ATTACHMENT 1

# EFFLUENT, WASTE DISPOSAL, AND POTENTIAL DOSES SEMIANNUAL REPORT

January - June 1976

Brunswick Steam Electric Plant

August 12, 1976







(3A)

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT
1976
Supplemental Information

Facility Brunswick Steam Electric Plant License Carolina Power & Light Co.

1. Regulatory Limits

a. Fission & activation gases

$$\Sigma \bar{E}_\beta \{0.72\ Q_s + 290\ Q_v\} \leq 1 \text{ quarterly average}$$

$$\Sigma \bar{E}_\gamma \{22\ Q_s + 200\ Q_v\} \leq 1 \text{ quarterly average}$$

$$\Sigma \bar{E}_\beta \{1.4\ Q_s + 580\ Q_v\} \leq 1 \text{ 12 month average}$$

$$\Sigma \bar{E}_\gamma \{45\ Q_s + 400\ Q_v\} \leq 1 \text{ 12 month average}$$

b. Iodines

2 Curies per quarter
4 Curies per 12 months

c. Particulates, half-lives >8 days

$$\{4.7 \times 10^5\}Q_s + \{7.2 \times 10^7\}Q_v \leq 1 \text{ quarterly average}$$

$$\{9.3 \times 10^5\}Q_s + \{1.5 \times 10^8\}Q_v \leq 12 \text{ month average}$$

d. Liquid effluents

10 Curies per quarter
20 Curies per 12 months

2. Maximum Permissible Concentrations

a. Fission & activation Gases

$$\Sigma Q_s \{4.0\ \bar{E}_\gamma + 0.23\ \bar{E}_\beta\} + Q_v \{35\bar{E}_\gamma + 92\ \bar{E}_\beta\} \leq 1$$

b. Iodines

$$\{3.7 \times 10^4\}Q_s + \{5.8 \times 10^6\}\ Q_v \leq 1$$

c. Particulates, half-lives > 8 days

$$\{3.7 \times 10^4\}Q_s + \{5.8 \times 10^6\}Q_v \leq 1$$

d. Liquid Effluents

Values specified in 10CFR Part 20, Appendix B, Table II, Column 2 for unrestricted areas.

3. Average Energy

$\bar{E}_\gamma$ = 1.05 MEV  $\bar{E}_\beta$ = [illegible]

4. Measurements and Approximat[illegible] al Radioactivity

a. Fission and activation g[illegible]e
Analysis for specific radionuclides in representative grab samples by gamma spectroscopy.

b. Iodines

Analysis for specific radionuclides collected on charcoal cartridges by gamma spectroscopy.

c. Particulates

Analysis for specific radionuclides collected on filter papers by gamma spectroscopy.

d. Liquid effluents

Analysis for specific radionuclides by individual releases by gamma spectroscopy.

Relative variance for each measurement used in calculating activity values were combined using the additive property of variance. The square root of the combined variance was extracted to obtain an estimate of the standard deviation of the multistep process. The standard deviation was used to evaluate the error in the calculated activities at the 95% confidence level.

