0-	-0-	3.4E5	-0-	4.5E5	5.7E2	1.6E6
Te-129m	-0-	-0-	-0-	6.0E5	-0-	4.5E5	2.0E2	6.5E5
Cs-134	-0-	-0-	-0-	1.4E5	-0-	1.2E5	4.7E3	3.8E7
Cs-136	-0-	-0-	-0-	5.1E3	-0-	4.3E3	8.1E2	8.3E5
Cs-137	-0-	-0-	-0-	1.3E5	-0-	9.5E4	3.4E3	5.7E7
Ba-140	-0-	-0-	-0-	5.1E3	-0-	4.3E3	1.2E3	1.2E5
Ce-141	-0-	-0-	-0-	1.5E3	-0-	2.4E3	6.6E2	7.9E4
Ce-144	-0-	-0-	-0-	1.8E4	-0-	3.0E4	4.5E3	4.3E5
I -131	-0-	-0-	-0-	6.6E5	-0-	4.4E5	6.6E4	7.0E5
I -133	-0-	-0-	-0-	1.6E-2	-0-	8.7E-3	1.2E4	1.3E4
I -135	-0-	-0-	-0-	1.1E-18	-0-	6.4E-19	2.5E3	1.4E4
UN-ID	-0-	-0-	-0-	1.1E5	-0-	9.5E4	5.7E2	4.2E6

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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TABLE 2-11

DOSE PARAMETER R_i FOR SECTOR C

Pathway = Deer Consumer — Distance = 13 miles
X/Q = 2.8E-7 sec/m³ — D/Q = 2.9E-9 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	-0-	-0-	-0-	2.8E1	-0-	2.3E1	3.5E1	3.9E1
Cr-51	-0-	-0-	-0-	5.0E4	-0-	1.0E5	9.1E1	3.2E5
Mn-54	-0-	-0-	-0-	7.7E5	-0-	1.4E6	2.1E3	4.1E7
Co-57	-0-	-0-	-0-	4.6E6	-0-	8.0E6	8.6E6	2.3E7
Co-58	-0-	-0-	-0-	9.6E6	-0-	1.9E7	2.9E3	4.7E7
Co-60	-0-	-0-	-0-	3.6E7	-0-	7.2E7	7.8E3	7.2E8
Sr-89	-0-	-0-	-0-	4.9E7	-0-	2.6E7	8.3E3	3.1E7
Sr-90	-0-	-0-	-0-	1.0E9	-0-	8.0E8	2.7E6	1.2E9
Zr-95	-0-	-0-	-0-	6.2E7	-0-	1.1E8	4.1E3	2.0E8
Nb-95	-0-	-0-	-0-	2.3E8	-0-	4.5E8	2.8E3	8.2E8
Te-129m	-0-	-0-	-0-	5.9E8	-0-	4.5E8	1.0E3	5.3E8
Cs-134	-0-	-0-	-0-	1.4E8	-0-	1.2E8	2.3E4	3.4E8
Cs-136	-0-	-0-	-0-	5.1E6	-0-	4.2E6	4.0E3	9.5E6
Cs-137	-0-	-0-	-0-	1.2E8	-0-	9.3E7	1.7E4	4.0E8
Ba-140	-0-	-0-	-0-	5.0E6	-0-	4.2E6	6.0E3	7.4E6
Ce-141	-0-	-0-	-0-	1.5E6	-0-	2.4E6	3.3E3	4.2E6
Ce-144	-0-	-0-	-0-	1.8E7	-0-	2.9E7	2.2E4	4.9E7
I -131	-0-	-0-	-0-	6.5E8	-0-	4.3E8	3.3E5	5.9E8
I -133	-0-	-0-	-0-	1.6E-1	-0-	8.6E0	5.9E4	6.7E4
I -135	-0-	-0-	-0-	1.1E-15	-0-	6.3E-16	1.2E4	6.9E4
UN-ID	-0-	-0-	-0-	1.1E1	-0-	9.4E7	2.8E3	1.4E8

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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TABLE 2-11

DOSE PARAMETER R_i FOR SECTOR C

Pathway = Sewage Treat. Facility — Distance = 2.3 miles
X/Q = 1.2E-7 sec/m³ — D/Q = 1.1E-9 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	-0-	-0-	-0-	-0-	-0-	-0-	2.9E2	-0-
Cr-51	-0-	-0-	-0-	-0-	-0-	-0-	7.6E2	1.1E6
Mn-54	-0-	-0-	-0-	-0-	-0-	-0-	1.8E4	3.2E8
Co-57	-0-	-0-	-0-	-0-	-0-	-0-	7.2E3	7.8E7
Co-58	-0-	-0-	-0-	-0-	-0-	-0-	2.4E4	8.7E7
Co-60	-0-	-0-	-0-	-0-	-0-	-0-	6.5E4	4.9E9
Sr-89	-0-	-0-	-0-	-0-	-0-	-0-	6.9E4	4.9E3
Sr-90	-0-	-0-	-0-	-0-	-0-	-0-	2.3E7	-0-
Zr-95	-0-	-0-	-0-	-0-	-0-	-0-	3.4E4	5.7E7
Nb-95	-0-	-0-	-0-	-0-	-0-	-0-	2.4E4	3.1E7
Te-129m	-0-	-0-	-0-	-0-	-0-	-0-	8.3E3	4.5E6
Cs-134	-0-	-0-	-0-	-0-	-0-	-0-	1.9E5	1.6E9
Cs-136	-0-	-0-	-0-	-0-	-0-	-0-	3.3E4	3.4E7
Cs-137	-0-	-0-	-0-	-0-	-0-	-0-	1.4E5	2.3E9
Ba-140	-0-	-0-	-0-	-0-	-0-	-0-	5.0E4	4.7E6
Ce-141	-0-	-0-	-0-	-0-	-0-	-0-	2.7E4	3.1E6
Ce-144	-0-	-0-	-0-	-0-	-0-	-0-	1.9E5	1.6E7
I -131	-0-	-0-	-0-	-0-	-0-	-0-	2.7E6	3.9E6
I -133	-0-	-0-	-0-	-0-	-0-	-0-	4.9E5	5.6E5
I -135	-0-	-0-	-0-	-0-	-0-	-0-	1.0E5	5.8E5
UN-ID	-0-	-0-	-0-	-0-	-0-	-0-	2.4E4	1.7E8

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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TABLE 2-12

