TECHNICAL EVALUATION
&
PRELIMINARY DETERMINATION

APPLICANT

RockTenn CP, LLC
North 8th Street
Fernandina Beach, FL 32034
Fernandina Beach Kraft Pulp Mill
ARMS Facility ID No. 0890003

PROJECT

Project No. 0890003-046-AC
Application for Minor Air Construction Permit
Sulfur Dioxide (SO_2) Emissions Reduction Project

COUNTY

Nassau, Florida

PERMITTING AUTHORITY

Florida Department of Environmental Protection
Division of Air Resource Management
Office of Permitting and Compliance
2600 Blairstone Road, MS#5505
Tallahassee, Florida 32399-2400

December 11, 2014

1. GENERAL PROJECT INFORMATION

1.1. Facility Description and Location

The RockTenn CP, LLC (RockTenn) operates an existing Kraft Pulp Mill (SIC No. 2611) in Fernandina Beach at 8th Street North in Nassau County, Florida 32304. The UTM coordinates of the RockTenn Fernandina Beach Mill are zone 17, 456.2 kilometers (km) East, and 3394.2 km North. This site is an area that is in attainment (or designated as unclassifiable) for all pollutants subject to a National Ambient Air Quality Standard (NAAQS) except the 1-hour SO_2 standard for a small area. The RockTenn facility is located adjacent to the small SO_2 nonattainment area.

This facility is a fully integrated Kraft linerboard mill that consists of major activities areas such as; wood yard, pulp mill, recycle plant, chemical recovery, power house and paper mill. A corrugated containers plant is also located at the site. **Figure 1** shows the location of Nassau County in Florida while **Figure 2** shows a satellite view of the RockTenn Fernandina Beach Mill. **Figure 3** shows a view of the Fernandina Beach Mill from the water.

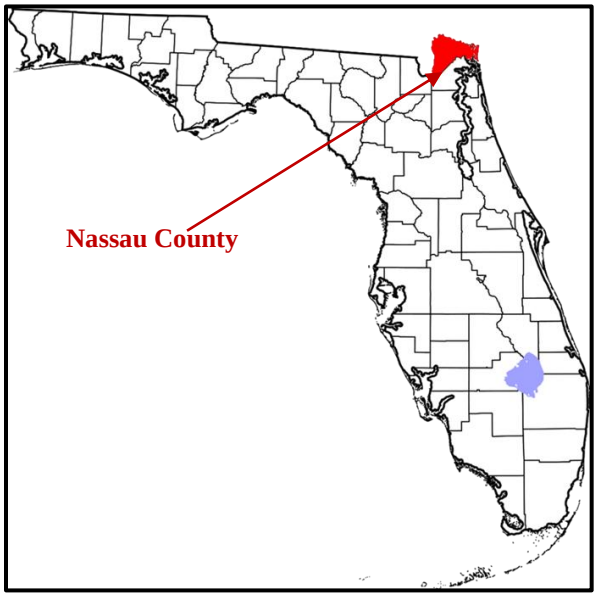

Figure 1. Location of Nassau County.

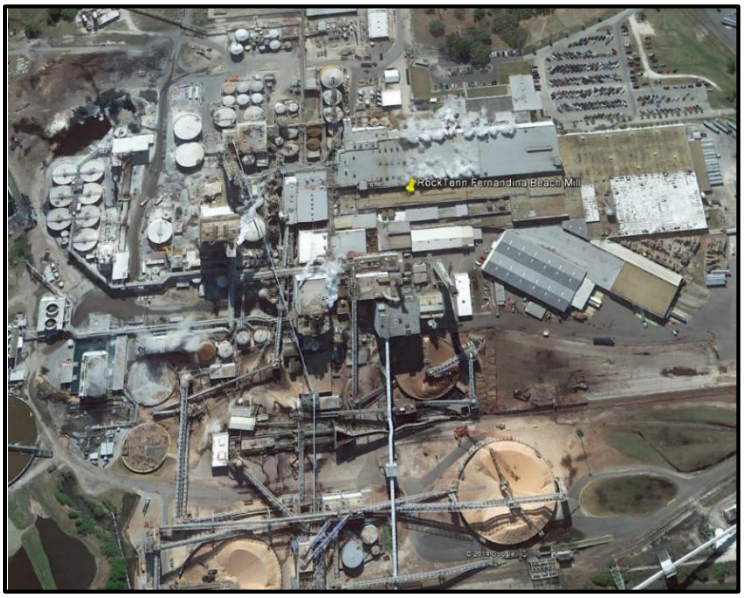

Figure 2. Satellite View of Fernandina Beach Mill.

