Matthew R. Bernier
Sr. Counsel
Duke Energy Florida, Inc.

March 3, 2014

Ms. Carlotta Stauffer, Commission Clerk
Florida Public Service Commission
2540 Shumard Oak Boulevard
Tallahassee, Florida 32399-0850

Re: *Petition of Duke Energy Florida, Inc., to Modify Scope of Existing Environmental Compliance Program; Docket No. 130301-EI*

Dear Ms. Stauffer:

Please find enclosed for electronic filing on behalf of Duke Energy Florida, Inc. ("DEF'), DEF's Response to Staff's Second Data Request (Nos. 1-15).

Thank you for your assistance in this matter. Please feel free to call me at (850) 521-1428 should you have any questions concerning this filing.

Respectfully,

s/Matthew R. Bernier
Matthew R. Bernier
Sr. Counsel
Matthew.Bernier@duke-energy.com

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a true and correct copy of the foregoing has been furnished via electronic mail to the following this 3rd day of March, 2014.

s/Matthew R. Bernier
Matthew R. Bernier

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DUKE ENERGY FLORIDA, INC.'S RESPONSES TO
STAFF'S SECOND DATA REQUEST (NOS. 1-15)
Docket No. 130301-EI

1. Does DEF anticipate any salvage value associated with the ACI and DSI systems?

   A. If yes, what is the estimated dollar amount associated with the salvage values of the systems?

   B. If no, why not?

   Response:

   Yes. DEF does anticipate salvage values associated with the ACI and DSI systems. As discussed in the response to Question 14 (below), the reagent systems that DEF plans to employ for the limited, continued operation of CR1&2 are relatively small, inexpensive systems that are based on mobile material handling systems. Due to the scale of these systems, DEF did not anticipate that the associated salvage values would have a material impact on the compliance planning decisions. As such, DEF did not develop estimates for the salvage value of the ACI and DSI systems in the compliance planning analyses performed.

2. Page 7 of the DEF's CR South Environmental Compliance Study states "The engineering team performed plant performance analysis using VISTA combustion systems model." A. Please describe the VISTA combustion systems model.

   B. Who is the developer of the model?

   C. Is the model accepted by the electric industry? Please explain.

   Response:

A. "Vista quantifies the cost and performance impacts associated with burning alternate coals in a power plant. Vista uses equipment-specific engineering models rather than generic correlations to evaluate performance impacts, with predictions based on equipment configuration and component information coupled with detailed calibration data supplied by the user." – Black & Veatch.

B. Black & Veatch developed the Vista model for the Electric Power Research Institute (EPRI).

C. Vista has been distributed to over 100 EPRI member utilities, and the "EPRI Vista Program for Test Burn Risk Assessment" has been established for continued support and development of the model.

3. Page 7 of the DEF's CR South Environmental Compliance Study states "[T]he planning team performed system operations analysis utilizing EPM/PROSYM."

A. Please describe EPM/PROSYM.

B. Who is the developer of EPM/PROSYM?

C. Is EPM/PROSYM accepted by the electric industry? Please explain.

Response:

A. EPM/PROSYM is a production cost modeling tool. PROSYM refers to the specific production cost simulation engine for that tool. EPM (Energy Portfolio Management) is the title of the larger suite of modeling software modules that may perform resource optimization, market analyses and other system modeling functions.

PROSYM is a chronological electric power production costing simulation computer software package. It is designed for performing planning and operational studies, and as a result of its chronological nature, accommodates detailed hour-by-hour investigation of the operations of electric utilities.

Because of its ability to handle detailed information in a chronological fashion, planning studies performed with PROSYM will closely reflect actual electric utility operations. The philosophy behind the model is as follows:

- Simulates a power system operation on a chronological hourly basis
- Simulates a year, hour-by-hour, in one week increments
- Used to define power system operating costs to meet power loads
- Costs for each plant and input into the model are fuel costs, variable operation and maintenance costs, and startup costs.
- Meets hourly loads:
- In the most economic manner possible, given a specified set of generating resources
- Recognizes operating constraints imposed on individual units
- Output is production costs by resource to meet weekly loads
- Output is available by regions, by plants, and by plant types
- Includes a pollution emission subroutine which estimates emissions with each scenario

B. The model is a proprietary model that is licensed by Ventyx, a subsidiary of ABB based in Atlanta.

C. PROSYM is one of the primary production cost modeling tools in the electric utility industry. DEF and its predecessor companies have been using this tool for more than 10 years in analyses of production cost impacts for the development of Ten-Year Site Plans and other filings.

4. Page 8 of the DEF's CR South Environmental Compliance Study states:

> Sensitivity studies were also performed to assess impacts that might be expected with different combinations of units on-line and off-line. During periods when one or both of the scrubbed units at CR North were projected to be off-line, the reduced emissions resulting from utilization of the proposed reagent systems at CR South will extend the site average compliance timelines to support system reliability.

A. Please discuss in detail the results of the studies discussed above.

B. Based on these results, how long (hours) can CR 1 and 2 can operate when both CR 4 and 5 are off-line before compliance limits are exceeded? Please explain.

C. Based on these results, and how long (hours) can CR 1 and 2 operate when either CR 4 or CR 5 is off-line before compliance limits are exceeded? Please explain.

