



**Robby A. Odom**  
Station Manager, Crystal River  
Steam Plant & Fuel Operations

January 8, 2014

Mr. Brian Accardo, Director  
Division of Air Resource Management  
Department of Environmental Protection  
2600 Blair Stone Road  
Tallahassee, FL 32399

Re: Application for One-Year Extension of MATS Compliance Deadline  
for Crystal River Units 1 and 2

Dear Mr. Accardo:

Duke Energy Florida, Inc. (DEF or the Company), is a regulated electric utility operating in Florida that serves approximately 1.7 million homes, businesses and industries. DEF has several units subject to EPA's Mercury and Air Toxics Standards (MATS) rule, including Crystal River Units 1 and 2. Based on the information below, DEF is requesting a one-year extension of the MATS compliance deadline for these units.

The final MATS rule was published on February 16, 2012, and it became effective on April 16, 2012. The rule establishes stringent limits for emissions of mercury and other metals and acid gases from coal- and oil-fired electric utility boilers. The MATS rule and Section 112 of the Clean Air Act (CAA) provide a three-year compliance time period (April 16, 2015). In addition, the MATS rule and Section 112(i)(3)(B) of the CAA allow for a one-year extension of that deadline to be administered by the state CAA Title V permitting authorities. This fourth year for compliance may be granted for the installation of pollution controls and in circumstances where a facility owner plans to retire a unit but cannot do so within the three-year compliance time frame because of one of the following:

- The continued operation of the retiring unit is needed to maintain reliability while other units install emission controls;
- New off-site generation is being built to replace the retiring unit, but the new generation will not become operational within the three-year time frame and any gap between retirement of the old unit and the entry into operation of the new unit would cause reliability problems; or
- Transmission upgrades are necessary to ensure reliability after the unit's retirement, but the upgrades cannot be completed within three years.

DEF has been studying the best path forward for MATS compliance for Crystal River Units 1 and 2. An important part of this analysis is the recognition that these units provide critical capacity to the central Florida grid, and therefore the continued operation of Units 1 and 2 is critical for transmission system reliability until replacement generation and/or transmission facilities can be built. As part of its technical evaluation process, DEF recently completed

extensive testing of low-sulfur, low-mercury Colorado bituminous coal in both Units 1 and 2. Along with testing of the coal, DEF also conducted operational and emissions testing with activated carbon and hydrated lime injection to further reduce emissions of mercury and HCl, respectively. This testing was conducted under a trial burn permit issued by the DEP on July 8, 2013 (Air Permit No. 0170004-040-AC).

The testing results, which are discussed in the attachment, reveal that work to enhance the performance of the electrostatic precipitators (ESPs) on Units 1 and 2 must be completed in order to assure compliance with the MATS emissions standards. The time needed for engineering design, permitting, reagent system installation, and ESP work as well as system tuning and testing following construction results in the need for additional time beyond the initial April 16, 2015 deadline for completion. Therefore, DEF respectfully requests that DEP grant a one-year extension of the MATS compliance deadline for Crystal River Units 1 and 2 to April 16, 2016.

DEF's development of its MATS compliance strategy, project descriptions, and project schedule are discussed in detail in the attached MATS Compliance Summary.

Thank you for your consideration of this very important request for extension of time. Please do not hesitate to contact Mike Kennedy at (727) 820-5567 or me at (352) 501-5682 if you have any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Rob Odom", with a long horizontal flourish extending to the right.

Rob Odom  
Station Manager, Crystal River  
Steam Plant & Fuel Operations

## Duke Energy Florida Crystal River South Plan for MATS Compliance

### MATS Plan Development

In April 2013, in the “*Review of Integrated Clean Air Compliance Plan*” filed with the Florida Public Service Commission (FPSC), the Company advised that installation of new selective catalytic reduction (SCR) and flue gas desulfurization (FGD) emission control systems at Crystal River Units 1 and 2 (or CR South) for long-term continued operation would not be economically feasible and that DEF would no longer be considering that alternative. DEF performed additional detailed studies addressing shorter term environmental compliance alternatives, and alternatives for replacement power with specific consideration for grid stability and system reliability. These studies helped refine the alternatives available to DEF to maintain compliance and reliability, which can be summarized as follows:

**Alternative 1:** *Retire the CR South units in April 2016 in response to the MATS compliance dates and meet system requirements with purchased power and/or new resources in a manner that the grid would support.*

**Alternative 2:** *Establish a MATS compliance plan for CR South and configure the units to operate in compliance through mid-2018, and establish a resource plan to provide for replacement combined cycle generation in that timeframe. This alternative includes a competitive solicitation for combined cycle energy and capacity starting in 2018, identification of additional resources needed in 2016 and beyond, and a transmission plan that supports the required resources.*

The Company compared the quantitative and qualitative merits of pursuing either of these alternatives. In the results of the quantitative economic analysis, the projected costs for continued operation of the CR South units through mid-2018 (Alternative 2) were substantially lower than the projected costs for retiring the units in mid-2016 (Alternative 1). DEF also determined that limited continued operation (Alternative 2) has a significant positive impact on system reliability if operation of the CR South units is extended until replacement generation can be added near Crystal River, or until transmission projects can be completed to address grid concerns. In evaluating Alternative 1, DEF determined that the large generation deficits resulting from removal of Units 1, 2, and 3 at Crystal River (Unit 3 was permanently retired in February of 2013), coupled with replacement power flowing from central Florida, would result in significant changes in system power flows. These changes are projected to exacerbate a number of localized system constraints and cause overloads elsewhere on the system that would need to be addressed.

DEF assessed the transmission resources required to support the replacement power alternatives under consideration, and characterized the transmission system benefits that would be attainable if the Company were to pursue limited continued operation of the CR

South units. The Company determined that DEF transmission system projects valued at an estimated \$150 million could be deferred if the CR South units were to remain in service during the interim period, and eliminated if replacement generation were constructed at or near the Crystal River site. At the Company's request, the Florida Reliability Coordinating Council (FRCC) also performed a transmission study of these conditions in June 2013 in the course of their reliability planning assessment cycle. The FRCC's study confirmed the transmission reliability concerns associated with retirement of the CR South units in 2016 and identified significant transmission system upgrades that would be required for DEF and adjacent systems. A copy of a letter from the FRCC to Duke Energy Florida regarding the results of the study is attached. While the issues identified may be addressed with transmission system upgrades, the timing and cost of the required upgrades present significant challenges and risks.

Based on the substantial economic and reliability benefits, DEF continued its evaluation of Alternative 2.

### Alternate Fuel Testing

DEF conducted a two phase alternate fuels testing program to evaluate plant systems and emissions performance while burning low mercury and chlorine western bituminous coals and injecting different sorbents. In the first phase, DEF evaluated the handling and combustion of western bituminous coal and collected baseline emissions data.

#### *Phase 1 Testing*

DEF selected Colorado bituminous coal for the initial trials in mid-2013. This fuel has a much lower sulfur content than the Central Appalachian (CAPP) coal which is normally used. This, as expected, caused the particulate matter (PM) and opacity levels to rise in response to the increase in ash resistivity. DEF made some adjustments to the electrostatic precipitator (ESP) power settings and rapping programs, within the range of the equipment's existing capabilities, to help compensate. Once completing the trials, the units returned to the normal CAPP coals.

The results of the first phase of the trials established that the plant would be able to handle and fire the western fuel without incident and that the emissions performance was in line with expectations and consistent with the levels needed to support the MATS plan under development. These results supported continuation with the second phase of the trials, which involved more detailed characterization of emission performance at different load levels and testing utilizing hydrated lime and activated carbon injection. DEF obtained test permits to allow the use of these reagents in the second phase of testing.

#### *Phase 2 Testing*

DEF conducted the second phase of testing in October and November 2013. For consistency and comparison with the first phase results, DEF also used Colorado bituminous coal in the

second phase. During the trials, DEF collected emissions data to assess equipment performance and determine what changes would be needed to achieve the MATS emission levels. DEF also performed some additional tuning and ESP adjustments to assess performance levels.

*Emissions Performance:* In the compliance analysis performed prior to testing, DEF projected emission levels of HCl, mercury and PM utilizing alternate coal, as well as with hydrated lime and activated carbon for further reductions of HCl and mercury.