DOSE PARAMETER R_i FOR SECTOR D

Pathway = Sheep (Meat) — Distance = 0.3 miles
X/Q = 3.0E-6 sec/m³ — D/Q = 3.4E-8 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	-0-	-0-	-0-	1.5E0	-0-	1.2E0	7.0E0	2.1E0
Cr-51	-0-	-0-	-0-	5.1E1	-0-	1.0E2	1.8E1	2.6E4
Mn-54	-0-	-0-	-0-	7.8E2	-0-	1.4E3	4.3E2	7.6E6
Co-57	-0-	-0-	-0-	4.7E3	-0-	8.1E3	1.7E2	1.9E6
Co-58	-0-	-0-	-0-	9.7E3	-0-	2.0E4	5.9E2	2.1E6
Co-60	-0-	-0-	-0-	3.7E4	-0-	7.3E4	1.6E3	1.2E8
Sr-89	-0-	-0-	-0-	5.0E4	-0-	2.6E4	1.7E3	3.1E4
Sr-90	-0-	-0-	-0-	1.0E6	-0-	8.1E5	5.5E5	1.3E6
Zr-95	-0-	-0-	-0-	6.3E4	-0-	1.1E5	8.3E2	1.6E6
Nb-95	-0-	-0-	-0-	3.4E5	-0-	4.5E5	5.7E2	1.6E6
Te-129m	-0-	-0-	-0-	6.0E5	-0-	4.5E5	2.0E2	6.5E5
Cs-134	-0-	-0-	-0-	1.4E5	-0-	1.2E5	4.7E3	3.8E7
Cs-136	-0-	-0-	-0-	5.1E3	-0-	4.3E3	8.1E2	8.3E5
Cs-137	-0-	-0-	-0-	1.3E5	-0-	9.5E4	3.4E3	5.7E7
Ba-140	-0-	-0-	-0-	5.1E3	-0-	4.3E3	1.2E3	1.2E5
Ce-141	-0-	-0-	-0-	1.5E3	-0-	2.4E3	6.6E2	7.9E4
Ce-144	-0-	-0-	-0-	1.8E4	-0-	3.0E4	4.5E3	4.3E5
I -131	-0-	-0-	-0-	6.6E5	-0-	4.4E5	6.6E4	7.0E5
I -133	-0-	-0-	-0-	1.6E-2	-0-	8.7E-3	1.2E4	1.3E4
I -135	-0-	-0-	-0-	1.1E-18	-0-	6.4E-19	2.5E3	1.4E4
UN-ID	-0-	-0-	-0-	1.1E5	-0-	9.5E4	5.7E2	4.2E6

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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TABLE 2-12

DOSE PARAMETER R_i FOR SECTOR D

Pathway = Deer Consumer — Distance = 1.4 miles
X/Q = 2.6E-7 sec/m³ — D/Q = 6.0E-9 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	-0-	-0-	-0-	2.8E1	-0-	2.3E1	3.5E1	3.9E1
Cr-51	-0-	-0-	-0-	5.0E4	-0-	1.0E5	9.1E1	3.2E5
Mn-54	-0-	-0-	-0-	7.7E5	-0-	1.4E6	2.1E3	4.1E7
Co-57	-0-	-0-	-0-	4.6E6	-0-	8.0E6	8.6E6	2.3E7
Co-58	-0-	-0-	-0-	9.6E6	-0-	1.9E7	2.9E3	4.7E7
Co-60	-0-	-0-	-0-	3.6E7	-0-	7.2E7	7.8E3	7.2E8
Sr-89	-0-	-0-	-0-	4.9E7	-0-	2.6E7	8.3E3	3.1E7
Sr-90	-0-	-0-	-0-	1.0E9	-0-	8.0E8	2.7E6	1.2E9
Zr-95	-0-	-0-	-0-	6.2E7	-0-	1.1E8	4.1E3	2.0E8
Nb-95	-0-	-0-	-0-	2.3E8	-0-	4.5E8	2.8E3	8.2E8
Te-129m	-0-	-0-	-0-	5.9E8	-0-	4.5E8	1.0E3	5.3E8
Cs-134	-0-	-0-	-0-	1.4E8	-0-	1.2E8	2.3E4	3.4E8
Cs-136	-0-	-0-	-0-	5.1E6	-0-	4.2E6	4.0E3	9.5E6
Cs-137	-0-	-0-	-0-	1.2E8	-0-	9.3E7	1.7E4	4.0E8
Ba-140	-0-	-0-	-0-	5.0E6	-0-	4.2E6	6.0E3	7.4E6
Ce-141	-0-	-0-	-0-	1.5E6	-0-	2.4E6	3.3E3	4.2E6
Ce-144	-0-	-0-	-0-	1.8E7	-0-	2.9E7	2.2E4	4.9E7
I -131	-0-	-0-	-0-	6.5E8	-0-	4.3E8	3.3E5	5.9E8
I -133	-0-	-0-	-0-	1.6E-1	-0-	8.6E0	5.9E4	6.7E4
I -135	-0-	-0-	-0-	1.1E-15	-0-	6.3E-16	1.2E4	6.9E4
UN-ID	-0-	-0-	-0-	1.1E1	-0-	9.4E7	2.8E3	1.4E8

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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TABLE 2-12

DOSE PARAMETER R_i FOR SECTOR D

Pathway = Camp San Onofre
X/Q = 7.1E-8 sec/m³

Distance = 2.9 miles
D/Q = 7.3E-10 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	-0-	-0-	-0-	-0-	-0-	-0-	1.3E3	-0-
Cr-51	-0-	-0-	-0-	-0-	-0-	-0-	3.3E3	3.7E6
Mn-54	-0-	-0-	-0-	-0-	-0-	-0-	7.7E4	1.1E9
Co-57	-0-	-0-	-0-	-0-	-0-	-0-	3.1E4	2.7E8
Co-58	-0-	-0-	-0-	-0-	-0-	-0-	1.1E5	3.0E8
Co-60	-0-	-0-	-0-	-0-	-0-	-0-	2.8E5	1.7E10
Sr-89	-0-	-0-	-0-	-0-	-0-	-0-	3.0E5	1.7E4
Sr-90	-0-	-0-	-0-	-0-	-0-	-0-	9.9E7	-0-
Zr-95	-0-	-0-	-0-	-0-	-0-	-0-	1.5E5	2.0E8
Nb-95	-0-	-0-	-0-	-0-	-0-	-0-	1.0E5	1.1E8
Te-129m	-0-	-0-	-0-	-0-	-0-	-0-	3.7E4	1.6E7
Cs-134	-0-	-0-	-0-	-0-	-0-	-0-	8.5E5	5.5E9
Cs-136	-0-	-0-	-0-	-0-	-0-	-0-	1.5E5	1.2E8
Cs-137	-0-	-0-	-0-	-0-	-0-	-0-	6.2E5	8.2E9
Ba-140	-0-	-0-	-0-	-0-	-0-	-0-	2.2E5	1.6E7
Ce-141	-0-	-0-	-0-	-0-	-0-	-0-	1.2E5	1.1E7
Ce-144	-0-	-0-	-0-	-0-	-0-	-0-	8.2E5	5.6E7
I -131	-0-	-0-	-0-	-0-	-0-	-0-	1.2E7	1.4E7
I -133	-0-	-0-	-0-	-0-	-0-	-0-	2.2E6	2.0E6
I -135	-0-	-0-	-0-	-0-	-0-	-0-	4.5E5	2.0E6
UN-ID	-0-	-0-	-0-	-0-	-0-	-0-	1.0E5	6.0E8

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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TABLE 2-13

