INTERNATIONAL PAPER

P.O. BOX 570
SAVANNAH, GA. 31402
PHONE (912) 238-6000

May 28, 2014

Mr. Eric Cornwell
Program Manager
Stationary Source Permitting Program
Air Protection Branch
Georgia Environmental Protection Division (EPD)
4244 International Parkway, Suite 120
Atlanta, GA 30354

Re: PSD Permit Application for No. 13 Power Boiler
International Paper - Savannah Mill
Title V Permit No. 2631-051-0007-V-02

Dear Mr. Cornwell:

The Savannah Mill proposes to make modifications to the existing No. 13 Power Boiler in order to comply with Boiler MACT and Regional Haze Rule emission limits for HCl and SO_2. The modifications include the addition of load-bearing natural gas burners and removal of oil-firing capability. Based on conservative estimates of emissions following the change, the project may result in a significant emissions increase in CO.

Schedule

The mill would like to begin construction of the piping needed to supply No. 13 Power Boiler with natural gas in September 2014. Addition of the natural gas burners is currently scheduled to coincide with the planned February 2015 outage. IP is requesting expedited review of this permit application to accommodate the project schedule. The enclosed application includes the expedited review request form. Once accepted into the expedited review program, International Paper will submit the fee of $20,000 within 10 business days as required.

PSD Analysis

During the PSD applicability evaluation, IP discovered that the results from the sole CO stack test, conducted in 2010 when burning biomass and coal, are very low when compared to other boilers that burn biomass. As such, the natural gas burner vendor could not guarantee that emissions of CO would not increase once the primary fuel was switched from coal to natural gas. For conservatism, International Paper is submitting a PSD application for CO with a proposed BACT limit.

CO Baseline Emissions

In order to determine if the data from the CO stack test in 2010 were in fact representative of baseline emissions, IP engaged Weston Solutions, Inc. to bring a continuous monitor on site. Additional data were collected over a longer period of normal operation to confirm the baseline CO and NO_x emission rates. Weston collected CO and NO_x data from April 8-14 and April 16-17, 2014. IP reviewed the fuel firing data and NCG combustion status during this time to select only periods that reflected typical operations for the mill on an annual basis (i.e., typical coal and bark firing rates with all NCG gases being combusted in No. 13 Power Boiler). The one-minute data from these time periods were averaged to develop an emission factor for CO based that would better represent baseline actual emissions than one 3-hour stack test. The Savannah Mill submitted the performance test report on May 27, 2014, to the GA EPD.

Summary

International Paper appreciates your assistance in helping expedite the review of this project and requests a written response on acceptance of the permit into the expedited review program. If you have any questions or need additional information, please contact Donna Katula, Environmental Performance Manager, at 912-238-7054 or by email at donna.katula@ipaper.com.

Based on information and belief formed after reasonable inquiry, I, as the responsible official of IP Savannah Mill certify, to the best of my knowledge, the statements and information in this submission are true and accurate.

Sincerely,

Ralph Stagner
Mill Manager

cc: Donna Katula, International Paper
Brittany Robinson, International Paper
Cliff Whitam, International Paper
Amy Marshall, URS Corporation

State of Georgia
Department of Natural Resources
Environmental Protection Division
Air Protection Branch

Stationary Source Permitting Program
4244 International Parkway, Suite 120
Atlanta, Georgia 30354
404/363-7000
Fax: 404/363-7100

EXPEDITED PERMITTING PROGRAM – APPLICATION FOR ENTRY TO PROGRAM FOR AIR PERMITS

EPD Use Only

Date Received: _____ Application No. _____

To be eligible for expedited review, this application form must be accompanied by the complete permit application for the type of air permit being requested.

1. Contact Information

Facility Name: International Paper - Savannah Mill
AIRS No. (if known): 04-13-051 - 0007
Contact Person: Donna D. Katula Title: Environmental Performance Mnger
Telephone No.: (912)238-7054 Alternate Phone No.: (912) 441-6388
Email Address: donna.katula@ipaper.com

If EPD is unable to contact me, please contact the alternate contact person:
Contact Person: Susan Helmey Title: Environmental Engineer
Telephone No.: (912)238-6741 Alternate Phone No.: _____
Email Address: susan.helmey@ipaper.com

On Page 2 of this form, please check the appropriate box for which type of air permit you are requesting expedited review.

I have read the Expedited Review Program Standard Operating Procedures and accept all of the terms and conditions within. I have participated in the required pre-application meeting with EPD. I understand that it is my responsibility to ensure an application of the highest quality is submitted and to address any requests for additional information by the deadline specified. I understand that submittal of this request form is not a guarantee that expedited review will be granted.

Signature: _____ Date: 5/29/14

DDC
OCT

2. Applying For Which Type Of Permit: (Please Check Appropriate Box)

Expedited Review Fees for Air Permits	
Permit Type – Please Check One	**Expedited Review Fee***
☐ Generic Permit: Concrete Batch Plant – Minor Source	$1,000
☐ Generic Permit: Concrete Batch Plant – Synthetic Minor Source	$1,500
☐ Generic Permit: Hot Mix Asphalt Plant – Synthetic Minor Source	$2,000
☐ Minor Source Permit (or Amendment)	$3,000
☐ Synthetic Minor Permit (or Amendment)	$4,000
☐ Major Source SIP Permit not subject to PSD or 112(g)	$6,000
☐ Title V 502(b)(10) Permit Amendment	$4,000
☐ Title V Minor Modification with Construction	$4,000
☐ Title V Significant Modification	$6,000
☐ Major Source SIP Permit subject to 112(g) but not subject to PSD	$15,000
☐ PSD Permit (or Amendment) not subject to NAAQS and/or PSD Increment Modeling	$15,000
☑ PSD Permit (or Amendment) subject to NAAQS and/or PSD Increment Modeling but not subject to Modeling for $PM_{2.5}$, NO_2, or SO_2	$20,000
☐ PSD Permit (or Amendment) subject to NAAQS and/or PSD Increment Modeling for $PM_{2.5}$, NO_2, or SO_2	$25,000
☐ PSD Permit (or Amendment) subject to NAAQS and/or PSD Increment Modeling for $PM_{2.5}$, NO_2, or SO_2 and also impacting a Class I Area	$30,000
☐ Nonattainment NSR Review Permit (or Amendment)	$40,000
* Do not send fee payment with this form. Upon acceptance of application for the expedited permit program, EPD will notify you by phone. Fees must be paid via check to "Georgia Department of Natural Resources" within ten (10) business days of acceptance.	

3. Comments.

This section is optional. Applicants may use this field to include specific comments or requests for EPD consideration. For example, the applicant may use this field to request a public hearing or to remind EPD of review time needs and/or expectations that may differ from the time frames in the procedures.

PSD AIR PERMIT APPLICATION FOR NO. 13 POWER BOILER INTERNATIONAL PAPER - SAVANNAH MILL

Prepared for:

INTERNATIONAL PAPER

International Paper
Savannah Mill
West Lathrop Avenue
Savannah, GA 31408

Prepared by:

URS

URS Corporation
1600 Perimeter Park Drive, Suite 400
Morrisville, North Carolina 27560

May 2014

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

FIGURES

TABLES

APPENDICES

1.1 BACKGROUND

International Paper (IP) operates an integrated Kraft pulp and paper mill in Savannah, Georgia. The Mill began operations in 1936. The facility currently employs over 600 people, and produces linerboard, medium, and saturating kraft. The primary activities at International Paper's Savannah pulp and paper mill (Savannah Mill) are pulp production (Standard Industrial Classification [SIC] code 2611) and paperboard production (SIC code 2631). Primary operations at the mill include multiple fuel-fired boilers, chemical recovery operations, wood pulping operations, papermaking, and additional operations and equipment necessary to support these operations. In addition, the Containerboard Division operates an on-site converting facility as part of the Mill's Title V Permit (SIC Code 2653).

With this application, the Savannah Mill is proposing to make modifications to the existing No. 13 Power Boiler in order to comply with Boiler MACT and Regional Haze Rule emission limits for HCl and SO_2. The modifications include the addition of load-bearing natural gas burners, removal of oil-firing capability, and optimization of combustion controls and the combustion air system. Based on conservative estimates of emissions following the change, the project may result in a significant emissions increase in CO.

1.2 TECHNICAL CONCLUSIONS

The following is a summary of the technical and regulatory conclusions in this permit application:

- In accordance with the Georgia regulations governing the Prevention of Significant Deterioration (PSD) of Air Quality and other applicable State and Federal regulations, major New Source Review (NSR) is required for CO for the project. Appendix B contains a summary of the project and net emissions increases of all PSD-regulated compounds and calculation details.
- A Best Available Control Technology (BACT) analysis was conducted for CO emissions from No. 13 Power Boiler. Section 5 contains the details of the BACT analysis.
- The IP Savannah Mill will continue to operate in compliance with all applicable state and federal regulations following implementation of the proposed project.
- IP is requesting expedited review for this project in order to meet current regulatory deadlines.

1.3 PERMIT REQUEST

IP is committed to continuous compliance with all Federal and Georgia air quality protection requirements. The IP Savannah Mill currently operates under Title V Permit No. 2631-051-0007-V-02. Based on the pre-application meeting on April 24, 2014 with the Georgia EPD regarding the permitting methodology and requirements, this permit application demonstrates compliance

with both Federal and Georgia permitting requirements. Therefore, IP requests that authority to construct and operate the project be granted and that a permit to construct and operate under the Georgia air quality regulations be issued.

The following information is included in this application for the permit review:

- Completed permit application forms for the project (Appendix A);
- Project emissions calculations (Appendix B); and
- Modeling protocol, protocol approval, and modeling files (Appendix C).

An electronic copy of this application is included with the modeling files on the disc in Appendix C.

2.1 SITE DESCRIPTION

International Paper's Savannah Mill is located near the city of Savannah, Georgia on the banks of the Savannah River. The mill began operations in 1936, and today, is a modern, technologically advanced pulp and paperboard production facility. Offices, warehouses, laboratories, vehicle garages, and maintenance areas are co-located with the main manufacturing operations. The areas surrounding the mill are primarily industrial and residential neighborhoods. Figure 2-1 is a general area map that shows the location of the Savannah Mill in relation to the surrounding area. Figure 2-2 displays the plant site and surrounding terrain. A plot plan is included as Figure 2-3.

There are 3 Class I areas managed by the US Fish and Wildlife Service within 200 km of the mill: Wolf Island is 84 km away, Okefenokee is 158 km away, and Cape Romain is 164 km away.

2.2 ATTAINMENT STATUS OF AREA

The Savannah Mill is located in Chatham County. The current Section 107 National Ambient Air Quality Standards (NAAQS) attainment status designations for areas within the state of Georgia are summarized in 40 CFR 81.311. Chatham County is classified as "better than national standards" for total suspended particulates (TSP, also referred to as Particulate Matter, PM) and for the 1971 sulfur dioxide (SO_2) NAAQS. Chatham County is designated as "unclassifiable/attainment" for carbon monoxide (CO), particulate matter less than 10 microns (PM_{10}) and less than 2.5 microns ($PM_{2.5}$), lead, the 1-hr nitrogen dioxide (NO_2) standard, and ozone. Chatham County is designated as "cannot be classified or better than national standards" for the annual NO_2 standard. Designations for the 2010 SO_2 standards are "being addressed in separate future actions." Accordingly, the Savannah Mill is not located in an area currently designated as "nonattainment" for any NAAQS and, therefore, Prevention of Significant Deterioration (PSD) is the applicable regulatory program for major new source review.

2.3 PROCESS DESCRIPTION

The Savannah Mill operates one power boiler, Power Boiler No. 13. The steam produced from this unit along with the recovery boiler provides steam for the entire mill. Two steam turbine generators produce most of the electric energy required to operate the mill, and excess electric capacity may be sold to the electrical grid. Currently, Power Boiler No. 13 is typically fired with bark and pulverized coal, with fuel oil used during startup and shutdown. This boiler also burns pulp mill non-condensable gases (NCG) and condensate stripper off-gases (SOG) to comply with NSPS Subpart BB and MACT Subpart S requirements. An electrostatic precipitator (ESP) controls PM emissions.

2.4 OVERVIEW OF THE PROPOSED PROJECT

The No. 13 Power Boiler is subject to upcoming emission limits under both the Industrial Boiler MACT at 40 CFR 63, Subpart DDDDD, and the Regional Haze Rule at 40 CFR 51.308. Emissions reductions of HCl and SO_2 are necessary to comply with these regulatory requirements. The modifications proposed for No. 13 Power Boiler include the addition of load-bearing natural gas burners, removal of oil-firing capability, and optimization of combustion controls and the combustion air system. Post-project, the boiler will burn primarily biomass and natural gas, with limited coal burning on an annual basis, and will continue to burn NCGs. The design heat input capacity of the boiler will not be impacted by this project.

2.5 PROPOSED PROJECT SCHEDULE

The mill would like to begin construction of the piping needed to supply No. 13 Power Boiler with natural gas in September 2014. Addition of the natural gas burners is currently scheduled to coincide with the planned February 2015 outage. IP is requesting expedited review of this permit application to accommodate the project schedule.

Boiler MACT compliance is required by January 31, 2016 (without a 1-year extension). The Regional Haze SO_2 12-month emissions cap also begins in 2016 (the first compliance period is January through December 2016). The mill will not have firm gas supply from the supplier until Summer 2016. For this reason, IP has requested a 1-year extension of the Boiler MACT compliance date, as a firm gas supply is necessary to comply with the Boiler MACT HCl limit. An extension is not required for compliance with the Regional Haze SO_2 limit.

To determine the appropriate permitting path for the project, it was necessary to calculate the emission increases expected to occur as a direct result of the proposed project. An overview of emission factors and the emissions calculations is presented in the remainder of this section of the permit application. Detailed emissions calculations are presented in Appendix B.

3.1 OVERVIEW OF EMISSION FACTORS

To facilitate calculation of emissions from the project, IP determined the appropriate emission factors and throughputs. Emission factors were obtained using various methodologies and sources. These sources include:

- National Council for Air and Stream Improvement, Inc. (NCASI);
- U.S. Environmental Protection Agency's (EPA's) AP-42 Compilation of Air Emission Factors (5th Edition, Revised);
- Stack test data;
- Regulatory and Permit Limits; and
- U.S. EPA's Mandatory Greenhouse Gas Reporting Regulation (40 CFR 98).

The sources of information for emission factor determination and calculation methodologies are discussed in greater detail in the following sections.

3.1.1 NCASI Emission Factors

NCASI is "an independent, non-profit research institute that focuses on environmental topics of interest to the forest products industry… and was established in 1943 by the pulp and paper industry to provide technical assistance." NCASI conducts research and provides technical information to all member companies through a variety of publications, including technical bulletins, special reports, handbooks, and newsletters. The emission factor information presented in the technical bulletins is deemed the most accurate available for the forest products industry if facility-specific test data are unavailable. The following NCASI Technical Bulletins (TB) and publications were utilized to obtain emission factor data for the specified sources:

- 2013 NCASI Pulp and Paper Database; and
- TB No. 1013 (March 2013), A Comprehensive Compilation and Review of Wood-Fired Boiler Emissions.

3.1.2 U.S. EPA AP-42 Emission Factors

Emission factors from U.S. EPA's AP-42 database (5th edition unless otherwise noted) were relied upon to calculate emissions from the No. 13 Power Boiler where test data, VOC content, manufacturer guarantees, and NCASI factors were not available or representative. The following AP-42 sections were utilized to obtain emission factor data for the specified sources:

- Section 1.1, Bituminous and Subbituminous Coal Combustion;

- Section 1.3, Fuel Oil Combustion;
- Section 1.4, Natural Gas Combustion; and
- Section 1.6, Wood Residue Combustion in Boilers;

3.1.3 Stack Test Data

Stack test data from the No. 13 Power Boiler were utilized where data was available and is preferred over published emission factors by NCASI or EPA. During the PSD applicability evaluation, IP discovered that the results from the sole CO stack test, conducted in 2010 when burning biomass and coal, are very low when compared to other boilers that burn biomass. As such, the natural gas burner vendor could not guarantee that emissions of CO would not increase once the primary fuel was switched from coal to natural gas. In order to determine if the data from the CO stack test in 2010 were in fact representative of baseline emissions, IP engaged Weston Solutions, Inc. to bring a continuous monitor on site. Additional data were collected over a longer period of normal operation to confirm the baseline CO and NO_x emission rates.

Weston collected CO and NO_x data from April 8-14 and April 16-17, 2014. IP reviewed the fuel firing data and NCG combustion status during this time to select only periods that reflected typical operations for the mill on an annual basis (i.e., typical coal and bark firing rates with all NCG gases being combusted in No. 13 Power Boiler). The one-minute data from these time periods were averaged to develop an emission factor for CO that would better represent baseline actual emissions than one 3-hour stack test. The result was an average CO emission rate of 42 ppm at 3% O_2 or 0.0562 lb/MMBtu. The Savannah Mill submitted the performance test report on May 27, 2014, to the GA EPD. Refer to the emissions calculations presented in Appendix B for more detailed information.

3.1.4 Regulatory and Permit Limits

Sulfur dioxide emissions from the No. 13 Power Boiler are estimated based on Title V Permit #2631-051-0007-V-02-0, Condition 6.2.6.

The post project NO_x emission factor is based on the NSPS Subpart D limit when burning natural gas. See Section 4.1.2 for further discussion on NSPS Subpart D.

The baseline actual emission factor for CO is based on stack test data and is very low when burning coal and biomass. The design of No. 13 Power Boiler is unique, and the gas burner vendor is unable to guarantee that CO emissions will not increase over baseline levels when burning biomass and gas, especially when considering the level of the NSPS Subpart D NO_x limit. Therefore, the post-project CO emission factor for burning biomass and natural gas is based on the proposed CO BACT limit.

3.1.5 Greenhouse Gas Emission Factors

The U.S. EPA Mandatory Greenhouse Gas (GHG) reporting rule emission factors and global warming potentials from Subpart C were used to calculate emissions from carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O) from combustion. Tables C-1 and C-2 to Subpart C of Part 98 list default CO_2, CH_4, and N_2O emission factors and high heat values for various fuel types.

3.2 PSD APPLICABILITY TEST HYBRID METHODOLOGY

The IP Savannah Mill has assessed the applicability of PSD to this project by performing the hybrid comparison test of "baseline actual emissions" to "projected actual emissions" for existing units as prescribed under U.S. EPA's PSD rules (as adopted by Georgia) at 40 CFR 52.21(a)(2)(iv)(c). The actual-to-projected-actual test is described as *Actual to projected-actual applicability test for projects that only involve existing emission units,* whereas the actual-to-potential test is described as *Actual-to-potential test for projects that only involved construction of a new emissions unit(s).* The PSD emissions analysis has been completed for the applicable PSD-regulated air pollutants, including PM, PM_{10}, $PM_{2.5}$, CO, carbon dioxide as CO_2e, lead (Pb), NO_x, SO_2, and VOC. As discussed below, the calculations demonstrate that PSD permitting is only required for this project for CO emissions.

3.3 BASELINE ACTUAL EMISSIONS (BAE)

Baseline Actual Emissions are defined by Chapter 391-3-1-.02(7)(a)2(i)(II) as "*the average rate, in tons per year, at which the emissions unit actually emitted the pollutant during any consecutive 24-month period selected by the owner or operator within the 10-year period immediately preceding either the date the owner or operator begins actual construction of the project, or the date a complete permit application is received by the Department for a permit*…". For this project, we used 2012-2013 as the baseline period for all pollutants. The PSD applicability calculations use the actual fuel usage rates for the baseline period and actual emission factors to calculate the baseline actual emissions.

3.4 POTENTIAL AND PROJECTED ACTUAL EMISSIONS (PAE)

Projected actual emissions are defined by Chapter 391-3-1-.02(7)(a)2(ii)), as "the maximum annual rate, in tons per year, at which an existing emissions unit is projected to emit a regulated NSR pollutant in any one of the 5 years (12-month period) following the date the unit resumes regular operation after the project, or in any one of the 10 years following that date, if the project involves increasing the emission unit's design capacity or its potential to emit that regulated NSR pollutant and full utilization of the unit would result in a significant emissions increase or a significant net emissions increase at the major stationary source."[1] To determine the maximum

[1] The 5-year projection applies to sources that do not modify the unit's existing design capacity or their PTE.

annual rate, a source must consider all relevant information, including historical operational data, the company's expected business activity and the company's highest projections of business activity for the five year period after implementation of the project. In lieu of using the projected actual emissions, Chapter 391-3-1-.02(7)(a)2(ii)IV allows the use of the emission unit's potential to emit, in tons per year. Because the project does not involve an increase in the design capacity of the No. 13 Power Boiler, post project emissions are the projected actual emissions, taking into account the mill's 5-Year Plan for the No. 13 Power Boiler (except for post-project CO emissions, which are the potential emissions based on the proposed BACT limit). The projected actual emissions use an annual fuel mix of 42% bark (40 tons/hr), 6% coal, and 52% natural gas at the projected utilization rate of the boiler over the next 5 years. Projected actual coal usage is based on the current Boiler MACT HCl limit and concentration of chlorine in the coal. If either the Boiler MACT HCl limit increases or the coal chlorine concentration decreases, the Mill could potentially burn more than 6% coal on an annual heat input basis, but a small increase in coal usage would not result in a significant emissions increase of any additional pollutants. Note that the projected actual fuel mix represents the compliance approach for Boiler MACT. During the time period between project implementation and the Boiler MACT compliance date, the actual fuel mix will depend on the availability of natural gas, fuel costs, and the other regulatory permit limits in place. The mill will maintain records of fuel use and emissions following project implementation.

In developing the projected actual emissions, EPD's PSD rule [391-3-1-.02(7)(a)2(ii)(II)III] specifies that the projected actual emission rate "may exclude, in calculating any increase in emissions that results from the particular project, that portion of the unit's emissions following the project that an existing unit could have accommodated during the consecutive 24-month period used to establish the baseline actual emissions… and that is also unrelated to the particular project, including any increased utilization due to product demand growth…". As such, the emissions increase calculated for the project does not include emissions that "could have been accommodated" during the baseline and that are unrelated to the project. Emissions that the No. 13 Power Boiler could have accommodated (CHA) have been estimated by annualizing the maximum month of emissions during the baseline period.

3.5 SUMMARY OF EMISSIONS INCREASES

The emissions increases were calculated as described in Sections 3.2 through 3.4 for the project (note that the project emissions increases consider fuel combustion only, not combustion of pulp mill gases, because these emissions are not affected by the proposed project). Emissions decreases are expected for many pollutants because the proposed project removes oil firing and reduces coal burning. Detailed emission calculations are shown in Appendix B. As shown in Table 3-1, the project emissions increases are greater than the PSD significant emission rate for CO.

This section summarizes all federally-enforceable and state-enforceable air regulations that are potentially applicable to the project. Both applicable and important non-applicable regulations are addressed. Supporting information for the proposed project is provided in the application forms contained in Appendix A. Information contained on the application forms is provided for determining regulatory applicability and demonstrating compliance with applicable requirements, and should not be considered proposed permit terms, limits, or conditions.

4.1 FEDERAL AIR QUALITY REGULATIONS

The federal regulations potentially applicable to the proposed project are Prevention of Significant Deterioration (PSD) regulations in 40 CFR 52.21; New Source Performance Standards (NSPS) in 40 CFR 60; National Emission Standards for Hazardous Air Pollutants (NESHAP) in 40 CFR 63; The Compliance Assurance Monitoring (CAM) in 40 CFR 64; Title V Operating Permit regulations in 40 CFR 70, and Regional Haze at 40 CFR 51.308. These requirements are codified in the Georgia Rules for Air Quality Control, specifically Rules 391-3-1-.02(7), (8), (9), (11) and 391-3-1-.03(10), respectively. A discussion of these regulations is provided in the following subsections.

4.1.1 Prevention of Significant Deterioration – 40 CFR 52

Implementation of the PSD regulations has been delegated in full to the State of Georgia. These air quality regulations are contained in Georgia Rules for Air Quality Control Rule 391-3-1-02(7). The PSD regulations apply to major modifications at major stationary sources, which are considered those sources belonging to any one of the 28 source categories listed in the regulations that has the potential to emit more than 100 tons per year of any PSD-regulated compound, or any other source which has the potential to emit more than 250 tons per year of any PSD compound. A major modification is defined as "any change to a major stationary source that would result in a significant emissions increase of any pollutant subject to regulation under the Act." Major modifications must meet certain pre-construction review and permitting requirements. The IP Savannah Mill is considered a major source under the PSD regulations because Kraft pulp and paper manufacturers are one of the 28 listed categories, and the Savannah Mill emits more than 100 tpy of a regulated criteria compound.

On July 20, 2011, the EPA deferred inclusion of carbon dioxide (CO_2) emissions from bioenergy and other biogenic sources under the PSD program for 3 years. On July 12, 2013 the federal appeals court ruled to vacate the deferral of biogenic CO_2 emissions for permitting purposes. Although the mandate has been delayed and the vacatur is not yet in effect, all CO_2 emissions have been included in the PSD applicability analysis for this project.

The emissions calculation methodology used to determine PSD applicability was described in Section 3. The emission factors and throughputs used to estimate emissions are presented in Appendix B. The net project emissions increases presented in Table 3-1 show that only CO

emissions increases are greater than the PSD significant emission rate. Therefore, a BACT analysis is required for CO emissions from No. 13 Power Boiler. The BACT analysis is presented in Section 5 of this application.

EPD has amended EPA's "reasonable possibility" rules outlined under 40 CFR 52.21(r)(6). EPD's rules state that for projects at an existing emissions unit at a major stationary source that are required to obtain a construction permit, and where the owner or operator elects to use the "baseline actual-to-projected actual" applicability test in paragraphs (b)(41)(ii)(a) through (c) of 40 CFR 52.21, then in lieu of EPA's "reasonable possibility" rules, an applicant must comply with the provisions specified under paragraph 391-3-1-.02(7)(b)15.(i). These provisions require recordkeeping for projects that require a state construction permit and use the "baseline actual-to-projected actual" applicability test. IP will keep records for 5 years following the project to show that the project did not cause a significant increase in emissions of any PSD regulated pollutant other than CO.

4.1.2 New Source Performance Standards (NSPS) – 40 CFR 60

NSPS apply to any stationary source for which standards are promulgated, and which is constructed, reconstructed, or modified after the effective date of the applicable standard to the affected facility.

No. 13 Power Boiler is currently subject to NSPS Subpart D. The SO_2 and NO_x limits are pro-rated based on fuel mix. The PM limit in Subpart D is less stringent than the 0.075 lb/MMBtu PSD emission limit that also applies. With the addition of natural gas firing and elimination of fuel oil firing, the SO_2 limit will only apply when coal and wood are fired together and the NO_x limit will be 0.2 lb/MMBtu when firing gas only, 0.3 lb/MMBtu when firing gas and wood, 0.7 lb/MMBtu when firing coal and wood, and pro-rated by heat input when firing a mixture of gas, wood, and coal.