*HCl, Mercury and Reagents:* During the trials, hydrated lime and activated carbon injection effectively reduced HCl and mercury, respectively, within the targeted range of emissions. During the hydrated lime injection tests, the anticipated reductions in ESP performance were observed. During the tests with activated carbon injection, detrimental effects on precipitator performance were not observed.

*Particulate Emissions:* In 2014, new PM and opacity limits are imposed pursuant to the Best Available Retrofit Technology (BART) requirements of the Regional Haze Rule. Additional PM limits are imposed under the MATS rule. In its compliance analysis, DEF determined that meeting the lower PM limits under BART at the desired plant output levels will provide PM reductions sufficient to satisfy the MATS requirements. 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. DEF used that data to determine what ESP changes are needed to meet the compliance targets. Once the recommended ESP changes are completed, the PM performance should be sufficient to meet both the BART and MATS PM requirements while using the alternate coals and reagents. Additional testing will be required to confirm that compliance levels are being achieved.

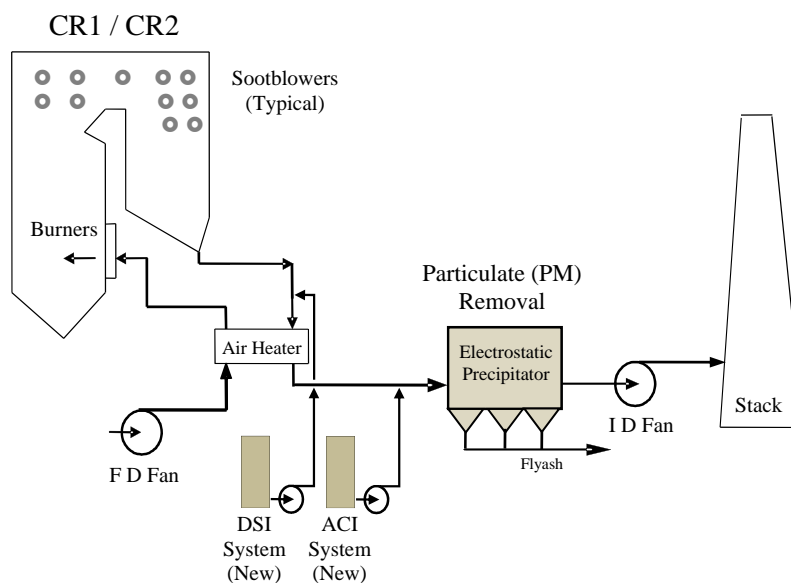
## Compliance Projects

As described above, DEF has determined that with the implementation of certain compliance projects, CR South can comply with the MATS requirements. These compliance projects include the addition of the reagent injection systems for HCl and mercury, ESP improvements and changes for PM, and other related plant projects. A list of these projects is provided below in Table 1. Table 2 contains the projected timelines for implementing these projects. DEF will also conduct testing after the projects are complete to assess the emissions rates from Units 1 & 2 and determine if there are any operating restrictions necessary to maintain compliance with BART and MATS. DEF will continue to refine the project scope and schedule, and will keep DEP informed of any significant revisions.

*Reagent Systems:* The addition of dry sorbent injection (DSI) systems utilizing hydrated lime is needed to reduce HCl emissions. Since chlorine levels in the targeted fuels are low, the DSI system would be relatively small and require low injection rates to achieve the results desired. The addition of activated carbon injection (ACI) systems is also needed to reduce mercury emission levels. Like the DSI systems, the proposed ACI

systems would also be relatively small to meet the reduction levels needed, and both systems would be set up to operate intermittently or continuously, depending on the needs of the facility. The reagents would be injected upstream of the ESPs, as depicted in Figure 1 below, and the resulting reactants would be captured in the precipitators.

**Figure 1**



*Electrostatic Precipitators (ESPs):* As discussed above, the PM performance results gathered during testing confirm that ESP performance needs to improve and the specified projects are required to reduce PM emissions for MATS compliance. The list of required ESP projects is included below in Table 1.

*Plant Systems:* Additional plant systems projects have been incorporated into the compliance plan to ensure that performance of the fuel handling systems, boiler systems, related combustion systems and plant controls to support the operating configurations required for compliance. A current list of these planned projects is included below in Table 1.