Figure 3. View of the Fernandina Beach Mill from the Water.

This facility consists of the emissions units (EU) shown in below in **Table 1**. The emission units affected by this permitting action are highlighted in yellow.

TABLE 1 – EMISSION UNITS AT THE FERNANDINA BEACH MILL.

EU No.	Brief Description
Regulated Emissions Units	
006	No. 5 Power Boiler
007	No. 4 Recovery Boiler
011	No. 5 Recovery Boiler
013	No. 4 Smelt Dissolving Tank
014	No. 5 Smelt Dissolving Tank
015	No. 7 Power Boiler
020	Tall Oil Plant
021	No. 4 Lime Kiln
024	C-Line Brownstock Washer System
033	Pulping System MACT I
035	Wide-web Flexographic Printers
038	John Deere 210 BHP Diesel Engine- Model JU6H-UF50
039	Caterpillar 292 BHP Diesel Engine– Model 3406c
040	Caterpillar 292 BHP Diesel Engine – Model 3406c
041	Coal Handling System
042	John Deere, Diesel Engine (125 BHP) – Model 6466DF-00
043	Wisconsin, Diesel Engine (65 BHP) – Model V465D
Unregulated Emissions Units and Activities	
025	Wood yard
026	Brownstock Washing
028	Chemical Recovery Area
029	Converting Area/Warehouse
030	Facility-Wide miscellaneous
031	Secondary Fiber Pulp
032	Papermaking

1.2. Facility Regulatory Categories

- The facility is a major source of hazardous air pollutants (HAP).
- The facility does not operate units subject to the acid rain provisions of the Clean Air Act.
- The facility is a Title V major source of air pollution in accordance with Chapter 213, F.A.C.
- The facility is a major stationary source in accordance with Rule 62-212.400, F.A.C. for the Prevention of Significant Deterioration (PSD) of Air Quality.

- The facility operates units that are subject to the New Source Performance Standards (NSPS) at 40 Code of Federal Regulations, Part 60 (40 CFR 60), and the National Emissions Standards for Hazardous Air Pollutants (NESHAP) at 40 CFR 63.

1.3. Project Description

{Documents specifically related to this project are posted and available on the Department's World Wide Web site at http://appprod.dep.state.fl.us/air/emission/apds/default.asp by entering the project number 0890003-046-AC.}

On July 8, 2014, RockTenn applied for a minor air construction permit for authorization to implement a sulfur dioxide (SO_2) Emissions Reduction Project at the Fernandina Beach Mill. Specifically, the applicant requests authorization to construct/modify equipment and set more stringent emission limits to reduce SO_2 emissions and ambient impacts from the facility.

1.3.1. Requested Changes

Described below are the major changes requested by RockTenn for their Fernandina Beach Mill.

1.3.1.1. *LVHC Control Optimization*.

Low-volume, high concentration (LVHC) non-condensable gases (NCGs) generated by the Fernandina Beach Mill's regulated pulping processes (e.g., evaporators, digesters, turpentine recovery system) are collected and conveyed in a closed vent system to the facility's lime kiln (EU 021), which serves as the primary control device. Currently, the Mill's No. 5 Power Boiler (EU 006), which is fired primarily with carbonaceous fuels and fuel oil, serves as the backup control device for NCGs when the lime kiln is not operational. As part of the SO_2 Emissions Reduction Project, RockTenn proposes to use the No. 7 Power Boiler (EU 015) as an alternative backup control device for NCGs. Specifically, the RockTenn intends to install piping, ductwork and other equipment necessary to route NCGs from the pulp mill through a closed vent conveyance system to a new white liquor scrubber prior to combustion in the No. 7 Power Boiler during certain periods when the lime kiln is unavailable. The current 1,225.2 pounds of SO_2 per hour (lb SO_2/hour) emission limit for No. 7 Power Boiler will not be changed as a result of this modification. In addition, the No. 7 Power Boiler is currently equipped to fire natural gas, which can be co-fired with NCGs to minimize SO_2 emissions.

1.3.1.2. *LVHC NCGs Scrubbing*

RockTenn intends to install a scrubber that will use clarified white liquor to remove sulfur compounds from the NCGs before they are introduced to the No. 7 Power Boiler. Based on vendor feedback and industry experience with similar applications of this scrubbing technology, RockTenn anticipates that the white liquor scrubber will effectively remove between 50% and 75% of the Total Reduced Sulfur (TRS) compounds present in the LVHC NCGs and prevent it from being converted to SO_2. For purposes of preparing this project, RockTenn has conservatively assumed a 50% removal rate. However, further NCGs characterization work and engineering studies will be performed at the Fernandina Beach Mill prior to installation of the scrubber to maximize TRS reduction.

