

**ENCLOSURE 1 TO SBK-L-05103**

Effluent Release Data as Required by  
Regulatory Guide 1.21

**EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT**  
**Supplemental Information 2004**

Facility: Seabrook Station Unit 1

Licensee: FPL Energy Seabrook, LLC

1. Regulatory Limits

A. Gaseous Effluents

- a. 5.0 mrad per quarter gamma air dose.
- b. 10.0 mrad per quarter beta air dose.
- c. 7.5 mrem per quarter to any organ.

B. Liquid Effluents

- a. 1.5 mrem per quarter total body.
- b. 5.0 mrem per quarter any organ.
- c. 2.0E-04  $\mu\text{Ci/ml}$  dissolved or entrained gas.

2. Maximum Permissible Concentrations

Provide the MPC's used in determining allowable release rates or concentrations.

- a. Fission and activation gases: 1 MPC
- b. Iodines: 1 MPC
- c. Particulates, half-lives >8 days: 1 MPC
- d. Liquid Effluents: 1 MPC

3. Average Energy

Not applicable

4. Measurements and Approximations of Total Radioactivity

Provide the methods used to measure or approximate the total radioactivity in effluents and the methods used to determine radionuclide composition.

- A. Fission and activation gases: Determined by gamma spectroscopy. Total error is based on stack flow error, analytical error, and calculated sampling error.
- B. Iodines: Determined by collection on charcoal with subsequent gamma spectroscopy analysis. Total error is based on stack flow error, analytical error, and calculated sampling error.

- C. Particulates: Determined by collection on fixed filter with subsequent gamma spectroscopy analysis. Strontium is determined by composite analysis of filters by liquid scintillation, gross alpha by proportional counter and iron 55 by liquid scintillation. Total error is based on stack flow error, analytical error, and calculated sampling error.
- D. Liquid Effluents: Determined by gamma spectroscopy. A composite sample is analyzed for strontium by liquid scintillation, tritium by liquid scintillation, gross alpha by proportional counter and iron 55 by liquid scintillation. Total error is based on the volume discharge error and analytical error.
- E. ND: None Detected or No Detectable Activity

## 5. Batch Releases

Provide the following information relating to batch releases of radioactive materials in liquid and gaseous effluents.

- A. Liquid
  - a. Number of batch releases: 119
  - b. Total time for batch releases: 33028 minutes
  - c. Maximum time period for batch release: 1335 minutes
  - d. Average time period for batch release: 278 minutes
  - e. Minimum time period for batch release: 72 minutes
  - f. Average stream flow during periods of release of effluents into a flowing stream: 1.65E+06 liters per minute
- B. Gaseous
  - a. Number of batch releases: 28
  - b. Total time for batch releases: 9589 minutes
  - c. Maximum time period for batch release: 2479 minutes
  - d. Average time period for batch release: 339 minutes
  - e. Minimum time period for batch release: 2 minute

## 6. Abnormal Releases

- A. Liquid
  - a. Number of releases: 0
  - b. Total activity released: N/A
- B. Gaseous
  - a. Number of releases: 0
  - b. Total activity released: N/A

TABLE 1A

## EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT 2004

## GASEOUS EFFLUENTS-SUMMATION OF ALL RELEASES

| Unit | Quarter<br>1 | Quarter<br>2 | Quarter<br>3 | Quarter<br>4 | Est. Total<br>Error, % |
|------|--------------|--------------|--------------|--------------|------------------------|
|------|--------------|--------------|--------------|--------------|------------------------|

## A. Fission and activation gases

|  |         |          |          |          |          |          |
|--|---------|----------|----------|----------|----------|----------|
| 1. Total releases  | Ci      | 1.02E-03 | 3.13E-02 | 4.67E-03 | 4.50E-03 | 1.70E+01 |
| 2. Average release rate<br>for period                        | uCi/sec | 1.29E-04 | 3.97E-03 | 5.92E-04 | 5.70E-04 |          |
| 3. Percent of applicable<br>Technical Specification<br>limit | %       | 2.38E-05 | 6.30E-04 | 8.92E-05 | 6.92E-05 |          |

## B. Iodines

|  |         |          |          |          |          |          |
|--|---------|----------|----------|----------|----------|----------|
| 1. Total release   | Ci      | ND       | ND       | ND       | ND       | 1.50E+01 |
| 2. Average release rate<br>for period                        | uCi/sec | N/A      | N/A      | N/A      | N/A      |          |
| 3. Percent of applicable<br>Technical Specification<br>limit | %       | 2.05E-01 | 2.95E-01 | 2.96E-01 | 3.32E-01 |          |

## C. Particulates

|  |         |          |          |          |          |          |
|--|---------|----------|----------|----------|----------|----------|
| 1. Total release   | Ci      | ND       | 1.81E-07 | 4.52E-05 | 3.52E-06 | 1.80E+01 |
| 2. Average release rate<br>for period                        | uCi/sec | N/A      | 2.29E-08 | 5.73E-06 | 4.46E-07 |          |
| 3. Percent of applicable<br>Technical Specification<br>limit | %       | 6.21E-06 | 1.40E-04 | 2.26E-05 | 1.36E-05 |          |
| 4. Total alpha radioactivity                                 | Ci      | ND       | ND       | ND       | ND       |          |

## D. Tritium

|  |         |          |          |          |          |          |
|--|---------|----------|----------|----------|----------|----------|
| 1. Total release   | Ci      | 1.53E+01 | 2.03E+01 | 1.94E+01 | 2.38E+01 | 1.60E+01 |
| 2. Average release rate<br>for period                        | uCi/sec | 1.94E+00 | 2.57E+00 | 2.46E+00 | 3.02E+00 |          |
| 3. Percent of applicable<br>Technical Specification<br>limit | %       | 6.21E-06 | 1.40E-04 | 2.26E-05 | 1.36E-05 |          |

TABLE 1B  
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT (2004)  
GASEOUS EFFLUENTS-ELEVATED RELEASES  
BATCH

| Nuclides Released | Unit | Quarter<br>1 | Quarter<br>2 | Quarter<br>3 | Quarter<br>4 |
|-------------------|------|--------------|--------------|--------------|--------------|
|-------------------|------|--------------|--------------|--------------|--------------|

1. Fission and activation gases

|                  |    |          |          |          |          |
|------------------|----|----------|----------|----------|----------|
| argon-41         | Ci | 3.78E-04 | 2.55E-02 | 2.97E-03 | 2.91E-03 |
| krypton-85       | Ci | ND       | ND       | ND       | ND       |
| krypton-85m      | Ci | ND       | ND       | ND       | ND       |
| krypton-87       | Ci | ND       | ND       | ND       | ND       |
| krypton-88       | Ci | ND       | ND       | ND       | 7.80E-04 |
| xenon-131m       | Ci | ND       | ND       | ND       | ND       |
| xenon-133        | Ci | 7.72E-05 | 5.79E-03 | 1.30E-03 | 4.99E-04 |
| xenon-133m       | Ci | ND       | ND       | ND       | ND       |
| xenon-135        | Ci | 5.61E-04 | 3.91E-05 | 4.04E-04 | 3.14E-04 |
| xenon-135m       | Ci | ND       | ND       | ND       | ND       |
| xenon-138        | Ci | ND       | ND       | ND       | ND       |
|                  | Ci |          |          |          |          |
| unidentified     | Ci | ND       | ND       | ND       | ND       |
| Total for period | Ci | 1.02E-03 | 3.13E-02 | 4.67E-03 | 4.50E-03 |

2. Iodines

|                  |    |          |          |          |          |
|------------------|----|----------|----------|----------|----------|
| iodine-131       | Ci | ND       | ND       | ND       | ND       |
| iodine-133       | Ci | ND       | ND       | ND       | ND       |
| iodine-135       | Ci | ND       | ND       | ND       | ND       |
| Total for period | Ci | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

3. Particulates

|                      |    |          |          |          |          |
|----------------------|----|----------|----------|----------|----------|
| strontium-89         | Ci | ND       | ND       | ND       | ND       |
| strontium-90         | Ci | ND       | ND       | ND       | ND       |
| cesium-134           | Ci | ND       | ND       | ND       | ND       |
| cesium-137           | Ci | ND       | ND       | ND       | ND       |
| barium-lanthanum-140 | Ci | ND       | ND       | ND       | ND       |
|                      | Ci |          |          |          |          |
| unidentified         | Ci | ND       | ND       | ND       | ND       |
| Total for period     | Ci | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

TABLE 1B  
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT (2004)  
GASEOUS EFFLUENTS-ELEVATED RELEASES  
CONTINUOUS

| Nuclides Released | Unit | Quarter<br>1 | Quarter<br>2 | Quarter<br>3 | Quarter<br>4 |
|-------------------|------|--------------|--------------|--------------|--------------|
|-------------------|------|--------------|--------------|--------------|--------------|

1. Fission and activation gases

|                  |    |          |          |          |          |
|------------------|----|----------|----------|----------|----------|
| argon-41         | Ci | ND       | ND       | ND       | ND       |
| krypton-85       | Ci | ND       | ND       | ND       | ND       |
| krypton-85m      | Ci | ND       | ND       | ND       | ND       |
| krypton-87       | Ci | ND       | ND       | ND       | ND       |
| krypton-88       | Ci | ND       | ND       | ND       | ND       |
| xenon-131m       | Ci | ND       | ND       | ND       | ND       |
| xenon-133        | Ci | ND       | ND       | ND       | ND       |
| xenon-133m       | Ci | ND       | ND       | ND       | ND       |
| xenon-135        | Ci | ND       | ND       | ND       | ND       |
| xenon-135m       | Ci | ND       | ND       | ND       | ND       |
| xenon-138        | Ci | ND       | ND       | ND       | ND       |
|                  | Ci |          |          |          |          |
|                  | Ci |          |          |          |          |
| unidentified     | Ci | ND       | ND       | ND       | ND       |
| Total for period | Ci | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

2. Iodines

|                  |    |          |          |          |          |
|------------------|----|----------|----------|----------|----------|
| iodine-131       | Ci | ND       | ND       | ND       | ND       |
| iodine-133       | Ci | ND       | ND       | ND       | ND       |
| iodine-135       | Ci | ND       | ND       | ND       | ND       |
| Total for period | Ci | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

3. Particulates

|                      |    |          |          |          |          |
|----------------------|----|----------|----------|----------|----------|
| strontium-89         | Ci | ND       | ND       | ND       | ND       |
| strontium-90         | Ci | ND       | ND       | ND       | ND       |
| cesium-134           | Ci | ND       | ND       | ND       | ND       |
| cesium-137           | Ci | ND       | ND       | ND       | ND       |
| barium-lanthanum-140 | Ci | ND       | ND       | ND       | ND       |
| cobalt-58            | Ci | ND       | ND       | 1.46E-06 | ND       |
| cobalt-60            | Ci | ND       | ND       | 3.50E-05 | 3.52E-06 |
| chromium-51          | Ci | ND       | ND       | ND       | ND       |
| manganese-54         | Ci | ND       | ND       | 4.37E-06 | ND       |
| niobium-95           | Ci | ND       | ND       | ND       | ND       |
| iron-59              | Ci | ND       | ND       | ND       | ND       |
| unidentified         | Ci | ND       | ND       | ND       | ND       |
| Total for period     | Ci | 0.00E+00 | 0.00E+00 | 4.08E-05 | 3.52E-06 |

TABLE 1C  
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT (2004)  
GASEOUS EFFLUENTS-GROUND LEVEL RELEASES

| BATCH             |      |              |              |              |              |
|-------------------|------|--------------|--------------|--------------|--------------|
| Nuclides Released | Unit | Quarter<br>1 | Quarter<br>2 | Quarter<br>3 | Quarter<br>4 |

1. Fission and activation gases

|                  |    |          |          |          |          |
|------------------|----|----------|----------|----------|----------|
| argon-41         | Ci | ND       | ND       | ND       | ND       |
| krypton-85       | Ci | ND       | ND       | ND       | ND       |
| krypton-85m      | Ci | ND       | ND       | ND       | ND       |
| krypton-87       | Ci | ND       | ND       | ND       | ND       |
| krypton-88       | Ci | ND       | ND       | ND       | ND       |
| xenon-131m       | Ci | ND       | ND       | ND       | ND       |
| xenon-133m       | Ci | ND       | ND       | ND       | ND       |
| xenon-133        | Ci | ND       | ND       | ND       | ND       |
| xenon-135        | Ci | ND       | ND       | ND       | ND       |
| xenon-135m       | Ci | ND       | ND       | ND       | ND       |
| xenon-138        | Ci | ND       | ND       | ND       | ND       |
|                  | Ci |          |          |          |          |
|                  | Ci |          |          |          |          |
| unidentified     | Ci | ND       | ND       | ND       | ND       |
| Total for period | Ci | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

2. Iodines

|                  |    |          |          |          |          |
|------------------|----|----------|----------|----------|----------|
| iodine-131       | Ci | ND       | ND       | ND       | ND       |
| iodine-132       | Ci | ND       | ND       | ND       | ND       |
| iodine-133       | Ci | ND       | ND       | ND       | ND       |
| iodine-135       | Ci | ND       | ND       | ND       | ND       |
| Total for period | Ci | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

3. Particulates

|                      |    |          |          |          |          |
|----------------------|----|----------|----------|----------|----------|
| strontium-89         | Ci | ND       | ND       | ND       | ND       |
| strontium-90         | Ci | ND       | ND       | ND       | ND       |
| cesium-134           | Ci | ND       | ND       | ND       | ND       |
| cesium-136           | Ci | ND       | ND       | ND       | ND       |
| cesium-137           | Ci | ND       | ND       | ND       | ND       |
| barium-lanthanum-140 | Ci | ND       | ND       | ND       | ND       |
| cobalt-57            | Ci | ND       | ND       | ND       | ND       |
| cobalt-58            | Ci | ND       | ND       | ND       | ND       |
| cobalt-60            | Ci | ND       | ND       | ND       | ND       |
| manganese-54         | Ci | ND       | ND       | ND       | ND       |
| iron-59              | Ci | ND       | ND       | ND       | ND       |
| niobium/zirconium-95 | Ci | ND       | ND       | ND       | ND       |
| chromium-51          | Ci | ND       | ND       | ND       | ND       |
| technetium-99m       | Ci | ND       | ND       | ND       | ND       |
| bromine-82           | Ci | ND       | ND       | ND       | ND       |
| unidentified         | Ci | ND       | ND       | ND       | ND       |
| Total for period     | Ci | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

**TABLE 1C**  
**EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT (2004)**  
**GASEOUS EFFLUENTS-GROUND LEVEL RELEASES**  
**CONTINUOUS**

| Nuclides Released | Unit | Quarter<br>1 | Quarter<br>2 | Quarter<br>3 | Quarter<br>4 |
|-------------------|------|--------------|--------------|--------------|--------------|
|-------------------|------|--------------|--------------|--------------|--------------|

**1. Fission and activation gases**

|                  |    |          |          |          |          |
|------------------|----|----------|----------|----------|----------|
| argon-41         | Ci | ND       | ND       | ND       | ND       |
| krypton-85       | Ci | ND       | ND       | ND       | ND       |
| krypton-85m      | Ci | ND       | ND       | ND       | ND       |
| krypton-87       | Ci | ND       | ND       | ND       | ND       |
| krypton-88       | Ci | ND       | ND       | ND       | ND       |
| xenon-133        | Ci | ND       | ND       | ND       | ND       |
| xenon-135        | Ci | ND       | ND       | ND       | ND       |
| xenon-135m       | Ci | ND       | ND       | ND       | ND       |
| xenon-138        | Ci | ND       | ND       | ND       | ND       |
|                  | Ci |          |          |          |          |
|                  | Ci |          |          |          |          |
| unidentified     | Ci | ND       | ND       | ND       | ND       |
| Total for period | Ci | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

**2. Iodines**

|                  |    |          |          |          |          |
|------------------|----|----------|----------|----------|----------|
| iodine-131       | Ci | ND       | ND       | ND       | ND       |
| iodine-133       | Ci | ND       | ND       | ND       | ND       |
|                  | Ci |          |          |          |          |
| Total for period | Ci | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

**3. Particulates**

|                      |    |          |          |          |          |
|----------------------|----|----------|----------|----------|----------|
| strontium-89         | Ci | ND       | ND       | ND       | ND       |
| strontium-90         | Ci | ND       | ND       | ND       | ND       |
| cesium-134           | Ci | ND       | ND       | ND       | ND       |
| cesium-136           | Ci | ND       | ND       | ND       | ND       |
| cesium-137           | Ci | ND       | ND       | ND       | ND       |
| barium-lanthanum-140 | Ci | ND       | ND       | ND       | ND       |
| cobalt-58            | Ci | ND       | 4.95E-08 | ND       | ND       |
| cobalt-60            | Ci | ND       | 4.20E-08 | ND       | ND       |
| chromium-51          | Ci | ND       | 8.96E-08 | ND       | ND       |
| unidentified         | Ci | ND       | ND       | ND       | ND       |
| Total for period     | Ci | 0.00E+00 | 1.81E-07 | 0.00E+00 | 0.00E+00 |



TABLE 2A

## EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT 2004

## LIQUID EFFLUENTS-SUMMATION OF ALL RELEASES

| Unit | Quarter 1 | Quarter 2 | Quarter 3 | Quarter 4 | Est. Total Error, % |
|------|-----------|-----------|-----------|-----------|---------------------|
|------|-----------|-----------|-----------|-----------|---------------------|

## A. Fission and activation products

|  |        |          |          |          |          |          |
|--|--------|----------|----------|----------|----------|----------|
| 1. Total releases                              | Ci     | 1.82E-02 | 8.68E-03 | 9.34E-03 | 1.41E-03 | 6.00E+00 |
| 2. Average diluted concentration during period | uCi/ml | 4.61E-11 | 2.47E-11 | 1.99E-11 | 3.15E-12 |          |
| 3. Percent of applicable limit                 | %      | 1.68E-02 | 5.32E-03 | 6.87E-03 | 3.99E-03 |          |

## B. Tritium

|  |        |          |          |          |          |          |
|--|--------|----------|----------|----------|----------|----------|
| 1. Total release                               | Ci     | 8.32E+01 | 1.94E+01 | 4.78E+01 | 1.36E+02 | 8.00E+00 |
| 2. Average diluted concentration during period | uCi/ml | 2.11E-07 | 5.53E-08 | 1.02E-07 | 3.04E-07 |          |
| 3. Percent of applicable limit                 | %      | 2.34E-02 | 5.10E-03 | 8.80E-03 | 2.58E-03 |          |