Response:

A. Sensitivity studies were performed using the engineering team's predictive model described in the referenced Compliance Study. The model was used to calculate the facility average emissions for each MATS constituent (e.g. particulate matter, HCl, and mercury) based on unit dispatch projections from the EPM/PROSYM system planning models. The sensitivity studies superimposed unscheduled outages of one or both of the scrubbed units at CR North (Units 4 & 5) with an increase in generation from Units 1 & 2 to project the impacts on the projected facility emission averages. Since projected unit operating loads were highest in the 2016 summer months, the sensitivity studies were performed in that time period to capture the "worst case scenarios". Utilization of dry sorbent injection (DSI) was assessed in the model, and the studies were performed to estimate how many days the simulated unscheduled outages could continue before the facility average compliance limits were reached. In the sensitivity scenario where Units 4 & 5 are both offline, the facility averages remained within compliance for 13 days during the simulated summer period, at which point the MATS mercury limit was reached. At the time these studies were performed, historical operating records did not reveal coincident outages this long, and DEF had not initially assumed that activated carbon injection (ACI) systems would also be installed. However, after further review, the Company elected to proceed with the addition of the ACI systems to provide an additional reliability support for the system if an event like this were to occur. The planned ACI systems would reduce mercury emissions and

effectively extend the compliant operating period further, but studies have not been performed to establish the additional number of days achievable.

B. As noted in the response in section A above, in an event where both Units 4 and 5 are offline due to unscheduled outages, the facility average emissions are projected to remain in compliance for 13 days (or approximately 300 hours), assuming the use of the planned DSI system. This would be extended further with the use of the planned ACI system, but these additional compliance durations have not been calculated.

C. In an event where either Units 4 or 5 are offline due to an unscheduled outage, the facility average emissions are projected to remain in compliance for 44 days (or approximately 1,100 hours), assuming the use of the planned DSI system. This would be extended further with the use of the planned ACI system, but these additional compliance durations have not been calculated.

5. Please complete the table below describing the historic performance of CR 4.

	Forced Outage (Hours)	**Planned Outage (Hours)**
2004		
2005		
2006		
2007		
2008		
2009		
2010		
2011		
2012		
2013		

Response:

Outage events were compiled through the MicroGADS database.

	Forced Outage (Hours)	Planned Outage (Hours)
2004	191	0
2005	173	551
2006	196	331
2007	36	252
2008	248	1,232
2009	219	0
2010	568	1,974
2011	78	1,448
2012	21	0
2013	41	517

6. Please complete the table below describing the historic performance of CR 5.

	Forced Outage (Hours)	Planned Outage (Hours)
2004		
2005		
2006		
2007		
2008		
2009		
2010		
2011		
2012		
2013		

Response:

Outage events were compiled through the MicroGADS database.

	Forced Outage (Hours)	Planned Outage (Hours)
2004	94	198
2005	94	0
2006	256	740
2007	4	424
2008	255	0
2009	150	3,174
2010	327	0
2011	58	687

2012	133	1,568
2013	354	0

7. How many times, since 2004, have CR 4 and CR 5 been off-line at the same time?

A. For each instance how many hours were both units off-line?

Response:

These outage events were compiled through the MicroGADS database and reviewed to establish periods where both units were offline at the same time due to scheduled and/or unscheduled outages.

Event	Start Time	End Time	Duration (Hours)
1	9/6/04 12:00	9/7/04 8:20	20
2	4/17/06 1:04	4/17/06 3:00	2
3	10/31/07 23:26	11/1/07 7:06	8
4	3/25/09 5:17	3/25/09 17:37	12
5	3/27/09 10:18	3/28/09 15:20	29
6	5/2/09 0:43	5/2/09 22:07	21
7	11/4/09 10:01	11/10/09 0:50	135
8	1/24/10 6:47	1/24/10 11:20	5
9	2/27/10 1:30	2/27/10 8:18	7
10	3/19/10 17:05	3/20/10 4:44	12
11	5/13/10 14:58	5/16/10 6:51	64
12	5/22/10 9:45	5/23/10 0:34	15
13	5/23/10 15:02	5/23/10 20:15	5
14	9/24/10 8:56	9/27/10 4:48	68
15	6/14/11 14:52	6/14/11 17:45	3
16	6/25/11 8:58	6/25/11 11:07	2
17	10/28/11 17:29	10/29/11 1:44	8
18	1/19/12 0:30	1/19/12 9:30	9
19	10/28/12 6:52	10/28/12 12:14	5
20	10/28/12 18:18	10/28/12 21:42	3
21	11/30/12 22:31	12/5/12 5:18	103
22	3/16/13 12:56	3/20/13 14:56	98
			634

8. Page 15 of the DEF's CR South Environmental Compliance Study states:

> As expected, while the units can meet the BART PM limit using the normal CAPP coal, the units had difficulty meeting the PM limits with the alternate coal and reagents during the trials. The compliance

planning team anticipated these challenges in the original projections for precipitator performance and plant output limits, and has used the data to determine what ESP changes are needed to meet the compliance targets. Once the recommended precipitator changes are completed, the PM performance should be sufficient to meet both the BART and MATS requirements while using the alternate coals and reagents. Additional testing will be required to confirm that compliance levels are being achieved.

A. Please explain why the units will have difficulty meeting the PM limits with the alternate coal and reagents during the trials.

B. When will the additional testing to confirm that compliance levels are being achieved be completed?

C. Does DEF have a contingency plan if the additional testing indicates the compliance level will not be met?

- If yes, please describe the plan.
- If no, why not?