1.3.1.3. *Recovery Boiler Combustion Improvements*

Preliminary plans with regard to No. 4 Recovery Boiler (EU 007) and the No. 5 Recovery Boiler (EU 011) for the SO_2 Emissions Reduction Project will include some or all of the following: adding liquor heaters to raise the as-fired solids content, installing a heavy liquor tank to provide uniform operations, combustion air system improvements, combustion control system upgrades, concentrator pump and associated piping changes, and pump and piping upgrades necessary to fire No. 2 fuel oil. In addition, the preliminary design includes plans for a comprehensive, fully integrated air system based on combustion modeling and an upgraded two- or three-level combustion air system. These upgrades will be designed to increase smelt bed and primary combustion zone temperatures within each boiler to improve the efficiency of liquor burning and sustain a sulfur-reducing environment. The improvements to these boilers also may include the addition of liquor heaters to condition the black liquor fired in these units for the purpose of maximizing combustion efficiency.

It should be noted, that RockTenn is not proposing to make any physical or operating changes to its lime kiln, smelt dissolving tank or any other existing pulping or chemical conversion equipment at the Fernandina Beach Mill.

1.3.2. Requested Emission Unit Modifications and Emission Limits

Based on the application, the physical changes, operational changes, and proposed SO_2 emissions standards for the SO_2 Emission Reduction Project are limited in nature as described below.

1.3.2.1. *No. 5 Power Boiler (EU 006)*

No physical changes are proposed for this emissions unit. The proposed new SO_2 emission limit is 15.0 pounds per hour (lb SO_2/hour) based on steady-state operation of the No. 5 Power Boiler firing primarily carbonaceous fuels (biomass) and other supplemental, low sulfur fuels. Upon completion of the Project, NCGs will no longer be burned in the No. 5 Power Boiler unless RockTenn documents sufficient control by the white liquor scrubber that would provide reasonable assurance of compliance with the proposed 15.0 lb SO_2/hour emission limit. In that case, the No. 5 Boiler could remain as an additional backup to Lime Kiln No. 4. Compliance with this limit will based on a continuous emission monitoring system (CEMS) and a 3-hour average. The application indicates that the previous SO_2 emission limit of 550.0 lb SO_2/hour was based on a 24-hour average.

1.3.2.2. *No. 7 Power Boiler (EU 015)*

The No. 7 Power Boiler will be equipped to combust NCGs and serve as a backup combustion device to the No. 4 Lime Kiln for redundant compliance with 40 CFR 63, Subpart S - National Emission Standards for Hazardous Air Pollutants from the Pulp and Paper Industry. The proposed preliminary physical modifications would comprise piping to tie into the existing NCG line downstream of the existing steam ejector and just upstream of the existing entrainment separator at the No. 5 Power Boiler and will use similar equipment and safety interlocks as those currently in place at the No. 5 Power Boiler.

Upstream of the introduction of NCGs to the No. 7 Power Boiler, a packed column scrubber system (or equivalent) will be installed to remove TRS from the NCG stream before combustion. This will serve to minimize facility sulfur losses and increase lime availability. The white liquor scrubber system will likely be installed near the lime kiln, next to the existing NCG condenser. The scrubber will be a counter flow, spray tower (or equivalent) with the white liquor sprayed into the top of scrubber vessel using nozzles and the NCG stream entering the bottom of the vessel and flowing up across the packing material. The spray will allow proper surface area contact to remove the ionized sulfur from the NCG stream. The white liquor will collect in an integral sump at the bottom of the scrubber and be pumped back into the white liquor system based on level control in the sump. NCGs will exit the scrubber and be routed to No. 4 Lime Kiln for primary control, to the No. 7 Power Boiler or (with prior authorization of the Department) to the No. 5 Power Boiler for backup control, via a steam ejector. The system installation will include the necessary flow, temperature, and chemistry controls. The white liquor scrubber will be a closed system that does not exhaust to the atmosphere, and it is not considered an emission unit in and of itself.

RockTenn does not intend to change the currently permitted SO_2 emission limit of 1225.20 lb SO_2/hr. However, RockTenn proposes to change the compliance averaging time from a 24-hour average to a 3-hour average. To demonstrate compliance with the SO_2 emission limit, RockTenn proposes to perform quarterly stack tests in accordance with the applicable stack testing methods contained in 40 CFR Part 60, Appendix A. Each quarterly stack test will consist of three 1-hour test runs, with compliance based on the average of the three test runs.

