



SAN ONOFRE NUCLEAR GENERATING STATION

Annual Radioactive Effluent Release Report

1994

January - December



Southern California Edison Company

SAN ONOFRE NUCLEAR GENERATING STATION

P. O. BOX 128

SAN CLEMENTE, CALIFORNIA 92674-0128

PREFACE

San Onofre Nuclear Generating Station is located next to San Onofre State Beach, adjoining Camp Pendleton Marine Corps Base, in San Diego County, 64 miles south of Los Angeles, California. There are two operating pressurized water reactors with a total rated capacity of 2254 net megawatts electrical.

Unit 1, rated at 410 net megawatts electrical, was supplied by Westinghouse Electric Company and began commercial operation on January 1, 1968. The unit was permanently shutdown on November 30, 1992. It is owned by Southern California Edison (80%) and San Diego Gas and Electric (20%).

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

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SECTION A. INTRODUCTION

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

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

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SECTION B. GASEOUS EFFLUENTS

Table 1A, "Gaseous Effluents-Summation of All Releases," provides a detailed listing of gaseous effluents released quarterly in four categories: fission and activation gases, iodine-131, particulates with half-lives greater than eight days, and tritium. Listed for each of the four categories are:

- (1) the total curies released
- (2) the average release rate
- (3) the percent of applicable limit
- (4) the estimated total error

In addition, the particulate category lists the gross alpha radioactivity released for each quarter.

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

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

Table 1C, "Gaseous Effluents-Ground Level Releases," provides the systematic listing by radionuclide for the quantity of radioactivity released in three categories: fission gases, iodines, and particulates. The total radioactivity for each radionuclide is listed for each quarterly period by "continuous" mode of release. Plant stack releases are considered to be "continuous" releases. As of 8/4/93, "batch" mode releases are no longer conducted because of the permanent shutdown of the reactor.

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

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

Table 1F, "Gaseous Effluents-Batch Release Summary," has been deleted. "Batch" mode releases are no longer conducted as of 8/4/93, due to the permanent shutdown of the reactor.

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TABLE 1A

GASEOUS EFFLUENTS-SUMMATION OF ALL RELEASES

| | Unit | First Quarter | Second Quarter | Estimated Total Error, % |
|--|---------|---------------|----------------|--------------------------|
| A. Fission and activation gases | | | | |
| 1. Total release | Ci | <LLD | <LLD | 3.00E+1 |
| 2. Average release rate for period | μCi/sec | 0.00E+0 | 0.00E+0 | |
| 3. Percent of applicable limit | % | 0.00E+0 | 0.00E+0 | |
| B. Iodines | | | | |
| 1. Total iodine-131 | Ci | <LLD | <LLD | 1.90E+1 |
| 2. Average release rate for period | μCi/sec | 0.00E+0 | 0.00E+0 | |
| 3. Percent of applicable limit | % | 0.00E+0 | 0.00E+0 | |
| C. Particulates | | | | |
| 1. Particulates with half-lives > 8 days | Ci | <LLD | <LLD | 1.60E+1 |
| 2. Average release rate for period | μCi/sec | 0.00E+0 | 0.00E+0 | |
| 3. Percent of applicable limit | % | 0.00E+0 | 0.00E+0 | |
| 4. Gross alpha activity | Ci | 2.50E-7 | 2.71E-8 | 5.00E+1 |
| D. Tritium | | | | |
| 1. Total release | Ci | 5.53E-1 | 1.54E-1 | 2.50E+1 |
| 2. Average release rate for period | μCi/sec | 7.11E-2 | 1.96E-2 | |
| 3. Percent of applicable limit | % | 9.25E-4 | 2.55E-4 | |

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TABLE 1A (Continued)

GASEOUS EFFLUENTS-SUMMATION OF ALL RELEASES

| | Unit | Third Quarter | Fourth Quarter | Estimated Total Error, % |
|--|---------|------------------|-------------------|--------------------------------|
| A. Fission and activation gases | | | | |
| 1. Total release | Ci | <LLD | <LLD | 3.00E+1 |
| 2. Average release rate for period | μCi/sec | 0.00E+0 | 0.00E+0 | |
| 3. Percent of applicable limit | % | 0.00E+0 | 0.00E+0 | |
| B. Iodines | | | | |
| 1. Total iodine-131 | Ci | <LLD | <LLD | 1.90E+1 |
| 2. Average release rate for period | μCi/sec | 0.00E+0 | 0.00E+0 | |
| 3. Percent of applicable limit | % | 0.00E+0 | 0.00E+0 | |
| C. Particulates | | | | |
| 1. Particulates with half- lives > 8 days | Ci | <LLD | <LLD | 1.60E+1 |
| 2. Average release rate for period | μCi/sec | 0.00E+0 | 0.00E+0 | |
| 3. Percent of applicable limit | % | 0.00E+0 | 0.00E+0 | |
| 4. Gross alpha activity | Ci | <LLD | 9.30E-8 | 5.00E+1 |
| D. Tritium | | | | |
| 1. Total release | Ci | 1.86E+0 | 8.98E-1 | 2.50E+1 |
| 2. Average release rate for period | μCi/sec | 2.34E-1 | 1.13E-1 | |
| 3. Percent of applicable limit | % | 3.04E-3 | 1.47E-3 | |

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TABLE 1C

GASEOUS EFFLUENTS-GROUND LEVEL RELEASES
CONTINUOUS MODE

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

LLD Lower Limit of Detection; see Table 1D.

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

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TABLE 1D

GASEOUS EFFLUENTS-LOWER LIMIT OF DETECTION
CONTINUOUS MODE

| Radionuclides | LLD ($\mu\text{Ci/cc}$) |
|---------------------------------|---------------------------|
| 1. Fission and activation gases | |
| krypton-85 | 2.00E-5 |
| krypton-85m | 4.80E-8 |
| krypton-87 | 2.50E-7 |
| krypton-88 | 1.70E-7 |
| xenon-133 | 1.20E-7 |
| xenon-133m | 3.90E-7 |
| xenon-135 | 5.00E-8 |
| xenon-135m | 2.00E-6 |
| xenon-138 | 3.30E-6 |
| 2. Iodines | |
| iodine-131 | 1.90E-13 |
| iodine-133 | 1.20E-12 |
| iodine-135 | 3.20E-11 |
| 3. Particulates | |
| barium-140 | 3.00E-13 |
| cerium-141 | 4.90E-14 |
| cerium-144 | 2.00E-13 |
| cesium-134 | 1.20E-13 |
| cesium-137 | 9.60E-14 |
| cobalt-58 | 1.10E-13 |
| cobalt-60 | 1.70E-13 |
| iron-59 | 2.60E-13 |
| lanthanum-140 | 6.30E-13 |
| manganese-54 | 1.10E-13 |
| molybdenum-99 | 5.20E-14 |
| strontium-89 | 1.00E-14 |
| strontium-90 | 1.00E-15 |
| zinc-65 | 2.80E-13 |
| 4. gross alpha | 1.00E-14 |

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

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TABLE 1E

GASEOUS EFFLUENTS-RADIATION DOSES AT THE SITE BOUNDARY

| | Unit | First Quarter | Second Quarter | Third Quarter | Fourth Quarter |
|--|------|---------------|----------------|---------------|----------------|
| A. Noble Gas | | | | | |
| 1. Gamma Air Dose | mrad | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| 2. Percent Applicable Limit | % | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| 3. Beta Air Dose | mrad | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| 4. Percent Applicable Limit | % | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| B. Tritium, Iodine, Particulates (at the nearest receptor) | | | | | |
| 5. Organ Dose | mrem | 1.96E-5 | 5.46E-6 | 6.60E-5 | 3.19E-5 |
| 6. Percent Applicable Limit | % | 2.61E-4 | 7.28E-5 | 8.80E-4 | 4.26E-4 |

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

TABLE 1F

GASEOUS EFFLUENTS-BATCH RELEASE SUMMARY

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

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SECTION C. LIQUID EFFLUENTS

Table 2A, "Liquid Effluents-Summation of All Releases," provides a detailed summary of liquid effluents released quarterly in three categories: fission and activation products, tritium, and dissolved and entrained gases. Listed for each of the three categories are:

- (1) the total curies released
- (2) the average diluted concentration
- (3) the percent of applicable limit
- (4) the estimated total error

In addition, Table 2A lists:

- (1) the gross alpha radioactivity
- (2) the volume of waste released (prior to dilution)
- (3) the volume of dilution water

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

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

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

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

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

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TABLE 2A

LIQUID EFFLUENTS-SUMMATION OF ALL RELEASES

| | Unit | First Quarter | Second Quarter | Estimated Total Error, % |
|--|--------|---------------|----------------|--------------------------|
| A. Fission and activation products ⁽¹⁾ | | | | |
| 1. Total release (not including tritium, gases, alpha) | Ci | 1.71E-3 | 4.10E-4 | 1.90E+1 |
| 2. Average diluted concentration during period | μCi/ml | 6.90E-10 | 2.07E-10 | |
| 3. Percent of applicable limit | % | 6.95E-2 | 2.01E-2 | |
| B. Tritium | | | | |
| 1. Total release | Ci | 1.17E-2 | 2.15E-4 | 1.90E+1 |
| 2. Average diluted concentration during period | μCi/ml | 4.72E-9 | 1.09E-10 | |
| 3. Percent of applicable limit | % | 4.72E-4 | 1.09E-5 | |
| C. Dissolved and entrained gases | | | | |
| 1. Total release | Ci | <LLD | <LLD | 1.90E+1 |
| 2. Average diluted concentration during period | μCi/ml | 0.00E+0 | 0.00E+0 | |
| 3. Percent of applicable limit | % | 0.00E+0 | 0.00E+0 | |
| D. Gross alpha radioactivity ⁽¹⁾ | | | | |
| 1. Total release | Ci | <LLD | <LLD | 5.00E+1 |
| E. Volume of waste released (prior to dilution) | liters | 7.57E+4 | 3.79E+4 | 5.00E+0 |
| F. Volume of dilution water used during period | liters | 2.48E+9 | 1.98E+9 | 5.00E+0 |

(1) Yard Drain Sump sample from 11/07/94 was inadvertently discarded. The 11/09/94 sample was used to account for the missing sample for composite analysis. See CDIR 94-010.

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TABLE 2A (Continued)

LIQUID EFFLUENTS-SUMMATION OF ALL RELEASES

| | Unit | Third Quarter | Fourth Quarter | Estimated Total Error, % |
|--|--------|------------------|-------------------|--------------------------------|
| A. Fission and activation products | | | | |
| 1. Total release (not including tritium, gases, alpha) | Ci | 2.80E-5 | 1.68E-4 | 1.90E+1 |
| 2. Average diluted concentration during period | μCi/ml | 1.79E-11 | 8.69E-11 | |
| 3. Percent of applicable limit | % | 1.82E-3 | 8.79E-3 | |
| B. Tritium | | | | |
| 1. Total release | Ci | 1.66E-4 | 3.20E-3 | 1.90E+1 |
| 2. Average diluted concentration during period | μCi/ml | 1.06E-10 | 1.66E-9 | |
| 3. Percent of applicable limit | % | 1.06E-5 | 1.66E-4 | |
| C. Dissolved and entrained gases | | | | |
| 1. Total release | Ci | <LLD | <LLD | 1.90E+1 |
| 2. Average diluted concentration during period | μCi/ml | 0.00E+0 | 0.00E+0 | |
| 3. Percent of applicable limit | % | 0.00E+0 | 0.00E+0 | |
| D. Gross alpha radioactivity | | | | |
| 1. Total release | Ci | <LLD | <LLD | 5.00E+1 |
| E. Volume of waste released (prior to dilution) | liters | 7.57E+4 | 9.46E+4 | 5.00E+0 |
| F. Volume of dilution water used during period | liters | 1.57E+9 | 1.93E+9 | 5.00E+0 |

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TABLE 2B

LIQUID EFFLUENTS
CONTINUOUS MODE

| Radionuclides Released | Unit | First Quarter | Second Quarter | Third Quarter | Fourth Quarter |
|------------------------------------|------|---------------|----------------|---------------|----------------|
| 1. Fission and activation products | | | | | |
| barium-140 | Ci | <LLD | <LLD | <LLD | <LLD |
| cerium-141 | Ci | <LLD | <LLD | <LLD | <LLD |
| cerium-144 | Ci | <LLD | <LLD | <LLD | <LLD |
| cesium-134 | Ci | 4.96E-4 | 1.11E-4 | 7.92E-6 | 1.68E-5 |
| cesium-137 | Ci | 1.17E-3 | 2.63E-4 | 1.96E-5 | 1.51E-4 |
| chromium-51 | Ci | <LLD | <LLD | <LLD | <LLD |
| cobalt-58 | Ci | 4.64E-5 | <LLD | <LLD | <LLD |
| cobalt-60 | Ci | <LLD | 3.60E-5 | 5.11E-7 | <LLD |
| iodine-131 | Ci | <LLD | <LLD | <LLD | <LLD |
| iron-55 ⁽¹⁾ | Ci | <LLD | <LLD | <LLD | <LLD |
| iron-59 | Ci | <LLD | <LLD | <LLD | <LLD |
| lanthanum-140 | Ci | <LLD | <LLD | <LLD | <LLD |
| manganese-54 | Ci | <LLD | <LLD | <LLD | <LLD |
| molybdenum-99 | Ci | <LLD | <LLD | <LLD | <LLD |
| niobium-95 | Ci | <LLD | <LLD | <LLD | <LLD |
| strontium-89 ⁽¹⁾ | Ci | <LLD | <LLD | <LLD | <LLD |
| strontium-90 ⁽¹⁾ | Ci | <LLD | <LLD | <LLD | <LLD |
| technetium-99m | Ci | <LLD | <LLD | <LLD | <LLD |
| zinc-65 | Ci | <LLD | <LLD | <LLD | <LLD |
| zirconium-95 | Ci | <LLD | <LLD | <LLD | <LLD |
| Total for period | Ci | 1.71E-3 | 4.10E-4 | 2.80E-5 | 1.68E-4 |
| 2. Dissolved and entrained gases | | | | | |
| xenon-133 | Ci | <LLD | <LLD | <LLD | <LLD |
| xenon-135 | Ci | <LLD | <LLD | <LLD | <LLD |
| Total for period | Ci | <LLD | <LLD | <LLD | <LLD |

LLD Lower Limit of Detection; see Table 2C.

- (1) Yard Drain Sump sample from 11/07/94 was inadvertently discarded. The 11/09/94 sample was used to account for the missing sample for composite analysis. See CDIR 94-010.

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TABLE 2B (Continued)

LIQUID EFFLUENTS
BATCH MODE

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

LLD Lower Limit of Detection; see Table 2C.

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TABLE 2C

LIQUID EFFLUENTS-LOWER LIMIT OF DETECTION
CONTINUOUS MODE

| Radionuclides | LLD ($\mu\text{Ci/cc}$) |
|------------------------------------|---------------------------|
| 1. Fission and activation products | |
| barium-140 | 4.10E-7 |
| cerium-141 | 6.70E-8 |
| cerium-144 | 2.70E-7 |
| chromium-51 | 4.70E-7 |
| cobalt-58 | 9.70E-8 |
| cobalt-60 | 1.40E-7 |
| iodine-131 | 8.10E-8 |
| iron-55 | 1.00E-6 |
| iron-59 | 2.30E-7 |
| lanthanum-140 | 7.50E-7 |
| manganese-54 | 9.60E-8 |
| molybdenum-99 | 8.80E-8 |
| niobium-95 | 9.70E-8 |
| strontium-89 | 5.00E-8 |
| strontium-90 | 1.00E-8 |
| technetium-99m | 9.00E-8 |
| zinc-65 | 2.40E-7 |
| zirconium-95 | 1.70E-7 |
| 2. Dissolved and entrained gases | |
| xenon-133 | 3.00E-7 |
| xenon-135 | 1.30E-7 |
| 3. gross alpha | 1.00E-7 |

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TABLE 2C (Continued)

LIQUID EFFLUENTS-LOWER LIMIT OF DETECTION
BATCH MODE

| Radionuclides | LLD ($\mu\text{Ci/cc}$) |
|------------------------------------|---------------------------|
| 1. Fission and activation products | |
| barium-140 | 3.20E-7 |
| cerium-141 | 6.10E-8 |
| cerium-144 | 2.70E-7 |
| cesium-134 | 1.10E-7 |
| cesium-137 | 9.10E-8 |
| chromium-51 | 4.20E-7 |
| cobalt-58 | 9.30E-8 |
| cobalt-60 | 1.40E-7 |
| iodine-131 | 5.70E-8 |
| iron-55 | 1.00E-6 |
| iron-59 | 2.10E-7 |
| lanthanum-140 | 1.70E-7 |
| manganese-54 | 9.50E-8 |
| molybdenum-99 | 3.40E-8 |
| niobium-95 | 8.90E-8 |
| strontium-89 | 5.00E-8 |
| strontium-90 | 1.00E-8 |
| technetium-99m | 3.40E-8 |
| zinc-65 | 2.40E-7 |
| zirconium-95 | 1.60E-7 |
| 2. Dissolved and entrained gases | |
| xenon-133 | 3.00E-7 |
| xenon-135 | 1.30E-7 |
| 3. gross alpha | 1.00E-7 |

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TABLE 2D

LIQUID EFFLUENTS-RADIATION DOSES AT THE LIQUID SITE BOUNDARY

| | Unit | First Quarter | Second Quarter | Third Quarter | Fourth Quarter |
|------------------------------|------|------------------|-------------------|------------------|-------------------|
| A. | | | | | |
| 1. Total body dose | mrem | 1.41E-2 | 4.64E-3 | 3.91E-4 | 1.78E-3 |
| 2. Percent Applicable Limit | % | 9.41E-1 | 3.09E-1 | 2.61E-2 | 1.19E-1 |
| B. | | | | | |
| 1. Limiting organ dose | mrem | 1.98E-2 | 6.34E-3 | 5.47E-4 | 2.64E-3 |
| 2. Percent Applicable Limit | % | 3.96E-1 | 1.27E-1 | 1.09E-2 | 5.28E-2 |
| 3. Limiting organ for period | | Liver | Liver | Liver | Liver |

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TABLE 2E

LIQUID EFFLUENTS-BATCH RELEASE SUMMARY

| | 12 month period |
|--|-----------------|
| 1. Number of batch releases: | 0 releases |
| 2. Total time period for batch releases: | 0 minutes |
| 3. Maximum time period for a batch release: | 0 minutes |
| 4. Average time period for a batch release: | 0 minutes |
| 5. Minimum time period for a batch release: | 0 minutes |
| 6. Average saltwater flow during batch releases: | 0 gpm |

SECTION D. PREVIOUS RADIOACTIVE EFFLUENT RELEASE REPORT ADDENDUM

1. The July - December 1992 Semiannual Radioactive Effluent Release Report value for Xe-131m (Section B, Gaseous Effluents, Table 1C, Third Quarter Batch release) was incorrectly reported as 3.68E+1 Curies. The correct value should have been 3.68E+0 Curies. The total for period fission and activation gases were correctly reported.
2. The January - December 1993 Annual Radioactive Effluent Release Report quarterly values for Direct Radiation (Section H, 10CFR50 Appendix I Requirements, Table 1) were incorrectly reported. The correct values should have been as follows:

| | Dose (millirems) | | | | |
|--|------------------|----------------|---------------|----------------|---------|
| | First Quarter | Second Quarter | Third Quarter | Fourth Quarter | Year |
| | DIRECT RADIATION | 1.39E-1 | 2.85E-1 | 1.12E-1 | 9.84E-2 |

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SECTION E. RADWASTE SHIPMENTS

TABLE 3

SOLID WASTE AND IRRADIATED FUEL SHIPMENT

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

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

N/A No shipment made.

| 2. Estimate of major nuclide composition (by type of waste) | | |
|---|---|---------|
| a. not applicable | % | 0.00E+0 |
| b. not applicable | % | 0.00E+0 |
| c. not applicable | % | 0.00E+0 |
| d. not applicable | % | 0.00E+0 |

3. Solid Waste Disposition

See COMMON section of this report

B. IRRADIATED FUEL SHIPMENTS (Disposition)

See COMMON section of this report

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SECTION F. APPLICABLE LIMITS

Gaseous Effluents - Applicable Limits

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

$$\% \text{ Applicable Limit} = \frac{(\text{Rel Rate}) (X/Q) (100)}{\text{ECL}_{\text{eff}}}$$

where: Rel Rate = total curies released in each category and each quarter, divided by the seconds in a quarter; the value in Sections A.2, B.2, C.2 and D.2 of Table 1A, $\mu\text{Ci/sec}$.

X/Q = $1.30\text{E-}5 \text{ sec/m}^3$; the annual average atmospheric dispersion defined in the Unit 1 ODCM, Rev. 10.

The ECL_{eff} is defined as:

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

where: F_i = fractional abundance of the i^{th} radionuclide obtained by dividing the activity (curies) for each radionuclide, C_i , by the sum of all the isotopic activity, C_T .

n = total number of radionuclides identified

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

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Liquid Effluents - Applicable Limits

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

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

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

The ECL_{eff} is defined as:

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

where: F_i = fractional abundance of the i^{th} radionuclide obtained by dividing the activity (curies) for each radionuclide, C_i , by the sum of all the isotopic activity, C_T .

n = total number of radionuclides identified

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

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SECTION G. ESTIMATION OF ERROR

Estimations of the error in reported values of gaseous and liquid effluents releases have been made.

