

**San Onofre
Nuclear Generating Station
Semiannual Radioactive Effluent
Release Report**

January To June 1992

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Southern California Edison Company



SAN ONOFRE NUCLEAR GENERATING STATION

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PREFACE

San Onofre Nuclear Generating Station is located next to San Onofre State Beach, adjoining Camp Pendleton Marine Corps Base, in San Diego County, 64 miles south of Los Angeles, California. There are three pressurized water Reactors with a total rated capacity of 2664 net megawatts electrical.

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

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

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SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

January - June

SECTION A. INTRODUCTION

This Semiannual 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 Semiannual 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 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 Unit 1.

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

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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 | 3.71E+2 | 9.40E+2 | 3.00E+1 |
| 2. Average release rate for period | μCi/sec | 4.72E+1 | 1.20E+2 | |
| 3. Percent of applicable limit | % | 2.09E-1 | 5.57E-1 | |
| B. Iodines | | | | |
| 1. Total iodine-131 | Ci | 4.15E-5 | 6.25E-5 | 1.90E+1 |
| 2. Average release rate for period | μCi/sec | 5.28E-6 | 7.95E-6 | |
| 3. Percent of applicable limit | % | 6.86E-5 | 1.03E-4 | |
| C. Particulates | | | | |
| 1. Particulates with half-lives > 8 days | Ci | 3.24E-6 | 3.79E-6 | 1.60E+1 |
| 2. Average release rate for period | μCi/sec | 4.12E-7 | 4.82E-7 | |
| 3. Percent of applicable limit | % | 1.07E-6 | 1.25E-6 | |
| 4. Gross alpha activity | Ci | * | * | 5.00E+1 |
| D. Tritium | | | | |
| 1. Total release | Ci | 7.17E+0 | 3.19E+1 | 2.50E+1 |
| 2. Average release rate for period | μCi/sec | 9.12E-1 | 4.06E+0 | |
| 3. Percent of applicable limit | % | 5.93E-3 | 2.64E-2 | |

* First and second quarter analyses not available at report time; values will be included in the following Semiannual Radioactive Effluent Release Report.

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

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TABLE 1C

GASEOUS EFFLUENTS-GROUND LEVEL RELEASES

| Nuclides Released | Unit | Continuous Mode | | Batch Mode | |
|-------------------------|------|-----------------|----------------|---------------|----------------|
| | | First Quarter | Second Quarter | First Quarter | Second Quarter |
| 1. <u>Fission gases</u> | | | | | |
| krypton-85 | Ci | <LLD | 1.58E+1 | 5.97E+0 | 1.39E+1 |
| krypton-85m | Ci | <LLD | 2.77E+0 | <LLD | <LLD |
| krypton-87 | Ci | <LLD | <LLD | <LLD | <LLD |
| krypton-88 | Ci | <LLD | <LLD | <LLD | <LLD |
| xenon-131m | Ci | <LLD | <LLD | 1.48E+0 | 3.98E+0 |
| xenon-133 | Ci | 2.27E+2 | 4.65E+2 | 1.32E+2 | 4.05E+2 |
| xenon-133m | Ci | 6.86E-2 | 7.62E-2 | 2.75E-1 | 1.19E+0 |
| xenon-135 | Ci | 4.28E+0 | 3.25E+1 | 2.04E-3 | 1.26E-2 |
| xenon-135m | Ci | <LLD | <LLD | <LLD | <LLD |
| xenon-138 | Ci | <LLD | <LLD | <LLD | <LLD |
| Total for period | Ci | 2.31E+2 | 5.16E+2 | 1.40E+2 | 4.24E+2 |
| 2. <u>Iodines</u> | | | | | |
| iodine-131 | Ci | 4.15E-5 | 6.25E-5 | NA | NA |
| iodine-133 | Ci | 3.20E-5 | 6.33E-5 | NA | NA |
| iodine-135 | Ci | <LLD | <LLD | NA | NA |
| Total for period | Ci | 7.35E-5 | 1.26E-4 | NA | NA |
| 3. <u>Particulates</u> | | | | | |
| barium-140 | Ci | <LLD | <LLD | NA | NA |
| cesium-134 | Ci | 1.67E-7 | <LLD | NA | NA |
| cesium-137 | Ci | 3.03E-6 | 3.79E-6 | NA | NA |
| cesium-138 | Ci | 2.54E-4 | 4.88E-4 | NA | NA |
| cobalt-57 | Ci | 4.09E-8 | <LLD | NA | NA |
| lanthanum-140 | Ci | <LLD | <LLD | NA | NA |
| strontium-89 | Ci | * | * | NA | NA |
| strontium-90 | Ci | * | * | NA | NA |

LLD Lower Limit of Detection; see Table 1D.

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

* First and second quarter analyses not available at report time; values will be included in the following Semiannual Radioactive Effluent Release Report.

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

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TABLE 1D

GASEOUS EFFLUENTS-LOWER LIMIT OF DETECTION

| Radionuclides | Continuous Mode LLD ($\mu\text{Ci/cc}$) | Batch Mode LLD ($\mu\text{Ci/cc}$) |
|--|--|---|
| 1. <u>Fission and activation gases</u> | | |
| krypton-85 | 1.00E-5 | * |
| krypton-85m | 5.30E-8 | 3.30E-6 |
| krypton-87 | 1.20E-7 | 8.20E-6 |
| krypton-88 | 2.20E-7 | 1.30E-5 |
| xenon-131m | 2.10E-6 | * |
| xenon-135m | 4.60E-7 | 2.40E-5 |
| xenon-138 | 1.70E-6 | 7.10E-5 |
| 2. <u>Iodines</u> | | |
| iodine-135 | 8.80E-12 | NA |
| 3. <u>Particulates</u> | | |
| barium-140 | 9.00E-14 | NA |
| cesium-134 | 5.50E-14 | NA |
| cobalt-57 | 2.20E-14 | NA |
| lanthanum-140 | 1.60E-13 | NA |

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

* Nuclides were detected in Table 1C.

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TABLE 1E

GASEOUS EFFLUENTS-RADIATION DOSES AT THE SITE BOUNDARY

| | | Unit | First Quarter* | Second Quarter* |
|----|--|------|-------------------|--------------------|
| A. | Noble Gas | | | |
| 1. | Gamma air dose | mrad | 5.62E-2 | 1.54E-1 |
| 2. | Percent Applicable Limit | % | 1.12E+0 | 3.08E+0 |
| 3. | Beta air dose | mrad | 1.67E-1 | 4.37E-1 |
| 4. | Percent Applicable Limit | % | 1.67E+0 | 4.37E+0 |
| B. | Tritium, Iodine, Particulate (at the nearest receptor) | | | |
| 1. | Organ dose | mrem | 2.80E-4 | 1.17E-3 |
| 2. | Percent Applicable Limit | % | 3.73E-3 | 1.56E-2 |

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

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

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TABLE 1F

GASEOUS EFFLUENTS-BATCH RELEASE SUMMARY

| | 6-MONTH PERIOD |
|---|-------------------|
| 1. Number of batch releases: | 35 releases |
| 2. Total time period for batch releases: | 13053 minutes |
| 3. Maximum time period for a batch release: | 540 minutes |
| 4. Average time period for a batch release: | 373 minutes |
| 5. Minimum time period for a batch release: | 253 minutes |

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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.

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

S.O.N.G.S. 1

TABLE 2A

LIQUID EFFLUENTS-SUMMATION OF ALL RELEASES

| | Unit | First Quarter | Second Quarter | Estimated Total Error, % |
|--|--------|---------------|----------------|--------------------------|
| A. Fission and activation products | | | | |
| 1. Total release (not including tritium, gases, alpha) | Ci | 6.54E-2 | 7.24E-2 | 1.90E+1 |
| 2. Average diluted concentration during period | μCi/ml | 4.36E-10 | 4.86E-10 | |
| 3. Percent of applicable limit | % | 3.10E-2 | 5.47E-2 | |
| B. Tritium | | | | |
| 1. Total release | Ci | 8.16E+2 | 6.17E+2 | 1.90E+1 |
| 2. Average diluted concentration during period | μCi/ml | 5.44E-6 | 4.14E-6 | |
| 3. Percent of applicable limit | % | 1.81E-1 | 1.38E-1 | |
| C. Dissolved and entrained gases | | | | |
| 1. Total release | Ci | 4.08E-1 | 5.20E-1 | 1.90E+1 |
| 2. Average diluted concentration during period | μCi/ml | 2.72E-9 | 3.49E-9 | |
| 3. Percent of applicable limit | % | 1.36E-3 | 1.74E-3 | |
| D. Gross alpha radioactivity | | | | |
| 1. Total release | Ci | * | * | 5.00E+1 |
| E. Volume of waste released (prior to dilution) | liters | 2.01E+5 | 1.03E+5 | 5.00E+0 |
| F. Volume of dilution water used during period | liters | 1.50E+11 | 1.49E+11 | 5.00E+0 |

* First and second quarter analyses not available at report time; values will be included in the following Semiannual Radioactive Effluent Release Report.

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TABLE 2B

LIQUID EFFLUENTS

| Nuclides Released | Unit | Continuous Mode | | Batch Mode | |
|------------------------------------|------|-----------------|----------------|---------------|----------------|
| | | First Quarter | Second Quarter | First Quarter | Second Quarter |
| 1. Fission and activation products | | | | | |
| antimony-124 | Ci | <LLD | <LLD | 9.56E-5 | <LLD |
| antimony-125 | Ci | <LLD | <LLD | 5.86E-5 | <LLD |
| barium-140 | Ci | <LLD | <LLD | 1.93E-4 | <LLD |
| cerium-141 | Ci | <LLD | <LLD | 2.71E-5 | <LLD |
| cerium-144 | Ci | <LLD | <LLD | 2.06E-4 | <LLD |
| cesium-134 | Ci | 1.00E-2 | 9.92E-3 | 1.22E-3 | 7.01E-4 |
| cesium-137 | Ci | 1.58E-2 | 1.57E-2 | 2.09E-3 | 1.11E-3 |
| chromium-51 | Ci | <LLD | <LLD | 6.80E-4 | <LLD |
| cobalt-57 | Ci | <LLD | <LLD | 1.55E-5 | <LLD |
| cobalt-58 | Ci | <LLD | <LLD | 5.39E-3 | 2.12E-3 |
| cobalt-60 | Ci | 9.36E-4 | 1.22E-5 | 6.84E-3 | 8.13E-4 |
| iodine-131 | Ci | 1.00E-2 | 1.60E-2 | 2.92E-5 | 3.60E-5 |
| iodine-133 | Ci | 1.02E-2 | 2.59E-2 | <LLD | <LLD |
| iron-55 | Ci | * | * | * | * |
| iron-59 | Ci | <LLD | <LLD | 6.15E-5 | <LLD |
| lanthanum-140 | Ci | <LLD | <LLD | 2.43E-4 | <LLD |
| manganese-54 | Ci | <LLD | <LLD | 1.98E-4 | <LLD |
| molybdenum-99 | Ci | <LLD | <LLD | <LLD | <LLD |
| niobium-95 | Ci | <LLD | <LLD | <LLD | 1.22E-5 |
| niobium-97 | Ci | <LLD | <LLD | <LLD | 9.74E-6 |
| ruthenium-103 | Ci | <LLD | <LLD | 1.52E-5 | <LLD |
| ruthenium-106 | Ci | <LLD | <LLD | 5.65E-4 | <LLD |
| silver-110m | Ci | <LLD | <LLD | 5.27E-4 | <LLD |
| strontium-89 | Ci | * | * | * | * |
| strontium-90 | Ci | * | * | * | * |
| technetium-99m | Ci | <LLD | <LLD | <LLD | <LLD |
| zinc-65 | Ci | <LLD | <LLD | 2.58E-5 | <LLD |
| zirconium-95 | Ci | <LLD | <LLD | <LLD | <LLD |
| Total for period | Ci | 4.69E-2 | 6.76E-2 | 1.85E-2 | 4.79E-3 |

LLD Lower Limit of Detection; see Table 2C.

* First and second quarter analyses not available at report time; values will be included in the following Semiannual Radioactive Effluent Release Report.

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TABLE 2B (Continued)

LIQUID EFFLUENTS

| Nuclides Released | Unit | Continuous Mode | | Batch Mode | |
|----------------------------------|------|-----------------|----------------|---------------|----------------|
| | | First Quarter | Second Quarter | First Quarter | Second Quarter |
| 2. Dissolved and entrained gases | | | | | |
| krypton-85 | Ci | <LLD | <LLD | 2.75E-2 | 3.44E-2 |
| xenon-131m | Ci | <LLD | <LLD | 1.82E-2 | 1.82E-2 |
| xenon-133 | Ci | 2.95E-4 | 1.94E-3 | 3.59E-1 | 4.64E-1 |
| xenon-133m | Ci | <LLD | 6.57E-4 | 1.39E-4 | 5.51E-4 |
| xenon-135 | Ci | <LLD | <LLD | 3.29E-3 | <LLD |

LLD Lower Limit of Detection; see Table 2C.

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TABLE 2C

LIQUID EFFLUENTS-LOWER LIMIT OF DETECTION

| Radionuclides | Continuous Mode LLD ($\mu\text{Ci/cc}$) | Batch Mode LLD ($\mu\text{Ci/cc}$) |
|------------------------------------|--|---|
| 1. Fission and activation products | | |
| antimony-124 | 1.40E-7 | 4.70E-8 |
| antimony-125 | 1.90E-7 | 2.40E-7 |
| barium-140 | 2.10E-7 | 3.00E-7 |
| cerium-141 | 9.70E-8 | 1.10E-7 |
| cerium-144 | 4.00E-7 | 5.00E-7 |
| chromium-51 | 5.50E-7 | 6.60E-7 |
| cobalt-57 | 5.20E-8 | 6.40E-8 |
| cobalt-58 | 5.00E-8 | * |
| iodine-133 | * | 2.00E-7 |
| iron-59 | 8.00E-8 | 1.40E-7 |
| lanthanum-140 | 1.40E-7 | 5.10E-8 |
| manganese-54 | 4.60E-8 | 6.90E-8 |
| molybdenum-99 | 8.00E-8 | 7.60E-8 |
| niobium-95 | 3.30E-8 | 8.60E-8 |
| niobium-97 | 1.30E-7 | 4.70E-7 |
| ruthenium-103 | 6.70E-8 | 1.00E-7 |
| ruthenium-106 | 3.80E-7 | 9.00E-7 |
| silver-110m | 6.90E-8 | 1.50E-7 |
| technetium-99m | 8.10E-8 | 7.70E-8 |
| zinc-65 | 1.20E-7 | 1.50E-7 |
| zirconium-95 | 6.30E-8 | 2.00E-7 |
| 2. Dissolved and entrained gases | | |
| krypton-85 | 1.20E-5 | * |
| xenon-131m | 2.10E-6 | * |
| xenon-133m | 4.30E-7 | * |
| xenon-135 | 5.40E-8 | 1.10E-7 |

* Nuclide detected in Table 2B.