5. Batch Releases

a. Liquid

1. Number of Batch releases: 594

2. Total time period for batch releases: 4.83 E04 minutes

3. Maximum time period for a batch release: 2010 minutes

4. Average time period for batch releases: 81.3 minutes

5. Minimum time period for a batch release: 4 minutes

6. Average stream flow during periods of release of effluent into a flowing stream: not applicable

b. Gaseous

1. Number of batch releases: none

2. Total time period for a batch release: not applicable

3. Maximum time period for a batch release: not applicable

4. Average time period for a batch release: not applicable

5. Minimum time period for a batch release: not applicable

6. Abnormal Release

a. Liquid

1. Number of releases: none

2. Total activity released: none

b. Gaseous

1. Number of release: 1

2. Total activity released: 3.81E-4Ci

TABLE 1A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (YEAR) 1976

GASEOUS EFFLUENTS-SUMMATION OF ALL RELEASES

| | Unit | Quarter I | Quarter II | Est.Total Error, % |
|---|---|---|---|---|
| A. Fission & activation gases | | | | |
| 1. Total release | Ci | 150.06 | 69.21 | 1.33E01 |
| 2. Average release rate for period | µCi/ sec | 2.07E-05 | 2.50E-05 | |
| 3. Percent of Technical specification limit | % | 2.40E-02 | 8.93E-03 | |
| B. Iodines | | | | |
| 1. Total iodine-131 | Ci | 3.15E-03 | 1.13E-04 | 1.33E01 |
| 2. Average release rate for period | µCi/sec | 4.30E-10 | 2.16E-11 | |
| 3. Percent of technical specification limit | % | 7.08E-02 | 2.80E-05 | |
| C. Particulates | | | | |
| 1. Particulates with half-lives > 8 days | Ci | 1.01E-02 | 3.58E-03 | 1.33E01 |
| 2. Average release rate for period | µCi/sec | 1.35E-09 | 6.97E-10 | |
| 3. Percent of technical specification limit | % | 1.92E00 | 1.67E00 | |
| 4. Gross alpha radioactivity | Ci | 0.00 | 0.00 | |
| D. Tritium | | | | |
| 1. Total release | Ci | 1.77E01 | 3.49E00 | 1.45E01 |
| 2. Average release rate for period | µCi/sec | 2.44E-06 | 6.73E-07 | |
| 3. Percent of technical specification limit | % | 6.96E-02 | 3.19E-03 | |

TABLE 1B

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (YEAR) 1976

GASEOUS EFFLUENTS-ELEVATED RELEASE

| Nuclides Released | Unit | Continuous Mode 1st Quarter | Continuous Mode 2nd Quarter | Batch Mode Quarter | Batch Mode Quarter |
|---|---|---|---|---|---|
| 1. Fission gases | | | | | |
| krypton-85 | Ci | 0.00E-00 | 0.00E-00 | | |
| krypton-85m | Ci | 2.00E00 | 4.77E00 | | |
| krypton-87 | Ci | 1.56E01 | 9.88E00 | | |
| krypton-88 | Ci | 0.00E00 | 4.25E00 | | |
| xenon-133 | Ci | 0.00E-00 | 6.03E00 | | |
| xenon-135 | Ci | 1.90E01 | 0.00E00 | | |
| xenon-135m | Ci | 0.00E00 | 0.00E00 | | |
| xenon-138 | Ci | 0.00E00 | 0.00E00 | | |
| Argon-41 | Ci | 1.14E02 | 3.62E01 | | |
| | Ci | | | | |
| | Ci | | | | |
| unidentified | Ci | 0.00E-00 | 0.00E00 | | |
| Total for period | Ci | 1.50E02 | 6.92E01 | | |
| 2. Iodines | | | | | |
| iodine-131 | Ci | 3.03E-3 | 1.13E-04 | | |
| iodine-133 | Ci | 1.02E-03 | 3.03E-04 | | |
| iodine-135 | Ci | 3.74E-05 | 2.83E-05 | | |
| Total for period | Ci | 2.60E-2 | 4.43E-04 | | |
| 3. Particulates | | | | | |
| strontium-89 | Ci | 6.58E-06 | 1.02E-05 | | |
| strontium-90 | Ci | 0.00E-00 | 0.00E00 | | |
| cesium-134 | Ci | 0.00E-00 | 0.00E-00 | | |
| cesium-137 | Ci | 0.00E-00 | 0.00E-00 | | |
| barium-lanthanum-140 | Ci | 0.00E-00 | 0.00E-00 | | |
| Cobalt-58 | Ci | 1.25E-05 | 7.86E-08 | | |
| Manganese-54 | Ci | 6.55E-03 | 0.00E-00 | | |
| Cerium-139 | Ci | 0.00E-00 | 5.23E-07 | | |
| unidentified | Ci | 0.00E-00 | 0.00E-00 | | |
| Total for period | Ci | 6.57E-03 | 1.03E-05 | | |