Sources of error for gaseous effluents - batch releases are:

- (1) tank volumes
- (2) sampling
- (3) counting
- (4) calibration

Sources of error for gaseous effluents - continuous releases are:

- (1) fan flow rate
- (2) sampling
- (3) counting
- (4) calibration
- (5) differential pressure drop

Sources of error for liquid effluents - batch releases are:

- (1) tank volumes
- (2) sampling
- (3) counting
- (4) calibration

Sources of error for liquid effluents - continuous releases are:

- (1) dilution flow rate
- (2) sampling
- (3) counting
- (4) calibration

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

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

where: σ_i = Error associated with each component.

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SECTION H. 10 CFR 50 APPENDIX I REQUIREMENTS

Table 1 in Section H presents the quarterly and annual maximum dose to an individual. Six different categories are presented:

- (1) Liquid Effluents - Whole Body
- (2) Liquid Effluents - Organ
- (3) Airborne Effluents - Tritium, Iodines and Particulates
- (4) Noble Gases - Gamma
- (5) Noble Gases - Beta
- (6) Direct Radiation

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

For individuals who may, at times, be within the site boundary, the occupancy of the individual will be sufficiently low to compensate for any increase in the atmospheric diffusion factor above that for the site boundary. For members of the public who traverse the site boundary via highway I-5, the residency time shall be considered negligible and hence the dose "0".

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

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TABLE 1

| | Dose * (millirems) | | | | |
|---------------------------------------|--------------------|----------------|---------------|----------------|---------|
| | First Quarter | Second Quarter | Third Quarter | Fourth Quarter | Year |
| LIQUID EFFLUENTS | 1) | 2) | 3) | 4) | 5) |
| Whole Body | 1.41E-2 | 4.64E-3 | 3.91E-4 | 1.78E-3 | 2.09E-2 |
| Organ | 6) | 7) | 8) | 9) | 10) |
| | 1.98E-2 | 6.34E-3 | 5.47E-4 | 2.64E-3 | 2.93E-2 |
| AIRBORNE EFFLUENTS | 11) | 12) | 13) | 14) | 15) |
| Tritium, Iodines, and Particulates | 6.44E-4 | 2.24E-4 | 1.05E-3 | 1.03E-3 | 2.95E-3 |
| NOBLE GASES ** | 16) | 17) | 18) | 19) | 20) |
| Gamma | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| Beta | 21) | 22) | 23) | 24) | 25) |
| | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| DIRECT RADIATION | 26) | 27) | 28) | 29) | 30) |
| | 1.12E-1 | 1.19E-1 | 9.65E-2 | 2.61E-1 | 5.78E-1 |

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

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

1. This 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.

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

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

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6. This data was calculated using the methodology of the ODCM; the liver received the maximum dose primarily by the saltwater fish pathway.
7. This data was calculated using the methodology of the ODCM; the liver received the maximum dose primarily by the saltwater fish pathway.
8. This data was calculated using the methodology of the ODCM; the liver received the maximum dose primarily by the saltwater fish pathway.
9. This data was calculated using the methodology of the ODCM; the liver received the maximum dose primarily by the saltwater fish pathway.
10. This data was calculated using the methodology of the ODCM; the liver received the maximum dose primarily by the saltwater fish pathway.
11. The maximum organ dose was to a child's thyroid and was located in the NW sector. This was calculated using the assumptions of USNRC Regulatory Guide 1.109.
12. The maximum organ dose was to a child's thyroid and was located in the NW sector. This was calculated using the assumptions of USNRC Regulatory Guide 1.109.
13. The maximum organ dose was to a child's thyroid and was located in the NW sector. This was calculated using the assumptions of USNRC Regulatory Guide 1.109.
14. The maximum organ dose was to a child's thyroid and was located in the NW sector. This was calculated using the assumptions of USNRC Regulatory Guide 1.109.
15. The maximum organ dose was to a child's thyroid and was located in the NW sector. This was calculated using the assumptions of USNRC Regulatory Guide 1.109.
16. There was no activity detected during the release period, therefore the reported air dose for gamma radiation was 0.00E+0 mrad.
17. There was no activity detected during the release period, therefore the reported air dose for gamma radiation was 0.00E+0 mrad.
18. There was no activity detected during the release period, therefore the reported air dose for gamma radiation was 0.00E+0 mrad.
19. There was no activity detected during the release period, therefore the reported air dose for gamma radiation was 0.00E+0 mrad.
20. There was no activity detected during the release period, therefore the reported air dose for gamma radiation was 0.00E+0 mrad.
21. There was no activity detected during the release period, therefore the reported air dose for beta radiation was 0.00E+0 mrad.
22. There was no activity detected during the release period, therefore the reported air dose for beta radiation was 0.00E+0 mrad.
23. There was no activity detected during the release period, therefore the reported air dose for beta radiation was 0.00E+0 mrad.
24. There was no activity detected during the release period, therefore the reported air dose for beta radiation was 0.00E+0 mrad.
25. There was no activity detected during the release period, therefore the reported air dose for beta radiation was 0.00E+0 mrad.

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26. Measurements were made using TLD dosimeters; values are presented as site wide dose and are prorated to 300 hours per year; highest dose was measured at the Site Boundary in the WSW sector.
27. Measurements were made using TLD dosimeters; values are presented as site wide dose and are prorated to 300 hours per year; highest dose was measured at the Site Boundary in the WSW sector.
28. Measurements were made using TLD dosimeters; values are presented as site wide dose and are prorated to 300 hours per year; highest dose was measured at the Site Boundary in the SW sector.
29. Measurements were made using TLD dosimeters; values are presented as site wide dose and are prorated to 300 hours per year; highest dose was measured at the Site Boundary in the WSW sector.
30. Measurements were made using TLD dosimeters; values are presented as site wide dose and are prorated to 300 hours per year; highest dose was measured at the Site Boundary in the WSW sector.

TABLE 2

| SOURCE | Percent Applicable Limit | | | | |
|------------------------------------|--------------------------|----------------|---------------|----------------|---------|
| | First Quarter | Second Quarter | Third Quarter | Fourth Quarter | Year |
| LIQUID EFFLUENTS | | | | | |
| Whole Body | 9.41E-1 | 3.09E-1 | 2.61E-2 | 1.19E-1 | 6.97E-1 |
| Organ | 3.96E-1 | 1.27E-1 | 1.09E-2 | 5.28E-2 | 2.93E-1 |
| AIRBORNE EFFLUENTS | | | | | |
| Tritium, Iodines, and Particulates | 8.59E-3 | 2.99E-3 | 1.40E-2 | 1.37E-2 | 1.97E-2 |
| NOBLE GASES | | | | | |
| Gamma | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |
| Beta | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 | 0.00E+0 |

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

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SECTION I. CHANGES TO THE OFFSITE DOSE CALCULATION MANUAL

On April 27, 1994 Revision 10 to the Unit 1 Offsite Dose Calculation Manual (ODCM) was adopted and published. This revision accomplished several tasks, chief among them was the revision of all appropriate referenced sections of the Unit 1 Technical Specifications to the new paragraph numbering sequence used in the recently issued Unit 1 Permanently Defueled Technical Specifications (PDTS). This item was strictly an administrative change. Also incorporated into this revision were the updates of dose parameter tables used in the gaseous dose calculations that resulted specifically from the 1993 Annual Land Use Census. Neither of the above changes have any impact on the accuracy or reliability of methods for determining dose or setpoint values.

Removed from R-1218 and R-1219 sections was the guide to set the setpoint as close to background as possible when not conducting a release. The goal for the radiation monitors and the effluent program as stated in the basis section for the ODCM for liquids is "to ensure that the concentration of radioactive materials released in liquid waste effluents from the site will be less than the concentration levels specified in 10 CFR Part 20, Appendix B, Table II, Column 2", and for gases, "ensure that the dose at any time at the site boundary from gaseous effluents from all units on the site will be within the annual dose limits of 10 CFR 20, for unrestricted areas". These bases are accomplished by the effluent program in its present format. This function of setpoints is captured in effluent procedure S0123-III-5.8.1 which requires the setpoint during routine times be kept close to background so as to provide adequate warning. Further, a study, issued as a memo to file, was conducted regarding setpoints. "Radioactive Effluent Monitor Routine (Non-Release) Setpoint Evaluation", dated March 16, 1994, evaluated the effluent monitors and their associated systems. Maintaining the routine setpoints within a range of 3 to 10 times background is appropriate and accomplishes the goal of early notification while still avoiding spurious alarms. This methodology also provides warning should an inadvertent release occur. Since this particular change does not change the intent of the program, lessen its regulatory adherence, or affect the methodology used calculating setpoints, no safety evaluation was required.

Also revised was the definition delineating when R-1254 mid-range is required to be functional. The approved "Permanently Defueled Technical Specifications Administrative Controls Licensing Commitments Document", M.A. Wharton to R.W. Krieger, dated January 25, 1994, specifies "the mid-range channel shall be maintained functional during evolutions in which an FHA is possible. This includes fuel handling and movement of heavy loads over the pool".

One definition, Functional, was added to section 6.1. It is taken directly from section D1 of the Unit 1 PDTS and section VI of the aforementioned Administrative Controls Document. This change is intended to allow the radiation monitor R-1254 to be maintained functional consistent with good engineering and maintenance practices for commercial grade equipment. Per the Administrative Controls Document:

Operation and surveillance requirements for radiation monitoring instrumentation are not included in the PDTS, since operability is not required for the safe, long-term storage of spent fuel in the spent fuel pool (SFP). However, several radiation monitors will be maintained to ensure operator safety and to monitor releases to the atmosphere.

The SONGS 1 vent stack monitor, R-1254, was previously maintained as a wide range gas monitor. However, analysis of the Fuel Handling Accident (FHA) for the permanently defueled condition revealed that the high range channel is not needed to detect and assess any radiological releases which may occur. The mid range channel would be adequate for detection and assessment of such releases. The low range channel will remain to detect releases anticipated during normal operations other than fuel handling.

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Although the monitors will be maintained as functional (commercial grade) equipment, surveillance requirements identified in the ODCM are still applicable, but apply only to R-1254. To maintain these monitors functional, consistent with good engineering and maintenance practices for commercial grade equipment, monitoring performance with the existing surveillances is acceptable. Similarly, because the monitors are used to alert the operators of abnormal radiological conditions, continuing to verify the alarm setpoint is necessary.

This change is based on the analysis and conclusions found in the approved PDTs and Administrative Controls Document. The same maintenance activities will be performed at the same current frequency as before, but the monitors will be considered as commercial grade equipment. Based on the PDTs and the Administrative Controls Document, the other Unit 1 effluent radiation instrumentation identified in Table 4-1 and Table 4-3 of the ODCM will also be maintained functional consistent with good engineering and maintenance practices for commercial grade equipment. These effluent instruments were transferred from the Technical Specifications in 1992 and placed in the ODCM in accordance with NRC Generic Letter 89-01. Radiation monitors, with the exception of R-1254, are considered "quality-affecting" but not "safety-related". As in the case of R-1254, all surveillance requirements identified in Tables 4-2 and 4-4 of the ODCM are still applicable to these instruments. The final result of this change will allow SCE to purchase equipment parts from a wider variety of suppliers without any reduction in instrument availability or reliability.

More definitive guidance was provided for the taking and analyzing of liquid grab samples when the required number of monitors are not in service. The previous guidance did not give clear time requirements between sample time and the required analysis for these liquid samples. The new guidelines, adapted from Units 2/3 ODCM Revision 22, an analysis within 4 hours of the sample time, and a sample taken once every 12 hours. The analysis showed that it was acceptable to amend the (then) sampling/analyzing requirement from once every 8 hours to the current sampling once every 12 hours and analyzing within 4 hours. Adapting that philosophy to Unit 1 shows this change is also acceptable, specially noting the much reduced source term at Unit 1 than is present at Unit 2/3. This change concerns itself only with the time allowed to analyze a sample from a sump should the monitor be out of service. The sampling requirement is not being changed, merely the analyzing time. The only credible source term for the yard drain sump now is the CCW system. Should monitor R-2101 be out of service, grab samples would still be taken as before. Now, with this change, the analysis is required to be performed within 4 hours. The time requirement for taking the actual sample isn't changed. Procedurally, chemistry guidance is to obtain the sample within 8 hours of the monitor being declared inoperable. They are required to analyze within four hours. Thus, the entire sample/analysis evolution is expected to complete within 12 hours. A safety evaluation was performed for this particular change and found that it does not affect the intent of the program, lessen its regulatory adherence, or affect the methodology used in calculating setpoints.

No safety evaluations were performed for updating the radiation monitor calibration constants or implementing changes from the 1993 Land Use Census. These changes reflect results from routine surveillances and as such do not constitute a modification in methodology for determining activity released from the site and subsequent dose to a member of the public.

Per NRC Generic Letter 89-01, no safety review was required or performed for the correction of typographical errors.

The following is a complete list of changes:

- ^a Indicates typographical, sequential sectional and page numbering, and format changes
- ^b Removed guidance calling for the setting of setpoints as close to background as possible when the monitor is not being used for a release. The bases for the radiation monitors and the effluent program as stated in the basis section of the ODCM for liquids is "to ensure that the concentration of radioactive materials released in liquid waste effluents from the site to unrestricted areas will be less than the concentration levels specified in 10 CFR Part 20, Appendix B, Table II, Column 2", and for gases, "ensure that the dose rate at and beyond the site boundary from gaseous effluents will be within the annual dose limits of 10 CFR Part 20 for unrestricted areas". The purpose of these bases is accomplished by the effluent program in its present format.

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- * The 1993 Land Use Census revealed increased occupancy factors in two locations, San Clemente Ranch Packing (Sector R, 2.4 miles) and "51 Area" Beach (renamed from Enlisted Beach) (Sector Q, 1.2 miles) and a decreased occupancy factor for one location, Highway Patrol weigh station (Sector G, 2.2 miles). Correspondingly, the dose parameters for all affected age groups were affected in those three locations. The occupancy factors increased from 0.3425 to 0.3674 and from 0.2283 to 0.2568, respectively, and decreased from 0.2283 to 0.2146. This information was formally transmitted in the memorandum from E.M. Goldin to J.R. Clark, "Submittal of 1993 ODCMs Dose Parameters (R_i) for San Onofre Nuclear Generating Station Unit 1 and Units 2/3", dated April 12, 1994.
- # The approved Unit 1 Permanently Defueled Technical Specifications (PDTs) revised the numbering on some sections and paragraphs. References to the Unit 1 PDTs contained in this ODCM must be revised to remain consistent.
- vi Revised listing of Figure 6-1 to reflect actual title.
- 1-6^f Revised reference to the Unit 1 PDTs.
- 1-8^f Revised reference to the Unit 1 PDTs. Also revised references from Operable to Functional.
- 1-9 Revised reference from Operable to Functional.
- 1-12 Revised the definition of C_t . A more restrictive method of measuring tritium was added. Tritium samples are analyzed prior to each radwaste tank release, rather than using the monthly composite, in calculating the monitor setpoint.
- 1-16^b Deleted statement specifying guidance on establishing the setpoint as close to background as possible whenever no release is in progress.
- 1-25^a Corrected typographical error on a reference.
- 1-26^a Corrected typographical error on a reference.
- 2-6^f Revised reference to the Unit 1 PDTs.
- 2-8^f Revised reference to the Unit 1 PDTs.
- 2-14^b Deleted statement specifying guidance on establishing the setpoint as close to background as possible whenever no release is in progress.
- 2-15 Deleted extraneous paragraph no longer required or accurate in the defueled, permanent shut down plant condition.
- 2-19 Revised the calibration constants for radiation monitor R-1219.
- 2-21^a Deleted extra heading on the page.
- 2-24 Added reference used in definition of R_{ik} .
- 2-33^{*} Revised the pathway name from Enlisted Beach Trailers to 51 Area Beach Trailers.
- 2-34^{*} Revised the pathway name from Enlisted Beach Trailers to 51 Area Beach Trailers.
- 2-35^{*} "51 Area" Beach Check-in occupancy factor increased from 0.2283 to 0.2568 (Sector Q, 1.2 miles), thereby changing dose parameters. Also, the name was changed from Enlisted Beach.
- 2-44^{*} San Clemente Ranch Packing with residents occupancy factor increased from 0.3425 to 0.3674 (Sector R, 2.4 miles), thereby changing dose parameters.
- 2-64^a Corrected typographical error in pathway name.

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- 2-67* Highway Patrol Weigh Station occupancy factor decreased from 0.2283 to 0.2146 (Sector G, 2.2 miles), thereby changing dose parameters.
- 3-2^f Revised reference to the Unit 1 PDTS.
- 4-1 Revised references from Operable to Functional.
- 4-2 Revised column from requiring operable channels to functional channels.
- 4-3 Revised Action 18 time requirements. A more clearly defined time limit on analyzing a sample was added. The sample must now be analyzed within 4 hours of sample time. Also revised references from Operable to Functional.
- 4-4 Revised reference from Operable to Functional.
- 4-7 Revised references from Operable to Functional.
- 4-8 Revised definition of when R-1254 mid-range channel is necessary per "Permanently Defueled Technical Specifications Administrative Controls Licensing Commitments Document", M.A. Wharton to R.W. Krieger, dated January 25, 1994. Also revised references from requiring operable channels to functional channels.
- 4-9 Revised references from Operable to Functional.
- 4-10 Revised reference from Operable to Functional.
- 4-12 Revised reference from Operable to Functional.
- 5-1^f Revised reference to the Unit 1 PDTS.
- 5-2^f Revised reference to the Unit 1 PDTS.
- 5-12^f Revised reference to the Unit 1 PDTS. Also revised the reference from Semiannual reporting period for the Radioactive Effluent Release Report to Annual in accordance with PCN-419.
- 6-2 Added the definition of "Functional" to section 6.1. The definition came from section D1 of the PDTS and section VI Radiation Monitors of the Permanently Defueled Technical Specifications Administrative Controls Licensing Commitments Document.
- 6-8^f Revised title of figure to reflect the Unit 1 PDTS.
- 6-11^f Revised reference to the Unit 1 PDTS.
- 6-13 Revised reference from Operable to Functional.

SECTION J. CHANGES TO RADIOACTIVE WASTE TREATMENT SYSTEMS

- 0 There were no changes to the Unit 1 Radioactive Waste Treatment Systems during the reporting period, January 1, 1994 to December 31, 1994.

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SECTION K. MISCELLANEOUSo Unplanned, Uncontrolled Release from Yard Drain Sump

The Unit 1 Yard Drain Sump overflowed to the PMF Catch Basin on two occasions in 1994:

| Start Date/Time | Stop Date/Time | Duration (minutes) | Estimated Curies Released | Estimated Whole Body Dose (mrem) | Estimated Liver Dose (mrem) |
|--------------------|-------------------|-----------------------|---------------------------------|---|--------------------------------------|
| 01/24/94 @ 2243 | 01/24/94 @ 2255 | 12 | 8.2E-5 | 3.2E-4 | 4.6E-4 |
| 10/05/94 @ 0027 | 10/05/94 @ 0037 | 10 | 0.0E+0 | 0.0E+0 | 0.0E+0 |

These events were due to heavy rainfall. It should be noted that curbs were placed to redirect runoff away from the Yard Drain Sump and the sump and pumps are routinely cleaned. These measures have been successful in reducing the duration and frequency of overflow. Based on conservative assumptions, there were no significant dose consequences as a result of these releases.

o Unplanned, Uncontrolled Release From Laundry Facility

The station laundry facility is used to wash modesty garments which are typically worn by workers underneath their protective clothing for Red Badge Zone work activities. The rinse and wash water was discharged to the Unit 1 outfall via the sewage treatment plant.

On 3/3/94, sample analysis of a rinse/wash cycle indicated Cs-137 activity at about $6.60\text{E-}8$ uCi/ml. This was at the LLD level and had a potentially high error associated with it. As a result, the station continued to sample the rinse/wash cycles for many months afterward. All these subsequent samples indicated no activity. Assuming the 3/3/94 sample indicated "real" activity, total activity released was conservatively estimated at $2.62\text{E-}8$ Ci. Dose consequences were minimal and were conservatively estimated at $2.59\text{E-}7$ mrem whole body, and $3.96\text{E-}7$ mrem liver.

In March, 1995, a plant modification was implemented to re-route the laundry facility discharge from the sewage treatment plant to a credited effluent release point at Units 2&3.

o Unplanned, Uncontrolled Release from CCW Heat Exchanger

The Unit 1 Component Cooling Water (CCW) System contains low level of activity and interfaces with several plant systems. One of the interfacing systems is the Saltwater Cooling System via the CCW heat exchangers. A CCW leak to the outfall through the CCW heat exchangers is considered an unplanned and uncontrolled release.