## C. Dissolved and entrained gases

|  |        |     |     |     |     |          |
|--|--------|-----|-----|-----|-----|----------|
| 1. Total release                               | Ci     | ND  | ND  | ND  | ND  | 1.90E+01 |
| 2. Average diluted concentration during period | uCi/ml | N/A | N/A | N/A | N/A |          |
| 3. Percent of applicable limit                 | %      | N/A | N/A | N/A | N/A |          |

## D. Gross alpha radioactivity

|                  |    |    |    |    |    |          |
|------------------|----|----|----|----|----|----------|
| 1. Total release | Ci | ND | ND | ND | ND | 1.00E+01 |
|------------------|----|----|----|----|----|----------|

|   |        |          |          |          |          |          |
|---|--------|----------|----------|----------|----------|----------|
| E. Volume of waste released (prior to dilution) | liters | 1.68E+07 | 1.53E+07 | 1.46E+07 | 1.26E+07 | 1.30E+00 |
| F. Volume of dilution water used during period  | liters | 3.95E+11 | 3.51E+11 | 4.69E+11 | 4.47E+11 | 9.00E+00 |

TABLE 2B  
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT 2004  
LIQUID EFFLUENTS  
BATCH MODE

| Nuclides Released    | Unit | Quarter 1 | Quarter 2 | Quarter 3 | Quarter 4 |
|----------------------|------|-----------|-----------|-----------|-----------|
| strontium-89         | Ci   | ND        | ND        | ND        | ND        |
| strontium-90         | Ci   | ND        | ND        | ND        | ND        |
| cesium-134           | Ci   | 7.34E-05  | 5.33E-05  | 1.48E-05  | ND        |
| cesium-137           | Ci   | 2.74E-04  | 1.99E-04  | 1.49E-04  | ND        |
| iodine-131           | Ci   | ND        | ND        | ND        | ND        |
| iodine-133           | Ci   | ND        | ND        | ND        | ND        |
| cobalt-57            | Ci   | ND        | 1.07E-05  | 5.06E-05  | 4.53E-06  |
| cobalt-58            | Ci   | 1.06E-03  | 1.77E-03  | 2.78E-03  | 2.42E-04  |
| cobalt-60            | Ci   | 1.99E-04  | 1.54E-04  | 4.75E-04  | 1.17E-04  |
| chromium-51          | Ci   | ND        | ND        | ND        | ND        |
| iron-55              | Ci   | 1.33E-02  | 1.98E-03  | 3.48E-03  | 9.28E-04  |
| iron-59              | Ci   | 9.09E-06  | 2.73E-06  | ND        | ND        |
| zinc-65              | Ci   | ND        | ND        | ND        | ND        |
| manganese-54         | Ci   | 1.82E-06  | 2.24E-06  | ND        | ND        |
| zirconium-niobium-95 | Ci   | ND        | ND        | ND        | ND        |
| molybdenum-99        | Ci   | ND        | ND        | ND        | ND        |
| technetium-99m       | Ci   | ND        | ND        | ND        | ND        |
| silver-110m          | Ci   | ND        | ND        | ND        | ND        |
| barium-lanthanum-140 | Ci   | ND        | ND        | ND        | ND        |
| cerium-141           | Ci   | ND        | ND        | ND        | ND        |
| antimony-124         | Ci   | 2.45E-05  | 1.81E-05  | ND        | ND        |
| antimony-125         | Ci   | 3.28E-03  | 4.49E-03  | 2.39E-03  | 1.18E-04  |
| antimony-126         | Ci   | ND        | ND        | ND        | ND        |
| niobium-97           | Ci   | ND        | ND        | ND        | ND        |
| tin-117m             | Ci   | ND        | ND        | ND        | ND        |
| sodium-24            | Ci   | ND        | ND        | ND        | ND        |
| Tellurium-129m       | Ci   | ND        | ND        | ND        | ND        |
| Tellurium-132        | Ci   | ND        | ND        | ND        | ND        |
| unidentified         | Ci   | ND        | ND        | ND        | ND        |

|                         |    |          |          |          |          |
|-------------------------|----|----------|----------|----------|----------|
| Total for period(above) | Ci | 1.82E-02 | 8.68E-03 | 9.34E-03 | 1.41E-03 |
|-------------------------|----|----------|----------|----------|----------|

|           |    |    |    |    |    |
|-----------|----|----|----|----|----|
| xenon-133 | Ci | ND | ND | ND | ND |
| xenon-135 | Ci | ND | ND | ND | ND |

TABLE 2B  
EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT 2004  
LIQUID EFFLUENTS  
CONTINUOUS MODE

| Nuclides Released    | Unit | Quarter 1 | Quarter 2 | Quarter 3 | Quarter 4 |
|----------------------|------|-----------|-----------|-----------|-----------|
| strontium-89         | Ci   | ND        | ND        | ND        | ND        |
| strontium-90         | Ci   | ND        | ND        | ND        | ND        |
| cesium-134           | Ci   | ND        | ND        | ND        | ND        |
| cesium-137           | Ci   | ND        | ND        | ND        | ND        |
| iodine-131           | Ci   | ND        | ND        | ND        | ND        |
| iodine-133           | Ci   | ND        | ND        | ND        | ND        |
| cobalt-58            | Ci   | ND        | ND        | ND        | ND        |
| cobalt-60            | Ci   | ND        | ND        | ND        | ND        |
| iron-55              | Ci   | ND        | ND        | ND        | ND        |
| iron-59              | Ci   | ND        | ND        | ND        | ND        |
| zinc-65              | Ci   | ND        | ND        | ND        | ND        |
| manganese-54         | Ci   | ND        | ND        | ND        | ND        |
| chromium-51          | Ci   | ND        | ND        | ND        | ND        |
| zirconium-niobium-95 | Ci   | ND        | ND        | ND        | ND        |
| molybdenum-99        | Ci   | ND        | ND        | ND        | ND        |
| technetium-99m       | Ci   | ND        | ND        | ND        | ND        |
| barium-lanthanum-140 | Ci   | ND        | ND        | ND        | ND        |
| cerium-141           | Ci   | ND        | ND        | ND        | ND        |
|                      |      |           |           |           |           |
| unidentified         | Ci   | ND        | ND        | ND        | ND        |

|                         |    |          |          |          |          |
|-------------------------|----|----------|----------|----------|----------|
| Total for period(above) | Ci | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
|-------------------------|----|----------|----------|----------|----------|

|            |    |    |    |    |    |
|------------|----|----|----|----|----|
| xenon-131m | Ci | ND | ND | ND | ND |
| xenon-133m | Ci | ND | ND | ND | ND |
| xenon-133  | Ci | ND | ND | ND | ND |
| xenon-135  | Ci | ND | ND | ND | ND |

# EFFLUENT AND WASTE DISPOSAL ANNUAL REPORT 2004

## SOLID WASTE AND IRRADIATED FUEL SHIPMENTS

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

| 1. Type of waste  | Unit                 | 1 year Period        | Est. Total Error, % |
|---|----------------------|----------------------|---------------------|
| a. Spent resins, filter sludges, evaporator Bottoms, etc. | m <sup>3</sup><br>Ci | 4.37E+00<br>2.57E+02 | 2.50E+01            |
| b. Dry compressible waste, contaminated Equip, etc.       | m <sup>3</sup><br>Ci | 1.58E+01<br>2.29E-01 | 2.50E+01            |
| c. Irradiated components, control Rods, etc.              | m <sup>3</sup><br>Ci | NA                   | NA                  |
| d. Other (describe): Cartridge Filters                    | m <sup>3</sup><br>Ci | 2.36E+00<br>1.59E+01 | 2.50E+01            |

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

|          |   |          |
|----------|---|----------|
| a. Ni-63 | % | 4.85E+01 |
| Co-58    | % | 2.49E+01 |
| Fe-55    | % | 8.55E+00 |
| Co-60    | % | 6.93E+00 |
| Cs-137   | % | 5.87E+00 |
| Cs-134   | % | 2.25E+00 |
| Mn-54    | % | 1.72E+00 |
| Sb-125   | % | 6.79E-01 |
| Co-57    | % | 3.19E-01 |
| H-3      | % | 2.30E-01 |

|          |   |          |
|----------|---|----------|
| b. Co-58 | % | 5.13E+01 |
| Fe-55    | % | 1.67E+01 |
| Sr-89    | % | 7.44E+00 |
| Zr-95    | % | 6.16E+00 |
| Nb-95    | % | 6.00E+00 |
| Ni-63    | % | 4.70E+00 |
| Co-60    | % | 3.28E+00 |
| Mn-54    | % | 1.78E+00 |
| Cr-51    | % | 9.23E-01 |
| Fe-59    | % | 3.77E-01 |
| Sb-125   | % | 3.50E-01 |
| Cs-137   | % | 2.25E-01 |
| Sr-90    | % | 1.96E-01 |
| Cs-134   | % | 1.96E-01 |
| Co-57    | % | 1.80E-01 |
| Sn-113   | % | 1.79E-01 |
| C-14     | % | 1.23E-02 |

|    |    |   |    |
|----|----|---|----|
| c. | NA | % | NA |
|----|----|---|----|

|    |        |   |          |
|----|--------|---|----------|
| d. | Fe-55  | % | 6.15E+01 |
|    | Ni-63  | % | 2.78E+01 |
|    | Co-60  | % | 9.23E+00 |
|    | Cs-137 | % | 8.35E-01 |
|    | Mn-54  | % | 4.55E-01 |
|    | Cs-134 | % | 8.35E-02 |
|    | Co-57  | % | 6.07E-02 |
|    | Co-58  | % | 2.15E-02 |
|    | H-3    | % | 1.11E-02 |
|    | Zn-65  | % | 3.53E-03 |

### 3. Solid Waste Disposition

| Number of Shipments | Waste Class | Container Type | Solidification Agent | Mode of Transportation | Destination            |
|---------------------|-------------|----------------|----------------------|------------------------|------------------------|
| 3                   | B           | Type A         | NA                   | Truck                  | Studsvik, Erwin, TN    |
| 3                   | B           | Strong Tight   | NA                   | Truck                  | Studsvik, Erwin, TN    |
| 2                   | A           | Strong Tight   | NA                   | Truck                  | RACE, Memphis, TN      |
| 2                   | A           | Strong Tight   | NA                   | Truck                  | Duratek, Kingston, TN  |
| 1                   | A           | Strong Tight   | NA                   | Truck                  | Duratek, Oak Ridge, TN |
| 1                   | C           | Strong Tight   | NA                   | Truck                  | CNS, Barnwell, SC      |
| 1                   | B           | Strong Tight   | NA                   | Truck                  | ALARON, Wampum, PA     |

### B. IRRADIATED FUEL SHIPMENTS (Disposition)

|                            |                               |                    |
|----------------------------|-------------------------------|--------------------|
| <u>Number of Shipments</u> | <u>Mode of Transportation</u> | <u>Destination</u> |
| NA                         | NA                            | NA                 |

### C. REVIEW AND APPROVAL

Prepared By: Fred Hant Date: 3-22-05

Reviewed By: Bon Date: 3-29-05

Approved By: A Carl Date: 4/24/05

## **LIST OF APPENDICES**

| <b><u>Appendix</u></b> | <b><u>Title</u></b>  |
|------------------------|--|
| A                      | Offsite Dose Calculation Manual                            |
| B                      | Process Control Program                                    |
| C                      | Radioactive Liquid Effluent Monitoring<br>Instrumentation  |
| D                      | Radioactive Gaseous Effluent Monitoring<br>Instrumentation |
| E                      | Liquid Holdup Tanks  |
| F                      | Radwaste Treatment Systems                                 |
| G                      | Unplanned Releases   |

## Appendix A

### Offsite Dose Calculation Manual

**Requirement:** Technical Specification 6.13.2c requires that licensee initiated changes to the Offsite Dose Calculation Manual be submitted to the Commission in the Annual Radioactive Effluent Release Report for the period in which the change(s) was made effective. Include in this changes to the Radiological Environmental Program in accordance with Offsite Dose Calculation Manual (ODCM)-C.9.1.1 and -C.9.2.1.

**Response:** The ODCM was changed in 2004.

The changes incorporated the following items:

1. Due to the loss of a milk sample location, three new vegetation locations were incorporated into the sample program replacing the milk location.
2. Moved a control air sample location for personnel protection purposes. The new location is consistent with ODCM requirements.
3. Changed the air sample collection frequency based on increased sample station reliability.
4. Clarified the guidance for determining milk pathway dose when milk samples are not available.
5. Added the Water Treatment Liquid Effluent discharge pathway. This pathway supports the Condensate Polisher System (CPS) Neutralization and Low Conductivity Tanks as well as the demineralizer rinse release point.
6. Added radiation and flow / flowrate monitoring capability to the Water Treatment discharge pathway. Also, added the instrumentation calibration, limiting conditions for operation, minimum channels operable, and surveillance and testing requirements.

## Appendix B

### Process Control Program

**Requirement:** Technical Specification 6.12.2a requires that licensee initiated changes to the Process Control Program be submitted to the Commission in the Annual Radioactive Effluent Release Report for the period in which the change(s) was made.

**Response:** The Process Control Program (PCP) was not changed in 2004.



## Appendix C

### Radioactive Liquid Effluent Monitoring Instrumentation

**Requirement:** Radioactive liquid effluent monitoring instrumentation channels are required to be operable in accordance with Offsite Dose Calculation Manual (ODCM)-C.5.1. With less than the minimum number of channels operable for 30 days, Offsite Dose Calculation Manual (ODCM)-C.5.1 requires an explanation for the delay in correcting the inoperability in the next Annual Effluent Release Report in accordance with Technical Specification 6.8.1.4.

**Response:** A review of the Action Statement Status and the Shift Operations Management System LCO tracking system for the period from January 1, 2004 to December 31, 2004 indicated ODCM C.5.1 was not entered for more than 30 consecutive days.

## Appendix D

### Radioactive Gaseous Effluent Monitoring Instrumentation

**Requirement:** Radioactive gaseous effluent monitoring instrumentation channels are required to be operable in accordance with Offsite Dose Calculation Manual (ODCM)-C.5.2. With less than the minimum number of channels operable for 30 days, Offsite Dose Calculation Manual (ODCM)-C.5.2 requires an explanation for the delay in correcting the inoperability in the next Annual Effluent Release Report in accordance with Tech. Spec. 6.8.1.4.

**Response:** A review of the Action Statement Status and the Shift Operations Management System LCO tracking system for the period from January 1, 2004 to December 31, 2004 indicated ODCM C.5.2 was not entered for more than 30 consecutive days.

## Appendix E

### Liquid Holdup Tanks

**Requirement:** Technical Specification 3.11.1.4 limits the quantity of radioactive material contained in any outside temporary tank. With the quantity of radioactive material in any outside temporary tank exceeding the limits of Technical Specification 3.11.1.4, a description of the events leading to this condition is required in the next Annual Effluent Release Report in accordance with Tech. Spec. 6.8.1.4.

**Response:** From January 1, 2004 to December 31, 2004, there was no radioactive material stored in any temporary outdoor tank that exceeded the limits of T. S. 3.11.1.4.

## Appendix F

### Radwaste Treatment Systems

**Requirement:** Technical Specification 6.14.1a requires that licensee initiated changes to the Radwaste Treatment Systems (liquid, gaseous, and solid) be submitted to the Commission in the Annual Radioactive Effluent Release Report for the period in which the change was made.

**Response:** For 2004, FPL Energy Seabrook LLC, will submit any changes to the Radwaste Treatment Systems (liquid, gaseous and solid) as part of the FSAR update.

## Appendix G

### Unplanned Releases

**Requirement:** Technical Specification 6.8.1.4 requires a list and description of unplanned releases from the site to UNRESTRICTED AREAS of radioactive materials in gaseous and liquid effluents made during the reporting period.

**Response:** A review of the January 1, 2004 to December 31, 2004 time period indicated there were no unplanned, unanticipated or abnormal releases from the site to unrestricted areas of radioactive materials of gaseous or liquid effluents.

**ENCLOSURE 2 TO SBK-L-05103**

**Joint Frequency Distributions of Wind Speed, Wind Direction and Atmospheric Stability**

## SEABROOK JAN04-DEC04 MET DATA JOINT FREQUENCY DISTRIBUTION (210-FOOT TOWER)

43.0 FT WIND DATA                      STABILITY CLASS A                      CLASS FREQUENCY (PERCENT) =       .71

## WIND DIRECTION FROM

| SPEED<br>MPH | N   | NNE | NE   | ENE  | E    | ESE  | SE    | SSE   | S   | SSW  | SW   | WSW  | W    | WNW  | NW   | NNW | VRBL | TOTAL  |
|--------------|-----|-----|------|------|------|------|-------|-------|-----|------|------|------|------|------|------|-----|------|--------|
| CALM         | 0   | 0   | 0    | 0    | 0    | 0    | 0     | 0     | 0   | 0    | 0    | 0    | 0    | 0    | 0    | 0   | 0    | 0      |
| (1)          | .00 | .00 | .00  | .00  | .00  | .00  | .00   | .00   | .00 | .00  | .00  | .00  | .00  | .00  | .00  | .00 | .00  | .00    |
| (2)          | .00 | .00 | .00  | .00  | .00  | .00  | .00   | .00   | .00 | .00  | .00  | .00  | .00  | .00  | .00  | .00 | .00  | .00    |
| C-3          | 0   | 0   | 0    | 0    | 0    | 0    | 0     | 0     | 0   | 0    | 0    | 0    | 0    | 0    | 0    | 0   | 0    | 0      |
| (1)          | .00 | .00 | .00  | .00  | .00  | .00  | .00   | .00   | .00 | .00  | .00  | .00  | .00  | .00  | .00  | .00 | .00  | .00    |
| (2)          | .00 | .00 | .00  | .00  | .00  | .00  | .00   | .00   | .00 | .00  | .00  | .00  | .00  | .00  | .00  | .00 | .00  | .00    |
| 4-7          | 0   | 0   | 0    | 0    | 0    | 0    | 1     | 1     | 0   | 0    | 0    | 0    | 1    | 0    | 0    | 0   | 0    | 3      |
| (1)          | .00 | .00 | .00  | .00  | .00  | .00  | 1.64  | 1.64  | .00 | .00  | .00  | .00  | 1.64 | .00  | .00  | .00 | .00  | 4.92   |
| (2)          | .00 | .00 | .00  | .00  | .00  | .00  | .01   | .01   | .00 | .00  | .00  | .00  | .01  | .00  | .00  | .00 | .00  | .03    |
| 8-12         | 0   | 0   | 0    | 1    | 1    | 1    | 20    | 6     | 0   | 1    | 3    | 5    | 0    | 0    | 0    | 0   | 0    | 38     |
| (1)          | .00 | .00 | .00  | 1.64 | 1.64 | 1.64 | 32.79 | 9.84  | .00 | 1.64 | 4.92 | 8.20 | .00  | .00  | .00  | .00 | .00  | 62.30  |
| (2)          | .00 | .00 | .00  | .01  | .01  | .01  | .23   | .07   | .00 | .01  | .03  | .06  | .00  | .00  | .00  | .00 | .00  | .44    |
| 13-18        | 0   | 0   | 3    | 0    | 0    | 0    | 6     | 0     | 0   | 0    | 2    | 1    | 1    | 3    | 2    | 0   | 0    | 18     |
| (1)          | .00 | .00 | 4.92 | .00  | .00  | .00  | 9.84  | .00   | .00 | .00  | 3.28 | 1.64 | 1.64 | 4.92 | 3.28 | .00 | .00  | 29.51  |
| (2)          | .00 | .00 | .03  | .00  | .00  | .00  | .07   | .00   | .00 | .00  | .02  | .01  | .01  | .03  | .02  | .00 | .00  | .21    |
| 19-24        | 0   | 0   | 2    | 0    | 0    | 0    | 0     | 0     | 0   | 0    | 0    | 0    | 0    | 0    | 0    | 0   | 0    | 2      |
| (1)          | .00 | .00 | 3.28 | .00  | .00  | .00  | .00   | .00   | .00 | .00  | .00  | .00  | .00  | .00  | .00  | .00 | .00  | 3.28   |
| (2)          | .00 | .00 | .02  | .00  | .00  | .00  | .00   | .00   | .00 | .00  | .00  | .00  | .00  | .00  | .00  | .00 | .00  | .02    |
| GT 24        | 0   | 0   | 0    | 0    | 0    | 0    | 0     | 0     | 0   | 0    | 0    | 0    | 0    | 0    | 0    | 0   | 0    | 0      |
| (1)          | .00 | .00 | .00  | .00  | .00  | .00  | .00   | .00   | .00 | .00  | .00  | .00  | .00  | .00  | .00  | .00 | .00  | .00    |
| (2)          | .00 | .00 | .00  | .00  | .00  | .00  | .00   | .00   | .00 | .00  | .00  | .00  | .00  | .00  | .00  | .00 | .00  | .00    |
| ALL SPEEDS   | 0   | 0   | 5    | 1    | 1    | 1    | 27    | 7     | 0   | 1    | 5    | 6    | 2    | 3    | 2    | 0   | 0    | 61     |
| (1)          | .00 | .00 | 8.20 | 1.64 | 1.64 | 1.64 | 44.26 | 11.48 | .00 | 1.64 | 8.20 | 9.84 | 3.28 | 4.92 | 3.28 | .00 | .00  | 100.00 |
| (2)          | .00 | .00 | .06  | .01  | .01  | .01  | .31   | .08   | .00 | .01  | .06  | .07  | .02  | .03  | .02  | .00 | .00  | .71    |

