

RADIOLOGICAL SURVEILLANCE OF
FLORIDA POWER AND LIGHT COMPANY'S
ST. LUCIE SITE

Third Quarter, 1985

Office of Radiation Control
Florida Department of Health
and Rehabilitative Services

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ST. LUCIE SITE
Technical Specifications Sampling

Third Quarter, 1985

| <u>Sample Type</u> | <u>Collection Frequency</u> | <u>Locations Sampled</u> | <u>Number of Samples</u> |
|----------------------------|-----------------------------|--------------------------|--------------------------|
| 1. Direct Radiation | Quarterly | 27 | 56 |
| 2. Airborne | | | |
| 2.a Air Iodines | Weekly | 5 | 65 |
| 2.b Air Particulates | Weekly | 5 | 69* |
| 3. Waterborne | | | |
| 3.a Surface Water | Weekly | 1 | 13 |
| | Monthly | 1 | 3 |
| 3.b Shoreline sediment | Semiannually | 2 | 3* |
| 4. Ingestion | | | |
| 4.a Fish and Invertebrates | | | |
| 4.a.1 Crustacea | Semiannually | 2 | 2 |
| 4.a.2 Fish | Semiannually | 2 | 3# |
| 4.b Food Products | | | |
| 4.b.1 Broadleaf Vegetation | Monthly | 3 | 9 |
| Total: | | | 223 |

* - Includes DOE split samples.

- Includes samples for HRS purposes.

NOTE: Measurement results having magnitudes that are significantly above the background of the measurement system are reported as net values plus or minus a one-standard-deviation error term.

Measurement results that are not significantly above background are reported as "non-detectable" (ND) or as less than a Lower Limit of Detection (<LLD), which is an estimated upper limit (with at least 95% confidence) for the true activity in the sample.

ST. LUCIE TECHNICAL SPECIFICATIONS SAMPLING

THIRD QUARTER, 1985

I. DIRECT RADIATION - TLDs - (micro-R/hour)

Each result is the average net response of two dosimeters.

| Sample Site | Deployed 6-12-85 | Collected 9-18-85 |
|-------------|--------------------------|----------------------|
| N-1 | 5.2 + 0.3 | |
| NNW-5 | 5.2 + 0.3 | |
| NNW-10 | 5.1 + 0.3 | |
| NW-5 | 4.9 + 0.3 | |
| NW-10 | 6.1 + 0.3 | |
| WNW-2 | 5.0 + 0.3 | |
| WNW-5 | 5.0 + 0.3 | |
| WNW-10 | 4.7 + 0.2 | |
| W-2 | 5.3 + 0.3 | |
| W-5 | 5.0 + 0.3 | |
| W-10 | 4.8 + 0.3 | |
| WSW-2 | 4.9 + 0.3 | |
| WSW-5 | 5.1 + 0.3 | |
| WSW-10 | 4.8 + 0.3 | |
| SW-2 | 4.9 + 0.3 | |
| SW-5 | 4.8 + 0.3 | |
| SW-10 | 4.9 + 0.3 | |
| SSW-2 | 5.0 + 0.3 | |
| SSW-5 | 4.8 + 0.3 | |
| SSW-10 | 5.3 + 0.3 | |
| S-5 | 5.2 + 0.3 << See Note 4. | |
| S-10 | 5.1 + 0.3 | |
| S/SSE-10 | 4.9 + 0.3 | |
| SSE-5 | 5.2 + 0.3 | |
| SSE-10 | 5.1 + 0.3 | |
| SE-1 | 4.8 + 0.3 | |
| H-32 | 5.7 + 0.3 | |

NOTES:

1. The error terms reported above are based on an empirical statistical analysis of the differences in the results from the individual dosimeters at each site. As such, these error terms are representative of the typical error for such measurements rather than accurately representing the error terms for individual measurements.
2. These results have been determined with the assumption that fading is negligible, although detailed testing to confirm this has not been done.

** See notes 3 and 4 on next page.

ST. LUCIE TECHNICAL SPECIFICATIONS SAMPLING

THIRD QUARTER, 1985

1. DIRECT RADIATION - TLDs - (micro-R/hour)

NOTES:

3. Testing to confirm compliance with NRC Reg. Guide 4.13 and ANSI N545-1975 performance standards has not been completed.
4. The dosimeters deployed at site S-5 on 6-12-85 apparently fell from their holder during this sample interval. They were found in the street at the sample site by a local resident on 7-16-85. The dosimeters were recovered and read out, and they were subsequently re-deployed on 7-19-85. The average exposure rate from 6-12-85 to 7-16-85 was 5.0 ± 0.3 micro-R/hr. The average exposure rate from 7-19-85 to 9-18-85 was 5.3 ± 0.3 micro-R/hr. The quarterly result in the above table is the time-weighted average of the results for the two sub-intervals.