On 3/5/94, a leaking tube was confirmed in the Upper CCW Heat Exchanger (ME20A). Total activity released was conservatively estimated at $5.58\text{E-}6$ Ci. Dose consequences from this activity were conservatively estimated at $6.97\text{E-}5$ mrem whole body, and $9.57\text{E-}5$ mrem liver. There were no significant dose consequences as a result of this release. A Chemistry Division Investigation Report (CDIR 94-002) was written to document this event and to provide for corrective actions. As a result, the Upper CCW Heat Exchanger has been replaced with a new one consisting of tube alloy material less prone to leakage.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

S.O.N.G.S. 1

EFFLUENT RADIATION MONITORS OUT OF SERVICE GREATER THAN 30 DAYS

January 1, 1994 - December 31, 1994

| S.O.N.G.S. 1 | | | |
|---|----------------------|---|---|
| Monitor | Inoperability Period | Inoperability Cause | Explanation |
| R-1219 Plant Vent Stack Monitor | 03/13/94 - 07/20/94 | Periodic monitor spiking | Extensive rework required on signal cable to correct spiking. |
| R-1254 Plant Vent Stack, Process Flow Monitor | 08/12/88 - present | Process flow indication | Process flow instrumentation is inadequate. Design change to correct flow measurement canceled due to permanent plant shutdown. Radiation monitor functions operable. |
| R-2100 Reheater Pit Sump Monitor | 05/10/94 - 07/07/94 | Periodic monitor spiking | Required extensive electrical rework on instrument. |
| | 07/29/94 - 10/04/94 | Lack of electrical power | De-energized to support repair activities on R-2101. |
| R-2101 Yard Drain Sump Monitor | 11/05/93 - 11/23/94 | Gasket leak and component degradation; monitor power failure | Newly manufactured parts arrived and radiation monitor repaired. |

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

S.O.N.G.S. 1

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

- o Gaseous effluent releases, excluding tritium, totaled $3.70\text{E-}7$ curies with 100% of the total being gross alpha.
- o The radiation doses from gaseous releases are: (a) gamma air dose: $0.00\text{E+}0$ mrad at the site boundary, (b) beta air dose: $0.00\text{E+}0$ mrad at the site boundary, (c) organ dose: $2.95\text{E-}3$ mrem at the nearest receptor.
- o Liquid releases totaled $1.76\text{E-}2$ curies of which tritium was $1.53\text{E-}2$ Ci, noble gases were $0.00\text{E+}0$ Ci, and particulates and iodines were $2.32\text{E-}3$ Ci.
- o The radiation doses from liquid releases are: (a) total body: $2.09\text{E-}2$ mrem, (b) limiting organ: $2.93\text{E-}2$ mrem.
- o The radioactive releases and resulting doses generated from Unit 1 were below the Applicable Limits for both gaseous and liquid effluents.

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



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ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

January - December

SECTION A. INTRODUCTION

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

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

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

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

SECTION B. GASEOUS EFFLUENTS

Table 1A, "Gaseous Effluents-Summation of All Releases," provides a detailed listing of gaseous effluents released quarterly in four categories: fission and activation gases, iodine-131, particulates with half-lives greater than eight days, and tritium. Listed for each of the four categories are:

- (1) the total curies released
- (2) the average release rate
- (3) the percent of applicable limit
- (4) the estimated total error

In addition, the particulate category lists the gross alpha radioactivity released for each quarter.

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

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

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

Waste gas decay tank and monitor 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 Units 2 and 3.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

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

TABLE 1A

GASEOUS EFFLUENTS-SUMMATION OF ALL RELEASES

| | Unit | First Quarter | Second Quarter | Estimated Total Error, % |
|--|---------|---------------|----------------|--------------------------|
| A. Fission and activation gases | | | | |
| 1. Total release | Ci | 5.04E+1 | 6.50E+1 | 3.00E+1 |
| 2. Average release rate for period | μCi/sec | 6.48E+0 | 8.26E+0 | |
| 3. Percent of applicable limit | % | 1.11E-2 | 1.52E-2 | |
| B. Iodines | | | | |
| 1. Total iodine-131 | Ci | 1.54E-4 | 5.85E-4 | 1.90E+1 |
| 2. Average release rate for period | μCi/sec | 1.98E-5 | 7.44E-5 | |
| 3. Percent of applicable limit | % | 4.75E-5 | 1.79E-4 | |
| C. Particulates | | | | |
| 1. Particulates with half-lives > 8 days | Ci | 1.94E-4 | 1.70E-4 | 1.60E+1 |
| 2. Average release rate for period | μCi/sec | 2.50E-5 | 2.17E-5 | |
| 3. Percent of applicable limit | % | 1.01E-5 | 3.71E-5 | |
| 4. Gross alpha activity | Ci | 1.28E-6 | 2.78E-7 | 5.00E+1 |
| D. Tritium | | | | |
| 1. Total release | Ci | 6.70E+0 | 5.22E+0 | 2.50E+1 |
| 2. Average release rate for period | μCi/sec | 8.62E-1 | 6.64E-1 | |
| 3. Percent of applicable limit | % | 4.14E-3 | 3.19E-3 | |

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

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

TABLE 1A (Continued)

GASEOUS EFFLUENTS-SUMMATION OF ALL RELEASES

| | Unit | Third Quarter | Fourth Quarter | Estimated Total Error, % |
|--|---------|------------------|-------------------|--------------------------------|
| A. Fission and activation gases | | | | |
| 1. Total release | Ci | 1.38E+2 | 1.12E+2 | 3.00E+1 |
| 2. Average release rate for period | μCi/sec | 1.74E+1 | 1.41E+1 | |
| 3. Percent of applicable limit | % | 3.93E-2 | 2.57E-2 | |
| B. Iodines | | | | |
| 1. Total iodine-131 | Ci | 7.49E-4 | 2.97E-4 | 1.90E+1 |
| 2. Average release rate for period | μCi/sec | 9.42E-5 | 3.74E-5 | |
| 3. Percent of applicable limit | % | 2.26E-4 | 8.97E-5 | |
| C. Particulates | | | | |
| 1. Particulates with half- lives > 8 days | Ci | 1.28E-4 | 8.67E-5 | 1.60E+1 |
| 2. Average release rate for period | μCi/sec | 1.61E-5 | 1.09E-5 | |
| 3. Percent of applicable limit | % | 9.42E-6 | 2.47E-6 | |
| 4. Gross alpha activity | Ci | <LLD | 1.50E-6 | 5.00E+1 |
| D. Tritium | | | | |
| 1. Total release | Ci | 3.44E+1 | 3.41E+0 | 2.50E+1 |
| 2. Average release rate for period | μCi/sec | 4.33E+0 | 4.29E-1 | |
| 3. Percent of applicable limit | % | 2.08E-2 | 2.06E-3 | |

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

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

TABLE 1C

GASEOUS EFFLUENTS-GROUND LEVEL RELEASES
CONTINUOUS MODE

| Radionuclides Released | Unit | First Quarter | Second Quarter | Third Quarter | Fourth Quarter |
|---------------------------------|------|---------------|----------------|---------------|----------------|
| 1. Fission and activation gases | | | | | |
| argon-41 | Ci | 8.13E-1 | 1.21E+0 | 3.82E+0 | 2.06E+0 |
| krypton-85 | Ci | <LLD | <LLD | <LLD | <LLD |
| krypton-85m | Ci | <LLD | <LLD | <LLD | <LLD |
| krypton-87 | Ci | <LLD | <LLD | <LLD | <LLD |
| krypton-88 | Ci | <LLD | <LLD | <LLD | <LLD |
| xenon-133 | Ci | 4.94E+1 | 6.37E+1 | 1.30E+2 | 1.10E+2 |
| xenon-133m | Ci | <LLD | <LLD | 4.01E+0 | <LLD |
| xenon-135 | Ci | <LLD | 6.46E-3 | 1.20E-1 | 4.71E-3 |
| xenon-135m | Ci | <LLD | <LLD | <LLD | <LLD |
| xenon-138 | Ci | <LLD | <LLD | <LLD | <LLD |
| Total for period | Ci | 5.02E+1 | 6.50E+1 | 1.38E+2 | 1.12E+2 |
| 2. Iodines | | | | | |
| iodine-131 | Ci | 1.54E-4 | 5.85E-4 | 7.49E-4 | 2.97E-4 |
| iodine-132 | Ci | <LLD | <LLD | 5.97E-7 | <LLD |
| iodine-133 | Ci | 6.24E-4 | 1.37E-3 | 1.07E-3 | 9.34E-4 |
| iodine-134 | Ci | <LLD | <LLD | 7.55E-7 | <LLD |
| iodine-135 | Ci | 1.33E-6 | 1.26E-4 | 2.48E-5 | 3.83E-6 |
| Total for period | Ci | 7.79E-4 | 2.08E-3 | 1.84E-3 | 1.23E-3 |

LLD Lower Limit of Detection; see Table 1D.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

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

TABLE 1C (Continued)

GASEOUS EFFLUENTS-GROUND LEVEL RELEASES
CONTINUOUS MODE

| Radionuclides Released | Unit | First Quarter | Second Quarter | Third Quarter | Fourth Quarter |
|------------------------|------|---------------|----------------|---------------|----------------|
| 3. Particulates | | | | | |
| barium-140 | Ci | <LLD | <LLD | <LLD | <LLD |
| bromine-82 | Ci | 3.73E-5 | 8.01E-5 | 1.25E-4 | 8.54E-5 |
| cerium-141 | Ci | <LLD | <LLD | <LLD | <LLD |
| cerium-144 | Ci | <LLD | <LLD | <LLD | <LLD |
| cesium-134 | Ci | <LLD | <LLD | <LLD | <LLD |
| cesium-137 | Ci | <LLD | <LLD | <LLD | 1.00E-7 |
| cesium-138 | Ci | <LLD | 1.67E-6 | 2.00E-6 | 4.41E-5 |
| cobalt-58 | Ci | 1.56E-4 | 4.56E-5 | <LLD | <LLD |
| cobalt-60 | Ci | <LLD | 2.13E-5 | 2.41E-6 | 1.17E-6 |
| iron-59 | Ci | <LLD | <LLD | <LLD | <LLD |
| lanthanum-140 | Ci | <LLD | <LLD | <LLD | <LLD |
| manganese-54 | Ci | <LLD | 3.29E-6 | <LLD | <LLD |
| molybdenum-99 | Ci | <LLD | <LLD | <LLD | <LLD |
| niobium-95 | Ci | 1.05E-6 | 8.05E-6 | <LLD | <LLD |
| niobium-97 | Ci | <LLD | 9.88E-5 | <LLD | <LLD |
| silver-110m | Ci | <LLD | 1.04E-5 | <LLD | <LLD |
| strontium-89 | Ci | <LLD | <LLD | <LLD | 3.53E-9 |
| strontium-90 | Ci | <LLD | <LLD | <LLD | <LLD |
| technetium-99m | Ci | <LLD | <LLD | 2.35E-7 | <LLD |
| yttrium-92 | Ci | 3.58E-6 | 4.97E-6 | <LLD | <LLD |
| zinc-65 | Ci | <LLD | <LLD | <LLD | <LLD |

LLD Lower Limit of Detection; see Table 1D.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

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

TABLE 1C (Continued)

GASEOUS EFFLUENTS-GROUND LEVEL RELEASES
BATCH MODE *

| Radionuclides Released | Unit | First Quarter | Second Quarter | Third Quarter | Fourth Quarter |
|---------------------------------|------|---------------|----------------|---------------|----------------|
| 1. Fission and activation gases | | | | | |
| krypton-85 | Ci | 1.88E-1 | <LLD | <LLD | <LLD |
| krypton-85m | Ci | <LLD | <LLD | <LLD | <LLD |
| krypton-87 | Ci | <LLD | <LLD | <LLD | <LLD |
| krypton-88 | Ci | <LLD | <LLD | <LLD | <LLD |
| xenon-133 | Ci | <LLD | <LLD | 7.09E-3 | <LLD |
| xenon-133m | Ci | <LLD | <LLD | <LLD | <LLD |
| xenon-135 | Ci | <LLD | <LLD | <LLD | <LLD |
| xenon-135m | Ci | <LLD | <LLD | <LLD | <LLD |
| xenon-138 | Ci | <LLD | <LLD | <LLD | <LLD |
| Total for period | Ci | 1.88E-1 | <LLD | 7.09E-3 | <LLD |

LLD Lower Limit of Detection; see Table 1D.

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

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

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

TABLE 1D

GASEOUS EFFLUENTS-LOWER LIMIT OF DETECTION
CONTINUOUS MODE

| Radionuclides | LLD ($\mu\text{Ci/cc}$) |
|---------------------------------|---------------------------|
| 1. Fission and activation gases | |
| krypton-85 | 2.00E-5 |
| krypton-85m | 4.80E-8 |
| krypton-87 | 2.50E-7 |
| krypton-88 | 1.70E-7 |
| xenon-133m | 3.90E-7 |
| xenon-135 | 5.00E-8 |
| xenon-135m | 2.00E-6 |
| xenon-138 | 3.30E-6 |
| 2. Iodines | |
| iodine-132 | 2.00E-11 |
| iodine-134 | 2.00E-10 |
| 3. Particulates | |
| barium-140 | 6.60E-13 |
| cerium-141 | 1.20E-13 |
| cerium-144 | 4.70E-13 |
| cesium-134 | 2.50E-13 |
| cesium-137 | 2.10E-13 |
| cesium-138 | 1.70E-09 |
| cobalt-58 | 2.20E-13 |
| cobalt-60 | 3.40E-13 |
| iron-59 | 5.40E-13 |
| lanthanum-140 | 1.30E-12 |
| manganese-54 | 2.20E-13 |
| molybdenum-99 | 1.20E-13 |
| niobium-95 | 2.20E-13 |
| niobium-97 | 5.90E-11 |
| silver-110m | 3.30E-13 |
| strontium-89 | 1.00E-13 |
| strontium-90 | 1.00E-14 |
| technetium-99m | 1.20E-13 |
| yttrium-92 | 9.00E-11 |
| zinc-65 | 5.80E-13 |
| 4. gross alpha | 1.00E-13 |

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

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

TABLE 1D (Continued)

GASEOUS EFFLUENTS-LOWER LIMIT OF DETECTION
BATCH MODE

| Radionuclides | LLD ($\mu\text{Ci/cc}$) |
|---------------------------------|---------------------------|
| 1. Fission and activation gases | |
| krypton-85 | 1.30E-3 |
| krypton-85m | 2.60E-6 |
| krypton-87 | 1.30E-5 |
| krypton-88 | 9.20E-6 |
| xenon-133 | 6.80E-6 |
| xenon-133m | 2.30E-5 |
| xenon-135 | 3.00E-6 |
| xenon-135m | 4.00E-5 |
| xenon-138 | 5.70E-5 |

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

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

TABLE 1E

GASEOUS EFFLUENTS-RADIATION DOSES AT THE SITE BOUNDARY

| | Unit | First Quarter | Second Quarter | Third Quarter | Fourth Quarter |
|--|------|------------------|-------------------|------------------|-------------------|
| A. Noble Gas | | | | | |
| 1. Gamma Air Dose | mrad | 3.81E-3 | 5.15E-3 | 1.26E-2 | 8.80E-3 |
| 2. Percent Applicable Limit | % | 3.81E-2 | 5.15E-2 | 1.26E-1 | 8.80E-2 |
| 3. Beta Air Dose | mrad | 8.35E-3 | 1.08E-2 | 2.36E-2 | 1.86E-2 |
| 4. Percent Applicable Limit | % | 4.18E-2 | 5.40E-2 | 1.18E-1 | 9.28E-2 |
| B. Tritium, Iodine, Particulates (at the nearest receptor) | | | | | |
| 5. Organ Dose | mrem | 3.30E-4 | 5.68E-4 | 1.44E-3 | 3.03E-4 |
| 6. Percent Applicable Limit | % | 2.20E-3 | 3.79E-3 | 9.60E-3 | 2.02E-3 |

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

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

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

TABLE 1F

GASEOUS EFFLUENTS-BATCH RELEASE SUMMARY

| | 12 month period |
|---|-----------------|
| 1. Number of batch releases: | 2 releases |
| 2. Total time period for batch releases: | 952 minutes |
| 3. Maximum time period for a batch release: | 492 minutes |
| 4. Average time period for a batch release: | 476 minutes |
| 5. Minimum time period for a batch release: | 460 minutes |

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

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

SECTION C. LIQUID EFFLUENTS

Table 2A, "Liquid Effluents-Summation of All Releases," provides a detailed summary of liquid effluents released quarterly in three categories: fission and activation products, tritium, and dissolved and entrained gases. Listed for each of the three categories are:

- (1) the total curies released
- (2) the average diluted concentration
- (3) the percent of applicable limit
- (4) the estimated total error

In addition, Table 2A lists:

- (1) the gross alpha radioactivity
- (2) the volume of waste released (prior to dilution)
- (3) the volume of dilution water

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

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

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

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

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

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

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

TABLE 2A

LIQUID EFFLUENTS-SUMMATION OF ALL RELEASES

| | Unit | First Quarter | Second Quarter | Estimated Total Error, % |
|--|--------|---------------|----------------|--------------------------|
| A. Fission and activation products | | | | |
| 1. Total release (not including tritium, gases, alpha) | Ci | 1.41E-1 | 1.07E-1 | 1.90E+1 |
| 2. Average diluted concentration during period | μCi/ml | 1.89E-10 | 1.42E-10 | |
| 3. Percent of applicable limit | % | 1.98E-3 | 1.41E-3 | |
| B. Tritium | | | | |
| 1. Total release | Ci | 1.04E+2 | 9.26E+1 | 1.90E+1 |
| 2. Average diluted concentration during period | μCi/ml | 1.39E-7 | 1.23E-7 | |
| 3. Percent of applicable limit | % | 1.39E-2 | 1.23E-2 | |
| C. Dissolved and entrained gases | | | | |
| 1. Total release | Ci | 6.88E-4 | 3.90E-4 | 1.90E+1 |
| 2. Average diluted concentration during period | μCi/ml | 9.22E-13 | 5.17E-13 | |
| 3. Percent of applicable limit | % | 4.61E-7 | 2.58E-7 | |
| D. Gross alpha radioactivity | | | | |
| 1. Total release | Ci | <LLD | <LLD | 5.00E+1 |
| E. Volume of waste released (prior to dilution) | liters | 2.24E+7 | 4.67E+6 | 5.00E+0 |
| F. Volume of dilution water used during period | liters | 7.46E+11 | 7.55E+11 | 5.00E+0 |

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

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

TABLE 2A (Continued)

LIQUID EFFLUENTS-SUMMATION OF ALL RELEASES

| | Unit | Third Quarter | Fourth Quarter | Estimated Total Error, % |
|--|--------|------------------|-------------------|--------------------------------|
| A. Fission and activation products | | | | |
| 1. Total release (not including tritium, gases, alpha) | Ci | 2.06E-2 | 1.19E-2 | 1.90E+1 |
| 2. Average diluted concentration during period | μCi/ml | 2.70E-11 | 1.56E-11 | |
| 3. Percent of applicable limit | % | 3.88E-4 | 3.52E-4 | |
| B. Tritium | | | | |
| 1. Total release | Ci | 9.96E+1 | 5.95E+2 | 1.90E+1 |
| 2. Average diluted concentration during period | μCi/ml | 1.31E-7 | 7.81E-7 | |
| 3. Percent of applicable limit | % | 1.31E-2 | 7.81E-2 | |
| C. Dissolved and entrained gases | | | | |
| 1. Total release | Ci | 3.44E-3 | 2.40E-2 | 1.90E+1 |
| 2. Average diluted concentration during period | μCi/ml | 4.52E-12 | 3.15E-11 | |
| 3. Percent of applicable limit | % | 2.26E-6 | 1.57E-5 | |
| D. Gross alpha radioactivity | | | | |
| 1. Total release | Ci | <LLD | <LLD | 5.00E+1 |
| E. Volume of waste released (prior to dilution) | liters | 2.75E+6 | 4.67E+6 | 5.00E+0 |
| F. Volume of dilution water used during period | liters | 7.61E+11 | 7.62E+11 | 5.00E+0 |

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

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TABLE 2B

LIQUID EFFLUENTS
CONTINUOUS MODE

| Radionuclides Released | Unit | First Quarter | Second Quarter | Third Quarter | Fourth Quarter |
|------------------------------------|------|------------------|-------------------|------------------|-------------------|
| 1. Fission and activation products | | | | | |
| barium-140 | Ci | <LLD | <LLD | <LLD | <LLD |
| cerium-141 | Ci | <LLD | <LLD | <LLD | <LLD |
| cesium-134 | Ci | 4.17E-5 | <LLD | <LLD | <LLD |
| cesium-137 | Ci | 3.23E-4 | <LLD | <LLD | <LLD |
| chromium-51 | Ci | <LLD | <LLD | <LLD | <LLD |
| cobalt-58 | Ci | 1.25E-4 | 1.61E-4 | <LLD | <LLD |
| cobalt-60 | Ci | <LLD | 1.24E-4 | <LLD | <LLD |
| iodine-131 | Ci | <LLD | <LLD | <LLD | <LLD |
| iron-55 | Ci | <LLD | <LLD | <LLD | <LLD |
| iron-59 | Ci | <LLD | <LLD | <LLD | <LLD |
| lanthanum-140 | Ci | <LLD | <LLD | <LLD | <LLD |
| manganese-54 | Ci | <LLD | <LLD | <LLD | <LLD |
| molybdenum-99 | Ci | <LLD | <LLD | <LLD | <LLD |
| niobium-95 | Ci | <LLD | <LLD | <LLD | <LLD |
| strontium-89 | Ci | <LLD | <LLD | <LLD | <LLD |
| strontium-90 | Ci | <LLD | <LLD | <LLD | <LLD |
| technetium-99m | Ci | <LLD | <LLD | <LLD | <LLD |
| zinc-65 | Ci | <LLD | <LLD | <LLD | <LLD |
| zirconium-95 | Ci | <LLD | <LLD | <LLD | <LLD |
| Total for period | Ci | 4.90E-4 | 2.85E-4 | <LLD | <LLD |
| 2. Dissolved and entrained gases | | | | | |
| xenon-133 | Ci | <LLD | <LLD | <LLD | <LLD |
| xenon-135 | Ci | <LLD | <LLD | <LLD | <LLD |
| Total for period | Ci | <LLD | <LLD | <LLD | <LLD |

LLD Lower Limit of Detection; see Table 2C.