1.3.2.3. *Recovery Boilers (No. 4 - EU 007 and No. 5 – EU 011)*

Improvements to the recovery boilers will be made to achieve more stable and consistent combustion within each unit. These improvements will increase both bed and primary combustion zone temperature which will promote more uniform operation that will contribute to control of emissions leaving the boiler. The advanced air management system to be installed will provide combustion air at three elevations within the boiler: primary, secondary and tertiary.

RockTenn proposes a SO_2 emission limit for both recovery boilers of 150.0 lb SO_2/hour on a 3-hour block average basis. Currently, neither recovery boiler has a SO_2 emission limit. To demonstrate compliance with this new SO_2 emission limit, RockTenn proposes to perform quarterly stack tests in accordance with the applicable stack testing methods contained in 40 CFR Part 60, Appendix A. Each quarterly stack test will consist of three, 1-hour test runs with compliance based on the average of the three test runs.

1.4. Application Processing Schedule

- Application for Air Construction Permit received on July 8, 2014.
- The application was made complete on October 3, 2014.

2. NEW SOURCE REVIEW (NSR) APPLICABILITY

The Department regulates major NSR in accordance with Florida's preconstruction review program pursuant to Rule 62-212, F.A.C. The Fernandina Beach Mill is an existing PSD major stationary source. The proposed project will reduce potential and actual SO_2 emissions from Nos. 5 and 7 Power Boilers and Nos. 4 and 5 Recovery Boilers during routine operations. The addition of the white liquor scrubber will also reduce SO_2 emissions from combustion of the NCGs stream by half when either the No. 5 or No. 7 Power Boiler is used as backup control for the No. 4 Lime Kiln. Because potential and actual SO_2 emissions will be reduced and there are no expected emission increases of any other regulated pollutants, major NSR does not apply.

3. DEPARTMENT REVIEW

The Department will authorize the modifications and specify the new SO_2 emissions limits as requested by the applicant with the following changes noted below.

3.1. No. 5 Power Boiler

The new SO_2 emission standard for the No. 5 Power Boiler will be 15.0 lb/hour based on a 3-hour block average as demonstrated by data collected from the existing CEMS. When firing No. 6 fuel oil, the Department does not have reasonable assurance that this unit can comply with the new SO_2 emissions standard. Therefore, the draft permit prohibits the firing of No. 6 fuel oil in the No. 5 Power Boiler, which will be effective January 31, 2016, which coincides with the federal Boiler MACT rule.

Also, the Department does not currently have reasonable assurance that the No. 5 Power Boiler will be able to consistently meet the new SO_2 emission standard when combusting NCGs while acting as a backup control device to the No. 4 Lime Kiln. Note that CEMS data provided by the mill indicates SO_2 levels approaching the previously permitted emission limit of 550.0 lb SO_2/hour on a 24-hour average basis when firing NCGs. The new 15.0 lb SO_2/hour standard is approximately 3% of the current standard of 550.0 lb SO_2/hour even without considering the difference in the averaging periods. Consequently, the draft permit prohibits operation of the No. 5 Power Boiler as a backup control for the No. 4 Lime Kiln beginning December 1, 2017. In addition, effective January 31, 2016 through November 30, 2017, SO_2 emissions from the No. 5 Power Boiler shall not exceed 15.0 lb/hour based on a 3-hour block average as determined by data collected from a CEMS during all periods of operation except when operating as a backup control device firing NCGs.

The draft permit provides an opportunity for the permittee to submit a future request to the Department for approval to operate the No. 5 Power Boiler as an additional backup control device. The request must include an engineering analysis along with supporting plant data regarding NCGs and the new white liquor scrubbing system that provides the necessary reasonable assurance showing that the No. 5 Power Boiler can combust NCGs and meet the new SO_2 emissions standard. In this case, the boiler could remain as a backup control device.

3.2. No. 7 Power Boiler

Effective January 31, 2016, the draft permit specifies the requested SO_2 emissions standard of 1225.20 lb/hour based on a 3-hour block average as determined by the current compliance demonstration methods in the Title V air operation permit (e.g., stack testing, fuel sulfur monitoring and fuel consumption monitoring). The new emissions standard applies at all times including periods of startup and shutdown. As previously indicated, a new white liquor scrubber will control some of the sulfur compounds in the NCGs exhaust stream before being fired in the No. 7 Power Boiler. All work on the white liquor scrubber system shall be complete by December 1, 2017. The white liquor scrubber shall be designed to remove at least 50% of the TRS based on the design TRS concentration. Although use of this boiler as a backup control device is limited, combustion of the NCGs stream will increase the boiler's SO_2 emissions. RockTenn states that:

"Power Boiler No. 7 is currently equipped to fire natural gas, which can be co-fired with LVHCs to minimize SO_2 emissions….."

