

*Superseded pages per  
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- Appendix E - Hydrology of the James River Estuary, Centered on Hog Island, Virginia
- Appendix F - Summary of Recent, Ongoing, and Future Studies in the Oligohaline Section of the James River Estuary
- Appendix G - Environmental Approvals and Consultations
- Appendix H - Evaluation of the Doses from Estimated Radioactive Effluents

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and then off one (1) hour. The filters are exchanged weekly and are analyzed after decay of radon daughters for gross beta with a Nuclear-Chicago low background beta counter. These initial gross beta measurements are performed by VEPCO on-site and the results are confirmed by sending nine (9) samples per month (one from each location) to EIC where they are analyzed for gross beta with a Beckman Wide Beta I or Beckman Wide Beta II low background beta counter. Sensitivity is  $0.05 \text{ pCi/m}^3$  for one-hundred (100) cubic meter ( $\text{m}^3$ ) volume. (Table C-2)

### Radiogas

Inert gases, primarily isotopes of krypton and xenon, may be released in low concentrations and may cause a slight increase in the background radiation level. The millirem dose (beta plus gamma) per month is measured using five  $1/8'' \times 1/8'' \times 0.035''$  solid Li F thermoluminescent dosimeters double sealed in plastic bags. These dosimeters are placed at locations shown in Table C-1 and Figure 1. Prior to May 1970, a single dosimeter was placed at each station, but subsequent measurements were based on five dosimeters at each station. Each dosimeter was read out using the Eberline Model TLR-5 reader. The combined thickness of both plastic bags is approximately  $40 \text{ mg/cm}^2$ . (Table C-3)

### Water

Water samples are collected bi-monthly from the James River, locations 1, 2, 6, 9, and 10 in Figure 2. These samples are analyzed for gross beta. Due to the salinity of this water, an oxalate precipitation is performed and the precipitate counted. A chemical recovery adjustment is made on sample before reporting results. Each river water sample is analyzed for tritium by liquid scintillation counting. (Table C-4)

Milk

Samples of milk are collected bi-monthly from four locations near the site (locations 6, 7, and 12 in Figure 1) with two samples from location number 1. Each sample is analyzed for Sr-90, Cs-137, and stable calcium. I-131 analysis is performed by gamma spectrometry of a one liter sample in a Marinelli beaker. Sr-90 is separated from the milk with cation exchange resin, eluted from the resin and analyzed. Stable cesium is determined and reported. (Table C-14)

The Surry Environmental Sampling Program, with the type of analysis and frequency for the samples taken, is shown in the following exhibit: SURRY NUCLEAR STATION - ENVIRONMENTAL SAMPLING PROGRAM.

SURRY NUCLEAR STATION  
ENVIRONMENTAL SAMPLING PROGRAM

| <u>SAMPLE TYPE</u>           | <u>FREQUENCY</u>                   |                      | <u>TYPE OF ANALYSIS</u>                            |
|------------------------------|------------------------------------|----------------------|--|
| I. <u>WATERS</u>             |                                    |                      |  |
| A. <u>James River</u>        | Bi-Monthly                         |                      | Gross Beta, Tritium                                |
| 1. Chickahominy              |                                    |                      |  |
| 2. Station Intake            |                                    |                      |  |
| 3. Cobham Bay                |                                    |                      |  |
| 4. Point of Shoals           |                                    |                      |  |
| 5. Newport News              |                                    |                      |  |
| B. <u>Wells</u>              | Semi-Annual                        |                      | Gross Alpha, Gross Beta                            |
| 1. Surry Station (Deep)      |                                    |                      |  |
| 2. Hog Island Reserve (Deep) |                                    |                      |  |
| 3. Bacon's Castle (Shallow)  |                                    |                      |  |
| 4. Jamestown (Shallow)       |                                    |                      |  |
| C. <u>Surface Water</u>      | Semi-Annual                        | Soluble<br>Insoluble | Gross Alpha, Gross Beta<br>Gross Alpha, Gross Beta |
| 1. Chippokes Creek           |                                    |                      |  |
| 2. Williamsburg Reservoir    |                                    |                      |  |
| 3. Newport News Reservoir    |                                    |                      |  |
| 4. Smithfield                |                                    |                      |  |
| D. <u>Precipitation</u>      | Monthly<br>Semi-Annual (composite) |                      | Gross Beta<br>Tritium                              |
| 1. Surry Station             |                                    |                      |  |
| 2. Newport News              |                                    |                      |  |
| II. <u>Air</u>               |                                    |                      |  |
| A. <u>Particulates</u>       | Weekly<br>Monthly                  |                      | Gross Beta<br>Gross Alpha                          |
| 1. Richmond                  |                                    |                      |  |
| 2. Surry Station             |                                    |                      |  |
| 3. Hog Island Reserve        |                                    |                      |  |