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TABLE 2B (Continued)

LIQUID EFFLUENTS
BATCH MODE

| Radionuclides Released | Unit | First Quarter | Second Quarter | Third Quarter | Fourth Quarter |
|------------------------------------|------|---------------|----------------|---------------|----------------|
| 1. Fission and activation products | | | | | |
| antimony-124 | Ci | 4.90E-3 | 7.71E-4 | 4.98E-5 | 6.55E-5 |
| antimony-125 | Ci | 9.69E-2 | 3.91E-2 | 2.89E-3 | 2.17E-3 |
| barium-140 | Ci | <LLD | <LLD | <LLD | <LLD |
| cerium-141 | Ci | 8.48E-5 | <LLD | <LLD | <LLD |
| cerium-144 | Ci | 4.19E-4 | 5.87E-4 | <LLD | <LLD |
| cesium-134 | Ci | 2.45E-3 | 2.84E-4 | 3.84E-5 | 3.15E-4 |
| cesium-136 | Ci | <LLD | 4.70E-4 | 2.58E-4 | 6.08E-5 |
| cesium-137 | Ci | 5.71E-3 | 1.36E-3 | 3.04E-4 | 1.15E-3 |
| chromium-51 | Ci | 6.57E-3 | 1.64E-3 | <LLD | <LLD |
| cobalt-57 | Ci | 3.56E-5 | 1.28E-4 | 3.85E-5 | 2.49E-5 |
| cobalt-58 | Ci | 1.30E-2 | 1.40E-2 | 1.78E-3 | 8.62E-4 |
| cobalt-60 | Ci | 2.12E-3 | 1.05E-2 | 3.96E-3 | 2.07E-3 |
| iodine-131 | Ci | <LLD | <LLD | 1.27E-4 | 1.42E-4 |
| iodine-133 | Ci | <LLD | <LLD | 1.08E-5 | 5.11E-5 |
| iron-55 | Ci | 2.18E-3 | 6.66E-3 | 2.29E-3 | 3.32E-3 |
| iron-59 | Ci | 2.28E-4 | <LLD | <LLD | <LLD |
| lanthanum-140 | Ci | <LLD | 7.76E-5 | 6.56E-6 | <LLD |
| manganese-54 | Ci | 6.67E-4 | 1.75E-3 | 5.77E-4 | 3.77E-4 |
| molybdenum-99 | Ci | <LLD | <LLD | <LLD | <LLD |
| niobium-95 | Ci | 1.04E-3 | 4.35E-3 | 2.28E-4 | 1.19E-4 |
| niobium-97 | Ci | 1.33E-3 | 9.57E-3 | 3.19E-3 | 1.64E-4 |
| ruthenium-103 | Ci | 4.56E-5 | <LLD | <LLD | <LLD |
| ruthenium-106 | Ci | 1.37E-4 | 2.57E-3 | 7.65E-4 | <LLD |
| silver-110m | Ci | 1.86E-3 | 1.02E-2 | 3.43E-3 | 9.23E-4 |
| strontium-89 | Ci | <LLD | <LLD | <LLD | <LLD |
| strontium-90 | Ci | <LLD | <LLD | <LLD | <LLD |
| strontium-92 | Ci | <LLD | 2.21E-4 | 7.80E-5 | <LLD |
| technetium-99m | Ci | <LLD | <LLD | <LLD | <LLD |
| tellurium-132 | Ci | 1.11E-4 | 2.27E-5 | <LLD | <LLD |

D Lower Limit of Detection; see Table 2C.

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

TABLE 2B (Continued)

LIQUID EFFLUENTS
BATCH MODE

| Radionuclides Released | Unit | First Quarter | Second Quarter | Third Quarter | Fourth Quarter |
|--|------|------------------|-------------------|------------------|-------------------|
| 1. Fission and activation products (Continued) | | | | | |
| tin-113 | Ci | 5.89E-5 | 1.05E-4 | <LLD | <LLD |
| tungsten-187 | Ci | <LLD | 1.06E-3 | 2.63E-4 | 6.93E-5 |
| zinc-65 | Ci | <LLD | <LLD | <LLD | <LLD |
| zirconium-95 | Ci | 4.94E-4 | 1.07E-3 | 1.17E-4 | <LLD |
| zirconium-97 | Ci | 5.78E-5 | 5.35E-4 | 1.60E-4 | <LLD |
| Total for period | Ci | 1.40E-1 | 1.07E-1 | 2.06E-2 | 1.19E-2 |
| 2. Dissolved and entrained gases | | | | | |
| krypton-85 | Ci | <LLD | <LLD | <LLD | 2.02E-2 |
| xenon-133 | Ci | 6.88E-4 | 3.90E-4 | 3.34E-3 | 3.74E-3 |
| xenon-135 | Ci | <LLD | <LLD | 1.03E-4 | 5.48E-5 |
| Total for period | Ci | 6.88E-4 | 3.90E-4 | 3.44E-3 | 2.40E-2 |

LLD Lower Limit of Detection; see Table 2C.

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TABLE 2C

LIQUID EFFLUENTS-LOWER LIMIT OF DETECTION
CONTINUOUS MODE

| Radionuclides | LLD ($\mu\text{Ci/cc}$) |
|------------------------------------|---------------------------|
| 1. Fission and activation products | |
| barium-140 | 4.10E-7 |
| cerium-141 | 6.70E-8 |
| cesium-134 | 1.10E-7 |
| cesium-137 | 9.10E-8 |
| chromium-51 | 4.70E-7 |
| cobalt-58 | 9.70E-8 |
| cobalt-60 | 1.40E-7 |
| iodine-131 | 8.10E-8 |
| iron-55 | 1.00E-6 |
| iron-59 | 2.30E-7 |
| lanthanum-140 | 7.50E-7 |
| manganese-54 | 9.60E-8 |
| molybdenum-99 | 8.80E-8 |
| niobium-95 | 9.70E-8 |
| strontium-89 | 5.00E-8 |
| strontium-90 | 1.00E-8 |
| technetium-99m | 9.00E-8 |
| zinc-65 | 2.40E-7 |
| zirconium-95 | 1.70E-7 |
| 2. Dissolved and entrained gases | |
| xenon-133 | 3.00E-7 |
| xenon-135 | 1.30E-7 |
| 3. gross alpha | 1.00E-7 |

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

TABLE 2C (Continued)

LIQUID EFFLUENTS-LOWER LIMIT OF DETECTION
BATCH MODE

| Radionuclides | LLD ($\mu\text{Ci/cc}$) |
|------------------------------------|---------------------------|
| 1. Fission and activation products | |
| barium-140 | 3.20E-7 |
| cerium-141 | 6.10E-8 |
| cerium-144 | 2.70E-7 |
| cesium-136 | 1.50E-7 |
| chromium-51 | 4.20E-7 |
| iodine-131 | 5.70E-8 |
| iodine-133 | 8.40E-8 |
| iron-59 | 2.10E-7 |
| lanthanum-140 | 1.70E-7 |
| molybdenum-99 | 3.40E-8 |
| ruthenium-103 | 6.90E-8 |
| ruthenium-106 | 7.40E-7 |
| strontium-89 | 5.00E-8 |
| strontium-90 | 1.00E-8 |
| strontium-92 | 5.00E-7 |
| technetium-99m | 3.40E-8 |
| tellurium-132 | 3.90E-8 |
| tin-113 | 7.50E-8 |
| tungsten-187 | 2.80E-7 |
| zinc-65 | 2.40E-7 |
| zirconium-95 | 1.60E-7 |
| zirconium-97 | 1.10E-7 |
| 2. Dissolved and entrained gases | |
| krypton-85 | 4.30E-5 |
| xenon-135 | 1.30E-7 |
| 3. gross alpha | 1.00E-7 |

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TABLE 2D

LIQUID EFFLUENTS-RADIATION DOSES AT THE LIQUID SITE BOUNDARY

| | Unit | First Quarter | Second Quarter | Third Quarter | Fourth Quarter |
|------------------------------|------|------------------|-------------------|------------------|-------------------|
| A. | | | | | |
| 1. Total body dose | mrem | 1.06E-3 | 1.00E-3 | 4.28E-4 | 1.30E-3 |
| 2. Percent Applicable Limit | % | 3.53E-2 | 3.34E-2 | 1.43E-2 | 4.34E-2 |
| B. | | | | | |
| 1. Limiting organ dose | mrem | 1.05E-2 | 3.97E-2 | 1.29E-2 | 4.90E-3 |
| 2. Percent Applicable Limit | % | 1.05E-1 | 3.97E-1 | 1.29E-1 | 4.90E-2 |
| 3. Limiting organ for period | | GI-LLI | GI-LLI | GI-LLI | GI-LLI |

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TABLE 2E

LIQUID EFFLUENTS-BATCH RELEASE SUMMARY

| | 12 month period |
|--|-----------------|
| 1. Number of batch releases: | 108 releases |
| 2. Total time period for batch releases: | 21999 minutes |
| 3. Maximum time period for a batch release: | 658 minutes |
| 4. Average time period for a batch release: | 204 minutes |
| 5. Minimum time period for a batch release: | 12 minutes |
| 6. Average saltwater flow during batch releases: | 738287 gpm |

SECTION D. PREVIOUS RADIOACTIVE EFFLUENT RELEASE REPORT ADDENDUM

- The January - December 1993 Annual Radioactive Effluent Release Report quarterly values for Direct Radiation (Section H, 10CFR50 Appendix I Requirements, Table 1) were incorrectly reported. The correct values should have been as follows:

| | Dose (millirems) | | | | |
|--|------------------|----------------|---------------|----------------|---------|
| | First Quarter | Second Quarter | Third Quarter | Fourth Quarter | Year |
| | DIRECT RADIATION | 1.39E-1 | 2.85E-1 | 1.12E-1 | 9.84E-2 |

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SECTION E. RADWASTE SHIPMENTS

TABLE 3

SOLID WASTE AND IRRADIATED FUEL SHIPMENT

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

| 1. Type of waste | Unit | 12 month period | Estimated total error (%) |
|---|----------------|-----------------|---------------------------|
| a. Spent resins, filter sludges, evaporator bottoms (*) | m ³ | 1.89E+1 | 3.00E+1 |
| | Ci | 4.99E+2 | |
| b. Dry compressible waste, contaminated equipment | m ³ | N/A | N/A |
| | Ci | N/A | |
| c. Irradiated components, control rods | m ³ | N/A | N/A |
| | Ci | N/A | |
| d. Other | m ³ | N/A | N/A |
| | Ci | N/A | |

NOTE: Total curie content estimated.

* Material packaged into High Integrity Containers and shipped in a Type B Cask (C of C 9208) or a Type A Cask (C of C 9176).

N/A No shipments made.

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TABLE 3 (Continued)

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

| 2. Estimate of major nuclide composition (by type of waste) | | |
|---|----------------|----------|
| a. | antimony-125 | 6.45E-02 |
| | carbon-14 | 1.22E-01 |
| | cerium-144 | 2.99E-02 |
| | cesium-134 | 1.26E+01 |
| | cesium-137 | 2.07E+01 |
| | cobalt-58 | 3.07E+01 |
| | cobalt-60 | 4.66E+00 |
| | curium-242 | 4.14E-05 |
| | iodine-129 | 1.87E-04 |
| | iron-55 | 1.09E+01 |
| | manganese-54 | 4.39E+00 |
| | nickel-63 | 1.58E+01 |
| | plutonium-241 | 3.23E-03 |
| | strontium-90 | 5.78E-02 |
| | technetium-99 | 1.80E-04 |
| | tritium | 2.70E-03 |
| b. | not applicable | 0.00E+0 |
| c. | not applicable | 0.00E+0 |
| d. | not applicable | 0.00E+0 |

3. Solid Waste Disposition

See COMMON section of this report

B. IRRADIATED FUEL SHIPMENTS (Disposition)

See COMMON section of this report

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SECTION F. APPLICABLE LIMITS

Gaseous Effluents - Applicable Limits

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

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

where: Rel Rate = total curies released in each category and each quarter, divided by the seconds in a quarter; the value in Sections A.2, B.2, C.2 and D.2 of Table 1A, $\mu\text{Ci/sec}$.

X/Q = $4.80\text{E-}6 \text{ sec/m}^3$; the annual average atmospheric dispersion defined in the Units 2&3 ODCM, Rev. 27.

The ECL_{eff} is defined as:

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

where: F_i = fractional abundance of the i^{th} radionuclide obtained by dividing the activity (curies) for each radionuclide, C_i , by the sum of all the isotopic activity, C_T .

n = total number of radionuclides identified

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

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Liquid Effluents - Applicable Limits

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

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

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

The ECL_{eff} is defined as:

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

where: F_i = fractional abundance of the i^{th} radionuclide obtained by dividing the activity (curies) for each radionuclide, C_i , by the sum of all the isotopic activity, C_T .

n = total number of radionuclides identified

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

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SECTION G. ESTIMATION OF ERROR

Estimations of the error in reported values of gaseous and liquid effluents releases have been made.

Sources of error for gaseous effluents - batch releases are:

- (1) tank volumes
- (2) sampling
- (3) counting
- (4) calibration

Sources of error for gaseous effluents - continuous releases are:

- (1) fan flow rate
- (2) sampling
- (3) counting
- (4) calibration
- (5) differential pressure drop

Sources of error for liquid effluents - batch releases are:

- (1) tank volumes
- (2) sampling
- (3) counting
- (4) calibration

Sources of error for liquid effluents - continuous releases are:

- (1) dilution flow rate
- (2) sampling
- (3) counting
- (4) calibration

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

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

where: σ_i = Error associated with each component.

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SECTION H. 10 CFR 50 APPENDIX I REQUIREMENTS

Table 1 in Section H presents the quarterly and annual maximum dose to an individual. Six different categories are presented:

- (1) Liquid Effluents - Whole Body
- (2) Liquid Effluents - Organ
- (3) Airborne Effluents - Tritium, Iodines and Particulates
- (4) Noble Gases - Gamma
- (5) Noble Gases - Beta
- (6) Direct Radiation

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

For individuals who may, at times, be within the site boundary, the occupancy of the individual will be sufficiently low to compensate for any increase in the atmospheric diffusion factor above that for the site boundary. For members of the public who traverse the site boundary via highway I-5, the residency time shall be considered negligible and hence the dose "0".

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

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TABLE 1

| | Dose * (millirems) | | | | |
|---------------------------------------|--------------------|----------------|---------------|----------------|---------|
| | First Quarter | Second Quarter | Third Quarter | Fourth Quarter | Year |
| LIQUID EFFLUENTS | 1) | 2) | 3) | 4) | 5) |
| Whole Body | 1.06E-3 | 1.00E-3 | 4.28E-4 | 1.30E-3 | 3.79E-3 |
| Organ | 6) | 7) | 8) | 9) | 10) |
| | 1.05E-2 | 3.97E-2 | 1.29E-2 | 4.90E-3 | 6.81E-2 |
| AIRBORNE EFFLUENTS | 11) | 12) | 13) | 14) | 15) |
| Tritium, Iodines, and Particulates | 2.94E-3 | 1.10E-3 | 5.80E-3 | 1.33E-3 | 1.12E-2 |
| NOBLE GASES ** | 16) | 17) | 18) | 19) | 20) |
| Gamma | 1.17E-3 | 1.13E-3 | 6.66E-3 | 5.30E-3 | 1.34E-2 |
| Beta | 21) | 22) | 23) | 24) | 25) |
| | 2.53E-3 | 2.57E-3 | 1.43E-2 | 1.17E-2 | 2.75E-2 |
| DIRECT RADIATION | 26) | 27) | 28) | 29) | 30) |
| | 1.12E-1 | 1.19E-1 | 9.65E-2 | 2.61E-1 | 5.78E-1 |

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

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

1. This 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.

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

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

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6. This data was calculated using the methodology of the ODCM; the GI-LLI received the maximum dose primarily by the saltwater fish pathway.
7. This data was calculated using the methodology of the ODCM; the GI-LLI received the maximum dose primarily by the saltwater fish pathway.
8. This data was calculated using the methodology of the ODCM; the GI-LLI received the maximum dose primarily by the saltwater fish pathway.
9. This data was calculated using the methodology of the ODCM; the GI-LLI received the maximum dose primarily by the saltwater fish pathway.
10. This data was calculated using the methodology of the ODCM; the GI-LLI received the maximum dose primarily by the saltwater fish pathway.
11. The maximum organ dose was to a child's thyroid and was located in the NNW sector. This was calculated using the assumptions of USNRC Regulatory Guide 1.109.
12. The maximum organ dose was to a child's thyroid and was located in the NNW sector. This was calculated using the assumptions of USNRC Regulatory Guide 1.109.
13. The maximum organ dose was to a child's thyroid and was located in the NNW sector. This was calculated using the assumptions of USNRC Regulatory Guide 1.109.
14. The maximum organ dose was to a child's thyroid and was located in the NNW sector. This was calculated using the assumptions of USNRC Regulatory Guide 1.109.
15. The maximum organ dose was to a child's thyroid and was located in the NNW sector. This was calculated using the assumptions of USNRC Regulatory Guide 1.109.
16. A maximum air dose of $1.92\text{E-}3$ 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 using the assumptions of the USNRC Regulatory Guide 1.109.
17. The maximum air dose for gamma radiation was located in the E sector, at the exclusion area boundary, and calculated using the assumptions of the USNRC Regulatory Guide 1.109.
18. The maximum air dose for gamma radiation was located in the NNW sector, at the exclusion area boundary, and calculated using the assumptions of the USNRC Regulatory Guide 1.109.
19. A maximum air dose of $2.34\text{E-}2$ mrad for gamma radiation was located in the SSW sector, a seaward direction. The reported maximum air dose for gamma radiation was located in the E sector, a landward sector, at the exclusion area boundary and calculated using the assumptions of the USNRC Regulatory Guide 1.109.
20. A maximum air dose of $3.18\text{E-}2$ mrad for gamma radiation was located in the SSW sector, a seaward direction. The reported maximum air dose for gamma radiation was located in the ENE sector, a landward sector, at the exclusion area boundary and calculated using the assumptions of the USNRC Regulatory Guide 1.109.

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1. A maximum air dose of $3.44\text{E-}3$ mrad for beta radiation was located in the SSW sector, a seaward direction. The reported maximum air dose for beta radiation was located in the ENE sector, a landward sector, at the exclusion area boundary and calculated using the assumptions of the USNRC Regulatory Guide 1.109.
22. The maximum air dose for beta radiation was located in the E sector, at the exclusion area boundary, and calculated using the assumptions of the USNRC Regulatory Guide 1.109.
23. The maximum air dose for beta radiation was located in the ENE sector, at the exclusion area boundary, and calculated using the assumptions of the USNRC Regulatory Guide 1.109.
24. A maximum air dose of $3.92\text{E-}2$ mrad for beta radiation was located in the SSW sector, a seaward direction. The reported maximum air dose for beta radiation was located in the E sector, a landward sector, at the exclusion area boundary and calculated using the assumptions of the USNRC Regulatory Guide 1.109.
25. A maximum air dose of $5.61\text{E-}2$ mrad for beta radiation was located in the SSW sector, a seaward direction. The reported maximum air dose for beta radiation was located in the ENE sector, a landward sector, at the exclusion area boundary and calculated using the assumptions of the USNRC Regulatory Guide 1.109.
26. Measurements were made using TLD dosimeters; values are presented as site wide dose and are prorated to 300 hours per year; highest dose was measured at the Site Boundary in the WSW sector.
27. Measurements were made using TLD dosimeters; values are presented as site wide dose and are prorated to 300 hours per year; highest dose was measured at the Site Boundary in the WSW sector.
28. Measurements were made using TLD dosimeters; values are presented as site wide dose and are prorated to 300 hours per year; highest dose was measured at the Site Boundary in the SW sector.
29. Measurements were made using TLD dosimeters; values are presented as site wide dose and are prorated to 300 hours per year; highest dose was measured at the Site Boundary in the WSW sector.
30. Measurements were made using TLD dosimeters; values are presented as site wide dose and are prorated to 300 hours per year; highest dose was measured at the Site Boundary in the WSW sector.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

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

TABLE 2

| SOURCE | Percent Applicable Limit | | | | |
|---------------------------------------|--------------------------|----------------|---------------|----------------|---------|
| | First Quarter | Second Quarter | Third Quarter | Fourth Quarter | Year |
| LIQUID EFFLUENTS | | | | | |
| Whole Body | 3.53E-2 | 3.34E-2 | 1.43E-2 | 4.34E-2 | 6.32E-2 |
| Organ | 1.05E-1 | 3.97E-1 | 1.29E-1 | 4.90E-2 | 3.41E-1 |
| AIRBORNE EFFLUENTS | | | | | |
| Tritium, Iodines, and Particulates | 1.96E-2 | 7.33E-3 | 3.87E-2 | 8.87E-3 | 3.73E-2 |
| NOBLE GASES | | | | | |
| Gamma | 1.17E-2 | 1.13E-2 | 6.66E-2 | 5.30E-2 | 6.70E-2 |
| Beta | 1.27E-2 | 1.29E-2 | 7.15E-2 | 5.85E-2 | 6.88E-2 |

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

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

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

SECTION I. CHANGES TO THE OFFSITE DOSE CALCULATION MANUAL

On December 21, 1994 Revision 27 to the Units 2/3 Offsite Dose Calculation Manual (ODCM) was adopted and published. Incorporated into this revision were 1) the inclusion of the new South Yard Facility (SYF), 2) changes made due to the 1993 Land Use Census, 3) the pump flow rates for the FFCPD HUT and Unit 3 TPS were changed to 1000 gpm and 100 gpm, respectively, 4) the batch liquid release setpoint determination to also allow the use of the tritium sample obtained prior to release of a radwaste tank, and 5) modified some monitor calibration constants based on recent isotopic calibrations. The pump flow rate changes were a result of recent design changes.