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE

(2)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD

C= CALM (WIND SPEED LESS THAN OR EQUAL TO .95 MPH)

## SEABROOK JAN04-DEC04 MET DATA JOINT FREQUENCY DISTRIBUTION (210-FOOT TOWER)

43.0 FT WIND DATA

STABILITY CLASS B

CLASS FREQUENCY (PERCENT) = 1.37

WIND DIRECTION FROM

| SPEED<br>MPH | N   | NNE | NE   | ENE  | E    | ESE  | SE    | SSE  | S   | SSW  | SW   | WSW  | W    | WNW   | NW   | NNW  | VRBL | TOTAL  |
|--------------|-----|-----|------|------|------|------|-------|------|-----|------|------|------|------|-------|------|------|------|--------|
| CALM         | 0   | 0   | 0    | 0    | 0    | 0    | 0     | 0    | 0   | 0    | 0    | 0    | 0    | 0     | 0    | 0    | 0    | 0      |
| (1)          | .00 | .00 | .00  | .00  | .00  | .00  | .00   | .00  | .00 | .00  | .00  | .00  | .00  | .00   | .00  | .00  | .00  | .00    |
| (2)          | .00 | .00 | .00  | .00  | .00  | .00  | .00   | .00  | .00 | .00  | .00  | .00  | .00  | .00   | .00  | .00  | .00  | .00    |
| C-3          | 0   | 0   | 0    | 0    | 0    | 0    | 0     | 0    | 0   | 0    | 0    | 0    | 0    | 0     | 0    | 1    | 0    | 1      |
| (1)          | .00 | .00 | .00  | .00  | .00  | .00  | .00   | .00  | .00 | .00  | .00  | .00  | .00  | .00   | .00  | .85  | .00  | .85    |
| (2)          | .00 | .00 | .00  | .00  | .00  | .00  | .00   | .00  | .00 | .00  | .00  | .00  | .00  | .00   | .00  | .01  | .00  | .01    |
| 4-7          | 0   | 0   | 0    | 0    | 2    | 0    | 3     | 2    | 0   | 0    | 2    | 0    | 3    | 1     | 0    | 1    | 0    | 14     |
| (1)          | .00 | .00 | .00  | .00  | 1.69 | .00  | 2.54  | 1.69 | .00 | .00  | 1.69 | .00  | 2.54 | .85   | .00  | .85  | .00  | 11.86  |
| (2)          | .00 | .00 | .00  | .00  | .02  | .00  | .03   | .02  | .00 | .00  | .02  | .00  | .03  | .01   | .00  | .01  | .00  | .16    |
| 8-12         | 0   | 1   | 0    | 3    | 4    | 6    | 11    | 6    | 1   | 6    | 5    | 8    | 3    | 9     | 3    | 0    | 0    | 66     |
| (1)          | .00 | .85 | .00  | 2.54 | 3.39 | 5.08 | 9.32  | 5.08 | .85 | 5.08 | 4.24 | 6.78 | 2.54 | 7.63  | 2.54 | .00  | .00  | 55.93  |
| (2)          | .00 | .01 | .00  | .03  | .05  | .07  | .13   | .07  | .01 | .07  | .06  | .09  | .03  | .10   | .03  | .00  | .00  | .77    |
| 13-18        | 0   | 0   | 3    | 2    | 0    | 0    | 5     | 1    | 0   | 0    | 4    | 2    | 2    | 8     | 6    | 0    | 0    | 33     |
| (1)          | .00 | .00 | 2.54 | 1.69 | .00  | .00  | 4.24  | .85  | .00 | .00  | 3.39 | 1.69 | 1.69 | 6.78  | 5.08 | .00  | .00  | 27.97  |
| (2)          | .00 | .00 | .03  | .02  | .00  | .00  | .06   | .01  | .00 | .00  | .05  | .02  | .02  | .09   | .07  | .00  | .00  | .38    |
| 19-24        | 0   | 0   | 0    | 0    | 0    | 0    | 0     | 0    | 0   | 0    | 0    | 0    | 1    | 1     | 2    | 0    | 0    | 4      |
| (1)          | .00 | .00 | .00  | .00  | .00  | .00  | .00   | .00  | .00 | .00  | .00  | .00  | .85  | .85   | 1.69 | .00  | .00  | 3.39   |
| (2)          | .00 | .00 | .00  | .00  | .00  | .00  | .00   | .00  | .00 | .00  | .00  | .00  | .01  | .01   | .02  | .00  | .00  | .05    |
| GT 24        | 0   | 0   | 0    | 0    | 0    | 0    | 0     | 0    | 0   | 0    | 0    | 0    | 0    | 0     | 0    | 0    | 0    | 0      |
| (1)          | .00 | .00 | .00  | .00  | .00  | .00  | .00   | .00  | .00 | .00  | .00  | .00  | .00  | .00   | .00  | .00  | .00  | .00    |
| (2)          | .00 | .00 | .00  | .00  | .00  | .00  | .00   | .00  | .00 | .00  | .00  | .00  | .00  | .00   | .00  | .00  | .00  | .00    |
| ALL SPEEDS   | 0   | 1   | 3    | 5    | 6    | 6    | 19    | 9    | 1   | 6    | 11   | 10   | 9    | 19    | 11   | 2    | 0    | 118    |
| (1)          | .00 | .85 | 2.54 | 4.24 | 5.08 | 5.08 | 16.10 | 7.63 | .85 | 5.08 | 9.32 | 8.47 | 7.63 | 16.10 | 9.32 | 1.69 | .00  | 100.00 |
| (2)          | .00 | .01 | .03  | .06  | .07  | .07  | .22   | .10  | .01 | .07  | .13  | .12  | .10  | .22   | .13  | .02  | .00  | 1.37   |

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE

(2)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD

C= CALM (WIND SPEED LESS THAN OR EQUAL TO .95 MPH)



## SEABROOK JAN04-DEC04 MET DATA JOINT FREQUENCY DISTRIBUTION (210-FOOT TOWER)

43.0 FT WIND DATA

STABILITY CLASS C

CLASS FREQUENCY (PERCENT) = 4.22

## WIND DIRECTION FROM

| SPEED<br>MPH | N    | NNE | NE   | ENE  | E    | ESE  | SE    | SSE  | S    | SSW  | SW    | WSW  | W     | WNW   | NW    | NNW | VRBL | TOTAL  |
|--------------|------|-----|------|------|------|------|-------|------|------|------|-------|------|-------|-------|-------|-----|------|--------|
| CALM         | 0    | 0   | 0    | 0    | 0    | 0    | 0     | 0    | 0    | 0    | 0     | 0    | 0     | 0     | 0     | 0   | 0    | 0      |
| (1)          | .00  | .00 | .00  | .00  | .00  | .00  | .00   | .00  | .00  | .00  | .00   | .00  | .00   | .00   | .00   | .00 | .00  | .00    |
| (2)          | .00  | .00 | .00  | .00  | .00  | .00  | .00   | .00  | .00  | .00  | .00   | .00  | .00   | .00   | .00   | .00 | .00  | .00    |
| C-3          | 1    | 0   | 0    | 0    | 1    | 0    | 0     | 0    | 0    | 0    | 0     | 0    | 1     | 1     | 0     | 0   | 0    | 4      |
| (1)          | .28  | .00 | .00  | .00  | .28  | .00  | .00   | .00  | .00  | .00  | .00   | .00  | .28   | .28   | .00   | .00 | .00  | 1.10   |
| (2)          | .01  | .00 | .00  | .00  | .01  | .00  | .00   | .00  | .00  | .00  | .00   | .00  | .01   | .01   | .00   | .00 | .00  | .05    |
| 4-7          | 1    | 0   | 0    | 0    | 2    | 1    | 6     | 2    | 1    | 4    | 5     | 1    | 8     | 4     | 0     | 0   | 0    | 35     |
| (1)          | .28  | .00 | .00  | .00  | .55  | .28  | 1.65  | .55  | .28  | 1.10 | 1.38  | .28  | 2.20  | 1.10  | .00   | .00 | .00  | 9.64   |
| (2)          | .01  | .00 | .00  | .00  | .02  | .01  | .07   | .02  | .01  | .05  | .06   | .01  | .09   | .05   | .00   | .00 | .00  | .41    |
| 8-12         | 2    | 2   | 2    | 20   | 21   | 12   | 35    | 9    | 7    | 18   | 40    | 18   | 20    | 19    | 20    | 1   | 0    | 246    |
| (1)          | .55  | .55 | .55  | 5.51 | 5.79 | 3.31 | 9.64  | 2.48 | 1.93 | 4.96 | 11.02 | 4.96 | 5.51  | 5.23  | 5.51  | .28 | .00  | 67.77  |
| (2)          | .02  | .02 | .02  | .23  | .24  | .14  | .41   | .10  | .08  | .21  | .47   | .21  | .23   | .22   | .23   | .01 | .00  | 2.86   |
| 13-18        | 0    | 0   | 2    | 4    | 3    | 0    | 2     | 0    | 1    | 1    | 10    | 1    | 9     | 19    | 19    | 0   | 0    | 71     |
| (1)          | .00  | .00 | .55  | 1.10 | .83  | .00  | .55   | .00  | .28  | .28  | 2.75  | .28  | 2.48  | 5.23  | 5.23  | .00 | .00  | 19.56  |
| (2)          | .00  | .00 | .02  | .05  | .03  | .00  | .02   | .00  | .01  | .01  | .12   | .01  | .10   | .22   | .22   | .00 | .00  | .83    |
| 19-24        | 0    | 0   | 0    | 0    | 0    | 0    | 0     | 0    | 0    | 0    | 0     | 0    | 1     | 3     | 3     | 0   | 0    | 7      |
| (1)          | .00  | .00 | .00  | .00  | .00  | .00  | .00   | .00  | .00  | .00  | .00   | .00  | .28   | .83   | .83   | .00 | .00  | 1.93   |
| (2)          | .00  | .00 | .00  | .00  | .00  | .00  | .00   | .00  | .00  | .00  | .00   | .00  | .01   | .03   | .03   | .00 | .00  | .08    |
| GT 24        | 0    | 0   | 0    | 0    | 0    | 0    | 0     | 0    | 0    | 0    | 0     | 0    | 0     | 0     | 0     | 0   | 0    | 0      |
| (1)          | .00  | .00 | .00  | .00  | .00  | .00  | .00   | .00  | .00  | .00  | .00   | .00  | .00   | .00   | .00   | .00 | .00  | .00    |
| (2)          | .00  | .00 | .00  | .00  | .00  | .00  | .00   | .00  | .00  | .00  | .00   | .00  | .00   | .00   | .00   | .00 | .00  | .00    |
| ALL SPEEDS   | 4    | 2   | 4    | 24   | 27   | 13   | 43    | 11   | 9    | 23   | 55    | 20   | 39    | 46    | 42    | 1   | 0    | 363    |
| (1)          | 1.10 | .55 | 1.10 | 6.61 | 7.44 | 3.58 | 11.85 | 3.03 | 2.48 | 6.34 | 15.15 | 5.51 | 10.74 | 12.67 | 11.57 | .28 | .00  | 100.00 |
| (2)          | .05  | .02 | .05  | .28  | .31  | .15  | .50   | .13  | .10  | .27  | .64   | .23  | .45   | .54   | .49   | .01 | .00  | 4.22   |

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE

(2)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD

C= CALM (WIND SPEED LESS THAN OR EQUAL TO .95 MPH)

## SEABROOK JAN04-DEC04 MET DATA JOINT FREQUENCY DISTRIBUTION (210-FOOT TOWER)

43.0 FT WIND DATA

STABILITY CLASS D

CLASS FREQUENCY (PERCENT) = 50.08

WIND DIRECTION FROM

| SPEED<br>MPH | N    | NNE  | NE   | ENE  | E    | ESE  | SE   | SSE  | S    | SSW  | SW   | WSW  | W    | WNW   | NW    | NNW  | VRBL | TOTAL  |
|--------------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|------|------|--------|
| CALM         | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0    | 0    | 0      |
| (1)          | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00   | .00   | .00  | .00  | .00    |
| (2)          | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00   | .00   | .00  | .00  | .00    |
| C-3          | 26   | 17   | 22   | 13   | 18   | 11   | 15   | 9    | 19   | 22   | 13   | 18   | 22   | 24    | 19    | 25   | 0    | 293    |
| (1)          | .60  | .39  | .51  | .30  | .42  | .26  | .35  | .21  | .44  | .51  | .30  | .42  | .51  | .56   | .44   | .58  | .00  | 6.81   |
| (2)          | .30  | .20  | .26  | .15  | .21  | .13  | .17  | .10  | .22  | .26  | .15  | .21  | .26  | .28   | .22   | .29  | .00  | 3.41   |
| 4-7          | 128  | 91   | 56   | 99   | 142  | 99   | 98   | 134  | 85   | 79   | 83   | 70   | 114  | 149   | 146   | 93   | 0    | 1666   |
| (1)          | 2.97 | 2.11 | 1.30 | 2.30 | 3.30 | 2.30 | 2.28 | 3.11 | 1.97 | 1.84 | 1.93 | 1.63 | 2.65 | 3.46  | 3.39  | 2.16 | .00  | 38.71  |
| (2)          | 1.49 | 1.06 | .65  | 1.15 | 1.65 | 1.15 | 1.14 | 1.56 | .99  | .92  | .97  | .81  | 1.33 | 1.73  | 1.70  | 1.08 | .00  | 19.38  |
| 8-12         | 51   | 55   | 156  | 86   | 173  | 76   | 50   | 25   | 25   | 92   | 188  | 88   | 135  | 273   | 152   | 47   | 0    | 1672   |
| (1)          | 1.18 | 1.28 | 3.62 | 2.00 | 4.02 | 1.77 | 1.16 | .58  | .58  | 2.14 | 4.37 | 2.04 | 3.14 | 6.34  | 3.53  | 1.09 | .00  | 38.85  |
| (2)          | .59  | .64  | 1.82 | 1.00 | 2.01 | .88  | .58  | .29  | .29  | 1.07 | 2.19 | 1.02 | 1.57 | 3.18  | 1.77  | .55  | .00  | 19.45  |
| 13-18        | 5    | 4    | 62   | 26   | 13   | 14   | 0    | 0    | 7    | 7    | 32   | 10   | 42   | 222   | 117   | 14   | 0    | 575    |
| (1)          | .12  | .09  | 1.44 | .60  | .30  | .33  | .00  | .00  | .16  | .16  | .74  | .23  | .98  | 5.16  | 2.72  | .33  | .00  | 13.36  |
| (2)          | .06  | .05  | .72  | .30  | .15  | .16  | .00  | .00  | .08  | .08  | .37  | .12  | .49  | 2.58  | 1.36  | .16  | .00  | 6.69   |
| 19-24        | 0    | 0    | 23   | 3    | 0    | 0    | 0    | 0    | 0    | 0    | 3    | 0    | 7    | 28    | 25    | 0    | 0    | 89     |
| (1)          | .00  | .00  | .53  | .07  | .00  | .00  | .00  | .00  | .00  | .00  | .07  | .00  | .16  | .65   | .58   | .00  | .00  | 2.07   |
| (2)          | .00  | .00  | .27  | .03  | .00  | .00  | .00  | .00  | .00  | .00  | .03  | .00  | .08  | .33   | .29   | .00  | .00  | 1.04   |
| GT 24        | 0    | 0    | 9    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0    | 0    | 9      |
| (1)          | .00  | .00  | .21  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00   | .00   | .00  | .00  | .21    |
| (2)          | .00  | .00  | .10  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00   | .00   | .00  | .00  | .10    |
| ALL SPEEDS   | 210  | 167  | 328  | 227  | 346  | 200  | 163  | 168  | 136  | 200  | 319  | 186  | 320  | 696   | 459   | 179  | 0    | 4304   |
| (1)          | 4.88 | 3.88 | 7.62 | 5.27 | 8.04 | 4.65 | 3.79 | 3.90 | 3.16 | 4.65 | 7.41 | 4.32 | 7.43 | 16.17 | 10.66 | 4.16 | .00  | 100.00 |
| (2)          | 2.44 | 1.94 | 3.82 | 2.64 | 4.03 | 2.33 | 1.90 | 1.95 | 1.58 | 2.33 | 3.71 | 2.16 | 3.72 | 8.10  | 5.34  | 2.08 | .00  | 50.08  |