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TABLE 2D

LIQUID EFFLUENTS-RADIATION DOSES AT THE LIQUID SITE BOUNDARY

| | | Unit | First Quarter* | Second Quarter* |
|----|--------------------------|------|-------------------|--------------------|
| A. | | | | |
| 1. | Total body dose | mrem | 8.36E-3 | 6.76E-3 |
| 2. | Percent Applicable Limit | % | 5.57E-1 | 4.50E-1 |
| B. | | | | |
| 1. | Limiting organ dose | mrem | 2.13E-2 | 3.43E-2 |
| 2. | Percent Applicable Limit | % | 4.26E-1 | 6.85E-1 |

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

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

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TABLE 2E

LIQUID EFFLUENTS-BATCH RELEASE SUMMARY

| | 6-MONTH PERIOD |
|--|-------------------|
| 1. Number of batch releases: | 6 releases |
| 2. Total time period for batch releases: | 11544 minutes |
| 3. Maximum time period for a batch release: | 2405 minutes |
| 4. Average time period for a batch release: | 1924 minutes |
| 5. Minimum time period for a batch release: | 1337 minutes |
| 6. Average saltwater flow during batch releases: | 301167 gpm |

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SECTION D. PREVIOUS SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT ADDENDUM

1. The July - December 1991 Semiannual Radioactive Effluent Release Report values for composite gross alpha, Sr-89, Sr-90, and Fe-55 (Tables 1A and 1C, Gaseous Effluents, Tables 2A and 2B, Liquid Effluents) were incomplete due to data not available at report time. The values not reported were for the fourth quarter of 1991. The values are as follows:

GASEOUS EFFLUENTS (4th Quarter 1991)

| Nuclides Released | Unit | Continuous Mode | Batch Mode |
|-------------------|------|-----------------|------------|
| strontium-89 | Ci | <LLD | * |
| strontium-90 | Ci | <LLD | * |
| Gross alpha | Ci | 4.34E-7 | * |

Sr-89 LLD = 1.00E-14 $\mu\text{Ci/cc}$

Sr-90 LLD = 1.00E-15 $\mu\text{Ci/cc}$

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

LIQUID EFFLUENTS (4th Quarter 1991)

| Nuclides Released | Unit | Continuous Mode | Batch Mode |
|-------------------|------|-----------------|------------|
| iron-55 | Ci | <LLD | <LLD |
| strontium-89 | Ci | <LLD | <LLD |
| strontium-90 | Ci | <LLD | <LLD |
| tritium | Ci | ** | <LLD |
| Gross alpha | Ci | <LLD | <LLD |

Fe-55 LLD = 1.00E-6 $\mu\text{Ci/ml}$

Sr-89 LLD = 5.00E-8 $\mu\text{Ci/ml}$

Sr-90 LLD = 1.00E-8 $\mu\text{Ci/ml}$

Gross alpha LLD = 1.00E-7 $\mu\text{Ci/ml}$

- ** Only composites from sewage sludge are analyzed for tritium. All other liquid pathways are analyzed for tritium onsite with the resultant curies enumerated in Table 2B.

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

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SECTION D. PREVIOUS SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT
ADDENDUM (Continued)

2. GASEOUS EFFLUENT-RADIATION DOSES AT THE SITE BOUNDARY

For the fourth quarter of 1991 Semiannual Report, Sr-89, and Sr-90.

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

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

3. LIQUID EFFLUENT-RADIATION DOSES AT THE SITE BOUNDARY

For the fourth quarter of 1991 Semiannual Report, Sr-89, Sr-90,
and Fe-55.

| | Unit | Fourth Quarter |
|-----------------------------|------|-------------------|
| A. | | |
| 1. Total body dose | mrem | 0.00E+0 |
| 2. Percent Applicable Limit | % | 0.00E+0 |
| B. | | |
| 1. Limit organ dose | mrem | 0.00E+0 |
| 2. Percent Applicable Limit | % | 0.00E-0 |

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SECTION E. RADWASTE SHIPMENTS

SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

TABLE 3

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

| 1. | Type of waste | Unit | 6-month Period | Est. Total Error, % |
|----|---|----------------------|----------------------|------------------------|
| a. | Spent resins, filter sludges, evaporator bottoms, etc. | m ³ Ci | 1.89E+1 * 5.61E+2 | 3.00E+1 |
| b. | Dry compressible waste, contaminated equip., etc. | m ³ Ci | 2.80E+0 # 1.41E-2 | 3.00E+1 |
| c. | Irradiated components, control rods, etc. | m ³ Ci | N/A N/A | N/A |
| d. | Other (absorbed liquids, sand building rubble, biological waste.) | m ³ Ci | 9.09E+0 * 4.27E+1 | 3.00E+1 |

NOTE: Total curie content estimated.

* Shipped in Type B cask (C of C9028)

Material packaged in 55-gallon DOT 7A drums (7.5 cu. ft each),
or strong, tight containers (steel boxes, 98 cu. ft. each).

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S.O.N.G.S. 1

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. americium-241 | % | 2.12E-4 |
| antimony-125 | % | 3.80E-2 |
| carbon-14 | % | 1.45E-1 |
| cerium-144 | % | 3.68E-1 |
| cesium-134 | % | 2.76E+1 |
| cesium-137 | % | 4.24E+1 |
| chromium-51 | % | 4.13E-4 |
| cobalt-57 | % | 4.91E-3 |
| cobalt-58 | % | 5.38E+0 |
| cobalt-60 | % | 1.37E+1 |
| curium-243/244 | % | 3.43E-4 |
| iodine-129 | % | 1.91E-5 |
| iron-55 | % | 4.69E+0 |
| iron-59 | % | 4.26E-4 |
| manganese-54 | % | 1.22E+0 |
| nickel-63 | % | 4.06E+0 |
| niobium-94 | % | 1.02E-2 |
| plutonium-238 | % | 1.18E-2 |
| plutonium-239/240 | % | 2.62E-4 |
| plutonium-241 | % | 4.33E-2 |
| plutonium-242 | % | 2.61E-6 |
| ruthenium-106 | % | 7.27E-2 |
| silver-110m | % | 6.63E-3 |
| strontium-89 | % | 2.74E-2 |
| strontium-90 | % | 1.64E-1 |
| technetium-99 | % | 9.48E-5 |
| tritium | % | 6.42E-2 |
| zinc-65 | % | 1.17E-2 |
| zirconium-95 | % | 1.78E-3 |

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

S.O.N.G.S. 1

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)

| | | | |
|----|---------------|---|---------|
| b. | carbon-14 | % | 1.90E-1 |
| | cesium-134 | % | 1.31E+1 |
| | cesium-137 | % | 2.21E+1 |
| | cobalt-58 | % | 3.81E+0 |
| | cobalt-60 | % | 1.30E+1 |
| | iodine-129 | % | 1.72E-3 |
| | iron-55 | % | 3.79E+1 |
| | manganese-54 | % | 1.55E+0 |
| | nickel-63 | % | 3.49E+0 |
| | technetium-99 | % | 1.55E-4 |
| | tritium | % | 5.00E+0 |

| | | | |
|----|----------------|---|---------|
| c. | Not Applicable | % | 0.00E+0 |
|----|----------------|---|---------|

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

S.O.N.G.S. 1

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)

| | | |
|-------------------|---|---------|
| d. americium-241 | % | 5.77E-3 |
| antimony-125 | % | 2.81E-1 |
| carbon-14 | % | 9.66E-1 |
| cerium-141 | % | 3.93E-1 |
| cerium-144 | % | 2.23E-0 |
| cesium-134 | % | 1.34E-1 |
| cesium-137 | % | 2.86E-1 |
| chromium-51 | % | 1.63E+1 |
| cobalt-58 | % | 5.39E+0 |
| cobalt-60 | % | 1.94E+1 |
| curium-242 | % | 2.01E-1 |
| curium-243/244 | % | 1.18E-2 |
| iodine-129 | % | 3.84E-4 |
| iron-55 | % | 4.64E+1 |
| iron-59 | % | 4.63E-1 |
| manganese-54 | % | 2.21E+0 |
| nickel-59 | % | 1.08E-2 |
| nickel-63 | % | 4.11E+0 |
| niobium-95 | % | 1.40E-1 |
| plutonium-238 | % | 1.93E-2 |
| plutonium-239/240 | % | 5.85E-3 |
| plutonium-241 | % | 6.53E-1 |
| plutonium-242 | % | 2.96E-5 |
| ruthenium-106 | % | 5.65E-2 |
| silver-110m | % | 2.69E-1 |
| strontium-89 | % | 5.23E-3 |
| strontium-90 | % | 7.69E-3 |
| technetium-99 | % | 1.36E-3 |
| tritium | % | 4.70E-2 |

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 limit, tabulated in Table 1A, was calculated using the following equation:

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

where: Rel Rate = total curies released in each category and each quarter, divided by the seconds in a quarter; the value in Parts 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. 8.

The MPC_{eff} is defined as:

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

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

n = total number of radionuclides identified

MPC_i = MPC of the i th radionuclide

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

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SECTION F. APPLICABLE LIMITS (Continued)

Liquid Effluents - Applicable Limits

The percent of applicable limit, tabulated in Table 2A, was calculated using the following equation:

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

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

The MPC_{eff} is defined as:

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

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

n = total number of radionuclides identified

MPC_i = MPC of the i th radionuclide

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

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

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

TABLE 1

| SOURCE | Dose* (millirems) | |
|---------------------------------------|-------------------|-------------|
| | 1st Quarter | 2nd Quarter |
| LIQUID EFFLUENTS | 1) | 2) |
| Whole Body | 8.36E-3 | 6.76E-3 |
| Organ | 3) | 4) |
| | 2.13E-2 | 3.43E-2 |
| AIRBORNE EFFLUENTS | 5) | 6) |
| Tritium, Iodines, and Particulates | 4.64E-3 | 3.88E-2 |
| NOBLE GASES** | 7) | 8) |
| Gamma | 4.51E-2 | 8.56E-2 |
| Beta | 9) | 10) |
| | 1.34E-1 | 2.53E-1 |
| DIRECT RADIATION | 11) | 12) |
| | 9.82E-2 | 1.27E-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.

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

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

1. This data was calculated using the methodology of the ODCM.
2. This data was calculated using the methodology of the ODCM.
3. This data was calculated using the methodology of the ODCM; the thyroid received the maximum dose primarily by the saltwater fish pathway.
4. This data was calculated using the methodology of the ODCM; the thyroid received the maximum dose primarily by the saltwater fish pathway.
5. The maximum organ dose was to a child's thyroid and was located in the NW sector. This was calculated using the activity reported in the January - June 1992 Semiannual Radioactive Effluent Release Report with the assumptions of USNRC Regulatory Guide 1.109.
6. The maximum organ dose was to a child's thyroid and was located in the NW sector. This was calculated using the activity reported in the January - June 1992 Semiannual Radioactive Effluent Release Report with the assumptions of USNRC Regulatory Guide 1.109.
7. A maximum air dose of $2.57\text{E}-1$ mrad for gamma radiation was located in the SSW sector, a seaward direction. The reported maximum air dose for gamma radiation was located in the NW sector, a landward sector, at the exclusion area boundary and calculated with the assumptions of the USNRC Regulatory Guide 1.109.
8. A maximum air dose of $8.56\text{E}-2$ 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 NW sector, a landward sector, at the exclusion area boundary and calculated with the assumptions of the USNRC Regulatory Guide 1.109.
9. A maximum air dose of $7.66\text{E}-1$ mrad for beta radiation was located in the SSW sector, a seaward direction. The reported maximum air dose for beta radiation was located in the N sector, a landward sector, at the exclusion area boundary and calculated with the assumptions of the USNRC Regulatory Guide 1.109.
10. A maximum air dose of $1.37\text{E}+0$ mrad for beta radiation was located in the SSW sector, a seaward direction. The reported maximum air dose for beta radiation was located in the NW sector, a landward sector, at the exclusion area boundary and calculated with the assumptions of the USNRC Regulatory Guide 1.109.

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

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

TABLE 2

| SOURCE | % Applicable Limit | |
|---------------------------------------|--------------------|-------------|
| | 1st Quarter | 2nd Quarter |
| LIQUID EFFLUENTS | | |
| Whole Body | 5.57E-1 | 4.50E-1 |
| Organ | 4.26E-1 | 6.85E-1 |
| AIRBORNE EFFLUENTS | | |
| Tritium, Iodines, and Particulates | 6.19E-2 | 5.17E-1 |
| NOBLE GASES | | |
| Gamma | 9.02E-1 | 1.71E+0 |
| Beta | 1.34E+0 | 2.53E+0 |

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

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S.O.N.G.S. 1

SECTION I. CHANGES TO THE OFFSITE DOSE CALCULATION MANUAL

On February 28, 1992 Revision 7 to the Unit 1 Offsite Dose Calculation Manual (ODCM) was adopted and published. This revision primarily updated tables used in liquid and gaseous dose calculations as a result of the 1991 Land Use Census. Additionally, there were editorial changes which include typographical errors and misspellings. None of the changes resulted in any modifications to either the plant configuration or operation. As such, there is no impact on the accuracy or reliability of methods for determining effluent dose or setpoint values and no safety reviews were required.

A complete copy of Revision 7 is being submitted to the NRC per Technical Specification 6.9.1.9 concurrent with this report.

The following is a complete list of changes:

- ^a Indicates typographical, sequential sectional and page numbering, and format changes
- GEN^a Added S01-ODCM above rev # in lower right corner of all pages to facilitate incorporation into SDMS
- GEN* The Food and Ground (GF) pathway values for child, teen, and adult (infant is zero) were increased by a factor of (1/0.7) or 43% in Sector N, 0.2 mile (page 2-21). The GF values for child and teen were also increased by 43% in Sector P, 0.2 mile (page 2-22), Sector Q, 0.5 mile (page 2-24), and Sector Q, 0.9 mile (page 2-26). The increase is due to the fact that a shielding factor of 0.7 used in the Regulatory Guide 1.109, equation C-2, for calculation of ground exposure is not applicable to beach use since no structural shielding is provided for beach users. The increase in GF values does not affect the controlling location factors but it does increase the dose parameters columns for "Food and Ground" for the mentioned uses. Because, there is no food pathway contribution for the beach uses, then the increase in the "Food and Ground" column will be only due to an increase in the ground GF factor (Food=0) and is expected to be 43% higher than the 1990 values. The modification to the GF factor was made per recommendation of Dr. James Brown, a consultant to the Station's Effluent Engineering group.
- 1-17^a Table 1-4, in notes, changed NUREG-0172 to NUREG-0472
- 1-18^a same as page 1-17
- 1-19^a Provided regulatory references for representative sampling
- 2-20 Added controlling sector location to Table 2-4

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S.O.N.G.S. 1

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

- 2-21* (Sector N, Surf Beach) All food and ground pathway values changed
- 2-22* Surf Beach Life Guard occupancy factor increased from 0.0685 to 0.0716 (Sector P, 0.2 mile).
- 2-23 (old 2-23) Point Loran military housing deleted. It was not used for military housing in 1991 due to cutback in budget (Sector P, 2.5 miles).
- 2-24* Surf Beach Guard Shack occupancy factor increased from 0.0571 to 0.1712 (Sector Q, 0.5 mile). Also, the "guard shack" for infant, child, and teen uses was deleted and beach use parameters were added to these age groups.
- 2-26* Enlisted beach campground (a new use) was added with an occupancy factor of 0.1014 (Sector Q, 0.9 mile). Enlisted Beach (Sector Q, 1.0 mile) was deleted).
- 2-27^a (Sector Q, Enlisted Beach Check-In) X/Q corrected from 8.6E-6 to 8.6E-7
- 2-30 San Clemente Ranch Administrative Office occupancy factor decreased from 0.3425 to 0.2283 (Sector Q, 2.3 miles).
- 2-34^a Child Food and Ground pathway Ru-103 corrected: 4.2E+9 changed to 4.2E+8
- 2-36 San Clemente Ranch Packing With Resident occupancy factor decreased from 0.5833 to 0.3425 (Sector R, 2.4 miles). D/Q corrected from 9.5E-9 to 9.5E-10.^a
- 2-51 Sheep Meat X/Q value changed from 2.9E-6 to 2.4E-6 and D/Q from 3.8E-8 to 3.2E-8. This does not affect the dose parameters which do not contain the X/Q and D/Q factors (Sector E, 0.4 mile).
[Adult Inhalation Sr-90 corrected from 7.7E+5 to 7.7E+3 and Adult Food and Ground Te-129m corrected from 7.6E+3 to 7.6E+5.^a]
- 2-53^a Adult Inhalation Zr-95 corrected: 1.8E+5 changed to 1.8E+6
- 2-54 Sheep Meat X/Q changed from 1.0E-6 to 1.1E-6 and D/Q from 8.8E-9 to 9.2E-9. This does not affect the dose parameters which do not contain the X/Q and D/Q factors (Sector F, 0.7 mile).
- 2-56 San Onofre State Park Guard Shack occupancy factor increased from 0.0571 to 0.1712 (Sector F, 1.0 mile). The "guard shack" description for infant, child, and teen was deleted. GF and ZIN are Zero because the uses for San Onofre State Park are listed in sector G (Campground, the closest use).
- 2-58 (old 2-58) Beach Concession use was deleted due to the closure of stand (Sector F, 1.1 mile).