TABLE 1C

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (YEAR) 1976

GASEOUS EFFLUENTS-GROUND-LEVEL RELEASES

| Nuclides Released | II Unit | Continuous Mode 1st Quarter | Continuous Mode 2nd Quarter | Batch Mode Quarter | Batch Mode Quarter |
|---|---|---|---|---|---|
| 1. Fission gases | | | | | |
| krypton-85 | Ci | 0.00E-00 | 0.00E-00 | | |
| krypton-85m | Ci | 0.00E-00 | 0.00E-00 | | |
| krypton-87 | Ci | 0.00E-00 | 0.00E-00 | | |
| krypton-88 | Ci | 0.00E-00 | 0.00E-00 | | |
| xenon-133 | Ci | 0.00E-00 | 0.00E-00 | | |
| xenon-135 | Ci | 0.00E-00 | 0.00E-00 | | |
| xenon-135m | Ci | 0.00E-00 | 0.00E-00 | | |
| xenon-138 | Ci | 0.00E-00 | 0.00E-00 | | |
| | Ci | | | | |
| | Ci | | | | |
| | Ci | | | | |
| unidentified | Ci | 0.00E-00 | 0.00E-00 | | |
| Total for period | Ci | 0.00E-00 | 0.00E-00 | | |
| 2. Iodines | | | | | |
| iodine-131 | Ci | 1.23E-04 | 0.00E-00 | | |
| iodine-133 | Ci | 1.20E-04 | 0.00E-00 | | |
| iodine-135 | Ci | 3.88E-06 | 0.00E-00 | | |
| Total for period | Ci | 2.47E-04 | 0.00E-00 | | |
| 3. Particulates | | | | | |
| strontium-89 | Ci | 8.32E-06 | 7.62E-06 | | |
| strontium-90 | Ci | 0.00E-00 | 0.00E-00 | | |
| cesium-134 | Ci | 0.00E-00 | 0.00E-00 | | |
| cesium-137 | Ci | 0.00E-00 | 0.00E-00 | | |
| barium-lanthanum-140 | Ci | 0.00E-00 | 0.00E-00 | | |
| Cobalt-58 | Ci | 5.30E-04 | 7.44E-04 | | |
| Cobalt-60 | Ci | 1.79E-04 | 5.85E-04 | | |
| Chromium-51 | Ci | 1.45E-03 | 7.85E-04 | | |
| Zirconium-Niobium-95 | Ci | 3.31E-04 | 3.33E-04 | | |
| Zinc-65 | Ci | 1.39E-04 | 2.56E-04 | | |
| Iron-59 | Ci | 2.39E-04 | 1.35E-04 | | |
| Manganese-54 | Ci | 4.10E-04 | 7.28E-04 | | |
| Molybdenum-99 | Ci | 9.28E-05 | 0.00E-00 | | |
| Technetium-99 | Ci | 9.87E-05 | 0.00E-00 | | |
| Zirconium-97 | Ci | 0.00E-00 | 4.38E-09 | | |
| Niobium-97m | Ci | 0.00E-00 | 4.20E-09 | | |
| unidentifed | Ci | 0.00E-00 | 0.00E-00 | | |
| Total for period | Ci | 3.48E-03 | 3.57E-03 | | |

NOTES:

1) Minimum detectable concentrations for radionuclides not detected (uCi/cc):

| | |
|---|---|
| Kr-85 | 5.40E-06 |
| Kr-88 | 6.05E0-08 |
| Xe-133 | 4.15E-08 |
| Xe-135m | 2.87E-08 |
| Xe-138 | 1.85E-08 |
| Cs-134 | 1.74E-14 |
| Cs-137 | 1.29E-14 |
| Ba-La-140 | 2.93E-14 |

2) No batch releases were made during the first or second quarter.

TABLE 2A

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (YEAR) 1976

LIQUID EFFLUENTS-SUMMATION OF ALL RELEASES

| | Unit | Quarter 1st | Quarter 2nd | Est. Total Error, % |
|---|---|---|---|---|
| A. Fission and activation products | | | | |
| 1. Total release (not including tritium, gases, alpha) | Ci | 6.00E-01 | 5.47E-01 | 1.15E01 |
| 2. Average diluted concentration during period | uCi/ml | 1.49E-08 | 9.79E-09 | |
| 3. Percent of applicable limit | % | 3.00E-00 | 2.74E-00 | |
| B. Tritium | | | | |
| 1. Total release | Ci | 1.12E00 | 1.01E00 | 1.33E01 |
| 2. Average diluted concentration during period | uCi/ml | 2.78E-08 | 1.81E-08 | |
| 3. Percent of applicable limit | % | 9.26E-4 | 6.00E-04 | |
| C. Dissolved and entrained gases | | | | |
| 1. Total release | Ci | 2.2E-03 | 2.11E-04 | 1.15E01 |
| 2. Average diluted concentration during period | uCi/ml | 5.46E-11 | 3.77E-12 | |
| 3. Percent of applicable limit | % | 1.81E-05 | 1.23E-06 | |
| D. Gross alpha radioactivity | | | | |
| 1. Total release | Ci | 0.00E00 | 0.00E00 | 1.22E01 |
| E. Volume of waste released (prior to dilution) | liters | 6.45E06 | 1.36E07 | 5.66E00 |
| F. Volume of dilution water used during period | liters | 4.03E10 | 5.59E10 | 1.10E01 |