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE

(2)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD

C= CALM (WIND SPEED LESS THAN OR EQUAL TO .95 MPH)

## SEABROOK JAN04-DEC04 MET DATA JOINT FREQUENCY DISTRIBUTION (210-FOOT TOWER)

43.0 FT WIND DATA

STABILITY CLASS E

CLASS FREQUENCY (PERCENT) = 30.25

## WIND DIRECTION FROM

| SPEED<br>MPH | N    | NNE  | NE   | ENE  | E    | ESE  | SE   | SSE  | S    | SSW  | SW    | WSW   | W     | WNW   | NW    | NNW  | VRBL | TOTAL  |
|--------------|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|------|------|--------|
| CALM         | 1    | 0    | 1    | 1    | 0    | 0    | 0    | 1    | 1    | 0    | 1     | 2     | 1     | 0     | 3     | 0    | 0    | 12     |
| (1)          | .04  | .00  | .04  | .04  | .00  | .00  | .00  | .04  | .04  | .00  | .04   | .08   | .04   | .00   | .12   | .00  | .00  | .46    |
| (2)          | .01  | .00  | .01  | .01  | .00  | .00  | .00  | .01  | .01  | .00  | .01   | .02   | .01   | .00   | .03   | .00  | .00  | .14    |
| C-3          | 23   | 19   | 20   | 27   | 19   | 23   | 14   | 40   | 42   | 52   | 45    | 43    | 69    | 56    | 43    | 37   | 0    | 572    |
| (1)          | .88  | .73  | .77  | 1.04 | .73  | .88  | .54  | 1.54 | 1.62 | 2.00 | 1.73  | 1.65  | 2.65  | 2.15  | 1.65  | 1.42 | .00  | 22.00  |
| (2)          | .27  | .22  | .23  | .31  | .22  | .27  | .16  | .47  | .49  | .61  | .52   | .50   | .80   | .65   | .50   | .43  | .00  | 6.66   |
| 4-7          | 34   | 21   | 29   | 22   | 60   | 48   | 41   | 63   | 48   | 115  | 168   | 170   | 180   | 228   | 157   | 64   | 0    | 1448   |
| (1)          | 1.31 | .81  | 1.12 | .85  | 2.31 | 1.85 | 1.58 | 2.42 | 1.85 | 4.42 | 6.46  | 6.54  | 6.92  | 8.77  | 6.04  | 2.46 | .00  | 55.69  |
| (2)          | .40  | .24  | .34  | .26  | .70  | .56  | .48  | .73  | .56  | 1.34 | 1.95  | 1.98  | 2.09  | 2.65  | 1.83  | .74  | .00  | 16.85  |
| 8-12         | 4    | 8    | 17   | 8    | 25   | 12   | 19   | 18   | 12   | 20   | 74    | 74    | 49    | 48    | 72    | 13   | 0    | 473    |
| (1)          | .15  | .31  | .65  | .31  | .96  | .46  | .73  | .69  | .46  | .77  | 2.85  | 2.85  | 1.88  | 1.85  | 2.77  | .50  | .00  | 18.19  |
| (2)          | .05  | .09  | .20  | .09  | .29  | .14  | .22  | .21  | .14  | .23  | .86   | .86   | .57   | .56   | .84   | .15  | .00  | 5.50   |
| 13-18        | 0    | 0    | 14   | 6    | 13   | 2    | 1    | 10   | 2    | 3    | 12    | 3     | 8     | 5     | 6     | 0    | 0    | 85     |
| (1)          | .00  | .00  | .54  | .23  | .50  | .08  | .04  | .38  | .08  | .12  | .46   | .12   | .31   | .19   | .23   | .00  | .00  | 3.27   |
| (2)          | .00  | .00  | .16  | .07  | .15  | .02  | .01  | .12  | .02  | .03  | .14   | .03   | .09   | .06   | .07   | .00  | .00  | .99    |
| 19-24        | 0    | 0    | 0    | 2    | 5    | 0    | 0    | 0    | 0    | 0    | 0     | 1     | 1     | 0     | 0     | 0    | 0    | 9      |
| (1)          | .00  | .00  | .00  | .08  | .19  | .00  | .00  | .00  | .00  | .00  | .00   | .04   | .04   | .00   | .00   | .00  | .00  | .35    |
| (2)          | .00  | .00  | .00  | .02  | .06  | .00  | .00  | .00  | .00  | .00  | .00   | .01   | .01   | .00   | .00   | .00  | .00  | .10    |
| GT 24        | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0     | 0     | 0     | 0    | 0    | 1      |
| (1)          | .00  | .00  | .00  | .00  | .04  | .00  | .00  | .00  | .00  | .00  | .00   | .00   | .00   | .00   | .00   | .00  | .00  | .04    |
| (2)          | .00  | .00  | .00  | .00  | .01  | .00  | .00  | .00  | .00  | .00  | .00   | .00   | .00   | .00   | .00   | .00  | .00  | .01    |
| ALL SPEEDS   | 62   | 48   | 81   | 66   | 123  | 85   | 75   | 132  | 105  | 190  | 300   | 293   | 308   | 337   | 281   | 114  | 0    | 2600   |
| (1)          | 2.38 | 1.85 | 3.12 | 2.54 | 4.73 | 3.27 | 2.88 | 5.08 | 4.04 | 7.31 | 11.54 | 11.27 | 11.85 | 12.96 | 10.81 | 4.38 | .00  | 100.00 |
| (2)          | .72  | .56  | .94  | .77  | 1.43 | .99  | .87  | 1.54 | 1.22 | 2.21 | 3.49  | 3.41  | 3.58  | 3.92  | 3.27  | 1.33 | .00  | 30.25  |

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE

(2)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD

C= CALM (WIND SPEED LESS THAN OR EQUAL TO .95 MPH)

## SEABROOK JAN04-DEC04 MET DATA JOINT FREQUENCY DISTRIBUTION (210-FOOT TOWER)

43.0 FT WIND DATA

STABILITY CLASS F

CLASS FREQUENCY (PERCENT) = 7.81

WIND DIRECTION FROM

| SPEED<br>MPH | N    | NNE  | NE   | ENE  | E    | ESE  | SE   | SSE | S    | SSW  | SW   | WSW   | W     | WNW   | NW    | NNW  | VRBL | TOTAL  |
|--------------|------|------|------|------|------|------|------|-----|------|------|------|-------|-------|-------|-------|------|------|--------|
| CALM         | 3    | 1    | 1    | 0    | 0    | 0    | 0    | 0   | 0    | 1    | 1    | 0     | 1     | 1     | 0     | 0    | 0    | 9      |
| (1)          | .45  | .15  | .15  | .00  | .00  | .00  | .00  | .00 | .00  | .15  | .15  | .00   | .15   | .15   | .00   | .00  | .00  | 1.34   |
| (2)          | .03  | .01  | .01  | .00  | .00  | .00  | .00  | .00 | .00  | .01  | .01  | .00   | .01   | .01   | .00   | .00  | .00  | .10    |
| C-3          | 11   | 11   | 13   | 15   | 7    | 5    | 3    | 1   | 6    | 18   | 39   | 44    | 67    | 59    | 40    | 28   | 0    | 367    |
| (1)          | 1.64 | 1.64 | 1.94 | 2.24 | 1.04 | .75  | .45  | .15 | .89  | 2.68 | 5.81 | 6.56  | 9.99  | 8.79  | 5.96  | 4.17 | .00  | 54.69  |
| (2)          | .13  | .13  | .15  | .17  | .08  | .06  | .03  | .01 | .07  | .21  | .45  | .51   | .78   | .69   | .47   | .33  | .00  | 4.27   |
| 4-7          | 2    | 2    | 1    | 3    | 4    | 3    | 6    | 4   | 4    | 10   | 18   | 60    | 38    | 70    | 54    | 11   | 0    | 290    |
| (1)          | .30  | .30  | .15  | .45  | .60  | .45  | .89  | .60 | .60  | 1.49 | 2.68 | 8.94  | 5.66  | 10.43 | 8.05  | 1.64 | .00  | 43.22  |
| (2)          | .02  | .02  | .01  | .03  | .05  | .03  | .07  | .05 | .05  | .12  | .21  | .70   | .44   | .81   | .63   | .13  | .00  | 3.37   |
| 8-12         | 0    | 0    | 1    | 0    | 1    | 0    | 1    | 0   | 0    | 0    | 1    | 0     | 0     | 0     | 0     | 0    | 0    | 4      |
| (1)          | .00  | .00  | .15  | .00  | .15  | .00  | .15  | .00 | .00  | .00  | .15  | .00   | .00   | .00   | .00   | .00  | .00  | .60    |
| (2)          | .00  | .00  | .01  | .00  | .01  | .00  | .01  | .00 | .00  | .00  | .01  | .00   | .00   | .00   | .00   | .00  | .00  | .05    |
| 13-18        | 0    | 0    | 0    | 0    | 1    | 0    | 0    | 0   | 0    | 0    | 0    | 0     | 0     | 0     | 0     | 0    | 0    | 1      |
| (1)          | .00  | .00  | .00  | .00  | .15  | .00  | .00  | .00 | .00  | .00  | .00  | .00   | .00   | .00   | .00   | .00  | .00  | .15    |
| (2)          | .00  | .00  | .00  | .00  | .01  | .00  | .00  | .00 | .00  | .00  | .00  | .00   | .00   | .00   | .00   | .00  | .00  | .01    |
| 19-24        | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0   | 0    | 0    | 0    | 0     | 0     | 0     | 0     | 0    | 0    | 0      |
| (1)          | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00 | .00  | .00  | .00  | .00   | .00   | .00   | .00   | .00  | .00  | .00    |
| (2)          | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00 | .00  | .00  | .00  | .00   | .00   | .00   | .00   | .00  | .00  | .00    |
| GT 24        | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0   | 0    | 0    | 0    | 0     | 0     | 0     | 0     | 0    | 0    | 0      |
| (1)          | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00 | .00  | .00  | .00  | .00   | .00   | .00   | .00   | .00  | .00  | .00    |
| (2)          | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00 | .00  | .00  | .00  | .00   | .00   | .00   | .00   | .00  | .00  | .00    |
| ALL SPEEDS   | 16   | 14   | 16   | 18   | 13   | 8    | 10   | 5   | 10   | 29   | 59   | 104   | 106   | 130   | 94    | 39   | 0    | 671    |
| (1)          | 2.38 | 2.09 | 2.38 | 2.68 | 1.94 | 1.19 | 1.49 | .75 | 1.49 | 4.32 | 8.79 | 15.50 | 15.80 | 19.37 | 14.01 | 5.81 | .00  | 100.00 |
| (2)          | .19  | .16  | .19  | .21  | .15  | .09  | .12  | .06 | .12  | .34  | .69  | 1.21  | 1.23  | 1.51  | 1.09  | .45  | .00  | 7.81   |

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE

(2)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD

C= CALM (WIND SPEED LESS THAN OR EQUAL TO .95 MPH)

## SEABROOK JAN04-DEC04 MET DATA JOINT FREQUENCY DISTRIBUTION (210-FOOT TOWER)

43.0 FT WIND DATA

STABILITY CLASS G

CLASS FREQUENCY (PERCENT) = 5.56

## WIND DIRECTION FROM

| SPEED<br>MPH | N    | NNE  | NE  | ENE  | E   | ESE | SE  | SSE | S   | SSW | SW   | WSW   | W     | WNW   | NW    | NNW  | VRBL | TOTAL  |
|--------------|------|------|-----|------|-----|-----|-----|-----|-----|-----|------|-------|-------|-------|-------|------|------|--------|
| CALM         | 0    | 1    | 0   | 1    | 0   | 0   | 1   | 1   | 0   | 0   | 0    | 0     | 0     | 0     | 1     | 0    | 0    | 5      |
| (1)          | .00  | .21  | .00 | .21  | .00 | .00 | .21 | .21 | .00 | .00 | .00  | .00   | .00   | .00   | .21   | .00  | .00  | 1.05   |
| (2)          | .00  | .01  | .00 | .01  | .00 | .00 | .01 | .01 | .00 | .00 | .00  | .00   | .00   | .00   | .01   | .00  | .00  | .06    |
| C-3          | 7    | 4    | 3   | 10   | 3   | 3   | 0   | 1   | 3   | 4   | 29   | 53    | 91    | 113   | 36    | 13   | 0    | 373    |
| (1)          | 1.46 | .84  | .63 | 2.09 | .63 | .63 | .00 | .21 | .63 | .84 | 6.07 | 11.09 | 19.04 | 23.64 | 7.53  | 2.72 | .00  | 78.03  |
| (2)          | .08  | .05  | .03 | .12  | .03 | .03 | .00 | .01 | .03 | .05 | .34  | .62   | 1.06  | 1.31  | .42   | .15  | .00  | 4.34   |
| 4-7          | 1    | 0    | 0   | 0    | 1   | 0   | 1   | 0   | 0   | 0   | 5    | 14    | 11    | 34    | 30    | 3    | 0    | 100    |
| (1)          | .21  | .00  | .00 | .00  | .21 | .00 | .21 | .00 | .00 | .00 | 1.05 | 2.93  | 2.30  | 7.11  | 6.28  | .63  | .00  | 20.92  |
| (2)          | .01  | .00  | .00 | .00  | .01 | .00 | .01 | .00 | .00 | .00 | .06  | .16   | .13   | .40   | .35   | .03  | .00  | 1.16   |
| 8-12         | 0    | 0    | 0   | 0    | 0   | 0   | 0   | 0   | 0   | 0   | 0    | 0     | 0     | 0     | 0     | 0    | 0    | 0      |
| (1)          | .00  | .00  | .00 | .00  | .00 | .00 | .00 | .00 | .00 | .00 | .00  | .00   | .00   | .00   | .00   | .00  | .00  | .00    |
| (2)          | .00  | .00  | .00 | .00  | .00 | .00 | .00 | .00 | .00 | .00 | .00  | .00   | .00   | .00   | .00   | .00  | .00  | .00    |
| 13-18        | 0    | 0    | 0   | 0    | 0   | 0   | 0   | 0   | 0   | 0   | 0    | 0     | 0     | 0     | 0     | 0    | 0    | 0      |
| (1)          | .00  | .00  | .00 | .00  | .00 | .00 | .00 | .00 | .00 | .00 | .00  | .00   | .00   | .00   | .00   | .00  | .00  | .00    |
| (2)          | .00  | .00  | .00 | .00  | .00 | .00 | .00 | .00 | .00 | .00 | .00  | .00   | .00   | .00   | .00   | .00  | .00  | .00    |
| 19-24        | 0    | 0    | 0   | 0    | 0   | 0   | 0   | 0   | 0   | 0   | 0    | 0     | 0     | 0     | 0     | 0    | 0    | 0      |
| (1)          | .00  | .00  | .00 | .00  | .00 | .00 | .00 | .00 | .00 | .00 | .00  | .00   | .00   | .00   | .00   | .00  | .00  | .00    |
| (2)          | .00  | .00  | .00 | .00  | .00 | .00 | .00 | .00 | .00 | .00 | .00  | .00   | .00   | .00   | .00   | .00  | .00  | .00    |
| GT 24        | 0    | 0    | 0   | 0    | 0   | 0   | 0   | 0   | 0   | 0   | 0    | 0     | 0     | 0     | 0     | 0    | 0    | 0      |
| (1)          | .00  | .00  | .00 | .00  | .00 | .00 | .00 | .00 | .00 | .00 | .00  | .00   | .00   | .00   | .00   | .00  | .00  | .00    |
| (2)          | .00  | .00  | .00 | .00  | .00 | .00 | .00 | .00 | .00 | .00 | .00  | .00   | .00   | .00   | .00   | .00  | .00  | .00    |
| ALL SPEEDS   | 8    | 5    | 3   | 11   | 4   | 3   | 2   | 2   | 3   | 4   | 34   | 67    | 102   | 147   | 67    | 16   | 0    | 478    |
| (1)          | 1.67 | 1.05 | .63 | 2.30 | .84 | .63 | .42 | .42 | .63 | .84 | 7.11 | 14.02 | 21.34 | 30.75 | 14.02 | 3.35 | .00  | 100.00 |
| (2)          | .09  | .06  | .03 | .13  | .05 | .03 | .02 | .02 | .03 | .05 | .40  | .78   | 1.19  | 1.71  | .78   | .19  | .00  | 5.56   |

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE

(2)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD

C= CALM (WIND SPEED LESS THAN OR EQUAL TO .95 MPH)