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S.O.N.G.S. 1

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

- 2-58 San Onofre State Park Beach Campground occupancy factor for maintenance workers increased to 0.2283 (Sector G, 1.0 mile).
- 2-62^a Reformatted definitions
- 2-63^a Reformatted definitions
- 5-4 Removed TLD 99, Transit Dose, at completion of comparative study on LiF and CaSO₄ TLDs

On June 29, 1992 Revision 8 to the Unit 1 Offsite Dose Calculation Manual (ODCM) was adopted and published. This revision relocated the Radiological Effluent Technical Specifications (RETS) verbatim from the Technical Specifications to the ODCM per NRC Generic Letter 89-01. Amendment 145 to the Technical Specifications was issued concurrently. Additionally an administrative factor was added to the monitor setpoint calculations for airborne effluents to take credit for simultaneous releases from other airborne pathways at San Onofre, a requirement was added for performance of an investigative report by the responsible division if any ODCM action or surveillance requirements are missed, and liquid radiation monitor calibration constants were updated to reflect recent surveillances. None of the changes modify either the plant configuration or operation. As such, there is no impact on the accuracy or reliability of methods for determining effluent dose or setpoint values. Further, the transfer of RETS is administrative and will not result in a reduction in the level of radiological effluent controls.

A complete copy of Revision is being submitted to the NRC per Technical Specification 6.14.2.3 concurrent with this report.

The following is a list of the affected Technical Specifications and the new ODCM Specification and Surveillance numbers.

SPECIFICATIONS

| <u>OLD T.S.</u> | <u>ODCM</u> | <u>TITLE</u> |
|-----------------|-------------|---|
| 3.15.1 | 1.1.1 | Liquid Effluents Concentration |
| 3.15.2 | 1.2.1 | Liquid Effluent Dose |
| 3.15.3 | 1.3.1 | Liquid Waste Treatment |
| 3.5.8 | 4.1.1 | Radioactive Liquid Effluent Instrumentation |
| 3.16.1 | 2.1.1 | Dose Rate |
| 3.16.2 | 2.2.1 | Noble Gas Dose |
| 3.16.3 | 2.3.1 | I-131, I-133, H-3, and Particulates Dose |
| 3.16.4 | 2.4.1 | Gaseous Radwaste Treatment |

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

S.O.N.G.S. 1

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

SPECIFICATIONS (Continued)

| <u>OLD T.S.</u> | <u>ODCM</u> | <u>TITLE</u> |
|-----------------|-------------|--|
| 3.5.9 | 4.2.1 | Radioactive Gaseous Process and Effluent Instrumentation |
| 3.17 | 3.3.1 | Dose |
| 3.18.1 | 5.1.1 | Environmental Monitoring Program |
| 3.18.2 | 5.2.1 | Land Use Census |
| 3.18.3 | 5.3.1 | Interlaboratory Comparison Program |
| 6.9.1.6 | 5.4.1 | Annual Radiological Environmental Operating Report |
| 6.9.1.7 | 5.4.2 | Annual Radiological Environmental Operating Report |
| 1.0 | 6.1 | Definitions |
| 1.2 | 6-1 | TABLE; Operational Modes |
| 1.1 | 6-2 | TABLE; Frequency Notations |
| 5.1 | 6.2 | Site Description |
| 5.1.1 | 6-1 | FIGURE; Unit 1 Exclusion Area Boundary |
| 6.9.1.8 | 6.3.1 | Semiannual Radioactive Effluent Release Report |
| 6.9.1.9 | 6.3.2 | Semiannual Radioactive Effluent Release Report |
| 6.15.1 | 6.3.3 | Major Changes to Radwaste Treatment Systems |

SURVEILLANCES

| <u>OLD T.S.</u> | <u>ODCM</u> | <u>TITLE</u> |
|-----------------|-------------|--|
| 4.1.2 | 4.1.2 | Radioactive Liquid Effluent Instrumentation |
| 4.5.1 | 1.1.2 | Liquid Effluents Concentration |
| 4.5.2 | 1.2.2 | Liquid Effluent Dose |
| 4.5.3 | 1.3.2 | Liquid Waste Treatment |
| 4.1.3 | 4.2.2 | Radioactive Gaseous Process and Effluent Instrumentation |
| 4.6.1 | 2.1.2 | Dose Rate |
| 4.6.2 | 2.2.2 | Noble Gas Dose |
| 4.6.3 | 2.3.2 | I-131, I-133, H-3, and Particulates Dose |
| 4.6.4 | 2.4.2 | Gaseous Radwaste Treatment |
| 4.17 | 3.3.2 | Dose |
| 4.18.1 | 5.1.2 | Environmental Monitoring Program |
| 4.18.2 | 5.2.2 | Land Use Census |
| 4.18.3 | 5.3.2 | Interlaboratory Comparison Program |

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S.O.N.G.S. 1

SECTION J. CHANGES TO RADIOACTIVE WASTE TREATMENT SYSTEMS

- o There were no changes to the Unit 1 Radioactive Waste Treatment Systems during the reporting period, January 1, 1992 to June 30, 1992.

SECTION K. MISCELLANEOUS

- o Unplanned, Unmonitored Release from Yard Drain Sump

On February 12, 1992, the Unit 1 Yard Drain Sump overflowed to the Unit 1 PMF Catch Basin from 1455 to 1526. Total activity released was estimated at $2.96\text{E-}4$ curies. This event was due to a significant amount of rainfall coupled with reduced capacity of the Yard Sump Pumps caused by silt and debris washing into the sump during this rainfall. Subsequent to the overflow event, the sump was cleaned and the pump capacity was restored. There were no significant dose consequences as a result of this unplanned, unmonitored release.

On March 20, 1992, the Unit 1 Yard Drain Sump overflowed to the Unit 1 PMF Catch Basin from 2207 to 2223. Total activity released was estimated at $1.0\text{ E-}4$ curies. This event was due to a significant amount of rainfall coupled with reduced capacity of the Yard Sump Pumps caused by silt and debris washing into the sump during this rainfall. Subsequent to the event, the sump was cleaned and the pump capacity was restored. There were no significant dose consequences as a result of this unplanned, unmonitored release. As a result of this event sandbags are placed to redirect runoff to alternate paths and to prevent silt and debris collection by the yard drain sump during the rainy season or when significant rainfall is expected.

On June 21, 1992, while planning and conducting a cleaning of the Yard Drain Sump, the presence of a "French Drain" at the bottom of the sump was identified. This was recognized as an unplanned and unmonitored flowpath. The sump was taken out of service with its contents transferred to another effluent release point prior to discharge. On June 25, 1992, subsequent to obtaining soil samples around and below the "French" drain area, a stainless steel plate was installed over the drain and the Yard Drain Sump was returned to service. It was estimated that this flowpath would not have exceeded 0.48 MPC in the first centimeter of soil at any given time, well within the 10 CFR 20 limit of 1.0 MPC to Unrestricted Areas. Long term dose consequences are under evaluation and will be included in a future Semiannual Report.

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S.O.N.G.S. 1

SECTION K. MISCELLANEOUS (Continued)

EFFLUENT RADIATION MONITORS OUT OF SERVICE GREATER THAN 30 DAYS

January 1, 1992 - June 30, 1992

| S.O.N.G.S. 1 | | | |
|---|----------------------|-------------------------|---|
| Monitor | Inoperability Period | Inoperability Cause | Explanation |
| R-1214 Plant Vent Stack, Noble Gas Monitor | 06/13/86 - present | Removed from service | Maintained out-of-service pending Technical Specification Change. |
| 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 deferred pending Unit 1 shutdown. Radiation monitor functions operable. |

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

S.O.N.G.S. 1

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

- o Gaseous effluent releases, excluding tritium, totaled $1.31\text{E}+3$ curies with 94% of the total being Xe-133.
- o The radiation doses from gaseous releases are: (a) gamma air dose: $2.10\text{E}-1$ mrad at the site boundary, (b) beta air dose: $6.04\text{E}-1$ mrad at the site boundary, (c) organ dose: $1.45\text{E}-3$ mrem at the nearest receptor.
- o Liquid releases totaled $1.43\text{E}+3$ curies of which tritium was $1.43\text{E}+3$ Ci, noble gases were $9.28\text{E}-1$ Ci, and particulates and iodines were $1.38\text{E}-1$ Ci.
- o The radiation doses from liquid releases are: (a) total body: $1.51\text{E}-2$ mrem, (b) limiting organ: $5.56\text{E}-2$ mrem.
- o The radioactive releases and resulting doses generated from Unit 1 were below the Applicable Limits for both gaseous and liquid effluents.

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SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

January - June

SECTION A. INTRODUCTION

This Semiannual 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 Semiannual Report Addendum
7. Radwaste Shipments
8. 10 CFR 50 Appendix I Requirements
9. Changes to Offsite Dose Calculation Manual

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

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

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 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.

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

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

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 | 4.53E+2 | 2.78E+2 | 3.00E+1 |
| 2. Average release rate for period | μCi/sec | 5.77E+1 | 3.54E+1 | |
| 3. Percent of applicable limit | % | 9.61E-2 | 5.95E-2 | |
| B. Iodines | | | | |
| 1. Total iodine-131 | Ci | 4.79E-3 | 1.31E-4 | 1.90E+1 |
| 2. Average release rate for period | μCi/sec | 6.09E-4 | 1.67E-5 | |
| 3. Percent of applicable limit | % | 2.92E-3 | 8.00E-5 | |
| C. Particulates | | | | |
| 1. Particulates with half-lives > 8 days | Ci | 1.00E-4 | 3.30E-5 | 1.60E+1 |
| 2. Average release rate for period | μCi/sec | 1.28E-5 | 4.20E-6 | |
| 3. Percent of applicable limit | % | 4.79E-6 | 1.43E-6 | |
| 4. Gross alpha activity | Ci | * | * | 5.00E+1 |
| D. Tritium | | | | |
| 1. Total release | Ci | 3.46E+0 | 5.63E+0 | 2.50E+1 |
| 2. Average release rate for period | μCi/sec | 4.40E-1 | 7.16E-1 | |
| 3. Percent of applicable limit | % | 1.06E-3 | 1.72E-3 | |

* First and second quarter analyses not available at report time; values will be included in the following Semiannual Radioactive Effluent Release Report.

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

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

TABLE 1C

GASEOUS EFFLUENTS-GROUND LEVEL RELEASES

| Nuclides Released | Unit | Continuous Mode | | Batch Mode | |
|-------------------|------|-----------------|----------------|---------------|----------------|
| | | First Quarter | Second Quarter | First Quarter | Second Quarter |
| 1. Fission gases | | | | | |
| argon-41 | Ci | 2.20E+0 | 2.10E+0 | <LLD | <LLD |
| krypton-85 | Ci | <LLD | <LLD | 7.27E-1 | 3.81E-1 |
| krypton-85m | Ci | <LLD | <LLD | <LLD | <LLD |
| krypton-87 | Ci | <LLD | <LLD | <LLD | <LLD |
| krypton-88 | Ci | <LLD | <LLD | <LLD | <LLD |
| xenon-131m | Ci | 6.60E-2 | <LLD | 8.41E-2 | <LLD |
| xenon-133 | Ci | 4.48E+2 | 2.76E+2 | 1.30E-1 | 2.00E-2 |
| xenon-133m | Ci | 3.22E-2 | <LLD | <LLD | <LLD |
| xenon-135 | Ci | 2.24E+0 | 4.24E-3 | 1.07E-3 | <LLD |
| xenon-135m | Ci | <LLD | <LLD | <LLD | <LLD |
| xenon-138 | Ci | <LLD | <LLD | <LLD | <LLD |
| Total for period | Ci | 4.53E+2 | 2.78E+2 | 9.42E-1 | 4.01E-1 |
| 2. Iodines | | | | | |
| iodine-131 | Ci | 4.79E-3 | 1.31E-4 | NA | NA |
| iodine-132 | Ci | 6.02E-4 | <LLD | NA | NA |
| iodine-133 | Ci | 6.94E-4 | 4.95E-4 | NA | NA |
| iodine-135 | Ci | 1.33E-5 | 4.53E-5 | NA | NA |
| Total for period | Ci | 6.10E-3 | 6.71E-4 | NA | NA |

LLD Lower Limit of Detection; See Table 1D.

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

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

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

TABLE 1C (Continued)

GASEOUS EFFLUENTS-GROUND LEVEL RELEASES

| Nuclides Released | Unit | Continuous Mode | | Batch Mode | |
|------------------------|------|-----------------|----------------|---------------|----------------|
| | | First Quarter | Second Quarter | First Quarter | Second Quarter |
| 3. <u>Particulates</u> | | | | | |
| barium-140 | Ci | <LLD | <LLD | NA | NA |
| bromine-82 | Ci | 2.28E-5 | 3.50E-5 | NA | NA |
| cerium-141 | Ci | 1.42E-6 | 1.41E-7 | NA | NA |
| cerium-144 | Ci | <LLD | 3.13E-6 | NA | NA |
| cesium-134 | Ci | 2.66E-6 | 1.44E-7 | NA | NA |
| cesium-137 | Ci | 6.78E-6 | 2.71E-6 | NA | NA |
| cesium-138 | Ci | 2.40E-6 | 1.60E-4 | NA | NA |
| chromium-51 | Ci | 3.02E-6 | <LLD | NA | NA |
| cobalt-57 | Ci | 4.16E-8 | 1.26E-9 | NA | NA |
| cobalt-58 | Ci | 7.72E-5 | 2.87E-5 | NA | NA |
| cobalt-60 | Ci | 5.05E-6 | <LLD | NA | NA |
| iron-59 | Ci | 1.71E-7 | <LLD | NA | NA |
| lanthanum-140 | Ci | <LLD | <LLD | NA | NA |
| manganese-54 | Ci | 4.01E-7 | <LLD | NA | NA |
| molybdenum-99 | Ci | 5.83E-8 | 1.99E-7 | NA | NA |
| niobium-95 | Ci | 9.74E-7 | <LLD | NA | NA |
| niobium-95m | Ci | 2.67E-10 | <LLD | NA | NA |
| rubidium-88 | Ci | 5.43E-4 | <LLD | NA | NA |
| strontium-89 | Ci | * | * | NA | NA |
| strontium-90 | Ci | * | * | NA | NA |
| technetium-99m | Ci | 5.96E-8 | 2.03E-7 | NA | NA |
| tin-113 | Ci | 1.90E-6 | <LLD | NA | NA |
| zirconium-95 | Ci | 6.52E-7 | <LLD | NA | NA |

LLD Lower Limit of Detection; See Table 1D.