TABLE 2B

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (YEAR) 1976

LIQUID EFFLUENTS

| | | Continuous Mode | | Batch Mode | |
|---|---|---|---|---|---|
| Nuclides Released | Unit | Quarter | Quarter | 1st Quarter | 2nd Quarter |
| strontium-8 | Ci | | | 1.46E-05 | 1.43E-04 |
| strontium-90 | Ci | | | 8.82E-06 | 6.68E-05 |
| cesium-134 | Ci | | | 1.56E-06 | 0.00E00 |
| cesium-137 | Ci | | | 2.27E-06 | 0.00E00 |
| iodine-131 | Ci | | | 1.45E-04 | 0.00E00 |
| cobalt-58 | Ci | | | 4.76E-02 | 5.86E-02 |
| cobalt-60 | Ci | | | 1.67E-02 | 4.49E-02 |
| iron-59 | Ci | | | 2.13E-02 | 2.45E-02 |
| zinc-65 | Ci | | | 1.08E-02 | 2.87E-02 |
| manganese-54 | Ci | | | 2.89E-02 | 5.48E-02 |
| chromium-51 | Ci | | | 1.60E-01 | 1.11E-01 |
| zirconium-niobium-95 | Ci | | | 9.44E-03 | 8.98E-02 |
| molybdenum-99 | Ci | | | 2.40E-03 | 2.26E-04 |
| technetium-99m | Ci | | | 3.29E-03 | 2.06E-04 |
| barium-lanthanum-140 | Ci | | | 0.00E00 | 2.31E-06 |
| cerium-141 | Ci | | | 8.91E-06 | 0.00E00 |
| Carbon-14 | Ci | | | 0.00E00 | 2.50E-04 |
| Fluorine-18 | Ci | | | 1.06E-01 | 6.18E-02 |
| Sodium-24 | Ci | | | 8.36E-02 | 1.35E-02 |
| Scandium-46 | Ci | | | | 6.65E-06 |
| Manganese-56 | Ci | | | 1.35E-03 | 6.73E-04 |
| Copper-54 | Ci | | | 5.63E-02 | 1.79E-02 |
| Cobalt-57 | Ci | | | 2.56E-06 | 5.94E-04 |
| Gallium-72 | Ci | | | 1.44E-03 | 7.67E-03 |
| Arsehic-76 | Ci | | | 1.89E-02 | 3.67E-03 |
| Niobium-97 | Ci | | | 1.29E-03 | 1.88E-04 |
| Tin-113 | Ci | | | 1.30E-05 | 3.43E-05 |
| Indium-113m | Ci | | | 2.32E-05 | 5.26E-05 |
| Tin-117m | Ci | | | 8.24E-06 | 0.00E00 |
| Antimony-122 | Ci | | | 1.24E-04 | 0.00E00 |
| Antimony-124 | Ci | | | 6.89E-04 | 1.04E-03 |
| Iodine-132 | Ci | | | 1.81E-04 | 4.28E-07 |
| Iodine-133 | Ci | | | 9.62E-04 | 2.53E-06 |
| Cerium-139 | Ci | | | 3.95E-06 | 0.00E00 |
| Barium-139 | Ci | | | 2.47E-05 | 0.00E00 |
| Tungsten-187 | Ci | | | 1.98E-06 | 0.00E00 |
| Yttrium-91 | Ci | | | 0.00E00 | 1.10E-03 |
| unidentified | Ci | | | 2.86E-02 | 2.61E-02 |
| Total for period above | Ci | | | 6.00E-01 | 5.47E-01 |
| Argon-41 | Ci | | | 1.58E-03 | |
| xenon-133 | Ci | | | 0.00E00 | 0.00E00 |
| xenon-135 | Ci | | | 6.15E-04 | 2.11E-04 |
| Total for period | Ci | | | 2.20E-03 | 2.11E-04 |

NOTES: 1) No continuous releases were made during the first or second quarter.