NSPS Subpart Db, Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units, regulates steam generating units with heat input capacities greater than 100 MMBtu/hr for which construction, modification, or reconstruction was commenced after June 19, 1984. As discussed in Section 2.4, No. 13 Power Boiler will be modified to add load-bearing natural gas burners and the combustion air system will be optimized. The NSPS regulation defines modification as any physical change in, or change in the method of operation of, an existing facility which increases the amount of any air pollutant (to which a standard applies) emitted into the atmosphere by that facility or which results in the emission of any air pollutant (to which a standard applies) into the atmosphere not previously emitted. Addition of natural gas firing capability will not increase emissions of PM, SO_2, or NO_x above current levels (PM and SO_2 emissions from natural gas are lower than currently permitted fuels and the Subpart D NO_x emission limit for natural gas burning is lower than the NO_x limits for currently

permitted fuels); therefore, the project is not an NSPS modification and applicability of Subpart Db is not triggered.

4.1.3 National Emission Standards for Hazardous Air Pollutants (NESHAP) – 40 CFR 63

The No. 13 Power Boiler serves as the primary control device for the control of total HAP emissions from the LVHC and HVLC systems under 40 CFR 63, Subpart S. As the proposed project will affect combustion of fuels only, compliance with this regulation will not be affected.

The No. 13 Power Boiler is subject to the NESHAP for Industrial, Commercial, and Institutional Boilers and Process Heaters (Boiler MACT) as an existing biomass boiler (this project does not constitute reconstruction of the boiler, so new source requirements are not triggered). Emission limits for PM, CO, Hg, and HCl will apply, as well as various work practices. This project will improve emissions from the boiler in order to comply with the upcoming Boiler MACT. The compliance date for the Boiler MACT for existing sources is January 31, 2016. The mill has submitted a request for a 1-year compliance extension to Georgia EPD because a firm natural gas supply is critical to compliance with the Boiler MACT HCl limit and the gas supplier is unable to provide a firm gas supply until the summer of 2016. Specific compliance procedures for Boiler MACT will be outlined in the notification of compliance status submitted following the compliance date of the rule.

4.1.4 The Compliance Assurance Monitoring (CAM) Rule – 40 CFR 64

The CAM Rule (40 CFR Part 64) applies to pollutant-specific emissions units (PSEU) that are pre-control major sources and use a control device to comply with an emission limit. For the CAM Rule to apply to a specific emission unit/pollutant, the following four criteria must be met:

1. The emission unit must be located at a major source for which a Part 70 or Part 71 permit is required.
2. The emission unit must be subject to an emission limitation or standard.
3. The emission unit must use a control device to achieve compliance with the emission limitation or standard.
4. The emission unit must have potential, pre-controlled emissions of the pollutant of at least 100 percent of the major source threshold.

IP Savannah submitted a CAM analysis with the Title V Permit Renewal Application and with the No. 13 Power Boiler Bark Burning Increase Project permit application. The current Title V permit contains CAM requirements for the No. 13 Power Boiler for PM because the Boiler MACT had not been promulgated at the time of the issuance of the permit. Because this project is for Boiler MACT compliance, the permit should be modified to indicate that CAM requirements for PM are no longer applicable after the Boiler MACT compliance date of January 31, 2016.

4.1.5 Title V Operating Permits – 40 CFR 70

The IP Savannah Mill currently operates under Title V permit No. 2631-051-0007-V-02. IP Savannah requests approval to proceed with this project and that a revised Title V permit be issued under Georgia Air Regulations as a major modification. Permit application forms are included in Appendix A and on the CD in Appendix C.

4.1.6 Regional Haze - 40 CFR 51.308

Effective January 1, 2016, No. 13 Power Boiler SO_2 emissions are limited to 6,578 tons during any consecutive 12-month period. The first compliance period is January through December 2016. The proposed project will reduce SO_2 emissions and improve the margin of compliance with this requirement.

4.2 GEORGIA AIR QUALITY REGULATIONS

Georgia has promulgated air pollution control requirements under Georgia Rules for Air Quality Control (GRAQC) Chapter 391-3-1. Most of these regulations are part of the Georgia state implementation plan (SIP) for compliance with the Clean Air Act and most SIP regulations are federally-enforceable. Generally applicable requirements, such as those pertaining to requirements to obtain air quality permits and malfunction reporting, are not discussed because these requirements are widely recognized as being applicable to significant sources of air pollution. A brief discussion of both applicable and key non-applicable requirements is included in this section.

4.2.1 Visible Emissions - GRAQC 391-3-1-.02(2)(b)

The No. 13 Power Boiler is subject to an NSPS opacity limit that is more stringent than this rule. Accordingly, this rule is not listed as an applicable requirement for No. 13 Power Boiler in the Mill's air permit.

4.2.2 Fuel-Burning Equipment - GRAQC 391-3-1-.02(2)(d)

The purpose of this rule is to regulate emissions of PM, opacity, and NO_x from fuel-burning equipment. The proposed project will not affect the No. 13 Power Boiler's ability to comply with this regulation.

4.2.3 Sulfur Dioxide – 391-3-1-.02(2)(g)

This regulation establishes the maximum sulfur content for fuels fired in the No. 13 Power Boiler. The proposed project will not affect the unit's compliance with this regulation.

4.2.4 VOC Emissions from Major Sources - GRAQC 391-3-1-.02(2)(tt)

This regulation limits VOC emissions for certain counties in Georgia, as outlined in 391-3-1-.02(2)(tt)(3). The Savannah Mill is located in Chatham County, which is not a listed county and therefore, this rule does not apply.

4.2.5 NO_x Emissions from Major Sources - GRAQC 391-3-1-.02(2)(yy)

This regulation limits NO_x emissions for certain counties in Georgia, as outlined in 391-3-1-.02(2)(yy)(2). The Savannah Mill is located in Chatham County, which is not a listed county and therefore, this rule does not apply.

4.2.6 Prevention of Significant Deterioration of Air Quality - GRAQC 391-3-1-.02(7)

See Section 4.1.1 above for discussion of PSD applicability. EPD has incorporated EPA's "reasonable possibility" rules as outlined under 40 CFR 52.21(r)(6) by reference, with certain exceptions. EPD's rules state that for projects at an existing emissions unit at a major stationary source that are required to obtain a permit under the Construction (SIP) Permit requirements of paragraph 391-3-1-.03(1) of the state rules, and where the owner or operator elects to use the "baseline actual-to-projected actual" applicability test in paragraphs (b)(41)(ii)(a) through (c) of 40 CFR 52.21, then in lieu of EPA's "reasonable possibility" rules, an applicant must comply with the provisions specified under paragraph 391-3-1-.02(7)(b)15.(i). Since the Savannah Mill is using the "baseline actual-to-projected actual" applicability test for the proposed project, the following State rules apply:

Georgia Rule 391-3-1-.02(7)(b)(15)(i)(l)

Before beginning actual construction of the project, the owner or operator shall document and maintain a record of the following information:

i. a description of the project - *this application satisfies this requirement*

ii. identification of the emissions unit(s) whose emissions of a regulated NSR pollutant could be affected by the project - *this application satisfies this requirement*

iii. a description of the applicability test used to determine that the project is not a major modification for any regulated NSR pollutant, including the baseline actual emissions, the projected actual emissions, the amount of emissions excluded and an explanation for why such amount was excluded, and any netting calculations, if applicable - *this application satisfies this requirement*

iv. the records required under i-iii above shall be retained for a period of 10 years following resumption of regular operations after the change, or for a period of 15

years following resumption of regular operations after the change if the project increases the design capacity of or potential to emit of a regulated NSR pollutant at such emissions unit. - *The Savannah Mill will retain the records identified by i-iii above for a period of 10 years following project implementation*

Georgia Rule 391-3-1-.02(7)(b)(15)(i)(ll)

The owner or operator shall provide a copy of the information set out in subparagraph (7)(b)15.(i)(l) of this rule with the application for construction required under paragraph 391-3-1-.03(1) of these rules.

This application satisfies the recordkeeping requirements specified above.

Georgia Rule 391-3-1-.02(7)(b)(15)(i)(lll)

The owner or operator shall monitor the emissions of any regulated NSR pollutant that could increase as a result of the project and that is emitted by any emissions unit identified in subparagraph (7)(b)15.(i)(I)ll. of this rule, and calculate and maintain a record of the annual emissions, in tons per year on a calendar year basis, for a period of five years following resumption of regular operations after the change, or for a period of ten years following resumption of regular operations after the change if the project increases the design capacity of or potential-to-emit that regulated NSR pollutant at such emissions unit. These records shall be retained for a period of five years past the end of each calendar year. If an owner or operator is required to, or elects to, exclude emissions associated with startups, shutdowns, and/or malfunctions from estimations of projected actual emissions for PSD applicability purposes as allowed by subparagraph (7)(a)2.(ii)(II)ll. of this rule, the owner or operator may exclude such emissions from the calculation of annual emissions.

Although this project will not change the design capacity of the facility, the potential to emit CO is increasing. Therefore, the Savannah mill will calculate and maintain a record of annual emissions, in tons per year, on a calendar year basis, for a period of 10 years after project implementation.

Georgia Rule 391-3-1-.02(7)(b)(15)(i)(lV)

If the owner or operator excluded demand growth emissions from the projected actual emissions for a project and that project is subject to the requirements of subparagraph (7)(a)2.(ii)(II)III.A.(B) of this rule, the owner or operator shall calculate the actual increase in emissions due to demand growth, in tons per year on a calendar year basis, for a period 10 years following resumption of regular operations after the change. These records shall be retained for a period of five years past the end of each calendar year.

The Savannah mill will maintain records that indicate the actual increase in emissions due to demand growth, in tons per year on a calendar year basis, for a period of 10 years following project implementation.

Georgia Rule 391-3-1-.02(7)(b)(15)(i)(V)

The owner or operator shall submit a report to the Division within 60 days after the end of each year during which records must be generated under subparagraphs (7)(b)15.(i)(III) and (IV) of this rule setting out the unit's annual emissions and, if applicable, the unit's actual increase in emissions due to demand growth during the calendar year that preceded submission of the report.

The Savannah mill will submit a report to the Division within 60 days after the end of each year, for a period of ten years after project implementation, as required under subparagraphs (7)(b)15.(i)(III) and (IV) above.

4.2.7 New Source Performance Standards - GRAQC 391-3-1-.02(8)

See Section 4.1.2 above for discussion of NSPS applicability.

4.2.8 Emission Standards for Hazardous Air Pollutants - GRAQC 391-3-1-.02(9)

See Section 4.1.3 above for discussion of NESHAP applicability.

4.2.9 Compliance Assurance Monitoring - GRAQC 391-3-1-.02(11)

See Section 4.1.4 above for CAM applicability discussion.

4.2.10 Title V Operating Permits - GRAQC 391-3-1-.03(10)

See Section 4.1.5 above for Title V applicability discussion.

5.1 INTRODUCTION

The PSD regulations (40 CFR 51.166) and Georgia air regulations (rule 391-3-1-.02(7)) require a Best Available Control Technology (BACT) analysis for new emission units and modified emission units at an existing major source that will have an increase in emissions of a PSD-regulated compound subject to PSD review. As indicated earlier in this application, this project triggers PSD review for only CO emissions. This section presents the CO BACT analyses for the No. 13 Power Boiler.

5.2 SUMMARY OF PROPOSED BACT

The following table summarizes the proposed CO BACT for the No. 13 Power Boiler.

Source	Proposed CO BACT
No. 13 Power Boiler	400 ppm at 3% O_2; 1742 tpy

5.3 TOP-DOWN BACT APPROACH

The GA EPD regulations (391-3-1-.02(7)(b)(7)) incorporate the federal PSD regulatory requirement to conduct a BACT analysis, which is set forth as follows in the PSD regulations [40 CFR 52.21(j)(2)]:

> *(j) Control Technology Review.*
>
> *(2) A new major stationary source shall apply best available control technology for each regulated NSR pollutant that it would have the potential to emit in significant amounts.*

BACT is defined in the PSD regulations [40 CFR 52.21(b)(12)] as:

> *...an emissions limitation (including a visible emission standard) based on the maximum degree of reduction for each pollutant subject to regulation under Act which would be emitted from any proposed major stationary source or major modification which the Administrator, on a case-by- case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of such pollutant. In no event shall application of best available control technology result in emissions of any pollutant which would exceed the emissions allowed by any applicable standard under 40 CFR parts 60 and 61.*
>
> *If the Administrator determines that technological or economic limitations on the application of measurement methodology to a particular emissions unit would make the imposition of an emissions standard infeasible, a design, equipment,*

> *work practice, operational standard, or combination thereof, may be prescribed instead to satisfy the requirement for the application of best available control technology. Such standard shall, to the degree possible, set forth the emissions reduction achievable by implementation of such design, equipment, work practice or operation, and shall provide for compliance by means which achieve equivalent results.*

Guidelines for the evaluation of BACT can be found in EPA's Guidelines for Determining Best Available Control Technology (BACT) (US EPA, 1978) and in the PSD Workshop Manual (US EPA, 1990). These guidelines were drafted by the EPA to provide a consistent approach to BACT and to ensure that the impacts of alternative emission control systems are measured by the same set of parameters. Unlike many of the Clean Air Act programs, the PSD program's BACT evaluation is determined on a case-by-case basis. To assist applicants and regulators with the case-by-case process, in 1987 U.S. EPA issued a memorandum that implemented certain program initiatives to improve the effectiveness of the PSD program within the confines of existing regulations and state implementation plans.[2] Among the initiatives was a "top-down" approach for determining BACT. In brief, the top-down process suggests that all available control technologies be ranked in descending order of control effectiveness. The most stringent or "top" control option is the default BACT emission limit unless the applicant demonstrates, and the permitting authority in its informed opinion agrees, that energy, environmental, and/or economic impacts justify the conclusion that the most stringent control option is not achievable in that case. Upon elimination of the most stringent control option based upon energy, environmental, and/or economic considerations, the next most stringent alternative is evaluated in the same manner. This process continues until BACT is selected.

BACT is to be set at the lowest value that is achievable. However, there is an important distinction between emission rates achieved at a specific time on a specific unit, and an emission limitation that a unit must be able to meet continuously over its operating life. As discussed by the DC Circuit Court of Appeals

> In National Lime Ass'n v. EPA, 627 F.2d 416, 431 n.46 (D.C. Cir. 1980), we said that where a statute requires that a standard be "achievable," it must be achievable "under most adverse circumstances which can reasonably be expected to recur."[3]

U.S EPA has reached similar conclusions in prior determinations for PSD permits.

> "Agency guidance and our prior decisions recognize a distinction between, on the one hand, measured 'emissions rates,' which are necessarily data obtained from a particular facility at a specific time, and on the other hand, the 'emissions limitation' determined to be BACT and set forth in the permit, which the facility is

[2] Memo dated December 1, 1987, from J. Craig Potter (EPA Headquarters) to EPA Regional Administrators, titled "Improving New Source Review Implementation."

[3] As quoted in Sierra Club v. EPA (97-1686).

> required to continuously meet throughout the facility's life. Stated simply, if there is uncontrollable fluctuation or variability in the measured emission rate, then the lowest measured emission rate will necessarily be more stringent than the "emissions limitation" that is "achievable" for that pollution control method over the life of the facility. Accordingly, because the "emissions limitation" is applicable for the facility's life, it is wholly appropriate for the permit issuer to consider, as part of the BACT analysis, the extent to which the available data demonstrate whether the emissions rate at issue has been achieved by other facilities over a long term."[4]

Thus, BACT must be set at the lowest feasible emission rate recognizing that the facility must be in compliance with that limit for the lifetime of the facility on a continuous basis. Thus, while viewing individual unit performance can be instructive in evaluating what BACT might be, any actual performance data must be viewed carefully, as rarely will the data be adequate to truly assess the performance that a unit will achieve during its entire operating life. While statistical variability of actual performance can be used to infer what is "achievable," such testing requires a detailed test plan akin to what teams in U.S. EPA use to develop MACT standards over a several year period, and is far beyond what is reasonable to expect of an individual source. In contrast to limited snapshots of actual performance data, emission limits from similar sources can reasonably be used to infer what is "achievable."[5]

To assist in meeting the BACT limit, the source must consider production processes or available methods, systems or techniques, as long as those considerations do not redefine the source.

5.3.1 Top-Down BACT Assessment Methodology

The following sections provide detail on the BACT assessment methodology utilized in preparing the BACT analysis for the proposed new and modified emission units.

Step 1

The first step is to define the spectrum of process and/or add-on control alternatives potentially applicable to the subject emissions units. The following categories of technologies are addressed in identifying candidate control alternatives:

- Demonstrated add-on control technologies applied to the same emissions unit at other similar source types;

---

[4] EPA Environmental Appeals Board decision, *In re: Newmont Nevada Energy Investment L.L.C.* PSD Appeal No. 05-04, decided December 21, 2005. Environmental Administrative Decisions, Volume 12, Page 442.

[5] Emission limits must be used with care in assessing what is "achievable." Limits established for facilities which were never built must be viewed with care, as they have never been demonstrated and that company never took a significant liability in having to meet that limit. Likewise, permitted units which have not yet commenced construction must also be viewed with special care for similar reasons.

- Add-on controls not demonstrated for the source category in question but transferred from other source categories with similar emission stream characteristics;
- Process controls such as combustion or alternate production processes;
- Add-on control devices serving multiple emission units in parallel; and
- Equipment or work practices, especially for fugitive or area emission sources where add-on controls are not feasible.

A review of the RACT/BACT/LAER Clearinghouse and a review of technologies in use at similar sources were performed as part of this process.

Step 2

The second step in the top-down approach is to evaluate the technical feasibility of the alternatives identified in the first step and to reject those that can be demonstrated as technically infeasible based on an engineering evaluation or on chemical or physical principles. The following criteria were considered in determining technical feasibility: previous commercial-scale demonstrations, precedents based on issued PSD permits, state requirements for similar sources, technology transfer, and engineering evaluations for the control devices considered.

Step 3

The third step is an assessment, or ranking, of each technically feasible alternative considering the specific operating constraints of the emission units undergoing review. After determining what control efficiency is achievable with each technically feasible control alternative, the alternatives were ranked into a control hierarchy from most to least stringent, using the percent removal efficiency for the pollutant of concern.

Step 4

In the fourth step, a cost effectiveness and environmental and energy impact analysis is required if the top level of BACT control is not selected, starting with the most stringent control alternative. If the top level of control is selected as BACT, then a cost effectiveness evaluation is not required. An element of the environmental impacts analysis is the consideration of toxic or other pollutant impacts from the control alternative choice. The economic analysis is performed using procedures recommended by the EPA's Office of Air Quality Planning and Standards (OAQPS) Air Pollution Control Cost Manual (sixth edition, January 2002). If the top level of control is determined to be economically infeasible based on high cost effectiveness, or to cause adverse energy or environmental impacts, the control technology is rejected as BACT and the impact analysis is performed on the next most stringent control alternative until all control alternatives have been assessed. The cost effectiveness analysis looks at the annualized control cost (in dollars per ton of emissions removed) and compares the value to commonly accepted values for cost effective emission controls established by the state regulatory agency.

Step 5

The final step is to summarize the selection of BACT and propose the associated emission limits or work practices to be incorporated into the permit plus any recommended recordkeeping and monitoring conditions that should be incorporated into the final permit.

The following sections present the detailed BACT analysis for the new equipment that will emit CO and the modified project equipment that will have a net emissions increase of CO due to the modification.

5.4 BACT ANALYSIS FOR CO EMISSIONS FROM NO. 13 POWER BOILER

The Savannah Mill is proposing to make modifications to the existing No. 13 Power Boiler in order to comply with Boiler MACT and Regional Haze Rule emission limits for HCl and SO_2. The modifications include the addition of load-bearing natural gas burners, removal of oil-firing capability, and optimization of combustion controls and the combustion air system. Post-project, the boiler will burn primarily biomass and natural gas, with limited coal burning on an annual basis, and will continue to burn NCGs. The project could result in a significant emissions increase of CO. The CO BACT analysis is presented below.

5.4.1 Step 1a – Identification of Control Technologies – Typical Technologies in Use in the United States

CO emissions are generated from boilers as a result of incomplete fuel combustion. Operating conditions such as lower than optimal temperatures, insufficient residence time, and lower than optimal oxygen levels due to inadequate mixing and/or a low air-to-fuel ratio in the combustion zone will increase CO emissions.

A search of EPA's RBLC was performed that included CO BACT determinations since 1990 from biomass boilers >250 MMBtu/hr, process type code 11.120. Utility boilers, turbines and duct burners, closed loop heat energy systems, sugar industry bagasse boilers, furnaces providing direct heat to wood products dryers, units burning refinery fuel gas, and projects that were not constructed were excluded as non-representative of multi-fuel industrial boilers like No. 13 Power Boiler. The RBLC search results are summarized in Table 5-1.

Good Combustion Practices

Implementation of proper burner design and optimization of combustion air systems to achieve good combustion efficiency in boilers will minimize the generation of CO. Good combustion efficiency relies on both hardware design and operating procedures. A firebox design that provides proper residence time, temperature and combustion zone turbulence, in combination with proper control of air-to-fuel ratio, are essential elements of a biomass boiler operating with low CO emissions. To minimize CO emissions from properly operated industrial boilers, no auxiliary equipment is needed.

Catalytic Oxidation

Regenerative catalytic oxidation (RCO) technology can be used to reduce CO emissions. It is the only catalytic oxidation technology evaluated because it requires only moderate reheating to a minimum temperature of 450 to 700°F, depending upon catalyst selection. Furthermore, RCOs can achieve a high thermal efficiency because they utilize a ceramic bed to recapture the heat of the stream exiting the combustion zone. Because oxidation catalysts can be poisoned by wood flyash, the type of RCO system evaluated in this application is based on use of a "tail end" oxidation system manufactured by Babcock Power in which the catalyst system is located downstream of the boiler's ESP.

The No. 13 Power Boiler also burns NCG's and SOG's that contain sulfur. Sulfur species are poisons for all catalytic processes employing reduced metals as the primary active phase. Sulfur may cause significant deactivation even at very low concentrations, due to the formation of strong metal-S bonds. Sulfur chemisorbs onto and reacts with the active catalyst sites, preventing reactant access. Furthermore, the stable metal-adsorbate bonds can lead to non-selective side reactions, which modify the surface chemistry. Therefore, in order to apply a catalyst to No. 13 Power Boiler, sulfur controls would also have to be added. The mill already operates a white liquor scrubber to remove sulfur from some of the NCG's burned in the boiler. The cost analysis for the RCO includes addition of a second white liquor scrubber to remove additional sulfur prior to combustion of the gases in the boiler.

The addition of a white liquor scrubber would address the SO_2 formed in the boiler from combustion of NCG's and SOG's, but the mill will also be able to burn up to approximately 6% coal on an annual heat input basis and still comply with the Boiler MACT HCl limit and Regional Haze SO_2 limit during periods when natural gas may be unavailable. The SO_2 and HCl emissions from un-scrubbed coal combustion could make operation of the catalyst problematic. According to Babcock Power, the chlorine will react with the coating that is added to the catalyst and deteriorate performance, leading to more frequent catalyst replacement. In addition, the SO_2 oxidation would be 5 to 10% and would result in SO_3 and eventually H_2SO_4 emissions that could cause a blue plume from the stack. Addition of additional acid gas controls would likely be necessary to ensure proper operation of a CO catalyst when burning coal. For this application, we assumed installation of a wet ESP and pre-quench system following the catalyst to control H_2SO_4 emissions and replacement of catalyst every 2 years. The addition of the wet ESP and pre-quench system will change the characteristics of the flue gas such that it is saturated. The current fan and stack for No. 13 Power Boiler cannot accommodate this change and would also require replacement.

Although higher temperature catalysts can be used in different applications to reduce emissions by up to 90 percent, evaluation of the lower temperature catalyst considered in this evaluation has been demonstrated on a few large power and cogeneration boilers in the U.S. to be the only practical way of operating these systems, due to the gas reheat involved, achieving

approximately 70 percent control efficiency. Information received from Babcock Power in May 2014 confirms that a catalyst operating at 450°F will achieve 70 percent CO control.

Thermal Oxidation

Thermal oxidation oxidizes CO to carbon dioxide and water by passing exhaust gas through a burner flame zone to combust remaining carbon compounds at temperatures of approximately 1,500°F or higher to achieve control efficiencies of up to 95 percent or higher. Similar to catalytic oxidation, a secondary fuel-burning system would be necessary to elevate exhaust temperatures, resulting in additional cost and increased combustion-related emissions. Combustion of NCG's and SOG's that contain sulfur and combustion of coal results in SO_2 emissions that would get oxidized to SO_3 and cause H_2SO_4 emissions that could result in a blue plume from the stack. Therefore, addition of a thermal oxidizer will necessitate use of a wet ESP to prevent a significant increase in H_2SO_4 emissions and formation of a blue plume when sulfur-containing gases and fuels are burned. The addition of the wet ESP and pre-quench system will change the characteristics of the flue gas such that it is saturated. The current fan and stack for No. 13 Power Boiler cannot accommodate this change and would also require replacement.

5.4.2 Step 1b – Identification of Control Technologies – Review of Technologies in Use at International Paper Facilities

IP operates a number of industrial boilers at its facilities. None of the boilers operated by IP utilize add-on CO controls.

5.4.3 Step 2 – Technical Feasibility Analysis

Thermal oxidation and good combustion practices are technically feasible CO control technologies for industrial biomass and natural gas boilers. Although Babcock Power has not installed their catalytic oxidation system on a boiler such as ours that burns sulfur-containing gases and we are not optimistic that the system would provide reliable and effective control during all modes of operation without experiencing operational difficulty or adverse impacts related to emissions of other compounds, we have prepared a cost analysis for the RCO option.

5.4.4 Step 3 - Ranking of CO Control Technologies

A summary of the control options considered in this analysis is as follows:

- Thermal oxidation (95% control);
- Regenerative catalytic oxidation (70% control); and
- Good combustion practices.

5.4.5 Step 4 – Control Effectiveness Evaluation

Economic Impacts

Capital, operating, and annual cost estimates for a thermal oxidizer to control CO emissions from No. 13 Power Boiler are presented in Tables 5-2 and 5-3. Capital costs were estimated using an average cost of $57.5 per standard cubic foot per minute (scfm) as published in the EPA Clean Air Technology Center (CATC) fact sheet for thermal incinerators and a cost estimate for a WESP obtained for a similar IP boiler and scaled up to the size of No. 13 Power Boiler. The fan and stack cost estimates were obtained for No. 13 Power Boiler as part of IP's Boiler MACT control options evaluation. Operating costs were based on methodologies used in the EPA Control Cost Manual along with site-specific fuel, electricity, and labor costs. As summarized in Table 5-6, the estimated cost effectiveness is approximately $12,355 per ton of CO removed, which is well above any reasonable cost effectiveness value for CO control.