DCP A-7022.00SC is installing a new maintenance building, the South Yard Facility (SYF) in parking lot 1. When finally completed, two potential airborne effluent release points will be created, one for the handling and working of radioactive material and another for the decontamination of equipment and components. The building is not scheduled to be fully operational until 1995. Included in this revision was monitor information that will be pertinent when the equipment is installed and accepted by Station. Noted action statements, applicable when the radiation monitor is out of service, will be applicable if the building is used prior to full equipment implementation. Indeed, if the SYF is to be used for handling or working radioactive material prior to final DCP turnover, a station procedure with the proper safety evaluation will be used to govern such interim usage to ensure that there is no adverse radiological impact to a member of the public. Subsequent to the final DCP turnover, the next appropriate ODCM revision will incorporate all pertinent information regarding the SYF as effluent release points.

One change brought on by the Land Use Census concerned the addition of a page of R_i parameters for Outage Residents. These are plant workers who, during refueling outages, live on plant property. These workers are present only during outages, typically 3 months per unit every two years. They were present during the 1993 Land Use Census and so accordingly are presented in this document. The Outage Resident doses are not limiting as they are bounded by existing receptors. In years when no outages occur, this page will not appear in either the Land Use Census or the ODCM.

One note was added to Table 4-3 regarding 1 hour particulate and iodine sampling time when only one channel is operable. In the G.T. Gibson memorandum for file "Units 2/3 Clarification No. 14", dated June 30, 1994, the position was stated:

normal monitor shutdown for filter changing does not result in the monitor being inoperable. Shutdown beyond one hour should be carefully considered as bordering on "inoperable".

Even though this memorandum addressed radiation monitors R-7804 and R-7807 in their compliance to Technical Specification 3.4.5.1, the position was logically applied to other gaseous radiation monitors. The NRC concurred with the original memo regarding R-7804 and R-7807.

No safety evaluations were performed for updating radiation monitor calibration constants or implementing changes from the 1993 Land Use Census. These changes reflect results from routine surveillances and as such do not constitute a modification in methodology for determining activity released from the site and subsequent dose to a member of the public.

Two radiation monitors had flow indicating switches installed in their sample flow lines, RE-7817 (BPS and FFCPD) and RE-7821 (TPS) in DCP 2&3 6191.00BJ. These flow switches, FISL-7817 and FISL-7821 respectively, are required for monitor operability. They alarm when the radmonitor's minimum required sample flow is not present. By the action of the FISLs, they effectively become an integral part of the radiation monitor circuitry. When the FISL fails, the radmonitor is declared inoperable. When the FISL alarms on low flow, the radmonitor is declared inoperable. Because of this method of capturing the essence of the requirement, calling out the individual flow switches in Tables 4-1 and 4-2 is not warranted. The flow instruments are being listed in individual maintenance procedures. Because of problems experienced with these new flow indicating switches, a new design of flow switch is planned for installation early next year. Testing of this new design is already occurring.

Per NRC Generic Letter 89-01, no safety review was required or performed for the correction of typographical errors.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

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

The following is a complete list of the changes:

- ^a Indicates typographical, sequential and page numbering, and format changes.
- ^b The South Yard Facility (SYF) is under construction. The schedule currently calls for completion in steps, with the final turnover occurring in the summer of 1995. Interim use of the SYF, if necessary, will be controlled by a station procedure with the required safety evaluation. The next appropriate ODCM revision subsequent to the final DCP A-7022.00SC turnover will incorporate all pertinent information regarding the SYF.
- * The 1993 Land Use Census revealed increased occupancy factors in two locations, San Clemente Ranch Packing (Sector R, 2.6 miles) and "51 "Area" Beach (renamed from Enlisted Beach) (Sector Q, 1.4 miles) and a decreased occupancy factor for one location, Highway Patrol weigh station (Sector G, 2.0 miles). Correspondingly, the dose parameters for all affected age groups were affected in those three locations. The occupancy factors increased from 0.3425 to 0.3674 and from 0.2283 to 0.2568, respectively, and decreased from 0.2283 to 0.2146. This information was formally transmitted in the memorandum from E.M. Goldin to J.R. Clark, "Submittal of 1993 ODCMs Dose Parameters (R_i) for San Onofre Nuclear Generating Station Unit 1 and Units 2/3", dated April 12, 1994.
- ii^a Revised page sequence numbering due to pages added in section 4.
- iii^a Revised page sequence numbering due to pages added in section 4.
- iv^a Revised page sequence numbering due to pages added in section 4.
- v^a Revised page sequence numbering due to pages added in section 4.
- 1-10 Revised the definition of C_t . An option to use the tritium sample result obtained prior to each radwaste tank release is added in calculating the monitor setpoint.
- 1-15 Revised the FFCPD HUT waste flow rate to 1000 gpm per MOs 94050511, 94050513, 94050515, and 94050404. New stainless steel pumps were installed which produce higher flow rates.
- 1-21^a Corrected alignment on equation definitions.
- 1-23 Revised the Unit 3 Turbine Plant Sump pump flow rate to 100 gpm/pump per DCP 3-6748.
- 1-26 Revised calibration constants.
- 2-2^b Added South Yard Facility to continuous release pathways.
- 2-4^b Added note "j" regarding the South Yard Facility flow path.
- 2-12^a Deleted extra spaces between lines.
- 2-15^a Properly aligned a paragraph.
- 2-18^a Corrected typographical error.
- 2-25 Revised calibration constants.
- 2-28 Clarified definition for W_k under equation 2-13.
- 2-30^a Added missing parenthesis to equations 2-16 and 2-17.
- 2-32 Corrected a typographical error in equation 2-18. Also changed Health Physics Engineering to Corporate Health Physics and Environmental.
- 2-33 Clarified definition for W_k under equation 2-18. Also corrected a typographical error in the same definition.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

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

- 2-34 Clarified definition for W_k under equation 2-19.
- 2-40* Revised the pathway name from Enlisted Beach Trailers to 51 Area Beach Trailers.
- 2-40a* Created new page and new pathway in accordance with the Land Use Census. This page reflects the periodic "outage resident" which resides on site during refueling outages.
- 2-41^a Corrected typographical error in name of pathway.
- 2-44* Revised the pathway name from Enlisted Beach/Campground to 51 Area Beach/Campground.
- 2-45* 51 Area Beach Check-in occupancy factor increased from 0.2283 to 0.2568 (Sector Q, 1.4 miles), thereby changing dose parameters. Also, the name was changed from Enlisted Beach Check-in.
- 2-52* San Clemente Ranch Packing with residents occupancy factor increased from 0.3425 to 0.3674 (Sector R, 2.6 miles), thereby changing dose parameters.
- 2-77* Highway Patrol Weigh Station occupancy factor decreased from 0.2283 to 0.2146 (Sector G, 2.0 miles), thereby changing dose parameters.
- 2-81^a Removed "₁" from C_i under equation 2-21.
- 4-7 Added footnote (4) to certain particulate and iodine samplers.
- 4-8^b Added this page to Table 4-3 to list the planned new SYF effluent flowpaths.
- 4-9 Added clarification notes on 1 hour particulate and iodine sample time with only one channel operable. Also revised page sequence numbering due to pages added in section 4.
- 4-10^a Revised page sequence numbering due to pages added in section 4.
- 4-11^a Revised page sequence numbering due to pages added in section 4.
- 4-12^a Revised page sequence numbering due to pages added in section 4.
- 4-13^b Added this page to Table 4-4 to list the planned new SYF effluent flowpaths. Also revised page sequence numbering due to pages added in section 4.
- 4-14^b Added note (5) regarding SYF building occupancy. Also revised page sequence numbering due to pages added in section 4.
- 4-15^a Revised page sequence numbering due to pages added in section 4.
- 4-16^a Revised page sequence numbering due to pages added in section 4.
- 4-17^a Revised page sequence numbering due to pages added in section 4.
- 4-18^a Revised page sequence numbering due to pages added in section 4.
- 5-1 Corrected name of required document in section 5.1.1.a.
- 5-11 Added a statement, to be consistent with existent procedures, regarding the reporting in the next Annual Radioactive Effluent Release Report of new locations found by the yearly Land Use Census which yields a calculated dose or dose commitment greater than those currently being calculated. Also corrected a typographical error.
- 5-16^a Added "***" to item 41 Old Route 101-East to emphasize the footnote explaining that this TLD is located inside the Site boundary. The physical location was not changed.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

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

SECTION J. CHANGES TO RADIOACTIVE WASTE TREATMENT SYSTEMS

- o There were no changes to the Units 2 and 3 Radioactive Waste Treatment Systems during the reporting period, January 1, 1994 to December 31, 1994.

SECTION K. MISCELLANEOUS

- o Unplanned, Uncontrolled Release from Nitrogen Gas System

This event involved the intermittent and low level radioactive contamination of the Nitrogen Gas System from 1/24/94 to 2/9/94. It was due to leaking isolation check valves between the nitrogen supply header and the radwaste system waste gas decay tank header. Total activity released to the atmosphere was conservatively estimated at $2.36\text{E}-2$ Ci. Dose consequences were minimal and were conservatively estimated at $8.01\text{E}-7$ mrem gamma dose, and $4.99\text{E}-6$ mrem beta dose. A Station Division Investigation Report (IDIR-94-003) was written to document this event and to provide for corrective actions.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

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

EFFLUENT RADIATION MONITORS OUT OF SERVICE GREATER THAN 30 DAYS

January 1, 1994 - December 31, 1994

| S.O.N.G.S. 2 | | | |
|--|----------------------|--|--|
| Monitor | Inoperability Period | Inoperability Cause | Explanation |
| 2RT-7817 BPS/FFCPD Discharge Monitor | 02/14/94 - 03/22/94 | Surveillances and electrical repair work | Maintenance surveillances and electrical component repair/upgrade conducted. |
| | 06/01/94 - 07/01/94 | Lack of sample flow | Monitor Isolated for design change installation. |
| | 08/04/94 - 09/12/94 | Check source failed; design change testing. | Corrective work on check source and testing of flow switch for design change. |
| | 09/27/94 - 11/10/94 | Inaccurate sensing of sample flow | New sample flow switch sticking caused monitor inoperability. Newer design installed early 1995. |
| 2RT-7821 Turbine Plant Sump Monitor | 05/30/94 - 07/01/94 | Lack of sample flow | Design change installation isolated monitor. |
| | 07/04/94 - 08/11/94 | Inaccurate sensing of sample flow | Inoperable due to sticking flow switch. |
| | 08/26/94 - 11/02/94 | Inaccurate sensing of sample flow | Inoperable due to sticking flow switch. Improved design installed in early 1995. |
| | 09/13/94 - 10/26/94 | Planned monitor maintenance and system testing | Complete monitor channel calibration was conducted as well as testing on the recently completed design change. |
| 2RT-7818B Condenser Air Ejector High Range Monitor | 01/25/88 - 12/22/94 | Detector design deficiency | Monitor configuration redesigned and modifications installed. |
| | 05/19/94 - 06/20/94 | Monitor spiking | Maintenance activities and long-term trending to evaluate monitor spiking. |
| 2RT-7828 Containment Purge Process Flow Monitor | 02/03/94 - present | Process flow indication | To be corrected during obsolete component design change. Radiation monitor functions operable. |
| 2RT-7865 Main Purge Process Flow Monitor | 04/22/92 - present | Process flow indication | To be corrected during obsolete component design change. Radiation monitor functions operable. |
| 2RT-7870 Condenser Air Ejector Process Flow Monitor | 07/07/94 - 10/26/94 | Inconsistent process flow indication | Implemented design change that corrected stack flow profile. |

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

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

EFFLUENT RADIATION MONITORS OUT OF SERVICE GREATER THAN 30 DAYS

January 1, 1994 - December 31, 1994

| S.O.N.G.S. 3 | | | |
|--|----------------------|--|--|
| Monitor | Inoperability Period | Inoperability Cause | Explanation |
| 3RT-6753/ 3RT-6759 Steam Generator Blowdown Monitor | 10/08/93 - 01/05/94 | No sample flow | No steam generator pressure or steam flow due to Unit being in a refueling outage. |
| 3RT-7817 BPS/FFCPD Discharge Monitor | 12/05/91 - 04/29/94 | Removed from service | Installed flow meter modifications per design change package. Retesting revealed design inadequate. |
| | 06/11/94 - 07/13/94 | Inaccurate sensing of sample flow | Inoperable due to sticking flow switch. |
| | 09/19/94 - present | Inaccurate sensing of sample flow | Inoperable due to sticking flow switch. Improved design installed in early 1995. |
| 3RT-7821 Turbine Plant Sump Monitor | 05/08/94 - 06/08/94 | Lack of sample flow | Monitor isolated for design change installation. |
| | 10/08/94 - present | Inaccurate sensing of sample flow and leaking isolation valve. | Inoperable due to sticking flow switch. Improved design installed in early 1995. Isolation valve pending repair. |
| 3RT-7818 B Condenser Air Ejector High Range Monitor | 01/25/88 - present | Detector design deficiency | Monitor configuration redesigned, modifications installed in January 1995. |
| | 09/14/94 - 10/24/94 | Isolated for design change evaluation | Testing for new monitor design configuration. |
| 3RT-7828 Containment Purge Process Flow Monitor | 02/03/94 - present | Process flow indication | To be corrected during obsolete component design change. Radiation monitor functions operable. |
| 3RT-7865 Plant Vent Stack Process Flow Monitor | 08/02/91 - present | Process flow indication | To be corrected during obsolete component design change. Radiation monitor functions operable. |
| 3RT-7870 Condenser Air Ejector Process Flow Monitor | 03/03/89 - 01/11/94 | Inconsistent process flow indication | Implemented design change that corrected stack flow profile. |
| | 03/21/94 - 04/22/94 | Inconsistent process flow indication | New component installation required modification. |
| S.O.N.G.S. 2&3 | | | |
| Monitor | Inoperability Period | Inoperability Cause | Explanation |
| 2/3RT-7813 Liquid Radwaste Discharge Line Monitor | 11/12/93 - 01/04/94 | High background reading | Required decontamination and corrective work on two isolation valves. |

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

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

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

- o Gaseous effluent releases, excluding tritium, totaled $3.66\text{E}+2$ curies with 97% of the total being Xe-133.
- o The radiation doses from gaseous releases are: (a) gamma air dose: $1.34\text{E}-2$ mrad at the site boundary, (b) beta air dose: $2.75\text{E}-2$ mrad at the site boundary, (c) organ dose: $1.12\text{E}-2$ mrem at the nearest receptor.
- o Liquid releases totaled $8.91\text{E}+2$ curies of which tritium was $8.91\text{E}+2$ Ci, noble gases were $2.85\text{E}-2$ Ci, and particulates and iodines were $2.81\text{E}-1$ Ci.
- o The radiation doses from liquid releases are: (a) total body: $3.79\text{E}-3$ mrem, (b) limiting organ: $6.81\text{E}-2$ mrem.
- o The radioactive releases and resulting doses generated from Units 2 and 3 were below the Applicable Limits for both gaseous and liquid effluents.

COMMON

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

COMMON

COMMON RADWASTE SHIPMENTS

TABLE 3

SOLID WASTE AND IRRADIATED FUEL SHIPMENT

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

| 1. Type of waste | Unit | 12 month period | Estimated total error (%) |
|---|----------------|-----------------|---------------------------|
| a. Spent resins, filter sludges, evaporator bottoms | m ³ | N/A | N/A |
| | Ci | N/A | |
| b. Dry active waste (DAW), compactable and non-compactable (*, #) | m ³ | 3.25E+1 | 3.00E+1 |
| | Ci | 9.89E+0 | |
| c. Irradiated components, control rods | m ³ | N/A | N/A |
| | Ci | N/A | |
| d. Other (filters) (*) | m ³ | 4.90E+0 | 3.00E+1 |
| | Ci | 7.37E+1 | |

NOTE: Total curie content estimated.

* Material packaged into High Integrity Containers and shipped in a Type B Cask (C of C 9208) or Type A Cask (C of C 9176).

Material packaged in strong, tight containers of various sizes.

N/A No shipment made.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

COMMON

TABLE 3 (Continued)

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

| 2. Estimate of major nuclide composition (by type of waste) | | |
|---|------------------|-----------|
| a. | Not Applicable | % 0.00E+0 |
| b. | americium-241 | % 7.64E-4 |
| | antimony-125 | % 1.64E+0 |
| | cadmium-109 | % 2.70E-4 |
| | carbon-14 | % 8.36E-1 |
| | cesium-134 | % 5.06E+0 |
| | cesium-137 | % 3.52E+1 |
| | cobalt-58 | % 6.49E+0 |
| | cobalt-60 | % 1.94E+1 |
| | curium-242 | % 3.16E-4 |
| | curium-243/44 | % 6.29E-4 |
| | iodine-129 | % 1.57E-2 |
| | iodine-131 | % 1.96E-6 |
| | iron-55 | % 2.27E+1 |
| | krypton-85 | % 3.25E-3 |
| | manganese-54 | % 1.60E+0 |
| | nickel-59 | % 3.84E-3 |
| | nickel-63 | % 6.58E+0 |
| | plutonium-238 | % 4.99E-4 |
| | plutonium-239/40 | % 5.36E-4 |
| | plutonium-241 | % 7.22E-2 |
| | strontium-90 | % 3.01E-2 |
| | technetium-99 | % 2.37E-3 |
| | tritium | % 2.74E-1 |
| | uranium-235 | % 5.91E-7 |
| | uranium-238 | % 5.83E-5 |

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

COMMON

TABLE 3 (Continued)

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

| 2. Estimate of major nuclide composition (by type of waste) | | |
|---|---|---------|
| c. Not Applicable | % | 0.00E+0 |
| d. americium-241 | % | 5.47E-4 |
| carbon-14 | % | 1.20E+1 |
| cesium-137 | % | 6.40E-2 |
| chromium-51 | % | 1.41E+0 |
| cobalt-58 | % | 2.11E+1 |
| cobalt-60 | % | 1.01E+1 |
| curium-242 | % | 6.60E-3 |
| curium-243/44 | % | 4.26E-3 |
| iodine-129 | % | 2.79E-4 |
| iodine-131 | % | 2.18E-6 |
| iron-55 | % | 4.42E+1 |
| manganese-54 | % | 2.47E+0 |
| nickel-63 | % | 6.33E+0 |
| niobium-94 | % | 2.98E-5 |
| niobium-95 | % | 9.36E-1 |
| plutonium-238 | % | 1.03E-3 |
| plutonium-239/40 | % | 6.86E-4 |
| plutonium-241 | % | 7.50E-2 |
| strontium-90 | % | 1.24E-2 |
| technetium-99 | % | 7.35E-5 |
| tritium | % | 2.76E-2 |
| zirconium-95 | % | 1.31E+0 |

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

COMMON

TABLE 3 (Continued)

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

| 3. Solid Waste Disposition (S.O.N.G.S. 1, 2, and 3) | | |
|---|--|--------------|
| Number of Shipments | Mode of Transportation | Destination |
| 4 * | Tri-State Motor Transit Truck/Type A Cask | Barnwell, SC |
| 2 * | Tri-State Motor Transit Truck/Type B Cask | Barnwell, SC |
| 83 # | Hitman Transport Truck/Trailer | Barnwell, SC |
| 2 # | Tri-State Motor Transit Truck/Trailer | Barnwell, SC |

* All waste packaged at SONGS is staged at one location. There are no independent shipments of dry active waste made for Unit 1 or Units 2&3, and are not reported separately.

SONGS maintains contracts with vendors (SEG/ATG) that provide volume reduction services. These shipments were made from their processing facilities. The 85 shipments made from these facilities included waste from other generators. Edison's waste volume was a small fraction of the total waste volume of these shipments.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

COMMON

TABLE 3 (Continued)

B. IRRADIATED FUEL SHIPMENTS (Disposition)

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

C. DEWATERING

| Number of Containers | Solidification Agent |
|----------------------|----------------------|
| 4 | N/A |

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

During the reporting period January 1, 1994 through December 31, 1994, a change to the Process Control Program via procedure S0123-VII-8.5.1 was approved for implementation. Please find attached an explanation of the changes and the justification for making the changes.

REFERENCES:

- 1) Unit 1 Technical Specifications, section D6.13.2.
- 2) Units 2 and 3 Technical Specifications, section 6.13.2.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

COMMON

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

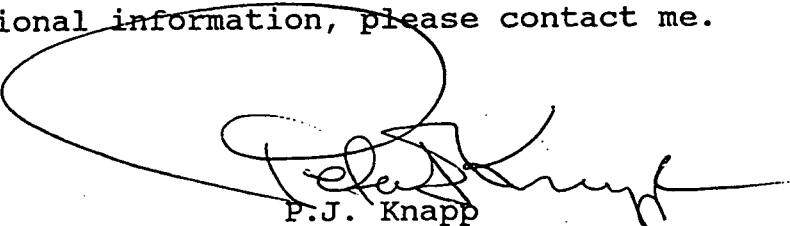
December 23, 1994

R.W. KRIEGER
R.W. WALDO
W.C. MARSH
R.J. LEE

SUBJECT: Notification of a TCN 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 of Unit 2 and 3 and the Unit 1 Permanently Defueled technical specifications D 6.5.2.9., D 6.5.2.10, and D 6.13.2, a change to the Process Control Program, via a TCN to 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 that change.

If you require any additional information, please contact me.



P.J. Knapp

PJK9412.09
cc: P. Chang
S. Enright

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

COMMON

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

MEMORANDUM FOR FILE

December 23, 1994

SUBJECT: Notification of Change to the Process Control Program for San Onofre Unit 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 TCN and justification for the changes.