2.a IODINE-131 IN WEEKLY AIR FILTERS - (pCi/m³)

| Collection Date | Sample Site | | | | |
|-----------------|-------------|-------|-------|---------------|-------|
| | H08 | H12 | H14 | H30 | H34 |
| 7-02-85 | <0.02 | <0.03 | <0.02 | <0.02 | <0.02 |
| 7-09-85 | <0.03 | <0.03 | <0.02 | <0.03 | <0.03 |
| 7-17-85 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| 7-23-85 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 |
| 7-30-85 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 |
| 8-06-85 | <0.03 | <0.03 | <0.02 | <0.02 | <0.03 |
| 8-13-85 | <0.02 | <0.03 | <0.02 | <0.02 | <0.03 |
| 8-20-85 | <0.03 | <0.03 | <0.03 | <0.03 | <0.03 |
| 8-27-85 | <0.04 | <0.04 | <0.04 | <0.04 | <0.04 |
| 9-03-85 | <0.03 | <0.02 | <0.02 | <0.02 | <0.02 |
| 9-10-85 | <0.03 | <0.03 | <0.02 | <0.03 | <0.03 |
| 9-17-85 | <0.03 | <0.03 | <0.02 | <0.03 | <0.03 |
| 9-24-85 | <0.03 | <0.03 | <0.02 | <0.03 (A<0.05 | |

A - This sample had a low collected volume due to a tripped circuit breaker. Severe storms this week are the suspected cause. The equipment is estimated to have run for 80 hours out of the 168 total hours for this sampling interval.

2.b AIR PARTICULATES - GROSS BETA - (pCi/m³)

| Collection Date | Sample Site | | | | |
|-----------------|---------------|---------------|----------------|---------------|------------------|
| | H08 | H12 | H14 | H30 | H34 |
| 7-02-85 | 0.011 ± 0.002 | 0.010 ± 0.002 | 0.012 ± 0.002 | 0.010 ± 0.002 | 0.013 ± 0.002 |
| 7-09-85 | 0.016 ± 0.002 | 0.014 ± 0.002 | 0.018 ± 0.002 | 0.014 ± 0.002 | 0.018 ± 0.002 |
| 7-17-85 | 0.009 ± 0.002 | 0.011 ± 0.002 | 0.012 ± 0.002 | 0.010 ± 0.001 | 0.013 ± 0.002 |
| 7-23-85 | 0.009 ± 0.002 | 0.009 ± 0.002 | 0.008 ± 0.002 | 0.008 ± 0.002 | 0.011 ± 0.002 |
| 7-30-85 | 0.017 ± 0.002 | 0.011 ± 0.002 | 0.008 ± 0.002 | 0.011 ± 0.002 | 0.011 ± 0.002 |
| 8-06-85 | 0.010 ± 0.002 | 0.011 ± 0.002 | *0.010 ± 0.002 | 0.010 ± 0.002 | 0.009 ± 0.002 |
| 8-13-85 | 0.011 ± 0.002 | 0.012 ± 0.002 | *0.008 ± 0.001 | 0.010 ± 0.001 | 0.012 ± 0.002 |
| 8-20-85 | 0.011 ± 0.002 | 0.011 ± 0.002 | *0.009 ± 0.001 | 0.008 ± 0.001 | 0.010 ± 0.001 |
| 8-27-85 | 0.017 ± 0.002 | 0.016 ± 0.002 | *0.018 ± 0.002 | 0.019 ± 0.002 | 0.019 ± 0.002 |
| 9-03-85 | 0.019 ± 0.002 | 0.018 ± 0.002 | 0.014 ± 0.002 | 0.013 ± 0.002 | 0.015 ± 0.002 |
| 9-10-85 | 0.020 ± 0.002 | 0.012 ± 0.002 | 0.014 ± 0.002 | 0.020 ± 0.002 | 0.014 ± 0.002 |
| 9-17-85 | 0.017 ± 0.002 | 0.017 ± 0.002 | 0.014 ± 0.002 | 0.014 ± 0.002 | 0.014 ± 0.002 |
| 9-24-85 | 0.006 ± 0.001 | 0.008 ± 0.001 | 0.008 ± 0.001 | 0.011 ± 0.002 | (A)0.013 ± 0.003 |
| Means: | 0.013 ± 0.001 | 0.012 ± 0.001 | 0.012 ± 0.001 | 0.012 ± 0.001 | 0.013 ± 0.001 |

* - DOE split samples.