Response:

A. Western Bituminous (WB) coal has a higher ash resistivity than the CAPP coal that Units 1 & 2 typically burn. The low sulfur content of WB coal contributes to its high ash resistivity, as less SO3 is generated in the combustion process. These characteristics reduce the particulate collection efficiency of the precipitators. Additionally, dry sorbent injection tends to increase opacity and particulate loading to the precipitators. Hydrated lime injection, which is used in this instance to reduce HCl emissions, will further reduce SO3 levels and impact particulate collection efficiency. Accordingly, the ESP enhancements are intended to ensure an adequate margin of compliance after switching to WB coal and the installation of the DSI/ACI systems.

B. DEF's precipitator compliance projects are scheduled during the CR 1 Spring 2014 and Spring 2015 outages, and the CR 2 Fall 2014 outage. There are test periods scheduled after each of these outages to allow for engineering and performance testing to assess the emissions reductions and precipitator performance improvements achieved. In addition, once the installation and commissioning for all of the compliance projects have been completed, additional testing will be scheduled to confirm expected levels of performance and to demonstrate compliance. These tests are currently anticipated in January and February of 2016, but these schedules may shift as work progresses.

C. DEF anticipates that the improved performance of the precipitators and the installation of the reagent systems will allow DEF to achieve compliance at the desired plant output levels. If, however, testing after completion of the initial project work reveals that PM emissions are still above desired levels, the compliance plan provides time to implement additional (secondary) projects, including the precipitator ash conditioning and/or economizer soot cleaning enhancements listed in the plan, to help further reduce PM. DEF's testing has already confirmed that the desired HCl and mercury emission performance levels can be achieved with the alternate coal and reagents. Furthermore, DEF's testing has confirmed that the desired PM emission performance levels can also be achieved, albeit at unit output levels that are lower than desired. DEF's expectation is that the desired unit output levels of 700 MW or more for Units 1 & 2 will be achieved once the compliance projects have been implemented.

9. Please provide the FRCC study referred to in DEF's response to Staff's First Data Request No. 30.

Response:

Please see the attached MATS extension letter dated February 6, 2014 and the FRCC Evaluation of Transmission Impact of the EPA's Mercury and Air Toxics Standard (MATS).

10. Page 5 of DEF's CR South Environmental Compliance Study contains Table 2-1, titled BART Emission Limits.

A. In the same format as Table 2-1 please provide the current emissions and opacity for CR 1 and CR 2.

B. In the same format as Table 2-1 please provide the estimated emissions and opacity for CR 1 and CR 2 after switching to western bituminous coal and installation of the proposed systems.

Response:

Based on clarifications received from Staff, the following response is provided in lieu of a response in the table format requested.

A. Current emissions levels for Crystal River Units 1 and 2 for mercury, NOx, SO2, filterable PM and HCl were previously provided in response to Question 11 from the Staff's first data request for this docket, and are repeated below for convenience.

		Current Emission Levels	Averaging Period
Hg*	lbs/Tbtu	3.3	3 hour stack test (2013)
NOx	lbs/MMBtu	0.389 (Unit 1) 0.288 (Unit 2)	Annual Average (2013)
SO2	lbs/MMBtu	1.5	Annual Average (2013)
Filterable PM	lbs/MMBtu	0.038 (Unit 1)** 0.008 (Unit 2)**	3 hour stack test (2013)
HCl	lbs/MMBtu	0.085	

With regard to current levels of opacity for Crystal River Units 1 and 2, the units currently operate within the permit required limits (30% for Unit 1 and

15% for Unit 2; during normal operation). Opacity levels are measured on a six-minute average basis for compliance and the levels tend to vary based on fuel characteristics, unit load (higher opacity at higher loads) and ESP performance.

B. Projected future emissions levels for Crystal River Units 1 and 2 for mercury, NOx, SO2, filterable PM and HCl were previously provided in response to Question 12 from the Staff's first data request for this docket, and are repeated below for convenience.

		Projected Emission Levels (Units 1 & 2)	**Averaging Period**
Hg	**lbs/Tbtu**	2.2	90-day facility average
HCl	**lbs/MMBtu**	0.007	30-day facility average
NO_x	**lbs/MMBtu**	0.29	
SO2	**lbs/MMBtu**	0.05	
Filterable PM	**lbs/MMBtu**	0.04	30-day average with Units 1 & 2

Regarding expected future opacity emissions, as noted above, opacity levels tend to vary based on fuel characteristics, unit load (higher opacity at higher loads) and ESP performance. The proposed ESP enhancements will ensure that that opacity levels remain within current permitted levels after switching to western bituminous coal and installation of the proposed DSI/ACI systems.

11. Page 5 of DEF's CR South Environmental Compliance Study contains Table 2-2, titled MATS-Key Hazardous Air Pollutants Limits.

A. In the same format as Table 2-2 please provide the current Crystal River site emissions.

B. In the same format as Table 2-2 please provide the estimated Crystal River site emissions.

Response:

Based on clarifications received from Staff, the following response is provided in lieu of a response in the table format requested.

A. The following table provides an indication of what facility-wide average values for the MATS related parameters might look like, if these data were being continuously collected for current plant operations. This information is based on currently available data collected from these units by various means and over various timeframes; therefore, they do not represent a specific averaging period (i.e., 30-day or 90-day average).