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

* First and second quarter analyses not available at report time; values will be included in the following Semiannual Radioactive Effluent Release Report.

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TABLE 1D

GASEOUS EFFLUENTS-LOWER LIMIT OF DETECTION

| Radionuclides | Continuous Mode LLD ($\mu\text{Ci/cc}$) | Batch Mode LLD ($\mu\text{Ci/cc}$) |
|--|--|---|
| 1. <u>Fission and activation gases</u> | | |
| argon-41 | * | 6.60E-6 |
| krypton-85 | 2.10E-5 | * |
| krypton-85m | 2.40E-7 | 1.70E-6 |
| krypton-87 | 3.70E-7 | 5.90E-6 |
| krypton-88 | 4.50E-7 | 5.10E-6 |
| xenon-131m | 5.40E-6 | 8.40E-5 |
| xenon-133m | 1.00E-6 | 1.40E-5 |
| xenon-135 | * | 1.80E-6 |
| xenon-135m | 1.20E-6 | 1.90E-5 |
| xenon-138 | 2.30E-6 | 3.90E-5 |
| 2. <u>Iodines</u> | | |
| iodine-132 | 6.90E-12 | NA |
| 3. <u>Particulates</u> | | |
| barium-140 | 6.00E-13 | NA |
| cerium-144 | 8.00E-13 | NA |
| chromium-51 | 1.80E-12 | NA |
| cobalt-60 | 3.70E-13 | NA |
| iron-59 | 4.00E-13 | NA |
| lanthanum-140 | 1.00E-12 | NA |
| manganese-54 | 1.70E-13 | NA |
| niobium-95 | 1.60E-13 | NA |
| niobium-95m | 7.50E-13 | NA |
| rubidium-88 | 6.30E-8 | NA |
| tin-113 | 2.00E-13 | NA |
| zirconium-95 | 2.80E-13 | NA |

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

* Nuclides were detected in Table 1C.

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

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

TABLE 1E

GASEOUS EFFLUENTS-RADIATION DOSES AT THE SITE BOUNDARY

| | Unit | First Quarter* | Second Quarter* |
|---|------|-------------------|--------------------|
| A. Noble Gas | | | |
| 1. Gamma air dose | mrad | 2.78E-2 | 1.78E-2 |
| 2. Percent Applicable Limit | % | 2.78E-1 | 1.78E-1 |
| 3. Beta air dose | mrad | 7.37E-2 | 4.53E-2 |
| 4. Percent Applicable Limit | % | 3.69E-1 | 2.27E-1 |
| B. Tritium, Iodine, Particulate (at the nearest receptor) | | | |
| 1. Organ dose | mrem | 2.01E-3 | 2.75E-4 |
| 2. Percent Applicable Limit | % | 1.34E-2 | 1.83E-3 |

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

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

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

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

TABLE 1F

GASEOUS EFFLUENTS-BATCH RELEASE SUMMARY

| | 6-MONTH PERIOD |
|---|-------------------|
| 1. Number of batch releases: | 10 releases |
| 2. Total time period for batch releases: | 3972 minutes |
| 3. Maximum time period for a batch release: | 616 minutes |
| 4. Average time period for a batch release: | 397 minutes |
| 5. Minimum time period for a batch release: | 5 minutes |

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

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

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 "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.

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

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

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 | 1.56E-2 | 1.78E-2 | 1.90E+1 |
| 2. Average diluted concentration during period | μCi/ml | 2.98E-11 | 2.74E-11 | |
| 3. Percent of applicable limit | % | 1.68E-4 | 4.36E-5 | |
| B. Tritium | | | | |
| 1. Total release | Ci | 1.16E+2 | 1.61E+2 | 1.90E+1 |
| 2. Average diluted concentration during period | μCi/ml | 2.21E-7 | 2.47E-7 | |
| 3. Percent of applicable limit | % | 7.38E-3 | 8.24E-3 | |
| C. Dissolved and entrained gases | | | | |
| 1. Total release | Ci | 6.19E-2 | 1.43E-1 | 1.90E+1 |
| 2. Average diluted concentration during period | μCi/ml | 1.18E-10 | 2.19E-10 | |
| 3. Percent of applicable limit | % | 5.91E-5 | 1.10E-4 | |
| D. Gross alpha radioactivity | | | | |
| 1. Total release | Ci | * | * | 5.00E+1 |
| E. Volume of waste released (prior to dilution) | | | | |
| | liters | 3.23E+6 | 4.42E+6 | 5.00E+0 |
| F. Volume of dilution water used during period | | | | |
| | liters | 5.24E+11 | 6.51E+11 | 5.00E+0 |

* First and second quarter analyses not available at report time; values will be included in the following Semiannual Radioactive Effluent Release Report.

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TABLE 2B

LIQUID EFFLUENTS

| Nuclides Released | Unit | Continuous Mode | | Batch Mode | |
|------------------------------------|------|-----------------|----------------|---------------|----------------|
| | | First Quarter | Second Quarter | First Quarter | Second Quarter |
| 1. Fission and activation products | | | | | |
| antimony-124 | Ci | <LLD | <LLD | 4.04E-4 | 2.27E-4 |
| antimony-125 | Ci | 1.01E-4 | <LLD | 1.98E-3 | 1.72E-3 |
| barium-140 | Ci | <LLD | <LLD | <LLD | <LLD |
| cerium-141 | Ci | <LLD | <LLD | 2.20E-5 | <LLD |
| cesium-134 | Ci | <LLD | <LLD | 7.50E-4 | 4.23E-5 |
| cesium-137 | Ci | 1.71E-4 | <LLD | 2.82E-3 | 6.99E-4 |
| chromium-51 | Ci | <LLD | <LLD | 3.33E-4 | 1.68E-3 |
| cobalt-57 | Ci | <LLD | <LLD | 4.24E-6 | 1.57E-5 |
| cobalt-58 | Ci | <LLD | <LLD | 6.35E-3 | 7.88E-3 |
| cobalt-60 | Ci | <LLD | <LLD | 1.48E-3 | 2.31E-3 |
| iodine-131 | Ci | <LLD | <LLD | 1.31E-4 | <LLD |
| iron-55 | Ci | * | * | * | * |
| iron-59 | Ci | <LLD | <LLD | 2.98E-5 | 9.99E-5 |
| lanthanum-140 | Ci | <LLD | <LLD | <LLD | 6.76E-6 |
| manganese-54 | Ci | <LLD | <LLD | 9.25E-5 | 3.14E-4 |
| molybdenum-99 | Ci | <LLD | <LLD | <LLD | <LLD |
| niobium-95 | Ci | <LLD | <LLD | 1.67E-4 | 1.38E-3 |
| niobium-95m | Ci | <LLD | <LLD | 5.27E-5 | <LLD |
| niobium-97 | Ci | <LLD | <LLD | 7.32E-6 | 3.82E-5 |
| ruthenium-103 | Ci | <LLD | <LLD | 1.71E-5 | 2.85E-5 |
| silver-110m | Ci | <LLD | <LLD | 4.76E-4 | 4.78E-4 |
| strontium-89 | Ci | * | * | * | * |
| strontium-90 | Ci | * | * | * | * |
| strontium-92 | Ci | <LLD | <LLD | <LLD | 3.57E-5 |
| technetium-99m | Ci | <LLD | <LLD | <LLD | <LLD |
| tin-113 | Ci | <LLD | <LLD | 3.29E-5 | 9.57E-5 |
| tin-117m | Ci | <LLD | <LLD | 2.54E-5 | <LLD |
| zinc-65 | Ci | <LLD | <LLD | <LLD | <LLD |
| zirconium-95 | Ci | <LLD | <LLD | 1.23E-4 | 7.75E-4 |
| Total for period | Ci | 2.72E-4 | <LLD | 1.53E-2 | 1.78E-2 |

LLD Lower Limit of Detection; see Table 2C.

- * First and second quarter analyses not available at report time; values will be included in the following Semiannual Radioactive Effluent Release Report.

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TABLE 2B (Continued)

LIQUID EFFLUENTS

| | | Continuous Mode | | Batch Mode | |
|----------------------------------|------|-----------------|----------------|---------------|----------------|
| Nuclides Released | Unit | First Quarter | Second Quarter | First Quarter | Second Quarter |
| 2. Dissolved and entrained gases | | | | | |
| xenon-131m | Ci | <LLD | <LLD | 6.00E-3 | 7.10E-4 |
| xenon-133 | Ci | 1.95E-5 | <LLD | 5.58E-2 | 1.40E-1 |
| xenon-133m | Ci | <LLD | <LLD | 5.86E-5 | 1.80E-3 |
| xenon-135 | Ci | <LLD | <LLD | 7.13E-5 | 1.78E-4 |

LLD Lower Limit of Detection; see Table 2C.

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TABLE 2C

LIQUID EFFLUENTS-LOWER LIMIT OF DETECTION

| Radionuclides | Continuous Mode LLD ($\mu\text{Ci/cc}$) | Batch Mode LLD ($\mu\text{Ci/cc}$) |
|------------------------------------|--|---|
| 1. Fission and activation products | | |
| antimony-124 | 3.10E-7 | * |
| antimony-125 | 1.80E-7 | * |
| barium-140 | 3.00E-7 | 2.00E-7 |
| cerium-141 | 8.90E-8 | 6.80E-8 |
| cesium-134 | 8.00E-8 | * |
| cesium-137 | 6.70E-8 | * |
| chromium-51 | 6.60E-7 | * |
| cobalt-57 | 5.30E-8 | * |
| cobalt-58 | 1.10E-7 | * |
| cobalt-60 | 1.10E-7 | * |
| iodine-131 | 8.00E-8 | 4.90E-8 |
| iron-59 | 1.80E-7 | * |
| lanthanum-140 | 4.90E-7 | 4.60E-8 |
| manganese-54 | 7.20E-8 | * |
| molybdenum-99 | 1.10E-7 | 3.90E-8 |
| niobium-95 | 7.10E-8 | * |
| niobium-95m | 3.00E-7 | 1.40E-7 |
| niobium-97 | 8.50E-7 | * |
| ruthenium-103 | 5.60E-8 | * |
| silver-110m | 1.10E-7 | * |
| strontium-92 | 1.30E-4 | 5.90E-8 |
| technetium-99m | 1.10E-7 | 3.90E-8 |
| tin-113 | 6.40E-8 | * |
| tin-117m | 5.50E-8 | 3.80E-8 |
| zinc-65 | 1.90E-7 | 6.90E-8 |
| zirconium-95 | 1.40E-7 | * |
| 2. Dissolved and entrained gases | | |
| xenon-131m | 4.00E-6 | * |
| xenon-133 | 3.80E-7 | * |
| xenon-133m | 9.30E-7 | * |
| xenon-135 | 2.30E-8 | * |

* Nuclide detected in Table 2B.

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TABLE 2D

LIQUID EFFLUENTS-RADIATION DOSES AT THE LIQUID SITE BOUNDARY

| | | Unit | First Quarter* | Second Quarter* |
|----|--------------------------|------|-------------------|--------------------|
| A. | | | | |
| 1. | Total body dose | mrem | 5.08E-4 | 7.78E-4 |
| 2. | Percent Applicable Limit | % | 1.69E-2 | 2.59E-2 |
| B. | | | | |
| 1. | Limiting organ dose | mrem | 2.71E-3 | 7.09E-3 |
| 2. | Percent Applicable Limit | % | 2.71E-2 | 7.09E-2 |

NOTE: The limiting organ for the first and second quarter is the GI-LLI.

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

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

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

TABLE 2E

LIQUID EFFLUENTS-BATCH RELEASE SUMMARY

| | 6-MONTH PERIOD |
|--|-------------------|
| 1. Number of batch releases: | 110 releases |
| 2. Total time period for batch releases: | 23433 minutes |
| 3. Maximum time period for a batch release: | 755 minutes |
| 4. Average time period for a batch release: | 213 minutes |
| 5. Minimum time period for a batch release: | 58 minutes |
| 6. Average saltwater flow during batch releases: | 724009 gpm |

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SECTION D. PREVIOUS SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT ADDENDUM

1. The July - December 1991 Semiannual Radioactive Effluent Release Report values for composite gross alpha, Sr-89, Sr-90, and Fe-55 (Tables 1A and 1C, Gaseous Effluents, Tables 2A and 2B, Liquid Effluents) were incomplete due to data not available at report time. The values not reported were for the fourth quarter of 1991. The values are as follows:

GASEOUS EFFLUENTS (4th Quarter 1991)

| Nuclides Released | Unit | Continuous Mode | Batch Mode |
|-------------------|------|-----------------|------------|
| strontium-89 | Ci | <LLD | * |
| strontium-90 | Ci | <LLD | * |
| Gross alpha | Ci | 2.79E-6 | * |

Sr-89 LLD = $1.00\text{E-}13 \mu\text{Ci/cc}$ Sr-90 LLD = $1.00\text{E-}14 \mu\text{Ci/cc}$

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

LIQUID EFFLUENTS (4th Quarter 1991)

| Nuclides Released | Unit | Continuous Mode | Batch Mode |
|-------------------|------|-----------------|------------|
| iron-55 | Ci | <LLD | 8.54E-3 |
| strontium-89 | Ci | <LLD | <LLD |
| strontium-90 | Ci | <LLD | <LLD |
| Gross alpha | Ci | <LLD | <LLD |

Fe-55 LLD = $1.00\text{E-}6 \mu\text{Ci/ml}$ Sr-89 LLD = $5.00\text{E-}8 \mu\text{Ci/ml}$ Sr-90 LLD = $1.00\text{E-}8 \mu\text{Ci/ml}$ Gross alpha LLD = $1.00\text{E-}7 \mu\text{Ci/ml}$

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SECTION D. PREVIOUS SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT
ADDENDUM (Continued)

2. GASEOUS EFFLUENT-RADIATION DOSES AT THE SITE BOUNDARY

For the fourth quarter of 1991 Semiannual Report, Sr-89, and Sr-90.