TABLE C-1  
 SURRY POWER STATION  
 ENVIRONMENTAL SAMPLING PROGRAM  
 1971

LAND BASED SAMPLING STATIONS

STATION NUMBER (See Figure 1)

| <u>Sample Medium*</u> | <u>1</u> | <u>2</u> | <u>3</u> | <u>4</u> | <u>5</u> | <u>6</u> | <u>7</u> | <u>8</u> | <u>9</u> | <u>10</u> | <u>11</u> | <u>12</u> | <u>13</u> |
|-----------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|-----------|-----------|
| Air Particulate       | X        | X        | X        | -        | X        | X        | -        | -        | X        | X         | X         | -         | X         |
| Radiogas              | X        | X        | X        | -        | X        | X        | -        | -        | X        | X         | X         | X         | X         |
| Precipitation         | X        | -        | -        | -        | -        | -        | -        | -        | -        | -         | X         | -         | -         |
| Milk                  | -        | -        | X(2)     | -        | -        | X        | -        | -        | X        | -         | -         | X         | -         |
| Well Water            | X        | X        | X        | -        | -        | -        | -        | X        | -        | -         | -         | -         | -         |
| Crop                  | -        | -        | X        | -        | -        | -        | -        | -        | -        | -         | -         | -         | -         |
| Surface Water         | -        | -        | -        | X        | -        | -        | X        | -        | -        | -         | X         | X         | -F        |
| Fowl (Coot)           | -        | X        | -        | -        | -        | -        | -        | -        | -        | -         | -         | -         | -         |
| Soil                  | X        | -        | X        | -        | X        | X        | -        | -        | X        | X         | -         | -         | -         |

- |                            |                          |                       |                   |
|----------------------------|--------------------------|-----------------------|-------------------|
| No. 1 - Surry Station      | No. 5 - Alliance         | No. 9 - Down          | No. 13 - Richmond |
| No. 2 - Hog Island Reserve | No. 6 - Colonial Parkway | No. 10 - Fort Eustis  |                   |
| No. 3 - Bacon's Castle     | No. 7 - Williamsburg     | No. 11 - Newport News |                   |
| No. 4 - Chippokes Creek    | No. 8 - Jamestown        | No. 12 - Smithfield   |                   |

JAMES RIVER SAMPLING STATIONS

STATION NUMBER (See Figure 2)

| <u>Sample Medium*</u> | <u>1</u> | <u>2</u> | <u>3</u> | <u>4</u> | <u>5</u> | <u>6</u> | <u>7</u> | <u>8</u> | <u>9</u> |
|-----------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| James River Water     | X        | X        | -        | -        | X        | -        | -        | X        | X        |
| Silt                  | X        | -        | X        | X        | X        | -        | -        | X        | X        |
| Oyster                | -        | -        | -        | -        | -        | -        | X        | X        | X        |
| Clam                  | X        | X        | -        | X        | -        | X        | -        | -        | -        |
| Crab                  | -        | -        | -        | -        | -        | -        | X        | X        | -        |
| Fish                  | -        | -        | X        | -        | X        | -        | -        | -        | -        |

- |                           |                          |                           |
|---------------------------|--------------------------|---------------------------|
| No. 1 - Chickahominy      | No. 4 - Hog Island Point | No. 7 - Deep Water Shoals |
| No. 2 - Cobham Bay        | No. 5 - Station Intake   | No. 8 - Point of Shoals   |
| No. 3 - Station Discharge | No. 6 - Lawnes Creek     | No. 9 - Newport News      |

\*Intertidal vegetation sampled when available from discharge canal area.

FIGURE 2  
SURRY NUCLEAR STATION  
JAMES RIVER SAMPLING STATIONS