2) Minimum detectable concentrations for radionuclides not detected (uCi/ml):

| | | | |
|---|---|---|---|
| Cs-134 | 3.50E-08 | Ce-141 | 4.50E-08 |
| I-131 | 2.89E-08 | Xe-133 | 4.98E-08 |
| Ba-La-140 | 9.65E-08 | | |

TABLE 3

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT (YEAR) 1976

SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

A. Solid Waste Shipped Offsite for Burial or Disposal (Not irradiated fuel)

| 1. Type of waste | Unit | 6-month period | Est. Total Error, % |
|---|---|---|---|
| a. Spent resins, filter sludges, evaporated bottoms, etc. | $m^3$<br>Ci | 326.76<br>141.41 | ±1.5E01 |
| b. Dry compressible waste, contaminated equip, etc. | $m^3$<br>Ci | 367.58<br>16.88 | ±2.0E01 |
| c. Irradiated components, control rods, etc. | $m^3$<br>Ci | 0.44<br>0.15 | ±1.0E01 |
| d. Other (describe) | $m^3$<br>Ci | 1.00<br>5.30 | ±1.2E01 |

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

| | | |
|---|---|---|
| ~~a+b~~ | Cobalt-58 | 39.7 % |
| | Chromium-51 | 34.5 % |
| | Manganese-54 | 10.6 % |
| | Cobalt-60 | 6.9 % |
| | Iron-59 | 4.2 % |
| | Zinc-65 | 3.9 % |
| c. | Uranium-235 | 99 % |
| | | % |
| | | % |
| d. | Americium-Beryllium- | 99 % |
| | | % |
| | | % |

3. Solid Waste Disposition

| Number of Shipments | Mode of Transportation | Destination |
|---|---|---|
| 88 | (85) Sole use vehicle | See attached sheet |
| | (2) Parcel post | See attached sheet |
| | (1) Hand carry | See attached sheet |

B. Irradiated Fuel Shipments (Disposition)

| Number of Shipments | Mode of Transportation | Destination |
|---|---|---|
| None | | |

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| NO. of shipments | Destination |
|---|---|
| 37 | Southern Space Inc.<br>Columbia SC |
| 35 | Chem-Nuclear Systems, Inc.<br>Barnwell, SC |
| 10 | Harris Energy & Environmental Lab<br>Raleigh, NC |
| 5 | Vallecitos Nuclear Center<br>Pleasanton, CA |
| 1 | Peach Bottom Atomic Power Station<br>Delta, PA |

AIR SUBMERSION SKIN DOSE, mRem/6 Months
BRUNSWICK STEAM ELECTRIC PLANT
Jan 1 to June 30, 1976