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

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

3. LIQUID EFFLUENT-RADIATION DOSES AT THE SITE BOUNDARY

For the fourth quarter of 1991 Semiannual Report, Sr-89, Sr-90,
and Fe-55.

| | Unit | Fourth Quarter |
|-----------------------------|------|-------------------|
| A. | | |
| 1. Total body dose | mrem | 4.18E-4 |
| 2. Percent Applicable Limit | % | 1.39E-2 |
| B. | | |
| 1. Limit organ dose | mrem | 2.60E-3 |
| 2. Percent Applicable Limit | % | 2.60E-2 |

NOTE: The limiting organ is the bone.

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SECTION E. RADWASTE SHIPMENTS

SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

TABLE 3

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

| 1. | Type of waste | Unit | 6-month Period | Est. Total Error, % |
|----|---|----------------------|----------------------|------------------------|
| a. | Spent resins, filter sludges, evaporator bottoms, etc. | m ³ Ci | 8.87E+1 * 4.05E+2 | 3.00E+1 |
| b. | Dry compressible waste, contaminated equip., etc. | m ³ Ci | 9.29E+1 # 3.02E+0 | 3.00E+1 |
| c. | Irradiated components, control rods, etc. | m ³ Ci | 3.85E-1 * 1.68E-1 | 3.00E+1 |
| d. | Other (absorbed liquids, sand building rubble, biological waste.) | m ³ Ci | 6.14E+0 * 1.02E+2 | 3.00E+1 |

NOTE: Total curie content estimated.

* Shipped in Type B cask (C of C9028)

Material packaged in 55-gallon DOT 7A drums (7.5 cu. ft each),
or strong, tight containers (steel boxes, 98 cu. ft. each).

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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. | americium-241 | % | 5.09E-5 |
| | carbon-14 | % | 2.47E-1 |
| | cerium-144 | % | 8.02E-1 |
| | cesium-134 | % | 2.49E+1 |
| | cesium-137 | % | 4.20E+1 |
| | cobalt-58 | % | 2.03E+0 |
| | cobalt-60 | % | 4.69E+0 |
| | curium-243/244 | % | 3.63E-5 |
| | iodine-129 | % | 3.78E-4 |
| | iron-55 | % | 9.95E+0 |
| | manganese-54 | % | 2.20E+0 |
| | nickel-63 | % | 1.30E+1 |
| | plutonium-238 | % | 1.21E-4 |
| | plutonium-239/240 | % | 1.21E-4 |
| | plutonium-241 | % | 7.31E-3 |
| | strontium-90 | % | 1.28E-1 |
| | technetium-99 | % | 3.36E-4 |
| | tritium | % | 1.74E-2 |

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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)

| | | | |
|----|-------------------|---|---------|
| b. | americium-241 | % | 1.07E-4 |
| | antimony-125 | % | 1.07E+0 |
| | carbon-14 | % | 3.46E+0 |
| | cerium-144 | % | 1.61E-1 |
| | cesium-134 | % | 6.65E+0 |
| | cesium-137 | % | 2.07E+1 |
| | cobalt-57 | % | 3.82E-1 |
| | cobalt-58 | % | 1.80E+0 |
| | cobalt-60 | % | 4.81E+0 |
| | curium-242 | % | 5.38E-5 |
| | curium-243/244 | % | 9.57E-5 |
| | iodine-129 | % | 1.42E-3 |
| | iron-55 | % | 4.54E+1 |
| | iron-59 | % | 3.05E-4 |
| | manganese-54 | % | 1.25E+0 |
| | nickel-63 | % | 8.92E+0 |
| | niobium-95 | % | 2.37E-1 |
| | plutonium-238 | % | 1.98E-2 |
| | plutonium-239/240 | % | 1.01E-3 |
| | plutonium-241 | % | 3.53E+0 |
| | plutonium-242 | % | 1.72E-5 |
| | ruthenium-106 | % | 2.85E-1 |
| | strontium-89 | % | 6.17E-2 |
| | strontium-90 | % | 6.52E-1 |
| | technetium-99 | % | 1.88E-3 |
| | tin-113 | % | 6.27E-2 |
| | tritium | % | 5.10E-1 |
| | zinc-65 | % | 2.35E-3 |
| | zirconium-95 | % | 3.63E-2 |

| | | | |
|----|-----------|---|---------|
| c. | cobalt-60 | % | 1.00E+2 |
|----|-----------|---|---------|

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

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

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)

| | | |
|-------------------|---|---------|
| d. americium-241 | % | 4.22E-4 |
| antimony-124 | % | 2.45E-1 |
| antimony-125 | % | 7.57E-1 |
| carbon-14 | % | 1.54E+0 |
| cerium-144 | % | 2.85E-1 |
| cesium-134 | % | 1.81E-1 |
| cesium-137 | % | 7.40E-1 |
| chromium-51 | % | 8.06E+0 |
| cobalt-57 | % | 5.92E-3 |
| cobalt-58 | % | 2.85E+1 |
| cobalt-60 | % | 5.63E+0 |
| curium-242 | % | 6.64E-3 |
| curium-243\244 | % | 1.28E-3 |
| hydrogen-3 | % | 7.66E-2 |
| iodine-129 | % | 4.82E-3 |
| iron-55 | % | 3.75E+1 |
| iron-59 | % | 1.91E+0 |
| manganese-54 | % | 1.01E+0 |
| nickel-63 | % | 3.87E+0 |
| niobium-95 | % | 4.56E+0 |
| plutonium-238 | % | 1.18E-3 |
| plutonium-239/240 | % | 8.80E-4 |
| plutonium-241 | % | 1.01E-1 |
| plutonium-242 | % | 4.24E-6 |
| ruthenium-103 | % | 4.79E-1 |
| ruthenium-106 | % | 3.74E-1 |
| scandium-46 | % | 7.25E-4 |
| silver-110m | % | 1.58E-1 |
| strontium-89 | % | 1.18E-2 |
| strontium-90 | % | 5.73E-3 |
| technetium-99 | % | 4.06E-3 |
| tin-113 | % | 1.13E+0 |
| zinc-65 | % | 1.94E-3 |
| zirconium-95 | % | 2.84E+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 limit, tabulated in Table 1A, was calculated using the following equation:

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

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

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

The MPC_{eff} is defined as:

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

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

n = total number of radionuclides identified

MPC_i = MPC of the i th radionuclide

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

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SECTION F. APPLICABLE LIMITS (Continued)

Liquid Effluents - Applicable Limits

The percent of applicable limit, tabulated in Table 2A, was calculated using the following equation:

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

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

The MPC_{eff} is defined as:

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

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

n = total number of radionuclides identified

MPC_i = MPC of the i th radionuclide

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

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

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 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 ODCM Specification Limits for each dose presented in Table 1.

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

TABLE 1

| SOURCE | Dose* (millirems) | |
|---------------------------------------|-------------------|-------------|
| | 1st Quarter | 2nd Quarter |
| LIQUID EFFLUENTS | 1) | 2) |
| Whole Body | 5.08E-4 | 7.78E-4 |
| Organ | 3) | 4) |
| | 2.71E-3 | 7.09E-3 |
| AIRBORNE EFFLUENTS | 5) | 6) |
| Tritium, Iodines, and Particulates | 7.26E-3 | 1.51E-3 |
| NOBLE GASES** | 7) | 8) |
| Gamma | 1.54E-2 | 6.30E-3 |
| Beta | 9) | 10) |
| | 4.09E-2 | 1.45E-2 |
| DIRECT RADIATION | 11) | 12) |
| | 9.82E-2 | 1.27E-1 |

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

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

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

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

1. This data was calculated using the methodology of the ODCM.
2. This data was calculated using the methodology of the ODCM.
3. This data was calculated using the methodology of the ODCM; the GI-LLI received the maximum dose primarily by the saltwater fish pathway.
4. This data was calculated using the methodology of the ODCM; the GI-LLI received the maximum dose primarily by the saltwater fish pathway.
5. The maximum organ dose was to a child's thyroid and was located in the NNW sector. This was calculated using the activity reported in the January - June 1992 Semiannual Report with the assumptions of USNRC Regulatory Guide 1.109.
6. The maximum organ dose was to a child's thyroid and was located in the NNW sector. This was calculated using the activity reported in the January - June 1992 Semiannual Report with the assumptions of USNRC Regulatory Guide 1.109.
7. The maximum air dose for gamma radiation was located in the ENE sector, at the exclusion area boundary, and calculated with the assumptions of the USNRC Regulatory Guide 1.109.
8. The maximum air dose for gamma radiation was located in the E sector, at the exclusion area boundary, and calculated with the assumptions of the USNRC Regulatory Guide 1.109.
9. The maximum air dose for beta radiation was located in the ENE sector, at the exclusion area boundary, and calculated with the assumptions of the USNRC Regulatory Guide 1.109.
10. The maximum air dose for beta radiation was located in the E sector, at the exclusion area boundary, and calculated with the assumptions of the USNRC Regulatory Guide 1.109.
11. Measurements were made using TLD dosimeters; values are presented as site wide dose and are prorated to 300 hours per year; highest dose was measured at the Site Boundary in the WSW sector.
12. Measurements were made using TLD dosimeters; values are presented as site wide dose and are prorated to 300 hours per year; highest dose was measured at the Site Boundary in the E sector.

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

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

TABLE 2

| SOURCE | % Applicable Limit | |
|---------------------------------------|--------------------|-------------|
| | 1st Quarter | 2nd Quarter |
| LIQUID EFFLUENTS | | |
| Whole Body | 1.69E-2 | 2.59E-2 |
| Organ | 2.71E-2 | 7.09E-2 |
| AIRBORNE EFFLUENTS | | |
| Tritium, Iodines, and Particulates | 5.11E-2 | 1.01E-2 |
| NOBLE GASES | | |
| Gamma | 1.54E-1 | 6.30E-2 |
| Beta | 2.05E-1 | 7.25E-2 |

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

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

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

SECTION I. CHANGES TO THE OFFSITE DOSE CALCULATION MANUAL

On February 28, 1992 Revision 25 to the Units 2/3 Offsite Dose Calculation Manual (ODCM) was adopted and published. This revision added steam generator blowdown and the Full Flow Condensate Polisher Demineralizer (FFCPD) holdup tank (HUT) as liquid release points and revised the Turbine Plant Sump discharge flowrates to reflect the replacement of the pump per DCP 2-6747. In recognition of unequal mixing in the plant vent stack, minimum instrument requirements for noble gases were revised to require both radiation monitors on the unit-specific branches whenever the radiation monitor on the common plenum is out of service. Additionally, radiation monitor calibration constants were updated to reflect recent surveillances and there was one editorial change for typographical errors. This revision also updated tables used in liquid and gaseous dose calculations due to changes in the 1991 Land Use Census. None of the changes resulted in any modifications to either the plant configuration or operation. As such, there is no impact on the accuracy or reliability of methods for determining effluent dose or setpoint values.

A complete copy of Revision 25 is being submitted to the NRC per Technical Specification 6.14.2.3 concurrent with this report. Safety reviews were performed for the following changes:

- o batch release of steam generator blowdown via 2(3)RT-6759 or 2(3)RT-6753 respectively
- o batch release of the FFCPD HUT via 2(3)RT-7817
- o instrument requirements for the plant vent stack

No positive findings were found in any of the safety evaluations.

No safety evaluations were performed for updating radiation monitor calibration constants or implementing changes from the 1991 Land Use Census. Similarly, the increase in the discharge rate from the turbine plant sump will be factored into the existing setpoint equation. 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.

The following is a complete list for this revision. Per NRC Generic Letter 89-01, no safety review was required or performed for the correction of typographical errors.

^a Indicates typographical, sequential sectional and page numbering, and format changes

GEN^a Added S023-ODCM above rev # in lower right corner of all pages to facilitate incorporation into SDMS

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

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

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

- GEN* The Food and Ground (GF) pathway values for child, teen, and adult (infant is zero) were increased by a factor of (1/0.7) or 43% in Sector P, 0.4 mile (page 2-38), Sector Q, 0.7 mile (page 2-43), and Sector Q, 1.1 mile (page 2-44). The increase is due to the fact that a shielding factor of 0.7 used in the Regulatory Guide 1.109, equation C-2, for calculation of ground exposure is not applicable to beach use since no structural shielding is provided for beach users. The increase in GF values does not affect the controlling location factors but it does increase the dose parameters columns for "Food and Ground" for the mentioned uses. Because, there no food pathway contribution for the beach uses, then the increase in the "Food and Ground" column will be only due to an increase in the ground GF factor (Food=0) and is expected to be 43% higher than the 1990 values. The modification to the GF factor was made per recommendation of Dr. James Brown, a consultant to the Station's Effluent Engineering group.
- 1-2 Added SG Blowdown and FFCDP HUT as liquid batch release points
- 1-15 Added discharge value for FFCDP Holdup Tank
- 1-23 Added separate discharge flowrate value for Unit 2 per DCP 2-6747
- 1-26 Table 1-3, updated liquid calibration constants for 2RT-6753, 2RT-6759, and 3RT-6753
- 1-28^a Table 1-4, in notes, changed NUREG-0172 to NUREG-0472
- 1-29^a same as pg 1-28
- 1-30 Provided regulatory references for representative sampling
- 2-35^a Table 2-4, deleted note " $1.17E+3 = 1.17 \times 10^3$ "
- 2-37 Table 2-6, added controlling sector location to table
- 2-38* Surf Beach Life Guard occupancy factor increased from 0.0685 to 0.0716 (Sector P, 0.4 mile).
- 2-39 Point Loran Military housing was deleted. It was not used for military housing in 1991 due to cutback in budget (Sector P, 2.7 miles).
- 2-43 Surf Beach Guard Shack occupancy factor increased from 0.0571 to 0.1712 (Sector Q, 0.7 mile). Also, the "guard shack" for infant, child, and teen uses was deleted and beach use parameters were added to these age groups.
- 2-44 Enlisted Beach campground (a new use) was added with an occupancy factor of 0.0104 (Sector Q, 1.1 mile).
- 49 San Clemente Ranch Administrative Office occupancy factor decreased from 0.5833 to 0.3425 (Sector R, 2.6 miles).