DOSE PARAMETER R_i FOR SECTOR E

Pathway = Sheep (Meat) Distance = 0.4 miles
X/Q = 2.9E-6 sec/m³ D/Q = 3.8E-8 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	-0-	-0-	-0-	1.5E0	-0-	1.2E0	7.0E0	2.1E0
Cr-51	-0-	-0-	-0-	5.1E1	-0-	1.0E2	1.8E1	2.6E4
Mn-54	-0-	-0-	-0-	7.8E2	-0-	1.4E3	4.3E2	7.6E6
Co-57	-0-	-0-	-0-	4.7E3	-0-	8.1E3	1.7E2	1.9E6
Co-58	-0-	-0-	-0-	9.7E3	-0-	2.0E4	5.9E2	2.1E6
Co-60	-0-	-0-	-0-	3.7E4	-0-	7.3E4	1.6E3	1.2E8
Sr-89	-0-	-0-	-0-	5.0E4	-0-	2.6E4	1.7E3	3.1E4
Sr-90	-0-	-0-	-0-	1.0E6	-0-	8.1E5	5.5E5	1.3E6
Zr-95	-0-	-0-	-0-	6.3E4	-0-	1.1E5	8.3E2	1.6E6
Nb-95	-0-	-0-	-0-	3.4E5	-0-	4.5E5	5.7E2	1.6E6
Te-129m	-0-	-0-	-0-	6.0E5	-0-	4.5E5	2.0E2	6.5E5
Cs-134	-0-	-0-	-0-	1.4E5	-0-	1.2E5	4.7E3	3.8E7
Cs-136	-0-	-0-	-0-	5.1E3	-0-	4.3E3	8.1E2	8.3E5
Cs-137	-0-	-0-	-0-	1.3E5	-0-	9.5E4	3.4E3	5.7E7
Ba-140	-0-	-0-	-0-	5.1E3	-0-	4.3E3	1.2E3	1.2E5
Ce-141	-0-	-0-	-0-	1.5E3	-0-	2.4E3	6.6E2	7.9E4
Ce-144	-0-	-0-	-0-	1.8E4	-0-	3.0E4	4.5E3	4.3E5
I -131	-0-	-0-	-0-	6.6E5	-0-	4.4E5	6.6E4	7.0E5
I -133	-0-	-0-	-0-	1.6E-2	-0-	8.7E-3	1.2E4	1.3E4
I -135	-0-	-0-	-0-	1.1E-18	-0-	6.4E-19	2.5E3	1.4E4
UN-ID	-0-	-0-	-0-	1.1E5	-0-	9.5E4	5.7E2	4.2E6

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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TABLE 2-13

DOSE PARAMETER R_i FOR SECTOR E

Pathway = Deer Consumer — Distance = 1.4 miles
X/Q = 3.0E-7 sec/m³ — D/Q = 4.7E-9 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	-0-	-0-	-0-	2.8E1	-0-	2.3E1	3.5E1	3.9E1
Cr-51	-0-	-0-	-0-	5.0E4	-0-	1.0E5	9.1E1	3.2E5
Mn-54	-0-	-0-	-0-	7.7E5	-0-	1.4E6	2.1E3	4.1E7
Co-57	-0-	-0-	-0-	4.6E6	-0-	8.0E6	8.6E6	2.3E7
Co-58	-0-	-0-	-0-	9.6E6	-0-	1.9E7	2.9E3	4.7E7
Co-60	-0-	-0-	-0-	3.6E7	-0-	7.2E7	7.8E3	7.2E8
Sr-89	-0-	-0-	-0-	4.9E7	-0-	2.6E7	8.3E3	3.1E7
Sr-90	-0-	-0-	-0-	1.0E9	-0-	8.0E8	2.7E6	1.2E9
Zr-95	-0-	-0-	-0-	6.2E7	-0-	1.1E8	4.1E3	2.0E8
Nb-95	-0-	-0-	-0-	2.3E8	-0-	4.5E8	2.8E3	8.2E8
Te-129m	-0-	-0-	-0-	5.9E8	-0-	4.5E8	1.0E3	5.3E8
Cs-134	-0-	-0-	-0-	1.4E8	-0-	1.2E8	2.3E4	3.4E8
Cs-136	-0-	-0-	-0-	5.1E6	-0-	4.2E6	4.0E3	9.5E6
Cs-137	-0-	-0-	-0-	1.2E8	-0-	9.3E7	1.7E4	4.0E8
Ba-140	-0-	-0-	-0-	5.0E6	-0-	4.2E6	6.0E3	7.4E6
Ce-141	-0-	-0-	-0-	1.5E6	-0-	2.4E6	3.3E3	4.2E6
Ce-144	-0-	-0-	-0-	1.8E7	-0-	2.9E7	2.2E4	4.9E7
I -131	-0-	-0-	-0-	6.5E8	-0-	4.3E8	3.3E5	5.9E8
I -133	-0-	-0-	-0-	1.6E-1	-0-	8.6E0	5.9E4	6.7E4
I -135	-0-	-0-	-0-	1.1E-15	-0-	6.3E-16	1.2E4	6.9E4
UN-ID	-0-	-0-	-0-	1.1E1	-0-	9.4E7	2.8E3	1.4E8

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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TABLE 2-13

DOSE PARAMETER R_i FOR SECTOR E

Pathway = Camp Horno
X/Q = 6.2E-8 sec/m³

Distance = 4.2 miles
D/Q = 5.8E-10 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	-0-	-0-	-0-	-0-	-0-	-0-	1.3E3	-0-
Cr-51	-0-	-0-	-0-	-0-	-0-	-0-	3.3E3	3.7E6
Mn-54	-0-	-0-	-0-	-0-	-0-	-0-	7.7E4	1.1E9
Co-57	-0-	-0-	-0-	-0-	-0-	-0-	3.1E4	2.7E8
Co-58	-0-	-0-	-0-	-0-	-0-	-0-	1.1E5	3.0E8
Co-60	-0-	-0-	-0-	-0-	-0-	-0-	2.8E5	1.7E10
Sr-89	-0-	-0-	-0-	-0-	-0-	-0-	3.0E5	1.7E4
Sr-90	-0-	-0-	-0-	-0-	-0-	-0-	9.9E7	-0-
Zr-95	-0-	-0-	-0-	-0-	-0-	-0-	1.5E5	2.0E8
Nb-95	-0-	-0-	-0-	-0-	-0-	-0-	1.0E5	1.1E8
Te-129m	-0-	-0-	-0-	-0-	-0-	-0-	3.7E4	1.6E7
Cs-134	-0-	-0-	-0-	-0-	-0-	-0-	8.5E5	5.5E9
Cs-136	-0-	-0-	-0-	-0-	-0-	-0-	1.5E5	1.2E8
Cs-137	-0-	-0-	-0-	-0-	-0-	-0-	6.2E5	8.2E9
Ba-140	-0-	-0-	-0-	-0-	-0-	-0-	2.2E5	1.6E7
Ce-141	-0-	-0-	-0-	-0-	-0-	-0-	1.2E5	1.1E7
Ce-144	-0-	-0-	-0-	-0-	-0-	-0-	8.2E5	5.6E7
I -131	-0-	-0-	-0-	-0-	-0-	-0-	1.2E7	1.4E7
I -133	-0-	-0-	-0-	-0-	-0-	-0-	2.2E6	2.0E6
I -135	-0-	-0-	-0-	-0-	-0-	-0-	4.5E5	2.0E6
UN-ID	-0-	-0-	-0-	-0-	-0-	-0-	1.0E5	6.0E8