Various cost inputs associated with operation of RCO control are presented in Table 5-4. The total cost of control includes capital and operating costs estimated by the mill for addition of a white liquor scrubber to reduce the sulfur content of the pulp mill gases burned in the boiler to avoid poisoning the catalyst and a WESP to avoid an H_2SO_4 emissions increase from oxidation of SO_2 emissions from coal and NCG/SOG combustion. RCO capital, operating, and annualized costs were estimated using cost information included in a BACT evaluation conducted by Oglethorpe Power Corporation (Oglethorpe) for an equivalently sized biomass boiler in a PSD permit application submitted and approved by the GA EPD. The WESP costs are from an equipment cost estimate obtained for a similar IP boiler and scaled up to the size of No. 13 Power Boiler and OAQPS Control Cost Manual factors. The fan and stack cost estimates were obtained for No. 13 Power Boiler as part of IP's Boiler MACT control options evaluation. Detailed calculations are presented in Table 5-5. As shown in Table 5-6, the cost effectiveness of RCO control is approximately $10,470/ton of CO removed, which is well above any reasonable cost effectiveness value for CO control.

There are no adverse economic impacts associated with implementation of good combustion controls on the biomass boiler. Improvements to combustion conditions/combustion efficiency by optimizing the combustion air system may actually save fuel cost.

Environmental and Energy Impacts

There are adverse environmental impacts associated with use of oxidation technologies in NO_x-limited areas due to additional NO_x emissions that would increase ozone formation in the region. There are additional energy impacts due to additional energy costs to operate the oxidation systems, as well as fuel requirements. Oxidation of VOC, CO, and SO_2 emissions would lead to increased CO_2 and H_2SO_4 emissions. Additional electricity would be required to operate the add-on control equipment and additional power would be needed for the new fan to overcome

the additional pressure drop through the system. Environmental and energy impacts are summarized in Table 5-7.

5.4.6 Step 5 - Proposed BACT for No. 13 Power Boiler

There are no controls indicated for CO emissions from industrial biomass boilers other than proper operation and good combustion control. Facilities with other boiler types (i.e., large power and cogeneration) have been known to install oxidation catalysts to reduce emissions of CO, but this technology has not been installed on boilers similar to No. 13 Power Boiler (multi-fuel industrial boilers that also burn sulfur-containing pulp mill gases).

Results of the top-down BACT analysis indicate that BACT for CO emissions from the No. 13 Power Boiler is a work practice approach. IP will optimize the combustion air system on the No. 13 Power Boiler and implement good combustion practices as BACT. The range of BACT limits for similar units in the RBLC is 0.3 to 2.3 lb/MMBtu (up to 1,998 ppm). The proposed BACT limit for the No. 13 Power Boiler is 400 ppm at 3% O_2 (1,742 tpy CO), which is roughly equivalent to the lowest biomass boiler entry in the RBLC database and is lower than the applicable Boiler MACT limit of 720 ppm at 3% O_2. IP will stack test following implementation of the boiler modifications to demonstrate compliance with the BACT limit and will monitor the O_2 concentration in the furnace exhaust (minimum O_2 level, 30-day rolling average as required in Boiler MACT) to demonstrate that good combustion conditions are maintained during normal operations.

6.1 BACKGROUND AND INTRODUCTION

A major component of the PSD permitting process is the air quality analysis which is often performed using a combination of atmospheric dispersion modeling, ambient background data, and visibility impact analyses. This section addresses the regulatory dispersion modeling requirements which are necessary to receive a PSD permit, and presents the air quality impact compliance demonstration for the proposed Project. The air quality analyses presented in this section satisfy the regulatory requirements given in the Code of Federal Regulations at 40 CFR 52.21.2(k) and 40 CFR 52.21(m).

6.1.1 Air Quality Analysis Applicability

The Savannah Mill is considered a major source of regulated criteria compounds as defined by the Clean Air Act (CAA). The proposed project will result in net emission increases of CO that exceed the PSD Significant Emission Rate. Thus, an air quality impact analysis is required.

6.1.2 PSD Ambient Significance Concentration Levels

PSD Ambient Significant Concentration Levels are used in the PSD permitting process to determine baseline dates and are used as a guide to determine whether a full air quality impact analysis is required for a compound. If modeling the significant project emissions increases results in predicted ambient concentrations that exceed any of the significance levels for a compound, a full impact analysis is performed for that compound.

6.1.3 Ambient Monitoring Exemption Levels

Another set of concentration limits which are applicable to most PSD reviews are the PSD preconstruction ambient monitoring exemption levels. These concentrations are used to determine whether preconstruction site specific ambient air monitoring might be required as part of a PSD permit application. Concentrations greater than the preconstruction ambient monitoring exemption levels could require a new or modified source to monitor existing air quality for six to twelve months prior to major modifications. Existing representative monitoring data is often substituted, if available.

6.1.4 National Ambient Air Quality Standards and PSD Increments

The PSD regulations require that major industrial sources undergoing major modifications demonstrate by means of air quality dispersion modeling that proposed air emissions will not cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) or deteriorate air quality above an amount known as the increment. As described in 40 CFR 51.166, a major new or modified emission source would, at a minimum, be considered to cause or contribute to an exceedance of the NAAQS if modeled emission increases exceed the PSD Ambient Significance Levels. The PSD regulations do not establish increment for the only pollutant triggering PSD review, CO.

6.2 AREA DESCRIPTION

International Paper's Savannah Mill is located near the city of Savannah, Georgia on the banks of the Savannah River. The mill began operations in 1936, and today, is a modern, technologically advanced pulp and paperboard production facility. Offices, warehouses, laboratories, vehicle garages, and maintenance areas are co-located with the main manufacturing operations. The areas surrounding the mill are primarily industrial and residential neighborhoods. There are 3 Class I areas managed by the US Fish and Wildlife Service within 200 km of the mill: Wolf Island is 84 km away, Okefenokee is 158 km away, and Cape Romain is 164 km away.

6.3 AIR QUALITY IMPACT ANALYSIS APPROACH

The approach to the air quality impact analysis is based on requirements and recommendations contained in the EPA Guideline on Air Quality Models (Revised), (EPA-450/12-78-027R), GA EPD PSD Permit Application Guidance Document, September 2012, the PSD New Source Review Workshop Manual, October 1990, and the modeling methodology outlined in the April 2014 *Air Dispersion Modeling Protocol for No. 13 Power Boiler Natural Gas Project.* A copy of the modeling protocol and approval letter are contained in Appendix C.

The following sections describe in detail the dispersion model selection, the meteorological data, the GEP building wake effect/downwash analysis, the modeling receptor grids, the emission sources, and the Significant Impact Modeling Analysis.

6.3.1 Dispersion Models

Because air emissions from the Savannah Mill occur from multiple source locations, the modeling analysis was performed using AERMOD (version 14134, the EPA approved computer dispersion model. The AERMOD model was used to model the effected emission unit and predict maximum ambient concentrations for the modeled compound, CO.

6.3.2 Meteorological Data

The AERMOD modeling analysis was conducted using the five-year meteorological data set (2007-2011) comprised of surface data from the Savannah/Hilton Head International Airport and upper air meteorological data from the Charleston International Airport in Charleston, SC. All meteorological data was downloaded from the GA EPD website.

6.3.3 Good Engineering Practice (GEP) Stack Height Analysis

A GEP analysis was performed for the No. 13 Power Boiler in order to determine if wake effects and downwash options need to be selected in the computer model. The GEP analysis was performed following the procedures outlined in the EPA documents *Guideline For Determination of Good Engineering Practice Stack Height (Technical Support Document For the Stack Height Regulations)* Revised (EPA-450/4-80-023R), the *User's Guide to the Building*

Profile Input Program (October 1993), and the most recent version of the "BPIP-PRIME" program, version 04274.

The building wake and downwash effect analysis was applied to the No. 13 Power Boiler. For each building, an area of wake and downwash effects extends outward to a distance of five times L (the lesser of the maximum projected width or height of the building) directly downwind from the leeward side of the building. Wake effects were assumed to occur if the emission source is located within a rectangle composed of two lines perpendicular to the wind direction, one at 5L downwind of the building and the other at 2L upwind of the building, and by two lines parallel to the wind direction, each at 0.5L away from each side of the building.

As the wind direction rotates, the wake and downwash effect region of influence changes and is combined to form a GEP 5L region of influence in all wind directions. Any emission source within the region of influence is affected by wake and downwash effects. For buildings close to an emission source, wake and downwash effects were considered where the distance between the emission source and the nearest part of the building is less than or equal to 5L. Wake and downwash effects from buildings that are closer than the greater of either building's maximum projected width or height are considered to have one region of influence.

The GEP analysis was performed for the Savannah Mill using the latest version of the Providence/Oris Solutions GEP program to demonstrate compliance with stack height regulations (40 CFR Part 51) and to determine if the No. 13 Power Boiler is impacted by building wake and downwash effects. The building heights and projected widths were input into the model for each ten degrees of wind direction. These building heights and projected widths are the same as are used for the GEP stack height calculation.

Table 6-1 presents the parameters of the buildings and structures used in the GEP analysis and Figure 6-1 shows the buildings and structures at the mill. The attached CD contains the results of the GEP output.

6.3.4 Receptors and Terrain Data

The dispersion modeling receptor grid was developed following procedures outlined in the New Source Review Workshop Manual (October 1990) and the PSD Permit Application Guidance Document (September 2012). A Cartesian receptor grid system was created to adequately assess air quality impacts in all directions from the facility fence line to a distance of 5 kilometers from the site. The grid system was created using the Universal Transverse Mercator (UTM) NAD83 coordinate system. Discrete receptors were placed along the fence line at 100-meter intervals. Receptors extend outward from the fence line at 100-meter intervals out to approximately 3,000 meters from the facility and at 500-meter intervals out to approximately 5,000 meters from the facility. Discrete receptors were not included along the portions of roads that traverse the facility property and are not open to the general public.

Terrain heights, processed and determined by AERMAP (version 11103) using the USGS National Elevation Dataset[6] (NED), were included for all receptors. Figure 6-2 presents the dispersion modeling receptor grid for the modeling analysis.

6.3.5 Point Sources

The AERMOD model uses a steady state Gaussian plume equation to model emissions from point sources such as stacks and vents. A single point source was included in this modeling analysis to simulate plume dispersion. The following parameters were used for modeling the point source: emission rate (grams/sec), stack height (m), stack diameter (m), stack exit velocity (m/sec), stack exhaust temperature (K), and direction specific building dimensions (m). Table 6-2 presents the point source parameters used in the modeling analysis and Figure 6-1 presents the stack location.

6.3.6 Significant Impact Modeling Analysis

URS performed a Class II Significant Impact Modeling Analysis for each regulated compound subject to PSD review that has a NAAQS and PSD increment standard. For this analysis, the only included compound was CO. Modeling was performed for the annual emission increase from the proposed project. The significant impact analysis was performed to determine whether a compound exceeds the PSD Ambient Significance Levels and PSD Monitoring Exemption Levels. The Class II Ambient Significance Levels and Monitoring Exemption Levels were obtained from the New Source Review Workshop Manual, Prevention of Significant Deterioration and Nonattainment Area Permitting, October 1990.

6.3.7 Modeling Results

URS performed a significant impact analysis for the annual increase of CO, the only compound subject to PSD review, using the emission increases associated with the project (post-project potential CO emissions minus baseline actual CO emissions). The emission increases were modeled to determine maximum impacts.

The maximum Class II ambient concentration increases are 51.53 $\mu g/m^3$ and 26.28 $\mu g/m^3$ for the 1-hour average and 8-hour average, respectively. The Class II ambient significance levels are not exceeded, and thus, a full NAAQS and increment analysis was not performed. Also, the ambient monitoring exemption level is not exceeded, and thus, preconstruction monitoring data are not required. Table 6-3 presents the Class II significant impact analysis results.

6.4 OZONE ANALYSIS

The proposed project will not result in a significant increase of NO_x or VOC. Therefore, pre-construction monitoring of ground level ozone is not required.

[6] http://www.mrlc.gov/viewerjs/

6.5 $PM_{2.5}$ SECONDARY FORMATION ANALYSIS

The proposed project will not result in a significant increase of NO_x, SO_2, or $PM_{2.5}$. Therefore, a $PM_{2.5}$ secondary formation analysis is not required.

6.6 CLASS I ANALYSIS

The proposed project will not result in an increase in any pollutant impacting air quality related values (NO_x, SO_2, PM, and H_2SO_4). Therefore, a Class I Area Analysis is not required.

7.1 INTRODUCTION

Under the PSD requirements at 40 CFR 52.21(o), an additional impact analysis is required to evaluate the effects of economic growth and the effect on soils, vegetation and visibility from regulated compounds emitted in significant quantities from a new or modified major stationary source. The following section presents the PSD additional impact analysis associated with the emission increases of CO from the proposed project.

7.2 AIR TOXICS ANALYSIS

Because this project is being performed to comply with a MACT standard and the capacity of the boiler or the facility is not increasing, an air toxics analysis was not performed.

7.3 GROWTH ANALYSIS

The permanent workforce at IP Savannah will not increase due to the proposed project. The proposed project will utilize contractor employees on a temporary basis. The workforce is readily available within the surrounding area and will not impact air quality. Therefore, there will be no commercial, residential, or industrial growth associated with the project and an analysis of air quality impacts was not conducted.

7.4 CLASS II AREA VISIBILITY ANALYSIS

For a PSD analysis, a visibility assessment is typically conducted for the pollutants which trigger PSD review. The visibility impacting pollutants are PM, SO_2, and NO_x. As there is not a significant increase in emissions of these pollutants due to the project, a visibility analysis is not required.

7.5 SOILS AND VEGETATION ANALYSIS

For a PSD analysis, a soil and vegetation impact assessment and visibility assessment is typically conducted for the pollutants which PSD is triggered. For soil and vegetation, the relevant pollutants are NO_2, SO_2, and CO per EPA's "A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals."[7] These pollutants should be analyzed within their respective Significant Impact Areas. The proposed project will not result in a significant increase of NO_x or SO_2. The increase in CO due to this project does not exceed the Significant Impact Levels and thus, a soils and vegetation Analysis is not required.

[7] EPA 450/2-81-078, December 1980.

Figures

Figure 2-1. Location of the IP Savannah Mill

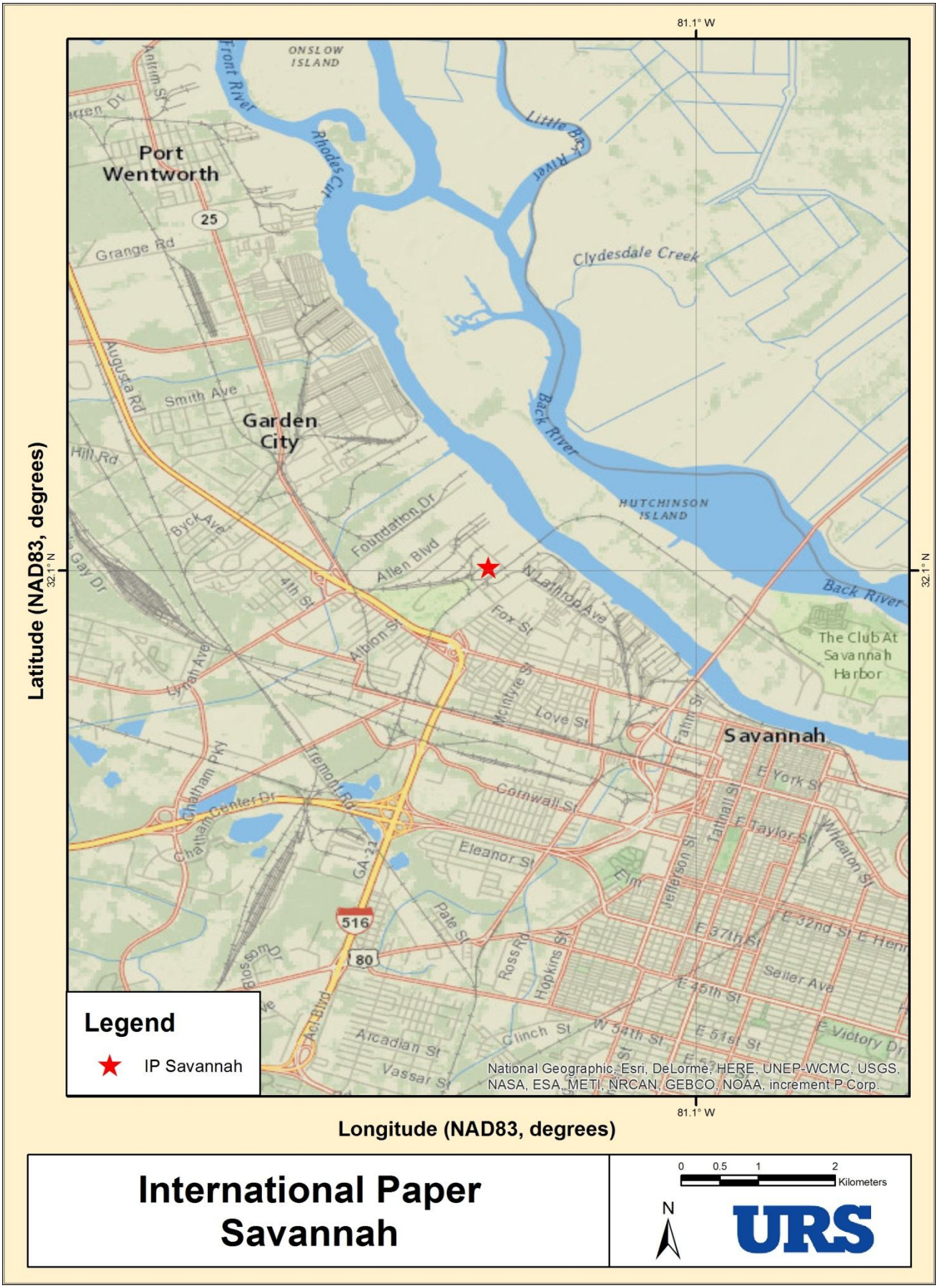

Figure 2-2. IP Savannah Mill and Surrounding Terrain

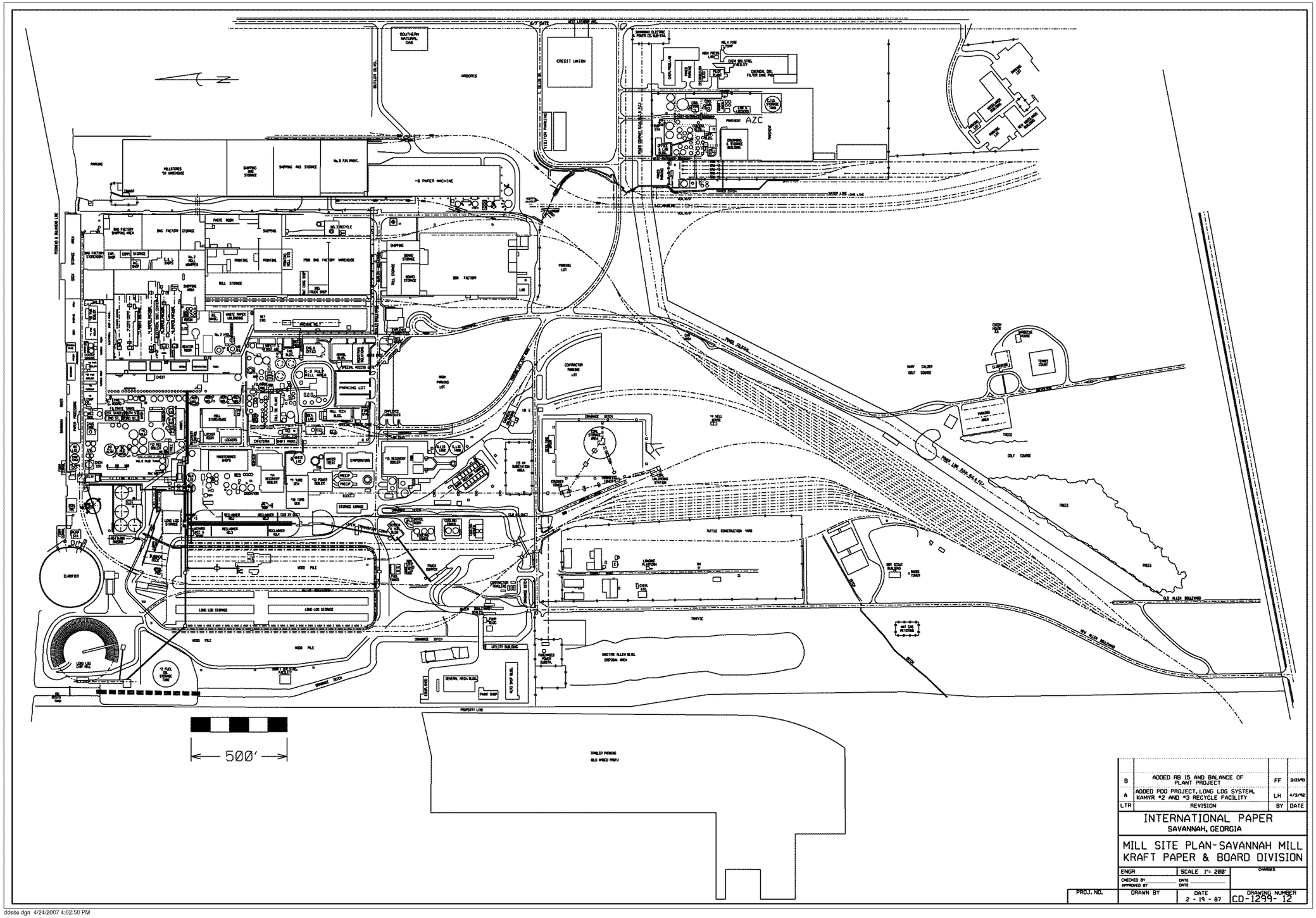

Figure 2-3. IP Savannah Mill Site Plan

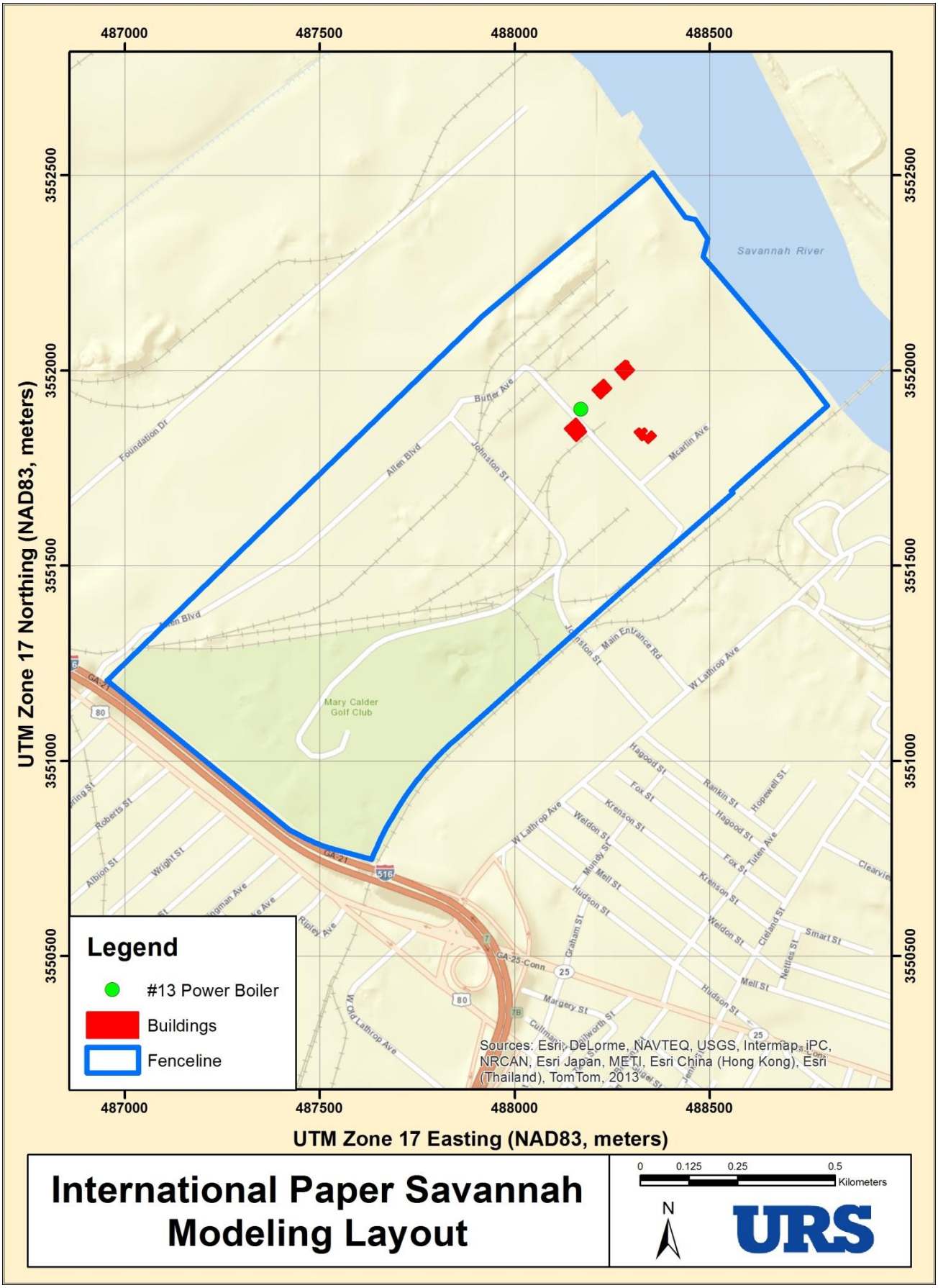

Figure 6-1. IP Savannah Buildings and No. 13 Power Boiler

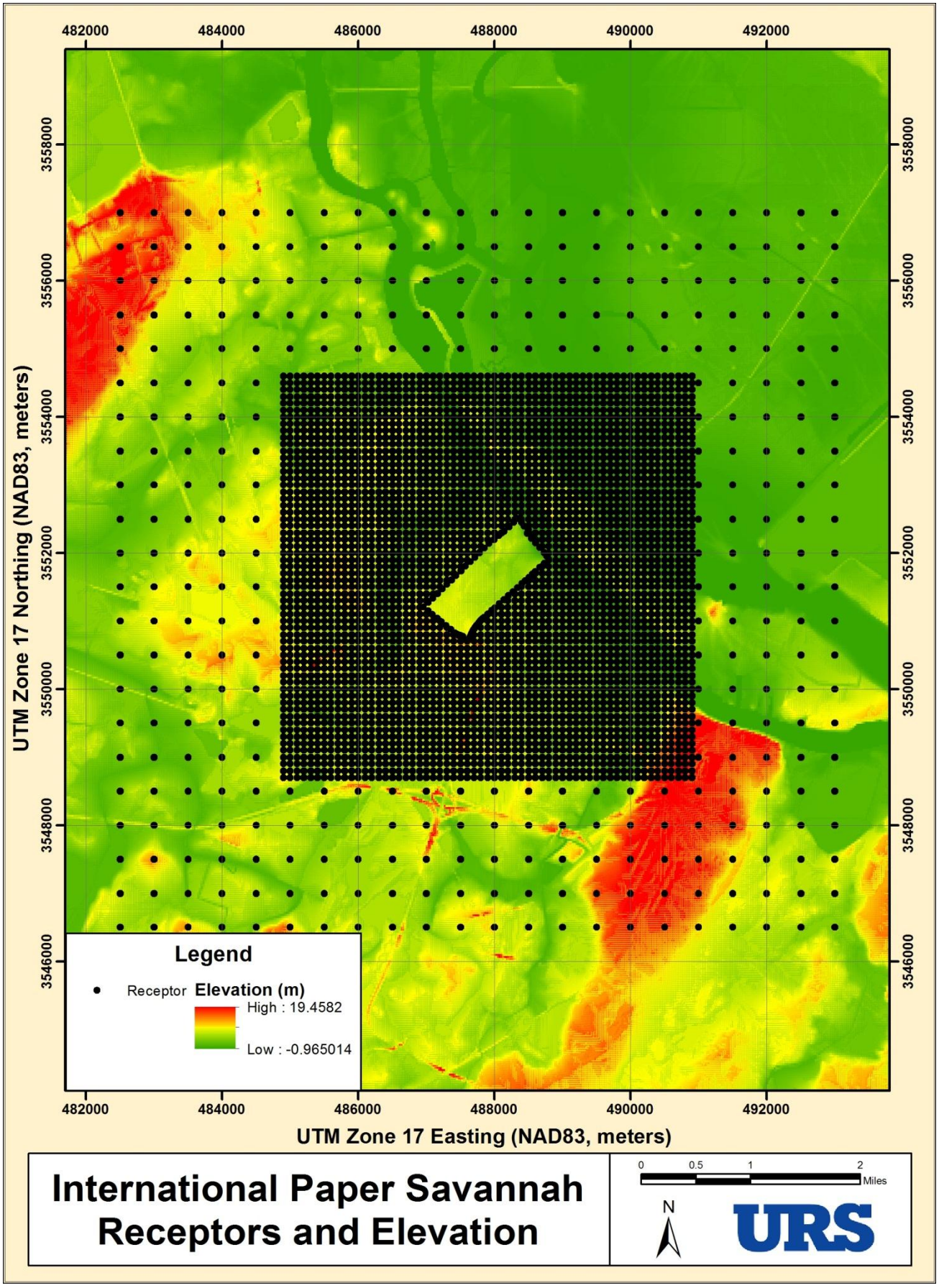

Figure 6-2. Modeling Receptor Grid and Elevations

Tables

TABLE 3-1
SUMMARY OF PSD COMPOUND EMISSIONS INCREASES
IP SAVANNAH MILL BOILER MACT PROJECT
URS PROJECT NO. 31829473

	Emissions, tpy										
	NOx	**PM (f)**	**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**VOC**	**CO**	**F**	**Pb**	**H_2SO_4**	**CO_2e**
Baseline Actual Emissions	1,453.7	52.4	668.5	649.5	2,407.4	22.4	186.2	9.5	0.04	39.00	689,838
Emissions That Could Have Been Accommodated During the Baseline	1,741.0	64.0	810.1	787.2	2,924.4	28.1	223.1	11.5	0.05	47.47	826,861
Projected Actual Emissions	1,256.5	33.3	116.8	106.9	408.1	40.2	1,742.0	1.0	0.01	4.04	644,701
Project Net Emission Increases	-484.5	-30.7	-693.3	-680.2	-2,516.3	12.1	1,518.9	-10.5	-0.04	-43.44	-182,159
PSD Significant Emission Rates	40	25	15	10	40	40	100	3	0.6	7	75,000
PSD Review Required	No	No	No	No	No	No	**Yes**	No	No	No	No

Table 5-1. RBLC Results for CO BACT on Large (>250 MMBtu/hr) Biomass Industrial Boilers in the last 10 Years

Notes - deleted utility boilers, industrial furnaces, projects not constructed, and small boiler.