Description of Change(s): A TCN was initiated to correct reference numbers provided in the objectives section of the procedure. References 2.2.2 and 2.2.3 reflect new procedure title changes following revisions as described in previous Memorandum for File dated April 21, 1993. Reference 2.3.3 was changed to U.S. Ecology, Inc. Ward Valley, California State Disposal Site Licenses and Site Criteria in place of Washington State Disposal Site Licenses and Site Criteria. Reference 2.1.2 of the NRC Commitments section has been changed to reflect the Unit 1 Permanently Defueled Technical Specification numbering system whereby the technical specification number 6.13 is preceded by the letter "D". This change was also made throughout the entire procedure where reference to Unit 1 technical specification numbers are listed. The word semiannual has been changed to annual throughout the entire procedure. Section 7.2.1 has been changed. Report information from .1 thru .7 has changed to include more detailed information for entering data in reports made annually to the Nuclear Regulatory Commission. Developmental Resources 2.4.5 State of Nevada license to U.S. Ecology, No 13-11-0043-02, with amendments, 2.4.6 State of Washington license to U.S. Ecology, No. WN-1019-2, with amendments, 2.4.7 Handford Special Nuclear Material License issued to U.S. Ecology, License No. 16-19204-01 and 2.4.9 State of South Carolina, Permit for Transportation of Radioactive Waste into or within South Carolina, No. 0281-04-94-X have been deleted.

Rational for Change: Title changes to References 2.2.2 and 2.2.3 are a result of the revisions to 10 CFR Part 20, Standards for the Protection Against Radiation which necessitated a revision to the ALARA program. The Unit 1 Permanently Defueled Technical Specification has changed the section numbering by preceding each section number with the letter "D". Changes to .1 thru .7 of section 7.2.1 and the additional information required was included so that the annual effluent report information listed in SO123-VII-8.5.1 would be consistent with the information listed in section 6.4.2 of procedure SO123-VII-8.1.6. This information is required when preparing annual reports to the Nuclear Regulatory Commission. Southern California Edison no longer ships radioactive waste to Handford, Washington, Beatty, Nevada or Barnwell, South Carolina burial sites. Reference change 2.3.3 and the deletion of Developmental Resources 2.4.5, 2.4.6 and 2.4.7 reflect the changes. The Effluents report is due annually.

Justification That the Change Does Not Reduce Conformance of the Solidified Waste to Existing Criteria: The changes described above are for editorial clarification, and do not affect conformance of the process Control Program for San Onofre Units 1, 2, and 3.

APPROVED BY: _____

Health Physics Manager

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

COMMON

COMMON 40 CFR 190 REQUIREMENTS

Table 1 below presents the annual site-wide doses and percent of ODCM Specification limits to members of the public. These values are calculated utilizing doses resulting from all effluent pathways and direct radiation. The different categories presented are: (1) Total Body, (2) Limiting Organ, and (3) Thyroid.

| Dose Category | Units | Year |
|-------------------------------------|-------|---------|
| 1. Total Body | | |
| a. Total Body Dose | mrem | 6.87E-1 |
| b. Percent ODCM Specification Limit | % | 2.75E+0 |
| 2. Limiting Organ | | |
| a. Organ Dose (GI-LLI) | mrem | 7.16E-2 |
| b. Percent ODCM Specification Limit | % | 2.87E-1 |
| 3. Thyroid | | |
| a. Thyroid Dose | mrem | 2.79E-3 |
| b. Percent ODCM Specification Limit | % | 3.72E-3 |

In addition to the dose calculated in the table above, there is the potential for incremental exposure to the public through disposal of certain solid materials at a facility outside the sphere of influence of airborne and liquid pathways. For example, Southern California Edison collects marine debris on the screens of the circulating water system and gathers dirt and sweepings during housekeeping activities. From time to time, extremely low levels of radioactivity have been detected in these wastes, placing their disposal outside NRC jurisdiction as described in 10 CFR 61. The Department of Health Services for the State of California has evaluated the potential impact to the public attributable to disposing of these materials at a municipal facility and concluded that the maximum exposure to individuals living or working at the facility is an acceptably small fraction of the designated safe limits.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

COMMON

COMMON CONCLUSIONS

- o Radioactive releases from S.O.N.G.S. 1, 2 and 3 totaled $3.66\text{E}+2$ curies for gaseous effluents, 97% of which was Xe-133. Curies discharged for liquid effluents were: tritium, $8.91\text{E}+2$ curies; noble gases, $2.85\text{E}-2$ curies; particulates and iodines, $2.83\text{E}-1$ curies.
- o Radioactive releases and resulting doses generated from S.O.N.G.S. 1, 2 and 3 were below the Applicable Limits for both gaseous and liquid effluents.
- o S.O.N.G.S. 1, 2 and 3 made 91 radwaste shipments to Barnwell, SC. Total volume was $5.63\text{E}+1$ cubic meters containing $5.82\text{E}+2$ curies of radioactivity.
- o Meteorological conditions during the year were typical for S.O.N.G.S. Meteorological dispersion was good 42% of the time, fair 38% of the time and poor 20% of the time.
- o The net result from the analysis of these effluent releases indicates that the operation of S.O.N.G.S. 1, 2 and 3 has met all the requirements of the applicable regulations and therefore has not resulted in any detrimental effects on the environment.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

COMMON

APPENDIX A

GASEOUS EFFLUENTS - APPLICABLE LIMITS

- A. Table 1A lists the total curies released and the release rate. The percent of applicable limit compares the released concentrations to the concentration limits of 10 CFR 20, Appendix B, Table II, Column 1.
- B. Table 1E lists the air doses as calculated using the historical X/Q. The air dose due to noble gases released in gaseous effluents from S.O.N.G.S. (per reactor) to areas at and beyond the site boundary shall be limited to the following values:
1. During any calendar quarter: ≤ 5 mrad for gamma radiation and ≤ 10 mrad for beta radiation.
 2. During any calendar year: ≤ 10 mrad for gamma radiation and ≤ 20 mrad for beta radiation.
- C. The dose to a Member of the Public from iodines, tritium, and all radionuclides in particulate form with half-lives greater than eight days in gaseous effluents released from S.O.N.G.S. (per reactor) to areas at and beyond the site boundary shall be limited to the following values:
1. During any calendar quarter: ≤ 7.5 mrem to any organ.
 2. During any calendar year: ≤ 15 mrem to any organ.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

COMMON

APPENDIX A (Continued)

LIQUID EFFLUENTS - APPLICABLE LIMITS

- A. Table 2A lists the total curies released, the diluted concentration, and percent of the applicable limit. The percent of applicable limit compares the diluted concentration of radioactive material released to the concentrations specified in 10 CFR 20, Appendix B, Table II, Column 2 for radionuclides other than dissolved or entrained noble gases. For dissolved or entrained noble gases, the concentration is limited to $2.00\text{E-}4 \mu\text{Ci/ml}$.
- B. Table 2D lists doses due to liquid releases. The dose commitment to a Member of the Public from radioactive materials in liquid effluents released from S.O.N.G.S. (per reactor) to unrestricted areas shall be limited to the following values:
1. During any calendar quarter: ≤ 1.5 mrem to the total body and
 ≤ 5 mrem to any organ.
 2. During any calendar year: ≤ 3 mrem to the total body and
 ≤ 10 mrem to any organ.

METEOROLOGY



METEOROLOGY

The meteorology of the San Onofre Nuclear Generating Station for each of the four quarters, 1994 is described in this section. Meteorological measurements have been made according to the guidance provided in USNRC Regulatory Guide 1.23, "Onsite Meteorological Programs." A summary report of the meteorological measurements taken during each calendar quarter are presented in Table 4A as joint frequency distribution (JFD) of wind direction and wind speed by atmospheric stability class.

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

Table 4A lists the joint frequency distribution for each quarter, 1994. Each page of Table 4A represents the data for the individual stability classes: A, B, C, D, E, F, and G. The last page of each section is the JFD for all the stability classes. The wind speeds have been measured at the 10-meter level, and the stability classes are defined by the temperature differential between the 10-meter and 40-meter levels.

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

METEOROLOGY

January - March

TABLE 4A

SITE: SAN ONOFRE

PERIOD OF RECORD 93123124-94033123

WIND SPEED (M/S) AT 10 METER LEVEL

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

| WIND DIR | .22-.50 | .51-.75 | .76-1.0 | 1.1-1.5 | 1.6-2.0 | 2.1-3.0 | 3.1-5.0 | 5.1-7.0 | 7.1-10.0 | 10.1-13.0 | 13.1-18.0 | >18 | TOTAL |
|----------|---------|---------|---------|---------|---------|---------|---------|---------|----------|-----------|-----------|-----|-------|
| N | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| NNE | 0 | 0 | 0 | 1 | 0 | 0 | 5 | 3 | 1 | 0 | 0 | 0 | 10 |
| NE | 0 | 0 | 0 | 0 | 0 | 0 | 6 | 3 | 3 | 0 | 0 | 0 | 12 |
| 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 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| SE | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 8 | 2 | 0 | 0 | 0 | 13 |
| SSE | 0 | 1 | 0 | 0 | 0 | 16 | 10 | 5 | 7 | 0 | 0 | 0 | 39 |
| S | 0 | 0 | 0 | 3 | 9 | 28 | 15 | 4 | 0 | 2 | 0 | 0 | 61 |
| SSW | 0 | 0 | 0 | 5 | 12 | 22 | 9 | 4 | 0 | 0 | 0 | 0 | 52 |
| SW | 0 | 0 | 0 | 7 | 16 | 22 | 11 | 1 | 1 | 0 | 0 | 0 | 58 |
| WSW | 0 | 0 | 0 | 10 | 13 | 48 | 10 | 0 | 0 | 0 | 0 | 0 | 81 |
| W | 0 | 0 | 0 | 3 | 11 | 61 | 54 | 9 | 0 | 0 | 0 | 0 | 138 |
| WNW | 0 | 1 | 0 | 0 | 1 | 8 | 15 | 11 | 0 | 0 | 0 | 0 | 36 |
| NW | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| NNW | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| TOTALS | 0 | 2 | 0 | 29 | 63 | 206 | 141 | 48 | 14 | 2 | 0 | 0 | 505 |

| | | | |
|-------------------------|-----|----------------------------|------|
| NUMBER OF VALID HOURS | 505 | NUMBER OF CALMS | 0 |
| NUMBER OF INVALID HOURS | 7 | TOTAL HOURS FOR THE PERIOD | 2160 |

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

| WIND DIR | .22-.50 | .51-.75 | .76-1.0 | 1.1-1.5 | 1.6-2.0 | 2.1-3.0 | 3.1-5.0 | 5.1-7.0 | 7.1-10.0 | 10.1-13.0 | 13.1-18.0 | >18 | TOTAL |
|----------|---------|---------|---------|---------|---------|---------|---------|---------|----------|-----------|-----------|-----|-------|
| N | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NNE | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| NE | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| ENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| E | 0 | 0 | 1 | 0 | 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 | 1 | 1 | 2 | 2 | 0 | 0 | 0 | 0 | 6 |
| SSE | 0 | 0 | 0 | 0 | 0 | 1 | 4 | 2 | 0 | 0 | 0 | 0 | 7 |
| S | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 4 |
| SSW | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| SW | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 3 |
| WSW | 0 | 0 | 1 | 0 | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 6 |
| W | 0 | 0 | 1 | 1 | 2 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 9 |
| WNW | 0 | 0 | 1 | 2 | 2 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 12 |
| NW | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 |
| NNW | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| TOTALS | 0 | 0 | 4 | 7 | 7 | 16 | 15 | 6 | 1 | 0 | 0 | 0 | 56 |

| | | | |
|-------------------------|----|----------------------------|------|
| NUMBER OF VALID HOURS | 56 | NUMBER OF CALMS | 0 |
| NUMBER OF INVALID HOURS | 7 | TOTAL HOURS FOR THE PERIOD | 2160 |

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

METEOROLOGY

January - March

TABLE 4A

SITE: SAN ONOFRE

PERIOD OF RECORD 93123124-94033123

WIND SPEED (M/S) AT 10 METER LEVEL

| PASQUILL C SLIGHTLY UNSTABLE ($-1.7 < DT/DZ \leq -1.5$ °C/100 METERS) | | | | | | | | | | | | | |
|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
| N | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| NNE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NE | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| ENE | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| E | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| ESE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SE | 0 | 0 | 0 | 0 | 0 | 2 | 5 | 2 | 4 | 0 | 0 | 0 | 13 |
| SSE | 0 | 1 | 0 | 0 | 0 | 2 | 4 | 0 | 1 | 2 | 1 | 0 | 11 |
| S | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 3 |
| SSW | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 5 |
| SW | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 4 |
| WSW | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| W | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 1 | 1 | 1 | 0 | 0 | 7 |
| WNW | 0 | 0 | 0 | 1 | 2 | 6 | 2 | 0 | 0 | 0 | 0 | 0 | 11 |
| NW | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| NNW | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 |
| TOTALS | 0 | 1 | 2 | 4 | 10 | 17 | 15 | 7 | 6 | 3 | 2 | 0 | 67 |

NUMBER OF VALID HOURS 67
 NUMBER OF INVALID HOURS 7

NUMBER OF CALMS 0
 TOTAL HOURS FOR THE PERIOD 2160

| PASQUILL D NEUTRAL ($-1.5 < DT/DZ \leq -0.5$ °C/100 METERS) | | | | | | | | | | | | | |
|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
| N | 0 | 0 | 7 | 9 | 8 | 9 | 2 | 1 | 0 | 0 | 0 | 0 | 36 |
| NNE | 0 | 1 | 3 | 6 | 4 | 8 | 12 | 14 | 0 | 0 | 0 | 0 | 48 |
| NE | 0 | 1 | 1 | 1 | 1 | 5 | 2 | 5 | 1 | 0 | 0 | 0 | 17 |
| ENE | 0 | 0 | 0 | 2 | 2 | 5 | 2 | 2 | 0 | 0 | 0 | 0 | 13 |
| E | 0 | 0 | 1 | 2 | 0 | 7 | 5 | 3 | 1 | 0 | 0 | 0 | 19 |
| ESE | 0 | 0 | 0 | 2 | 4 | 12 | 18 | 5 | 4 | 0 | 0 | 0 | 45 |
| SE | 0 | 0 | 2 | 3 | 2 | 18 | 43 | 15 | 7 | 0 | 1 | 0 | 91 |
| SSE | 0 | 0 | 0 | 2 | 4 | 14 | 7 | 3 | 1 | 4 | 3 | 0 | 38 |
| S | 0 | 3 | 2 | 3 | 6 | 4 | 7 | 1 | 3 | 3 | 0 | 0 | 32 |
| SSW | 1 | 1 | 0 | 6 | 2 | 8 | 3 | 2 | 1 | 2 | 0 | 0 | 26 |
| SW | 0 | 1 | 1 | 3 | 3 | 4 | 1 | 1 | 2 | 1 | 0 | 0 | 17 |
| WSW | 0 | 0 | 2 | 4 | 7 | 4 | 2 | 0 | 2 | 0 | 0 | 0 | 21 |
| W | 0 | 0 | 1 | 4 | 6 | 6 | 12 | 11 | 0 | 0 | 0 | 0 | 40 |
| WNW | 0 | 0 | 0 | 7 | 2 | 6 | 4 | 4 | 1 | 0 | 0 | 0 | 24 |
| NW | 0 | 0 | 2 | 2 | 5 | 14 | 6 | 2 | 1 | 0 | 0 | 0 | 32 |
| NNW | 0 | 1 | 1 | 2 | 6 | 9 | 5 | 0 | 0 | 0 | 0 | 0 | 24 |
| TOTALS | 1 | 8 | 23 | 58 | 62 | 133 | 131 | 69 | 24 | 10 | 4 | 0 | 523 |

NUMBER OF VALID HOURS 523
 NUMBER OF INVALID HOURS 7

NUMBER OF CALMS 0
 TOTAL HOURS FOR THE PERIOD 2160

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

METEOROLOGY

January - March

TABLE 4A

SITE: SAN ONOFRE

PERIOD OF RECORD 93123124-94033123

WIND SPEED (M/S) AT 10 METER LEVEL

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

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 1 | 1 | 9 | 8 | 14 | 7 | 0 | 0 | 0 | 0 | 0 | 40 |
| NNE | 1 | 2 | 5 | 29 | 15 | 31 | 34 | 5 | 2 | 0 | 0 | 0 | 124 |
| NE | 1 | 2 | 2 | 5 | 3 | 3 | 6 | 5 | 10 | 2 | 0 | 0 | 39 |
| ENE | 1 | 2 | 3 | 4 | 4 | 1 | 4 | 0 | 0 | 0 | 0 | 0 | 19 |
| E | 0 | 1 | 1 | 1 | 4 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 12 |
| ESE | 1 | 0 | 1 | 5 | 3 | 3 | 0 | 0 | 1 | 0 | 0 | 0 | 14 |
| SE | 0 | 0 | 2 | 2 | 2 | 3 | 9 | 1 | 0 | 0 | 0 | 0 | 19 |
| SSE | 0 | 0 | 0 | 1 | 2 | 4 | 4 | 0 | 0 | 0 | 0 | 0 | 11 |
| S | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 5 |
| SSW | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| SW | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| WSW | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| W | 0 | 0 | 1 | 2 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| WNW | 0 | 0 | 0 | 1 | 1 | 13 | 1 | 1 | 1 | 0 | 0 | 0 | 18 |
| NW | 0 | 0 | 0 | 2 | 2 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 10 |
| NNW | 0 | 0 | 1 | 3 | 3 | 5 | 3 | 0 | 0 | 0 | 0 | 0 | 15 |
| TOTALS | 5 | 8 | 20 | 67 | 49 | 86 | 74 | 14 | 14 | 2 | 0 | 0 | 339 |

NUMBER OF VALID HOURS
NUMBER OF INVALID HOURS339
7NUMBER OF CALMS
TOTAL HOURS FOR THE PERIOD0
2160PASQUILL F
MODERATELY STABLE ($1.5 \leq DT/DZ \leq -0.5$ °C/100 METERS)

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 1 | 0 | 1 | 6 | 3 | 8 | 6 | 1 | 0 | 0 | 0 | 0 | 26 |
| NNE | 0 | 2 | 4 | 27 | 54 | 71 | 12 | 1 | 0 | 0 | 0 | 0 | 171 |
| NE | 0 | 1 | 4 | 13 | 8 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 33 |
| ENE | 0 | 0 | 0 | 7 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 10 |
| E | 0 | 0 | 2 | 6 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 10 |
| ESE | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 |
| SE | 0 | 1 | 0 | 2 | 1 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 8 |
| SSE | 0 | 0 | 0 | 4 | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 10 |
| S | 0 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| SSW | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| SW | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| WSW | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| W | 0 | 0 | 1 | 2 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| WNW | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| NW | 0 | 0 | 0 | 1 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 6 |
| NNW | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| TOTALS | 1 | 5 | 16 | 73 | 76 | 104 | 22 | 2 | 0 | 0 | 0 | 0 | 299 |

NUMBER OF VALID HOURS
NUMBER OF INVALID HOURS299
7NUMBER OF CALMS
TOTAL HOURS FOR THE PERIOD0
2160

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

METEOROLOGY

January - March

TABLE 4A

SITE: SAN ONOFRE

PERIOD OF RECORD 93123124-94033123

WIND SPEED (M/S) AT 10 METER LEVEL

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

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 0 | 1 | 5 | 4 | 4 | 17 | 6 | 0 | 0 | 0 | 0 | 37 |
| NNE | 1 | 0 | 1 | 7 | 29 | 136 | 88 | 1 | 0 | 0 | 0 | 0 | 263 |
| NE | 1 | 0 | 3 | 6 | 2 | 3 | 4 | 0 | 0 | 0 | 0 | 0 | 19 |
| ENE | 0 | 1 | 1 | 6 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 10 |
| E | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| ESE | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| SE | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| SSE | 0 | 0 | 2 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| S | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SSW | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| SW | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| WSW | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| W | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| WNW | 0 | 0 | 0 | 1 | 1 | 4 | 3 | 0 | 0 | 0 | 0 | 0 | 9 |
| NW | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| NNW | 0 | 0 | 1 | 1 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| TOTALS | 2 | 3 | 14 | 33 | 39 | 151 | 115 | 7 | 0 | 0 | 0 | 0 | 364 |

NUMBER OF VALID HOURS 364
NUMBER OF INVALID HOURS 7NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 2160ALL STABILITY CLASSES, ALL DT/DZ
WIND SPEED (M/S) AT 10 METER LEVEL

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 1 | 1 | 10 | 29 | 23 | 35 | 33 | 9 | 0 | 0 | 0 | 0 | 141 |
| NNE | 2 | 5 | 13 | 70 | 102 | 248 | 151 | 24 | 3 | 0 | 0 | 0 | 618 |
| NE | 2 | 4 | 10 | 25 | 15 | 17 | 20 | 13 | 14 | 2 | 0 | 0 | 122 |
| ENE | 1 | 3 | 4 | 19 | 7 | 9 | 8 | 2 | 0 | 0 | 0 | 0 | 53 |
| E | 0 | 1 | 6 | 12 | 7 | 11 | 7 | 4 | 1 | 0 | 0 | 0 | 49 |
| ESE | 1 | 1 | 1 | 8 | 8 | 15 | 20 | 5 | 5 | 0 | 0 | 0 | 64 |
| SE | 0 | 3 | 4 | 7 | 6 | 28 | 62 | 28 | 13 | 0 | 1 | 0 | 152 |
| SSE | 0 | 2 | 2 | 9 | 9 | 40 | 30 | 10 | 9 | 6 | 4 | 0 | 121 |
| S | 1 | 3 | 2 | 11 | 18 | 34 | 24 | 7 | 3 | 5 | 1 | 0 | 109 |
| SSW | 1 | 1 | 3 | 13 | 16 | 30 | 13 | 8 | 1 | 2 | 0 | 0 | 88 |
| SW | 0 | 1 | 5 | 15 | 21 | 27 | 12 | 4 | 4 | 1 | 0 | 0 | 90 |
| WSW | 0 | 0 | 6 | 14 | 22 | 55 | 15 | 0 | 2 | 0 | 0 | 0 | 114 |
| W | 0 | 0 | 5 | 14 | 21 | 79 | 67 | 21 | 1 | 1 | 0 | 0 | 209 |
| WNW | 0 | 1 | 1 | 12 | 11 | 43 | 27 | 16 | 2 | 0 | 0 | 0 | 113 |
| NW | 0 | 0 | 2 | 5 | 8 | 23 | 14 | 2 | 1 | 0 | 0 | 0 | 55 |
| NNW | 0 | 1 | 5 | 8 | 12 | 19 | 10 | 0 | 0 | 0 | 0 | 0 | 55 |
| TOTALS | 9 | 27 | 79 | 271 | 306 | 713 | 513 | 153 | 59 | 17 | 6 | 0 | 2153 |