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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TABLE 2-14

DOSE PARAMETER R_i FOR SECTOR F

Pathway = Sheep (Meat) Distance = 0.7 miles
X/Q = 1.0E-6 sec/m³ D/Q = 8.8E-9 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	-0-	-0-	-0-	1.5E0	-0-	1.2E0	7.0E0	2.1E0
Cr-51	-0-	-0-	-0-	5.1E1	-0-	1.0E2	1.8E1	2.6E4
Mn-54	-0-	-0-	-0-	7.8E2	-0-	1.4E3	4.3E2	7.6E6
Co-57	-0-	-0-	-0-	4.7E3	-0-	8.1E3	1.7E2	1.9E6
Co-58	-0-	-0-	-0-	9.7E3	-0-	2.0E4	5.9E2	2.1E6
Co-60	-0-	-0-	-0-	3.7E4	-0-	7.3E4	1.6E3	1.2E8
Sr-89	-0-	-0-	-0-	5.0E4	-0-	2.6E4	1.7E3	3.1E4
Sr-90	-0-	-0-	-0-	1.0E6	-0-	8.1E5	5.5E5	1.3E6
Zr-95	-0-	-0-	-0-	6.3E4	-0-	1.1E5	8.3E2	1.6E6
Nb-95	-0-	-0-	-0-	3.4E5	-0-	4.5E5	5.7E2	1.6E6
Te-129m	-0-	-0-	-0-	6.0E5	-0-	4.5E5	2.0E2	6.5E5
Cs-134	-0-	-0-	-0-	1.4E5	-0-	1.2E5	4.7E3	3.8E7
Cs-136	-0-	-0-	-0-	5.1E3	-0-	4.3E3	8.1E2	8.3E5
Cs-137	-0-	-0-	-0-	1.3E5	-0-	9.5E4	3.4E3	5.7E7
Ba-140	-0-	-0-	-0-	5.1E3	-0-	4.3E3	1.2E3	1.2E5
Ce-141	-0-	-0-	-0-	1.5E3	-0-	2.4E3	6.6E2	7.9E4
Ce-144	-0-	-0-	-0-	1.8E4	-0-	3.0E4	4.5E3	4.3E5
I -131	-0-	-0-	-0-	6.6E5	-0-	4.4E5	6.6E4	7.0E5
I -133	-0-	-0-	-0-	1.6E-2	-0-	8.7E-3	1.2E4	1.3E4
I -135	-0-	-0-	-0-	1.1E-18	-0-	6.4E-19	2.5E3	1.4E4
UN-ID	-0-	-0-	-0-	1.1E5	-0-	9.5E4	5.7E2	4.2E6

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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TABLE 2-14

DOSE PARAMETER R_i FOR SECTOR F

Pathway = Deer Consumer
X/Q = 7.8E-7 sec/m³

Distance = 0.9 miles
D/Q = 2.0E-9 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	-0-	-0-	-0-	2.8E1	-0-	2.3E1	3.5E1	3.9E1
Cr-51	-0-	-0-	-0-	5.0E4	-0-	1.0E5	9.1E1	3.2E5
Mn-54	-0-	-0-	-0-	7.7E5	-0-	1.4E6	2.1E3	4.1E7
Co-57	-0-	-0-	-0-	4.6E6	-0-	8.0E6	8.6E6	2.3E7
Co-58	-0-	-0-	-0-	9.6E6	-0-	1.9E7	2.9E3	4.7E7
Co-60	-0-	-0-	-0-	3.6E7	-0-	7.2E7	7.8E3	7.2E8
Sr-89	-0-	-0-	-0-	4.9E7	-0-	2.6E7	8.3E3	3.1E7
Sr-90	-0-	-0-	-0-	1.0E9	-0-	8.0E8	2.7E6	1.2E9
Zr-95	-0-	-0-	-0-	6.2E7	-0-	1.1E8	4.1E3	2.0E8
Nb-95	-0-	-0-	-0-	2.3E8	-0-	4.5E8	2.8E3	8.2E8
Te-129m	-0-	-0-	-0-	5.9E8	-0-	4.5E8	1.0E3	5.3E8
Cs-134	-0-	-0-	-0-	1.4E8	-0-	1.2E8	2.3E4	3.4E8
Cs-136	-0-	-0-	-0-	5.1E6	-0-	4.2E6	4.0E3	9.5E6
Cs-137	-0-	-0-	-0-	1.2E8	-0-	9.3E7	1.7E4	4.0E8
Ba-140	-0-	-0-	-0-	5.0E6	-0-	4.2E6	6.0E3	7.4E6
Ce-141	-0-	-0-	-0-	1.5E6	-0-	2.4E6	3.3E3	4.2E6
Ce-144	-0-	-0-	-0-	1.8E7	-0-	2.9E7	2.2E4	4.9E7
I -131	-0-	-0-	-0-	6.5E8	-0-	4.3E8	3.3E5	5.9E8
I -133	-0-	-0-	-0-	1.6E-1	-0-	8.6E0	5.9E4	6.7E4
I -135	-0-	-0-	-0-	1.1E-15	-0-	6.3E-16	1.2E4	6.9E4
UN-ID	-0-	-0-	-0-	1.1E1	-0-	9.4E7	2.8E3	1.4E8

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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TABLE 2-14

DOSE PARAMETER R_i FOR SECTOR F

Pathway = San Onofre State Park Guard Shack Distance = 1.0 miles
X/Q = 6.2E-7 sec/m³ D/Q = 5.0E-9 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	-0-	-0-	-0-	-0-	-0-	-0-	7.2E1	-0-
Cr-51	-0-	-0-	-0-	-0-	-0-	-0-	1.9E2	2.7E5
Mn-54	-0-	-0-	-0-	-0-	-0-	-0-	4.4E3	7.9E7
Co-57	-0-	-0-	-0-	-0-	-0-	-0-	1.8E3	2.0E7
Co-58	-0-	-0-	-0-	-0-	-0-	-0-	6.1E3	2.2E7
Co-60	-0-	-0-	-0-	-0-	-0-	-0-	1.6E4	1.2E9
Sr-89	-0-	-0-	-0-	-0-	-0-	-0-	1.7E4	1.2E3
Sr-90	-0-	-0-	-0-	-0-	-0-	-0-	5.7E6	-0-
Zr-95	-0-	-0-	-0-	-0-	-0-	-0-	8.6E3	1.4E7
Nb-95	-0-	-0-	-0-	-0-	-0-	-0-	5.9E3	7.8E6
Te-129m	-0-	-0-	-0-	-0-	-0-	-0-	2.1E3	1.1E6
Cs-134	-0-	-0-	-0-	-0-	-0-	-0-	4.8E4	3.9E8
Cs-136	-0-	-0-	-0-	-0-	-0-	-0-	8.4E3	8.6E6
Cs-137	-0-	-0-	-0-	-0-	-0-	-0-	3.5E4	5.9E8
Ba-140	-0-	-0-	-0-	-0-	-0-	-0-	1.2E4	1.2E6
Ce-141	-0-	-0-	-0-	-0-	-0-	-0-	6.9E3	7.8E5
Ce-144	-0-	-0-	-0-	-0-	-0-	-0-	4.7E4	4.0E6
I -131	-0-	-0-	-0-	-0-	-0-	-0-	6.8E5	9.8E5
I -133	-0-	-0-	-0-	-0-	-0-	-0-	1.2E5	1.4E5
I -135	-0-	-0-	-0-	-0-	-0-	-0-	2.6E4	1.4E5
UN-ID	-0-	-0-	-0-	-0-	-0-	-0-	5.9E3	4.3E7