RBLCID	FACILITY_NAME	CORPORATE_OR_COMPANY_NAME	FACILITY_STATE	PROCESS_NAME	PROCCESS_TYPE	PRIMARY_FUEL	THROUGHPUT	THROUGHPUT_UNIT	PROCESS_NOTES	CONTROL_METHOD_DESCRIPTION	EMISSION_LIMIT_1	EMISSION_LIMIT_1_UNIT	EMISSION_LIMIT_1_AVG_TIME_CONDITION	CASE-BY-CASE_BASIS	EMISSION_LIMIT_2	EMISSION_LIMIT_2_UNIT	EMISSION_LIMIT_2_AVGERAGE_TIME_CONDITION	STANDARAD_EMISSION_LIMIT	STANDARD_EMISSION_LIMIT_UNIT	STANDARD_LIMIT_AVERAGE_TIME_CONDITION	Equivalent lb/MMBtu
ME-0037	VERSO BUCKSPORT LLC	VERSO BUCKSPORT LLC	ME	Biomass Boiler 8	11.12	Biomass	814	MMBTU/H	Also fires oil and natural gas in addition to biomass.		0.3	LB/MMBTU	30 DAY ROLLING	BACT-PSD	435	LB/H	24-HR BLOCK	0			0.3
WA-0335	SIMPSON TACOMA KRAFT COMPANY, LLC	SIMPSON PAPER COMPANY	WA	UTILITY AND LARGE INDUSTRIAL SIZED BOILERS/FURNACES	11.12	WOOD WASTE	595	MMBTU/H	BY BTU VALUE ANNUALLY, THE HOG FUEL BOILER BURNS ABOUT 89% WOOD WASTE (INCLUDING RECYCLED CARDBOARD), 8% WASTEWATER TREATMENT SLUDGE, 3% #6 OIL.	OVERFIRE AIR SYSTEM INSTALLED IN 2006 TO IMPROVE COMBUSTION CONDITIONS.	0.35	LB/MMBTU	30 DAY ROLLING	BACT-PSD	913	T	12 MONTH ROLLING TC	0			0.35
ND-0022	NORTHERN SUN	ARCHER DANIELS MIDLAND COMPANY	ND	WOOD/HULL FIRED BOILER	11.12	BIOMASS			THE BOILER IS ALLOWED TO COMBUST HULLS (SUNFLOWER OR SOYBEAN HULLS), BIOMASS FUELS, CREOSOTE-TREATED RAILROAD TIES AND CLEAN WOOD. BIOMASS FUELS CONSIST OF APPROXIMATELY 70-95% HULLS, 2.5%-30% WAX AND 6% VEGETABLE OIL.	GOOD COMBUSTION PRACTICES	0.63	LB/MM BTU		BACT-PSD	0			0			0.63
GA-0114	INLAND PAPERBOARD AND PACKAGING, INC. - ROME LINERBOARD MILL	TEMPLE INLAND, INC.	GA	BOILER, SOLID FUEL	11.12	BARK	856	MMBTU/H	BARK, WASTEWATER SLUDGE, TDF, FUEL OIL; MAY BE USED TO INCIENRATE NCG GASES; NEW BOILER	STAGED COMBUSTION AND GOOD COMBUSTION PRACTICES	368	PPM @ 3% O2		BACT-PSD	0			0		NOT AVAILABLE, SEE NOTE	0.30
WA-0327	SKAGIT COUNTY LUMBER MILL	SIERRA PACIFIC INDUSTRIES	WA	WOOD-FIRED COGENERATION UNIT	11.12	BARK & WASTE WOOD	430	mmBtu/H			400	LB/H		BACT-PSD	659	T/YR	12 MONTH ROLLING AV	0.35	LB/MMBTU		0.93
LA-0188	BOGALUSA MILL	INLAND PAPERBOARD AND PACKAGING (GAYLORD)	LA	NO. 12 HOGGED FUEL BOILER	11.12	BARK	787.5	MMBTU/H	BOILER IS ALSO PERMITTED TO BURN: FUEL OIL - 568.75 MM BTU/HR SECONDARY FIBER (OCC) REJECTS - 374.0 MM BTU/HR	EXISTING OVERFIRE AIR SYSTEM AND GOOD COMBUSTION PRACTICES	491.45	LB/H	HOURLY MAXIMUM	BACT-PSD	2081.6	T/YR	ANNUAL MAXIMUM	0.6	LB/MMBTU	ANNUAL AVERAGE	0.62
WA-0337	BOISE WHITE PAPER LLC	BOISE CASCADE CORP	WA	UTILITY-AND LARGE INDUSTRIAL-SIZE BOILERS/FURNACES (>250 MILLION BTU/H)	11.12	WOOD/BARK	343	MMBTU/H	FUEL PRIMARILY WOOD WASTE, BUT CAN BE UP TO 40% NATURAL GAS.	OVERFIRE AIR SYSTEM ADDED TO IMPROVE THE BOILER'S COMBUSTION SYSTEM. BOILER HAS AN ESP.	500	PPMVD	12 MONTH ROLLING AVERAGE	Other Case-by-Case							0.41
CA-1203	SIERRA PACIFIC INDUSTRIES-LOYALTON	SIERRA PACIFIC INDUSTRIES	CA	RILEY SPREADER STOKER BOILER	11.12	WOOD	335.7	MMBTU/H		RILEY STOKER BOILER SHALL BE OPERATED WITH HIGH PRESSURE OVER FIRE AIR FOR CONTROL OF CO EMISSIONS	1443	PPM	@12% CO2, 8-HR ROLLING AVG	BACT-PSD	550	LB/H	8-HR ROLLING AVG				1.64
CA-1203	SIERRA PACIFIC INDUSTRIES-LOYALTON	SIERRA PACIFIC INDUSTRIES	CA	RILEY SPREADER STOKER BOILER - Transient Period (see notes)	11.12	WOOD	335.7	MMBTU/H	EMISSION LIMITS DURING TRANSIENT PERIODS; FOR PERIODS AGGREGATING TO NO MORE THAN 100 HRS PER YEAR	RILEY STOKER BOILER SHALL BE OPERATED WITH HIGH PRESSURE OVER FIRE AIR FOR CONTROL OF CO EMISSIONS	1998	PPM	@12% CO2, 8-HR ROLLING AVG	BACT-PSD	772.42	LB/H	8-HR ROLLING AVG				2.30

min	0.30
max	2.30
median	0.62

TABLE 5-2
CALCULATION OF THERMAL OXIDIZER HEATING REQUIREMENT
IP SAVANNAH BOILER MACT PROJECT
URS PROJECT NO. 31829473

Process Inputs	Parameter
Air flowrate, SCFM (wet)	197,537
Inlet moisture content (by volume)	0.14
Inlet gas temp, F	369
CO emissions, lb/hr	397.72
Cp air, Btu/F-SCF	0.021
Cp water vapor, Btu/F-SCF	0.026
RO thermal efficiency	0.90
Temperature increase	1,131
RO heating requirement, MMBtu/hr	318.0

Heat = (scfm * (1 - % H2O) * Cp air) + (scfm * % H2O * Cp water)) * (Temperature increase) * 60 min/hr / (1 E 06 Btu/MM Btu) / TEff

TABLE 5-3
THERMAL OXIDATION CONTROL COSTS
IP SAVANNAH BOILER MACT PROJECT
URS PROJECT NO. 31829473

Direct Costs				**Cost**	**Cost Factor/Comments**
Total Equipment Costs - RCO					
Flow rate	197,537	(A) scfm		$11,358,378	References 1, 4
Scaled EPA cost from 2002 basis (date published) to 2013 cost basis				$16,440,361	395.6 is 2002 Chemical Engineering plant cost index January 2014 Chemical Engineering Plant 572.6 Cost Index
Purchased Equipment Costs - WESP					
WESP + pre-humidification chamber				$5,925,449	5
New stack				$2,500,000	6
New ID Fan				$600,000	6
WESP + pre-humidification chamber + Stack + ID Fan				$9,025,449	A
Instrumentation, 0.1 A				$902,545	3
Estimated Tax, 0.03 A				$270,763	3
Freight, 0.05 A				$451,272	3
Purchased Equipment Cost, PEC				$10,650,030	B
Direct Installation Costs - WESP					
Foundations & Supports, 0.04 B				$426,001	3
Handling & Erection, 0.5 B				$5,325,015	3
Electrical, 0.08 B				$852,002	3
Piping, 0.01 B				$106,500	3
Insulation for Ductwork, 0.02 B				$213,001	3
Painting, 0.02 B				$213,001	3
Direct Installation Costs				$7,135,520	
Indirect Installation Costs - WESP					
Engineering, 0.20B				$2,130,006	3
Construction and field expenses, 0.20B				$2,130,006	3
Contractor Fees, 0.10B				$1,065,003	3
Start-up, 0.01B				$106,500	3
Performance test, 0.01B				$106,500	3
Contingencies, 0.03B				$319,501	3
Total indirect Costs				$5,857,516	
Total Capital Cost (TCC)			TCC	**$40,083,428**	

Direct Annual costs			**Cost**	**Cost Factor/Comments**		
Electricity Cost	385	kW addl for fan	$219,331	Elec. Cost=	$0.065	$/kWh cost
(Ref 2, Power for fan)		(Ref 2, Power for fan)		Operation=	8,760	hr/yr
	476	kW for WESP	$271,049			
Fuel Cost			$14,761,916	Burner Fuel Usage:	2,785,267	MM Btu/yr
				gas cost $	5.30	/MMBtu
Operating Labor						
Operator	1	hr/shift	$39,540			
$	36.11	/hr				
Supervisor			$5,931	15% of operating labor, Reference 2		
Maintenance	1	hr/shift	$42,519			
Labor $	38.83	/hr				
Material			$42,519	100% of maintenance labor, Reference 2		
Indirect Annual Costs						
Overhead			$78,306	0.6	* C	C = operating labor + maintenance costs
Administration			$801,668.55	2%	TCC	
Property Taxes				Exempt		I= 0.07
Insurance			$400,834.28	1%	TCC	n= 20
Capital Recovery			$3,783,592.00	0.0944	20 years, 7% interest	rate= 0.0944
Total Annual Cost			**$20,447,206**			

CO Emissions Reduction/Cost Effectiveness		
Total uncontrolled CO emissions	1742	tons/yr

TABLE 5-3
THERMAL OXIDATION CONTROL COSTS
IP SAVANNAH BOILER MACT PROJECT
URS PROJECT NO. 31829473

Capture Efficiency	100%	
Total captured CO emissions	1742	tons/yr
RTO Control Efficiency	95%	
Emission Reduction	1655	tons/yr
Cost/ton of CO removal	**$12,356**	$/ton

Basis:
1) EPA CATC Fact sheet for oxidizers, http://www.epa.gov/ttn/catc/dir1/cs3-2ch2.pdf, states capital cost is $25-90/scfm, midpoint selected.
2) EPA OAQPS Air Pollution Control Cost Manual (6th edition), January 2002, Section 3.2, Chapter 2.
3) EPA OAQPS Air Pollution Control Cost Manual (6th edition), Section 6 (PM control) Chapter 3 (ESP)
4) Flow rate from 2010 stack test measurements.
5) Lundberg cost estimate for installation of WESP on another IP boiler, adjusted for size using 0.6 power function on the ratio of max flow rates
6) Black & Veatch cost analysis, Septemeber 2013.

TABLE 5-4
SUPPORTING COST INPUT DATA FOR REGENERATIVE CATALYTIC OXIDIZER COST ANALYSIS
IP SAVANNAH BOILER MACT PROJECT
URS PROJECT NO. 31829473

Parameter	Value	Units	Note(s)
Control Efficiency	70	%	1
Volume of Catalyst	800	ft3	2
Pressure Drop Across the Oxidation Catalyst	10	inches of H2O	2
Electricity Usage	890.0	kW-hr	2
Catalyst Life	2	year	2
Natural Gas Consumption for Gas Reheating	48,586	ft3/hr	2, 3
Catalyst Cost, Initial	387.5	$/ft3	2
Catalyst Cost, Replacement	401.5	$/ft3	2
Operating Labor Cost	36.11	$/hr	4
Maintenance Labor Cost	38.83	$/hr	4
Electricity Cost	0.065	$/kW-hr	4
Natural Gas Cost	5.3	$/1000 ft3	4
Oxidation Catalyst Equipment Life	10	years	5
Interest Rate	7	%	5

Notes:

1. Based on Babcock Power information.
2. Value provided by Babcock Power in October 2009 PSD Permit Application for Oglethorpe Power Corporation, Warren County Biomass Energy Facility, same MMBtu size boiler as IP Savannah PB13.
3. Calculated based on reheating needed (MMBtu/hr) and natural gas heat input capacity.
4. Site Specific Data provided by IP Savannah that reflect expected costs following the gas conversion project.
5. Based on example problem in OAQPS Manual, Section 3.2, Chapter 2, page 2-45.

TABLE 5-5
REGENERATIVE CATALYTIC OXIDIZER COST ANALYSIS
IP SAVANNAH BOILER MACT PROJECT
URS PROJECT NO. 31829473

Capital Cost		Notes	Reference
Direct Costs - RCO			
Purchased Equipment Costs			
RCO Price + auxiliary equipment + freight	$10,603,704	A	2
White liquor scrubber	$91,724	A	3
Sales Tax	$320,863	0.03A	1(a)
Purchased Equipment Cost, PEC	$11,016,290	B	
Direct Installation Costs			
Foundations and Support	$881,303	0.08B	1(a)
Handling & Erection	$1,542,281	0.14B	1(a)
Electrical	$440,652	0.04B	1(a)
Piping	$220,326	0.02B	1(a)
Insulation for ductwork	$110,163	0.01B	1(a)
Painting	$110,163	0.01B	1(a)
Direct Installation Costs	$3,304,887		
Direct Costs - WESP			
Purchased Equipment Costs			
WESP + pre-humidification chamber	$5,925,449		5
New stack	$2,500,000		6
New ID Fan	$600,000		6
WESP + pre-humidification chamber + Stack + ID Fan	$9,025,449	A	
Instrumentation, 0.1 A	$902,545		1(c)
Estimated Tax, 0.03 A	$270,763		1(c)
Freight, 0.05 A	$451,272		1(c)
Purchased Equipment Cost, PEC	$10,650,030	B	
Direct Installation Costs			
Foundations & Supports, 0.04 B	$426,001		1(c)
Handling & Erection, 0.5 B	$5,325,015		1(c)
Electrical, 0.08 B	$852,002		1(c)
Piping, 0.01 B	$106,500		1(c)
Insulation for Ductwork, 0.02 B	$213,001		1(c)
Painting, 0.02 B	$213,001		1(c)
Direct Installation Costs	$7,135,520		
Total Direct Costs, DC	$32,106,727		
Indirect Costs (Installation of RCO)			
Engineering	$1,101,629	0.10B	1(a)
Construction and field expenses	$550,815	0.05B	1(a)
Contractor Fees	$1,101,629	0.10B	1(a)
Start-up	$220,326	0.02B	1(a)
Performance test	$110,163	0.01B	1(a)
Contingencies	$330,489	0.03B	1(a)
Indirect Costs (Installation of WESP)			
Engineering	$2,130,006	0.20B	1(c)
Construction and field expenses	$2,130,006	0.20B	1(c)
Contractor Fees	$1,065,003	0.10B	1(c)
Start-up	$106,500	0.01B	1(c)
Performance test	$106,500	0.01B	1(c)
Contingencies	$319,501	0.03B	1(c)
Total Indirect Costs, IC	$9,272,566		

TABLE 5-5
REGENERATIVE CATALYTIC OXIDIZER COST ANALYSIS
IP SAVANNAH BOILER MACT PROJECT
URS PROJECT NO. 31829473

Total Capital Investment	$41,379,293	**TCI = DC + IC**	
Operating Cost			
Direct Annual Costs			
Operating Labor			
Operator	$39,540	1 hr/s, 3 s/d, 365 d/yr	1(c)
Supervisor	$5,931	15% of operator	1(b), 1(c)
Total	$45,472		
Maintenance			
Labor	$42,519	1 hr/s, 3 s/d, 365 d/yr	1(c)
Material	$42,519	100% of maintenance labor	1(b), 1(c)
Total	$85,038		
Electricity			
Total Requirement - RCO, WESP, fan increase	1780	KW	
Unit cost	$0.065	$/kW-hr	
Total	$1,013,546		
Fuel			
Natural Gas	48.6	1000 ft^3/hr	
Cost	$5.30	$/1000 ft^3	
Total	$2,255,764		
Catalyst Costs			
Catalyst Replacement	$155,169	annualized cost at 7% interest	
White Liquor Scrubber Costs			
Caustic	$2,000,000		4
Electricity for 3 hp pump	$1,274		
Total Direct Annual Costs	*$5,556,262*		
Indirect Annual Costs			
Overhead	$78,306	60% of operating labor + maintenance	1(b)
Administrative Charges	$827,586	2% of TCI	1(b)
Property tax			Exempt
Insurance	$413,793	1% of TCI	1(b)
Annual Interest Rate	7%		
Economic life of RCO	10		
Capital Recovery Factor	0.142		
Total Capital Recovery Cost	$5,891,480		
Total Indirect Annual Costs	*$7,211,165*		
Total Annual Cost	**$12,767,427**	*TAC = DAC + IDAC*	

1. U.S. EPA OAQPS, *EPA Air Pollution Control Cost Manual (6th Edition)* , September 2000, Section 3, Chapter 2.
   [a] Table 2.8: Capital Cost Factors for Thermal and Catalytic Incinerators (OAQPS 2-42); Vendor quote usually includes instrumentation
   [b] Table 2.10: Annual Costs for Thermal and Catalytic Incinerators Example Problem (OAQPS 2-45)
   [c] Section 6 (Particulate Matter control) Chpt 3 (ESP) Pg (3-46) Table 3.16 - Capital Cost Factors for ESPs
2. Capital cost based on Babcock Power estimate provided to IP 6/16/2010 scaled to Dec 2013 dollars using CE Plant Cost Index.
   551 2010 Chemical Engineering Plant Cost Index
   573 January 2014 Chemical Engineering Plant Cost Index
3. 2005 cost of existing white liquor scrubber, $75,000, scaled using 2005 Chemical Engineering Plant Cost Index of 468.2 and Jan 2014 index of 572.6
4. Per Wes Aaron, IP Savannah, the increase in sulfur will require additional caustic to balance. At 2014 budgeted price it is $2,000,000 annually in increased operating cost for the chemical.
5. Lundberg cost estimate for installation of WESP on another IP boiler, adjusted using 0.6 power function on the ratio of flow rates

TABLE 5-6
ECONOMIC IMPACT ANALYSIS FOR BOILER CONTROLS
IP SAVANNAH MILL BOILER MACT PROJECT
URS PROJECT NO. 31829473

Control Alternatives	Uncontrolled CO Emissions[1] (ton/yr)	CO Control Efficiency (%)	CO Emissions Reduction (ton/yr)	Economic Impacts		
				Total Capital Cost ($)	Annual Cost ($/yr)	Cost Effectiveness ($/ton)
Thermal Oxidation	1,742	95%	1,655	$40,083,428	$20,447,206	$12,355
Regenerative Catalytic Oxidation	1,742	70%	1,219	$41,379,293	$12,767,427	$10,470

1. Potential uncontrolled CO Emissions are estimated based on proposed BACT limit and full capacity of boiler:

400 ppm at 3% O2

0.311 lb/MMBtu at projected fuel mix using f factors

TABLE 5-7
BOILER CONTROLS ENVIRONMENTAL AND ENERGY IMPACT ANALYSES
IP SAVANNAH BOILER MACT PROJECT
URS PROJECT NO. 31829473

Control Alternatives	Adverse Impacts From Other Air Pollutants? (Yes/No)	Adverse Hazardous or Solid Waste Impacts? (Yes/No)	Energy Impacts	
			Electrical (kW*hr/yr)	Fuel (MM Btu/yr)
Thermal Oxidation	Yes	No	3,374,327	2,785,267
Regenerative Catalytic Oxidation	Yes	No	15,593,022	434,128

TABLE 6-1
BUILDING/STRUCTURE HEIGHTS
IP SAVANNAH MILL BOILER MACT PROJECT
URS PROJECT NO. 31829473

Building	Height	
	(ft)	(m)
No. 13 Power Boiler	165.0	50.3
No. 14 Recovery Boiler	195.0	59.4
No. 15 Recovery Boiler	250.0	76.2
Kamyr Digester	194.0	59.2

TABLE 6-2
POINT SOURCE STACK PARAMETERS
IP SAVANNAH MILL BOILER MACT PROJECT
URS PROJECT NO. 31829473

Model ID	Source Description	UTM Coordinates (NAD83)		Base Elevation (m)	Stack Height (m)	Stack Temperature (K)	Stack Exit Velocity (m/s)	Stack Diameter (m)	CO Emission Rate (g/s)
		Easting (m)	Northing (m)						
VE03	No. 13 Power Boiler	488,170.5	3,551,900.4	3.98	106.7	447.0	23.93	3.05	44.75

TABLE 6-3
SIGNIFICANT IMPACT MODELING RESULTS
IP SAVANNAH MILL BOILER MACT PROJECT
URS PROJECT NO. 31829473

Pollutant	Averaging Period	Maximum Modeled Concentration ($\mu g/m^3$)	Maximum Concentration Occurance				Maximum Receptor Location		Ambient Significance Level (µg/m3)	Monitoring Significance Level (µg/m3)	NAAQS/PSD Increment Analysis Required?	Monitoring Required?
			Year	Month	Day	Hour	Easting (m)	Northing (m)				
CO	1-hour	51.53	2009	12	14	11	486,400.0	3,552,100.0	2,000	--	No	No
CO	8-hour	26.28	2007	5	8	16	488,300.0	3,550,800.0	500	575	No	No

Appendix A

Application Forms

State of Georgia
Department of Natural Resources
Environmental Protection Division
Air Protection Branch

Stationary Source Permitting Program
4244 International Parkway, Suite 120
Atlanta, Georgia 30354
404/363-7000
Fax: 404/363-7100

SIP AIR PERMIT APPLICATION

EPD Use Only

Date Received: _____ Application No. _____

FORM 1.00: GENERAL INFORMATION

1. Facility Information

Facility Name: International Paper - Savannah Mill
AIRS No. (if known): 04-13- 051 - 0007
Facility Location: Street: West Lathrop Avenue
City: Savannah Georgia Zip: 31408 County: Chatham
Is this facility a "small business" as defined in the instructions? Yes: ☐ No: ☒

2. Facility Coordinates

Latitude: 32° 6' 17" **NORTH** Longitude: 81° 7' 14" **WEST**
UTM Coordinates: 488624.23 **EAST** 3552046.32 **NORTH** **ZONE** 17

3. Facility Owner

Name of Owner: International Paper Company
Owner Address Street: International Place, 6400 Poplar Avenue
City: Memphis State: TN Zip: 38197

4. Permitting Contact and Mailing Address

Contact Person: Donna D. Katula Title: Environmental Performance Manager
Telephone No.: (912) 238-7054 Ext. _____ Fax No.: (912) 238-7343
Email Address: donna.katula@ipaper.com
Mailing Address: Same as: Facility Location: ☐ Owner Address: ☐ Other: ☒
If Other: Street Address: P.O. Box 570
City: Savannah State: GA Zip: 31402

5. Authorized Official

Name: Ralph Stagner Title: Mill Manager
Address of Official Street: P.O. Box 570
City: Savannah State: GA Zip: 31402

This application is submitted in accordance with the provisions of the Georgia Rules for Air Quality Control and, to the best of my knowledge, is complete and correct.