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

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

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

- 2-51^a Child Food and Ground pathway Cs-137 corrected: 2.2E+10 changed to 2.3E+10
- 2-52 San Clemente Ranch Packing With Resident occupancy factor decreased from 0.5833 to 0.3425 (Sector R, 2.6 miles).
- 2-55^a Adult Food and Ground pathway Co-60 corrected: 2.3E+10 changed to 2.2E+10
- 2-58^a Adult Inhalation Cs-137 corrected: 3.4E+2 changed to 3.4E+3
- 2-64 Sheep Meat D/Q changed from 5.3E-8 to 6.1E-8. This does not affect the dose parameters which do not contain the D/Q factor (Sector C, 0.2 mile). [Adult Inhalation Cs-136 corrected: 8.1E+3 changed to 8.1E+2^a]
- 2-72 San Onofre State Park Guard Shack occupancy factor increased from 0.0571 to 0.1712 (Sector F, 0.8 mile). The X/Q changed from 8.1E-7 to 8.6E-7 and D/Q changed from 7.1E-9 to 7.5E-9 in that same sector. The "guard shack" description for infant, child, and teen was deleted. GF and ZIN are zero because the uses for San Onofre State Park are listed in Sector G (Campground, the closest use).
- 2-73 (old 2-73) Beach concession use was deleted due to the closure of the stand (Sector F, 0.9 mile).
- 2-76 San Onofre Beach Campground occupancy factor for maintenance work increased to 0.2283 (Sector G, 0.8 mile).
- 2-80^a Reformatted definitions
- 2-81^a Reformatted definitions
- 2-82^a Reformatted definitions
- 4-2^a Table 4-1, to l.c, added Auxiliary Building Sump, Component Cooling Water Sumps, and Storage Tank Area Sumps
- 4-7 Modified noble gas monitoring requirement for plant vent stack to require both RT-7865s when 2/3RT-7808 is inoperable
- 4-8 Modified footnote (2) to require process flow verification on the plant vent stack if either RT7865 is not available. Added footnote (3).
- 5-17 Removed TLD 99, Transit Dose, at completion of comparative study on LiF and CaSO₄ TLDs
- 6-4^a Added definition for Ventilation Exhaust Treatment System

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

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SECTION J. MISCELLANEOUS

o Unplanned, Unmonitored Release from Unit 2 Condenser Air Ejector

On January 7, 1992, during a routine sample changeout of the Unit 2 Condenser Air Ejector Monitor, 2RE-7870, an absence of flow through the sample skid was discovered. Compensatory sampling was initiated. Investigation found a worn O-ring in the moisture separator such that air was sucked into the detector skid. The O-ring was replaced, and the system was tested satisfactory. As a result of the O-ring failure, the detector was monitoring local atmospheric intrusion from 2130, January 1, 1992 (the previous sample time) to 1040, January 7, 1992 (when compensatory sampling began). Both samples showed no detectable noble gas and tritium activity. There were no significant dose consequences as a result of this unmonitored release.

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

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

SECTION J. MISCELLANEOUS (Continued)

EFFLUENT RADIATION MONITORS OUT OF SERVICE GREATER THAN 30 DAYS

January 1, 1992 - June 30, 1992

| S.O.N.G.S. 2&3 | | | |
|--|----------------------|--------------------------------------|---|
| Monitor | Inoperability Period | Inoperability Cause | Explanation |
| 2/3RT-7813 Liquid Radwaste Discharge Line Monitor | 05/18/92 - present | Removed from service. | Install flow meter modifications per design change package. |
| S.O.N.G.S. 2 | | | |
| Monitor | Inoperability Period | Inoperability Cause | Explanation |
| 2RT-7818 B Condenser Air Ejector High Range | 01/25/88 - present | Detector design deficiency | Design flaw in 2RT-7818 causes channel B to be inoperable. Testing to restore operability continues. |
| 2RT-7828 Containment Purge Process Flow Monitor | 10/14/91 - 03/02/92 | Process Flow indication | Anomalous stack flow. Flow sensor works, channel check procedure revised. |
| 2RT-7865 Main Purge Process Flow Monitor | 04/22/92 - present | Process flow indication | Flow testing complete, data analysis in progress (to be completed September, 1992). Radiation monitor functions operable. |
| 2RT-7870 Condenser Air Ejector Process Flow Monitor | 02/18/89 - present | Inconsistent process flow indication | Design change to replace existing circuitry scheduled for issue in September, 1992. Implementation planned by December, 1992. Radiation monitor functions operable. |

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

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

SECTION J. MISCELLANEOUS (Continued)

EFFLUENT RADIATION MONITORS OUT OF SERVICE GREATER THAN 30 DAYS

January 1, 1992 - June 30, 1992

| S.O.N.G.S. 3 | | | |
|--|----------------------|--|---|
| Monitor | Inoperability Period | Inoperability Cause | Explanation |
| 3RT-6753 and 3RT-6759 Steam Generator Blowdown Monitors | 01/25/92 - 03/23/92 | No sample flow. | Monitor secured due to refueling outage. |
| 3RT-7817 BPS/FFCPD Discharge Monitor | 12/05/91 - present | Removed from service. | Install flow meter modifications per design change package. |
| 3RT-7818 A/B Condenser Air Ejector Monitor | 07/29/91 - 06/03/92 | Testing new sample pump bearing design | Nominally inoperable when testing new type of bearing. |
| 3RT-7818 B Condenser Air Ejector High Range Monitor | 01/25/88 - present | Detector design deficiency | Design flaw in 3RT-7818 causes channel B to be inoperable. Testing to restore operability continues. |
| 3RT-7821 Turbine Plant Sump Monitor | 04/29/92 - present | Removed from service. | Install flow meter modifications per design change package. |
| 3RT-7828 Containment Purge Process Flow Monitor | 11/23/91 - present | Process Flow indication | Anomalous stack flow. Flow sensor works, channel check procedure revised. |
| 3RT-7865 Plant Vent Stack Process Flow Monitor | 08/02/91 - present | Process flow indication | Flow testing complete, data analysis in progress (to be completed September, 1992). Radiation monitor functions operable. |

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

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

SECTION J. MISCELLANEOUS (Continued)

EFFLUENT RADIATION MONITORS OUT OF SERVICE GREATER THAN 30 DAYS

January 1, 1992 - June 30, 1992

| S.O.N.G.S. 3 (Continued) | | | |
|--------------------------------------|----------------------|--------------------------------------|---|
| Monitor | Inoperability Period | Inoperability Cause | Explanation |
| 3RT-7870 Condenser Air Ejector | 01/27/92 - 03/22/92 | No sample flow. | Monitor secured due to refueling outage. |
| Process Flow Monitor | 03/03/89 - present | Inconsistent process flow indication | Design change to replace existing circuitry scheduled for issue in September, 1992. Implementation planned by December, 1992. Radiation monitor functions operable. |

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

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

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

- o Gaseous effluent releases, excluding tritium, totaled $7.32\text{E}+2$ curies with 99% of the total being Xe-133.
- o The radiation doses from gaseous releases are: (a) gamma air dose: $4.56\text{E}-2$ mrad at the site boundary, (b) beta air dose: $1.19\text{E}-1$ mrad at the site boundary, (c) organ dose: $2.29\text{E}-3$ mrem at the nearest receptor.
- o Liquid releases totaled $2.77\text{E}+2$ curies of which tritium was $2.77\text{E}+2$ Ci, noble gases were $2.05\text{E}-1$ Ci, and particulates and iodines were $3.34\text{E}-2$ Ci.
- o The radiation doses from liquid releases are: (a) total body: $1.29\text{E}-3$ mrem, (b) limiting organ: $9.81\text{E}-3$ 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.

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

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 | 6-month Period | Est. Total Error, % |
|----|---|----------------------|-------------------|------------------------|
| a. | Spent resins, filter sludges, evaporator bottoms, etc. | m ³ Ci | NA NA | NA |
| b. | Dry compressible waste, contaminated equip., etc. | m ³ Ci | NA NA | NA |
| c. | Irradiated components, control rods, etc. | m ³ Ci | NA NA | NA |
| d. | Other (absorbed liquids, sand building rubble, biological waste.) | m ³ Ci | NA NA | NA |

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 |

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

COMMON

TABLE 3 (Continued)

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

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

| <u>Number of Shipments</u> | <u>Mode of Transportation</u> | <u>Destination</u> |
|----------------------------|--|--------------------|
| 10* | Tri-State Motor Transit Truck/Trailer | Beatty, NV |
| 6* | Tri-State Motor Transit Truck/Type B Cask | Beatty, NV |
| 12* | Tri-State Motor Transit Truck/Type A Cask | Beatty, NV |

* All waste packaged at SONGS is staged at one location. There are no independent shipments of Dry Active Waste (DAW) made for Unit 1 or Units 2/3 and are not reported separately.

B. IRRADIATED FUEL SHIPMENTS (Disposition)

| <u>Number of Shipments</u> | <u>Mode of Transportation</u> | <u>Destination</u> |
|----------------------------|-------------------------------|--------------------|
| None | NA | NA |

C. DEWATERING

| <u>Number of Containers</u> | <u>Solidification Agent</u> |
|-----------------------------|-----------------------------|
| 21 | NA |

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

COMMON

TABLE 3 (Continued)

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

During the reporting period January 01 1992 through June 30 1992, two revisions to the Process Control Program via procedure S0123-VII-8.5.1 was approved for implementation. Please find attached a description of the approved changes, and a discussion of the rationale for making the changes.

REFERENCES:

- 1) Unit 1 Technical Specifications, sections 6.5.2.9, 6.5.2.10, 6.13.2
- 2) S0123-VII-8.5.1, Process Control Program for San Onofre Units 1, 2 and 3

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

COMMON

TABLE 3 (Continued)

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

March 20, 1992

H. E. MORGAN
R. W. WALDO
R. M. ROSENBLUM
R. J. LEE

SUBJECT: Notification of Revision to S0123-VII-8.5.1, Process Control
Program for San Onofre Units 1, 2 and 3

In accordance with Technical Specifications 6.5.2.9, 6.5.2.10 and 6.13.2, a revision to the Process Control Program, via procedure S0123-VII-8.5.1, has been approved for implementation. Please find attached a description of the approved change, and a discussion of the rationale for making the change.

If you require any additional information, please contact me.



P. J. KNAPP

RKBrewer/notify:mjk
Attachment

cc: K. Yhip
R. W. Krieger
✓ M. M. Lewis
CDM Files

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

COMMON

TABLE 3 (Continued)

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

MEMORANDUM FOR FILE

March 20, 1992

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

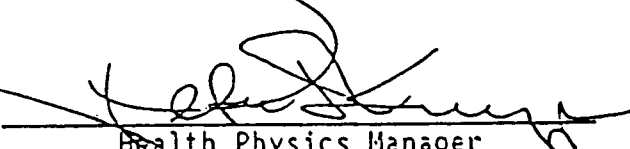
Health Physics has initiated a changes to the Process Control Program via procedure SO123-VII-8.5.1. The following provides an explanation of the revision and justification for the change(s).

Description of Change: The Unit 1 Technical Specification definition of SOLIDIFICATION was inserted in Section 6.1.5 of procedure SO123-VII-8.5.1.

Rationale for Change: It was identified that the definition for SOLIDIFICATION was inadvertently omitted during deletion and subsequent insertion into the PCP of select Unit 1 Technical Specifications.

Justification That the Change Does Not Reduce Conformance of the Solidified Waste to Existing Criteria: The change was administrative in nature.

APPROVED BY:


Health Physics Manager


Date

RKBrewer/notify:mjk

cc: H. E. Morgan
R. W. Waldo
R. M. Rosenblum
R. J. Lee
K. Yhip
R. W. Krieger
M. M. Lewis
CDM Files

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

COMMON

TABLE 3 (Continued)

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

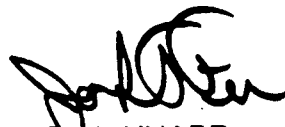
June 26, 1992

H. E. MORGAN
R. W. KRIEGER
R. M. ROSENBLUM
R. J. LEE

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

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

If you require any additional information, please contact me.


for P.J. KNAPP
Health Physics Manager

Attachment

cc: K. Yhip
R. Waldo
M. Lewis
D. Brevig
CDM Files

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

COMMON

TABLE 3 (Continued)

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

MEMORANDUM FOR FILE

June 26, 1992

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

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

Description of Changes:

1. Reference to the Unit 1 Technical Specifications Section 6.13 was added to Section 2.1.2 of procedure SO123-VII-8.5.1.
2. Reference 2.1.9, the Unit 1 Technical Specifications Section 3.19, was deleted from procedure SO123-VII-8.5.1.
3. Reference to "Units 2 and 3 only" was removed from the title of Section 6.2.6 of procedure SO123-VII-8.5.1.
4. Section 6.2.6.1 of procedure SO123-VII-8.5.1 was modified to include the requirement for reporting changes to the Unit 1 Radioactive Waste Treatment Systems in the Semiannual Effluent Release Report.

Rationale for Changes:

1. Clarified that this reference is applicable to Unit 1.
2. Section 3.19 of the Unit 1 Technical Specifications was deleted pursuant to implementation of Amendment No. 145.
3. Implementation of Amendment No. 145 made Section 6.2.6 applicable to Unit 1.
4. Section 6.15 of the Unit 1 Technical Specifications was deleted from the Technical Specifications and incorporated in Section 6.2.6.1 of procedure SO123-VII-8.5.1 pursuant to implementation of Amendment No. 145.

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

COMMON

TABLE 3 (Continued)

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

MEMORANDUM FOR FILE

-2-

June 26, 1992

Justification That the Change Does Not Reduce Conformance of the Solidified Waste to Existing Criteria:

No changes were made to the PCP procedure which affect solidified waste requirements. The changes made to procedure SO123-VII-8.5.1 are administrative in nature.

APPROVED BY:



Health Physics Manager

26 JUNE 92

Date

cc: H. E. Morgan
R. W. Waldo
R. M. Rosenblum
R. J. Lee
K. Yhip
R. W. Krieger
M. M. Lewis
CDM Files

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

COMMON

COMMON CONCLUSIONS

- o Radioactive releases from S.O.N.G.S. 1, 2 and 3 totaled $2.04\text{E}+3$ curies for gaseous effluents, 96% of which was Xe-133. Curies discharged for liquid effluents were: tritium, $1.43\text{E}+3$ curies; noble gases, $1.04\text{E}+0$ curies; particulates and iodines, $1.71\text{E}-1$ 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 28 radwaste shipments to Beatty, Nevada. Total volume was $2.19\text{E}+2$ cubic meters containing $1.11\text{E}+3$ curies of radioactivity.
- o Meteorological conditions during the year were typical for S.O.N.G.S. Meteorological dispersion was good 36% of the time, fair 40% of the time and poor 23% 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 regulatory requirements and therefore has not produced any detrimental effect on the environment.

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

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.

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

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

The meteorology of the San Onofre Nuclear Generating Station for the first and second quarter, 1992 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 Semiannual Report, but has not been included in this report because of the bulk of data records.

Table 4A lists the joint frequency distribution for first and second quarter, 1992. 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.