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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TABLE 2-14

DOSE PARAMETER R_i FOR SECTOR F

Pathway = Border-Highway Patrol Weight Station Distance = 2.0 miles
X/Q = 2.2E-7 sec/m³ D/Q = 1.6E-9 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	-0-	-0-	-0-	-0-	-0-	-0-	3.6E2	-0-
Cr-51	-0-	-0-	-0-	-0-	-0-	-0-	9.5E2	1.3E6
Mn-54	-0-	-0-	-0-	-0-	-0-	-0-	2.2E4	3.9E8
Co-57	-0-	-0-	-0-	-0-	-0-	-0-	9.0E3	9.8E7
Co-58	-0-	-0-	-0-	-0-	-0-	-0-	3.0E4	1.1E8
Co-60	-0-	-0-	-0-	-0-	-0-	-0-	8.1E4	6.1E9
Sr-89	-0-	-0-	-0-	-0-	-0-	-0-	8.7E4	6.2E3
Sr-90	-0-	-0-	-0-	-0-	-0-	-0-	2.8E7	-0-
Zr-95	-0-	-0-	-0-	-0-	-0-	-0-	4.3E4	7.2E7
Nb-95	-0-	-0-	-0-	-0-	-0-	-0-	3.0E4	3.9E7
Te-129m	-0-	-0-	-0-	-0-	-0-	-0-	1.0E4	5.6E6
Cs-134	-0-	-0-	-0-	-0-	-0-	-0-	2.4E5	1.9E9
Cs-136	-0-	-0-	-0-	-0-	-0-	-0-	4.2E4	4.3E7
Cs-137	-0-	-0-	-0-	-0-	-0-	-0-	1.8E5	2.9E9
Ba-140	-0-	-0-	-0-	-0-	-0-	-0-	6.2E4	5.9E6
Ce-141	-0-	-0-	-0-	-0-	-0-	-0-	3.4E4	3.9E6
Ce-144	-0-	-0-	-0-	-0-	-0-	-0-	2.3E5	2.0E7
I -131	-0-	-0-	-0-	-0-	-0-	-0-	3.4E6	4.9E6
I -133	-0-	-0-	-0-	-0-	-0-	-0-	6.1E5	7.0E5
I -135	-0-	-0-	-0-	-0-	-0-	-0-	1.3E5	7.2E5
UN-ID	-0-	-0-	-0-	-0-	-0-	-0-	2.9E4	2.1E8

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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TABLE 2-15

DOSE PARAMETER R_i FOR SECTOR G

Pathway = San Onofre State Park Beach Campground Distance = 1.0 miles
X/Q = 6.2E-7 sec/m³ D/Q = 2.9E-9 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	8.0E1	-0-	1.4E2	-0-	1.6E2	-0-	1.6E2	-0-
Cr-51	4.4E1	5.7E5	1.3E2	5.7E5	3.7E2	5.7E5	4.1E2	5.7E5
Mn-54	3.1E3	1.7E8	5.3E3	1.7E8	8.2E3	1.7E8	9.5E3	1.7E8
Co-57	6.0E2	4.2E7	1.6E3	4.2E7	3.9E3	4.2E7	3.9E3	4.2E7
Co-58	1.4E3	4.7E7	4.2E3	4.7E7	1.2E4	4.7E7	1.3E4	4.7E7
Co-60	3.9E3	2.7E9	1.2E4	2.7E9	3.2E4	2.7E9	3.5E4	2.7E9
Sr-89	4.9E4	2.7E3	7.4E4	2.7E3	5.4E4	2.7E3	3.7E4	2.7E3
Sr-90	5.0E6	-0-	1.2E7	-0-	1.3E7	-0-	1.2E7	-0-
Zr-95	2.7E3	3.1E7	7.5E3	3.1E7	1.8E4	3.1E7	1.9E4	3.1E7
Nb-95	1.6E3	1.7E7	4.6E3	1.7E7	1.2E4	1.7E7	1.3E4	1.7E7
Te-129m	3.9E3	2.4E6	6.2E3	2.4E6	6.4E3	2.4E6	4.5E3	2.4E6
Cs-134	8.7E4	8.4E8	1.3E5	8.4E8	1.4E5	8.4E8	1.0E5	8.4E8
Cs-136	1.7E4	1.9E7	2.1E4	1.9E7	2.4E4	1.9E7	1.8E4	1.9E7
Cs-137	7.5E4	1.3E9	1.0E5	1.3E9	1.0E5	1.3E9	7.7E4	1.3E9
Ba-140	6.9E3	2.5E6	9.1E3	2.5E6	2.8E4	2.5E6	2.7E4	2.5E6
Ce-141	2.7E3	1.7E6	7.0E3	1.7E6	1.6E4	1.7E6	1.5E4	1.7E6
Ce-144	1.8E4	8.6E6	4.8E4	8.6E6	1.1E5	8.6E6	1.0E5	8.6E6
I -131	1.8E6	2.1E6	2.0E6	2.1E6	1.8E6	2.1E6	1.5E6	2.1E6
I -133	4.4E5	3.0E5	4.7E5	3.0E5	3.6E5	3.0E5	2.7E7	3.0E5
I -135	8.6E4	3.1E5	9.8E4	3.1E5	7.7E4	3.1E5	5.5E4	3.1E5
UN-ID	7.7E3	9.2E7	1.4E4	9.2E7	1.6E4	9.2E7	1.3E4	9.2E7

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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TABLE 2-15