*Project Timelines:* Implementation timelines for the required projects, operational testing and MATS compliance testing are shown in Table 2. The recently completed alternate coal and reagent trials provided key information needed to identify and select the required projects. The engineering, project management, environmental and operations teams are now moving forward with the design, planning and permitting phases of the selected projects. The first half of 2014 is needed for detailed project design and planning, permitting and procurement. Where possible, project teams are pursuing opportunities to expedite portions of the work on a few of the projects, as shown. The majority of the project implementation work will begin during the Fall of 2014 maintenance outage planned for Crystal River Unit 2. The bulk of project work will be

performed during scheduled maintenance outages in the Fall of 2014 and the Spring of 2015. Operational testing and analysis will be performed after the projects are completed to determine the emission reduction levels achieved and to help identify any additional measures needed to achieve performance and reliability objectives. Additional follow up work and final adjustments will be completed during outages in the Fall of 2015. Based on this schedule, DEF’s project work and final adjustments should be completed by the end of 2015, allowing time for final tuning and testing to meet the April 2016 MATS compliance target for the CR South units.

**Table 1: CR South Plan for MATS Compliance – Current Planned Projects**  
 (Note: Current planning information – subject to change.)

<b>Reagent Systems</b>	<b>Unit 1</b>	<b>Unit 2</b>
Dry Sorbent Injection (DSI) Systems Projects	✓	✓
Activated Carbon Injection (ACI) Systems Projects	✓	✓
<b>ESP Projects</b>	<b>Unit 1</b>	<b>Unit 2</b>
Flue Gas Redistribution	✓	
High Frequency Power Supplies	✓	✓
Hopper High Level Indicators & Hopper Vibrators	✓	✓
High Voltage Rapper Connections Project	✓	✓
Rapper Testing, Adjustments and Optimization		✓
Additional Flow Baffles		✓
Recommission Last 3 Fields of CR2 Old A/B ESP		✓
Precipitator Ash Conditioning (Secondary)	✓	✓
<b>Plant Systems Compliance Projects</b>	<b>Unit 1</b>	<b>Unit 2</b>
CO Monitors	✓	✓
Economizer Soot Cleaning (Secondary)	✓	✓
Combustion Optimization Project	✓	✓
ID Fan Flue Gas Flow Bias Project		✓
Plant Controls for ESP Data Acquisition	✓	✓
Appendix K Sorbent Trap Systems	✓	✓
PM CEMS for Particulate Monitoring	✓	✓
Unspecified Plant Projects	✓	✓
Fuel & Ash Handling Systems	✓	✓
<b>CR South Testing and Regulatory Support</b>	<b>Unit 1</b>	<b>Unit 2</b>
MATS Related Plant Testing (ECRC)	✓	✓
MATS Compliance Procedure & CEMS Software	✓	✓
MATS Work Practice Standards	✓	✓

**Table 2: CR South Compliance Plan – Current Projected Timelines**  
 (Note: Current planning information – subject to change.)

Crystal River Unit 1 Compliance Projects	2014												2015												2016											
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J						
<b>Reagent Systems for CR 1</b>																																				
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MATS Compliance Procedure & CEMS Software																																				
MATS Work Practice Standards																																				
<b>Crystal River Unit 2 Compliance Projects</b>																																				
<b>Reagent Systems for CR 2</b>																																				
Dry Sorbent Injection (DSI) Systems Projects																																				
Activated Carbon Injection (ACI) Systems Projects																																				
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MATS Work Practice Standards																																				
<b>LEGEND</b>																																				
Engineering, Planning and Permitting																																				
Project Execution																																				
Testing																																				





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January 7, 2014

Alex Glenn  
State President Florida Duke Energy  
PO Box 14042  
St Petersburg, FL 33733-4042

Re: FRCC Transmission Impact study due to the potential retirement of CR1 and CR2

Mr. Glenn,

The FRCC Transmission Working Group, under direction of the FRCC Planning Committee (PC), has performed a study to determine the transmission reliability impact to the FRCC Region of the Environmental Protection Agency (EPA) Mercury and Air Toxics Standard (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.

Based on the results of the MATS Study, the FRCC PC 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. 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.

Sincerely,

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Vicente Ordax Jr., P.E.  
Director of Planning