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

METEOROLOGY

January - June

TABLE 4A

SITE: SAN ONOFRE

PERIOD OF RECORD 91123124-92033123
 EXTREMELY UNSTABLE (DT/DZ LESS THAN -1.9 DEG.C/100 M)
 PASQUILL A

WIND SPEED (M/S) AT 10 M LEVEL

| WIND | .22- | .51- | .76- | 1.1- | 1.6- | 2.1- | 3.1- | 5.1- | 7.1- | 10.1- | 13.1- | >18 | TOTAL |
|--------|------|------|------|------|------|------|------|------|------|-------|-------|-----|-------|
| DIR | .50 | .75 | 1.0 | 1.5 | 2.0 | 3.0 | 5.0 | 7.0 | 10.0 | 13.0 | 18.0 | | |
| N | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NNE | 0 | 0 | 0 | 0 | 1 | 1 | 3 | 1 | 0 | 0 | 0 | 0 | 6 |
| NE | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| ENE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 2 | 0 | 0 | 5 |
| 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 | 5 | 7 | 5 | 1 | 2 | 0 | 20 |
| SSE | 0 | 0 | 0 | 0 | 1 | 4 | 10 | 7 | 5 | 0 | 4 | 0 | 31 |
| S | 0 | 0 | 0 | 1 | 2 | 11 | 15 | 7 | 4 | 0 | 0 | 0 | 40 |
| SSW | 0 | 0 | 0 | 1 | 5 | 12 | 3 | 1 | 2 | 0 | 0 | 0 | 24 |
| SW | 0 | 0 | 0 | 4 | 4 | 19 | 8 | 3 | 2 | 0 | 0 | 0 | 40 |
| WSW | 0 | 0 | 0 | 1 | 3 | 13 | 11 | 1 | 1 | 0 | 0 | 0 | 30 |
| W | 0 | 0 | 0 | 0 | 4 | 22 | 42 | 0 | 0 | 0 | 0 | 0 | 68 |
| WNW | 0 | 0 | 0 | 0 | 0 | 4 | 18 | 8 | 0 | 0 | 0 | 0 | 30 |
| NW | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 2 |
| NNW | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| TOTALS | 0 | 0 | 0 | 7 | 20 | 87 | 118 | 37 | 21 | 3 | 6 | 0 | 299 |

NUMBER OF CALMS 0
 NUMBER OF INVALID HOURS 4
 NUMBER OF VALID HOURS 299
 TOTAL HOURS FOR THE PERIOD 2184

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

METEOROLOGY

January - June

TABLE 4A

SITE: SAN ONOFRE

PERIOD OF RECORD 91123124-92033123
 MODERATELY UNSTABLE ($-1.9 < DT/DZ \leq -1.7$ DEG.C/100 M)
 PASQUILL B

WIND SPEED (M/S) AT 10 M LEVEL

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NNE | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 4 |
| NE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ENE | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 4 |
| 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 | 4 | 2 | 0 | 1 | 0 | 0 | 7 |
| SSE | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 4 | 2 | 1 | 0 | 0 | 10 |
| S | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 2 | 0 | 2 | 0 | 0 | 8 |
| SSW | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SW | 0 | 0 | 0 | 1 | 2 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 8 |
| WSW | 0 | 0 | 0 | 1 | 2 | 6 | 4 | 2 | 0 | 0 | 0 | 0 | 15 |
| W | 0 | 0 | 0 | 0 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| WNW | 0 | 0 | 0 | 2 | 1 | 2 | 4 | 0 | 1 | 0 | 0 | 0 | 10 |
| NW | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 2 | 1 | 0 | 0 | 0 | 5 |
| NNW | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| TOTALS | 0 | 0 | 1 | 5 | 10 | 15 | 25 | 13 | 6 | 4 | 0 | 0 | 79 |

NUMBER OF CALMS 0
 NUMBER OF INVALID HOURS 4
 NUMBER OF VALID HOURS 79
 TOTAL HOURS FOR THE PERIOD 2184

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

METEOROLOGY

January - June

TABLE 4A

SITE: SAN ONOFRE

PERIOD OF RECORD 91123124-92033123
 SLIGHTLY UNSTABLE (-1.7 < DT/TZ <= -1.5 DEG.C/100 M)

PASQUILL C

WIND SPEED (M/S) AT 10 M LEVEL

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| NNE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ENE | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| E | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| ESE | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 3 |
| SE | 0 | 0 | 1 | 0 | 0 | 2 | 5 | 6 | 2 | 0 | 0 | 0 | 16 |
| SSE | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 4 | 0 | 1 | 0 | 0 | 11 |
| S | 0 | 0 | 0 | 0 | 1 | 2 | 2 | 1 | 0 | 1 | 1 | 0 | 8 |
| SSW | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 4 |
| SW | 0 | 0 | 0 | 2 | 0 | 5 | 2 | 0 | 0 | 0 | 0 | 0 | 9 |
| WSW | 0 | 0 | 0 | 1 | 2 | 6 | 5 | 2 | 0 | 0 | 0 | 0 | 16 |
| W | 0 | 0 | 1 | 3 | 2 | 9 | 1 | 0 | 0 | 0 | 0 | 0 | 16 |
| WNW | 0 | 0 | 0 | 1 | 0 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 5 |
| NW | 0 | 0 | 0 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 4 |
| NNW | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| TOTALS | 0 | 0 | 2 | 9 | 7 | 32 | 27 | 14 | 2 | 2 | 1 | 0 | 96 |

NUMBER OF CALMS 0
 NUMBER OF INVALID HOURS 4
 NUMBER OF VALID HOURS 96
 TOTAL HOURS FOR THE PERIOD 2184

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

METEOROLOGY

January - June

TABLE 4A

SITE: SAN ONOFRE

PERIOD OF RECORD 91123124-92033123
 NEUTRAL(-1.5 < DT/DZ <= -0.5 DEG.C/100 M)

PASQUILL D

WIND SPEED (M/S) AT 10 M LEVEL

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 2 | 2 | 8 | 8 | 8 | 4 | 0 | 0 | 0 | 0 | 0 | 32 |
| NNE | 0 | 1 | 4 | 3 | 10 | 14 | 1 | 1 | 0 | 0 | 0 | 0 | 34 |
| NE | 0 | 2 | 0 | 0 | 0 | 2 | 1 | 0 | 1 | 0 | 0 | 0 | 6 |
| ENE | 0 | 2 | 1 | 2 | 0 | 0 | 1 | 3 | 5 | 0 | 0 | 0 | 14 |
| E | 0 | 0 | 0 | 1 | 0 | 6 | 5 | 7 | 12 | 0 | 0 | 0 | 31 |
| ESE | 0 | 0 | 0 | 1 | 1 | 7 | 18 | 7 | 1 | 0 | 0 | 0 | 35 |
| SE | 0 | 0 | 0 | 0 | 4 | 15 | 42 | 37 | 14 | 1 | 1 | 0 | 114 |
| SSE | 0 | 0 | 1 | 3 | 3 | 10 | 11 | 18 | 9 | 4 | 3 | 0 | 62 |
| S | 0 | 0 | 0 | 4 | 1 | 3 | 1 | 1 | 1 | 0 | 1 | 0 | 12 |
| SSW | 0 | 0 | 0 | 1 | 2 | 8 | 0 | 2 | 0 | 0 | 1 | 0 | 14 |
| SW | 0 | 0 | 2 | 4 | 3 | 4 | 2 | 3 | 0 | 0 | 0 | 0 | 18 |
| WSW | 0 | 0 | 1 | 6 | 6 | 14 | 10 | 3 | 0 | 0 | 0 | 0 | 40 |
| W | 0 | 0 | 1 | 3 | 8 | 7 | 7 | 13 | 0 | 0 | 0 | 0 | 39 |
| WNW | 0 | 1 | 2 | 3 | 3 | 12 | 5 | 7 | 0 | 0 | 0 | 0 | 33 |
| NW | 0 | 1 | 4 | 1 | 2 | 11 | 8 | 2 | 1 | 0 | 0 | 0 | 30 |
| NNW | 0 | 1 | 2 | 4 | 2 | 7 | 6 | 1 | 0 | 0 | 0 | 0 | 23 |
| TOTALS | 0 | 10 | 20 | 44 | 53 | 128 | 122 | 105 | 44 | 5 | 6 | 0 | 537 |

NUMBER OF CALMS 0
 NUMBER OF INVALID HOURS 4
 NUMBER OF VALID HOURS 537
 TOTAL HOURS FOR THE PERIOD 2184

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

METEOROLOGY

January - June

TABLE 4A

SITE: SAN ONOFRE

PERIOD OF RECORD 91123124-92033123
 SLIGHTLY STABLE ($-0.5 < DT/DZ \leq -1.5$ DEG.C/100 M)

PASQUILL E

WIND SPEED (M/S) AT 10 M LEVEL

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 1 | 5 | 8 | 5 | 16 | 11 | 2 | 0 | 0 | 0 | 0 | 48 |
| NNE | 0 | 0 | 2 | 34 | 30 | 31 | 23 | 8 | 0 | 0 | 0 | 0 | 128 |
| NE | 0 | 0 | 6 | 8 | 6 | 9 | 7 | 7 | 1 | 0 | 0 | 0 | 44 |
| ENE | 0 | 0 | 1 | 6 | 2 | 6 | 5 | 6 | 4 | 0 | 0 | 0 | 30 |
| E | 0 | 0 | 1 | 3 | 4 | 6 | 1 | 0 | 2 | 1 | 0 | 0 | 18 |
| ESE | 0 | 1 | 2 | 2 | 2 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 14 |
| SE | 0 | 0 | 1 | 1 | 2 | 8 | 3 | 2 | 1 | 2 | 0 | 0 | 20 |
| SSE | 1 | 0 | 0 | 2 | 4 | 0 | 2 | 3 | 0 | 0 | 1 | 0 | 13 |
| S | 0 | 0 | 0 | 2 | 1 | 3 | 0 | 1 | 0 | 3 | 0 | 0 | 10 |
| SSW | 0 | 0 | 1 | 3 | 5 | 1 | 1 | 2 | 2 | 1 | 0 | 0 | 16 |
| SW | 0 | 0 | 2 | 6 | 2 | 1 | 2 | 5 | 1 | 0 | 0 | 0 | 19 |
| WSW | 0 | 1 | 1 | 5 | 2 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 13 |
| W | 0 | 0 | 1 | 4 | 3 | 13 | 2 | 0 | 0 | 0 | 0 | 0 | 23 |
| WNW | 0 | 1 | 0 | 4 | 3 | 11 | 12 | 5 | 0 | 0 | 0 | 0 | 36 |
| NW | 0 | 0 | 1 | 2 | 0 | 3 | 2 | 2 | 0 | 0 | 0 | 0 | 10 |
| NNW | 0 | 0 | 0 | 1 | 3 | 6 | 2 | 0 | 0 | 0 | 0 | 0 | 12 |
| TOTALS | 1 | 4 | 24 | 91 | 74 | 121 | 77 | 43 | 11 | 7 | 1 | 0 | 454 |

NUMBER OF CALMS 0
 NUMBER OF INVALID HOURS 4
 NUMBER OF VALID HOURS 454
 TOTAL HOURS FOR THE PERIOD 2184

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

METEOROLOGY

January - June

TABLE 4A

SITE: SAN ONOFRE

PERIOD OF RECORD 91123124-92033123
 MODERATELY STABLE ($1.5 \leq DT/DZ \leq -0.5$ DEG.C/100 M)

PASQUILL F

WIND SPEED (M/S) AT 10 M LEVEL

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 0 | 0 | 5 | 7 | 8 | 7 | 0 | 0 | 0 | 0 | 0 | 27 |
| NNE | 0 | 0 | 2 | 22 | 48 | 74 | 38 | 6 | 0 | 0 | 0 | 0 | 190 |
| NE | 1 | 1 | 5 | 8 | 12 | 15 | 3 | 0 | 0 | 0 | 0 | 0 | 45 |
| ENE | 0 | 1 | 2 | 6 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 14 |
| E | 0 | 0 | 1 | 3 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 7 |
| ESE | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| SE | 0 | 0 | 1 | 2 | 1 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 8 |
| SSE | 0 | 0 | 0 | 1 | 2 | 2 | 3 | 1 | 0 | 1 | 0 | 0 | 10 |
| S | 0 | 0 | 0 | 0 | 6 | 3 | 2 | 0 | 1 | 2 | 0 | 0 | 14 |
| SSW | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| SW | 0 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| WSW | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| W | 0 | 0 | 0 | 2 | 2 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 9 |
| WNW | 0 | 0 | 0 | 1 | 1 | 6 | 4 | 0 | 0 | 0 | 0 | 0 | 12 |
| NW | 0 | 0 | 0 | 0 | 2 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 7 |
| NNW | 0 | 0 | 0 | 0 | 2 | 2 | 4 | 0 | 0 | 0 | 0 | 0 | 8 |
| TOTALS | 1 | 3 | 11 | 56 | 87 | 119 | 71 | 7 | 1 | 4 | 0 | 0 | 360 |

NUMBER OF CALMS 0
 NUMBER OF INVALID HOURS 4
 NUMBER OF VALID HOURS 360
 TOTAL HOURS FOR THE PERIOD 2184

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

METEOROLOGY

January - June

TABLE 4A

SITE: SAN ONOFRE

PERIOD OF RECORD 91123124-92033123
 EXTREMELY STABLE(DT/DZ EXCEEDS 4.0 DEG.C/100 M)

PASQUILL G

WIND SPEED (M/S) AT 10 M LEVEL

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 0 | 0 | 2 | 1 | 0 | 9 | 0 | 0 | 0 | 0 | 0 | 12 |
| NNE | 0 | 0 | 1 | 5 | 21 | 143 | 95 | 5 | 0 | 0 | 0 | 0 | 270 |
| NE | 0 | 1 | 0 | 7 | 3 | 8 | 9 | 2 | 0 | 0 | 0 | 0 | 30 |
| ENE | 0 | 0 | 0 | 5 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 9 |
| E | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| ESE | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| SE | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| SSE | 0 | 0 | 0 | 2 | 2 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| S | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 |
| SSW | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| SW | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| WSW | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| W | 0 | 0 | 0 | 1 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| WNW | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| NW | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| NNW | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 4 |
| TOTALS | 0 | 2 | 3 | 29 | 37 | 162 | 114 | 7 | 1 | 0 | 0 | 0 | 355 |

NUMBER OF CALMS 0
 NUMBER OF INVALID HOURS 4
 NUMBER OF VALID HOURS 355
 TOTAL HOURS FOR THE PERIOD 2184

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

METEOROLOGY

January - June

TABLE 4A

SITE: SAN ONOFRE

PERIOD OF RECORD 91123124-92033123

ALL STABILITY, ALL DT/DZ

WIND SPEED (M/S) AT 10 M LEVEL

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 3 | 7 | 23 | 21 | 33 | 31 | 2 | 0 | 0 | 0 | 0 | 120 |
| NNE | 0 | 1 | 9 | 64 | 111 | 263 | 163 | 21 | 0 | 0 | 0 | 0 | 632 |
| NE | 1 | 4 | 11 | 23 | 21 | 34 | 21 | 9 | 2 | 0 | 0 | 0 | 126 |
| ENE | 0 | 3 | 4 | 19 | 8 | 8 | 9 | 12 | 12 | 2 | 0 | 0 | 77 |
| E | 0 | 0 | 2 | 8 | 5 | 14 | 7 | 7 | 14 | 1 | 0 | 0 | 58 |
| ESE | 0 | 2 | 3 | 4 | 6 | 14 | 23 | 7 | 1 | 0 | 0 | 0 | 60 |
| SE | 0 | 0 | 3 | 3 | 8 | 26 | 62 | 54 | 22 | 5 | 3 | 0 | 186 |
| SSE | 1 | 0 | 1 | 8 | 12 | 20 | 34 | 37 | 16 | 7 | 8 | 0 | 144 |
| S | 0 | 0 | 0 | 8 | 12 | 23 | 22 | 12 | 7 | 8 | 2 | 0 | 94 |
| SSW | 0 | 0 | 1 | 7 | 13 | 22 | 6 | 5 | 4 | 2 | 1 | 0 | 61 |
| SW | 0 | 1 | 4 | 22 | 11 | 32 | 16 | 11 | 3 | 0 | 0 | 0 | 100 |
| WSW | 0 | 1 | 2 | 17 | 15 | 41 | 33 | 8 | 1 | 0 | 0 | 0 | 118 |
| W | 0 | 0 | 3 | 13 | 24 | 58 | 55 | 13 | 0 | 0 | 0 | 0 | 166 |
| WNW | 0 | 2 | 3 | 11 | 9 | 38 | 44 | 21 | 1 | 0 | 0 | 0 | 129 |
| NW | 0 | 1 | 5 | 5 | 4 | 20 | 15 | 6 | 3 | 0 | 0 | 0 | 59 |
| NNW | 0 | 1 | 3 | 6 | 8 | 18 | 13 | 1 | 0 | 0 | 0 | 0 | 50 |
| TOTALS | 2 | 19 | 61 | 241 | 288 | 664 | 554 | 226 | 86 | 25 | 14 | 0 | 2180 |