A - This sample had a low collected volume due to a tripped circuit breaker. Severe storms this week are the suspected cause. The equipment is estimated to have run for 80 hours out of the 168 total hours for this sampling interval.

2.b AIR PARTICULATES - GAMMA SCANS OF QUARTERLY COMPOSITES - (pCi/m³)

| Sample Site | Third Quarter, 1985 | | | |
|-------------|---------------------|--------|---------|---------|
| | Be-7 | K-40 | Cs-134 | Cs-137 |
| H08 | 0.068 ± 0.006 | <0.014 | <0.0006 | <0.0007 |
| H12 | 0.078 ± 0.007 | <0.013 | <0.0008 | <0.0007 |
| H14 | 0.070 ± 0.007 | <0.017 | <0.0005 | <0.0008 |
| H30 | 0.072 ± 0.007 | <0.015 | <0.0008 | <0.0006 |
| H34 | 0.074 ± 0.006 | <0.014 | <0.0007 | <0.0007 |

3.a SURFACE WATER - (pCi/l)

| Sample Site | Collection Date | H-3 | K-40 | Mn-54 | Fe-59 | Co-58 | Co-60 | Zn-65 | Nb-95 (A) | Zr-95 (A) | I-131 | Cs-134 | Cs-137 | Ba-140 (B) | Ba-140 La-140 (B) |
|-------------|-----------------|------|----------|-------|-------|-------|-------|-------|--------------|--------------|-------|--------|--------|---------------|-------------------------|
| | | | | | | | | | | | | | | | |
| H15 | 7-02-85 | <240 | 380 + 40 | <4 | <8 | <3 | <5 | <8 | <5 | <7 | <5 | <4 | <4 | <5 | |
| | 7-09-85 | <240 | 310 + 40 | <3 | <7 | <4 | <5 | <7 | <8 | <6 | <4 | <4 | <4 | <6 | |
| | 7-16-85 | <240 | 340 + 40 | <4 | <9 | <5 | <6 | <7 | <8 | <6 | <4 | <4 | <5 | <7 | |
| | 7-23-85 | <240 | 330 + 40 | <4 | <8 | <4 | <4 | <9 | <8 | <8 | <4 | <4 | <4 | <7 | |
| | 7-30-85 | <240 | 360 + 40 | <4 | <9 | <3 | <5 | <10 | <6 | <5 | <4 | <5 | <5 | <7 | |
| | 8-05-85 | <250 | 360 + 40 | <4 | <13 | <4 | <4 | <10 | <7 | <5 | <5 | <4 | <4 | <8 | |
| | 8-13-85 | <250 | 350 + 40 | <3 | <10 | <3 | <5 | <9 | <7 | <6 | <4 | <4 | <4 | <7 | |
| | 8-20-85 | <250 | 330 + 40 | <4 | <9 | <3 | <5 | <12 | <10 | <6 | <4 | <5 | <5 | <5 | |
| | 8-27-85 | <260 | 370 + 40 | <4 | <8 | <4 | <5 | <6 | <7 | <4 | <4 | <4 | <4 | <12 | |
| | 9-03-85 | <190 | 310 + 40 | <4 | <7 | <3 | <5 | <10 | <7 | <5 | <5 | <5 | <5 | <6 | |
| | 9-10-85 | <190 | 320 + 40 | <3 | <9 | <4 | <5 | <11 | <8 | <7 | <4 | <4 | <4 | <6 | |
| | 9-17-85 | <180 | 310 + 40 | <3 | <10 | <5 | <4 | <10 | <6 | <7 | <4 | <4 | <4 | <5 | |
| | 9-24-85 | <180 | 280 + 50 | <5 | <9 | <5 | <4 | <9 | <7 | <5 | <5 | <3 | <3 | <9 | |
| H59 | 7-02-85 | <240 | 400 + 40 | <4 | <9 | <5 | <5 | <10 | <8 | <14 | <5 | <5 | <5 | <7 | |
| | 8-06-85 | <250 | 400 + 40 | <4 | <8 | <3 | <5 | <12 | <7 | <4 | <5 | <4 | <4 | <6 | |
| | 9-03-85 | <190 | 240 + 40 | <4 | <8 | <4 | <3 | <10 | <7 | <5 | <5 | <4 | <4 | <8 | |

- (A) These tabulated LLD values for Zr/Nb-95 are the higher of the individual parent or daughter LLDs.
- (B) These tabulated LLD values are for Ba-140, either based on direct measurement of Ba-140 or based on ingrowth of La-140, whichever method yields the greater sensitivity for a given sample.