Signature: _____ Date: 5/29/14

DDK
JCF

6. Reason for Application: (Check all that apply)

☐ New Facility (to be constructed)

☒ Existing Facility (initial or modification application)

☐ Permit to Construct

☐ Permit to Operate

☐ Change of Location

☒ Permit to Modify Existing Equipment: Affected Permit No.: 2631-051-0007-V-02-0, -1

☐ Revision of Data Submitted in an Earlier Application

Application No.: _____

Date of Original Submittal: _____

7. Permitting Exemption Activities (for permitted facilities only):

Have any exempt modifications based on emission level per Georgia Rule 391-3-1-.03(6)(i)(3) been performed at the facility that have not been previously incorporated in a permit?

☒ **No** ☐ **Yes, please fill out the SIP Exemption Attachment** (See Instructions for the attachment download)

8. Has assistance been provided to you for any part of this application?

☐ **No** ☐ **Yes, SBAP** ☒ **Yes, a consultant has been employed or will be employed.**

If yes, please provide the following information:

Name of Consulting Company: URS Corporation

Name of Contact: Amy Marshall

Telephone No.: (919) 461-1251 Fax No.: (919) 461-1415

Email Address: Amy.Marshall@urs.com

Mailing Address: Street: 1600 Perimeter Park Drive, Suite 400

City: Morrisville State: NC Zip: 27560

Describe the Consultant's Involvement:

Prepared permit application

9. Submitted Application Forms: Select only the necessary forms for the facility application that will be submitted.

No. of Forms	Form
1	2.00 Emission Unit List
1	2.01 Boilers and Fuel Burning Equipment
	2.02 Storage Tank Physical Data
	2.03 Printing Operations
	2.04 Surface Coating Operations
	2.05 Waste Incinerators (solid/liquid waste destruction)
	2.06 Manufacturing and Operational Data
1	3.00 Air Pollution Control Devices (APCD)
	3.01 Scrubbers
	3.02 Baghouses & Other Filter Collectors
1	3.03 Electrostatic Precipitators
1	4.00 Emissions Data
1	5.00 Monitoring Information
	6.00 Fugitive Emission Sources
1	7.00 Air Modeling Information

10. Construction or Modification Date

Estimated Start Date: 09/2014 (Construction of Natural Gas Line); 02/2015 (Installation of Gas Burners on PB13.)

11. If confidential information is being submitted in this application, were the guidelines followed in the "Procedures for Requesting that Submitted Information be treated as Confidential"?

☒ No ☐ Yes

12. New Facility Emissions Summary

Criteria Pollutant	New Facility	
	Potential (tpy)	Actual (tpy)
Carbon monoxide (CO)		
Nitrogen oxides (NOx)		
Particulate Matter (PM) (filterable only)		
PM <10 microns (PM10)		
PM <2.5 microns (PM2.5)		
Sulfur dioxide (SO_2)		
Volatile Organic Compounds (VOC)		
Greenhouse Gases (GHGs) (in CO2e)		
Total Hazardous Air Pollutants (HAPs)		
Individual HAPs Listed Below:		

13. Existing Facility Emissions Summary

Criteria Pollutant	Current Facility		After Modification	
	Potential (tpy)	Actual (tpy)	Potential (tpy)	Actual (tpy)
Carbon monoxide (CO)	4360	1407	4725	2526
Nitrogen oxides (NOx)	5040	2645	3071	2195
Particulate Matter (PM) (filterable only)	1030	222	1029	205
PM <10 microns (PM10)	1030	222	1029	197
PM <2.5 microns (PM2.5)	1030	222	1029	188
Sulfur dioxide (SO_2)	16960	7680	11178	5534
Volatile Organic Compounds (VOC)	1250	940	1219	947
Greenhouse Gases (GHGs) (in CO2e)	>100,000	>100,000	>100,000	>100,000
Total Hazardous Air Pollutants (HAPs)	1305	1036	1305	1036
Individual HAPs Listed Below:				
See Title V application forms for PTE				
and attached calculations in				
Appendix B				

14. 4-Digit Facility Identification Code:

SIC Code: 2631 SIC Description: Paperboard Mills

NAICS Code: 322130 NAICS Description: Pulp and Paperboard

15. Description of general production process and operation for which a permit is being requested. If necessary, attach additional sheets to give an adequate description. Include layout drawings, as necessary, to describe each process. References should be made to source codes used in the application.

See sections 2 and 3 in permit application for a detailed project description.

16. Additional information provided in attachments as listed below:

Attachment A - Application Forms

Attachment B - PSD Applicability Calculations

Attachment C - Modeling Protocol and Electronic Files

Attachment D -

Attachment E -

Attachment F -

17. Additional Information: Unless previously submitted, include the following two items:

☒ Plot plan/map of facility location or date of previous submittal: October 2006 Permit Renewal

☒ Flow Diagram or date of previous submittal: October 2006 Permit Renewal

18. Other Environmental Permitting Needs:

Will this facility/modification trigger the need for environmental permits/approvals (other than air) such as Hazardous Waste Generation, Solid Waste Handling, Water withdrawal, water discharge, SWPPP, mining, landfill, etc.?

☒ **No** ☐ **Yes, please list below:**

Facility Name: IP Savannah **Date of Application:** May 2014

FORM 2.00 – EMISSION UNIT LIST

Emission Unit ID	Name	Manufacturer and Model Number	Description
PB-13	No. 13 Power Boiler	Combustion Engineering VU40X	This unit burns fuel to generate process steam.

Facility Name: IP Savannah **Date of Application:** May 2014

FORM 2.01 – BOILERS AND FUEL BURNING EQUIPMENT

Emission Unit ID	Type of Burner	Type of Draft[1]	Design Capacity of Unit (MMBtu/hr Input)	Percent Excess Air	Dates		Date & Description of Last Modification
					Construction	Installation	
PB-13			1280	Variable	1981	1982	2007; Upgraded to burn bark: overfire air, bark bin modifications, ash system improvements, magnet and metal detector in bark lines, etc.

[1] This column does not have to be completed for natural gas only fired equipment.

Facility Name: IP Savannah **Date of Application:** May 2014

FUEL DATA

Emission Unit ID	Fuel Type	Potential Annual Consumption				Hourly Consumption		Heat Content		Percent Sulfur		Percent Ash in Solid Fuel	
		Total Quantity		Percent Use by Season									
		Amount	Units	Ozone Season May 1 - Sept 30	Non-ozone Season Oct 1 - Apr 30	Max.	Avg.	Min.	Avg.	Max.	Avg.	Max.	Avg.
PB-13	Coal	18,768	tpy			2.14			25.6 MMBtu/ton	3%			
PB-13	No. 6 Fuel Oil/ Used Oil	0	tpy			0			150 MMBtu/Mgal	3%			
PB-13	Woodwaste	350400	tpy			40			4757 Btu/lb	0%			
PB-13	Natural Gas	4113	MMscf/yr			0.5			1020 Btu/scf				
PB-13	No. 2 Fuel Oil	0	tpy			0			140 MMBtu/Mgal				
PB-13	No. 5 Fuel Oil	0	tpy			0			150 MMBtu/Mgal				
		*Note annual project values entered above											

Fuel Supplier Information						
Fuel Type	Name of Supplier	Phone Number	Supplier Location			
			Address	City	State	Zip

Facility Name: IP Savannah **Date of Application:** May 2014

Form 3.00 – AIR POLLUTION CONTROL DEVICES - PART A: GENERAL EQUIPMENT INFORMATION

APCD Unit ID	Emission Unit ID	APCD Type (Baghouse, ESP, Scrubber etc)	Date Installed	Make & Model Number (Attach Mfg. Specifications & Literature)	Unit Modified from Mfg Specifications?	Gas Temp. °F		Inlet Gas Flow Rate (acfm)
						Inlet	Outlet	
AP07	PB13	ESP	1981	Research Cottrell I.P. 3335-318310	no		345	78.5 ft/sec (exit)

Facility Name: IP Savannah **Date of Application:** May 2014

Form 3.00 – AIR POLLUTION CONTROL DEVICES – PART B: EMISSION INFORMATION

APCD Unit ID	Pollutants Controlled	Percent Control Efficiency		Inlet Stream To APCD		Exit Stream From APCD		Pressure Drop Across Unit (Inches of water)
		Design	Actual	lb/hr	Method of Determination	lb/hr	Method of Determination	
AP07	PM, PM10		92					

Facility Name: IP Savannah **Date of Application:** May 2014

FORM 3.03 –ELECTROSTATIC PRECIPITATORS

APCD ID	Type of ESP (Wet or Dry)	Field No.	Voltage (Volts)		Current (Amps)		Total Power (kW)	Water Flow Rate[1] e.g. Gal/min, Gal/hr	Inlet Gas Velocity e.g. ft/min, ft/sec	Spark Rate sparks/min
			Primary	Secondary	Primary	Secondary				
AP07*	Dry	1-10							*ESP Design not changing with this Project	

[1] Complete only for wet ESP's.

Facility Name: IP Savannah **Date of Application:** May 2014

FORM 4.00 – EMISSION INFORMATION

Emission Unit ID	Air Pollution Control Device ID	Stack ID	Pollutant Emitted	Emission Rates				
				Hourly Actual Emissions (lb/hr)	Hourly Potential Emissions (lb/hr)	Actual Annual Emission (tpy)	Potential Annual Emission (tpy)	Method of Determination
PB-13	AP07	VE03	See Appendix B for Emissions Calculations.					

Facility Name: IP Savannah **Date of Application:** May 2014

FORM 5.00 MONITORING INFORMATION

Emission Unit ID/ APCD ID	Emission Unit/APCD Name	Monitored Parameter		Monitoring Frequency
		Parameter	Units	
PB-13 /AP07	No. 13 Power Boiler	Opacity	%	continuous
		total secondary power	kW	Each 8-hr shift
		coal sulfur and GCV	% and Btu/lb	daily
		Secondary Current and Voltage on ESP	Amps and Volts	Each 8-hr shift

Comments:

Facility Name: IP Savannah **Date of Application:** May 2014

FORM 7.00 – AIR MODELING INFORMATION: Stack Data

Stack ID	Emission Unit ID(s)	Stack Information			Dimensions of largest Structure Near Stack		Exit Gas Conditions at Maximum Emission Rate			
		Height Above Grade (ft)	Inside Diameter (ft)	Exhaust Direction	Height (ft)	Longest Side (ft)	Velocity (ft/sec)	Temperature (°F)	Flow Rate (acfm)	
									Average	Maximum
VE03	PB13	350	10	Toward the Sky	250	170	78.5	345	370460.5	

NOTE: If emissions are not vented through a stack, describe point of discharge below and, if necessary, include an attachment. List the attachment in Form 1.00 *General Information*, Item 16.

Facility Name: IP Savannah **Date of Application:** May 2014

FORM 7.00 AIR MODELING INFORMATION: Chemicals Data

Chemical	Potential Emission Rate (lb/hr)	Toxicity	Reference	MSDS Attached
CO	398	Not Applicable	Not Applicable	☐
				☐
				☐
				☐
				☐
				☐
				☐
				☐
				☐
				☐
				☐
				☐
				☐
				☐
				☐
				☐
				☐
				☐
				☐
				☐
				☐
				☐
				☐
				☐
				☐
				☐
				☐
				☐
				☐
				☐
				☐
				☐

State of Georgia
Department of Natural Resources
Environmental Protection Division
Air Protection Branch
Major Source Operating Permit Application

4244 International Parkway
Suite 120
Atlanta, Georgia 30354-3906
404-363-7000

Certifications and Signatures

Facility Name: International Paper

Project Name: 2014 IP- Savannah BMACT

AIRS Number: 130510007

Submittal File Name: 130510007_20140530.mdb ~~23~~

COMPUTER DISK VIRUS EXAMINATION CERTIFICATION:
I certify that, to the best of my knowledge, the completed electronic application disk has been inspected and found free of any known viruses.

Signature: Amy M Marshall Date: 5/30/14

Name (print): Amy M Marshall

Offical Title: Vice President

SOFTWARE USAGE CERTIFICATION:
I certify that the software used to complete the Georgia Title V application was used as provided by the Georgia Environmental Protection Division, Air Protection Branch and was unaltered in any way. I understand that the submission of a Title V (Part 70) application completed using any altered version of the provided software constitutes the submission of an incomplete application and that such action may be subject to enforcement by the Georgia Air Protection Branch and/or the US EPA.

CERTIFICATION OF COMPLIANCE:
Except as stated on the Compliance Plan For a Non-Compliant Emission Unit or Group form of this application, I hereby certify that this facility is in compliance with all applicable requirements effective as of the date of this certification and will continue to comply with such requirements. For applicable requirements promulgated as of the date of this certification, that will become effective during the permit term, I further certify that, except as stated on the Compliance Plan For a Non-Compliant Emission Unit or Group form of this application, this facility will comply with such requirements and will continue to comply with such requirements.

I certify under penalty of law that I have personally examined, and am familiar with, the statements and information submitted in this application and all of its attachments. Based on my inquiry of those individuals with primary responsibility for obtaining the information, I certify that the statements and information are, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false statements and information or omitting required statements and information, including the possibility of fine or imprisonment.

Unless otherwise required by the Director, compliance certifications will be submitted to the Director at least annually.

SIGNATURE OF RESPONSIBLE OFFICIAL:

Signature: Date: 5/29/14

Name (print): Ralph S. Stagner

Offical Title: Savannah Mill Manager

Address: P.O. Box 570
Savannah, GA 31402

DDK
JCT

Notary Public Certification of Responsible Official's Signature:

JULIE WILLIFORD NOTARY PUBLIC EXPIRES GEORGIA August 13, 2017 BULLOCH COUNTY

Signature of Notary Public: Julie Williford

Printed on: 5/23/2014

A - Facility Information

Parent/Holding Company Name:	International Paper Company
Facility Location:	West Lathrop Avenue Savannah, GA 31408- County: Chatham

Location of Center of Production Area: **UTM Zone:** 0

Latitude:	32 deg N 6 min 17 sec	**UTM Horizontal Meters:**	488624.23
Longitude:	81 deg W 7 min 14 sec	**UTM Vertical Meters:**	3552046.32

Reason for Application Submittal:

Modification of Existing Title V Permit

Application Submitted for:

All facilities under common control at a Part 70 site.

A6 - Current Permits And Amendments (And Deferred Modifications Under State Rule 391-3-1-.03(6)(i))

Permit or Amendment Number:	**2631-051-0007-V-02-0**
Original Issue Date and Amendment Date:	April 20, 2010
Permit or Amendment Description:	Title V Permit Renewal

Permit or Amendment Number:	**2631-051-0007-V-02-1**
Original Issue Date and Amendment Date:	March 2, 2012
Permit or Amendment Description:	Revision of the periodic reporting deadlines in Conditions 6.1.3, 6.1.4, and 8.14.1.

All significant Processes at this Facility:

Process Fiber Boxes

Description

In the box plant, rolls of paper are received via railcar or trucks. The first step in the process is the corrugator, where three sheets of paper are formed into corrugated board. Impregnating wax is applied to the top layer, the medium goes through the corrugator roll, and the top and bottom layers are glued to the medium. The glue is starch-based and is mixed in the starch kitchen using starch, borax, liquid caustic, other additives, and water. The corrugated sheet then goes through the slitter to trim the edges and is cut to length and stacked at the end of the Corrugator. The corrugated stock is sent to the converting department where they are cut and printed with ink and/or curtain coated with wax. The box plant operates 2 die cutters, 3 flexo/folder/gluer lines, a curtain coater,

and a poultry line. These lines cut, wax, and/or apply ink or glue to the corrugated stock to form boxes. Trim from these operations is sent to one of two cyclones and baled.

Process Paper, Paperboard & Saturating Kraft

Description

Pulp mill, Paper mill, Paperboard mill

Other ID Numbers:

FEI Number:	13-565-2423
Dun and Bradstreet Number:	033 275 252

A8 - Required Documents:

A2, A3, A4 - Contact Names and Addresses by Responsibilities

Facility: International Paper Application: 2014 IP- Savannah BMACT

Legal Owner (legal actions, etc.)

Primary Contact: Ralph S. Stagner, Mill Manager
Phone: (912) 238-7589 EXT: Fax:
E-Mail: ralph.stagner@ipaper.com

Mailing Address: International Paper Company
P. O. Box 570
Savannah, GA 31402

Facility Contact

Primary Contact: Donna D. Katula, Environmental Performance Manager
Phone: (912) 238-7054 EXT: Fax: (912) 238-7343
E-Mail:

Mailing Address: International Paper Company
P. O. Box 570
Savannah, GA 31402

Permits (granted permits, permit amendments, etc.)

Primary Contact: Donna D. Katula, Environmental Performance Manager
Phone: (912) 238-7054 EXT: Fax: (912) 238-7343
E-Mail:

Mailing Address: International Paper Company
P. O. Box 570
Savannah, GA 31402

Permit Applications (requests for additional information, etc.)

Primary Contact: Donna D. Katula, Environmental Performance Manager
Phone: (912) 238-7054 EXT: Fax: (912) 238-7343
E-Mail:

Mailing Address: International Paper Company
P. O. Box 570
Savannah, GA 31402

Surveys, Questionaires (emission inventories, etc.)

Primary Contact: Donna D. Katula, Environmental Performance Manager

Phone: (912) 238-7054 EXT: Fax: (912) 238-7343

E-Mail:

Mailing Address: International Paper Company
P. O. Box 570
Savannah, GA 31402

Enforcement Actions (non-compliance letters, notices of violation, etc.)

Primary Contact: Donna D. Katula, Environmental Performance Manager

Phone: (912) 238-7054 EXT: Fax: (912) 238-7343

E-Mail:

Mailing Address: International Paper Company
P. O. Box 570
Savannah, GA 31402

Fees (fee manuals, fee forms, audit notices, etc.)

Primary Contact: Donna D. Katula, Environmental Performance Manager

Phone: (912) 238-7054 EXT: Fax: (912) 238-7343

E-Mail:

Mailing Address: International Paper Company
P. O. Box 570
Savannah, GA 31402

Monitoring (CEM certification applications, requests for monitoring and testing information, etc.)

Primary Contact: Donna D. Katula, Environmental Performance Manager

Phone: (912) 238-7054 EXT: Fax: (912) 238-7343

E-Mail:

Mailing Address: International Paper Company
P. O. Box 570
Savannah, GA 31402

B1 - Part 70 Site Potential To Emit

Criteria Pollutant	Potential To Emit Applicability Range for the Entire Site (tons per year)
Carbon Monoxide	250 or More
Hydrogen Sulfide	< 100
Nitrogen Oxides	250 or More
Particulate Matter	250 or More
Particulate Matter <10 microns	250 or More
Sulfur Dioxide	250 or More
Total Hazardous Air Pollutants	25 or More
Total Reduced Sulfur (includes H2S)	< 100
Volatile Organic Compounds	250 or More

Hazardous Air Pollutant	Potential To Emit Applicability Range for the Entire Site (tons per year)
1,1,2-Trichloroethane	> 0 to < 10
1,2,4-Trichlorobenzene	> 0 to < 10
2,2,4-Trimethylpentane	> 0 to < 10
2,4-Dinitrophenol	> 0 to < 10
2,4-Dinitrotoluene	> 0 to < 10
2-Chloroacetophenone	> 0 to < 10
Acetaldehyde	25 or More
Acetophenone	25 or More
Acrolein	> 0 to < 10
Antimony Compounds	> 0 to < 10
Arsenic Compounds (inorganic including arsine)	> 0 to < 10
Benzene (including benzene from gasoline)	> 0 to < 10
Benzyl chloride	> 0 to < 10
Beryllium Compounds	> 0 to < 10

beta-Propiolactone	> 0 to < 10
Biphenyl	10 To < 25
Bis(2-ethylhexyl)phthalate (DEHP)	> 0 to < 10
Bromoform	> 0 to < 10
Cadmium Compounds	> 0 to < 10
Carbon disulfide	> 0 to < 10
Carbon tetrachloride	> 0 to < 10
Chlorobenzene	> 0 to < 10
Chloroform	> 0 to < 10
Chloroprene	> 0 to < 10
Chromium Compounds	> 0 to < 10
Cobalt Compounds	> 0 to < 10
Cresols/Cresylic acid (isomers and mixture)	> 0 to < 10
Cumene	10 To < 25
Cyanide Compounds	> 0 to < 10
Dimethyl sulfate	> 0 to < 10
Ethyl benzene	> 0 to < 10
Ethyl chloride (Chloroethane)	> 0 to < 10
Ethylene dibromide (Dibromoethane)	> 0 to < 10
Ethylene dichloride (1,2-Dichloroethane)	> 0 to < 10
Formaldehyde	10 To < 25
Hexachlorobenzene	> 0 to < 10
Hexachlorocyclopentadiene	> 0 to < 10
Hexane	> 0 to < 10
Hydrochloric acid	25 or More
Hydrogen fluoride (Hydrofluoric acid)	> 0 to < 10
Isophorone	> 0 to < 10
Lead Compounds	> 0 to < 10

Manganese Compounds	> 0 to < 10
Mercury Compounds	> 0 to < 10
Methanol	25 or More
Methyl bromide (Bromomethane)	> 0 to < 10
Methyl chloride (Chloromethane)	> 0 to < 10
Methyl chloroform (1,1,1-Trichloroethane)	> 0 to < 10
Methyl ethyl ketone (2-Butanone)	10 To < 25
Methyl hydrazine	> 0 to < 10
Methyl isobutyl ketone (Hexone)	> 0 to < 10
Methyl methacrylate	> 0 to < 10
Methyl tert butyl ether (MTBE)	> 0 to < 10
Methylene chloride (Dichloromethane)	> 0 to < 10
Napthalene	> 0 to < 10
Nickel Compounds	> 0 to < 10
o-Cresol	> 0 to < 10
o-Xylenes	> 0 to < 10
Pentachlorophenol	> 0 to < 10
Phenol	> 0 to < 10
Phosphorus	> 0 to < 10
Polycyclic Organic Matter	> 0 to < 10
Propionaldehyde	> 0 to < 10
Selenium Compounds	> 0 to < 10
Styrene	> 0 to < 10
Tetrachloroethylene (Perchloroethylene)	> 0 to < 10
Toluene	> 0 to < 10
Trichloroethylene	> 0 to < 10
Vinyl acetate	> 0 to < 10
Vinyl chloride	> 0 to < 10

Vinylidene chloride (1,1-Dichloroethylene)	> 0 to < 10
Volatile Hazardous Air Pollutants	25 or More
Xylenes (isomers and mixture)	> 0 to < 10

B2 - Facility-Wide Actual Emissions Estimates

Pollutant	Maximum Actual Annual (tons per year)	5 Year Average Actual (tons per year)
Nitrogen Oxides	3071	3071
Particulate Matter	1029	1029
Particulate Matter <10 microns	1029	1029
Sulfur Dioxide	11178	11178
Total Hazardous Air Pollutants	1305	1305
Volatile Organic Compounds	1219	1219

C - RULE APPLICABILITY

Facility: International Paper Application: 2014 IP- Savannah BMACT

C1 - Regulatory Applicability

The following regulations have been identified as APPLICABLE:

Other	Other regulation - List additional regulations in the Comment blank.
FEDNEW	Enter into the comment field any newly promulgated Federal regulations that is applicable or potentially applicable to your facility that has not already been listed here. ***40 CFR 52.21*** ***40 CFR 70*** ***40 CFR 279*** ***40 CFR 63, Subpart DDDDD*** ***40 CFR 63, Subpart HHHHH*** ***40 CFR 51.308*** ***40 CFR 98, Subpart C***
SIPNEW	Enter into the comment field any newly promulgated SIP regulations that is applicable or potentially applicable to your facility that has not already been listed here. ***391-3-1-.03(1), (2), (4), (9), (10)*** ***391-3-1-.07*** ***SIP 391-3-1-.02(2)(tt)*** ***SIP 391-3-1-.02(2)(yy)***
FEDERAL	40 CFR 60, subpart BB, NSPS for Kraft Pulp Mills [391-3-1-.02(8)(b)34]
FEDERAL	40 CFR 60, subpart D, NSPS for Fossil-fuel Fired Steam Generators391-3-1-.02(8)(b)2]
FEDERAL	40 CFR 60, subpart Db, NSPS for Industrial-Commercial-Institutional Steam Generating Units [391-3-1-.02(8)(b)4]
FEDERAL	40 CFR 60, subpart Dc, NSPS for Small Industrial -Commercial-Institutional Steam Generating Units [391-3-1-.02(8)(b)5]
FEDERAL	40 CFR 63, Subpart A, (excluding 63.13, and 63.15(a)(2)) General Provisions[391-3-1-.02(9)(b)15]
FEDERAL	40 CFR 63, Subpart KK, NESHAPs for Printing and Publishing Operations [391-3-1-.02(9)(b)51]
FEDERAL	40 CFR 63, Subpart MM, NESHAPs for Combustion Sources at Kraft, Soda, and Sulfite Pulp and Paper Mills [391-3-1-.02(9)(b)53]
FEDERAL	40 CFR 63, Subpart S, NESHAPs for Pulp and Paper Industry
FEDERAL	40 CFR 64, Compliance Assurance Monitoring
FEDERAL	40 CFR 68, Chemical Accident Prevention Provisions [391-3-1-.02(10)]
FEDERAL	40 CFR 82, Subpart F - Recycling and Emissions Reduction
FEDERAL	40 CFR, Part 60, subpart A, General Provisions [391-3-1-.02(8)(b)1]

SIP	391-3-1-.02(2)(b) Visible Emissions
SIP	391-3-1-.02(2)(d) Fuel-burning Equipment
SIP	391-3-1-.02(2)(e) Particulate Emission from Manufacturing Processes
SIP	391-3-1-.02(2)(g) Sulfur Dioxide
SIP	391-3-1-.02(2)(gg) Kraft Pulp Mills
SIP	391-3-1-.02(2)(n) Fugitive Dust
SIP	391-3-1-.02(3) Sampling
SIP	391-3-1-.02(6) Source Monitoring

C1 - Regulatory Applicability

The following regulations have been identified as NOT APPLICABLE:

FEDERAL	40 CFR 60, subpart 0, NSPS for Sewage Treatment Plants [391-3-1-.02(8)(b)20]
FEDERAL	40 CFR 60, subpart AA, NSPS for Steel Plants: Electric Arc Furnaces[391-3-1-.02(8)(b)32]
FEDERAL	40 CFR 60, subpart AAA, NSPS for Steel Plants. Electric Arc Furnaces and Argon-Oxygen Decarburization Vessels Constructed After August 17, 1983[391-3-1-.02(8)(b)33]
FEDERAL	40 CFR 60, subpart BBB, NSPS for Rubber Tire Manufacturing Industry[391-3-1-.02(8)(b)53]
FEDERAL	40 CFR 60, subpart CC, NSPS for Glass Manufacturing Plants[391-3-1-.02(8)(b)35]
FEDERAL	40 CFR 60, subpart Da, NSPS for Electric Utility Steam Generating Units [391-3-1-.02(8)(b)3]
FEDERAL	40 CFR 60, subpart DD, NSPS for Grain Elevators [391-3-1-.02(8)(b)36]
FEDERAL	40 CFR 60, subpart DDD, NSPS for Volatile Organic Compound (VOC) Emission from Polymer Manufacturing Industry [391-3-1-.02(8)(b)54]
FEDERAL	40 CFR 60, subpart E, NSPS for Incinerators [391-3-1-.02(8)(b)6]
FEDERAL	40 CFR 60, subpart Ea, NSPS for Municipal Waste Combustors [391-3-1-.02(8)(b)7]
FEDERAL	40 CFR 60, subpart Eb, NSPS for Municipal Waste Combustors[391-3-1-.02(8)(b)71]
FEDERAL	40 CFR 60, subpart EE, NSPS for Surface Coating of Metal Furniture[391-3-1-.02(8)(b)37]
FEDERAL	40 CFR 60, subpart F, NSPS for Portland Cement Plants [391-3-1-.02(8)(b)8]
FEDERAL	40 CFR 60, subpart FFF, NSPS for Flexible Vinyl and Urethane Printing and Coating[391-3-1-.02(8)(b)55]
FEDERAL	40 CFR 60, subpart G, NSPS for Nitric Acid Plants [391-3-1-.02(8)(b)9]

FEDERAL	40 CFR 60, subpart GG, NSPS for Stationary Gas Turbines [391-3-1-.02(8)(b)38]
FEDERAL	40 CFR 60, subpart GGG, NSPS for Equipment Leaks of VOC in Petroleum Refineries [391-3-1-.02(8)(b)56]
FEDERAL	40 CFR 60, subpart H, NSPS for Sulfuric Acid Plants [391-3-1-.02(8)(b)10]
FEDERAL	40 CFR 60, subpart HH, NSPS for Lime Manufacturing Plants [391-3-1-.02(8)(b)39]
FEDERAL	40 CFR 60, subpart HHH, NSPS for Synthetic Fiber Production Facilities[391-3-1-.02(8)(b)57]
FEDERAL	40 CFR 60, subpart I, NSPS for Asphalt Concrete Plants [391-3-1-.02(8)(b)11]
FEDERAL	40 CFR 60, subpart III, NSPS for Volatile Organic Compounds (VOC) Emissions From the Synthetic Organic Chemical Manufacturing Industry (SOCMI) Air Oxidation Unit Processes [391-3-1-.02(8)(b)58]
FEDERAL	40 CFR 60, subpart J, NSPS for Petroleum Refineries [391-3-1-.02(8)(b)12]
FEDERAL	40 CFR 60, subpart JJJ, NSPS for Petroleum Dry Cleaners [391-3-1-.02(8)(b)59]
FEDERAL	40 CFR 60, subpart K, NSPS for Storage Vessels for Petroleum Liquids[391-3-1-.02(8)(b)13]
FEDERAL	40 CFR 60, subpart Ka, NSPS for Storage Vessels for Petroleum Liquids[391-3-1-.02(8)(b)14]
FEDERAL	40 CFR 60, subpart Kb, NSPS for Volatile Organic Liquid Storage Vessels[391-3-1-.02(8)(b)15]
FEDERAL	40 CFR 60, subpart KK, NSPS for Lead-Acid Battery Manufacturing Plants[391-3-1-.02(8)(b)40]
FEDERAL	40 CFR 60, subpart KKK, NSPS for Equipment Leaks of VOC from Onshore Natural Gas Processing Plants [391-3-1-.02(8)(b)60]
FEDERAL	40 CFR 60, subpart L, NSPS for Secondary Lead Smelters [391-3-1-.02(8)(b)16]
FEDERAL	40 CFR 60, subpart LL, NSPS for Metallic Mineral Processing Plants[391-3-1-.02(8)(b)41]
FEDERAL	40 CFR 60, subpart LLL, NSPS for Onshore Natural Gas Processing[391-3-1-.02(8)(b)61]
FEDERAL	40 CFR 60, subpart M, NSPS for Secondary Brass and Bronze Ingot Production Plants [391-3-1-.02(8)(b)17]
FEDERAL	40 CFR 60, subpart MM, NSPS for Automobile and Light-Duty Truck Coating Operations [391-3-1-.02(8)(b)42]
FEDERAL	40 CFR 60, subpart N, NSPS for Iron and Steel Plants [391-3-1-.02(8)(b)18]
FEDERAL	40 CFR 60, subpart Na, NSPS for Secondary Emissions from Basic Oxygen Process Steelmaking Facilities for Which Construction is Commenced After January 20, 1983[391-3-1-.02(8)(b)19]

FEDERAL	40 CFR 60, subpart NN, NSPS for Phosphate Rock Plants[391-3-1-.02(8)(b)43]
FEDERAL	40 CFR 60, subpart NNN, NSPS for Volatile Organic Compounds (VOC) Emissions From the Synthetic Organic Chemical Manufacturing Industry (SOCMI) Distillation Operation [391-3-1-.02(8)(b)62]
FEDERAL	40 CFR 60, subpart OOO, NSPS for Nonmetallic Mineral Processing Plants[391-3-1-.02(8)(b)63]
FEDERAL	40 CFR 60, subpart P, NSPS for Primary Copper Smelters [391-3-1-.02(8)(b)21]
FEDERAL	40 CFR 60, subpart PP, NSPS for Ammonium Sulfate Manufacture[391-3-1-.02(8)(b)44]
FEDERAL	40 CFR 60, subpart PPP, NSPS for Wool Fiberglass Insulation Manufacturing Plants [391-3-1-.02(8)(b)64]
FEDERAL	40 CFR 60, subpart Q, NSPS for Primary Zinc Smelters [391-3-1-.02(8)(b)22]
FEDERAL	40 CFR 60, subpart QQ, NSPS for Graphic Arts Industry: Publication Rotogravure Printing [391-3-1-.02(8)(b)45]
FEDERAL	40 CFR 60, subpart QQQ, NSPS for VOC Emissions from Petroleum Refinery Wastewater Systems [391-3-1-.02(8)(b)65]
FEDERAL	40 CFR 60, subpart R, NSPS for Primary Lead Smelters [391-3-1-.02(8)(b)23]
FEDERAL	40 CFR 60, subpart RR, NSPS for Pressure Sensitive Tape and Label Surface Coating Operations [391-3-1-.02(8)(b)46]
FEDERAL	40 CFR 60, subpart RRR, NSPS for VOC Emissions from Synthethic Organic Chemical Manufacturing Industry (SOCMI) Reactor Process [391-3-1-.02(b)66]
FEDERAL	40 CFR 60, subpart S, NSPS for Primary Aluminum Reduction [391-3-1-.02(8)(b)24]
FEDERAL	40 CFR 60, subpart SS, NSPS for Industrial Surface Coating: Large Appliances[391-3-1-.02(8)(b)47]
FEDERAL	40 CFR 60, subpart SSS, NSPS for Magnetic Tape Coating [391-3-1-.02(8)(b)67]
FEDERAL	40 CFR 60, subpart T, NSPS for the Phosphate Fertilizer Industry: Wet-Process Phosphoric Acid Plants [391-3-1-.02(8)(b)25]
FEDERAL	40 CFR 60, subpart TT, NSPS for Metal Coil Surface Coating [391-3-1-.02(8)(b)48]
FEDERAL	40 CFR 60, subpart TTT, NSPS for Plastic Parts for Business Machine Coatings [391-3-1-.02(8)(b)68]
FEDERAL	40 CFR 60, subpart U, NSPS for the Phosphate Fertilizer Industry: Superphosphoric Acid Plants [391-3-1-.02(8)(b)26]
FEDERAL	40 CFR 60, subpart UU, NSPS for Asphalt Processing and Asphalt Roofing Manufacture [391-3-1-.02(8)(b)49]
FEDERAL	40 CFR 60, subpart UUU, NSPS for Calciners and Dryers in Mineral Industries [391-3-1-.02(8)(b)69]
FEDERAL	40 CFR 60, subpart V, NSPS for the Phosphate Fertilizer Industry: Diammonium

	Phosphate Plants [391-3-1-.02(8)(b)27]
FEDERAL	40 CFR 60, subpart VV, NSPS for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry [391-3-1-.02(8)(b)50]
FEDERAL	40 CFR 60, subpart VVV, NSPS for Polymeric Coating of Supporting Substrates Facilities [391-3-1-.02(8)(b)70]
FEDERAL	40 CFR 60, subpart W, NSPS for the Phosphate Fertilizer Industry: Triple Superphosphate Plants [391-3-1-.02(8)(b)28]
FEDERAL	40 CFR 60, subpart WW, NSPS for Beverage Can Surface Coating Industry[391-3-1-.02(8)(b)51]
FEDERAL	40 CFR 60, subpart WWW, NSPS for Municipal Solid Waste Landfills[391-3-1-.02(8)(b)72]
FEDERAL	40 CFR 60, subpart X, NSPS for the Phosphate Fertilizer Industry: Granular Triple Superphosphate Storage Facilities [391-3-1-.02(8)(b)29]
FEDERAL	40 CFR 60, subpart XX, NSPS for Bulk Gasoline Terminals [391-3-1-.02(8)(b)52]
FEDERAL	40 CFR 60, subpart Y, NSPS for Coal Preparation Plants [391-3-1-.02(8)(b)30]
FEDERAL	40 CFR 60, subpart Z, NSPS for Ferroalloy Production Facilities[391-3-1-.02(8)(b)31]
FEDERAL	40 CFR 61, Subpart A – General Provisions
FEDERAL	40 CFR 61, subpart BB, NESHAP for Benzene Emissions from Benzene Transfer Operations [391-3-1-.02(9)(b)13]
FEDERAL	40 CFR 61, subpart C, NESHAP for Beryllium [391-3-1-.02(9)(b)1]
FEDERAL	40 CFR 61, subpart D, NESHAP for Beryllium Rocket Motor Firing[391-3-1-.02(9)(b)2]
FEDERAL	40 CFR 61, subpart E, NESHAP for Mercury [391-3-1-.02(9)(b)3]
FEDERAL	40 CFR 61, subpart F, NESHAP for Vinyl Chloride [391-3-1-.02(9)(b)4]
FEDERAL	40 CFR 61, subpart FF, NESHAP for Benzene Waste Operations[391-3-1-.02(9)(b)14]
FEDERAL	40 CFR 61, subpart J, NESHAP for Equipment Leaks (Fugitive Emission Sources) of Benzene [391-3-1-.02(9)(b)5]
FEDERAL	40 CFR 61, subpart L, NESHAP for Benzene Emissions from Coke Byproduct Recovery Plants [391-3-1-.02(9)(b)6]
FEDERAL	40 CFR 61, subpart M, NESHAP for Asbestos (inc. work practices)[391-3-1-.02(9)(b)7]
FEDERAL	40 CFR 61, subpart N, NESHAP for Inorganic Arsenic Emissions from Glass Manufacturing Plants [391-3-1-.02(9)(b)8]
FEDERAL	40 CFR 61, subpart O, NESHAP for Inorganic Arsenic Emissions from Primary Copper Smelters [391-3-1-.02(9)(b)9]
FEDERAL	40 CFR 61, subpart P, NESHAP for Inorganic Arsenic Emissions from Arsenic Trioxide and Metallic Arsenic Production Facilities [391-3-1-.02(9)(b)10]

FEDERAL	40 CFR 61, subpart V, NESHAP for Equipment Leaks (Fugitive Emission Sources) [of VHAP] [391-3-1-.02(9)(b)11]
FEDERAL	40 CFR 61, subpart Y, NESHAP for Benzene Emissions from Benzene Storage Vessels [391-3-1-.02(9)(b)12]
FEDERAL	40 CFR 63, Subpart AA, NESHAPs for Phosphoric Acid Manufacturing Plants
FEDERAL	40 CFR 63, Subpart B, Sections 63.40 through 63.44, Requirements for Control Technology Determinations for Major Sources in Accordance with the Clean Air Act sections 112(g) [391-3-1-.02(9)(b)16]
FEDERAL	40 CFR 63, Subpart B, Sections 63.50 through 63.56, Requirements for Control Technology Determinations for Major Sources in Accordance with the Clean Air Act sections 112(j) [391-3-1-.02(9)(b)17]
FEDERAL	40 CFR 63, Subpart BB, NESHAPs for Phosphate Fertilizer Production Plants
FEDERAL	40 CFR 63, Subpart CC, NESHAPS for Emission Standards for Hazardous Air Pollutants from Petroleum Refineries,?63.642(k)procedures for ?63.642(g)[391-3-1-.02(9)(b)43]
FEDERAL	40 CFR 63, Subpart CCC, NESHAPs for Steel Pickling – HCl Process Facilities and HCl Regeneration Plants [391-3-1-.02(9)(b)65]
FEDERAL	40 CFR 63, Subpart CCCC, NESHAPs for Nutritional Yeast Manufacturing [391-3-1-.02(9)(b)91]
FEDERAL	40 CFR 63, Subpart D, Compliance Extensions for Early Reductions[391-3-1-.02(9)(b)19]
FEDERAL	40 CFR 63, Subpart DDD, NESHAPs for Mineral Wool Production [391-3-1-.02(9)(b)66]
FEDERAL	40 CFR 63, Subpart EE, NESHAPs for Magnetic Tape Manufacturing Operations[391-3-1-.02(9)(b)45]
FEDERAL	40 CFR 63, Subpart EEE, NESHAPs for Hazardous Waste Combustors [391-3-1-.02(9)(b)67]
FEDERAL	40 CFR 63, Subpart F, NESHAPs for Organic Hazardous Air Pollutants from the Synthetic Organic Chemical Manufacturing Industry [391-3-1-.02(9)(b)20]
FEDERAL	40 CFR 63, Subpart G, NESHAPs for Organic Hazardous Air Pollutants from Synthetic Organic Chemical Manufacturing Industry for Process Vents, Storage Vessels, Transfer Operations, and Wastewater. [391-3-1-.02(9)(b)21]
FEDERAL	40 CFR 63, Subpart GG, NESHAPS for Emission Standards for Aerospace Manufacturing and Rework Facilities[391-3-1-.02(9)(b)47]
FEDERAL	40 CFR 63, Subpart GGG, NESHAPs for Pharmaceuticals Production [391-3-1-.02(9)(b)69]
FEDERAL	40 CFR 63, Subpart GGGG, NESHAPs for Vegetable Oil Production [391-3-1-.02(9)(b)95]
FEDERAL	40 CFR 63, Subpart H, NESHAPs for Organic Hazardous Air Pollutants for Equipment Leaks [391-3-1-.02(9)(b)22]

FEDERAL	40 CFR 63, Subpart HH, NESHAPs for Oil and Natural Gas Production Facilities
FEDERAL	40 CFR 63, Subpart HHH, NESHAPs for Natural Gas Transmission and Storage Facilities [391-3-1-.02(9)(b)70]
FEDERAL	40 CFR 63, Subpart HHHH, NESHAPs for Wet Formed Fiberglass Mat Production
FEDERAL	40 CFR 63, Subpart I, NESHAPs for Organic Hazardous Air Pollutants for Certain Processes Subject to the Negotiated Regulation for Equipment Leaks[391-3-1-.02(9)(b)23]
FEDERAL	40 CFR 63, Subpart II, NESHAPS for Emission Standards for Shipbuilding and Repair(Surface Coating[391-3-1-.02(9)(b)49]
FEDERAL	40 CFR 63, Subpart III, NESHAPs for Flexible Polyurethane Foam Production [391-3-1-.02(9)(b)71]
FEDERAL	40 CFR 63, Subpart J, NESHAPs for Polyvinyl Chloride and Copolymers Production
FEDERAL	40 CFR 63, Subpart JJ, NESHAPS for Emission Standards for Wood Furniture Manufacturing Operations[391-3-1-.02(9)(b)50]
FEDERAL	40 CFR 63, Subpart JJJ, NESHAPs for Group IV Polymers and Resins [391-3-1-.02(9)(b)72]
FEDERAL	40 CFR 63, Subpart L, NESHAPs for Coke Oven Batteries [391-3-1-.02(9)(b)26]
FEDERAL	40 CFR 63, Subpart LL, NESHAPs for Primary Aluminum Reduction Plants [391-3-1-.02(9)(b)52]
FEDERAL	40 CFR 63, Subpart LLL, NESHAPs for Portland Cement Manufacturing Industry [391-3-1-.02(9)(b)74]
FEDERAL	40 CFR 63, Subpart M, Perchloroethylene Air NESHAPs for Dry Cleaning Facilities[391-3-1-.02(9)(b)27]
FEDERAL	40 CFR 63, Subpart MMM, NESHAPs for Pesticide Active Ingredient Production [391-3-1-.02(9)(b)75]
FEDERAL	40 CFR 63, Subpart N, NESHAPs for Chromium Emissions from Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks [391-3-1-.02(9)(b)28]
FEDERAL	40 CFR 63, Subpart NNN, NESHAPs for Wool Fiberglass Manufacturing [391-3-1-.02(9)(b)76]
FEDERAL	40 CFR 63, Subpart NNNN, NESHAPs for Large Appliance Surface Coating
FEDERAL	40 CFR 63, Subpart O, Ethylene Oxide NESHAPs for Sterilization Facilities[391-3-1-.02(9)(b)29]
FEDERAL	40 CFR 63, Subpart OO, NESHAPs for Tanks, Level 1 [391-3-1-.02(9)(b)55]
FEDERAL	40 CFR 63, Subpart OOO, NESHAPs for Amino/Phenolic Resins Production [391-3-1-.02(9)(b)77]
FEDERAL	40 CFR 63, Subpart PP, NESHAPs for Containers [391-3-1-.02(9)(b)56]

FEDERAL	40 CFR 63, Subpart PPP, NESHAPs for Polyether Polyols Production [391-3-1-.02(9)(b)78]
FEDERAL	40 CFR 63, Subpart Q, NESHAPs for Hazardous Air Pollutants for Industrial Process Cooling Towers [391-3-1-.02(9)(b)31]
FEDERAL	40 CFR 63, Subpart QQ, NESHAPs for Surface Impoundments [391-3-1-.02(9)(b)57]
FEDERAL	40 CFR 63, Subpart QQQ, NESHAPs for Primary Copper Production
FEDERAL	40 CFR 63, Subpart QQQQQ, NESHAPs for Friction Products Manufacturing
FEDERAL	40 CFR 63, Subpart R, NESHAPs for Gasoline Distribution Facilities (Bulk Gasoline Terminals and Pipeline Breakout Stations) [391-3-1-.02(9)(b)32]
FEDERAL	40 CFR 63, Subpart RR, NESHAPs for Individual Drain Systems [391-3-1-.02(9)(b)58]
FEDERAL	40 CFR 63, Subpart RRR, NESHAPs for Secondary Aluminum Production [391-3-1-.02(9)(b)80]
FEDERAL	40 CFR 63, Subpart SS, NESHAPs for Closed Vent Systems, Control Devices, Recovery Devices and Routing to a Fuel Gas System or a Process [391-3-1-.02(9)(b)59]
FEDERAL	40 CFR 63, Subpart SSSS, NESHAPs for Metal Coil Surface Coating
FEDERAL	40 CFR 63, Subpart T, NESHAPs for Halogenated Solvent Cleaning[391-3-1-.02(9)(b)34]
FEDERAL	40 CFR 63, Subpart TT, NESHAPs for Equipment Leaks, Control Level 1 [391-3-1-.02(9)(b)60]
FEDERAL	40 CFR 63, Subpart TTT, NESHAPs for Primary Lead Smelting [391-3-1-.02(9)(b)82]
FEDERAL	40 CFR 63, Subpart TTTT, NESHAPs for Leather Finishings Operations
FEDERAL	40 CFR 63, Subpart U, NESHAPs for Group I Polymers and Resins
FEDERAL	40 CFR 63, Subpart UU, NESHAPs for Equipment Leaks, Control Level 2 [391-3-1-.02(9)(b)61]
FEDERAL	40 CFR 63, Subpart UUU, NESHAPs for Petroleum Refineries
FEDERAL	40 CFR 63, Subpart UUUU, NESHAPs for Cellulose Production Manufacturing
FEDERAL	40 CFR 63, Subpart VV, NESHAPs for Oil-Water Separators and Organic-Water Separators [391-3-1-.02(9)(b)62]
FEDERAL	40 CFR 63, Subpart VVV, NESHAPs for Publicly Owned Treatment Works [391-3-1-.02(9)(b)84]
FEDERAL	40 CFR 63, Subpart VVVV, NESHAPs for Boat Manufacturing [391-3-1-.02(9)(b)110]
FEDERAL	40 CFR 63, Subpart W, NESHAPs for Hazardous Air Pollutants for Epoxy Resins Production and Non-Nylon Polyamides Production [391-3-1-.02(9)(b)37]
FEDERAL	40 CFR 63, Subpart WW, NESHAPs for Storage Vessels (Tanks) Control Level 2 [391-3-1-.02(9)(b)63]

FEDERAL	40 CFR 63, Subpart X, NESHAPs for Hazardous Air Pollutants From Secondary Lead Smelting [391-3-1-.02(9)(b)38]
FEDERAL	40 CFR 63, Subpart XXX, NESHAPs for Ferroalloys Production: Ferromanganese and Silicomanganese [391-3-1-.02(9)(b)86]
FEDERAL	40 CFR 63, Subpart XXXX, NESHAPs for Tire Manufacturing
FEDERAL	40 CFR 63, Subpart Y, NESHAPS for Emission Standards for Marine Tank Vessel Loading Operations[391-3-1-.02(9)(b)39]
FEDERAL	40 CFR 63, Subpart YY, NESHAPs for Generic MACT Standards [391-3-1-.02(9)(b)64]
FEDERAL	40 CFR 72 - PERMITS REGULATIONS [391-3-1-.13]
FEDERAL	40 CFR 73 - ALLOWANCE SYSTEM
FEDERAL	40 CFR 75 - CONTINUOUS EMISSION MONITORING
FEDERAL	40 CFR 76 - ACID RAIN NITROGEN OXIDES EMISSION REDUCTION PROGRAM
FEDERAL	40 CFR 77 - EXCESS EMISSIONS
FEDERAL	40 CFR 82 Subpart F – Refrigerant Recycling Rule
FEDERAL	40 CFR 82 Subpart G – Significant New Alternative Program
FEDERAL	40 CFR 82, Subpart A - Production and Consumption Controls
FEDERAL	40 CFR 82, Subpart B - Servicing of Motor Vehicle Air Conditioners
FEDERAL	40 CFR 82, Subpart C - Ban on Nonessential Products Containing Class I Substances and Ban on Nonessential Products Containing or Manufactured with Class II Substances
FEDERAL	40 CFR 82, Subpart D - Federal Procurement
FEDERAL	40 CFR 82, Subpart E - The Labeling of Products Using Ozone Depleting Substances
FEDERAL	40 CFR 82, Subpart G - Significant New Alternatives Policy Program
FEDERAL	40 CFR, Part 60, subpart AAAA, NSPS for Small Municipal Waste Combustion Units for Which Construction is Commenced After August 30, 1999 [391-3-1-.02(8)(b)74]
FEDERAL	40 CFR, Part 60, subpart CCCC, NSPS for Commercial and Industrial Solid Waste Incineration Units for Which Construction is Commenced After November 30, 1999 [391-3-1-.02(8)(b)75]
FEDERAL	40 CFR, Part 60, subpart Ec, NSPS for Hospital/Medical/Infectious Waste Incinerators for which construction is commenced after June 20, 1996 [391-3-1-.02(8)(b)73]
NONSIP	391-3-1-.02(2)(f) Normal Superphosphate Facilities
NONSIP	391-3-1-.02(2)(tt) VOC Emissions From Major Sources
NONSIP	391-3-1-.02(2)(uu) Visibility Protection
NONSIP	391-3-1-.02(2)(yy) Nitrogen Oxide Emissions From Major Sources

PBR	391-3-1-.03(11)(b)1. Fuel-burning Equipment Burning Natural Gas/LPG and/or Distillate Oil
PBR	391-3-1-.03(11)(b)10. Fiberglas Molding and Forming Operations
PBR	391-3-1-.03(11)(b)11. Nut Shelling (Proposed)
PBR	391-3-1-.03(11)(b)2. Fuel-burning Equipment Burning Natural Gas/LPG and/or Residual Oil
PBR	391-3-1-.03(11)(b)3. On-Site Power Generation
PBR	391-3-1-.03(11)(b)4. Concrete and Concrete Products
PBR	391-3-1-.03(11)(b)5. Hot Mix Asphalt Plants
PBR	391-3-1-.03(11)(b)6. Cotton Ginning Operations
PBR	391-3-1-.03(11)(b)7. Coating and/or Gluing Operations (Proposed)
PBR	391-3-1-.03(11)(b)9. Non-reactive Mixing Operations
PBR	391-3-1-.03(110(b)8. Printing Operations
SIP	391-3-1-.02(2)(aa) VOC Emissions from Wire Coating
SIP	391-3-1-.02(2)(aaa) Consumer and Commercial Products
SIP	391-3-1-.02(2)(bb) Petroleum Liquid Storage
SIP	391-3-1-.02(2)(bbb) Gasoline Marketing
SIP	391-3-1-.02(2)(c) Incinerators
SIP	391-3-1-.02(2)(cc) Bulk Gasoline Terminals
SIP	391-3-1-.02(2)(ccc) VOC Emissions from Bulk Mixing Tanks
SIP	391-3-1-.02(2)(dd) Cutback Asphalt
SIP	391-3-1-.02(2)(ddd) VOC Emissions from Offset Lithography
SIP	391-3-1-.02(2)(ee) Petroleum Refinery
SIP	391-3-1-.02(2)(eee)VOC Emissions from Expanded Polystyrene Products Manufacturing
SIP	391-3-1-.02(2)(ff) Solvent Metal Cleaning
SIP	391-3-1-.02(2)(fff) Particulate Emissions from Yarn Spinning Operations
SIP	391-3-1-.02(2)(ggg) Existing Municipal Solid Waste Landfills
SIP	391-3-1-.02(2)(h) Portland Cement Plants
SIP	391-3-1-.02(2)(hh) Petroleum Refinery Equipment Leaks
SIP	391-3-1-.02(2)(hhh) Wood Furniture Finishing and Cleaning Operations

SIP	391-3-1-.02(2)(i) Nitric Acid Plants
SIP	391-3-1-.02(2)(ii) VOC Emissions from Surface Coating of Miscellaneous Metal Parts and Products
SIP	391-3-1-.02(2)(iii) Hospital/Medical/Infectious Waste Incinerators Constructed on or Before June 20, 1996
SIP	391-3-1-.02(2)(j) Sulfuric Acid Plants
SIP	391-3-1-.02(2)(jj) VOC Emissions from Surface Coating of Flat Wood Paneling
SIP	391-3-1-.02(2)(jjj) NOx Emissions from Electric Utility Steam Generating Units
SIP	391-3-1-.02(2)(k) Asphaltic Concrete Hot Mix Plants
SIP	391-3-1-.02(2)(kk) VOC Emissions from Synthesized Pharmaceutical Manufacturing
SIP	391-3-1-.02(2)(kkk) VOC Emissions from Aerospace Manufacturing and Rework Facilities
SIP	391-3-1-.02(2)(l) Conical Burners
SIP	391-3-1-.02(2)(ll) VOC Emissions from the Manufacture of Pneumatic Rubber Tires
SIP	391-3-1-.02(2)(lll) NOx Emissions from Fuel-burning Equipment
SIP	391-3-1-.02(2)(mm) VOC Emissions from Graphic Arts Systems
SIP	391-3-1-.02(2)(mmm) NOx Emissions from Stationary Gas Turbines and Stationary Engines used to Generate Electricity
SIP	391-3-1-.02(2)(nn) VOC Emissions from External Floating Roof Tanks
SIP	391-3-1-.02(2)(nnn) NOx Emissions from Large Stationary Gas Turbines
SIP	391-3-1-.02(2)(o) Cupola Furnaces
SIP	391-3-1-.02(2)(oo) Fiberglass Insulation Manufacturing Plants
SIP	391-3-1-.02(2)(ooo) Heavy-Duty Diesel Engine Requirements
SIP	391-3-1-.02(2)(p) Kaolin and Fuller's Earth Processes
SIP	391-3-1-.02(2)(pp) Bulk Gasoline Plants
SIP	391-3-1-.02(2)(ppp) Commercial/Industrial/Solid Waste Incinerators Constructed On or Before November 30, 1999
SIP	391-3-1-.02(2)(q) Cotton Gins
SIP	391-3-1-.02(2)(qq) VOC Emissions from Large Petroleum Dry Cleaners
SIP	391-3-1-.02(2)(r) Granular and Mixed Fertilizer
SIP	391-3-1-.02(2)(rr) Gasoline Dispensing Facility - Stage I

SIP	391-3-1-.02(2)(ss) Gasoline Transport Vehicles and Vapor Collection Systems
SIP	391-3-1-.02(2)(t) VOC Emissions from Automobile and Light-Duty Truck Manufacturing
SIP	391-3-1-.02(2)(u) VOC Emissions from Can Coating
SIP	391-3-1-.02(2)(v) VOC Emissions from Coil Coating
SIP	391-3-1-.02(2)(vv) Volatile Organic Liquid Handling and Storage
SIP	391-3-1-.02(2)(w) VOC Emissions from Paper Coating
SIP	391-3-1-.02(2)(x) VOC Emissions from Fabric and Vinyl Coating
SIP	391-3-1-.02(2)(y) VOC Emissions from Metal Furniture Coating
SIP	391-3-1-.02(2)(z) VOC Emissions from Large Appliance Surface Coating
SIP	391-3-1-.02(2)(zz) Gasoline Dispensing Facilities--Stage II
SIP	391-3-1-.02(5) Open Burning

C2 - Title VI Applicability

Does your facility have any air conditioners or refrigeration equipment that uses CFC's, HFC's or other stratospheric ozone-depleting substances listed in 40 CFR Part 82, Subpart A, Appendices A and B?