| SECTOR | MILES | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | .5 | 1.5 | 2.5 | 3.5 | 4.5 | 7.5 | 15.0 | 25.0 | 35.0 | 45.0 |
| NNE | 3.55E-03 | 5.372E-03 | 5.368E-03 | 4.627E-03 | 3.886E-03 | 2.405E-03 | 1.147E-03 | 6.291E-04 | 4.256E-04 | 3.145E-04 |
| NE | 4.474E-03 | 7.221E-03 | 7.033E-03 | 5.922E-03 | 5.009E-03 | 2.960E-03 | 1.406E-03 | 7.586E-04 | 5.180E-04 | 3.700E-04 |
| ENE | 2.086E-03 | 3.710E-03 | 4.260E-03 | 3.888E-03 | 3.332E-03 | 2.221E-03 | 1.055E-03 | 6.107E-04 | 4.256E-04 | 3.146E-04 |
| E | 5.127E-04 | 1.396E-03 | 1.614E-03 | 1.483E-03 | 1.297E-03 | 8.707E-04 | 4.630E-04 | 2.777E-04 | 1.851E-04 | 1.481E-04 |
| ESE | 1.315E-03 | 1.524E-03 | 1.539E-03 | 1.353E-03 | 1.148E-03 | 7.224E-04 | 3.519E-04 | 2.037E-04 | 1.351E-04 | 1.018E-04 |
| SE | 1.216E-03 | 1.252E-03 | 1.172E-03 | 1.022E-03 | 8.728E-04 | 5.752E-04 | 2.967E-04 | 1.817E-04 | 1.297E-04 | 1.001E-04 |
| SSE | 1.688E-03 | 2.049E-03 | 2.042E-03 | 1.651E-03 | 1.354E-03 | 7.975E-04 | 3.708E-04 | 2.039E-04 | 1.353E-04 | 1.001E-04 |
| S | 1.417E-03 | 2.044E-03 | 1.854E-03 | 1.594E-03 | 1.315E-03 | 7.966E-04 | 3.889E-04 | 2.222E-04 | 1.518E-04 | 1.148E-04 |
| SSW | 1.256E-03 | 2.[illegible] E-03 | 2.965E-03 | 2.593E-03 | 2.222E-03 | 1.388E-03 | 6.665E-04 | 3.887E-04 | 2.592E-04 | 1.851E-04 |
| SW | 2.061E-03 | 1.863E-03 | 1.834E-03 | 1.629E-03 | 1.388E-03 | 8.701E-04 | 4.257E-04 | 2.406E-04 | 1.573E-04 | 1.166E-04 |
| WSW | 3.542E-03 | 2.595E-03 | 2.407E-03 | 2.036E-03 | 1.684E-03 | 1.073E-03 | 5.182E-04 | 2.961E-04 | 2.035E-04 | 1.462E-04 |
| W | 4.078E-03 | 2.592E-03 | 2.221E-03 | 1.850E-03 | 1.554E-03 | 9.807E-04 | 4.810E-04 | 2.779E-04 | 2.035E-04 | 1.498E-04 |
| WNW | 3.354E-03 | 2.224E-03 | 2.037E-03 | 1.846E-03 | 1.555E-03 | 1.036E-03 | 5.552E-04 | 3.516E-04 | 2.590E-04 | 2.035E-04 |
| NW | 3.526E-03 | 1.685E-03 | 1.407E-03 | 1.203E-03 | 1.018E-03 | 6.662E-04 | 3.516E-04 | 2.040E-04 | 1.480E-04 | 1.129E-04 |
| NNW | 2.419E-03 | 2.222E-03 | 2.406E-03 | 2.220E-03 | 2.035E-03 | 1.332E-03 | 6.846E-04 | 4.076E-04 | 2.775E-04 | 2.220E-04 |
| N | 2.438E-03 | 2.966E-03 | 2.963E-03 | 2.592E-03 | 2.221E-03 | 1.406E-03 | 6.663E-04 | 3.701E-04 | 2.601E-05 | 1.850E-04 |

MAXIMUM OFFSITE SKIN DOSE mREM/6Months 7.221E-03

AIR SUBMERSION WHOLE BODY DOSE, mRem/6 Months
BRUNSWICK STEAM ELECTRIC PLANT
Jan 1 to June 30, 1976