NUMBER OF VALID HOURS 2153
NUMBER OF INVALID HOURS 7NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 2160

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

METEOROLOGY

April - June

TABLE 4A

SITE: SAN ONOFRE

PERIOD OF RECORD 94033124-94063023

WIND SPEED (M/S) AT 10 METER LEVEL

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

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NNE | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| NE | 0 | 0 | 0 | 1 | 0 | 0 | 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 | 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 | 1 | 1 | 0 | 0 | 5 | 9 | 5 | 0 | 0 | 0 | 0 | 21 |
| SSE | 0 | 0 | 0 | 3 | 5 | 17 | 39 | 16 | 2 | 0 | 0 | 0 | 82 |
| S | 0 | 0 | 0 | 6 | 16 | 35 | 101 | 16 | 0 | 0 | 0 | 0 | 174 |
| SSW | 0 | 0 | 0 | 3 | 9 | 41 | 59 | 12 | 1 | 0 | 0 | 0 | 125 |
| SW | 0 | 0 | 0 | 9 | 14 | 59 | 48 | 4 | 0 | 0 | 0 | 0 | 134 |
| WSW | 0 | 0 | 1 | 2 | 18 | 77 | 74 | 0 | 1 | 0 | 0 | 0 | 173 |
| W | 0 | 0 | 0 | 4 | 8 | 47 | 95 | 8 | 1 | 0 | 0 | 0 | 163 |
| WNW | 0 | 0 | 0 | 2 | 1 | 10 | 25 | 8 | 9 | 0 | 0 | 0 | 55 |
| NW | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 1 | 0 | 0 | 0 | 5 |
| NNW | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| TOTALS | 0 | 1 | 2 | 30 | 71 | 293 | 453 | 71 | 15 | 0 | 0 | 0 | 936 |

NUMBER OF VALID HOURS 936
NUMBER OF INVALID HOURS 0NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 2184PASQUILL B
MODERATELY UNSTABLE ($-1.9 < DT/DZ \leq -1.7$ °C/100 METERS)

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 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 | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 4 |
| ESE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SE | 0 | 0 | 1 | 0 | 0 | 6 | 9 | 5 | 0 | 0 | 0 | 0 | 21 |
| SSE | 0 | 0 | 0 | 1 | 2 | 9 | 5 | 1 | 0 | 0 | 0 | 0 | 18 |
| S | 0 | 0 | 0 | 1 | 2 | 4 | 5 | 0 | 0 | 0 | 0 | 0 | 12 |
| SSW | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 5 |
| SW | 0 | 0 | 0 | 1 | 4 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 9 |
| WSW | 0 | 0 | 1 | 3 | 4 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 12 |
| W | 0 | 0 | 0 | 2 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 7 |
| WNW | 0 | 0 | 0 | 1 | 1 | 5 | 3 | 1 | 0 | 0 | 0 | 0 | 11 |
| NW | 0 | 1 | 0 | 0 | 0 | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 7 |
| NNW | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTALS | 0 | 1 | 2 | 9 | 18 | 35 | 31 | 12 | 1 | 0 | 0 | 0 | 109 |

NUMBER OF VALID HOURS 109
NUMBER OF INVALID HOURS 0NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 2184

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

METEOROLOGY

April - June

TABLE 4A

SITE: SAN ONOFRE

PERIOD OF RECORD 94033124-94063023

WIND SPEED (M/S) AT 10 METER LEVEL

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

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 0 | 1 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| NNE | 0 | 0 | 2 | 1 | 6 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 11 |
| NE | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| ENE | 0 | 1 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| E | 0 | 0 | 0 | 0 | 1 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 7 |
| ESE | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| SE | 0 | 0 | 0 | 2 | 4 | 11 | 16 | 4 | 0 | 0 | 0 | 0 | 37 |
| SSE | 0 | 0 | 0 | 1 | 3 | 15 | 24 | 3 | 0 | 0 | 0 | 0 | 46 |
| S | 0 | 0 | 0 | 1 | 2 | 16 | 7 | 0 | 0 | 0 | 0 | 0 | 26 |
| SSW | 0 | 0 | 0 | 1 | 4 | 6 | 4 | 1 | 0 | 0 | 0 | 0 | 16 |
| SW | 0 | 0 | 0 | 1 | 2 | 1 | 0 | 4 | 0 | 0 | 0 | 0 | 8 |
| WSW | 0 | 0 | 0 | 1 | 3 | 2 | 5 | 0 | 0 | 0 | 0 | 0 | 11 |
| W | 0 | 0 | 1 | 3 | 4 | 3 | 4 | 7 | 0 | 0 | 0 | 0 | 22 |
| WNW | 0 | 0 | 0 | 2 | 2 | 7 | 8 | 1 | 0 | 0 | 0 | 0 | 20 |
| NW | 1 | 0 | 0 | 0 | 3 | 1 | 4 | 1 | 0 | 0 | 0 | 0 | 10 |
| NNW | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| TOTALS | 1 | 1 | 5 | 16 | 41 | 74 | 74 | 21 | 0 | 0 | 0 | 0 | 233 |

NUMBER OF VALID HOURS 233
NUMBER OF INVALID HOURS 0NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 2184PASQUILL D
NEUTRAL ($-1.5 < DT/DZ \leq -0.5$ °C/100 METERS)

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 2 | 2 | 13 | 5 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 26 |
| NNE | 0 | 2 | 4 | 11 | 11 | 8 | 1 | 0 | 0 | 0 | 0 | 0 | 37 |
| NE | 0 | 0 | 1 | 4 | 8 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 16 |
| ENE | 0 | 1 | 2 | 2 | 4 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 16 |
| E | 0 | 0 | 0 | 6 | 7 | 9 | 4 | 0 | 0 | 0 | 0 | 0 | 26 |
| ESE | 0 | 0 | 2 | 1 | 3 | 15 | 7 | 0 | 0 | 0 | 0 | 0 | 28 |
| SE | 0 | 1 | 2 | 11 | 24 | 64 | 69 | 4 | 0 | 0 | 0 | 0 | 175 |
| SSE | 0 | 0 | 2 | 7 | 14 | 14 | 20 | 6 | 0 | 0 | 0 | 0 | 63 |
| S | 1 | 1 | 4 | 7 | 3 | 9 | 7 | 1 | 0 | 0 | 0 | 0 | 33 |
| SSW | 0 | 0 | 0 | 9 | 5 | 7 | 4 | 1 | 0 | 1 | 0 | 0 | 27 |
| SW | 1 | 1 | 2 | 7 | 2 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 19 |
| WSW | 0 | 2 | 3 | 7 | 0 | 4 | 6 | 3 | 0 | 0 | 0 | 0 | 25 |
| W | 1 | 0 | 2 | 1 | 2 | 2 | 9 | 4 | 1 | 0 | 0 | 0 | 22 |
| WNW | 0 | 1 | 1 | 5 | 2 | 5 | 6 | 2 | 2 | 0 | 0 | 0 | 24 |
| NW | 1 | 2 | 1 | 3 | 2 | 10 | 7 | 0 | 0 | 0 | 0 | 0 | 26 |
| NNW | 0 | 1 | 2 | 6 | 4 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 18 |
| TOTALS | 4 | 14 | 30 | 100 | 96 | 165 | 144 | 23 | 4 | 1 | 0 | 0 | 581 |

NUMBER OF VALID HOURS 581
NUMBER OF INVALID HOURS 0NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 2184

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

METEOROLOGY

April - June

TABLE 4A

SITE: SAN ONOFRE

PERIOD OF RECORD 94033124-94063023

WIND SPEED (M/S) AT 10 METER LEVEL

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

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 1 | 1 | 2 | 7 | 5 | 1 | 0 | 0 | 0 | 0 | 0 | 17 |
| NNE | 0 | 1 | 6 | 14 | 15 | 16 | 0 | 0 | 0 | 0 | 0 | 0 | 52 |
| NE | 1 | 5 | 1 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 |
| ENE | 0 | 0 | 1 | 4 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 10 |
| E | 0 | 0 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| ESE | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| SE | 0 | 0 | 0 | 1 | 1 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 9 |
| SSE | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| S | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SSW | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SW | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| WSW | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 4 |
| W | 0 | 0 | 1 | 1 | 0 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 7 |
| WNW | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 5 |
| NW | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 5 |
| NNW | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| TOTALS | 3 | 7 | 12 | 32 | 34 | 37 | 12 | 1 | 0 | 0 | 0 | 0 | 138 |

NUMBER OF VALID HOURS 138
 NUMBER OF INVALID HOURS 0

NUMBER OF CALMS 0
 TOTAL HOURS FOR THE PERIOD 2184

PASQUILL F
MODERATELY STABLE ($1.5 \leq DT/DZ \leq -0.5$ °C/100 METERS)

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 0 | 0 | 0 | 1 | 3 | 5 | 0 | 0 | 0 | 0 | 0 | 9 |
| NNE | 0 | 0 | 0 | 19 | 41 | 23 | 4 | 0 | 0 | 0 | 0 | 0 | 87 |
| NE | 0 | 1 | 1 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 |
| ENE | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| E | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| ESE | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| SE | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| SSE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| S | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 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 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| WNW | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| NW | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NNW | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| TOTALS | 0 | 1 | 2 | 31 | 47 | 31 | 9 | 0 | 0 | 0 | 0 | 0 | 121 |

NUMBER OF VALID HOURS 121
 NUMBER OF INVALID HOURS 0

NUMBER OF CALMS 0
 TOTAL HOURS FOR THE PERIOD 2184

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

METEOROLOGY

April - June

TABLE 4A

SITE: SAN ONOFRE

PERIOD OF RECORD 94033124-94063023

WIND SPEED (M/S) AT 10 METER LEVEL

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

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 0 | 0 | 0 | 0 | 1 | 8 | 0 | 0 | 0 | 0 | 0 | 9 |
| NNE | 0 | 0 | 0 | 0 | 14 | 30 | 13 | 0 | 0 | 0 | 0 | 0 | 57 |
| 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 | 14 | 31 | 21 | 0 | 0 | 0 | 0 | 0 | 66 |

| | | | |
|-------------------------|----|----------------------------|------|
| NUMBER OF VALID HOURS | 66 | NUMBER OF CALMS | 0 |
| NUMBER OF INVALID HOURS | 0 | TOTAL HOURS FOR THE PERIOD | 2184 |

ALL STABILITY CLASSES, ALL DT/DZ
WIND SPEED (M/S) AT 10 METER LEVEL

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 3 | 4 | 17 | 15 | 14 | 16 | 0 | 0 | 0 | 0 | 0 | 69 |
| NNE | 0 | 3 | 12 | 45 | 87 | 81 | 18 | 0 | 0 | 0 | 0 | 0 | 246 |
| NE | 1 | 6 | 4 | 12 | 13 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 40 |
| ENE | 0 | 2 | 4 | 7 | 11 | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 35 |
| E | 0 | 0 | 1 | 10 | 10 | 15 | 8 | 0 | 0 | 0 | 0 | 0 | 44 |
| ESE | 0 | 0 | 2 | 3 | 6 | 19 | 7 | 0 | 0 | 0 | 0 | 0 | 37 |
| SE | 0 | 2 | 4 | 15 | 29 | 94 | 104 | 18 | 0 | 0 | 0 | 0 | 266 |
| SSE | 0 | 0 | 2 | 12 | 25 | 58 | 88 | 26 | 2 | 0 | 0 | 0 | 213 |
| S | 1 | 1 | 4 | 16 | 23 | 65 | 120 | 17 | 0 | 0 | 0 | 0 | 247 |
| SSW | 0 | 0 | 0 | 13 | 19 | 55 | 68 | 15 | 2 | 1 | 0 | 0 | 173 |
| SW | 1 | 1 | 2 | 19 | 23 | 64 | 51 | 10 | 1 | 0 | 0 | 0 | 172 |
| WSW | 1 | 2 | 5 | 14 | 25 | 84 | 87 | 6 | 1 | 0 | 0 | 0 | 225 |
| W | 1 | 0 | 4 | 11 | 18 | 56 | 112 | 19 | 2 | 0 | 0 | 0 | 223 |
| WNW | 0 | 1 | 1 | 10 | 6 | 28 | 47 | 12 | 11 | 0 | 0 | 0 | 116 |
| NW | 3 | 3 | 2 | 4 | 5 | 15 | 16 | 4 | 1 | 0 | 0 | 0 | 53 |
| NNW | 0 | 1 | 2 | 10 | 6 | 3 | 2 | 1 | 0 | 0 | 0 | 0 | 25 |
| TOTALS | 8 | 25 | 53 | 218 | 321 | 666 | 744 | 128 | 20 | 1 | 0 | 0 | 2184 |

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

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

METEOROLOGY

July - September

TABLE 4A

SITE: SAN ONOFRE

PERIOD OF RECORD 94063024-94093023

WIND SPEED (M/S) AT 10 METER LEVEL

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

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 0 | 0 | 1 | 0 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 6 |
| NNE | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| NE | 0 | 0 | 0 | 0 | 1 | 0 | 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 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ESE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SE | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 4 | 2 | 0 | 0 | 0 | 10 |
| SSE | 0 | 0 | 0 | 1 | 1 | 6 | 11 | 7 | 0 | 0 | 0 | 0 | 26 |
| S | 0 | 0 | 0 | 3 | 5 | 23 | 58 | 15 | 0 | 0 | 0 | 0 | 104 |
| SSW | 0 | 1 | 1 | 3 | 9 | 24 | 52 | 1 | 0 | 0 | 0 | 0 | 91 |
| SW | 1 | 0 | 0 | 4 | 10 | 53 | 40 | 2 | 0 | 0 | 0 | 0 | 110 |
| WSW | 0 | 0 | 0 | 4 | 15 | 95 | 49 | 1 | 0 | 0 | 0 | 0 | 164 |
| W | 0 | 0 | 0 | 5 | 14 | 72 | 139 | 0 | 0 | 0 | 0 | 0 | 230 |
| WNW | 0 | 0 | 0 | 5 | 8 | 40 | 63 | 3 | 0 | 0 | 0 | 0 | 119 |
| NW | 0 | 0 | 0 | 0 | 1 | 6 | 5 | 1 | 0 | 0 | 0 | 0 | 13 |
| NNW | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTALS | 1 | 1 | 1 | 26 | 64 | 323 | 422 | 35 | 2 | 0 | 0 | 0 | 875 |

| | | | |
|-------------------------|-----|----------------------------|------|
| NUMBER OF VALID HOURS | 875 | NUMBER OF CALMS | 0 |
| NUMBER OF INVALID HOURS | 13 | TOTAL HOURS FOR THE PERIOD | 2208 |

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

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| NNE | 0 | 0 | 0 | 3 | 3 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 7 |
| NE | 0 | 0 | 0 | 0 | 1 | 0 | 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 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| ESE | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| SE | 0 | 0 | 0 | 1 | 1 | 4 | 0 | 1 | 0 | 0 | 0 | 0 | 7 |
| SSE | 0 | 0 | 0 | 0 | 3 | 5 | 7 | 4 | 0 | 0 | 0 | 0 | 19 |
| S | 0 | 0 | 0 | 0 | 3 | 9 | 6 | 0 | 0 | 0 | 0 | 0 | 18 |
| SSW | 0 | 0 | 1 | 3 | 0 | 4 | 6 | 0 | 0 | 0 | 0 | 0 | 14 |
| SW | 0 | 0 | 1 | 4 | 2 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 11 |
| WSW | 0 | 0 | 1 | 2 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 8 |
| W | 0 | 1 | 1 | 2 | 7 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 13 |
| WNW | 0 | 0 | 0 | 6 | 4 | 8 | 3 | 0 | 0 | 0 | 0 | 0 | 21 |
| NW | 0 | 0 | 0 | 1 | 3 | 7 | 1 | 0 | 0 | 0 | 0 | 0 | 12 |
| NNW | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| TOTALS | 0 | 1 | 5 | 26 | 33 | 46 | 24 | 5 | 0 | 0 | 0 | 0 | 140 |

| | | | |
|-------------------------|-----|----------------------------|------|
| NUMBER OF VALID HOURS | 140 | NUMBER OF CALMS | 0 |
| NUMBER OF INVALID HOURS | 13 | TOTAL HOURS FOR THE PERIOD | 2208 |

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

METEOROLOGY

July - September

TABLE 4A

SITE: SAN ONOFRE

PERIOD OF RECORD 94063024-94093023

WIND SPEED (M/S) AT 10 METER LEVEL

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

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 2 | 1 | 8 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 |
| NNE | 0 | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| NE | 0 | 0 | 0 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| ENE | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| E | 0 | 1 | 0 | 0 | 3 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 9 |
| ESE | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 4 |
| SE | 1 | 0 | 0 | 0 | 7 | 16 | 7 | 0 | 0 | 0 | 0 | 0 | 31 |
| SSE | 0 | 0 | 1 | 4 | 6 | 16 | 25 | 4 | 1 | 0 | 0 | 0 | 57 |
| S | 0 | 0 | 1 | 5 | 10 | 14 | 12 | 3 | 0 | 0 | 0 | 0 | 45 |
| SSW | 0 | 0 | 6 | 3 | 2 | 11 | 2 | 4 | 0 | 0 | 0 | 0 | 28 |
| SW | 0 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| WSW | 0 | 0 | 2 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| W | 0 | 0 | 4 | 3 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 11 |
| WNW | 0 | 0 | 0 | 3 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| NW | 0 | 0 | 1 | 3 | 4 | 5 | 0 | 1 | 0 | 0 | 0 | 0 | 14 |
| NNW | 0 | 0 | 3 | 3 | 3 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 14 |
| TOTALS | 1 | 4 | 19 | 40 | 54 | 76 | 48 | 12 | 1 | 0 | 0 | 0 | 255 |

NUMBER OF VALID HOURS 255
NUMBER OF INVALID HOURS 13NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 2208PASQUILL D
NEUTRAL ($-1.5 < DT/DZ \leq -0.5$ °C/100 METERS)

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 1 | 2 | 8 | 7 | 6 | 2 | 0 | 0 | 0 | 0 | 0 | 26 |
| NNE | 1 | 6 | 5 | 11 | 12 | 11 | 1 | 0 | 0 | 0 | 0 | 0 | 47 |
| NE | 0 | 1 | 1 | 4 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 9 |
| ENE | 0 | 0 | 1 | 5 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 8 |
| E | 0 | 3 | 1 | 4 | 3 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 16 |
| ESE | 0 | 0 | 0 | 0 | 5 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 10 |
| SE | 0 | 1 | 0 | 6 | 13 | 27 | 26 | 2 | 0 | 0 | 0 | 0 | 75 |
| SSE | 0 | 0 | 1 | 10 | 14 | 17 | 13 | 1 | 0 | 0 | 0 | 0 | 56 |
| S | 2 | 2 | 1 | 7 | 8 | 9 | 2 | 0 | 0 | 0 | 0 | 0 | 31 |
| SSW | 0 | 4 | 3 | 8 | 4 | 11 | 3 | 0 | 0 | 0 | 0 | 0 | 33 |
| SW | 0 | 0 | 1 | 3 | 5 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 19 |
| WSW | 0 | 0 | 4 | 5 | 7 | 11 | 1 | 0 | 0 | 0 | 0 | 0 | 28 |
| W | 0 | 2 | 5 | 2 | 1 | 4 | 10 | 3 | 0 | 0 | 0 | 0 | 27 |
| WNW | 0 | 2 | 3 | 4 | 0 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 15 |
| NW | 0 | 1 | 3 | 3 | 1 | 5 | 2 | 1 | 0 | 0 | 0 | 0 | 16 |
| NNW | 0 | 0 | 7 | 4 | 2 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 18 |
| TOTALS | 3 | 23 | 38 | 84 | 84 | 127 | 68 | 7 | 0 | 0 | 0 | 0 | 434 |