Yes

Does any air conditioner or any piece of refrigeration equipment contain a refrigerant charge of greater than 50 lbs?

Yes

Does your facility maintain, service, repair, or dispose of any motor vehicle air conditioners (MVAC's) or appliances?

Yes

Comments:

D7 - Significant Emission Units
Boilers, Furnaces, Other Indirect Contact Heat Generating Equipment

Facility: International Paper | Application: 2014 IP- Savannah BMACT

Emission Unit: PB13 No. 13 Power Boiler

Emission Unit

Unit ID:	PB13
Unit Name:	No. 13 Power Boiler

Model Information

Manufacturer:	Combustion Engineering
Model Number:	VU40X
Date Manufactured or Reconstructed:	1981
Installation Date:	1982
Heat Input Capacity:	1280 MMBtu

Description

This unit burns fuel to generate process steam.

Fuels and Firing Conditions:

Fuel: Bark (woodwaste)

Maximum Hourly Consumption:	40 tons
Maximum Annual Consumption:	350400 tons
Maximum Fuel Heating Value:	4757 Btu/lb
Maximum Heat Input:	381 MMBtu/hr
Maximum Allowable Sulfur Percentage:	0 %

Fuel: Coal

Maximum Hourly Consumption:	36 tons
Maximum Annual Consumption:	26276 tons
Maximum Fuel Heating Value:	0.0128 MMBtu/lb
Maximum Heat Input:	922 MMBtu/hr
Maximum Allowable Sulfur Percentage:	3 %

Boilers, Furnaces, Other Indirect Contact Heat Generating Equipment

Facility: International Paper | Application: 2014 IP- Savannah BMACT

Emission Unit: PB13 No. 13 Power Boiler

Fuel: Natural Gas

Maximum Hourly Consumption:	1.25 MM cubic feet
Maximum Annual Consumption:	10993 MM cubic feet
Maximum Fuel Heating Value:	1020 Btu/cf
Maximum Heat Input:	1280 MMBtu/hr
Maximum Allowable Sulfur Percentage:	0 %

Comments

D10 - Control Devices

Electrostatic Precipitator

Facility: International Paper Application: 2014 IP- Savannah BMACT

Emission Unit: AP07 No. 13 Power Boiler Electrostatic Precipitator

Emission Unit

Unit ID:	AP07
Unit Name:	No. 13 Power Boiler Electrostatic Precipitator

Model Information

Manufacturer:	Research Cottrell
Model Number:	I.P. 3335-318310
Date Manufactured or Reconstructed:	
Installation Date:	1981

General Information

Control Reason: To comply with permit requirements

Parameters Currently Monitored: Secondary current, Secondary voltage

Primary Voltage:	1 volts
Primary Amperage:	1 amps
Secondary Voltage:	1 kiloVolts
Secondary Amperage:	1 milliamps
Spark Rate:	1 sparks per minute
Number Fields:	10 Fields
Inlet Gas Velocity:	40 ft./sec.
Water Flowrate:	0
Type Of ESP:	DRY

This Control Device controls the following Pollutants:

Pollutant	Overall Control Efficiency
Particulate Matter	92 %

This Control Device controls Emissions from the following Equipment:

Electrostatic Precipitator

Facility: International Paper Application: 2014 IP- Savannah BMACT

Emission Unit: AP07 No. 13 Power Boiler Electrostatic Precipitator

Emission Unit	PB13, No. 13 Power Boiler
Equipment Type	Boilers, Furnaces & Other Indirect Contact Heat Generating Equipment

Description

Dry Plate Electrostatic Precipitator

Comments

Control Device is operated to comply with State or Federal Rules, Product Recovery, and Permit Requirements. Facility does not have design information for primary voltage, secondary voltage, primary amps, secondary amps or spark rate. Facility must monitor secondary current and secondary voltage to calculate secondary power under condition 5.2.3.b to comply with condition 6.1.7.c.xii of 75% of value determined in accordance with 4.2.2.

Inlet loading to control device is not available. Value shown is exit velocity.

D10 - Control Devices

Miscellaneous Device

Facility: International Paper Application: 2014 IP- Savannah BMACT

Emission Unit: PB13 No. 13 Power Boiler

Emission Unit

Unit ID:	PB13
Unit Name:	No. 13 Power Boiler

Model Information

Manufacturer:	Combustion Engineering
Model Number:	VU40X
Date Manufactured or Reconstructed:	1981
Installation Date:	1982

General Information

Control Reason:	To comply with state or federal rule
Parameters Currently Monitored:	amount of time gases are fed to PB; comb temp
Device Specifications:	LVHC & HVLC gases are introduced with the fuel into the flame zone. The amount of time the HVLC & LVHC gases are fed to PB13 is tracked; furnace combustion temperature is also monitored.

This Control Device controls the following Pollutants:

Pollutant	Overall Control Efficiency
Total Hazardous Air Pollutants	98 %

This Control Device controls Emissions from the following Equipment:

Emission Unit	PB13, No. 13 Power Boiler
Equipment Type	Boilers, Furnaces & Other Indirect Contact Heat Generating Equipment

Description

Reduces the total HAP emissions by introducing the HAPs into the flame zone of the boiler.

Comments

D11 - Emission Unit - Control Device Association

Facility: International Paper Application: 2014 IP- Savannah BMACT

Emission Unit:	PB13, No. 13 Power Boiler
Emission Type:	Boilers, Furnaces & Other Indirect Contact Heat Generating Equipment
Control Device:	AP07, No. 13 Power Boiler Electrostatic Precipitator
Control Type:	Electrostatic Precipitator

Emission Unit:	PB13, No. 13 Power Boiler
Emission Type:	Boilers, Furnaces & Other Indirect Contact Heat Generating Equipment
Control Device:	PB13, No. 13 Power Boiler
Control Type:	Miscellaneous Device

D12 - Stack and Process Vent Summary

Facility: International Paper | Application: 2014 IP- Savannah BMACT

Stack ID	**VE03**
Stack Name	No. 13 Power Boiler ESP Stack
Stack Height	350 feet
All Emission Units Exhausting throught this Stack	PB13
All Pollution Control Devices Exhuasting through this Stack	AP07

Summary of Emissions - Units, Groups

Facility: International Paper | Application: 2014 IP- Savannah BMACT

Emission Unit: PB13 No. 13 Power Boiler

Pollutant Carbon Monoxide

Numerical Emission Limit or Standard:	400ppm @ 3% O2, dry basis
Maximum Actual Emissions in Units of the Standard:	400ppm @ 3% O2, dry basis
Maximum Actual Emissions in Tons per Year:	1742 tons/yr
Method the Emissions were determined (CEM, Stack Testing, Mass Balance, etc.):	
Applicable Federal Standard:	BACT Limit
Applicable State Standard:	
Applicable Permit Condition(s):	
Is this a Proposed Voluntary Limit?	No
Is there a Work Practice or Design Standard?	No
Is this in Compliance with the Standard(s) ?	No

Emission Unit: PB13 No. 13 Power Boiler

Pollutant Hydrogen fluoride (Hydrofluoric acid)

Numerical Emission Limit or Standard:	0
Maximum Actual Emissions in Units of the Standard:	0
Maximum Actual Emissions in Tons per Year:	0.99 tons/yr
Method the Emissions were determined (CEM, Stack Testing, Mass Balance, etc.):	2013 NCASI, except Natural gas - AP-42
Applicable Federal Standard:	
Applicable State Standard:	
Applicable Permit Condition(s):	
Is this a Proposed Voluntary Limit?	No
Is there a Work Practice or Design Standard?	No
Is this in Compliance with the Standard(s) ?	No

Emission Unit: PB13 No. 13 Power Boiler

Pollutant Lead Compounds

Numerical Emission Limit or Standard:	0
Maximum Actual Emissions in Units of the Standard:	0
Maximum Actual Emissions in Tons per Year:	0.01 tons/yr
Method the Emissions were determined (CEM, Stack Testing, Mass Balance, etc.):	2013 NCASI, except Natural gas - AP-42
Applicable Federal Standard:	
Applicable State Standard:	
Applicable Permit Condition(s):	
Is this a Proposed Voluntary Limit?	No
Is there a Work Practice or Design Standard?	No
Is this in Compliance with the Standard(s) ?	No

Emission Unit: PB13 No. 13 Power Boiler

Pollutant Nitrogen Oxides

Numerical Emission Limit or Standard:	0.7lb/MMBtu
Maximum Actual Emissions in Units of the Standard:	0.313lb/MMBtu
Maximum Actual Emissions in Tons per Year:	1256.5 tons/yr
Method the Emissions were determined (CEM, Stack Testing, Mass Balance, etc.):	Calculated weight based on testing for coal and bark and NSPS Subpart D limit for natural gas
Applicable Federal Standard:	40 CFR 60.44(b)
Applicable State Standard:	391-3-1-.02(2)(d)4(iv)]
Applicable Permit Condition(s):	3.3.7©
Is this a Proposed Voluntary Limit?	No
Is there a Work Practice or Design Standard?	No
Is this in Compliance with the Standard(s) ?	Yes

Emission Unit: PB13 No. 13 Power Boiler

Pollutant Opacity

Numerical Emission Limit or Standard:	20% Opacity
Maximum Actual Emissions in Units of the Standard:	20% Opacity
Maximum Actual Emissions in Tons per Year:	tons/yr
Method the Emissions were determined (CEM, Stack Testing, Mass Balance, etc.):	
Applicable Federal Standard:	40 CFR 60.42(a)(2)
Applicable State Standard:	391-3-1-.02(2)(d)3
Applicable Permit Condition(s):	3.3.8
Is this a Proposed Voluntary Limit?	No
Is there a Work Practice or Design Standard?	No
Is this in Compliance with the Standard(s) ?	Yes

Emission Unit: PB13 No. 13 Power Boiler

Pollutant Other

Numerical Emission Limit or Standard:	0
Maximum Actual Emissions in Units of the Standard:	0
Maximum Actual Emissions in Tons per Year:	644701.5 tons/y
Method the Emissions were determined (CEM, Stack Testing, Mass Balance, etc.):	CO2e, 40 CRF Part 98 Subpart C, Tables C-1 and C-2
Applicable Federal Standard:	
Applicable State Standard:	
Applicable Permit Condition(s):	
Is this a Proposed Voluntary Limit?	No
Is there a Work Practice or Design Standard?	No
Is this in Compliance with the Standard(s) ?	No

Emission Unit: PB13 No. 13 Power Boiler

Pollutant Other

Numerical Emission Limit or Standard:	0
Maximum Actual Emissions in Units of the Standard:	0
Maximum Actual Emissions in Tons per Year:	106.9 tons/yr
Method the Emissions were determined (CEM, Stack Testing, Mass Balance, etc.):	PM 2.5 Test Data, 2013 NCASI, AP-42
Applicable Federal Standard:	
Applicable State Standard:	
Applicable Permit Condition(s):	
Is this a Proposed Voluntary Limit?	No
Is there a Work Practice or Design Standard?	No
Is this in Compliance with the Standard(s) ?	No

Emission Unit: PB13 No. 13 Power Boiler

Pollutant Particulate Matter

Numerical Emission Limit or Standard:	0.075lb/MMBtu
Maximum Actual Emissions in Units of the Standard:	0.0083lb/MMBtu
Maximum Actual Emissions in Tons per Year:	33.3 tons/yr
Method the Emissions were determined (CEM, Stack Testing, Mass Balance, etc.):	Test data for coal and bark, AP-42 for fuel oils and natural gas, max actual is filterable only
Applicable Federal Standard:	[40 CFR 52.21, 40 CFR 60.42(a)(1) (subsumed)
Applicable State Standard:	391-3-1-.02(2)(d)2(iii)
Applicable Permit Condition(s):	3.3.7a
Is this a Proposed Voluntary Limit?	No
Is there a Work Practice or Design Standard?	No
Is this in Compliance with the Standard(s) ?	Yes

Emission Unit: PB13 No. 13 Power Boiler

Pollutant Particulate Matter <10 microns

Numerical Emission Limit or Standard:	0
Maximum Actual Emissions in Units of the Standard:	0
Maximum Actual Emissions in Tons per Year:	116.8 tons/yr
Method the Emissions were determined (CEM, Stack Testing, Mass Balance, etc.):	
Applicable Federal Standard:	
Applicable State Standard:	
Applicable Permit Condition(s):	
Is this a Proposed Voluntary Limit?	No
Is there a Work Practice or Design Standard?	No
Is this in Compliance with the Standard(s) ?	No

Emission Unit: PB13 No. 13 Power Boiler

Pollutant Sulfur Dioxide

Numerical Emission Limit or Standard:	2822pounds/hour
Maximum Actual Emissions in Units of the Standard:	93.18pounds/hour
Maximum Actual Emissions in Tons per Year:	408.1 tons/yr
Method the Emissions were determined (CEM, Stack Testing, Mass Balance, etc.):	Coal - 2012-2013 coal data, Bark - Permit Cond. 6.2.6, Fuel Oil and natural gas- AP-42,
Applicable Federal Standard:	40 CFR 52.21
Applicable State Standard:	
Applicable Permit Condition(s):	3.3.7(b)(iv)
Is this a Proposed Voluntary Limit?	No
Is there a Work Practice or Design Standard?	No
Is this in Compliance with the Standard(s) ?	Yes

Emission Unit: PB13 No. 13 Power Boiler

Pollutant Sulfuric acid mist

Numerical Emission Limit or Standard:	0
Maximum Actual Emissions in Units of the Standard:	0
Maximum Actual Emissions in Tons per Year:	4.04 tons/yr
Method the Emissions were determined (CEM, Stack Testing, Mass Balance, etc.):	2013 NCASI, except Natural gas - AP-42
Applicable Federal Standard:	
Applicable State Standard:	
Applicable Permit Condition(s):	
Is this a Proposed Voluntary Limit?	No
Is there a Work Practice or Design Standard?	No
Is this in Compliance with the Standard(s) ?	No

Emission Unit: PB13 No. 13 Power Boiler

Pollutant Volatile Organic Compounds

Numerical Emission Limit or Standard:	0
Maximum Actual Emissions in Units of the Standard:	0
Maximum Actual Emissions in Tons per Year:	40.2 tons/yr
Method the Emissions were determined (CEM, Stack Testing, Mass Balance, etc.):	AP-42
Applicable Federal Standard:	
Applicable State Standard:	
Applicable Permit Condition(s):	
Is this a Proposed Voluntary Limit?	No
Is there a Work Practice or Design Standard?	No
Is this in Compliance with the Standard(s) ?	No

Compliance Determination Procedures: Monitoring

Emission Unit: PB13No. 13 Power Boile	**Pollutant: Sulfur Dioxide**
Monitoring Code:	M20
Monitoring Code Description:	Sampling and analysis by reference test method
Is this Monitoring Already Taking Place and Being Performed?	Yes
Location Where Monitoring is Taking Place:	PB13 - No. 13 Power Boiler
Averaging Time:	30 Days
Data Acquisition Frequency:	1 Days
Description of the Types of Records Being Kept with this Monitoring:	lab analysis data sheets, spreadsheet calculations
Reporting Frequency:	3 Months
Regulation or Permit Condition that Requires this Monitoring:	391-3-1-.02(6)(b)1, 40 CFR 70.6(a)(3)(I) Condition 4.2.1, 4.2.2
Comments or Other Information:	Report deviations when > 1.2 lb SO2 / MMBtu when firing coal or bark or calculated limit when firing different fossil fuels simultaneously.

Emission Unit: PB13No. 13 Power Boile	**Pollutant: Particulate Matter**
Monitoring Code:	M23
Monitoring Code Description:	Monitoring of control equipment and/or process operation parameters. [Note: For this entry, in addition to giving the code, List all parameters which will have specific limitations.]
Is this Monitoring Already Taking Place and Being Performed?	Yes
Location Where Monitoring is Taking Place:	VE03 - No. 13 Power Boiler ESP Stack
Averaging Time:	8 Hours
Data Acquisition Frequency:	1 Hours
Description of the Types of Records Being Kept with this Monitoring:	electronic data historian of precipitator power levels.
Reporting Frequency:	3 Months
Regulation or Permit Condition that Requires this Monitoring:	391-3-1-.02(6)(b)1, 40 CFR 70.6(a)(3)(I) Condition 4.2.1, 4.2.2
Comments or Other Information:	Total power is calculated from secondary current and secondary voltage for each section of the electrostatic precipitator. Report deviation when < 75% of tested value

Emission Unit: PB13No. 13 Power Boile	**Pollutant: Nitrogen Oxides**
Monitoring Code:	M20
Monitoring Code Description:	Sampling and analysis by reference test method
Is this Monitoring Already Taking Place and Being Performed?	Yes
Location Where Monitoring is Taking Place:	PB13 - No. 13 Power Boiler
Averaging Time:	
Data Acquisition Frequency:	
Description of the Types of Records Being Kept with this Monitoring:	Annual Performance Test
Reporting Frequency:	1 Years
Regulation or Permit Condition that Requires this Monitoring:	40 CFR 60 Subpart D Condition 4.2.1, 4.2.2
Comments or Other Information:	Report deviations when > 0.30 lb NOx / MMBtu when firing fuel oil and bark or when > 0.70 lb NOx / MMBtu when firing coal and bark and >0.2 lb/MMBtu when firing natural gas

Compliance Determination Procedures: Reference Test Methods

Compliance Plan for a non-Compliant Emission Unit or Group

F - Facility Compliance

Facility: International Paper Application: 2014 IP- Savannah BMACT

The following list contains all of the emissions units and groups that have been entered for this project:

Type	ID	Emission Group Name
Facility-Wide		Facility-Wide Emissions
Emission Unit	PB13	No. 13 Power Boiler

Completeness Report - Errors and Warnings

Facility: ***International Paper***
Project: ***2014 IP- Savannah BMACT***

Error	*Warning*	*Description of Error or Warning*
☐	☐	

Appendix B

PSD Applicability and PTE Calculations

IP Savannah
Summary of PSD Compound Emission Increases
No. 13 Power Boiler - Boiler MACT Project
URS Project 31829473
5/22/2014

Project Description: IP Savannah currently burns bark, coal and Nos. 2, 5, and 6 fuel oil in No. 13 Power Boiler. This project proposes to replace oil firing with natural gas and reduce coal firing for Boiler MACT compliance.
The table below presents fuel firing emissions only. The project does not affect firing of NCG's or SOG's in PB13.

	Emissions, tpy										
	NOx	PM (f)	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO	F	Pb	H_2SO_4	CO_2e
Baseline Actual Emissions	1,453.72	52.44	668.45	649.54	2,407.44	22.38	186.23	9.47	0.04	39.00	689,838.17
Emissions That Could Have Been Accommodated During the Baseline	1,741.00	63.98	810.11	787.18	2,924.45	28.11	223.11	11.50	0.05	47.47	826,860.53
Projected Actual Emissions	1,256.51	33.28	116.81	106.93	408.14	40.21	1,742.00	0.99	0.01	4.04	644,701.48
Project Net Emission Increases	-484.49	-30.71	-693.30	-680.25	-2,516.31	12.10	1,518.89	-10.51	-0.04	-43.44	-182,159.06
PSD Significant Emission Rates	40	25	15	10	40	40	100	3	0.6	7	75,000
PSD Review Required	No	No	No	No	No	No	**Yes**	No	No	No	No

Particulate matter species are filterable plus condensable unless otherwise indicated.

IP Savannah
Baseline Actual Emissions Calculations
No. 13 Power Boiler - Boiler MACT Project
URS Project 31829473

Calculation Description: IP Savannah proposes to replace oil with natural gas and reduce coal use to 6%. This sheet calculates baseline actual emissions and emissions that could have been accommodated during the baseline.

							Baseline Actual Emissions							
Month	Bark MMBtu	Coal MMBtu	No. 2 Oil MMBtu	No. 5 Oil MMBtu	No. 6 Oil MMBtu	Total	PM (f) (tons/month)	24-mon ann avg	PM10 (tons/month)	24-mon ann avg	PM2.5 (tons/month)	24-mon ann avg	SO_2 (tons/month)	24-mon ann avg
Jan-12	196,092	475,344	15	1515	3,414	676,380	5	58	69	777	67	756	248	2,798
Feb-12	87,413	198,149	5	0	2,154	287,721	2	57	29	759	28	738	104	2,733
Mar-12	132,425	286,700	81	1464	7,274	427,944	4	56	42	739	41	719	154	2,664
Apr-12	132,551	399,341	5	0	1,072	532,969	4	55	57	731	56	711	206	2,635
May-12	162,409	410,126	23	1362	1,260	575,180	5	55	59	730	58	710	213	2,633
Jun-12	150,930	390,022	8	0	1,979	542,939	4	55	56	728	55	708	202	2,625
Jul-12	200,471	388,034	6	0	1,893	590,404	5	56	56	728	55	708	204	2,624
Aug-12	100,985	417,788	9	0	2,651	521,433	4	56	60	728	58	708	215	2,624
Sep-12	175,183	357,315	5	0	1,245	533,748	4	55	52	723	50	703	187	2,607
Oct-12	182,842	378,917	5	0	1,808	563,572	4	55	55	718	53	698	198	2,590
Nov-12	191,227	385,881	9	648	1,313	579,078	5	54	56	709	54	690	202	2,556
Dec-12	214,750	405,472	5	605	452	621,284	5	53	59	696	57	677	212	2,505
Jan-13	191,227	426,779	59	0	2,179	620,244	5	53	62	686	60	667	223	2,469
Feb-13	73,781	182,049	147	0	2,850	258,827	2	52	26	677	26	658	96	2,437
Mar-13	149,884	463,935	12	750	1,319	615,900	5	53	67	688	65	669	239	2,475
Apr-13	189,937	386,132	12	1260	23	577,364	5	53	56	688	54	669	201	2,475
May-13	163,357	390,698	11	0	1,939	556,005	4	53	56	688	55	669	203	2,476
Jun-13	191,512	390,121	14	0	1,760	583,407	5	53	57	691	55	672	204	2,487
Jul-13	165,363	402,990	20	0	1,672	570,045	4	54	58	688	57	669	209	2,478
Aug-13	189,675	390,284	18	0	3,943	583,920	5	53	57	681	55	662	206	2,451
Sep-13	181,920	396,197	16	0	2,094	580,227	5	53	57	679	56	660	207	2,447
Oct-13	223,295	416,279	16	0	2,040	641,630	5	53	61	673	59	654	219	2,422
Nov-13	198,434	419,303	10	0	1,016	618,763	5	53	61	668	59	649	218	2,405
Dec-13	141,442	476,134	9	0	2,397	619,982	5	52	68	668	66	650	245	2,407

24-month average annual emissions:	52	668	650	2,407
Baseline Period:	01/12- 12/13	01/12- 12/13	01/12- 12/13	01/12- 12/13
Max monthly emissions during baseline:	5.43	68.80	66.86	248.38
Max Emission Period:	01/12	01/12	01/12	01/12
Emissions the boiler could have accommodated during the baseline (tpy):	64	810	787	2,924

IP Savannah
Baseline Actual Emissions Calculations
No. 13 Power Boiler - Boiler MACT Project
URS Project 31829473

Calculation Description: IP Savannah proposes to replace oil with natural gas and reduce coal use to 6%. This sheet calculates baseline actual emissions and emissions that could have been accommodated during the baseline.