Estimated Current Crystal River Facility-wide Average

		Unit 1	Unit 2	Unit 4	Unit 5	Facility*
2013 Heat Input	%	10%	18%	36%	36%	
PM	lb/MMBtu	0.038	0.008	0.007	0.006	**0.010**
HCl	lb/MMBtu	0.0840	0.0840	0.0002	0.0002	**0.0240**
Mercury	lb/TBtu	3.3	3.3	0.3	0.3	**1.2**

*Facility average is weighted based on 2013 actual heat input. Actual facility-wide average will vary based on individual unit operation (heat input).

B. The following table provides an indication of future expected facility-wide average values for the MATS related parameters. This information is based on expected performance following the implementation of the MATS related projects.

Estimated Future Crystal River Facility-wide Average

		Unit 1	Unit 2	Unit 4	Unit 5	Facility*
2013 Heat Input	%	10%	18%	36%	36%	
PM	lb/MMBtu	0.032		0.007		**0.014**
HCl	lb/MMBtu	0.0050		0.0002		**0.0016**
Mercury	lb/TBtu	2.2		0.3		**0.8**

*Facility average is weighted based on 2013 actual heat input. Actual facility-wide average will vary based on individual unit operation (heat input).

12. Please complete the table below summarizing the emissions at the Crystal River site.

	Averaging Period	Hg	HCl	NO_x	SO_2	Filterable PM
		(lbs/Tbtu)	(lbs./MMBtu)			

		Averaging Period	Hg	HCl	NO_x	SO_2	Filterable PM
			(lbs/Tbtu)	(lbs./MMBtu)			
MATS Limit		N/A					
		90 days Ave.					
		30 days Ave.					
CAVR Limits		N/A					
		30 days Ave.					
		3-hour stack test (for 2018)					
		3-hour stack test (for BART)					
Current Emission Level	CR 1&2 Ave.	N/A					
		90 days Ave.					
		30 days Ave.					
		3-hour stack test (for 2018)					
		3-hour stack test (for BART)					
	CR Site Ave.	N/A					
		90 days Ave.					
		30 days Ave.					
		3-hour stack test (for 2018)					
		3-hour stack test (for BART)					
Projected Emission Level after CR 1&2 Retrofits	CR 1&2 Ave.	N/A					
		90 days Ave.					
		30 days Ave.					
		3-hour stack test (for 2018)					
		3-hour stack test (for BART)					
	CR Site Ave.	N/A					
		90 days Ave.					
		30 days Ave.					
		3-hour stack test (for 2018)					
		3-hour stack test (for BART)					

Response:

Based on clarifications received from Staff, the following response is provided in lieu of a response in the table format requested.

The requested information has been previously provided in response to Questions 9 and 10 from the Staff's first data request for this docket and the response to Question 10 and 11 of this data request.

13. Has DEF requested a one-year extension for the MATS compliance deadline? If yes, what is the status of that request?

Response:

Yes. DEF requested a one-year extension of the MATS compliance deadline for Crystal River units 1 and 2 based on the need for additional time to complete the construction of upgrades to achieve and maintain compliance with the MATS emissions limits (these are the projects detailed in the petition). DEF received the extension on February 6, 2014.

14. Page 53261 of the Federal Register Vol. 78, No. 168 dated August 29, 2013, under the heading Crystal River, states:

> EPA has evaluated the cost-effectiveness of DSI under the shutdown option and concludes that, although FDEP should have evaluated DSI as a possible interim BART control option, DSI would not be cost-effective. EPA estimates that DSI would result in approximately $46,000,000 in capital costs and $54,000,000 in annual operating costs at the Crystal River facility, not including expenses for any necessary upgrades to the ESPs due to the increased loading from the DSI system or the potential costs due to local retrofit constraints.

Is the DSI system described in the statement above different from the DSI system DEF is proposing in this docket? Please explain.

Response:

Yes. The DSI systems proposed for CR Units 1 and 2 in this docket are different from the DSI system contemplated in the EPA's BART analysis. In the EPA review cited, the agency reviewed comments and conducted evaluations as a part of the "Approval and Promulgation of Air Quality Implementation Plans; State of Florida; Regional Haze State Implementation Plan". The dry sorbent injection (DSI) system referenced by the EPA in this review would be a large emission control system intended to reduce SOx emissions as part of a full dry flue gas desulfurization system implementation, similar to the system discussed in DEF's 2013 Review of Integrated Clean Air Compliance Plan filed on April 1, 2013, in Docket No. 130007-EI.

In this instant docket, DEF is proposing to install a small DSI system to inject small amounts of hydrated lime to interact with fuel-bound chlorides to reduce HCl which is an emission targeted by the MATS rule. Both of the referenced reagent systems use dry sorbents to affect emissions reduction, but the intended use is quite different. The DSI systems included in the MATS compliance projects for the limited continued operating period of CR1&2 will be significantly smaller than the DSI system referenced in the EPA review.

15. Please complete the table below summarizing the actual and projected capacity factor for Crystal River Units 1, 2, 4, and 5.