DOSE PARAMETER R_i FOR SECTOR G

Pathway = Hwy Patrol Weigh Station
X/Q = 1.8E-7 sec/m³

Distance = 2.2 miles
D/Q = 7.1E-10 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	-0-	-0-	-0-	-0-	-0-	-0-	2.9E2	-0-
Cr-51	-0-	-0-	-0-	-0-	-0-	-0-	7.6E2	1.1E6
Mn-54	-0-	-0-	-0-	-0-	-0-	-0-	1.8E4	3.2E8
Co-57	-0-	-0-	-0-	-0-	-0-	-0-	7.2E3	7.8E7
Co-58	-0-	-0-	-0-	-0-	-0-	-0-	2.4E4	8.7E7
Co-60	-0-	-0-	-0-	-0-	-0-	-0-	6.5E4	4.9E9
Sr-89	-0-	-0-	-0-	-0-	-0-	-0-	6.9E4	4.9E3
Sr-90	-0-	-0-	-0-	-0-	-0-	-0-	2.3E7	-0-
Zr-95	-0-	-0-	-0-	-0-	-0-	-0-	3.4E4	5.7E7
Nb-95	-0-	-0-	-0-	-0-	-0-	-0-	2.4E4	3.1E7
Te-129m	-0-	-0-	-0-	-0-	-0-	-0-	8.3E3	4.5E6
Cs-134	-0-	-0-	-0-	-0-	-0-	-0-	1.9E5	1.6E9
Cs-136	-0-	-0-	-0-	-0-	-0-	-0-	3.3E4	3.4E7
Cs-137	-0-	-0-	-0-	-0-	-0-	-0-	1.4E5	2.3E9
Ba-140	-0-	-0-	-0-	-0-	-0-	-0-	5.0E4	4.7E6
Ce-141	-0-	-0-	-0-	-0-	-0-	-0-	2.7E4	3.1E6
Ce-144	-0-	-0-	-0-	-0-	-0-	-0-	1.9E5	1.6E7
I -131	-0-	-0-	-0-	-0-	-0-	-0-	2.7E6	3.9E6
I -133	-0-	-0-	-0-	-0-	-0-	-0-	4.9E5	5.6E5
I -135	-0-	-0-	-0-	-0-	-0-	-0-	1.0E5	5.8E5
UN-ID	-0-	-0-	-0-	-0-	-0-	-0-	2.4E4	1.7E8

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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TABLE 2-15

DOSE PARAMETER R_i FOR SECTOR G

Pathway = Sheep (Meat) Distance = 3.1 miles
X/Q = 1.0E-7 sec/m³ D/Q = 3.8E-10 m⁻²

Radio-Nuclide	Infant		Child		Teen		Adult	
	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway	Inhalation Pathway	Food & Ground Pathway
H -3	-0-	-0-	-0-	1.5E0	-0-	1.2E0	7.0E0	2.1E0
Cr-51	-0-	-0-	-0-	5.1E1	-0-	1.0E2	1.8E1	2.6E4
Mn-54	-0-	-0-	-0-	7.8E2	-0-	1.4E3	4.3E2	7.6E6
Co-57	-0-	-0-	-0-	4.7E3	-0-	8.1E3	1.7E2	1.9E6
Co-58	-0-	-0-	-0-	9.7E3	-0-	2.0E4	5.9E2	2.1E6
Co-60	-0-	-0-	-0-	3.7E4	-0-	7.3E4	1.6E3	1.2E8
Sr-89	-0-	-0-	-0-	5.0E4	-0-	2.6E4	1.7E3	3.1E4
Sr-90	-0-	-0-	-0-	1.0E6	-0-	8.1E5	5.5E5	1.3E6
Zr-95	-0-	-0-	-0-	6.3E4	-0-	1.1E5	8.3E2	1.6E6
Nb-95	-0-	-0-	-0-	3.4E5	-0-	4.5E5	5.7E2	1.6E6
Te-129m	-0-	-0-	-0-	6.0E5	-0-	4.5E5	2.0E2	6.5E5
Cs-134	-0-	-0-	-0-	1.4E5	-0-	1.2E5	4.7E3	3.8E7
Cs-136	-0-	-0-	-0-	5.1E3	-0-	4.3E3	8.1E2	8.3E5
Cs-137	-0-	-0-	-0-	1.3E5	-0-	9.5E4	3.4E3	5.7E7
Ba-140	-0-	-0-	-0-	5.1E3	-0-	4.3E3	1.2E3	1.2E5
Ce-141	-0-	-0-	-0-	1.5E3	-0-	2.4E3	6.6E2	7.9E4
Ce-144	-0-	-0-	-0-	1.8E4	-0-	3.0E4	4.5E3	4.3E5
I -131	-0-	-0-	-0-	6.6E5	-0-	4.4E5	6.6E4	7.0E5
I -133	-0-	-0-	-0-	1.6E-2	-0-	8.7E-3	1.2E4	1.3E4
I -135	-0-	-0-	-0-	1.1E-18	-0-	6.4E-19	2.5E3	1.4E4
UN-ID	-0-	-0-	-0-	1.1E5	-0-	9.5E4	5.7E2	4.2E6

Inhalation Pathway, units = $\frac{\text{mrem/yr}}{\mu\text{Ci/m}^3}$

Food & Ground Pathway, units = $\frac{(\text{m}^2)(\text{mrem/yr})}{\mu\text{Ci/sec}}$

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2.4 TOTAL DOSE CALCULATIONS (3.17)

2.4.1 Total Dose to Most Likely Member of the Public.

The total annual dose or total dose commitment to any member of the public, due to releases of radioactivity and to radiation, from uranium fuel cycle sources within 5 miles of the Site is calculated using the following expressions. This methodology is used to meet the dose limitations of 40 CFR 190 per twelve consecutive months. The transportation of radioactive material is excluded from the dose calculations.

The Annual Total Dose is determined monthly for maximum organ (gas & liquid), whole body (gas & liquid) and thyroid (gas & liquid) to verify that the Site total (Units 1, 2 and 3) is less than or equal to 25 mrem, 25 mrem and 75 mrem respectively.

.1 Annual Total Organ Dose (D_{TOT}(organ))

$$D^{*}_{TOT}(\text{organ}) = \sum_{l=1}^{12} \sum_{j=1}^{2/3} \left[D_{jl}(OG) + D_{jl}(OL) + D^{H^3}_{jl}(OG) \right] ; \qquad (2\text{-}20)$$

j = Units 1, 2 and 3

l = months 1 - 12**

*NOTE: $D^{H^3}_{jl}(OG) = 0$ for bone

**All to be summed over the most recent 12 months.

Where:

$$D_{jl}(OG) = K \sum_{i=1}^{n} C_{il} R_{ikl} W_k ; \qquad (2\text{-}21)$$

i = each isotope in specific organ category

$$K = 3.1688E\text{-}2 \frac{\text{year-}\mu\text{Ci}}{\text{sec-Ci}}$$

2.4.1 Total Dose to Most Likely Member of the Public (Continued)

n = Number of isotopes in the specified organ category

C_{il} = Total particulate gas curies released for the month

$R_{ikl}W_k$ = Controlling location factors from ODCM Tables 2-4, Units 1 and 2/3

$D_{jl}(OL)$ = Liquid organ dose for the specified organ in mrem for the month. [Reference ODCM Units 2/3 (1-19), Unit 1 (1-13)]

$D^{H^3}_{jl}(OG)$ = Gas organ dose form tritium in mrem for the month. (Note: H^3 bone contribution = 0)

.2 Annual Total Whole Body Dose ($D_{TOT}(WB)$)

$$D_{TOT}(WB) = \sum_{l=1}^{12} \sum_{j=1}^{2/3} \left[D_{jl}(WBL) + D^{H^3}_{jl}(OG) + 0.9\, D_{jl}(\gamma) \right] + D(Direct); \quad (2\text{-}22)$$

j = Units 1, 2 and 3
l = months 1 - 12*

*To be summed over the most recent 12 months.

