



L-2016-032
10 CFR 52.3

February 29, 2016

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555-0001

Re: Florida Power & Light Company
Proposed Turkey Point Units 6 and 7
Docket Nos. 52-040 and 52-041
Response to NRC Environmental Request for Additional Information Letter 160302
(eRAI 8508) Related to Meteorology and Air Quality

Reference:

1. NRC Letter to FPL dated February 3, 2016, Environmental Request for Additional Information Letter 160302 for the Combined License Application Review for Turkey Point, Units 6 and 7

Florida Power & Light Company (FPL) provides, as an attachment, its response to the Nuclear Regulatory Commission's (NRC) Request for Additional Information (RAI) No. EIS MET-1 provided in Reference 1.

If you have any questions, or need additional information, please contact me at 561-904-3794.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on February 29, 2016.

Sincerely,

A handwritten signature in black ink, appearing to read 'W. Maher', is written over a horizontal line.

William Maher
Senior Licensing Director – New Nuclear Projects

WDM/RFO

Attachment: FPL Response to NRC RAI No. EIS MET-1 (eRAI 8508)

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NRD

Proposed Turkey Point Units 6 and 7
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cc:

PTN 6 & 7 Project Manager, AP1000 Projects Branch 1, USNRC DNRL/NRO
Regional Administrator, Region II, USNRC
Senior Resident Inspector, USNRC, Turkey Point Units 3 & 4

NRC RAI Letter No. 160302 Dated February 3, 2016

Review Section: EIS MET – Meteorology and Air Quality

Application Section: N/A

NRC RAI Number: EIS MET-1 (eRAI 8508)

In order to respond to EPA's comments on the DEIS, please provide quantitative information on the operation of Unit 5 at the Turkey Point site. Unit 5 consists of 4 combined cycle gas turbines with emissions vented in 4 separate stacks. Please provide the following information regarding Unit 5:

- specific locations of each of the 4 stacks (UTM coordinates preferred),
- emission rates for ammonia when burning natural gas
- emission rates for ammonia when oil-fired at full operating capacity
- the frequency of fuel oil used in the past five years
- If Unit 5 is not operated continuously at full capacity, please provide:
 - information on the frequency of use
 - average hourly activity/capacity level

Basis: The staff is requesting this information under the authority of 10 CFR 51.41 in order to fulfill the NRC's responsibilities under the National Environmental Policy Act of 1969 and to inform the final environmental impact statement.

FPL RESPONSE:

FPL recognized during development of this RAI response that some Unit 5 information provided in the Site Certification Application (SCA) was superseded by different specifications and conditions issued with the ensuing Unit 5 air permits. Therefore, this response provides the information requested by this RAI, as well as previously sought information on Unit 5 stack parameters, SO₂ emissions, and NO_x emissions.

Specific locations of each of the 4 stacks (UTM coordinates preferred)

The Universal Transverse Mercator (UTM) coordinates locating each Unit 5 combustion turbine (CT) exhaust stack are shown below, as determined by aerial imagery and the ESRI ArcGIS platform.

| Unit 5 CT Exhaust Stacks UTM Coordinates | | |
|--|--------------|---------------|
| Unit | X Easting | Y Northing |
| 5A | 567171.500 m | 2813712.200 m |
| 5B | 567130.100 m | 2813712.300 m |
| 5C | 567044.100 m | 2813712.100 m |
| 5D | 567002.800 m | 2813712.200 m |

Stack Parameters

The stack parameters for Unit 5 in the original SCA and Air Construction/Prevention of Significant Deterioration (PSD) Permit Application were updated by FPL prior to the issuance of the final approval (permit) by the Florida Department of Environmental Protection (FDEP). The updated Tables 3.4-1 and 3.4-2 can be found on pages 14 and 15 of 41 in Reference 1 [<http://arm-permit2k.dep.state.fl.us/psd/0250003/0000D6A3.pdf>]. The following table contains the stack parameters for each combustion turbine at an inlet temperature of 59 °F for pressurized natural gas (PNG) and fuel oil (DSL) firing that corresponds to the emission limits in the final PSD permit for Unit 5 in Reference 2 [<http://arm-permit2k.dep.state.fl.us/psd/0250003/0000F673.pdf>].

| Unit 5 Stack Parameters (59 °F turbine inlet) | | | | |
|--|-------------------|-----------|-----------------------|-----------|
| Stack Parameter | Parameter Units | Fuel | | |
| | | PNG | PNG w/DB ^a | DSL |
| Height | feet | 131 | 131 | 131 |
| Diameter | feet | 19.0 | 19.0 | 19.0 |
| Exhaust Exit Velocity | feet/second | 60.2 | 59.6 | 72.0 |
| Exhaust Exit Temperature | °F | 202 | 188 | 295 |
| Exhaust Flow ^b | acfm ^c | 1,024,106 | 1,013,899 | 1,224,844 |
| ^a Duct Burning | | | | |
| ^b calculated using the stack diameter (exit area) and exhaust exit velocity | | | | |
| ^c actual cubic feet per minute | | | | |

Stack parameters for other turbine inlet temperatures and conditions can be found in updated Tables 3.4-1 and 3.4-2 (Reference 1).