## SEABROOK JAN04-DEC04 MET DATA JOINT FREQUENCY DISTRIBUTION (210-FOOT TOWER)

43.0 FT WIND DATA

STABILITY CLASS ALL

CLASS FREQUENCY (PERCENT) = 100.00

WIND DIRECTION FROM

| SPEED<br>MPH | N    | NNE  | NE   | ENE  | E    | ESE  | SE   | SSE  | S    | SSW  | SW   | WSW  | W     | WNW   | NW    | NNW  | VRBL | TOTAL  |
|--------------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|------|------|--------|
| CALM         | 4    | 2    | 2    | 2    | 0    | 0    | 1    | 2    | 1    | 1    | 2    | 2    | 2     | 1     | 4     | 0    | 0    | 26     |
| (1)          | .05  | .02  | .02  | .02  | .00  | .00  | .01  | .02  | .01  | .01  | .02  | .02  | .02   | .01   | .05   | .00  | .00  | .30    |
| (2)          | .05  | .02  | .02  | .02  | .00  | .00  | .01  | .02  | .01  | .01  | .02  | .02  | .02   | .01   | .05   | .00  | .00  | .30    |
| C-3          | 68   | 51   | 58   | 65   | 48   | 42   | 32   | 51   | 70   | 96   | 126  | 158  | 250   | 253   | 138   | 104  | 0    | 1610   |
| (1)          | .79  | .59  | .67  | .76  | .56  | .49  | .37  | .59  | .81  | 1.12 | 1.47 | 1.84 | 2.91  | 2.94  | 1.61  | 1.21 | .00  | 18.73  |
| (2)          | .79  | .59  | .67  | .76  | .56  | .49  | .37  | .59  | .81  | 1.12 | 1.47 | 1.84 | 2.91  | 2.94  | 1.61  | 1.21 | .00  | 18.73  |
| 4-7          | 166  | 114  | 86   | 124  | 211  | 151  | 156  | 206  | 138  | 208  | 281  | 315  | 355   | 486   | 387   | 172  | 0    | 3556   |
| (1)          | 1.93 | 1.33 | 1.00 | 1.44 | 2.45 | 1.76 | 1.82 | 2.40 | 1.61 | 2.42 | 3.27 | 3.66 | 4.13  | 5.65  | 4.50  | 2.00 | .00  | 41.37  |
| (2)          | 1.93 | 1.33 | 1.00 | 1.44 | 2.45 | 1.76 | 1.82 | 2.40 | 1.61 | 2.42 | 3.27 | 3.66 | 4.13  | 5.65  | 4.50  | 2.00 | .00  | 41.37  |
| 8-12         | 57   | 66   | 176  | 118  | 225  | 107  | 136  | 64   | 45   | 137  | 311  | 193  | 207   | 349   | 247   | 61   | 0    | 2499   |
| (1)          | .66  | .77  | 2.05 | 1.37 | 2.62 | 1.24 | 1.58 | .74  | .52  | 1.59 | 3.62 | 2.25 | 2.41  | 4.06  | 2.87  | .71  | .00  | 29.08  |
| (2)          | .66  | .77  | 2.05 | 1.37 | 2.62 | 1.24 | 1.58 | .74  | .52  | 1.59 | 3.62 | 2.25 | 2.41  | 4.06  | 2.87  | .71  | .00  | 29.08  |
| 13-18        | 5    | 4    | 84   | 38   | 30   | 16   | 14   | 11   | 10   | 11   | 60   | 17   | 62    | 257   | 150   | 14   | 0    | 783    |
| (1)          | .06  | .05  | .98  | .44  | .35  | .19  | .16  | .13  | .12  | .13  | .70  | .20  | .72   | 2.99  | 1.75  | .16  | .00  | 9.11   |
| (2)          | .06  | .05  | .98  | .44  | .35  | .19  | .16  | .13  | .12  | .13  | .70  | .20  | .72   | 2.99  | 1.75  | .16  | .00  | 9.11   |
| 19-24        | 0    | 0    | 25   | 5    | 5    | 0    | 0    | 0    | 0    | 0    | 3    | 1    | 10    | 32    | 30    | 0    | 0    | 111    |
| (1)          | .00  | .00  | .29  | .06  | .06  | .00  | .00  | .00  | .00  | .00  | .03  | .01  | .12   | .37   | .35   | .00  | .00  | 1.29   |
| (2)          | .00  | .00  | .29  | .06  | .06  | .00  | .00  | .00  | .00  | .00  | .03  | .01  | .12   | .37   | .35   | .00  | .00  | 1.29   |
| GT 24        | 0    | 0    | 9    | 0    | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0     | 0    | 0    | 10     |
| (1)          | .00  | .00  | .10  | .00  | .01  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00   | .00   | .00   | .00  | .00  | .12    |
| (2)          | .00  | .00  | .10  | .00  | .01  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00   | .00   | .00   | .00  | .00  | .12    |
| ALL SPEEDS   | 300  | 237  | 440  | 352  | 520  | 316  | 339  | 334  | 264  | 453  | 783  | 686  | 886   | 1378  | 956   | 351  | 0    | 8595   |
| (1)          | 3.49 | 2.76 | 5.12 | 4.10 | 6.05 | 3.68 | 3.94 | 3.89 | 3.07 | 5.27 | 9.11 | 7.98 | 10.31 | 16.03 | 11.12 | 4.08 | .00  | 100.00 |
| (2)          | 3.49 | 2.76 | 5.12 | 4.10 | 6.05 | 3.68 | 3.94 | 3.89 | 3.07 | 5.27 | 9.11 | 7.98 | 10.31 | 16.03 | 11.12 | 4.08 | .00  | 100.00 |

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE

(2)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD

C= CALM (WIND SPEED LESS THAN OR EQUAL TO .95 MPH)

## SEABROOK JAN04-DEC04 MET DATA JOINT FREQUENCY DISTRIBUTION (210-FOOT TOWER)

209.0 FT WIND DATA

STABILITY CLASS A

CLASS FREQUENCY (PERCENT) = .70

WIND DIRECTION FROM

| SPEED<br>MPH | N   | NNE | NE   | ENE  | E    | ESE | SE    | SSE   | S   | SSW  | SW   | WSW  | W    | WNW  | NW   | NNW | VRBL | TOTAL  |
|--------------|-----|-----|------|------|------|-----|-------|-------|-----|------|------|------|------|------|------|-----|------|--------|
| CALM         | 0   | 0   | 0    | 0    | 0    | 0   | 0     | 0     | 0   | 0    | 0    | 0    | 0    | 0    | 0    | 0   | 0    | 0      |
| (1)          | .00 | .00 | .00  | .00  | .00  | .00 | .00   | .00   | .00 | .00  | .00  | .00  | .00  | .00  | .00  | .00 | .00  | .00    |
| (2)          | .00 | .00 | .00  | .00  | .00  | .00 | .00   | .00   | .00 | .00  | .00  | .00  | .00  | .00  | .00  | .00 | .00  | .00    |
| C-3          | 0   | 0   | 0    | 0    | 0    | 0   | 0     | 0     | 0   | 0    | 0    | 0    | 0    | 0    | 0    | 0   | 0    | 0      |
| (1)          | .00 | .00 | .00  | .00  | .00  | .00 | .00   | .00   | .00 | .00  | .00  | .00  | .00  | .00  | .00  | .00 | .00  | .00    |
| (2)          | .00 | .00 | .00  | .00  | .00  | .00 | .00   | .00   | .00 | .00  | .00  | .00  | .00  | .00  | .00  | .00 | .00  | .00    |
| 4-7          | 0   | 0   | 0    | 0    | 0    | 0   | 0     | 0     | 0   | 0    | 0    | 0    | 0    | 0    | 0    | 0   | 0    | 0      |
| (1)          | .00 | .00 | .00  | .00  | .00  | .00 | .00   | .00   | .00 | .00  | .00  | .00  | .00  | .00  | .00  | .00 | .00  | .00    |
| (2)          | .00 | .00 | .00  | .00  | .00  | .00 | .00   | .00   | .00 | .00  | .00  | .00  | .00  | .00  | .00  | .00 | .00  | .00    |
| 8-12         | 0   | 0   | 0    | 0    | 0    | 0   | 7     | 5     | 0   | 0    | 0    | 1    | 2    | 0    | 0    | 0   | 0    | 15     |
| (1)          | .00 | .00 | .00  | .00  | .00  | .00 | 11.48 | 8.20  | .00 | .00  | .00  | 1.64 | 3.28 | .00  | .00  | .00 | .00  | 24.59  |
| (2)          | .00 | .00 | .00  | .00  | .00  | .00 | .08   | .06   | .00 | .00  | .00  | .01  | .02  | .00  | .00  | .00 | .00  | .17    |
| 13-18        | 0   | 0   | 1    | 1    | 1    | 0   | 13    | 4     | 0   | 1    | 2    | 3    | 1    | 0    | 0    | 0   | 0    | 27     |
| (1)          | .00 | .00 | 1.64 | 1.64 | 1.64 | .00 | 21.31 | 6.56  | .00 | 1.64 | 3.28 | 4.92 | 1.64 | .00  | .00  | .00 | .00  | 44.26  |
| (2)          | .00 | .00 | .01  | .01  | .01  | .00 | .15   | .05   | .00 | .01  | .02  | .03  | .01  | .00  | .00  | .00 | .00  | .31    |
| 19-24        | 0   | 0   | 4    | 0    | 0    | 0   | 2     | 4     | 0   | 0    | 2    | 1    | 0    | 3    | 3    | 0   | 0    | 19     |
| (1)          | .00 | .00 | 6.56 | .00  | .00  | .00 | 3.28  | 6.56  | .00 | .00  | 3.28 | 1.64 | .00  | 4.92 | 4.92 | .00 | .00  | 31.15  |
| (2)          | .00 | .00 | .05  | .00  | .00  | .00 | .02   | .05   | .00 | .00  | .02  | .01  | .00  | .03  | .03  | .00 | .00  | .22    |
| GT 24        | 0   | 0   | 0    | 0    | 0    | 0   | 0     | 0     | 0   | 0    | 0    | 0    | 0    | 0    | 0    | 0   | 0    | 0      |
| (1)          | .00 | .00 | .00  | .00  | .00  | .00 | .00   | .00   | .00 | .00  | .00  | .00  | .00  | .00  | .00  | .00 | .00  | .00    |
| (2)          | .00 | .00 | .00  | .00  | .00  | .00 | .00   | .00   | .00 | .00  | .00  | .00  | .00  | .00  | .00  | .00 | .00  | .00    |
| ALL SPEEDS   | 0   | 0   | 5    | 1    | 1    | 0   | 22    | 13    | 0   | 1    | 4    | 5    | 3    | 3    | 3    | 0   | 0    | 61     |
| (1)          | .00 | .00 | 8.20 | 1.64 | 1.64 | .00 | 36.07 | 21.31 | .00 | 1.64 | 6.56 | 8.20 | 4.92 | 4.92 | 4.92 | .00 | .00  | 100.00 |
| (2)          | .00 | .00 | .06  | .01  | .01  | .00 | .25   | .15   | .00 | .01  | .05  | .06  | .03  | .03  | .03  | .00 | .00  | .70    |

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE

(2)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD

C= CALM (WIND SPEED LESS THAN OR EQUAL TO .95 MPH)

## SEABROOK JAN04-DEC04 MET DATA JOINT FREQUENCY DISTRIBUTION (210-FOOT TOWER)

209.0 FT WIND DATA

STABILITY CLASS B

CLASS FREQUENCY (PERCENT) = 1.37

## WIND DIRECTION FROM

| SPEED<br>MPH | N   | NNE | NE  | ENE  | E    | ESE  | SE    | SSE   | S   | SSW  | SW   | WSW  | W    | WNW   | NW   | NNW | VRBL | TOTAL  |
|--------------|-----|-----|-----|------|------|------|-------|-------|-----|------|------|------|------|-------|------|-----|------|--------|
| CALM         | 0   | 0   | 0   | 0    | 0    | 0    | 0     | 0     | 0   | 0    | 0    | 0    | 0    | 0     | 0    | 0   | 0    | 0      |
| (1)          | .00 | .00 | .00 | .00  | .00  | .00  | .00   | .00   | .00 | .00  | .00  | .00  | .00  | .00   | .00  | .00 | .00  | .00    |
| (2)          | .00 | .00 | .00 | .00  | .00  | .00  | .00   | .00   | .00 | .00  | .00  | .00  | .00  | .00   | .00  | .00 | .00  | .00    |
| C-3          | 0   | 0   | 0   | 0    | 0    | 0    | 0     | 0     | 0   | 0    | 0    | 0    | 0    | 1     | 0    | 0   | 0    | 1      |
| (1)          | .00 | .00 | .00 | .00  | .00  | .00  | .00   | .00   | .00 | .00  | .00  | .00  | .00  | .84   | .00  | .00 | .00  | .84    |
| (2)          | .00 | .00 | .00 | .00  | .00  | .00  | .00   | .00   | .00 | .00  | .00  | .00  | .00  | .01   | .00  | .00 | .00  | .01    |
| 4-7          | 0   | 0   | 0   | 0    | 2    | 0    | 0     | 0     | 0   | 0    | 1    | 0    | 0    | 0     | 0    | 1   | 0    | 4      |
| (1)          | .00 | .00 | .00 | .00  | 1.68 | .00  | .00   | .00   | .00 | .00  | .84  | .00  | .00  | .00   | .00  | .84 | .00  | 3.36   |
| (2)          | .00 | .00 | .00 | .00  | .02  | .00  | .00   | .00   | .00 | .00  | .01  | .00  | .00  | .00   | .00  | .01 | .00  | .05    |
| 8-12         | 0   | 0   | 0   | 1    | 0    | 2    | 12    | 4     | 1   | 2    | 1    | 2    | 5    | 4     | 2    | 0   | 0    | 36     |
| (1)          | .00 | .00 | .00 | .84  | .00  | 1.68 | 10.08 | 3.36  | .84 | 1.68 | .84  | 1.68 | 4.20 | 3.36  | 1.68 | .00 | .00  | 30.25  |
| (2)          | .00 | .00 | .00 | .01  | .00  | .02  | .14   | .05   | .01 | .02  | .01  | .02  | .06  | .05   | .02  | .00 | .00  | .42    |
| 13-18        | 0   | 1   | 0   | 7    | 3    | 0    | 5     | 6     | 0   | 6    | 3    | 9    | 2    | 9     | 1    | 0   | 0    | 52     |
| (1)          | .00 | .84 | .00 | 5.88 | 2.52 | .00  | 4.20  | 5.04  | .00 | 5.04 | 2.52 | 7.56 | 1.68 | 7.56  | .84  | .00 | .00  | 43.70  |
| (2)          | .00 | .01 | .00 | .08  | .03  | .00  | .06   | .07   | .00 | .07  | .03  | .10  | .02  | .10   | .01  | .00 | .00  | .60    |
| 19-24        | 0   | 0   | 1   | 0    | 0    | 0    | 1     | 3     | 0   | 0    | 1    | 0    | 2    | 6     | 6    | 0   | 0    | 20     |
| (1)          | .00 | .00 | .84 | .00  | .00  | .00  | .84   | 2.52  | .00 | .00  | .84  | .00  | 1.68 | 5.04  | 5.04 | .00 | .00  | 16.81  |
| (2)          | .00 | .00 | .01 | .00  | .00  | .00  | .01   | .03   | .00 | .00  | .01  | .00  | .02  | .07   | .07  | .00 | .00  | .23    |
| GT 24        | 0   | 0   | 0   | 0    | 0    | 0    | 0     | 0     | 0   | 0    | 0    | 0    | 2    | 3     | 1    | 0   | 0    | 6      |
| (1)          | .00 | .00 | .00 | .00  | .00  | .00  | .00   | .00   | .00 | .00  | .00  | .00  | 1.68 | 2.52  | .84  | .00 | .00  | 5.04   |
| (2)          | .00 | .00 | .00 | .00  | .00  | .00  | .00   | .00   | .00 | .00  | .00  | .00  | .02  | .03   | .01  | .00 | .00  | .07    |
| ALL SPEEDS   | 0   | 1   | 1   | 8    | 5    | 2    | 18    | 13    | 1   | 8    | 6    | 11   | 11   | 23    | 10   | 1   | 0    | 119    |
| (1)          | .00 | .84 | .84 | 6.72 | 4.20 | 1.68 | 15.13 | 10.92 | .84 | 6.72 | 5.04 | 9.24 | 9.24 | 19.33 | 8.40 | .84 | .00  | 100.00 |
| (2)          | .00 | .01 | .01 | .09  | .06  | .02  | .21   | .15   | .01 | .09  | .07  | .13  | .13  | .27   | .12  | .01 | .00  | 1.37   |

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE

(2)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD

C= CALM (WIND SPEED LESS THAN OR EQUAL TO .95 MPH)



## SEABROOK JAN04-DEC04 MET DATA JOINT FREQUENCY DISTRIBUTION (210-FOOT TOWER)

209.0 FT WIND DATA

STABILITY CLASS C

CLASS FREQUENCY (PERCENT) = 4.19

## WIND DIRECTION FROM

| SPEED<br>MPH | N    | NNE | NE   | ENE  | E    | ESE  | SE   | SSE  | S    | SSW  | SW    | WSW  | W     | WNW   | NW    | NNW  | VRBL | TOTAL  |
|--------------|------|-----|------|------|------|------|------|------|------|------|-------|------|-------|-------|-------|------|------|--------|
| CALM         | 0    | 0   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0    | 0     | 0     | 0     | 0    | 0    | 0      |
| (1)          | .00  | .00 | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00   | .00  | .00   | .00   | .00   | .00  | .00  | .00    |
| (2)          | .00  | .00 | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00   | .00  | .00   | .00   | .00   | .00  | .00  | .00    |
| C-3          | 0    | 0   | 0    | 1    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0    | 0     | 1     | 0     | 1    | 0    | 3      |
| (1)          | .00  | .00 | .00  | .28  | .00  | .00  | .00  | .00  | .00  | .00  | .00   | .00  | .00   | .28   | .00   | .28  | .00  | .83    |
| (2)          | .00  | .00 | .00  | .01  | .00  | .00  | .00  | .00  | .00  | .00  | .00   | .00  | .00   | .01   | .00   | .01  | .00  | .03    |
| 4-7          | 0    | 0   | 0    | 0    | 0    | 1    | 0    | 0    | 1    | 0    | 1     | 1    | 0     | 0     | 1     | 0    | 0    | 5      |
| (1)          | .00  | .00 | .00  | .00  | .00  | .28  | .00  | .00  | .28  | .00  | .28   | .28  | .00   | .00   | .28   | .00  | .00  | 1.38   |
| (2)          | .00  | .00 | .00  | .00  | .00  | .01  | .00  | .00  | .01  | .00  | .01   | .01  | .00   | .00   | .01   | .00  | .00  | .06    |
| 8-12         | 3    | 0   | 3    | 11   | 17   | 9    | 21   | 14   | 4    | 11   | 18    | 14   | 10    | 11    | 3     | 1    | 0    | 150    |
| (1)          | .83  | .00 | .83  | 3.03 | 4.68 | 2.48 | 5.79 | 3.86 | 1.10 | 3.03 | 4.96  | 3.86 | 2.75  | 3.03  | .83   | .28  | .00  | 41.32  |
| (2)          | .03  | .00 | .03  | .13  | .20  | .10  | .24  | .16  | .05  | .13  | .21   | .16  | .12   | .13   | .03   | .01  | .00  | 1.73   |
| 13-18        | 1    | 1   | 5    | 9    | 6    | 1    | 7    | 16   | 3    | 5    | 28    | 9    | 17    | 16    | 20    | 1    | 0    | 145    |
| (1)          | .28  | .28 | 1.38 | 2.48 | 1.65 | .28  | 1.93 | 4.41 | .83  | 1.38 | 7.71  | 2.48 | 4.68  | 4.41  | 5.51  | .28  | .00  | 39.94  |
| (2)          | .01  | .01 | .06  | .10  | .07  | .01  | .08  | .18  | .03  | .06  | .32   | .10  | .20   | .18   | .23   | .01  | .00  | 1.67   |
| 19-24        | 0    | 0   | 0    | 0    | 0    | 0    | 0    | 1    | 1    | 1    | 6     | 0    | 7     | 15    | 17    | 1    | 0    | 49     |
| (1)          | .00  | .00 | .00  | .00  | .00  | .00  | .00  | .28  | .28  | .28  | 1.65  | .00  | 1.93  | 4.13  | 4.68  | .28  | .00  | 13.50  |
| (2)          | .00  | .00 | .00  | .00  | .00  | .00  | .00  | .01  | .01  | .01  | .07   | .00  | .08   | .17   | .20   | .01  | .00  | .57    |
| GT 24        | 0    | 0   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0    | 4     | 4     | 3     | 0    | 0    | 11     |
| (1)          | .00  | .00 | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00   | .00  | 1.10  | 1.10  | .83   | .00  | .00  | 3.03   |
| (2)          | .00  | .00 | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00   | .00  | .05   | .05   | .03   | .00  | .00  | .13    |
| ALL SPEEDS   | 4    | 1   | 8    | 21   | 23   | 11   | 28   | 31   | 9    | 17   | 53    | 24   | 38    | 47    | 44    | 4    | 0    | 363    |
| (1)          | 1.10 | .28 | 2.20 | 5.79 | 6.34 | 3.03 | 7.71 | 8.54 | 2.48 | 4.68 | 14.60 | 6.61 | 10.47 | 12.95 | 12.12 | 1.10 | .00  | 100.00 |
| (2)          | .05  | .01 | .09  | .24  | .27  | .13  | .32  | .36  | .10  | .20  | .61   | .28  | .44   | .54   | .51   | .05  | .00  | 4.19   |