	Capacity Factor (%)			
	CR 1	CR 2	CR 4	CR 5
2004				
2005				

2006				
2007				
2008				
2009				
2010				
2011				
2012				
2013				
2014				
2015				
2016				
2017				
2018				

Response:

	Capacity Factor (%)			
	CR 1	**CR 2**	**CR 4**	**CR 5**
2004	**63%**	**69%**	**78%**	**82%**
2005	**73%**	**66%**	**85%**	**85%**
2006	**69%**	**68%**	**82%**	**75%**
2007	**66%**	**60%**	**85%**	**82%**
2008	**62%**	**68%**	**67%**	**79%**
2009	**58%**	**58%**	**62%**	**44%**
2010	**52%**	**54%**	**53%**	**77%**
2011	**32%**	**37%**	**64%**	**67%**
2012	**33%**	**32%**	**69%**	**51%**
2013	**28%**	**31%**	**77%**	**76%**
2014	**26%**	**31%**	**79%**	**74%**
2015	**19%**	**27%**	**84%**	**73%**
2016	**23%**	**30%**	**84%**	**83%**
2017	**23%**	**32%**	**85%**	**90%**
2018	**20%**	**35%**	**91%**	**82%**

FRCC's Evaluation of Transmission Impact of the EPA's Mercury and Air Toxics Standard (MATS)

(Transmission Impact Study for Shutdown of Crystal River Units 1 & 2, with retirement of Crystal River Unit 3)

Performed by the FRCC TWG

Prepared by TWG	**June 3, 2013**
Accepted by MSPC	**February 4, 2014**

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Summary

The FRCC TWG, under direction of the FRCC PC, has performed a study to determine the transmission reliability impact to the FRCC Region of the EPA MATS regulation. In order to comply with the MATS regulation, Duke Energy Florida's ("DEF") Crystal River 1 & 2 ("CR 1 & 2") coal-fired units are subject to shutdown in April 2015 (or April 2016 if a one year extension is granted). In addition to the potential impacts of the MATS regulation, DEF announced in early 2013 that it would retire the Crystal River 3 nuclear unit ("CR 3"). The impact of shutting down CR 1 & 2, the retirement of CR 3, and replacing this generation with DEF reserves (as was analyzed in this evaluation) is a significant shift in power flow patterns causing reliability concerns in areas not previously identified.

The FRCC TWG finds the following with respect to the three MATS Study deliverables:

- An extension of at least one year on the EPA's MATS compliance deadline is needed for Crystal River 1 & 2. This will alleviate significant reliability issues that would begin in the summer 2015 timeframe (without such extension), ensuring BES reliability in the FRCC Region as various transmission projects and operational mitigation procedures are implemented.

- In 2016 and 2017, significant reliability issues continue to exist with the retirement/shutdown of the Crystal River units. The TWG requests that All entities with unresolved thermal and/or voltage criteria exceptions further investigate and develop mitigation plans.

- The results of the summer 2018 analysis for the potential addition of a combined cycle facility of 1,179 MW in the vicinity of the existing Crystal River plant, combined with the accelerated projects and previously identified operating solutions, finds that the reliability issues that are created by the potential shutdown of CR 1 & 2 and announced retirement of CR 3 are resolved.

Purpose of Study

On December 16, 2011 the Environmental Protection Agency ("EPA") issued their Mercury and Air Toxics Standards ("MATS") regulation. The MATS regulation is designed to reduce mercury, other metals and acid gas emissions from coal- and oil-fired power plants. The MATS regulation became effective on April 16, 2012, and the initial compliance deadline is three years after the effective date, or April 16, 2015. In order to comply with the MATS rule, Duke Energy Florida's ("DEF") Crystal River 1 & 2 ("CR 1 & 2") coal-fired units are subject to shutdown in April 2015 (or April 2016 if a one year extension is granted). The MATS rule does offer a one year extension, to be approved by the state permitting authority (Florida Department of Environmental Protection), if reliability issues warrant an extension.

In addition to the potential impacts of the MATS rule, DEF announced in early 2013 that it would retire the Crystal River 3 nuclear unit ("CR 3"), instead of repairing it as previously planned. The unit has been off-line since 2009, and has been previously modeled in the FRCC Databank as returning to service in 2015.
As a result of these events, and their potential impact(s) to the FRCC Region, the FRCC Planning Committee ("PC") directed the Transmission Working Group ("TWG") to perform an analysis determining the impact(s) to the Bulk Electric System ("BES") and the 69 kV transmission system within the FRCC.

The primary deliverables of the evaluation were:

- Determine whether a one year extension on the EPA's MATS compliance deadline is needed to ensure reliability.

- Assess the transmission reliability impact for the 2015 through 2017 timeframe and develop potential solutions.

- Evaluate the potential reliability benefits of a new combined cycle constructed in the vicinity of the existing Crystal River site, starting operations in summer of 2018.

Case Description and Sensitivities

The initial load flow cases selected for the evaluation were the 2012 FRCC Load Flow Databank (LFDB) cases (revision 1B), which were utilized for the FRCC's 2012 Long Range Study. These cases were slightly modified to reflect known assumptions and information about the system, including long-term resource and transmission plans, as well as correcting any issues that were identified during the Long Range Study effort.

The following years and loading conditions were selected for the analysis:

- Summer - 2015, 2016 (Peak and 60%), 2017, 2018
- Winter - 2015/16, 2016 /17

The following scenarios and sensitivities were analyzed:

- Base/Study scenarios – Generation economically dispatched by respective Balancing Authority area
  - Base cases include CR 1 & 2 and CR 3 on-line and fully dispatched
  - Study cases model CR 1 & 2 and CR 3 off-line with generation replaced with DEF available reserves. Minority owners of CR 3 replaced the generation from other resources.