Where:

$D_{jl}(WBL)$ = Liquid whole body organ dose in mrem for the whole month. [Reference ODCM Units 2/3 (1-19,) Unit 1 ODCM (1-13)]

$D^{H^3}_{jl}(OG)$ = Gas organ dose from tritium in mrem for the month. (from (2-21))

$D_{jl}(\gamma)$ = Gamma air dose in mrad for the month. 0.9 converts mrad to mrem. [Reference ODCM Units 2/3 (2-14), Unit 1 ODCM (2-10)]

$$D(Direct) = \sum_{j=1}^{4} \left[\max[D(beach)_i] - \frac{\sum_{i=1}^{n} D(bkgd)_i}{n} \right] .0342 \quad (2\text{-}23)$$

i = for all TLDs per quarter
j = for Quarters 1-4

2.4.1.2 Annual Total Whole Body Dose ($D_{TOT}(WB)$) (Continued)

*Direct Radiation

The direct radiation levels are evaluated most recently using cadmium covered TLDs. The TLDs are placed at 59 locations around the site. The average dose from TLDs 5 to 50 miles from the site is used as background. These sites are subject to change.

The background is subtracted from the highest reading beach TLD (numbers 55 through 58). This value is the direct dose but must be prorated by the beach occupancy time of 300 hours, a factor of 0.0342.

.3 Annual Total Thyroid Dose ($D_{TOT}(THYROID)$)

$$D_{TOT}(THYROID) = \sum_{l=1}^{12} \sum_{j=1}^{2/3} \left[(D_{jl}(OG) + D_{jl}(OL) \right] ; \qquad (2\text{-}24)$$

j = Units 1, 2 and 3
l = months 1 - 12*

*To be summed over the most recent 12 months.

Where:

$D_{jl}(OG)$ = Thyroid organ dose from gaseous iodine for the month in mrem. (from 2-21)

$D_{jl}(OL)$ = Liquid thyroid organ dose for the month in mrem. [Reference ODCM Units 2/3 (1-19), Unit 1 ODCM (1-13)]

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TABLE 5-1

RADIOLOGICAL ENVIRONMENTAL MONITORING SAMPLE LOCATIONS

	TYPE OF SAMPLE AND SAMPLING LOCATION***	DISTANCE* (miles)	DIRECTION*
Direct Radiation			
1	City of San Clemente (SDG&E Offices)	5.6	NW
2	Camp San Mateo (MCB, Camp Pendleton)	3.5	N
3	Camp San Onofre (MCB, Camp Pendleton)	2.6	NE
4	Camp Horno (MCB, Camp Pendleton)	4.5	E
5	Camp Las Pulgas (MCB, Camp Pendleton)	8.5	E
6	Old Route 101 (East-Southeast)	3.0	ESE
7	Old Route 101 (East-Northeast)	0.5	ENE
8	Noncommissioned Officers Beach Club	1.5	NW
9	Basilone Road/I-5 Freeway Offramp	2.0	NW
10	Bluff (Adjacent to PIC #1)	0.7	WNW
11	Former Visitor's Center	0.3**	NW
12	South Edge of Switchyard	0.2**	E
13	Southeast Site boundary (Bluff)	0.4**	SE
14	Huntington Beach Generating Station	37	NW
15	Southeast Site Boundary (Office Building)	0.2**	SE
16	East Southeast Site Boundary	0.4**	ESE
17	Transit Dose	-	-
18	Transit Dose	-	-
19	San Clemente Highlands	5.0	NNW
20	San Clemente Pier	5.3	NW
21	Concordia Elementary School - San Clemente	3.5	NW
22	Former Coast Guard Station - San Mateo Paint	2.7	WNW
23	San Clemente General Hospital	8.2	NW
24	San Clemente High School	6.0	NW

* Distance (miles) and Direction (sector) are measured relative to Units 2 and 3 midpoint. Direction is determined from degrees true north.

** Distances are within the Units 2 and 3 Site Boundary (0.4 mile in all sectors) and not required by Technical Specification.

*** MCB - Marine Corps Base PIC - Pressurized Ion Chamber

TABLE 5-1

RADIOLOGICAL ENVIRONMENTAL MONITORING SAMPLE LOCATIONS

	TYPE OF SAMPLE AND SAMPLING LOCATION***	DISTANCE* (miles)	DIRECTION*
Direct Radiation (Continued)			
25	Convalescent Home - San Clemente	8.0	NW
26	Dana Hills High School	11.0	NW
27	U.S. Post Office - Dana Point	10.6	NW
28	Doheny Fire Station - Capistrano Beach	9.5	NW
29	San Juan Capistrano Fire Station	10.8	NW
30	Laguna Beach Fire Station	17.5	NW
31	Aurora Park-Mission Viejo	18.7	NNW
32	Santa Ana Police Department	32.0	NW
33	Camp Talega (MCB, Camp Pendleton)	5.7	N
34	San Onofre School (MCB, Camp Pendleton)	1.9	NW
35	Range 312 (MCB, Camp Pendleton)	4.7	NNE
36	Range 208C (MCB, Camp Pendleton)	4.2	NE
37	Laguna Niguel Fire Station	14.2	NW
38	San Onofre State Beach Park	3.3	SE
39	Basilone Road Trailer Park (MCB, Camp Pendleton)	1.4	NNW
40	SCE Training Center - Mesa (Adjacent to PIC #3)	0.7	NNW
41	Old Route 101 - East	0.4	E
42	Horno Canyon (MCB, Camp Pendleton)	4.7	E
43	Edson Range (MCB, Camp Pendleton)	10.6	SE
44	Fallbrook Fire Station	18.0	E
45	Interstate 5 Weigh Station	2.0	ESE
46	San Onofre State Beach Park	1.0	SE
47	Camp Las Flores (MCB, Camp Pendleton)	8.6	SE
48	Mainside (MCB, Camp Pendleton)	15.0	ESE

* Distance (miles) and Direction (sector) are measured relative to Units 2 and 3 midpoint. Direction is determined from degrees true north.

** Distances are within the Units 2 and 3 Site Boundary (0.4 mile in all sectors) and not required by Technical Specification.