NUMBER OF CALMS 0
 NUMBER OF INVALID HOURS 4
 NUMBER OF VALID HOURS 2180
 TOTAL HOURS FOR THE PERIOD 2184

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

METEOROLOGY

January - June

TABLE 4A

SITE: SAN ONOFRE

PERIOD OF RECORD 92033124-92063023
 EXTREMELY UNSTABLE (DT/DZ LESS THAN -1.9 DEG.C/100 M)

PASQUILL A

WIND SPEED (M/S) AT 10 M LEVEL

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NNE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 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 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| SE | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 3 | 1 | 0 | 0 | 0 | 7 |
| SSE | 0 | 0 | 0 | 1 | 1 | 8 | 7 | 1 | 0 | 0 | 0 | 0 | 18 |
| S | 0 | 0 | 0 | 8 | 10 | 20 | 36 | 6 | 0 | 0 | 0 | 0 | 80 |
| SSW | 0 | 0 | 0 | 3 | 8 | 18 | 36 | 0 | 0 | 0 | 0 | 0 | 65 |
| SW | 0 | 0 | 0 | 4 | 5 | 40 | 35 | 1 | 0 | 0 | 0 | 0 | 85 |
| WSW | 0 | 0 | 0 | 0 | 5 | 40 | 70 | 5 | 0 | 0 | 0 | 0 | 120 |
| W | 0 | 0 | 0 | 2 | 9 | 67 | 183 | 11 | 0 | 0 | 0 | 0 | 272 |
| WNW | 0 | 0 | 0 | 1 | 2 | 20 | 53 | 18 | 1 | 0 | 0 | 0 | 95 |
| NW | 0 | 0 | 0 | 0 | 0 | 1 | 6 | 2 | 1 | 0 | 0 | 0 | 10 |
| NNW | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| TOTALS | 0 | 0 | 0 | 19 | 41 | 215 | 428 | 48 | 3 | 0 | 0 | 0 | 754 |

NUMBER OF CALMS 0
 NUMBER OF INVALID HOURS 0
 NUMBER OF VALID HOURS 754
 TOTAL HOURS FOR THE PERIOD 2184

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

METEOROLOGY

January - June

TABLE 4A

SITE: SAN ONOFRE

PERIOD OF RECORD 92033124-92063023
 MODERATELY UNSTABLE ($-1.9 < DT/DZ \leq -1.7$ DEG.C/100 M)

PASQUILL B

WIND SPEED (M/S) AT 10 M LEVEL

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| NNE | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| NE | 0 | 0 | 0 | 0 | 0 | 2 | 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 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| SE | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 4 |
| SSE | 0 | 0 | 0 | 0 | 3 | 5 | 5 | 1 | 0 | 0 | 0 | 0 | 14 |
| S | 0 | 0 | 1 | 0 | 1 | 3 | 8 | 0 | 0 | 0 | 0 | 0 | 13 |
| SSW | 0 | 0 | 0 | 1 | 0 | 6 | 4 | 1 | 0 | 0 | 0 | 0 | 12 |
| SW | 0 | 0 | 0 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 8 |
| WSW | 0 | 0 | 0 | 0 | 1 | 11 | 6 | 1 | 0 | 0 | 0 | 0 | 19 |
| W | 0 | 0 | 1 | 0 | 8 | 10 | 6 | 0 | 0 | 0 | 0 | 0 | 25 |
| WNW | 0 | 0 | 0 | 1 | 3 | 10 | 4 | 0 | 0 | 0 | 0 | 0 | 18 |
| NW | 0 | 0 | 0 | 1 | 1 | 3 | 9 | 1 | 0 | 0 | 0 | 0 | 15 |
| NNW | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| TOTALS | 0 | 0 | 3 | 5 | 18 | 60 | 43 | 5 | 0 | 0 | 0 | 0 | 134 |

NUMBER OF CALMS 0
 NUMBER OF INVALID HOURS 0
 NUMBER OF VALID HOURS 134
 TOTAL HOURS FOR THE PERIOD 2184

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

METEOROLOGY

January - June

TABLE 4A

SITE: SAN ONOFRE

PERIOD OF RECORD 92033124-92063023
 SLIGHTLY UNSTABLE (-1.7 < DT/TZ <= -1.5 DEG.C/100 M)

PASQUILL C

WIND SPEED (M/S) AT 10 M LEVEL

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| NNE | 0 | 0 | 0 | 0 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 5 |
| NE | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| ENE | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| E | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| ESE | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| SE | 0 | 0 | 0 | 1 | 3 | 4 | 5 | 2 | 0 | 0 | 0 | 0 | 15 |
| SSE | 0 | 0 | 1 | 1 | 1 | 5 | 18 | 5 | 1 | 0 | 0 | 0 | 32 |
| S | 0 | 1 | 1 | 0 | 3 | 11 | 3 | 0 | 0 | 0 | 0 | 0 | 19 |
| SSW | 0 | 1 | 2 | 3 | 3 | 6 | 6 | 0 | 0 | 0 | 0 | 0 | 21 |
| SW | 0 | 0 | 1 | 4 | 4 | 3 | 3 | 0 | 0 | 0 | 0 | 0 | 15 |
| WSW | 0 | 0 | 0 | 2 | 8 | 12 | 4 | 0 | 0 | 0 | 0 | 0 | 26 |
| W | 0 | 0 | 1 | 7 | 11 | 13 | 7 | 0 | 0 | 0 | 0 | 0 | 39 |
| WNW | 0 | 0 | 0 | 3 | 1 | 12 | 5 | 0 | 0 | 0 | 0 | 0 | 21 |
| NW | 0 | 0 | 0 | 5 | 3 | 8 | 5 | 0 | 0 | 0 | 0 | 0 | 21 |
| NNW | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| TOTALS | 0 | 2 | 9 | 26 | 44 | 81 | 57 | 7 | 1 | 0 | 0 | 0 | 227 |

NUMBER OF CALMS 0
 NUMBER OF INVALID HOURS 0
 NUMBER OF VALID HOURS 227
 TOTAL HOURS FOR THE PERIOD 2184

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

METEOROLOGY

January - June

TABLE 4A

SITE: SAN ONOFRE

PERIOD OF RECORD 92033124-92063023
 NEUTRAL (-1.5 < DT/DZ <= -0.5 DEG.C/100 M)
 PASQUILL D

WIND SPEED (M/S) AT 10 M LEVEL

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 1 | 5 | 16 | 17 | 9 | 2 | 0 | 0 | 0 | 0 | 0 | 50 |
| NNE | 0 | 2 | 3 | 18 | 25 | 14 | 0 | 0 | 0 | 0 | 0 | 0 | 62 |
| NE | 0 | 0 | 0 | 3 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 8 |
| ENE | 0 | 0 | 2 | 4 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 |
| E | 0 | 0 | 3 | 5 | 4 | 5 | 3 | 1 | 0 | 0 | 0 | 0 | 21 |
| ESE | 0 | 0 | 2 | 5 | 6 | 4 | 12 | 0 | 0 | 0 | 0 | 0 | 29 |
| SE | 0 | 1 | 0 | 4 | 6 | 34 | 53 | 5 | 0 | 0 | 0 | 0 | 103 |
| SSE | 0 | 0 | 1 | 8 | 10 | 18 | 27 | 3 | 1 | 0 | 0 | 0 | 68 |
| S | 0 | 2 | 1 | 8 | 7 | 16 | 8 | 1 | 0 | 0 | 0 | 0 | 43 |
| SSW | 0 | 2 | 1 | 3 | 4 | 11 | 2 | 0 | 0 | 0 | 0 | 0 | 23 |
| SW | 0 | 4 | 4 | 5 | 6 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 26 |
| WSW | 0 | 4 | 4 | 11 | 10 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 39 |
| W | 0 | 0 | 3 | 7 | 7 | 18 | 4 | 0 | 0 | 0 | 0 | 0 | 39 |
| WNW | 0 | 0 | 4 | 8 | 8 | 5 | 4 | 0 | 0 | 0 | 0 | 0 | 29 |
| NW | 0 | 0 | 2 | 9 | 17 | 11 | 6 | 0 | 0 | 0 | 0 | 0 | 45 |
| NNW | 0 | 0 | 2 | 9 | 9 | 7 | 2 | 0 | 0 | 0 | 0 | 0 | 29 |
| TOTALS | 0 | 16 | 37 | 123 | 142 | 169 | 124 | 10 | 1 | 0 | 0 | 0 | 622 |

NUMBER OF CALMS 0
 NUMBER OF INVALID HOURS 0
 NUMBER OF VALID HOURS 622
 TOTAL HOURS FOR THE PERIOD 2184

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

METEOROLOGY

January - June

TABLE 4A

SITE: SAN ONOFRE

PERIOD OF RECORD 92033124-92063023
 SLIGHTLY STABLE ($-0.5 < DT/DZ \leq -1.5$ DEG.C/100 M)

PASQUILL E

WIND SPEED (M/S) AT 10 M LEVEL

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 1 | 3 | 5 | 8 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 19 |
| NNE | 0 | 0 | 7 | 20 | 23 | 11 | 1 | 0 | 0 | 0 | 0 | 0 | 62 |
| NE | 0 | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| ENE | 0 | 1 | 0 | 1 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 6 |
| E | 0 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| ESE | 0 | 0 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| SE | 0 | 0 | 1 | 2 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| SSE | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| S | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| SSW | 0 | 0 | 2 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 5 |
| SW | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| WSW | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4 |
| W | 0 | 0 | 0 | 2 | 2 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 8 |
| WNW | 0 | 0 | 2 | 1 | 3 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 11 |
| NW | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| NNW | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| TOTALS | 0 | 4 | 19 | 44 | 47 | 25 | 7 | 0 | 0 | 0 | 0 | 0 | 146 |

NUMBER OF CALMS 0
 NUMBER OF INVALID HOURS 0
 NUMBER OF VALID HOURS 146
 TOTAL HOURS FOR THE PERIOD 2184

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

METEOROLOGY

January - June

TABLE 4A

SITE: SAN ONOFRE

PERIOD OF RECORD 92033124-92063023
 MODERATELY STABLE ($1.5 \leq DT/DZ \leq -0.5$ DEG.C/100 M)
 PASQUILL F

WIND SPEED (M/S) AT 10 M LEVEL

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 0 | 0 | 0 | 3 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 7 |
| NNE | 0 | 0 | 2 | 21 | 44 | 44 | 5 | 0 | 0 | 0 | 0 | 0 | 116 |
| NE | 0 | 0 | 1 | 5 | 5 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 14 |
| ENE | 0 | 0 | 0 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| E | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| ESE | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SE | 0 | 0 | 0 | 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 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| SSW | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| SW | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| WSW | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| W | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| WNW | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 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 | 6 | 30 | 54 | 50 | 7 | 1 | 0 | 0 | 0 | 0 | 148 |

NUMBER OF CALMS 0
 NUMBER OF INVALID HOURS 0
 NUMBER OF VALID HOURS 148
 TOTAL HOURS FOR THE PERIOD 2184

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

METEOROLOGY

January - June

TABLE 4A

SITE: SAN ONOFRE

PERIOD OF RECORD 92033124-92063023
 EXTREMELY STABLE(DT/DZ EXCEEDS 4.0 DEG.C/100 M)

PASQUILL G

WIND SPEED (M/S) AT 10 M LEVEL

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 4 |
| NNE | 0 | 0 | 0 | 4 | 26 | 90 | 23 | 0 | 0 | 0 | 0 | 0 | 143 |
| NE | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 |
| 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 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| W | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| 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 | 5 | 29 | 90 | 28 | 1 | 0 | 0 | 0 | 0 | 153 |

NUMBER OF CALMS 0
 NUMBER OF INVALID HOURS 0
 NUMBER OF VALID HOURS 153
 TOTAL HOURS FOR THE PERIOD 2184

SEMIANNUAL RADIOACTIVE EFFLUENT RELEASE REPORT (1992)

METEOROLOGY

January - June

TABLE 4A

SITE: SAN ONOFRE

PERIOD OF RECORD 92033124-92063023

ALL STABILITY, ALL DT/DZ

WIND SPEED (M/S) AT 10 M LEVEL

| WIND DIR | .22- .50 | .51- .75 | .76- 1.0 | 1.1- 1.5 | 1.6- 2.0 | 2.1- 3.0 | 3.1- 5.0 | 5.1- 7.0 | 7.1- 10.0 | 10.1- 13.0 | 13.1- 18.0 | >18 | TOTAL |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|---------------|---------------|-----|-------|
| N | 0 | 2 | 9 | 21 | 28 | 13 | 8 | 1 | 0 | 0 | 0 | 0 | 82 |
| NNE | 0 | 2 | 12 | 64 | 122 | 160 | 30 | 0 | 0 | 0 | 0 | 0 | 390 |
| NE | 0 | 1 | 3 | 11 | 14 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 36 |
| ENE | 0 | 1 | 2 | 8 | 5 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 21 |
| E | 0 | 0 | 5 | 8 | 4 | 8 | 3 | 1 | 0 | 0 | 0 | 0 | 29 |
| ESE | 0 | 0 | 4 | 7 | 9 | 4 | 12 | 1 | 0 | 0 | 0 | 0 | 37 |
| SE | 0 | 1 | 1 | 7 | 10 | 43 | 61 | 11 | 1 | 0 | 0 | 0 | 135 |
| SSE | 0 | 0 | 2 | 10 | 16 | 38 | 57 | 10 | 2 | 0 | 0 | 0 | 135 |
| S | 0 | 3 | 4 | 17 | 22 | 50 | 55 | 7 | 0 | 0 | 0 | 0 | 158 |
| SSW | 0 | 3 | 6 | 11 | 16 | 41 | 49 | 1 | 0 | 0 | 0 | 0 | 127 |
| SW | 0 | 5 | 5 | 13 | 16 | 57 | 39 | 1 | 0 | 0 | 0 | 0 | 136 |
| WSW | 0 | 4 | 5 | 16 | 25 | 73 | 80 | 6 | 0 | 0 | 0 | 0 | 209 |
| W | 0 | 0 | 5 | 18 | 39 | 112 | 201 | 11 | 0 | 0 | 0 | 0 | 386 |
| WNW | 0 | 0 | 6 | 14 | 17 | 50 | 68 | 19 | 1 | 0 | 0 | 0 | 175 |
| NW | 0 | 0 | 2 | 16 | 22 | 23 | 26 | 3 | 1 | 0 | 0 | 0 | 93 |
| NNW | 0 | 0 | 3 | 11 | 10 | 9 | 2 | 0 | 0 | 0 | 0 | 0 | 35 |
| TOTALS | 0 | 22 | 74 | 252 | 375 | 690 | 694 | 72 | 5 | 0 | 0 | 0 | 2184 |

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