3.b SEDIMENT - (pCi/kg, dry weight)

| <u>Sample Site</u> | <u>Collection Date</u> | <u>Be-7</u> | <u>K-40</u> | <u>Co-58</u> | <u>Co-60</u> | <u>Cs-134</u> | <u>Cs-137</u> | <u>Ra-226</u> | <u>Th-232</u> | <u>U-238</u> |
|--------------------|------------------------|-------------|-------------|--------------|--------------|---------------|---------------|---------------|---------------|--------------|
| H15* | 8-05-85 | <70 | 430 ± 60 | <7 | <9 | <8 | <8 | 210 ± 20 | 40 ± 10 | <340 |
| H59 | 8-06-85 | <70 | 170 ± 50 | <7 | <8 | <8 | <8 | 191 ± 6 | 62 ± 7 | 306 ± 9 |

* DOE split sample

4.a.1 CRUSTACEA - (H15: Mixed Species), (H59: Blue Crab) - (pCi/kg; wet weight)

| <u>Sample Site</u> | <u>Collection Date</u> | <u>K-40</u> | <u>Mn-54</u> | <u>Fe-59</u> | <u>Co-58</u> | <u>Co-60</u> | <u>Zn-65</u> | <u>Cs-134</u> | <u>Cs-137</u> | <u>Ra-226</u> | <u>Ra-228</u> |
|--------------------|------------------------|-------------|--------------|--------------|--------------|--------------|--------------|---------------|---------------|---------------|---------------|
| H15 | 8-21-85 | 1600 ± 100 | <11 | <30 | <12 | <16 | <32 | <13 | <14 | <36 | <62 |
| H59 | 8-15-85 | 2000 ± 100 | <10 | <25 | <10 | <11 | <21 | <12 | <10 | 120 ± 20 | 100 ± 30 |

4.a.2 FISH - Mixed Species - (pCi/kg, wet weight)

| <u>Sample Site</u> | <u>Collection Date</u> | <u>K-40</u> | <u>Mn-54</u> | <u>Fe-59</u> | <u>Co-58</u> | <u>Co-60</u> | <u>Zn-65</u> | <u>Cs-134</u> | <u>Cs-137</u> | <u>Ra-226</u> | <u>Ra-228</u> |
|--------------------|------------------------|-------------|--------------|--------------|--------------|--------------|--------------|---------------|---------------|---------------|---------------|
| H15 | 8-12-85 (A) | 2000 ± 100 | <10 | <29 | <10 | <11 | <28 | <10 | <12 | <30 | <48 |
| | 9-03-85 (B) | 2900 ± 100 | <10 | <22 | <9 | <13 | <22 | <10 | <12 | <25 | <49 |
| H59 | 8-21-85 | 3000 ± 200 | <8 | <23 | <10 | <11 | <22 | <12 | <12 | <24 | <37 |

(A) This sample was collected from the plant intake screens in case of unavailability of samples from the designated sampling point (B). It is believed to be representative of the plant area.

(B) This sample was collected from the beach area, as required by Technical Specifications.

4.b.1 BROADLEAF VEGETATION - Mangrove - (pCi/kg, wet weight)

| <u>Sample Site</u> | <u>Collection Date</u> | <u>Be-7</u> | <u>K-40</u> | <u>I-131</u> | <u>Cs-134</u> | <u>Cs-137</u> |
|--------------------|------------------------|--------------|----------------|--------------|---------------|---------------|
| H51 | 7-02-85 | 390 \pm 50 | 4500 \pm 100 | <26 | <8 | <8 |
| | 8-07-85 | 580 \pm 50 | 3400 \pm 100 | <7 | <9 | <8 |
| | 9-03-85 | 730 \pm 40 | 2300 \pm 100 | <9 | <8 | <7 |
| H52 | 7-02-85 | 560 \pm 50 | 3500 \pm 100 | <25 | <8 | <8 |
| | 8-07-85 | 580 \pm 50 | 3700 \pm 100 | <8 | <9 | <9 |
| | 9-03-85 | 700 \pm 40 | 4000 \pm 100 | <8 | <7 | <7 |
| H59 | 7-02-85 | 560 \pm 40 | 2300 \pm 100 | <17 | <6 | <6 |
| | 8-06-85 | 700 \pm 50 | 2600 \pm 100 | <8 | <9 | <9 |
| | 9-03-85 | 950 \pm 50 | 2600 \pm 100 | <8 | <8 | <7 |