NUMBER OF VALID HOURS 434
NUMBER OF INVALID HOURS 13NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 2208

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

METEOROLOGY

July - September

TABLE 4A

SITE: SAN ONOFRE

PERIOD OF RECORD 94063024-94093023
WIND SPEED (M/S) AT 10 METER LEVELPASQUILL E
SLIGHTLY STABLE ($-0.5 < DT/DZ \leq -1.5$ °C/100 METERS)

| WIND DIR | .22-.50 | .51-.75 | .76-1.0 | 1.1-1.5 | 1.6-2.0 | 2.1-3.0 | 3.1-5.0 | 5.1-7.0 | 7.1-10.0 | 10.1-13.0 | 13.1-18.0 | >18 | TOTAL |
|----------|---------|---------|---------|---------|---------|---------|---------|---------|----------|-----------|-----------|-----|-------|
| N | 0 | 1 | 1 | 6 | 8 | 11 | 1 | 0 | 0 | 0 | 0 | 0 | 28 |
| NNE | 0 | 0 | 6 | 27 | 23 | 17 | 2 | 0 | 0 | 0 | 0 | 0 | 75 |
| NE | 0 | 4 | 2 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| ENE | 0 | 2 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| E | 0 | 1 | 1 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| ESE | 0 | 0 | 0 | 5 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| SE | 0 | 1 | 1 | 3 | 3 | 4 | 6 | 1 | 0 | 0 | 0 | 0 | 19 |
| SSE | 0 | 0 | 1 | 3 | 3 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 12 |
| S | 0 | 1 | 0 | 6 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 10 |
| SSW | 0 | 0 | 3 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 9 |
| SW | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| WSW | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| W | 0 | 0 | 0 | 0 | 1 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 7 |
| WNW | 0 | 0 | 0 | 0 | 1 | 3 | 5 | 0 | 0 | 0 | 0 | 0 | 9 |
| NW | 0 | 0 | 1 | 0 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 5 |
| NNW | 0 | 0 | 2 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| TOTALS | 1 | 11 | 22 | 67 | 47 | 47 | 24 | 2 | 0 | 0 | 0 | 0 | 221 |

NUMBER OF VALID HOURS
NUMBER OF INVALID HOURS221
13NUMBER OF CALMS
TOTAL HOURS FOR THE PERIOD0
2208PASQUILL F
MODERATELY STABLE ($1.5 \leq DT/DZ \leq -0.5$ °C/100 METERS)

| WIND DIR | .22-.50 | .51-.75 | .76-1.0 | 1.1-1.5 | 1.6-2.0 | 2.1-3.0 | 3.1-5.0 | 5.1-7.0 | 7.1-10.0 | 10.1-13.0 | 13.1-18.0 | >18 | TOTAL |
|----------|---------|---------|---------|---------|---------|---------|---------|---------|----------|-----------|-----------|-----|-------|
| N | 0 | 0 | 0 | 3 | 6 | 6 | 3 | 0 | 0 | 0 | 0 | 0 | 18 |
| NNE | 0 | 0 | 1 | 19 | 24 | 27 | 1 | 0 | 0 | 0 | 0 | 0 | 72 |
| NE | 0 | 1 | 4 | 2 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 12 |
| ENE | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| E | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| ESE | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| SE | 0 | 0 | 0 | 1 | 2 | 2 | 4 | 2 | 0 | 0 | 0 | 0 | 11 |
| SSE | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| S | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| SSW | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| SW | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| WSW | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| W | 0 | 0 | 0 | 0 | 3 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 10 |
| WNW | 0 | 0 | 1 | 0 | 2 | 7 | 4 | 2 | 0 | 0 | 0 | 0 | 16 |
| NW | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 5 |
| NNW | 0 | 1 | 0 | 2 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 6 |
| TOTALS | 0 | 3 | 7 | 35 | 46 | 52 | 17 | 5 | 0 | 0 | 0 | 0 | 165 |

NUMBER OF VALID HOURS
NUMBER OF INVALID HOURS165
13NUMBER OF CALMS
TOTAL HOURS FOR THE PERIOD0
2208

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

METEOROLOGY

July - September

TABLE 4A

SITE: SAN ONOFRE

PERIOD OF RECORD 94063024-94093023

WIND SPEED (M/S) AT 10 METER LEVEL

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

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 0 | 0 | 1 | 1 | 2 | 4 | 0 | 0 | 0 | 0 | 0 | 8 |
| NNE | 0 | 0 | 0 | 1 | 12 | 45 | 11 | 2 | 0 | 0 | 0 | 0 | 71 |
| NE | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| ENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| E | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ESE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SE | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 4 |
| SSE | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| S | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| SSW | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SW | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| WSW | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| W | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| WNW | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 4 |
| NW | 0 | 0 | 0 | 1 | 0 | 1 | 5 | 0 | 0 | 0 | 0 | 0 | 7 |
| NNW | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 3 |
| TOTALS | 0 | 1 | 0 | 9 | 16 | 50 | 26 | 3 | 0 | 0 | 0 | 0 | 105 |

| | | | |
|-------------------------|-----|----------------------------|------|
| NUMBER OF VALID HOURS | 105 | NUMBER OF CALMS | 0 |
| NUMBER OF INVALID HOURS | 13 | TOTAL HOURS FOR THE PERIOD | 2208 |

ALL STABILITY CLASSES, ALL DT/DZ
WIND SPEED (M/S) AT 10 METER LEVEL

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 4 | 5 | 28 | 26 | 27 | 12 | 1 | 0 | 0 | 0 | 0 | 103 |
| NNE | 1 | 6 | 12 | 62 | 76 | 102 | 16 | 2 | 0 | 0 | 0 | 0 | 277 |
| NE | 0 | 6 | 7 | 16 | 9 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 42 |
| ENE | 0 | 3 | 3 | 7 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 18 |
| E | 0 | 5 | 2 | 8 | 6 | 10 | 3 | 0 | 0 | 0 | 0 | 0 | 34 |
| ESE | 0 | 0 | 0 | 7 | 8 | 7 | 1 | 0 | 0 | 0 | 0 | 0 | 23 |
| SE | 1 | 2 | 1 | 11 | 28 | 55 | 47 | 10 | 2 | 0 | 0 | 0 | 157 |
| SSE | 0 | 1 | 3 | 19 | 30 | 48 | 57 | 17 | 1 | 0 | 0 | 0 | 176 |
| S | 2 | 3 | 2 | 23 | 29 | 56 | 79 | 18 | 0 | 0 | 0 | 0 | 212 |
| SSW | 0 | 5 | 14 | 21 | 17 | 52 | 63 | 5 | 0 | 0 | 0 | 0 | 177 |
| SW | 2 | 2 | 4 | 17 | 17 | 67 | 40 | 2 | 0 | 0 | 0 | 0 | 151 |
| WSW | 0 | 0 | 8 | 17 | 28 | 108 | 50 | 1 | 0 | 0 | 0 | 0 | 212 |
| W | 0 | 3 | 10 | 12 | 30 | 85 | 156 | 3 | 0 | 0 | 0 | 0 | 299 |
| WNW | 0 | 2 | 4 | 18 | 17 | 63 | 81 | 6 | 0 | 0 | 0 | 0 | 191 |
| NW | 0 | 1 | 5 | 8 | 10 | 28 | 16 | 4 | 0 | 0 | 0 | 0 | 72 |
| NNW | 0 | 1 | 12 | 13 | 10 | 8 | 7 | 0 | 0 | 0 | 0 | 0 | 51 |
| TOTALS | 6 | 44 | 92 | 287 | 344 | 721 | 629 | 69 | 3 | 0 | 0 | 0 | 2195 |

| | | | |
|-------------------------|------|----------------------------|------|
| NUMBER OF VALID HOURS | 2195 | NUMBER OF CALMS | 0 |
| NUMBER OF INVALID HOURS | 13 | TOTAL HOURS FOR THE PERIOD | 2208 |

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

METEOROLOGY

October - December

TABLE 4A

SITE: SAN ONOFRE

PERIOD OF RECORD 94093024-94123123

WIND SPEED (M/S) AT 10 METER LEVEL

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

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 0 | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| NNE | 0 | 0 | 1 | 0 | 1 | 7 | 2 | 0 | 0 | 0 | 0 | 0 | 11 |
| NE | 0 | 0 | 0 | 0 | 0 | 2 | 6 | 0 | 0 | 0 | 0 | 0 | 8 |
| ENE | 0 | 0 | 0 | 0 | 0 | 2 | 12 | 0 | 0 | 0 | 0 | 0 | 14 |
| E | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 2 |
| ESE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SE | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 3 |
| SSE | 0 | 0 | 0 | 1 | 0 | 1 | 2 | 5 | 0 | 0 | 0 | 0 | 9 |
| S | 0 | 0 | 1 | 0 | 0 | 6 | 10 | 3 | 0 | 0 | 0 | 0 | 20 |
| SSW | 0 | 0 | 1 | 3 | 3 | 5 | 4 | 1 | 0 | 0 | 0 | 0 | 17 |
| SW | 0 | 0 | 0 | 1 | 6 | 9 | 9 | 2 | 0 | 0 | 0 | 0 | 27 |
| WSW | 0 | 0 | 2 | 3 | 10 | 18 | 13 | 3 | 0 | 0 | 0 | 0 | 49 |
| W | 0 | 0 | 2 | 6 | 11 | 33 | 57 | 0 | 1 | 0 | 0 | 0 | 110 |
| WNW | 0 | 0 | 1 | 3 | 1 | 8 | 26 | 10 | 3 | 0 | 0 | 0 | 52 |
| NW | 0 | 0 | 0 | 1 | 2 | 4 | 5 | 0 | 0 | 0 | 0 | 0 | 12 |
| NNW | 0 | 0 | 0 | 2 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 5 |
| TOTALS | 0 | 0 | 8 | 23 | 38 | 97 | 150 | 25 | 4 | 0 | 0 | 0 | 345 |

NUMBER OF VALID HOURS
NUMBER OF INVALID HOURS345
52NUMBER OF CALMS
TOTAL HOURS FOR THE PERIOD0
2208PASQUILL B
MODERATELY UNSTABLE (-1.9 < DT/DZ ≤ -1.7 °C/100 METERS)

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 4 |
| NNE | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| NE | 0 | 0 | 0 | 1 | 0 | 0 | 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 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 3 |
| ESE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SE | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 0 | 4 |
| SSE | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 4 |
| S | 0 | 0 | 0 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 4 |
| SSW | 0 | 0 | 1 | 1 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 6 |
| SW | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 5 |
| WSW | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| W | 0 | 0 | 1 | 2 | 1 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 8 |
| WNW | 0 | 0 | 0 | 0 | 3 | 4 | 3 | 0 | 0 | 0 | 0 | 0 | 10 |
| NW | 0 | 0 | 0 | 1 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 7 |
| NNW | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| TOTALS | 0 | 0 | 2 | 13 | 12 | 11 | 21 | 1 | 4 | 0 | 0 | 0 | 64 |

NUMBER OF VALID HOURS
NUMBER OF INVALID HOURS64
52NUMBER OF CALMS
TOTAL HOURS FOR THE PERIOD0
2208

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

METEOROLOGY

October - December

TABLE 4A

SITE: SAN ONOFRE

PERIOD OF RECORD 94093024-94123123

WIND SPEED (M/S) AT 10 METER LEVEL

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

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 0 | 1 | 4 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 10 |
| NNE | 0 | 0 | 0 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| NE | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| ENE | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 3 |
| E | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| ESE | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| SE | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 4 | 0 | 0 | 0 | 0 | 10 |
| SSE | 0 | 0 | 0 | 0 | 2 | 3 | 3 | 4 | 2 | 0 | 0 | 0 | 14 |
| S | 0 | 0 | 0 | 1 | 3 | 2 | 1 | 4 | 0 | 0 | 0 | 0 | 11 |
| SSW | 1 | 0 | 0 | 0 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 6 |
| SW | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 4 |
| WSW | 0 | 0 | 1 | 1 | 0 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 7 |
| W | 0 | 0 | 0 | 2 | 1 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 7 |
| WNW | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 3 |
| NW | 0 | 0 | 0 | 1 | 2 | 2 | 5 | 1 | 0 | 0 | 0 | 0 | 11 |
| NNW | 0 | 0 | 0 | 2 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 6 |
| TOTALS | 1 | 0 | 2 | 14 | 17 | 25 | 24 | 15 | 3 | 0 | 0 | 0 | 101 |

NUMBER OF VALID HOURS 101
 NUMBER OF INVALID HOURS 52

NUMBER OF CALMS 0
 TOTAL HOURS FOR THE PERIOD 2208

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

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 1 | 1 | 7 | 1 | 5 | 3 | 0 | 0 | 0 | 0 | 0 | 18 |
| NNE | 0 | 0 | 1 | 2 | 6 | 4 | 8 | 14 | 1 | 0 | 0 | 0 | 36 |
| NE | 0 | 0 | 2 | 3 | 1 | 10 | 17 | 111 | 4 | 0 | 0 | 0 | 148 |
| ENE | 0 | 0 | 0 | 2 | 4 | 2 | 2 | 0 | 2 | 1 | 0 | 0 | 13 |
| E | 0 | 0 | 1 | 0 | 0 | 3 | 5 | 0 | 0 | 0 | 0 | 0 | 9 |
| ESE | 0 | 2 | 0 | 2 | 1 | 4 | 10 | 5 | 0 | 0 | 0 | 0 | 24 |
| SE | 0 | 1 | 2 | 6 | 2 | 14 | 33 | 22 | 1 | 1 | 0 | 0 | 82 |
| SSE | 1 | 0 | 0 | 0 | 4 | 4 | 20 | 10 | 6 | 0 | 0 | 0 | 45 |
| S | 0 | 0 | 0 | 2 | 6 | 2 | 10 | 4 | 0 | 0 | 0 | 0 | 24 |
| SSW | 0 | 0 | 0 | 0 | 2 | 6 | 13 | 6 | 1 | 0 | 0 | 0 | 28 |
| SW | 0 | 1 | 2 | 2 | 4 | 11 | 13 | 4 | 2 | 0 | 0 | 0 | 39 |
| WSW | 0 | 0 | 0 | 2 | 3 | 13 | 39 | 6 | 1 | 0 | 0 | 0 | 64 |
| W | 0 | 0 | 0 | 1 | 3 | 13 | 21 | 15 | 14 | 0 | 0 | 0 | 67 |
| WNW | 1 | 2 | 3 | 4 | 4 | 13 | 13 | 5 | 7 | 0 | 0 | 0 | 52 |
| NW | 0 | 0 | 1 | 2 | 4 | 13 | 8 | 1 | 1 | 0 | 1 | 0 | 31 |
| NNW | 0 | 0 | 0 | 2 | 5 | 9 | 5 | 0 | 1 | 0 | 0 | 0 | 22 |
| TOTALS | 2 | 7 | 13 | 37 | 50 | 126 | 220 | 203 | 41 | 2 | 1 | 0 | 702 |

NUMBER OF VALID HOURS 702
 NUMBER OF INVALID HOURS 52

NUMBER OF CALMS 0
 TOTAL HOURS FOR THE PERIOD 2208

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

METEOROLOGY

October - December

TABLE 4A

SITE: SAN ONOFRE

PERIOD OF RECORD 94093024-94123123

WIND SPEED (M/S) AT 10 METER LEVEL

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

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 0 | 1 | 1 | 4 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 9 |
| NNE | 0 | 1 | 2 | 13 | 6 | 18 | 21 | 0 | 1 | 0 | 0 | 0 | 62 |
| NE | 1 | 0 | 1 | 2 | 5 | 10 | 56 | 6 | 2 | 0 | 0 | 0 | 83 |
| ENE | 1 | 1 | 5 | 3 | 2 | 4 | 1 | 1 | 0 | 0 | 0 | 0 | 18 |
| E | 1 | 0 | 4 | 3 | 1 | 3 | 1 | 0 | 1 | 0 | 0 | 0 | 14 |
| ESE | 0 | 1 | 0 | 4 | 7 | 4 | 9 | 0 | 0 | 0 | 0 | 0 | 25 |
| SE | 4 | 0 | 2 | 3 | 4 | 8 | 7 | 4 | 0 | 0 | 0 | 0 | 32 |
| SSE | 0 | 1 | 1 | 3 | 2 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 11 |
| S | 1 | 0 | 0 | 1 | 5 | 5 | 5 | 0 | 0 | 0 | 0 | 0 | 17 |
| SSW | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 3 |
| SW | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 4 |
| WSW | 0 | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 4 |
| W | 0 | 0 | 0 | 4 | 2 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 11 |
| WNW | 0 | 0 | 1 | 2 | 2 | 5 | 11 | 0 | 2 | 0 | 0 | 0 | 23 |
| NW | 0 | 0 | 0 | 0 | 1 | 4 | 1 | 0 | 1 | 0 | 0 | 0 | 7 |
| NNW | 0 | 0 | 0 | 2 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 7 |
| TOTALS | 8 | 5 | 17 | 43 | 43 | 74 | 120 | 13 | 7 | 0 | 0 | 0 | 330 |

NUMBER OF VALID HOURS 330
NUMBER OF INVALID HOURS 52

NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 2208

PASQUILL F
MODERATELY STABLE ($1.5 \leq DT/DZ \leq -0.5$ °C/100 METERS)

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 0 | 1 | 2 | 4 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 13 |
| NNE | 0 | 2 | 5 | 13 | 21 | 26 | 9 | 3 | 0 | 0 | 0 | 0 | 79 |
| NE | 0 | 0 | 6 | 5 | 9 | 19 | 4 | 1 | 0 | 0 | 0 | 0 | 44 |
| ENE | 2 | 1 | 0 | 3 | 5 | 4 | 3 | 0 | 0 | 0 | 0 | 0 | 19 |
| E | 2 | 1 | 5 | 2 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 14 |
| ESE | 0 | 1 | 2 | 7 | 3 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 17 |
| SE | 1 | 0 | 2 | 5 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 11 |
| SSE | 0 | 0 | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| S | 0 | 1 | 3 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 7 |
| SSW | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| SW | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| WSW | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 |
| W | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| WNW | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 3 |
| NW | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| NNW | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| TOTALS | 6 | 6 | 26 | 44 | 49 | 63 | 24 | 4 | 0 | 0 | 0 | 0 | 223 |

NUMBER OF VALID HOURS 223
NUMBER OF INVALID HOURS 52

NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 2208

ANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1994)

METEOROLOGY

October - December

TABLE 4A

SITE: SAN ONOFRE

PERIOD OF RECORD 94093024-94123123

WIND SPEED (M/S) AT 10 METER LEVEL

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

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 0 | 0 | 0 | 2 | 2 | 6 | 0 | 0 | 0 | 0 | 0 | 10 |
| NNE | 1 | 1 | 1 | 9 | 29 | 102 | 102 | 5 | 0 | 0 | 0 | 0 | 250 |
| NE | 0 | 0 | 2 | 4 | 6 | 20 | 23 | 1 | 1 | 0 | 0 | 0 | 57 |
| ENE | 0 | 0 | 1 | 4 | 7 | 4 | 5 | 0 | 0 | 0 | 0 | 0 | 21 |
| E | 0 | 0 | 3 | 3 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 8 |
| ESE | 0 | 1 | 2 | 3 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 10 |
| SE | 0 | 1 | 0 | 2 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 7 |
| SSE | 0 | 0 | 0 | 1 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 6 |
| S | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 5 |
| SSW | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| SW | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| WSW | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| W | 0 | 0 | 0 | 2 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 5 |
| WNW | 0 | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| NW | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| NNW | 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| TOTALS | 2 | 3 | 10 | 33 | 50 | 142 | 144 | 6 | 1 | 0 | 0 | 0 | 391 |

NUMBER OF VALID HOURS 391
NUMBER OF INVALID HOURS 52NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 2208ALL STABILITY CLASSES, ALL DT/DZ
WIND SPEED (M/S) AT 10 METER LEVEL

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 1 | 4 | 17 | 17 | 16 | 15 | 0 | 0 | 0 | 0 | 0 | 70 |
| NNE | 1 | 4 | 10 | 40 | 65 | 159 | 142 | 22 | 2 | 0 | 0 | 0 | 445 |
| NE | 1 | 0 | 11 | 16 | 21 | 61 | 106 | 119 | 8 | 0 | 0 | 0 | 343 |
| ENE | 3 | 2 | 6 | 12 | 18 | 18 | 24 | 1 | 2 | 1 | 0 | 0 | 88 |
| E | 3 | 1 | 13 | 8 | 3 | 11 | 11 | 1 | 1 | 0 | 0 | 0 | 52 |
| ESE | 0 | 5 | 4 | 16 | 12 | 13 | 22 | 5 | 0 | 0 | 0 | 0 | 77 |
| SE | 5 | 2 | 6 | 17 | 8 | 27 | 51 | 30 | 2 | 1 | 0 | 0 | 149 |
| SSE | 1 | 1 | 2 | 8 | 13 | 15 | 26 | 20 | 8 | 0 | 0 | 0 | 94 |
| S | 1 | 1 | 4 | 5 | 15 | 20 | 31 | 11 | 0 | 0 | 0 | 0 | 88 |
| SSW | 2 | 0 | 3 | 7 | 6 | 13 | 22 | 9 | 3 | 0 | 0 | 0 | 65 |
| SW | 0 | 2 | 2 | 3 | 13 | 23 | 27 | 7 | 3 | 0 | 0 | 0 | 80 |
| WSW | 0 | 0 | 3 | 11 | 13 | 35 | 56 | 10 | 1 | 0 | 0 | 0 | 129 |
| W | 0 | 0 | 3 | 18 | 19 | 54 | 85 | 15 | 15 | 0 | 0 | 0 | 209 |
| WNW | 1 | 2 | 5 | 10 | 13 | 34 | 55 | 15 | 12 | 0 | 0 | 0 | 147 |
| NW | 0 | 0 | 1 | 7 | 11 | 25 | 22 | 2 | 2 | 0 | 1 | 0 | 71 |
| NNW | 1 | 0 | 1 | 12 | 12 | 14 | 8 | 0 | 1 | 0 | 0 | 0 | 49 |
| TOTALS | 19 | 21 | 78 | 207 | 259 | 538 | 703 | 267 | 60 | 2 | 1 | 0 | 2156 |

NUMBER OF VALID HOURS 2156
NUMBER OF INVALID HOURS 52NUMBER OF CALMS 0
TOTAL HOURS FOR THE PERIOD 2208