- Base/Study scenarios – System response at the Florida / Southern import limit
  - Timeframe - summer 2016
  - Increased Southern to Florida transfer beyond firm commitments to 3,700 MW limit with remaining resources dispatched economically

- Polk Firm sensitivity – Stress Central Florida area
  - Timeframe - winter 2016/17 and summer 2017
  - Maximize all firm resources in the Polk area
    - FPL's Manatee unit evaluated at both economic dispatch and full output

- Crystal River site combined cycle sensitivity – DEF self-build alternative
  - Model a new 1,179 MW combined cycle resource assumed in-service by the summer of 2018, this correlates to DEF's latest Ten-Year Site Plan filed at the FPSC. The location is not specified in the Ten-Year Site Plan, so based on the FRCC PC study directive the unit was placed at the Crystal River plant with the combustion turbines connected to the 230 kV bus and the steam turbine connected to the 500 kV bus, with remaining DEF generation resources economically dispatched

- Unit Out scenarios (C3-Gens analysis)
  - Bayside 2, Crystal River 4, Crystal River 5, Fort Myers 2, Sanford 5 and Stanton 2, for winter 2015 and summer 2016.

Study Methodology

The TWG analysis was performed by conducting a power flow analysis under normal and various contingency conditions using Siemens Power System Simulator for Engineering ("PSS/E") and PowerGEM's Transmission Adequacy and Reliability Assessment ("TARA") software program. All system elements 69 kV and above within the FRCC region were modeled for NERC Category A, B, and selected C contingency events using steady state methods. All branches' (including transformers and ties) thermal loadings were monitored to be within System Operating Limits ("SOL"). Thermal loadings greater than 100% of a facility's applicable rating that were materially aggravated (more than 3%) when compared to the reference case or thermal overloads that did not exist in the reference case, for the same contingency, are attributed to the impact of the CR 1 & 2 shutdowns and the CR 3 retirement. Similarly, all system busses were monitored for applicable voltage criteria, including nuclear plant interface requirements. Voltages outside of transmission owner criteria that were materially lower (more than 2%) when compared to the reference case, for the same contingency, are attributed to the impact of the CR 1 & 2 shutdowns and the CR 3 retirement.

The TWG performed the following steps for the analysis:

- Verified that under normal operating conditions (NERC Category A criteria), all facilities remained within applicable ratings.

- Performed a "Rate C" contingency screening in order to identify any conditions that would indicate potential SOL limitations which would require pre-contingency mitigation measures. Any potential limitation required a remedy before any further analysis, in order to represent the pre-contingency condition.

- Performed a NERC Category B contingency analysis on all Base and Study cases and sensitivities using the criteria described above.

- Performed NERC Category C (C2, C5, C3 Gen and C3 Lines) event analysis on all Base and Study cases and sensitivities using the criteria described above.

General Findings

The impact of shutting down CR 1 & 2, the retirement of CR 3, and replacing this generation with DEF reserves (as was analyzed in this evaluation) is generally to reduce the two power injections from (1) the north to the Tampa Bay load area, and from (2) west central Florida to the western portions of the Orlando load area. Utilizing DEF's available reserves causes a shift in the power flow patterns with issues. The specific findings for the timeframes analyzed are discussed in subsequent sections.

Deliverable 1 - Findings and potential solutions for summer 2015 & winter 2015/16

DEF's System

The summer and winter of 2015 results indicate that with CR 1 & 2, and CR 3 retirement, the flow of power from the DEF Central Florida Substation into the Greater Orlando Area is reduced significantly. That coupled with the operation of the base load units at FPL's Sanford Plant and DEF's dispatch of Debary, results in significantly increased flows in the 230 kV corridor between the generation at Debary and Sanford, and the load to the south (West Greater Orlando Area). With the previously described conditions, this path experiences significant pre-contingency loading (99% of Rate A) and post-contingency thermal overloads. Additional post-contingency thermal overloads were also observed on other elements within DEF's system, which can be resolved using various switching mitigation procedures.

A combination of the previously stated 230 kV line rebuilds, significant 69 kV and 230 kV switching (sectionalizing), and significant re-dispatch is required to resolve the corridor overloads identified above. Since this corridor is used to transfer bulk power and to serve area load, switching alternatives are limited, and clearance windows would be short, making it very unlikely that the 230 kV rebuild lines could be completed prior to April 2015. In addition, re-dispatch options are also very limited due to the absence of the three base load resources at Crystal River that results in utilizing nearly all available reserves. What remains of the identified mitigations is a less desirable option to address the identified post-contingency corridor issues: a severe combination of 69 kV and 230 kV switching (sectionalizing), combined with limited re-dispatch at Debary.

If DEF were granted an extension to delay the shutdown of CR 1 & 2, the ability to run these units will resolve these significant issues on the system through April 2016.

Seminole Electric Cooperative, Inc.'s (SECI) System

During the 2012 Long Range Study, Seminole's 69 kV transmission line located in north Sumter County was projected to experience thermal overload conditions starting in the summer of 2016 and increasing slightly through the end of the planning horizon. Seminole's plan was to reconductor the 0.3 miles of 336 ACSR with 556 ACSR prior to the start of the summer of 2016 season. However, with the loss of CR 1 & 2, the thermal overload on the respective Seminole facility begins in the summer of 2015.

Seminole's original plan was to reconductor the 0.3 miles prior to the start of the summer 2016 season; however, with the assumption that CR 1 & 2 will be shutdown by 2015, Seminole would need to accelerate the reconductor project to be complete prior to the start of the summer 2015 season. This project could remain on its current schedule per the 2012 Long Range Study if DEF was granted an extension to delay the shutdown of CR1 & 2.