*** MCB - Marine Corps Base PIC - Pressurized Ion Chamber

TABLE 5-1

RADIOLOGICAL ENVIRONMENTAL MONITORING SAMPLE LOCATIONS

	TYPE OF SAMPLE AND SAMPLING LOCATION***	DISTANCE* (miles)	DIRECTION*
Direct Radiation (Continued)			
49	Camp Chappo (MCB, Camp Pendleton)	12.8	ESE
50	Oceanside Fire Station	15.5	SE
51	Carlsbad Fire Station	18.6	SE
52	Vista Fire Station	21	ESE
53	San Diego County Operations Center	45	SE
54	Escondido Fire Station	32	ESE
55	San Onofre State Beach (Unit 1, West Southwest)	0.2**	WSW
56	San Onofre State Beach (Unit 1, Southwest)	0.1**	SW
57	San Onofre State Beach (Unit 2)	0.1**	SSW
58	San Onofre State Beach (Unit 3)	0.1**	S
59	SONGS Meteorological Tower	0.3**	WNW
60	Transit Control Storage Area	-	-
61	Mesa - East Boundary (Adjacent to PIC #4)	0.7	N
62	MCB - Camp Pendleton (Adjacent to PIC #5)	0.6	NNE
63	MCB - Camp Pendleton (Adjacent to PIC #6)	0.6	NE
64	MCB - Camp Pendleton (Adjacent to PIC #7)	0.5	ENE
65	MCB - Camp Pendleton (Adjacent to PIC #8)	0.7	E
66	San Onofre State Beach (Adjacent to PIC #9)	0.6	ESE
67	Former SONGS Evaporation Pond (Adjacent to PIC #2)	0.6	NW
68	Range 210C (MCB, Camp Pendleton)	4.3	ENE
99	Transit Dose	-	-

* Distance (miles) and Direction (sector) are measured relative to Units 2 and 3 midpoint. Direction is determined from degrees true north.

** Distances are within the Units 2 and 3 Site Boundary (0.4 mile in all sectors) and not required by Technical Specification.

*** MCB - Marine Corps Base PIC - Pressurized Ion Chamber

TABLE 5-1

RADIOLOGICAL ENVIRONMENTAL MONITORING SAMPLE LOCATIONS

	TYPE OF SAMPLE AND SAMPLING LOCATION	DISTANCE* (miles)	DIRECTION*
Airborne			
1	City of San Clemente (City Hall)	5.5	NW
2	Camp San Onofre (Camp Pendleton)	1.8	NE
3	Huntington Beach Generating Station	37.0	NW
5	Units 2 and 3 Switchyard	0.13**	NNE
6	SONGS Meteorological Tower	0.3**	WNW
9	State Beach Park	0.6	ESE
10	Bluff	0.7	WNW
11	Mesa EOF	0.7	NNW
12	Former SONGS Evaporation Pond	0.6	NW
13	Marine Corps Base (Camp Pendleton East)	0.7	E
Soil Samples			
1	Camp San Onofre	2.5	NE
2	Old Route 101 - East Southeast	3.0	ESE
3	Basilone Road/I-5 Freeway Offramp	2.0	NW
4	Huntington Beach Generating Station	37.0	NW
5	Former Visitor's Center	0.2**	NNW
Ocean Water			
A	Station Discharge Outfall - Unit 1	0.5	SSW
B	Outfall - Unit 2	0.7	SW
C	Outfall - Unit 3	0.7	SW
D	Newport Beach	30.0	NW

* Distance (miles) and Direction (sector) are measured relative to Units 2 and 3 midpoint. Direction is determined from degrees true north.

** Distances are within the Units 2 and 3 Site boundary (0.4 mile in all sectors) and not required by Technical Specification.

TABLE 5-1

RADIOLOGICAL ENVIRONMENTAL MONITORING SAMPLE LOCATIONS

TYPE OF SAMPLE AND SAMPLING LOCATION		DISTANCE* (miles)	DIRECTION*
Drinking Water			
1	Tri-Cities Municipal Water District Reservoir	8.7	NW
2	San Clemente Golf Course Well	3.5	NNW
3	Huntington Beach	37.0	NW
Shoreline Sediment (Beach Sand)			
1	San Onofre State Beach (0.6 mile Southeast)	0.6	SE
2	San Onofre Surfing Beach	0.9	NW
3	San Onofre State Beach (3.1 miles Southeast)	3.1	SE
4	Newport Beach (North End)	30.0	NW
Local Crops			
1	San Mateo Canyon (San Clemente Canyon)	2.6	NW
2	Southeast of Oceanside	22.0	SE

* Distance (miles) and Direction (sector) are measured relative to Units 2 and 3 midpoint. Direction is determined from degrees true north.

TABLE 5-1

RADIOLOGICAL ENVIRONMENTAL MONITORING SAMPLE LOCATIONS

TYPE OF SAMPLE AND SAMPLING LOCATION		DISTANCE* (miles)	DIRECTION*
Non-Migratory Marine Animals			
A	Unit 1 Outfall	0.6	WSW
B	Units 2 and 3 Outfall	0.7	SSW
C	Newport Beach	30.0	NW
Kelp			
A	San Onofre Kelp Bed	1.5	S
B	San Mateo Kelp Bed	3.5	WNW
C	Barn Kelp Bed	6.6	SSE
D	Newport Beach	30.0	NW
Ocean Bottom Sediments			
A	Unit 1 Outfall (0.5 mile West)	0.5	W
B	Unit 1 Outfall (0.6 mile West)	0.6	W
C	Unit 2 Outfall	0.8	SSW
D	Unit 3 Outfall	0.9	S
E	Newport Beach	30.0	NW

* Distance (miles) and Direction (sector) are measured relative to Units 2 and 3 midpoint. Direction is determined from degrees true north.

TABLE 5-2

PIC - RADIOLOGICAL ENVIRONMENTAL MONITORING LOCATIONS
SONGS 1

PRESSURIZED ION CHAMBERS		Theta (Degrees)*	DISTANCE* Meters	miles	DIRECTION/SECTOR*	
S1	San Onofre Beach	298°	1070	0.7	WNW	P
S2	SONGS Former Evap. Pnd	313°	890	0.6	NW	Q
S3	Japanese Mesa	340°	1150	0.7	NNW	R
S4	MCB - Camp Pendleton	3°	1120	0.7	N	A
S5	MCB - Camp Pendleton	19°	1050	0.6	NNE	B
S6	MCB - Camp Pendleton	46°	940	0.6	NE	C
S7	MCB - Camp Pendleton	70°	870	0.5	ENE	D
S8	MCB - Camp Pendleton	98°	1120	0.7	E	E
S9	San Onofre State Beach	121°	940	0.6	ESE	F

* Distance (meters/miles) and Direction (sector) are measured relative to Units 2 and 3 midpoint. Theta direction is determined from degrees true north.

TABLE 5-3

SECTOR AND DIRECTION DESIGNATION FOR RADIOLOGICAL ENVIRONMENTAL MONITORING SAMPLE LOCATION MAP

DEGREES TRUE NORTH FROM SONGS 2 AND 3 MID-POINT			NOMENCLATURE	
Sector Limit	Center Line	Sector Limit	22.5° Sector*	Direction
348.75	0 & 360	11.25	A	N
11.25	22.5	33.75	B	NNE
33.75	45.0	56.25	C	NE
56.25	67.5	78.75	D	ENE
78.75	90.0	101.25	E	E
101.25	112.0	123.75	F	ESE
123.75	135.0	146.25	G	SE
146.25	157.0	168.75	H	SSE
168.75	180.0	191.25	J	S
191.25	202.5	213.75	K	SSW
213.75	225.0	236.25	L	SW
236.25	247.5	258.75	M	WSW
258.75	270.0	281.15	N	W
281.25	292.5	303.75	P	WNW
303.75	315.0	326.25	Q	NW
326.25	337.5	348.75	R	NNW

* Distance (miles) and Direction (sector) are measured relative to Units 2 and 3 midpoint. Direction is determined from degrees true North.