| SECTOR | MILES | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 0.5 | 1.5 | 2.5 | 3.5 | 4.5 | 7.5 | 15.0 | 25.0 | 35.0 | 45.0 |
| NNE | 2.387E-03 | 3.627E-03 | 3.626E-03 | 3.125E-03 | 2.625E-03 | 1.625E-03 | 7.751E-04 | 4.250E-04 | 2.875E-04 | 2.125E-04 |
| NE | 3.011E-03 | 4.877E-03 | 4.751E-03 | 4.000E-03 | 3.379E-03 | 2.000E-03 | 9.500E-04 | 5.125E-04 | 3.500E-04 | 2.500E-04 |
| ENE | 1.391E-03 | 2.503E-03 | 2.876E-03 | 2.626E-03 | 2.250E-03 | 1.500E-03 | 7.126E-04 | 4.125E-04 | 2.875E-04 | 2.125E-04 |
| E | 3.285E-04 | 9.405E-04 | 1.089E-03 | 1.001E-03 | 8.757E-04 | 5.879E-04 | 3.126E-04 | 1.875E-04 | 1.250E-04 | 1.000E-04 |
| ESE | 8.747E-04 | 1.027E-03 | 1.038E-03 | 9.133E-04 | 7.755E-04 | 4.878E-04 | 2.376E-04 | 1.375E-04 | 9.129E-05 | 6.878E-05 |
| SE | 7.970E-04 | 8.415E-04 | 7.896E-04 | 6.889E-04 | 5.885E-04 | 3.880E-04 | 2.002E-04 | 1.226E-04 | 8.758E-05 | 6.756E-05 |
| SSE | 1.112E-03 | 1.379E-03 | 1.377E-03 | 1.114E-03 | 9.137E-04 | 5.381E-04 | 2.502E-04 | 1.376E-04 | 9.135E-05 | 6.757E-05 |
| S | 9.405E-04 | 1.378E-03 | 1.251E-03 | 1.076E-03 | 8.882E-04 | 5.378E-04 | 2.626E-04 | 1.500E-04 | 1.025E-04 | 7.754E-05 |
| SSW | 8.297E-04 | 1.878E-03 | 2.001E-03 | 1.751E-03 | 1.500E-03 | 9.379E-04 | 4.501E-04 | 2.625E-04 | 1.750E-04 | 1.250E-04 |
| SW | 1.383E-03 | 1.239E-03 | 1.238E-03 | 1.100E-03 | 9.379E-04 | 5.877E-04 | 2.875E-04 | 1.625E-04 | 1.062E-04 | 7.877E-05 |
| WSW | 2.838E-03 | 1.751E-03 | 1.625E-03 | 1.375E-03 | 1.137E-03 | 7.252E-04 | 3.500E-04 | 2.000E-04 | 1.375E-04 | 9.877E-05 |
| W | 2.753E-03 | 1.750E-03 | 1.500E-03 | 1.250E-03 | 1.050E-03 | 6.265E-04 | 3.250E-04 | 1.876E-04 | 1.375E-04 | 1.012E-04 |
| WNW | 2.257E-03 | 1.501E-03 | 1.373E-03 | 1.242E-03 | 1.050E-03 | 7.001E-04 | 3.750E-04 | 2.375E-04 | 1.750E-04 | 1.375E-04 |
| NW | 2.378E-03 | 1.138E-03 | 9.503E-04 | 8.127E-04 | 6.876E-04 | 4.500E-04 | 2.375E-04 | 1.376E-04 | 1.000E-04 | 7.625E-05 |
| NNW | 1.629E-03 | 1.500E-03 | 1.625E-03 | 1.500E-03 | 1.375E-03 | 9.000E-04 | 4.625E-04 | 2.752E-04 | 1.875E-04 | 1.500E-04 |
| N | 2.657E-03 | 2.002E-03 | 2.001E-03 | 1.750E-03 | 1.500E-03 | 9.502E-04 | 4.501E-04 | 2.500E-04 | 1.753E-05 | 1.250E-04 |

MAXIMUM OFFSITE WHOLE BODY DOSE mREM/6Months 4.877E-03

WORST CASE SITE BOUNDARY DOSES
RELATED TO AIRBORNE IODINE RELEASES

(Hypothetical Cow and Leafy Vegetables at Site Boundary)

| Thyroid Dose due to inhalation, mRem/6 Months | |
|---|---|
| 1 year old | 4.20E-4 |
| 4 years old | 4.07E-4 |
| 14 years old | 2.69E-4 |
| Adult | 3.59E-4 |

| Thyroid Dose due to Milk Pathway mRem/6 Months | |
|---|---|
| 1 year old | 1.11E-1 |
| 4 years old | 4.60E-2 |
| 14 years old | 1.59E-2 |
| Adult | 1.23E-2 |

| Thyroid Dose due to Eating Green Leafy Vegetables, mRem/6 Months | |
|---|---|
| 1 year old | 0 |
| 4 years old | 7.63E-3 |
| 14 years old | 4.44E-3 |
| Adult | 4.69E-3 |

SUMMARY OF DOSES DUE TO LIQUID RELEASES

Dose Due to Eating Fish
Caught in Discharge Canal

| | |
|---|---|
| Whole Body | 3.63E-6 mRem/6 months |
| G. I. Tract | 1.91E-5 mRem/6 months |
| Thyroid | 2.47E-8 mRem/6 months |
| Bone | 5.25E-6 mRem/6 months |

| | |
|---|---|
| Shoreline Sediment Dose Along Discharge Canal | 4.28E-7 mRem/6 months |
| Ocean Swimming Dose | 3.06E-10 mRem/6 months |

Radological Impact on Man from from direct radiation from the facility is negligible based on the results from environmental TLD's.