Given the fact that natural gas will be used to help control SO_2 emissions when NCGs are fired in the No. 7 Power Boiler and the fact that the No. 7 Power Boiler is the largest SO_2 emitter at the mill, the draft air construction permit requires RockTenn to install, calibrate, operate and maintain a new SO_2 CEMS once the boiler becomes the backup control device for NCGs to demonstrate continuous compliance with the new emissions standard. The NCGs piping system to transport NCGs for combustion in the No. 7 Power Boiler shall be complete by December 1, 2017. Effective December 1, 2017, the No. 7 Power Boiler will be used as the primary backup NCGs control device for the No. 4 Lime Kiln to ensure compliance with 40 CFR 63, Subpart S - National Emission Standards for Hazardous Air Pollutants from the Pulp and Paper Industry. Also effective December 1, 2017, SO_2 emissions from the No. 7 Power Boiler shall not exceed 1225.20 lb SO_2/hour based on a 3-hour block average as determined by data collected from a certified CEMS. The new emissions standard applies at all times including periods of startup, shutdown, and the firing of NCGs.

3.3. Nos. 4 and 5 Recovery Boilers

Effective January 1, 2018, the new SO_2 emission standard for each of the Nos. 4 and 5 Recovery Boilers will be 150.0 lb/hour based on a 3-hour block average. This standard was based on the limited data available at the time, which showed a wide range of fluctuating emissions. The data provided feedback to the mill operators and engineers, who worked on operational changes to fine tune the sulfur recovery process. The mill believes that improvements to the primary, secondary, and tertiary combustion air will further level operations and emissions. The permittee will make the necessary physical improvements to each recovery boiler necessary to achieve a more stable and consistent combustion and chemical recovery process within each unit. The preliminary plans include some or all of the following: adding liquor heaters to raise the as-fired solids content, installing a heavy liquor tank to provide uniform operations, combustion air system improvements, combustion control system upgrades, concentrator pump and associated piping changes, and pump and piping upgrades necessary to fire No. 2 fuel oil. In addition, the preliminary design includes plans for a comprehensive, fully integrated air system based on combustion modeling and an upgraded two- or three-level combustion air system. Upgrades on at least one recovery boiler (Nos. 4 and/or 5) shall be complete no later than December 1, 2016. Upgrades on the remaining unit (No. 4 or No. 5) shall be complete no later than December 1, 2017.

The draft permit requires RockTenn to install, calibrate, operate and maintain a new SO_2 CEMS for each recovery boiler to demonstrate continuous compliance with the new emissions standard. In lieu of the CEMS, the permittee may elect to complete the physical improvements to the recovery boilers early. This would allow time to conduct engineering tests to gather critical SO_2 emissions data, fuel firing data, and other operational data to establish the SO_2 emissions profile for each unit to identify key parameters that ensure a stable combustion and recovery process. If able to identify a strong relationship between SO_2 emissions and key operating parameters, the permittee may request approval of a combination of periodic compliance testing (e.g., quarterly stack tests that collect 24-hours of continuous data) plus continuous parametric monitoring as an alternative to the installation and operation of a certified CEMS. If SO_2 CEMS are installed, the permittee may elect a SO_2 emissions cap of 300.0 lb/hour based on a 3-hour block average for the combined operation of the Nos. 4 and 5 recovery boilers in lieu of the individual emission limits of 150.0 lb/hour. The emissions cap would provide additional operational flexibility.

4. PRELIMINARY DETERMINATION

The Department makes a preliminary determination that the proposed project will comply with all applicable state rules and federal air pollution regulations as conditioned by the draft permit. This determination is based on a technical review of the complete application, reasonable assurances provided by the applicant, and the conditions specified in the draft permit. The SO_2 emissions standards specified in the draft permit provide the basis for a modeling analysis that demonstrates compliance with the corresponding National Air Quality Standard. Mr. David L. Read, P.E. is the permit processor responsible for reviewing the application and drafting the permit. Additional details of this analysis may be obtained by contacting him by telephone at 850/717-9075, by email at david.read@dep.state.fl.us or by mail at Department's Office of Permitting and Compliance at Mail Station #5505, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400.