Emission rates for SO₂ and NO_x when burning natural gas and oil

The emissions for Unit 5 in the original Site Certification Application (SCA) and Air Construction/Prevention of Significant Deterioration (PSD) Permit Application were updated by FPL prior to the issuance of the final approval by FDEP. The updated Tables 3.4-1 and 3.4-2 are on pages 14 and 15 of 41 of Reference 1. The following table contains the maximum emissions of SO₂ and NO_x for each combustion turbine at an inlet temperature of 59 °F for PNG and DSL firing corresponding to the emission limits in the final PSD permit for Unit 5 (Reference 2).

| Maximum Permitted SO₂ and NO_x Emissions (lb/hr at 59° F turbine inlet, no duct firing) | | |
|---|-------------------|-------------------|
| Pollutant | Fuel | |
| | PNG | DSL |
| SO ₂ | 9.8 ^a | 3.0 ^a |
| NO _x | 13.0 ^b | 62.1 ^b |

^aTables 3.4-1 and 3.4-2 (updated SCA emissions data submitted by FPL to FDEP; Reference 1)
^bFDEP Final PSD Permit PSD-FL-338 (Reference 2)

Emissions of SO₂ and NO_x for other turbine inlet temperatures and conditions can be found in updated Tables 3.4-1 and 3.4-2 (Reference 1).

Emission rates for ammonia when burning natural gas and oil

The following table presents maximum ammonia mass emissions based on an ammonia concentration [NH₃] in each CT stack based on 5 parts per million by volume, dry (ppmvd), corrected to 15 percent oxygen that is a requirement of the Air Construction/Prevention of Significant Deterioration (PSD) permit for Unit 5.

| Maximum Ammonia Emissions | | | | |
|----------------------------------|--|--|--|--|
| Fuel | FDEP Permit Limit ^a | | | Calculated ^b NH ₃ Emission (lb/hr) |
| | [NO _x] (ppmvd @ 15% O ₂) | NO _x Emission (lb/hr) | [NH ₃] (ppmvd @ 15% O ₂) | |
| PNG - CTs only | 2.0 | 13.0 | 5.0 | 12.0 |
| DSL | 8.0 | 62.1 | 5.0 | 14.4 |

^aFDEP Final PSD Permit PSD-FL-338 (Reference 2)
^bCalculated from the molecular weight difference between NO_x and NH₃

This mass emission of ammonia represents 'worst-case' ammonia mass emissions established to provide reasonable assurance to FDEP that the activity of the catalyst associated with the Selective Catalytic Reduction (SCR) system would be maintained to continuously control NO_x emissions. An ammonia concentration of 5 ppmvd corrected to 15% oxygen is a typical design value provided by SCR system vendors; this design value was guaranteed by the vendor supplying the Unit 5 SCR systems. FDEP established an ammonia concentration limit to demonstrate the effectiveness of SCR systems. The emissions of ammonia are not regulated under EPA's PSD program, and there are no ambient air quality standards for ammonia. Actual ammonia emissions are tested each year

when firing PNG. The test ammonia emissions presented in the following table show that they are much less than the 'worst-case' ammonia emissions limit in the permit.

| PNG-Fired Actual Ammonia Emissions | | | |
|--|------|--|---|
| Year | Unit | [NH ₃] (ppmvd @ 15% O ₂) | Calculated NH ₃ Emission (lb/hr) |
| 2014 | 5A | 0.08 | 0.20 |
| 2014 | 5B | 0.07 | 0.18 |
| 2014 | 5C | 0.68 | 1.65 |
| 2014 | 5D | 1.23 | 2.93 |
| 2013 | 5A | 0.45 | 1.12 |
| 2013 | 5B | 0.29 | 0.73 |
| 2013 | 5C | 0.51 | 1.24 |
| 2013 | 5D | 0.53 | 1.37 |
| ^a Calculated from the molecular weight difference between NO _x and NH ₃ | | | |

There is no test data for emissions of ammonia when firing DSL since DSL is rarely used and testing has not been required.

The frequency of fuel oil used in the past five years

The data used to compile the Unit 5 CT operations (fuel utilization and frequency of use) history for the most recent five year period of record (2011 – 2015) was retrieved by publicly accessing the ECMPs Client Tool query in Reference 3 [<http://ampd.epa.gov/ampd/>] to generate Facility ID '621' Emissions Summary Reports from EPA's Air Markets Program Data (AMPD) . The response information that follows below is based on these ECMPs queries.