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE

(2)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD

C= CALM (WIND SPEED LESS THAN OR EQUAL TO .95 MPH)

## SEABROOK JAN04-DEC04 MET DATA JOINT FREQUENCY DISTRIBUTION (210-FOOT TOWER)

209.0 FT WIND DATA

STABILITY CLASS D

CLASS FREQUENCY (PERCENT) = 50.04

WIND DIRECTION FROM

| SPEED<br>MPH | N    | NNE  | NE   | ENE  | E    | ESE  | SE   | SSE  | S    | SSW  | SW   | WSW  | W    | WNW   | NW    | NNW  | VRBL | TOTAL  |
|--------------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|------|------|--------|
| CALM         | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0    | 0    | 0      |
| (1)          | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00   | .00   | .00  | .00  | .00    |
| (2)          | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00   | .00   | .00  | .00  | .00    |
| C-3          | 12   | 8    | 8    | 12   | 9    | 4    | 7    | 11   | 9    | 8    | 8    | 8    | 5    | 9     | 18    | 11   | 0    | 147    |
| (1)          | .28  | .18  | .18  | .28  | .21  | .09  | .16  | .25  | .21  | .18  | .18  | .18  | .12  | .21   | .42   | .25  | .00  | 3.39   |
| (2)          | .14  | .09  | .09  | .14  | .10  | .05  | .08  | .13  | .10  | .09  | .09  | .09  | .06  | .10   | .21   | .13  | .00  | 1.70   |
| 4-7          | 62   | 47   | 33   | 67   | 79   | 73   | 76   | 44   | 38   | 39   | 35   | 37   | 38   | 42    | 63    | 48   | 0    | 821    |
| (1)          | 1.43 | 1.08 | .76  | 1.55 | 1.82 | 1.68 | 1.75 | 1.02 | .88  | .90  | .81  | .85  | .88  | .97   | 1.45  | 1.11 | .00  | 18.95  |
| (2)          | .72  | .54  | .38  | .77  | .91  | .84  | .88  | .51  | .44  | .45  | .40  | .43  | .44  | .49   | .73   | .55  | .00  | 9.48   |
| 8-12         | 120  | 83   | 63   | 97   | 122  | 129  | 77   | 117  | 68   | 89   | 112  | 100  | 93   | 168   | 127   | 63   | 0    | 1628   |
| (1)          | 2.77 | 1.92 | 1.45 | 2.24 | 2.82 | 2.98 | 1.78 | 2.70 | 1.57 | 2.05 | 2.58 | 2.31 | 2.15 | 3.88  | 2.93  | 1.45 | .00  | 37.57  |
| (2)          | 1.39 | .96  | .73  | 1.12 | 1.41 | 1.49 | .89  | 1.35 | .79  | 1.03 | 1.29 | 1.15 | 1.07 | 1.94  | 1.47  | .73  | .00  | 18.80  |
| 13-18        | 49   | 79   | 112  | 27   | 26   | 7    | 10   | 26   | 16   | 44   | 155  | 54   | 101  | 198   | 152   | 38   | 0    | 1094   |
| (1)          | 1.13 | 1.82 | 2.58 | .62  | .60  | .16  | .23  | .60  | .37  | 1.02 | 3.58 | 1.25 | 2.33 | 4.57  | 3.51  | .88  | .00  | 25.25  |
| (2)          | .57  | .91  | 1.29 | .31  | .30  | .08  | .12  | .30  | .18  | .51  | 1.79 | .62  | 1.17 | 2.29  | 1.76  | .44  | .00  | 12.63  |
| 19-24        | 8    | 16   | 43   | 15   | 5    | 9    | 2    | 0    | 4    | 1    | 19   | 6    | 41   | 201   | 115   | 8    | 0    | 493    |
| (1)          | .18  | .37  | .99  | .35  | .12  | .21  | .05  | .00  | .09  | .02  | .44  | .14  | .95  | 4.64  | 2.65  | .18  | .00  | 11.38  |
| (2)          | .09  | .18  | .50  | .17  | .06  | .10  | .02  | .00  | .05  | .01  | .22  | .07  | .47  | 2.32  | 1.33  | .09  | .00  | 5.69   |
| GT 24        | 0    | 1    | 35   | 1    | 0    | 1    | 1    | 0    | 0    | 0    | 4    | 0    | 17   | 54    | 36    | 0    | 0    | 150    |
| (1)          | .00  | .02  | .81  | .02  | .00  | .02  | .02  | .00  | .00  | .00  | .09  | .00  | .39  | 1.25  | .83   | .00  | .00  | 3.46   |
| (2)          | .00  | .01  | .40  | .01  | .00  | .01  | .01  | .00  | .00  | .00  | .05  | .00  | .20  | .62   | .42   | .00  | .00  | 1.73   |
| ALL SPEEDS   | 251  | 234  | 294  | 219  | 241  | 223  | 173  | 198  | 135  | 181  | 333  | 205  | 295  | 672   | 511   | 168  | 0    | 4333   |
| (1)          | 5.79 | 5.40 | 6.79 | 5.05 | 5.56 | 5.15 | 3.99 | 4.57 | 3.12 | 4.18 | 7.69 | 4.73 | 6.81 | 15.51 | 11.79 | 3.88 | .00  | 100.00 |
| (2)          | 2.90 | 2.70 | 3.40 | 2.53 | 2.78 | 2.58 | 2.00 | 2.29 | 1.56 | 2.09 | 3.85 | 2.37 | 3.41 | 7.76  | 5.90  | 1.94 | .00  | 50.04  |

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE

(2)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD

C= CALM (WIND SPEED LESS THAN OR EQUAL TO .95 MPH)

## SEABROOK JAN04-DEC04 MET DATA JOINT FREQUENCY DISTRIBUTION (210-FOOT TOWER)

209.0 FT WIND DATA

STABILITY CLASS E

CLASS FREQUENCY (PERCENT) = 30.37

WIND DIRECTION FROM

| SPEED<br>MPH | N    | NNE  | NE   | ENE  | E    | ESE  | SE   | SSE  | S    | SSW  | SW    | WSW  | W    | WNW   | NW    | NNW  | VRBL | TOTAL  |
|--------------|------|------|------|------|------|------|------|------|------|------|-------|------|------|-------|-------|------|------|--------|
| CALM         | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 1    | 0    | 0     | 0     | 0    | 0    | 1      |
| (1)          | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00   | .04  | .00  | .00   | .00   | .00  | .00  | .04    |
| (2)          | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00   | .01  | .00  | .00   | .00   | .00  | .00  | .01    |
| C-3          | 2    | 7    | 13   | 8    | 9    | 9    | 6    | 10   | 9    | 7    | 6     | 10   | 5    | 4     | 11    | 7    | 0    | 123    |
| (1)          | .08  | .27  | .49  | .30  | .34  | .34  | .23  | .38  | .34  | .27  | .23   | .38  | .19  | .15   | .42   | .27  | .00  | 4.68   |
| (2)          | .02  | .08  | .15  | .09  | .10  | .10  | .07  | .12  | .10  | .08  | .07   | .12  | .06  | .05   | .13   | .08  | .00  | 1.42   |
| 4-7          | 24   | 15   | 13   | 21   | 27   | 28   | 44   | 36   | 49   | 33   | 37    | 26   | 18   | 33    | 26    | 19   | 0    | 449    |
| (1)          | .91  | .57  | .49  | .80  | 1.03 | 1.06 | 1.67 | 1.37 | 1.86 | 1.25 | 1.41  | .99  | .68  | 1.25  | .99   | .72  | .00  | 17.07  |
| (2)          | .28  | .17  | .15  | .24  | .31  | .32  | .51  | .42  | .57  | .38  | .43   | .30  | .21  | .38   | .30   | .22  | .00  | 5.19   |
| 8-12         | 65   | 27   | 24   | 14   | 11   | 21   | 27   | 66   | 101  | 118  | 148   | 96   | 108  | 161   | 156   | 70   | 0    | 1213   |
| (1)          | 2.47 | 1.03 | .91  | .53  | .42  | .80  | 1.03 | 2.51 | 3.84 | 4.49 | 5.63  | 3.65 | 4.11 | 6.12  | 5.93  | 2.66 | .00  | 46.12  |
| (2)          | .75  | .31  | .28  | .16  | .13  | .24  | .31  | .76  | 1.17 | 1.36 | 1.71  | 1.11 | 1.25 | 1.86  | 1.80  | .81  | .00  | 14.01  |
| 13-18        | 21   | 13   | 18   | 5    | 6    | 2    | 11   | 24   | 17   | 32   | 98    | 102  | 99   | 106   | 136   | 24   | 0    | 714    |
| (1)          | .80  | .49  | .68  | .19  | .23  | .08  | .42  | .91  | .65  | 1.22 | 3.73  | 3.88 | 3.76 | 4.03  | 5.17  | .91  | .00  | 27.15  |
| (2)          | .24  | .15  | .21  | .06  | .07  | .02  | .13  | .28  | .20  | .37  | 1.13  | 1.18 | 1.14 | 1.22  | 1.57  | .28  | .00  | 8.25   |
| 19-24        | 0    | 1    | 14   | 0    | 14   | 3    | 7    | 7    | 3    | 2    | 15    | 5    | 11   | 13    | 10    | 0    | 0    | 105    |
| (1)          | .00  | .04  | .53  | .00  | .53  | .11  | .27  | .27  | .11  | .08  | .57   | .19  | .42  | .49   | .38   | .00  | .00  | 3.99   |
| (2)          | .00  | .01  | .16  | .00  | .16  | .03  | .08  | .08  | .03  | .02  | .17   | .06  | .13  | .15   | .12   | .00  | .00  | 1.21   |
| GT 24        | 0    | 0    | 0    | 2    | 8    | 0    | 1    | 4    | 1    | 0    | 1     | 1    | 3    | 4     | 0     | 0    | 0    | 25     |
| (1)          | .00  | .00  | .00  | .08  | .30  | .00  | .04  | .15  | .04  | .00  | .04   | .04  | .11  | .15   | .00   | .00  | .00  | .95    |
| (2)          | .00  | .00  | .00  | .02  | .09  | .00  | .01  | .05  | .01  | .00  | .01   | .01  | .03  | .05   | .00   | .00  | .00  | .29    |
| ALL SPEEDS   | 112  | 63   | 82   | 50   | 75   | 63   | 96   | 147  | 180  | 192  | 305   | 241  | 244  | 321   | 339   | 120  | 0    | 2630   |
| (1)          | 4.26 | 2.40 | 3.12 | 1.90 | 2.85 | 2.40 | 3.65 | 5.59 | 6.84 | 7.30 | 11.60 | 9.16 | 9.28 | 12.21 | 12.89 | 4.56 | .00  | 100.00 |
| (2)          | 1.29 | .73  | .95  | .58  | .87  | .73  | 1.11 | 1.70 | 2.08 | 2.22 | 3.52  | 2.78 | 2.82 | 3.71  | 3.92  | 1.39 | .00  | 30.37  |

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE

(2)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD

C= CALM (WIND SPEED LESS THAN OR EQUAL TO .95 MPH)

## SEABROOK JAN04-DEC04 MET DATA JOINT FREQUENCY DISTRIBUTION (210-FOOT TOWER)

209.0 FT WIND DATA

STABILITY CLASS F

CLASS FREQUENCY (PERCENT) = 7.80

## WIND DIRECTION FROM

| SPEED<br>MPH | N    | NNE  | NE   | ENE  | E    | ESE  | SE   | SSE  | S    | SSW  | SW   | WSW  | W     | WNW   | NW    | NNW  | VRBL | TOTAL  |
|--------------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|-------|------|------|--------|
| CALM         | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0     | 0    | 0    | 0      |
| (1)          | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00   | .00   | .00   | .00  | .00  | .00    |
| (2)          | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00   | .00   | .00   | .00  | .00  | .00    |
| C-3          | 2    | 3    | 4    | 6    | 2    | 4    | 2    | 2    | 3    | 2    | 5    | 3    | 5     | 3     | 1     | 2    | 0    | 49     |
| (1)          | .30  | .44  | .59  | .89  | .30  | .59  | .30  | .30  | .44  | .30  | .74  | .44  | .74   | .44   | .15   | .30  | .00  | 7.26   |
| (2)          | .02  | .03  | .05  | .07  | .02  | .05  | .02  | .02  | .03  | .02  | .06  | .03  | .06   | .03   | .01   | .02  | .00  | .57    |
| 4-7          | 7    | 8    | 7    | 5    | 5    | 10   | 5    | 9    | 6    | 21   | 18   | 14   | 10    | 10    | 9     | 5    | 0    | 149    |
| (1)          | 1.04 | 1.19 | 1.04 | .74  | .74  | 1.48 | .74  | 1.33 | .89  | 3.11 | 2.67 | 2.07 | 1.48  | 1.48  | 1.33  | .74  | .00  | 22.07  |
| (2)          | .08  | .09  | .08  | .06  | .06  | .12  | .06  | .10  | .07  | .24  | .21  | .16  | .12   | .12   | .10   | .06  | .00  | 1.72   |
| 8-12         | 22   | 12   | 3    | 4    | 1    | 4    | 4    | 9    | 24   | 29   | 29   | 27   | 31    | 39    | 52    | 29   | 0    | 319    |
| (1)          | 3.26 | 1.78 | .44  | .59  | .15  | .59  | .59  | 1.33 | 3.56 | 4.30 | 4.30 | 4.00 | 4.59  | 5.78  | 7.70  | 4.30 | .00  | 47.26  |
| (2)          | .25  | .14  | .03  | .05  | .01  | .05  | .05  | .10  | .28  | .33  | .33  | .31  | .36   | .45   | .60   | .33  | .00  | 3.68   |
| 13-18        | 3    | 3    | 0    | 1    | 0    | 1    | 0    | 3    | 3    | 4    | 12   | 22   | 26    | 23    | 42    | 15   | 0    | 158    |
| (1)          | .44  | .44  | .00  | .15  | .00  | .15  | .00  | .44  | .44  | .59  | 1.78 | 3.26 | 3.85  | 3.41  | 6.22  | 2.22 | .00  | 23.41  |
| (2)          | .03  | .03  | .00  | .01  | .00  | .01  | .00  | .03  | .03  | .05  | .14  | .25  | .30   | .27   | .49   | .17  | .00  | 1.82   |
| 19-24        | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0     | 0    | 0    | 0      |
| (1)          | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00   | .00   | .00   | .00  | .00  | .00    |
| (2)          | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00   | .00   | .00   | .00  | .00  | .00    |
| GT 24        | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0     | 0    | 0    | 0      |
| (1)          | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00   | .00   | .00   | .00  | .00  | .00    |
| (2)          | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00   | .00   | .00   | .00  | .00  | .00    |
| ALL SPEEDS   | 34   | 26   | 14   | 16   | 8    | 19   | 11   | 23   | 36   | 56   | 64   | 66   | 72    | 75    | 104   | 51   | 0    | 675    |
| (1)          | 5.04 | 3.85 | 2.07 | 2.37 | 1.19 | 2.81 | 1.63 | 3.41 | 5.33 | 8.30 | 9.48 | 9.78 | 10.67 | 11.11 | 15.41 | 7.56 | .00  | 100.00 |
| (2)          | .39  | .30  | .16  | .18  | .09  | .22  | .13  | .27  | .42  | .65  | .74  | .76  | .83   | .87   | 1.20  | .59  | .00  | 7.80   |

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE

(2)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD

C= CALM (WIND SPEED LESS THAN OR EQUAL TO .95 MPH)