Tampa Electric Company's (TEC) System
Prior to proceeding with the study analysis, the cases were assessed for potential Rate C overloads by running all contingencies (B, C2, C5 & C3 Gens) against the Rate C. TEC addressed potential BES screening overloads using one of four possible methods: pre-contingency switching, pre-contingency dispatch adjustment, documentation of a higher Rate C or automatic action schemes (i.e., SPS, UVLS, etc.).

The results for the summer 2015 and winter of 2015/16 indicate significant overloads in the corridor flowing power from east to west towards the Lake Tarpon area. While numerous thermal overloads appear to be satisfactorily resolved using various switching mitigations, additional TEC transmission lines resulted in Rate B overloads under contingency events that are still outstanding. Each is fully mitigated with the ability to run CR 1 & 2.

Running CR 1 & 2 at the current generation capacity, as it had been projected in the 2012 LFDB models, resolves the overloads on many of the effected TEC facilities or reduces the impact on the thermal overloads on the remaining facilities, so that switching solutions would resolve the remaining overloads.

Determination

The TWG has determined that in the summer 2015 and winter 2015/16 scenarios, with the order to comply with the MATS regulation and subsequent shutdown of Crystal River unit 1 and unit 2, in addition to the announced retirement of Crystal River 3, severe reliability issues exist. The shutdown of CR 1 & 2 will cause new overloads and increase the magnitude of known contingency overloads, many of which cannot be remedied by existing operational procedures. These post-contingency overloads will require new transmission facilities to be constructed and/or existing transmission facilities to be rebuilt or re-conductored in order to accommodate new flow patterns that have not been previously observed.

The TWG finds that a one year extension for the operation of CR units 1 & 2 is justified and necessary to maintain the integrity and the reliability of the BES within the FRCC. This extension will allow additional time to construct transmission projects to resolve many of the issues and aid in mitigating significant post-contingency overloads allowing for operational procedures to be implemented.

Deliverable 2 - Transmission impacts and potential solutions in 2016 & 2017

DEF's System
The results for the summer and winter of 2016 and 2017 indicate significant overloads in:

- The 230 kV tie-line between Lakeland Electric (LAK) and DEF.

- The 230 kV corridor between the generation in the area of Debary (DEF) and Sanford (FPL) and the load to the south.

By summer 2016, DEF plans to rebuild the LAK / DEF 230 kV tie-line and remove the limiting elements to resolve the worst overloads in this area, although DEF will still need to use some switching mitigation procedures for other issues downstream. DEF also plans to eliminate its most limiting elements on the addition LAK / DEF 230 kV tie-line by April 2016.

DEF is currently developing plans to have the corridor located north of Orland in southwest Seminole County rebuilt by summer of 2016. The rebuild of these segments in this corridor will improve area conditions, but until the last rebuild project is completed along this corridor, DEF will still have to depend on some combination of 69 kV and 230 kV switching and limited re-dispatch at Debary. If generation were made available by some means in the Crystal River area, this could resolve most, if not all, of the issues on this corridor and significantly reduce the negative impact in many other areas as well.

As observed in the summer 2015 and winter 2015/16, some additional less significant thermal overloads remain in DEF's system, but can be satisfactorily resolved using various switching mitigation procedures.

TEC's System
Similar to the summer of 2015 and winter of 2015/16 cases, the summer of 2016 & 2017 and winter of 2016/17 cases were assessed for possible Rate C overloads. TEC addressed potential BES screening overloads using one of four possible methods: pre-contingency switching, pre-contingency dispatch adjustment, documentation of a higher Rate C or automatic protection system (i.e., SPS, UVLS, etc.). s:

In addition to the BES Rate C overloads, the 69 kV system is also assessed for any potential Rate C overloads that may potentially impact the BES, but not required to be resolved prior to proceeding with the study analysis.. TEC would be able to address the 69 kV overloads by choosing to uneconomically increase the Pasco Cogen generation to its maximum as pre-contingency in all the cases.

The results for the summer of 2016 & 2017 and winter of 2016/17 indicate significant overloads in the corridor flowing power from east to west towards the Lake Tarpon area. While numerous thermal overloads appear to be satisfactorily resolved using various switching mitigations, additional TEC transmission lines resulted in Rate B overloads that remain outstanding. If generation were made available by some means in the Crystal River area, this could resolve most, if not all, of the issues and significantly reduce the negative impact in other areas as well.

Determination

In the 2016 and 2017 timeframe, severe reliability issues exist with the shutdown of CR 1 & 2. The most severe issues revolve around the Polk Firm and the Unit Out scenarios (most notably, Bayside 2). In these scenarios TWG has identified Rate C overloads and numerous post-contingency overloads in the TEC area for which mitigations have not yet been developed.

Deliverable 3 - Reliability impact of a new combined cycle built at Crystal River in 2018

TEC's System
The results for the summer of 2018 show the elimination of the Rate B and Rate C overloads shown in the previous cases with the exception of one 230 kV transmission line under a double contingency event in the Study scenario.

The effect of installing a combined cycle facility of 1,179 MW by the summer of 2018 in the Crystal River vicinity partially alleviates the thermal overload on TEC's 230 kV transmission line to 101% and a switching solution would resolve the remaining overload.

Determination

The TWG's evaluation of the transmission impact associated with the addition of a combined cycle facility of 1,179 MW by summer 2018 in the vicinity of the existing Crystal River plant, combined with the accelerated projects and previously identified operating solutions, finds that the reliability issues that are created by the potential shutdown of CR 1 & 2 and announced retirement of CR 3 are resolved

Effect on future studies

This study identified several concerns without providing firm resolutions for various contingency types and system conditions. For future studies that will have to incorporate the Crystal River shutdowns and retirements, including the FRCC Long Range Study, the issues identified in this analysis will need to have adequate remedies. Additionally, any future TSR/NITS or GISR/NRIS studies will be much more complex when starting with unresolved issues. There is one GISR already underway, and it is anticipated that more will be coming in the near future.

FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
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RICK SCOTT
GOVERNOR

CARLOS LOPEZ-CANTERA
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HERSCHEL T. VINYARD JR.
SECRETARY

February 6, 2014

Sent by Electronic Mail – Received Receipt Requested

robby.odom@duke-energy.com
Mr. Robby Odom, Station Manager
Crystal River South
Steam Plant & Fuel Operations
Duke Energy Florida, Inc.
299 First Avenue, North
St. Petersburg, Florida 33701

Re: Crystal River Units 1 and 2
MATS Compliance Date

Dear Mr. Odom:

On January 8, 2014, we received your request (enclosed) for a one-year extension of the Mercury and Air Toxics Standards (MATS) compliance deadline for Duke Energy Florida's coal-fueled Crystal River Units 1 and 2 (CR-1 and CR-2) to April 16, 2016 (DEF Extension Request). The request meets the criteria for obtaining an extension. The extension will be incorporated into the facility's Title V operating permit.

The method for obtaining an extension of the compliance deadline is provided in 40 CFR 63, Subpart A - General Provisions (Section 40 CFR Section 63.6). According to section 63.6(i)(4)(*i*)(A):

> *"The owner or operator of an existing source who is unable to comply with a relevant standard established under this part pursuant to section 112(d) of the Act may request that the Administrator (or a State, when the State has an approved part 70 permit program and the source is required to obtain a part 70 permit under that program, or a State, when the State has been delegated the authority to implement and enforce the emission standard for that source) grant an extension allowing the source up to 1 additional year to comply with the standard, if such additional period is necessary for the installation of controls."*

In addition, the U.S. Environmental Protection Agency recognized the need for and the likelihood of such extensions in its final action on the MATS rule (pp. 9407-9411 of the MATS Preamble):

> *"The EPA believes that although most units will be able to fully comply within 3 years, the fourth year that permitting authorities are allowed to grant for installation of controls is an important flexibility that will address situations where an extra year is necessary. That fourth year should be broadly available to enable a facility owner to install controls within 4 years if the 3-year time frame is inadequate for completing the installation."*

EPA also recognized that reliability concerns raised by regional transmission operators responsible for planning and reliable operation of the bulk electric system are appropriate to consider in the review of a compliance extension request (pp. 9410-9411 of MATS Preamble).

The information provided by Duke in its extension request indicates that the company requires the additional year provided by EPA rule to install additional pollution control equipment on CR-1 and CR-2. The complete description of the planned controls and the preliminary installation schedule are included in Tables 1 and 2 of the request, but essentially, Duke plans to install dry sorbent injection to control acid gas emissions; install activated carbon injection to control mercury emissions; and enhance its electrostatic precipitators to remove particulate matter, including metals.

In its request, Duke also provided information from the Florida Electric Reliability Coordinating Council (FRCC), the regional transmission operator, which concluded that a compliance extension is necessary to maintain the integrity and reliability of the bulk electric system (BES). As part of its analysis, the Council considered Duke's recent retirement of Crystal River Unit 3, a large nuclear unit; shut down scenarios for CR-1 and CR-2; and Duke's plans to replace this lost capacity. Specifically, the Council concluded:

> *"The impact of shutting down CR 1 & 2, the retirement of CR 3, and replacing this generation with DEF reserves (as was analyzed in this evaluation) is a significant shift in power flow patterns causing reliability concerns in areas not previously identified."*
>
> *"Based on the results of the MATS Study, the FRCC Planning Committee finds that a one year extension for the operation of CR 1 & 2 is justified and necessary to maintain the integrity and the reliability of the BES within the FRCC."*

On April 30, 2013, Duke notified the Department of its decision to shut down CR-1 and CR-2 by December 31, 2020. Accordingly, Florida updated its Regional Haze State Implementation Plan submittal (DEF Shut Down and SIP Update), and the shutdown commitment became federally enforceable when EPA approved Florida's Plan on August 29, 2013 (Link to EPA Approval). Obtaining a compliance extension for MATS purposes will not alter this commitment.

Given the above, Duke's request meets the requirements for obtaining an extension. The Department will incorporate the extension, with conditions, into Crystal River's Title V permit. To ensure CR-1 and CR-2 are on track to comply with the MATS rule by April 16, 2016, the Department will impose a number of key milestones:

Key Milestones	CR-2	CR-1
Submit Title V Operation Renewal Permit Application to Include MATS Rule	5/20/14	
Assess Condition of CR-1 Electrostatic Precipitator (ESP) during Planned Outage		6/1/14
Initiate Physical Improvements on CR-1 and CR-2 during Planned Outages	12/1/14	6/1/15
Complete Dry Sorbent/Activated Carbon Injection Projects and Phase I of ESP Projects	2/1/15	8/1/15
Complete Phase II of ESP and other Plant Systems Compliance Projects	2/1/16	
Achieve Final Compliance with the MATS Rule	4/16/16	
Progress Reports	Quarterly	

If you have any questions regarding this matter, please contact me at 850/717-9093.

Sincerely,

Paula L. Cobb, Deputy Director
Division of Air Resource Management

Enclosure: DEF MATS Extension Request