During the 2011 – 2015 period of record, the Units 5A, 5B, 5C, and 5D CTs used DSL only for functional testing purposes and PNG was used for power production. The average annual DSL use for CT functional testing ranged between 10.7 and 13.1 hours (less than 0.2% of the total unit operating time in all cases). The average duration of each DSL fuel functional test was approximately 0.3 hours.

| Unit 5 CT Fuel Utilization 2011 – 2015 (hours) | | | | | |
|---|----------------------------|--------------------|-------|-----------------------------|--|
| Unit | Total (PNG + DSL) Fuel Use | Total DSL Fuel Use | | Average Annual DSL Fuel Use | Average Annual DSL Fuel Functional Test Duration |
| 5A | 33,898 | 65.5 | 0.19% | 13.1 | 0.313 |
| 5B | 35,342 | 56.0 | 0.16% | 11.2 | 0.296 |
| 5C | 35,852 | 53.4 | 0.15% | 10.7 | 0.324 |
| 5D | 35,400 | 58.7 | 0.17% | 11.7 | 0.298 |

If Unit 5 is not operated continuously at full capacity, please provide:

- **information on the frequency of use**

The table below shows the frequency of use for the Unit 5 CTs during the 2011 – 2015 period of record. Units 5A, 5B, 5C, and 5D operated, on average, 80.2% of the possible hours in a year.

| Unit 5 CT Frequency of Use 2011 – 2015 (hours) | | | |
|---|-----------|--------------------|-------------------------|
| Unit | Total Use | Average Annual Use | Average Capacity Factor |
| 5A | 33,898 | 6780 | 77.4% |
| 5B | 35,342 | 7068 | 80.7% |
| 5C | 35,852 | 7170 | 81.9% |
| 5D | 35,400 | 7080 | 80.8% |

- **average hourly activity/capacity level**

The table below shows the hourly CT operation activity by megawatt (MW) load range (LR) averaged over the 2011 – 2015 period of record. There are ten load ranges, LR 1 to LR 10, each being a 10% load capacity increment of the unit's operating range as specified in the unit's 40 CFR Part 75 Emissions Monitoring Plan. As shown in the table, the most utilized load range for this period of record was LR 9 (238.4 to 268.2 MW) at 31.4% of the total average operating hours.

| Unit 5 CT Average Load Range (LR) Activity 2011 – 2015 (hours) | | | | | | | | | | |
|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
| | <u>LR 1</u> | <u>LR 2</u> | <u>LR 3</u> | <u>LR 4</u> | <u>LR 5</u> | <u>LR 6</u> | <u>LR 7</u> | <u>LR 8</u> | <u>LR 9</u> | <u>LR 10</u> |
| | 0- | 29.8- | 59.6- | 89.4- | 119.2- | 149- | 178.8- | 208.6- | 238.4- | 268.2- |
| | 29.8 | 59.6 | 89.4 | 119.2 | 149 | 178.8 | 208.6 | 238.4 | 268.2 | 298 |
| Unit | MW | MW | MW | MW | MW | MW | MW | MW | MW | MW |
| 5A | 44 | 176 | 247 | 467 | 332 | 3455 | 4230 | 6454 | 9898 | 8597 |
| 5B | 43 | 177 | 211 | 395 | 389 | 3760 | 4708 | 6486 | 10,461 | 8712 |
| 5C | 32 | 128 | 187 | 267 | 318 | 4100 | 4999 | 6967 | 11,654 | 7201 |
| 5D | 40 | 164 | 240 | 391 | 330 | 3803 | 4681 | 7917 | 12,065 | 5769 |
| Total | 158 | 644 | 886 | 1520 | 1369 | 15,118 | 18,618 | 27,824 | 44,077 | 30,278 |
| | 0.1% | 0.5% | 0.6% | 1.1% | 1.0% | 10.8% | 13.3% | 19.8% | 31.4% | 21.6% |

This response is PLANT SPECIFIC.

References:

1. FPL submission of comments and additional information on emissions for Turkey Point Unit 5 prior to issuance of Draft Air Construction/PSD Permit. Accessible at: <http://arm-permit2k.dep.state.fl.us/psd/0250003/0000D6A3.pdf>
2. Turkey Point Unit 5 Final FDEP Air Construction Permit; Project Number: 0250003-006-AC. Accessible at: <http://arm-permit2k.dep.state.fl.us/psd/0250003/0000F673.pdf>
3. Air Markets Program Data ECMPS Client Tool query. Accessible at: <http://ampd.epa.gov/ampd/>

ASSOCIATED COLA REVISIONS:

There are no COLA changes identified as the result of this response.

ASSOCIATED ENCLOSURES:

None.