## SEABROOK JAN04-DEC04 MET DATA JOINT FREQUENCY DISTRIBUTION (210-FOOT TOWER)

209.0 FT WIND DATA

STABILITY CLASS G

CLASS FREQUENCY (PERCENT) = 5.52

## WIND DIRECTION FROM

| SPEED<br>MPH | N    | NNE  | NE   | ENE  | E   | ESE  | SE   | SSE  | S    | SSW  | SW    | WSW   | W    | WNW   | NW    | NNW   | VRBL | TOTAL  |
|--------------|------|------|------|------|-----|------|------|------|------|------|-------|-------|------|-------|-------|-------|------|--------|
| CALM         | 0    | 0    | 0    | 0    | 0   | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0    | 0     | 0     | 0     | 0    | 0      |
| (1)          | .00  | .00  | .00  | .00  | .00 | .00  | .00  | .00  | .00  | .00  | .00   | .00   | .00  | .00   | .00   | .00   | .00  | .00    |
| (2)          | .00  | .00  | .00  | .00  | .00 | .00  | .00  | .00  | .00  | .00  | .00   | .00   | .00  | .00   | .00   | .00   | .00  | .00    |
| C-3          | 5    | 1    | 1    | 2    | 1   | 4    | 1    | 0    | 7    | 3    | 1     | 6     | 12   | 1     | 4     | 2     | 0    | 51     |
| (1)          | 1.05 | .21  | .21  | .42  | .21 | .84  | .21  | .00  | 1.46 | .63  | .21   | 1.26  | 2.51 | .21   | .84   | .42   | .00  | 10.67  |
| (2)          | .06  | .01  | .01  | .02  | .01 | .05  | .01  | .00  | .08  | .03  | .01   | .07   | .14  | .01   | .05   | .02   | .00  | .59    |
| 4-7          | 5    | 10   | 4    | 4    | 3   | 5    | 5    | 5    | 14   | 6    | 24    | 25    | 13   | 15    | 17    | 12    | 0    | 167    |
| (1)          | 1.05 | 2.09 | .84  | .84  | .63 | 1.05 | 1.05 | 1.05 | 2.93 | 1.26 | 5.02  | 5.23  | 2.72 | 3.14  | 3.56  | 2.51  | .00  | 34.94  |
| (2)          | .06  | .12  | .05  | .05  | .03 | .06  | .06  | .06  | .16  | .07  | .28   | .29   | .15  | .17   | .20   | .14   | .00  | 1.93   |
| 8-12         | 19   | 4    | 4    | 2    | 0   | 1    | 1    | 2    | 11   | 18   | 28    | 24    | 13   | 34    | 37    | 17    | 0    | 215    |
| (1)          | 3.97 | .84  | .84  | .42  | .00 | .21  | .21  | .42  | 2.30 | 3.77 | 5.86  | 5.02  | 2.72 | 7.11  | 7.74  | 3.56  | .00  | 44.98  |
| (2)          | .22  | .05  | .05  | .02  | .00 | .01  | .01  | .02  | .13  | .21  | .32   | .28   | .15  | .39   | .43   | .20   | .00  | 2.48   |
| 13-18        | 2    | 3    | 0    | 0    | 0   | 0    | 0    | 0    | 0    | 2    | 1     | 7     | 0    | 4     | 8     | 18    | 0    | 45     |
| (1)          | .42  | .63  | .00  | .00  | .00 | .00  | .00  | .00  | .00  | .42  | .21   | 1.46  | .00  | .84   | 1.67  | 3.77  | .00  | 9.41   |
| (2)          | .02  | .03  | .00  | .00  | .00 | .00  | .00  | .00  | .00  | .02  | .01   | .08   | .00  | .05   | .09   | .21   | .00  | .52    |
| 19-24        | 0    | 0    | 0    | 0    | 0   | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0    | 0     | 0     | 0     | 0    | 0      |
| (1)          | .00  | .00  | .00  | .00  | .00 | .00  | .00  | .00  | .00  | .00  | .00   | .00   | .00  | .00   | .00   | .00   | .00  | .00    |
| (2)          | .00  | .00  | .00  | .00  | .00 | .00  | .00  | .00  | .00  | .00  | .00   | .00   | .00  | .00   | .00   | .00   | .00  | .00    |
| GT 24        | 0    | 0    | 0    | 0    | 0   | 0    | 0    | 0    | 0    | 0    | 0     | 0     | 0    | 0     | 0     | 0     | 0    | 0      |
| (1)          | .00  | .00  | .00  | .00  | .00 | .00  | .00  | .00  | .00  | .00  | .00   | .00   | .00  | .00   | .00   | .00   | .00  | .00    |
| (2)          | .00  | .00  | .00  | .00  | .00 | .00  | .00  | .00  | .00  | .00  | .00   | .00   | .00  | .00   | .00   | .00   | .00  | .00    |
| ALL SPEEDS   | 31   | 18   | 9    | 8    | 4   | 10   | 7    | 7    | 32   | 29   | 54    | 62    | 38   | 54    | 66    | 49    | 0    | 478    |
| (1)          | 6.49 | 3.77 | 1.88 | 1.67 | .84 | 2.09 | 1.46 | 1.46 | 6.69 | 6.07 | 11.30 | 12.97 | 7.95 | 11.30 | 13.81 | 10.25 | .00  | 100.00 |
| (2)          | .36  | .21  | .10  | .09  | .05 | .12  | .08  | .08  | .37  | .33  | .62   | .72   | .44  | .62   | .76   | .57   | .00  | 5.52   |

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE

(2)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD

C= CALM (WIND SPEED LESS THAN OR EQUAL TO .95 MPH)

## SEABROOK JAN04-DEC04 MET DATA JOINT FREQUENCY DISTRIBUTION (210-FOOT TOWER)

209.0 FT WIND DATA

STABILITY CLASS ALL

CLASS FREQUENCY (PERCENT) = 100.00

## WIND DIRECTION FROM

| SPEED<br>MPH | N    | NNE  | NE   | ENE  | E    | ESE  | SE   | SSE  | S    | SSW  | SW   | WSW  | W    | WNW   | NW    | NNW  | VRBL | TOTAL  |
|--------------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|-------|------|------|--------|
| CALM         | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 0     | 0     | 0    | 0    | 1      |
| (1)          | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .01  | .00  | .00   | .00   | .00  | .00  | .01    |
| (2)          | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .00  | .01  | .00  | .00   | .00   | .00  | .00  | .01    |
| C-3          | 21   | 19   | 26   | 29   | 21   | 21   | 16   | 23   | 28   | 20   | 20   | 27   | 27   | 19    | 34    | 23   | 0    | 374    |
| (1)          | .24  | .22  | .30  | .33  | .24  | .24  | .18  | .27  | .32  | .23  | .23  | .31  | .31  | .22   | .39   | .27  | .00  | 4.32   |
| (2)          | .24  | .22  | .30  | .33  | .24  | .24  | .18  | .27  | .32  | .23  | .23  | .31  | .31  | .22   | .39   | .27  | .00  | 4.32   |
| 4-7          | 98   | 80   | 57   | 97   | 116  | 117  | 130  | 94   | 108  | 99   | 116  | 103  | 79   | 100   | 116   | 85   | 0    | 1595   |
| (1)          | 1.13 | .92  | .66  | 1.12 | 1.34 | 1.35 | 1.50 | 1.09 | 1.25 | 1.14 | 1.34 | 1.19 | .91  | 1.15  | 1.34  | .98  | .00  | 18.42  |
| (2)          | 1.13 | .92  | .66  | 1.12 | 1.34 | 1.35 | 1.50 | 1.09 | 1.25 | 1.14 | 1.34 | 1.19 | .91  | 1.15  | 1.34  | .98  | .00  | 18.42  |
| 8-12         | 229  | 126  | 97   | 129  | 151  | 166  | 149  | 217  | 209  | 267  | 336  | 264  | 262  | 417   | 377   | 180  | 0    | 3576   |
| (1)          | 2.64 | 1.46 | 1.12 | 1.49 | 1.74 | 1.92 | 1.72 | 2.51 | 2.41 | 3.08 | 3.88 | 3.05 | 3.03 | 4.82  | 4.35  | 2.08 | .00  | 41.30  |
| (2)          | 2.64 | 1.46 | 1.12 | 1.49 | 1.74 | 1.92 | 1.72 | 2.51 | 2.41 | 3.08 | 3.88 | 3.05 | 3.03 | 4.82  | 4.35  | 2.08 | .00  | 41.30  |
| 13-18        | 76   | 100  | 136  | 50   | 42   | 11   | 46   | 79   | 39   | 94   | 299  | 206  | 246  | 356   | 359   | 96   | 0    | 2235   |
| (1)          | .88  | 1.15 | 1.57 | .58  | .49  | .13  | .53  | .91  | .45  | 1.09 | 3.45 | 2.38 | 2.84 | 4.11  | 4.15  | 1.11 | .00  | 25.81  |
| (2)          | .88  | 1.15 | 1.57 | .58  | .49  | .13  | .53  | .91  | .45  | 1.09 | 3.45 | 2.38 | 2.84 | 4.11  | 4.15  | 1.11 | .00  | 25.81  |
| 19-24        | 8    | 17   | 62   | 15   | 19   | 12   | 12   | 15   | 8    | 4    | 43   | 12   | 61   | 238   | 151   | 9    | 0    | 686    |
| (1)          | .09  | .20  | .72  | .17  | .22  | .14  | .14  | .17  | .09  | .05  | .50  | .14  | .70  | 2.75  | 1.74  | .10  | .00  | 7.92   |
| (2)          | .09  | .20  | .72  | .17  | .22  | .14  | .14  | .17  | .09  | .05  | .50  | .14  | .70  | 2.75  | 1.74  | .10  | .00  | 7.92   |
| GT 24        | 0    | 1    | 35   | 3    | 8    | 1    | 2    | 4    | 1    | 0    | 5    | 1    | 26   | 65    | 40    | 0    | 0    | 192    |
| (1)          | .00  | .01  | .40  | .03  | .09  | .01  | .02  | .05  | .01  | .00  | .06  | .01  | .30  | .75   | .46   | .00  | .00  | 2.22   |
| (2)          | .00  | .01  | .40  | .03  | .09  | .01  | .02  | .05  | .01  | .00  | .06  | .01  | .30  | .75   | .46   | .00  | .00  | 2.22   |
| ALL SPEEDS   | 432  | 343  | 413  | 323  | 357  | 328  | 355  | 432  | 393  | 484  | 819  | 614  | 701  | 1195  | 1077  | 393  | 0    | 8659   |
| (1)          | 4.99 | 3.96 | 4.77 | 3.73 | 4.12 | 3.79 | 4.10 | 4.99 | 4.54 | 5.59 | 9.46 | 7.09 | 8.10 | 13.80 | 12.44 | 4.54 | .00  | 100.00 |
| (2)          | 4.99 | 3.96 | 4.77 | 3.73 | 4.12 | 3.79 | 4.10 | 4.99 | 4.54 | 5.59 | 9.46 | 7.09 | 8.10 | 13.80 | 12.44 | 4.54 | .00  | 100.00 |

(1)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PAGE

(2)=PERCENT OF ALL GOOD OBSERVATIONS FOR THIS PERIOD

C= CALM (WIND SPEED LESS THAN OR EQUAL TO .95 MPH)

**ENCLOSURE 3 TO SBK-L-05103**

Radiation Dose Assessment

**Seabrook Station**  
**Radiological Effluent Impact Assessment For 2004**  
**(Annual Radioactive Effluent Release Report)**

**I. Summary**

Seabrook Technical Specification Sections 6.7.6.g.4 & 9 require that limitations be placed on the quarterly and annual doses or dose commitments to Members of the Public from radioactive materials in liquid and gaseous effluents released from the station to Unrestricted Areas at or beyond the site boundary conforming to the dose objectives of Appendix I to 10 CFR Part 50. Technical Specification 6.7.6.g.8 requires that limitations on the quarterly and annual air doses resulting from noble gases released in gaseous effluents to areas beyond the site boundary also conform to Appendix I to 10 CFR Part 50. In a similar fashion, Technical Specification 6.7.6.g.11 requires limitations on the annual dose or dose commitment to any Member of the Public due to radioactivity and radiation from uranium fuel cycle sources conforming to the EPA Radiation Standards in 40 CFR Part 190. The following table details the above referenced effluent dose limits.

**DOSE OBJECTIVE CRITERIA FOR COMPLIANCE**

| EFFLUENT TYPE                                | DOSE TYPE          | QUARTERLY LIMITS | ANNUAL LIMITS |
|--|--------------------|------------------|---------------|
| LIQUIDS (10CFR50, APP. I)                    | Total Body         | 1.5 mrem         | 3 mrem        |
|  | Max. Organ         | 5 mrem           | 10 mrem       |
| NOBLE GAS (10CFR50, APP. I)                  | Gamma Air          | 5 mrad           | 10 mrad       |
|  | Beta Air           | 10 mrad          | 20 mrad       |
| GAS PARTICULATE (10CFR50, APP. I)            | Max. Organ         | 7.5 mrem         | 15 mrem       |
| TOTAL DOSE (40CFR190) [liquids, gas, direct] | Total Body & organ |                  | 25 mrem       |
|  | Thyroid            | ---              | 75 mrem       |

Technical Specification 6.8.1.4 and the Seabrook Offsite Dose Calculation Manual (ODCM) Part A, Section 10.2, provides that the Station's Annual Radioactive Effluent Release Report include a demonstration of compliance with the above off-site dose limitations, as well as the determination of dose impacts to Members of the Public who may be associated with permitted activities inside the site boundary.

Doses resulting from actual liquid and gaseous effluents from Seabrook Station during 2004 were calculated in accordance with Method II as defined in the Station Offsite Dose Calculation Manual. The calculation methods follow the models in Regulatory Guide 1.109 (Reference 1). The assessments included maximum whole body doses and organ doses from all liquid releases, maximum offsite organ doses resulting from airborne iodines, tritium and particulate radionuclides with half-lives greater than eight days, and maximum offsite beta air and gamma air doses from airborne noble gases. In addition, the potential direct dose from fixed radiation sources from plant operations was evaluated as part of the assessment required under 40 CFR Part 190 for doses from the uranium fuel cycle.

Doses were also calculated for the special receptor locations inside the site boundary where the public might be granted access for recreational or educational purposes. The Science and Nature Center is



located in the southwest portion of the site and offers educational opportunities on nuclear power and the environment. The "Rocks" is an area northeast of the main plant facilities with access to Brown's Creek and the tidal marsh that borders the site.

All calculated liquid and gaseous pathway doses for the 2004 reporting period are well below the dose criteria of 10CFR50, Appendix I, and the dose limits for effluent releases stated in the ODCM. In addition, the total dose to the most limiting Member of the Public due to the combined exposure to plant-related direct radiation, and liquid and gaseous effluents, was below the dose standards of 40CFR190.

## II. Method for Calculating the Total Body and Maximum Organ Doses Resulting from Liquid Releases

Liquid waste generated during plant operations is processed and discharged to the environment via the station's circulating water-cooling system. The cooling system utilizes an offshore-submerged multiport diffuser discharge for rapid dissipation and mixing of liquid effluents in the ocean environment. A 22-port diffuser section of the discharge system is located in approximately 50 to 60 feet of water with each nozzle 7 to 10 feet above the sea floor. Eleven riser shafts, with two diffuser nozzles each for the diffuser, are spaced about 100 feet apart over a distance of about 1000 feet. Water is discharged in a generally eastward direction away from the shoreline through the multiport diffuser, beginning at a location over one mile offshore. During power operations, these high velocity jets passively entrain about ten volumes of fresh water into the near field jet-mixing region before the plume reaches the water surface. This arrangement also effectively prevents the discharge plume (at least to the 1 degree or 40 to 1 dilution isopleth) from impacting the shoreline over the tidal cycle.

During shutdown periods, the high velocity jet mixing created by the normal circulating water flow at the diffuser nozzles is reduced. However, mixing within the discharge tunnel water volume is significantly increased due to the long transit time for batch discharges to travel the three miles from the plant through the 19-foot diameter tunnels to the diffuser nozzles. Additional mixing of the effluent in the near field assures that an equivalent overall 10 to 1 dilution occurs by the time reaches the ocean surface.

The exposure pathways considered in the calculations of total body and maximum organ doses resulting from liquid discharges from Seabrook Station are limited to ingestion of aquatic foods and exposure to shoreline deposits. The dose calculations do not include the ingestion of potable water or irrigated vegetation as potential exposure pathways because the liquid effluents from the plant are discharged into salt water.

The dose assessment models utilized in the Offsite Dose Calculation Manual (ODCM) (Reference 2) are taken from Regulatory Guide 1.109 (Reference 1). The total body and organ doses are evaluated for each of the four age groups (i.e., infant, child, teen and adult) to determine the maximum total body dose and maximum organ dose via all existing exposure pathways (i.e., fish and aquatic invertebrate ingestion, and shoreline exposure) to an age-dependent individual from all detected radionuclides in plant releases. The values for the various factors considered in the model equations are provided in Regulatory Guide 1.109 and the ODCM (see Table D). The flow rate of the liquid effluent ( $F$ ) and the radionuclide activities ( $Q_i$ ) are measured specifically prior to each liquid release. The values for half-lives for radionuclides ( $T_{1/2}$ ) and their radioactive decay constants ( $\lambda_i$ ) have been taken from Kocher (Reference 3).

Table A presents the calculated liquid pathway doses for each calendar quarter and total for the year. The calculated annual doses as a percent of the applicable regulatory limits are shown in Table C. The estimated quarterly and annual doses resulting from liquid effluents to members of the public are well below all dose limit criteria.

### III. Method for Calculating the Gamma and Beta Air Doses from Noble Gases

Gamma and beta air doses due to noble gases in gaseous effluents are calculated for several receptor locations when noble gases are recorded in effluents. Those locations include the points of estimated highest off-site ground level air concentration of radioactive material, site boundary (or closest point on the opposite shoreline in directions which are bordered by the tidal marsh), nearest resident, nearest vegetable garden, and nearest milk animal within five miles for each of the sixteen principle compass directions. The special on-site receptor locations (Science and Nature Center and the "Rocks") are also included.

Atmospheric dispersion factors (i.e.,  $X/Q$  factors) calculated from recorded concurrent site meteorological data (i.e., meteorological data measurements taken during the time of the release) are used in the estimation of receptor specific air concentrations due to station effluents. The atmospheric dispersion estimations utilize methodology generally consistent with US NRC Regulatory Guide 1.111 (Reference 4). Beta air doses use undepleted  $X/Q$ 's and assumes a semi-infinite plume at the point of exposure. Gamma air doses are calculated using the finite cloud model presented in "Meteorology and Atomic Energy – 1968" (Reference 5). That model is implemented through the definition of an effective gamma atmospheric dispersion factor  $[X/Q']$  (Reference 6) and the replacement of the undepleted  $X/Q$  in the infinite cloud dose equation by  $[X/Q']$ .

The release point of effluents is also considered in the atmospheric dispersion calculation. The primary vent stack is treated as a "mixed-mode" release, as defined in Regulatory Guide 1.111. These effluents are considered to be part-time ground level / part-time elevated releases depending on the ratio of primary vent stack exit velocity relative to the speed of prevailing wind. All other release points (e.g., Turbine Building and Chemistry lab hoods) are considered ground-level releases. The beta air and gamma air dose calculations are consistent with the models presented in Regulatory Guide 1.109 (Reference 1). The values for the dose factors,  $DF_i^{\gamma}$  and  $DF_i^{\beta}$ , have been taken from Table B-1 in Regulatory Guide 1.109.

Table A presents the calculated maximum off-site gamma air and beta air doses for each calendar quarter and year. The calculated annual doses as a percent of the applicable regulatory limit are shown in Table C. The estimated quarterly and annual air doses resulting from noble gas effluents are well below all dose limit criteria.

#### IV. Method for Calculating the Critical Organ Dose Resulting from Iodines, Tritium and Particulates with T 1/2 Greater than 8 Days in Gaseous Releases

Regulatory Guide 1.109 dose models are applied in the calculation of the critical organ doses from iodines, tritium and particulate radionuclides released into the atmosphere during reporting period. Atmospheric dispersion and deposition factors (i.e., depleted X/Q and D/Q factors) calculated with concurrent meteorological data (i.e., meteorological data measurements taken during the time of the release) are used in the determination of gaseous pathway doses. The dispersion models are described in Section B.7.3.2 & .3 of the Seabrook ODCM.

Potential exposure pathways associated with gaseous effluent are (i) external irradiation from radioactivity deposited on the ground surface, (ii) inhalation, and (iii) ingestion of vegetables (both fresh leafy and stored), meat, and milk. Dose estimates were determined for the site boundary and for the locations of the nearest resident, vegetable garden, and milk animal in each of the sixteen principle compass directions. The locations of the nearest resident, vegetable garden and milk animal in each sector were identified by the 2004 Annual Land Use Census as required by ODCM Control C.9.2.1 (see Table F). Additionally, doses were calculated at the point of approximate maximum ground level air concentration of radioactive materials in gaseous effluent. Conservatism in the dose estimates was maintained by assuming that the vegetable garden pathway was active at each milk animal location. Though not required to be part of the land use census, meat animal (cattle) locations are included in the assessment when identified. Meat and milk animals were assumed to receive their entire intake from pasture during the second and third quarters. This is a conservative assumption because most dairy operations utilize supplemental feeding when animals are on pasture, or actually restrict animals to full time silage feeding throughout the entire year. Table E provides the reference sources for dose model parameter assumptions used in the dose assessment.

The maximum organ doses were determined by summing the contributions from all exposure pathways at each location, and sorting in descending order. Doses were calculated for the whole body, GI-LLI, bone, liver, kidney, thyroid, lung, and skin for adults, teenagers, children, and infants. The estimated quarterly and annual organ doses due to iodines, tritium and particulates at the location of the maximally exposed individual are reported in Table A.

The estimated organ doses from iodines, tritium and particulates in gaseous effluents are well below the 10CFR50, Appendix I dose criteria for the reporting period (See Table C for calculated dose as a percentage of annual limits).

V. Total Dose (40 CFR Part 190)

40 CFR 190 states that the annual dose equivalent should not exceed 25 mrem to the whole body, 75 mrem to the Thyroid, or 25 mrem to any other organ of any Member of the Public from all uranium fuel cycle sources. To show compliance with this standard, the maximum doses for both the liquid and gaseous pathways from Seabrook Station are added together with the whole body dose from noble gas releases and any direct radiation component attributed to plant fixed sources to the maximum receptor location. Since there are no other uranium fuel cycle facilities within five miles of Seabrook, no additional impacts from sources beyond Seabrook Station need be considered.

The sum of the maximum annual whole body doses to Members of the Public from all exposure pathways for liquid and gaseous effluents, plus the direct external dose from station fixed sources, was 1.57E-02 mrem to a hypothetical individual at or beyond the site boundary. The maximum organ dose (including the thyroid) to any age group from all exposure pathways including direct radiation was 1.69E-02 mrem.

Table B illustrates the total dose projections from all station sources to the maximum potential off-site individual for the year 2004 and demonstrates compliance with the EPA's environmental radiation standard for the uranium fuel cycle per 40 CFR Part 190 (See Table C for total dose as a percentage of annual limit).

VI. References

1. Regulatory Guide 1.109, Revision 1, "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purposes of Evaluating Compliance with 10CFR Part 50, Appendix I", USNRC, October 1977.
2. Seabrook Station Offsite Dose Calculation Manual, Revision 28
3. Kocher, D.C., Dose-Rate Conversion Factors for Exposure to Photons and Electrons, Health Physics, Vol. 45, No. 3, Sept. 1983.
4. Regulatory Guide 1.111, Revision 1, "Method for Estimating Atmospheric Transport and Dispersion of Gaseous Effluents in Routine Releases from Light-Water Cooled Reactors", USNRC, July 1977.
5. Slade, D.H., "Meteorology and Atomic Energy – 1968", USAEC, July 1968.
6. Hamawi, J.N., "AEOLUS-2 A computer Code for the Determination of Continuous and Intermittent-Release Atmospheric Dispersion and Deposition of Nuclear Power Plant Effluents in Open-Terrain Sites, Coastal Sites, and Deep-River Valleys for the Assessment of Ensuing Doses and Finite-Cloud Gamma Radiation Exposures", Entech Engineering, Inc., March 1988.

Table A

Seabrook Station  
2004 Annual Radioactive Effluent Release Report

Maximum<sup>(a)</sup> Off-Site Doses and Dose Commitments to Members of the Public

| Dose (mrem) <sup>(b)</sup>   |                     |                  |                  |                  |                             |          |
|--|---------------------|------------------|------------------|------------------|-----------------------------|----------|
| Release Type   | 1st<br>Quarter      | 2nd<br>Quarter   | 3rd<br>Quarter   | 4th<br>Quarter   | Year <sup>(c)</sup><br>2004 |          |
| Liquid Effluents:  |                     |                  |                  |                  |                             |          |
| Total Body Dose  | 1.95E-04<br>(1)     | 3.15E-05<br>(1)  | 5.26E-05<br>(1)  | 4.85E-05<br>(2)  | 3.28E-04                    |          |
| Organ Dose   | 1.07E-03<br>(4)     | 1.46E-04<br>(4)  | 2.36E-04<br>(4)  | 7.33E-05<br>(3)  | 1.53E-03                    |          |
| Airborne Effluents:  |                     |                  |                  |                  |                             |          |
| Organ Dose from Iodines,<br>Tritium, and Particulates                    | 2.40E-03<br>(5)     | 4.23E-03<br>(5)  | 3.73E-03<br>(6)  | 5.04E-03<br>(7)  | 1.54E-02                    |          |
| Noble Gases  | Beta Air<br>(mrad)  | 6.82E-08<br>(8)  | 8.22E-06<br>(9)  | 3.15E-07<br>(8)  | 5.18E-07<br>(11)            | 9.12E-06 |
|  | Gamma Air<br>(mrad) | 3.13E-07<br>(8)  | 1.84E-05<br>(10) | 5.67E-07<br>(8)  | 1.25E-06<br>(12)            | 2.05E-05 |
| Direct Dose Offsite From<br>Plant Operation <sup>(e)</sup>               |                     |                  |                  |                  | 0                           |          |
| Doses (mrem) at Receptor Locations Inside Site Boundary <sup>(d)</sup> : |                     |                  |                  |                  |                             |          |
| Science and Nature Center (SW, 488m):                                    | 1.92E-06<br>(d1)    | 3.39E-06<br>(d1) | 2.39E-06<br>(d2) | 1.58E-06<br>(d2) | 9.28E-06                    |          |
| Organ Dose (mrem)  |                     |                  |                  |                  |                             |          |
| The "Rocks" (NE/ENE, 244m):  | 5.28E-05<br>(d1)    | 9.96E-05<br>(d1) | 8.28E-05<br>(d2) | 7.03E-05<br>(d2) | 3.06E-04                    |          |
| Organ Dose (mrem)  |                     |                  |                  |                  |                             |          |

Table A (continued)

Seabrook Station  
2004 Annual Radioactive Effluent Release Report

Maximum<sup>(a)</sup> Off-Site Doses and Dose Commitments to Members of the Public

NOTES:

- (a) "Maximum means the largest fraction of corresponding 10CFR50, Appendix I, dose design objective.
- (b) The numbered footnotes indicate the age group, organ, and location (compass sector and distance from the primary vent in meters) of the dose receptor, where appropriate.
- (1) Child
  - (2) Adult
  - (3) Liver of an adult.
  - (4) Bone of a child.
  - (5) Liver, kidney, lung, GI-LLI, thyroid, and whole body of a child, SW 1130 m.
  - (7) GI-LLI of a child, W 1315 m .
  - (8) Liver, kidney, lung, GI-LLI, thyroid, and whole body of a Child, NNW 1009 m.
  - (9) NNE 2926 m
  - (10) WNW 930 m
  - (11) W 974 m
  - (11) NNW 914 m
  - (12) SSE 914 m
- (c) "Maximum" dose for the year is the sum of the maximum doses for each quarter. This results in a conservative yearly dose estimate, but still well within the limits of 10CFR50.
- (d) For each special receptor location, the whole body and organ doses calculated for the airborne effluent releases were adjusted by the occupancy factor provided in Seabrook's ODCM (i.e., 0.0014 for the Science and Nature Center and 0.0076 for the "Rocks"). It should also be noted that for 2004 actual occupancy factors were much lower (close to zero) since access to the site by the general public has been greatly restricted for security reasons following the terrorist attacks on America on 09/11/01. For conservatism, the previous factors as listed in the ODCM were applied for an estimate of upper bound doses and comparison with calculated impacts for year's pre September 11, 2001. Where appropriate, the numbered footnotes indicate the organ and age group of the dose receptor:
- (d1) Liver, kidney, lung, GI-LLI, thyroid, and whole body of a teen
  - (d2) Lung of a teen
- (e) Only station sources are considered since there are no other facilities within five miles of Seabrook Station. 2004 data for the closest off-site environmental TLD locations in each sector (as listed in Table B.4-1 of Seabrook's ODCM) were compared to preoperation data from 1986-1988 for the same locations. No statistical difference, which could be attributed to station sources, was identified.



Table B  
Seabrook Station  
2004 Annual Radioactive Effluent Release Report

Total Dose to Maximum Off-Site Individual  
(40CFR190)

| Release Source                         | Total Body<br>(mrem) | Maximum Organ <sup>(a)</sup><br>(mrem) |
|--|----------------------|--|
| Liquids                                | 3.28E-04             | 1.53E-03                               |
| Noble Gases                            | 1.36E-05             | 1.36E-05                               |
| Gas Iodines, Tritium &<br>Particulates | 1.54E-02             | 1.54E-02                               |
| Direct Radiation                       | 0                    | 0                                      |
| Annual Total                           | 1.57E-02             | 1.69E-02                               |

(a) Maximum organ includes consideration of the thyroid.

Table C

Seabrook Station  
2004 Annual Radioactive Effluent Release Report

Calculated 2004 Maximum Doses Versus Applicable Limits

| Receptor                                    | Applicable ODCM Control | ODCM Annual Limit | Calculated Annual (2004) Dose | Percent of Limit |
|---|-------------------------|-------------------|-------------------------------|------------------|
| Offsite                                     |                         |                   |                               |                  |
| Liquid Effluents                            |                         |                   |                               |                  |
| Whole Body Dose                             | C.6.2.1                 | 3 mrem            | 3.28E-04 mrem                 | 0.011%           |
| Organ Dose                                  | C.6.2.1                 | 10 mrem           | 1.53E-03 mrem                 | 0.015%           |
| Airborne Effluents                          |                         |                   |                               |                  |
| Organ Dose (iodines, tritium, and part.)    | C.7.3.1                 | 15 mrem           | 1.54E-02 mrem                 | 0.10%            |
| Gamma Air Dose (noble gases)                | C.7.2.1                 | 10 mrad           | 2.05E-05 mrad                 | 0.0002%          |
| Beta Air Dose (noble gases)                 | C.7.2.1                 | 20 mrad           | 9.12E-06 mrad                 | 0.00005%         |
| All Plant Sources <sup>(a)</sup>            |                         |                   |                               |                  |
| Whole Body Dose                             | C.8.1.1                 | 25 mrem           | 1.57E-02 mrem                 | 0.063%           |
| Organ Dose                                  | C.8.1.1                 | 25 mrem           | 1.69E-02 mrem                 | 0.068%           |
| Onsite (Science and Nature Center, 488m SW) |                         |                   |                               |                  |
| Airborne Effluents                          |                         |                   |                               |                  |
| Organ Dose (iodines, tritium, and part.)    | C.7.3.1 <sup>(b)</sup>  | 15 mrem           | 9.28E-06 mrem                 | 0.00006%         |
| Onsite (The "Rocks", 244m NE/ENE)           |                         |                   |                               |                  |
| Airborne Effluents                          |                         |                   |                               |                  |
| Organ Dose (iodines, tritium, and part.)    | C.7.3.1 <sup>(b)</sup>  | 15 mrem           | 3.06E-04 mrem                 | 0.002%           |

- (a) The "all plant sources" doses are the sum of the whole body doses and maximum organ doses from liquid, noble gas, and iodines/tritium/particulate releases as well as direct radiation from fixed station sources.
- (b) ODCM Part A, Section 10.2 states that the annual effluent report shall include an assessment of the radiation doses from radioactive liquids and gaseous effluents to members of the public due to their activities inside the site boundary during the report period. The referenced limits (C.7.2.1 & C.7.3.1) are the acceptable doses from liquid and gaseous effluents to areas at and beyond the site boundary and are considered to be appropriate for comparison purposes.

Table D  
Seabrook Station  
2004 Annual Radioactive Effluent Release Report  
Sources of the Values of Factors Used in Liquid Dose Equations

| Factor     | Definition                                     | Source  |
|------------|--|---|
| $U_{ap}$   | Usage factor                                   | Table B.7-1, Station ODCM   |
| $M_p$      | Mixing ratio                                   | Section B.7.1, Station ODCM (value=0.1 for aquatic foods and 0.025 for shoreline) |
| $B_{ip}$   | Equilibrium bioaccumulation factor             | Table A-1, Reg. Guide 1.109   |
| $D_{aipj}$ | Dose factor                                    | Tables E-11 through E-14, R.G. 1.109  |
| $t_p$      | Nuclide transit time                           | Table E-15, Reg. Guide 1.109  |
| $K_c$      | Transfer coefficient from water to sediment    | Reg. Guide 1.109  |
| $t_b$      | Period of activity buildup in sediment or soil | Table B.7-2, Station ODCM   |
| W          | Shoreline width factor                         | Table A-2, Reg. Guide 1.109 (value=0.5)   |

Table E

Seabrook Station  
2004 Annual Radioactive Effluent Release Report

Sources of Values for the Factors Used in Dose Equations for Gaseous Releases

| Factor      | Definition  | Source                                    |
|-------------|---|---|
| $t_b$       | Period of activity buildup in sediment or soil  | Table B.7-2, Station ODCM                 |
| $\lambda_i$ | Nuclide decay constant  | Kocher (Reference 3)                      |
| $DFG_{ij}$  | Ground plane dose factor  | Table E-6, Reg. Guide 1.109               |
| $[X/Q]^D$   | Atmospheric dispersion factor   | Calculated following Reg. Guide 1.111     |
| $R_a$       | Breathing rate  | Table B.7-3, Station ODCM                 |
| $DFA_{ija}$ | Inhalation dose factor  | Tables E-7 through E-10, Reg. Guide 1.109 |
| $d_i$       | Nuclide deposition rate   | Reg. Guide 1.109                          |
| $P$         | Soil surface density  | Table B.7-2, Station ODCM                 |
| $t_e$       | Crop, leafy vegetable, or pasture grass exposure period                                     | Table B.7-2, Station ODCM                 |
| $t_h$       | Average time from crop harvest to consumption   | Table B.7-2, Station ODCM                 |
| $Y_v$       | Agricultural productivity by unit area  | Table B.7-2, Station ODCM                 |
| $r$         | Fraction of deposited activity retained on crops, leafy vegetables, or pasture grass        | Table E-15, Reg. Guide 1.109              |
| $B_{iv}$    | Stable element transfer coefficient from soil to produce, leafy vegetable, or pasture grass | Table E-1, Reg. Guide 1.109               |
| $p$         | Fractional equilibrium ratio  | Reg. Guide 1.109                          |
| $H$         | Ambient absolute humidity   | Table B.7-2, Station ODCM                 |
| $F_m$       | Stable element transfer coefficient from feed to milk                                       | Tables E-1 and E-2, Reg. Guide 1.109      |

Table E (continued)

Seabrook Station  
2004 Annual Radioactive Effluent Release Report

Sources of Values for the Factors Used in Dose Equations for Gaseous Releases

| Factor      | Definition  | Source                              |
|-------------|---|-------------------------------------|
| $t_f$       | Average time from feed to milk to consumption                                 | Reg. Guide 1.109                    |
| $f_p$       | Fraction of the year that animals graze on pasture                            | Table B.7-2, Station ODCM           |
| $f_s$       | Fraction daily feed pasture grass   | Table B.7-2, Station ODCM           |
| $F_f$       | Stable element transfer coefficient from feed to meat                         | Table E-1, Reg. Guide 1.109         |
| $t_s$       | Average time from meat animal slaughter to consumption                        | Table E-15, Reg. Guide 1.109        |
| $DFI_{ija}$ | Ingestion dose factor   | Tables E-11 through E-14, R.G.1.109 |
| $U_a$       | Annual intake of produce  | Table B.7-3, Station ODCM           |
| $U_m$       | Annual intake of milk   | Table B.7-3, Station ODCM           |
| $U_i$       | Annual intake of meat   | Table B.7-3, Station ODCM           |
| $U_v$       | Annual intake of leafy vegetables   | Table B.7-3, Station ODCM           |
| $f_g$       | Ingestion rate fractions for garden produce                                   | Reg. Guide 1.109                    |
| $f_l$       | Ingestion rate fractions for garden leafy vegetables                          | Reg. Guide 1.109                    |
| $\lambda_w$ | Rate constant for activity removal from plant and leaf surfaces by weathering | Table E-15, Reg. Guide 1.109        |
| $Q_F$       | Animal consumption rate   | Table E-3, Reg. Guide 1.109         |

Table F  
Seabrook Station  
2004 Annual Radioactive Effluent Release Report

Receptor Locations\* for Seabrook Station

| Sector | Nearest Resident<br>mile (km) | Nearest Garden<br>mile (km) | Milk Animals<br>within 5 Mile<br>Radius<br>mile (km) |
|--------|-------------------------------|-----------------------------|--|
| N      | 2.21 (3.55)                   | 2.83 (4.55)                 | ---  |
| NNE    | 1.89 (3.04)                   | 1.89 (3.04)                 | ---  |
| NE     | 1.82 (2.92)                   | 2.80 (4.51)                 | ---  |
| ENE    | 1.44 (2.31)                   | ---                         | ---  |
| E      | 1.60 (2.58)                   | ---                         | ---  |
| ESE    | 1.70 (2.73)                   | ---                         | ---  |
| SE     | 1.46 (2.36)                   | ---                         | ---  |
| SSE    | 1.02 (1.65)                   | ---                         | ---  |
| S      | 0.75 (1.21)                   | 0.76 (1.22)                 | ---  |
| SSW    | 0.69 (1.12)                   | 0.88 (1.42)                 | ---  |
| SW     | 0.70 (1.13)                   | 1.20 (1.94)                 | ---  |
| WSW    | 1.16 (1.87)                   | 1.43 (2.31)                 | ---  |
| W      | 0.82 (1.32)                   | 0.87 (1.40)                 | ---  |
| WNW    | 0.69 (1.11)                   | 0.94 (1.52)                 | ---  |
| NW     | 0.79 (1.27)                   | 0.79 (1.27)                 | 4.30 (6.93)  |
| NNW    | 0.63 (1.01)                   | 0.64 (1.04)                 | 3.30 (5.32)  |

\* Locations based on 2004 Land Use Census.