Baseline Actual Emissions

NOx (tons/month)	24-mon ann avg	CO (tons/month)	24-mon ann avg	VOC (tons/month)	24-mon ann avg	F (tons/month)	24-mon ann avg	Pb (tons/month)	24-mon ann avg	H_2SO_4 (tons/month)	24-mon ann avg
148	1,591	**18.9**	203.9	2.2	21.9	1.0	11.1	**0.0041**	0.0463	**4.0**	45.7
63	1,559	8.1	199.7	1.0	21.6	0.4	10.8	0.0017	0.0452	1.7	44.6
93	1,522	11.9	195.0	1.5	21.2	0.6	10.5	0.0025	0.0441	2.5	43.5
117	1,500	15.0	192.3	1.6	20.8	0.8	10.4	0.0034	0.0436	3.4	43.0
126	1,506	16.1	193.0	1.9	21.0	0.8	10.4	0.0035	0.0436	3.5	43.0
119	1,509	15.2	193.4	1.7	21.3	0.8	10.4	0.0034	0.0435	3.3	42.8
129	1,515	16.6	194.2	2.2	21.6	0.8	10.3	0.0034	0.0434	3.3	42.8
114	1,513	14.6	193.9	1.4	21.5	0.9	10.3	0.0035	0.0434	3.5	42.8
117	1,506	15.0	193.0	1.9	21.4	0.7	10.3	0.0031	0.0431	3.0	42.5
123	1,497	15.8	191.8	2.0	21.3	0.8	10.2	0.0033	0.0429	3.2	42.2
127	1,481	16.2	189.8	2.1	21.2	0.8	10.1	0.0034	0.0423	3.3	41.6
136	1,467	17.4	187.9	2.3	21.4	0.8	9.9	0.0035	0.0415	3.4	40.8
136	1,453	17.4	186.1	2.1	21.3	0.9	9.7	0.0037	0.0410	3.6	40.2
56	1,438	7.2	184.2	0.8	21.2	0.4	9.6	0.0016	0.0404	1.6	39.6
135	1,456	17.3	186.5	1.8	21.4	1.0	9.8	0.0040	0.0411	3.9	40.3
127	1,466	16.2	187.8	2.1	21.8	0.8	9.8	0.0034	0.0411	3.3	40.2
122	1,470	15.6	188.3	1.8	21.9	0.8	9.8	0.0034	0.0411	3.3	40.2
128	1,482	16.4	189.9	2.1	22.3	0.8	9.8	0.0034	0.0413	3.3	40.4
125	1,484	16.0	190.1	1.9	22.5	0.8	9.8	0.0035	0.0411	3.4	40.2
128	1,474	16.4	188.9	2.1	22.5	0.8	9.6	0.0034	0.0407	3.3	39.7
127	1,471	16.3	188.4	2.0	22.5	0.8	9.6	0.0034	0.0406	3.3	39.7
141	1,464	18.0	187.6	**2.4**	22.6	0.9	9.5	0.0036	0.0402	3.5	39.2
136	1,458	17.4	186.8	2.2	22.6	0.9	9.5	0.0036	0.0400	3.5	39.0
136	**1,454**	17.4	**186.2**	1.8	**22.4**	**1.0**	**9.5**	0.0041	**0.0400**	4.0	**39.0**

	1,454		186		22		9		0		39
	01/12- 12/13		01/12- 12/13		01/12- 12/13		01/12- 12/13		01/12- 12/13		01/12- 12/13
	147.87		18.95		2.39		0.98		0.0041		4.03
	01/12		01/12		10/13		12/13		01/12		01/12
	1,741		223		28.11		11		0.048		47

IP Savannah
Baseline Actual Emissions Calculations
No. 13 Power Boiler - Boiler MACT Project
URS Project 31829473

Calculation Description: IP Savannah proposes to replace oil with natural gas and reduce coal use to 6%. This sheet calculates baseline actual emissions and emissions that could have been accommodated during the baseline.

Baseline Actual Emissions							
CO_2 (tons/ month)	24-mon ann avg	CH_4 (tons/ month)	24-mon ann avg	N_2O (tons/ month)	24-mon ann avg	CO_2e (tons/ month)	24-mon ann avg
69,560	748,104	**7.3**	80.1	1.6	16.8	**70,227**	755,118
29,591	732,944	3.1	78.4	0.7	16.5	29,877	739,825
43,901	715,612	4.6	76.5	1.0	16.1	44,324	722,336
54,856	705,658	5.9	75.5	1.2	15.9	55,370	712,278
59,182	708,269	6.3	75.7	1.4	16.0	59,746	714,928
55,873	709,665	5.9	75.7	1.3	16.1	56,405	716,352
60,784	712,705	6.3	75.9	1.5	16.2	61,383	719,436
53,620	711,712	5.9	75.8	1.1	16.2	54,106	718,430
54,957	708,239	5.7	75.4	1.3	16.1	55,495	714,928
58,016	703,947	6.1	75.0	1.4	16.0	58,583	710,596
59,612	696,634	6.2	74.1	1.4	15.9	60,197	703,224
63,984	689,403	6.6	73.2	1.6	15.8	64,617	695,956
63,840	682,749	6.7	72.4	1.5	15.8	64,458	689,253
26,595	675,690	2.8	71.6	0.6	15.6	26,849	682,136
63,373	684,184	6.8	72.6	1.4	15.8	63,965	690,703
59,449	688,851	6.2	72.9	1.4	16.0	60,032	695,433
57,224	690,816	6.0	73.1	1.3	16.0	57,774	697,425
60,062	696,722	6.3	73.6	1.4	16.2	60,650	703,399
58,674	697,394	6.2	73.6	1.4	16.3	59,237	704,092
60,069	693,027	6.3	73.0	1.4	16.3	60,656	699,696
59,722	691,258	6.3	72.8	1.4	16.2	60,303	697,909
66,061	688,303	6.8	72.4	**1.6**	16.2	66,715	694,943
63,716	685,384	6.7	72.0	1.5	16.2	64,338	692,003
63,781	**683,251**	6.9	**71.9**	1.4	**16.1**	64,372	**689,838**
	683,251		72		16		689,838
	01/12- 12/13		01/12- 12/13		01/12- 12/13		01/12- 12/13
	69,560.41		7.34		1.62		70,226.51
	01/12		01/12		10/13		01/12
	819,018		86		19		826,861

IP Savannah
Emission Factors for Power Boiler 13
No. 13 Power Boiler - Boiler MACT Project
URS Project 31829473

Fuel[1]	Pollutant	EF	UOM	Reference
Coal	NOx	4.39E-01	lb/MMBtu	April 8-13, 2014 testing on coal and bark
	PM (f)	1.54E-02	lb/MMBtu	2011 Test Data (filt)
	PM10	2.80E-01	lb/MMBtu	2011 PM (f) Test Data*67% (from 2013 NCASI) + AP-42 (cond)
	PM2.5	2.74E-01	lb/MMBtu	2011 PM (f) Test Data*29% (from 2013 NCASI) + AP-42 (cond)
	SO_2	9.97E-01	lb/MMBtu	2012-2013 Coal Data
	CO	5.62E-02	lb/MMBtu	April 8-13, 2014 testing on coal and bark
	F	4.10E-03	lb/MMBtu	2013 NCASI
	Pb	1.64E-05	lb/MMBtu	2013 NCASI
	H_2SO_4	1.68E-02	lb/MMBtu	2013 NCASI
	VOC	2.34E-03	lb/MMBtu	AP-42 Table 1.1-19
Bark	NOx	4.39E-01	lb/MMBtu	April 8-13, 2014 testing on coal and bark
	PM (f)	1.54E-02	lb/MMBtu	2011 Test Data (filt)
	PM10	2.03E-02	lb/MMBtu	2011 Test Data (filt)*74% (from 2013 NCASI) + NCASI 2013 (cond)
	PM2.5	1.52E-02	lb/MMBtu	2011 Test Data (filt)*41% (from 2013 NCASI) + NCASI 2013 (cond)
	SO_2	8.70E-02	lb/MMBtu	Permit condition 6.2.6
	VOC	1.70E-02	lb/MMBtu	AP-42 Table 1.6-3
	CO	5.62E-02	lb/MMBtu	April 8-13, 2014 testing on coal and bark
	F	0.00E+00	lb/MMBtu	2013 NCASI
	Pb	1.97E-06	lb/MMBtu	2013 NCASI
	H_2SO_4	0.00E+00	lb/MMBtu	none expected from bark
No. 2 Fuel Oil	NOx	1.70E-01	lb/MMBtu	AP-42 Table 1.3-1
	PM (f)	1.43E-02	lb/MMBtu	AP-42 Table 1.3-1
	PM10	1.64E-02	lb/MMBtu	AP-42 Table 1.3-1, -2, -6
	PM2.5	1.10E-02	lb/MMBtu	AP-42 Table 1.3-1, -2, -6
	SO_2	1.52E-03	lb/MMBtu	AP-42 Table 1.3-1
	CO	3.60E-02	lb/MMBtu	AP-42 Table 1.3-1
	F	0.00E+00	lb/MMBtu	none expected, no factor
	Pb	9.00E-06	lb/MMBtu	2013 NCASI
	H_2SO_4	8.75E-03	lb/MMBtu	2013 NCASI
	VOC	1.43E-03	lb/MMBtu	AP-42 Table 1.3-3
No. 5 Fuel Oil	NOx	2.10E-01	lb/MMBtu	AP-42 Table 1.3-1
	PM (f)	1.07E-01	lb/MMBtu	AP-42 Table 1.3-1
	PM10	7.62E-02	lb/MMBtu	AP-42 Table 1.3-1, -2, -6
	PM2.5	5.26E-02	lb/MMBtu	AP-42 Table 1.3-1, -2, -6
	SO_2	5.25E-01	lb/MMBtu	AP-42 Table 1.3-1
	CO	3.30E-02	lb/MMBtu	AP-42 Table 1.3-1
	F	1.40E-04	lb/MMBtu	2013 NCASI
	Pb	1.01E-05	lb/MMBtu	2013 NCASI
	H_2SO_4	1.63E-02	lb/MMBtu	2013 NCASI
	VOC	1.87E-03	lb/MMBtu	AP-42 Table 1.3-3

Fuel[1]	Pollutant	EF	UOM	Reference
No. 6 Fuel Oil	NOx	2.10E-01	lb/MMBtu	AP-42 Table 1.3-1
	PM (f)	1.07E-01	lb/MMBtu	AP-42 Table 1.3-1
	PM10	7.75E-02	lb/MMBtu	AP-42 Table 1.3-1, -2, -4
	PM2.5	5.39E-02	lb/MMBtu	AP-42 Table 1.3-1, -2, -4
	SO_2	1.46E+00	lb/MMBtu	AP-42 Table 1.3-1
	CO	3.30E-02	lb/MMBtu	AP-42 Table 1.3-1
	F	1.40E-04	lb/MMBtu	2013 NCASI
	Pb	1.01E-05	lb/MMBtu	2013 NCASI
	H_2SO_4	1.63E-02	lb/MMBtu	2013 NCASI
	VOC	1.87E-03	lb/MMBtu	AP-42 Table 1.3-3
Natural Gas[2]	NOx	2.00E-01	lb/MMBtu	NSPS Subpart D Limit
	PM (f)	1.86E-03	lb/MMBtu	AP-42 Table 1.4-2
	PM10	7.45E-03	lb/MMBtu	AP-42 Table 1.4-2
	PM2.5	7.45E-03	lb/MMBtu	AP-42 Table 1.4-2
	SO_2	5.88E-04	lb/MMBtu	AP-42 Table 1.4-2
	CO			see below
	Pb	4.90E-07	lb/MMBtu	AP-42 Table 1.4-2
	VOC	5.39E-03	lb/MMBtu	AP-42 Table 1.4-2
	F	0.00E+00	lb/MMBtu	AP-42 Table 1.4-2
	H_2SO_4	0.00E+00	--	AP-42 Table 1.4-2
Bark-Projected Actual	SO_2	8.70E-02	lb/MMBtu	Permit condition 6.2.6; Regional Haze SO_2 Emissions Analysis
Coal-Projected Actual	SO_2	1.09E+00	lb/MMBtu	April 2013 Stack Test; Regional Haze SO_2 Emissions Analysis
CO Projected Actual[3]	CO	3.11E-01	lb/MMBtu	400 ppm at 3% O2 and projected actual fuel mix (weighted f factor)

Particulate matter species are filterable plus condensable unless otherwise indicated.

1. Data for current fuels from IP Savannah 2013 CEMR database
2. Emission Factors for natural gas from AP-42 Section 1.4 unless otherwise noted.
3. A sample CO Projected Actual Emission Factor Calculation is provided on the following page.

HHV

Coal[3]	25.6	MMBtu/ton
No. 2 Fuel Oil	140.0	MMBtu/Mgal
No. 5 Fuel Oil	150.0	MMBtu/Mgal
No. 6 Fuel Oil	150.0	MMBtu/Mgal
Bark[1]	4757	Btu/lb
Natural Gas[2]	1020	Btu/scf

HHV from CEMR Footnote File, unless otherwise noted.

1. Based on moisture content of 42.3% in fuel test data spreadsheet
2. Based on AP-42.
3. Based on GHG MRR

GHG Emission Factors[2]							
	Coal[1] (lb/MMBtu)	**Bark (lb/MMBtu)**	**No. 2 Oil (lb/MMBtu)**	**No. 5 Oil (lb/MMBtu)**	**No. 6 Oil (lb/MMBtu)**	**Natural Gas (lb/MMBtu)**	**GWP**
CO_2	205.65	206.79	163.05	165.57	165.57	116.98	1
CH_4	0.02	0.02	0.01	0.01	0.01	0.002	25
N_2O	0.004	0.01	0.001	0.001	0.001	0.0002	298

1 kg = 2.2046 lb

1. Bituminous coal factors used
2. Federal Register Vol. 78, No. 230 Nov. 29, 2013

IP Savannah
CO Emission Factor Development
No. 13 Power Boiler - Boiler MACT Project
URS Project 31829473

This sheet provides a sample calculation for the CO Emission Factor (conversion from 400 ppm @ 3% O2 to lb/MMBtu using F-factor approach)

$$0.311 \text{ lb CO/MMBtu} = \frac{400 \text{ ppm @ 3\% O2} \times 28 \text{ MW} \times (9600 \text{ MMBtu/dscf} \times \text{Proj. Actual Bark \%} + 9780 \text{ MMBtu/dscf} \times \text{Proj. Actual Coal \%} + 8710 \text{ MMBtu/dscf} \times \text{Proj. Actual Natural Gas \%}) \times (20.9 \text{ \%O2}/(20.9-3) \text{ \%O2})}{385 \text{ dscf/mol} \times 1000000}$$

400 ppm @ 3% O2 is proposed CO BACT.
Fd-Factors in MMBtu/dscf for bark, coal, and natural gas are from EPA M19 Table 19-2.

IP Savannah
Projected Actual Emissions
No. 13 Power Boiler - Boiler MACT Project
URS Project 31829473

Description: This sheet presents the projected actual emissions calculations for the project. The Projected Actual total heat input is based on 5-year plan of 640,000 lb steam per hour and 70% efficiency. The facility will no longer burn fuel oil and coal burning will be reduced to 6% heat input maximum. Bark burning is increased to 40 tph goal. Natural gas will provide the balance of the heat input. Based on the chlorine content of the coal today, the facility cannot burn more than 6% to be in compliance with Boiler MACT. Note that the facility could burn more coal if the Boiler MACT HCl limit changes or if the chlorine content of the facility's coal changes.

Projected Actual Fuel Firing

Bark 12-mo MMBtu	Coal 12-mo MMBtu	No. 2 Oil 12-mo MMBtu	No. 5 Oil 12-mo MMBtu	No. 6 Oil 12-mo MMBtu	Natural Gas MMBtu	Total 12-mo MMBtu
3,333,557	480,549	0	0	0	4,195,037	8,009,143
42%	6%	0.00%	0.00%	0.00%	52%	100.00%

Compound	Projected Actual Bark Emissions (tpy)	Projected Actual Coal Emissions (tpy)	Projected Actual Natural Gas Emissions (tpy)	Projected Actual Oil Emissions (tpy)	Projected Actual Fuel Emissions (tpy)	Projected Actual Fuel Emissions (lb/hr)[1]
PM (f)	25.67	3.70	3.91	0.00	33.28	7.60
PM10	33.83	67.35	15.63	0.00	116.81	26.67
PM2.5	25.36	65.95	15.63	0.00	106.93	24.41
SO_2	145.01	261.90	1.23	0.00	408.14	93.18
NOx	731.55	105.46	419.50	0.00	1256.51	286.87
CO	(allowable/BACT)				1742	397.72
VOC	28.34	0.56	11.31	0.00	40.21	9.18
F	0.00	0.99	0.00	0.00	0.99	0.22
Pb	0.00	0.00	0.00	0.00	0.01	0.00
H_2SO_4	0.00	4.04	0.00	0.00	4.04	0.92
CO_2	344,676	49,411	245,359	0.00	639,446	145,992
CH_4	26.46	5.83	4.62	0.00	36.91	8.43
N_2O	13.23	0.85	0.46	0.00	14.54	3.32
CO_2e	349,279	49,809	245,613	0.00	644,701	147,192

1. Assumed hours of operation equal 8760 hr/yr.

IP Savannah
CO Emissions Increase for Modeling
No. 13 Power Boiler - Boiler MACT Project
URS Project 31829473

This sheet presents the CO emissions increase for modeling.

2012-2013 PB13 CO emissions:	186	tons per year
Potential CO emissions:	1742	tons per year
CO emissions increase:	1556	tons per year

IP Savannah
PTE Emission Factors for Power Boiler 13
No. 13 Power Boiler - Boiler MACT Project
URS Project 31829473

Fuel[1]	Pollutant	EF	UOM	Reference
Coal	NOx	7.00E-01	lb/MMBtu	Permit Limit (3.3.7.c)
	PM (f)	7.50E-02	lb/MMBtu	Permit Limit (3.3.7.a)
	PM	3.45E-01	lb/MMBtu	Permit Limit (3.3.7.a) + AP-42 (cond)
	PM10 (f)	7.50E-02	lb/MMBtu	Permit Limit (3.3.7.a)
	PM2.5 (f)	7.50E-02	lb/MMBtu	Permit Limit (3.3.7.a)
	SO_2		lb/MMBtu	See Below
	F	4.10E-03	lb/MMBtu	2013 NCASI
	Pb	1.64E-05	lb/MMBtu	2013 NCASI
	H_2SO_4	1.68E-02	lb/MMBtu	2013 NCASI
	VOC	2.34E-03	lb/MMBtu	AP-42 Table 1.1-19
	CO		lb/MMBtu	See Below
Bark	NOx	3.00E-01	lb/MMBtu	Permit Limit (3.3.7.c)
	PM (f)	7.50E-02	lb/MMBtu	Permit Limit (3.3.7.a)
	PM	8.39E-02	lb/MMBtu	Permit Limit (3.3.7.a)+ NCASI 2013 (cond)
	PM10 (f)	7.50E-02	lb/MMBtu	Permit Limit (3.3.7.a)
	PM2.5 (f)	7.50E-02	lb/MMBtu	Permit Limit (3.3.7.a)
	SO_2		lb/MMBtu	See Below
	VOC	1.70E-02	lb/MMBtu	AP-42 Table 1.6-3
	F	0.00E+00	lb/MMBtu	2013 NCASI
	Pb	1.97E-06	lb/MMBtu	2013 NCASI
	H_2SO_4	0.00E+00	lb/MMBtu	none expected from bark
	CO		lb/MMBtu	See Below
Natural Gas[2]	NOx	2.00E-01	lb/MMBtu	NSPS Subpart D Limit
	PM (f)	7.50E-02	lb/MMBtu	Permit Limit (3.3.7.a)
	PM	8.06E-02	lb/MMBtu	Permit Limit (3.3.7.a) + AP-42 (cond)
	PM10 (f)	7.50E-02	lb/MMBtu	Permit Limit (3.3.7.a)
	PM2.5 (f)	7.50E-02	lb/MMBtu	Permit Limit (3.3.7.a)
	SO_2		lb/MMBtu	See Below
	Pb	4.90E-07	lb/MMBtu	AP-42 Table 1.4-2
	VOC	5.39E-03	lb/MMBtu	AP-42 Table 1.4-2
	F	0.00E+00	lb/MMBtu	AP-42 Table 1.4-2
	H_2SO_4	0.00E+00	--	AP-42 Table 1.4-2
	CO		lb/MMBtu	See Below
SO_2 Short Term Limit	SO_2	4.28E+03	lb/hr	Permit Limit (3.3.7.v)
SO_2 Annual Limit	SO_2	6.58E+03	tpy	Permit Limit (3.3.31)
CO BACT Limit[3]	CO	3.11E-01	lb/MMBtu	400 ppm at 3% O2 and projected actual fuel mix (weighted f factor)

Particulate matter species are filterable plus condensable unless otherwise indicated.
1. Data for current fuels from IP Savannah 2013 CEMR database
2. Emission Factors for natural gas from AP-42 Section 1.4 unless otherwise noted.
3. A sample CO Projected Actual Emission Factor Calculation is provided on the following page.

HHV

Coal[3]	25.6	MMBtu/ton
No. 2 Fuel Oil	140.0	MMBtu/Mgal
No. 5 Fuel Oil	150.0	MMBtu/Mgal
No. 6 Fuel Oil	150.0	MMBtu/Mgal
Bark[1]	4757	Btu/lb
Natural Gas[2]	1020	Btu/scf

HHV from CEMR Footnote File, unless otherwise noted.
1. Based on moisture content of 42.3% in fuel test data spreadsheet
2. Based on AP-42.
3. Based on GHG MRR

GHG Emission Factors[2]				
	Coal[1] (lb/MMBtu)	Bark (lb/MMBtu)	Natural Gas (lb/MMBtu)	GWP
CO_2	205.65	206.79	116.98	1
CH_4	0.02	0.02	0.002	25
N_2O	0.004	0.01	0.0002	298

1 kg = 2.2046 lb

1. Bituminous coal factors used

2. Federal Register Vol. 78, No. 230 Nov. 29, 2013

IP Savannah
Potential to Emit-Power Boiler 13
No. 13 Power Boiler - Boiler MACT Project
URS Project 31829473

Description: This sheet presents the Potential to Emit for Power Boiler 13. In operating scenario 1, the facility will reduce coal burning to 6% heat input maximum, Bark burning is increased to 40 tph maximum, and natural gas will provide the balance of the heat input. Natural gas is the only fuel burned in operating scenario 2.

Maximum Fuel Firing Scenario 1-Max Bark, Coal, and Balance Gas

Bark 12-mo MMBtu/yr	Coal 12-mo MMBtu/yr	Natural Gas MMBtu/yr	Total 12-mo MMBtu/yr
3,333,557	672,768	7,206,475	11,212,800
30%	6%	64%	100.00%

Maximum Fuel Firing Scenario 2- 100% Natural Gas: 11,212,800 MMBtu/yr

	Scenario 1				Scenario 2	Worst Case
Compound	PTE Bark Emissions (tpy)	PTE Coal Emissions (tpy)	PTE Natural Gas Emissions (tpy)	PTE Scenario 1 Emissions (tpy)	PTE Scenario 2 (tpy)	Power Boiler 13 PTE (tpy)
PM (f)	125	25	270	420	420	420
PM10 (f)	125	25	270	420	420	420
PM2.5 (f)	125	25	270	420	420	420
SO_2				Permit Limit	Permit Limit	6578
NOx	500	235	721	1456	1121	1456
CO				BACT Limit	BACT Limit	1742
VOC	28.34	0.79	19.43	48.55	30.23	48.55
F	0.00	1.38	0.00	1.38	0.00	1.38
Pb	0.00	0.01	0.00	0.01	0.00	0.01
H_2SO_4	0.00	5.65	0.00	5.65	0.00	5.65
CO_2	344,676	69,176	421,493	835,344	655,815	835344
CH_4	26.46	8.16	7.94	42.56	12.36	42.56
N_2O	13.23	1.19	0.79	15.21	1.24	15.21
CO_2e	349,279	69,733	421,928	840,940	656,492	840940

IP Savannah
Potential to Emit-Power Boiler 13
No. 13 Power Boiler - Boiler MACT Project
URS Project 31829473

Description: This sheet presents the Potential to Emit for Power Boiler 13. In operating scenario 1, the facility could burn up to 36 tons/hr of coal and the balance bark. This could occur during times of gas curtailment and bark feed system problems. The emission factors for coal are higher for all pollutants except VOC. Scenario 2 represents if the boiler burned max bark, 40 tons/hr, and the balance gas.

Scenario 1: Maximum Fuel Firing Scenario 1-Max Coal, Balance Bark (Worst Hourly Case for all Compounds Except VOC)

Max Hourly Bark MMBtu/hr	Coal Max Hourly MMBtu/hr	Natural Gas MMBtu/hr	Total MMBtu/hr
358	922	0	1,280
28%	72%	0%	100.00%

Scenario 2: Maximum Fuel Firing Scenario 2-Max Bark, Balance Gas (Required to calc max hourly VOC only)

Max Hourly Bark MMBtu/hr	Coal Max Hourly MMBtu/hr	Natural Gas MMBtu/hr	Total MMBtu/hr
381	0	899	1,280
30%	0%	70%	100.00%

	Scenario 1			Scenario 2	Worst Case
Compound	PTE Bark Emissions (lb/hr)	PTE Coal Emissions (lb/hr)	PTE Scenario 1 Emissions (lb/hr)	PTE Scenario 2 (lb/hr)	Power Boiler 13 PTE (lb/hr)
PM (f)	27	69	96	N/A	96
PM10 (f)	27	69	96	N/A	96
PM2.5 (f)	27	69	96	N/A	96
SO_2			Permit Limit	Permit Limit	4281
NOx	107	645	753	N/A	753
CO			BACT Limit	BACT Limit	398
VOC	6.09	2.16	8.25	11.32	11.32
F	0.00	3.78	3.78	N/A	3.78
Pb	0.00	0.02	0.02	N/A	0.02
H_2SO_4	0.00	15.48	15.48	N/A	15.48
CO_2	74,084	189,552	263,636	N/A	263636
CH_4	5.69	22.35	28.04	N/A	28.04
N_2O	2.84	3.25	6.09	N/A	6.09
CO_2e	75,074	191,080	266,154	N/A	266154

IP Savannah
Facility-Wide Emissions
No. 13 Power Boiler - Boiler MACT Project
URS Project 31829473

Potential Emissions

	Emissions, tpy											
	NOx	**PM (f)**	**PM_{10} (f)**	**$PM_{2.5}$ (f)**	**SO_2**	**VOC**	**CO**	**F**	**Pb**	**H_2SO_4**	**HAP**	**CO_2e**
2006 Permit Renewal PTE	**5,040**	**1,030**	**1,030**	**1,030**	**16,960**	**1,250**	**4,360**		**0.10**	**77**	**1,305**	**>100,000**
2006 PB13 PTE (With NCGs)	3,425	421	421	421	12,360	80	1,377		0.09	73	293	Projects do not reduce emissions such that they are less than 100,000
2014 PB13 PTE (Post NG Project)	1,456	420	420	420	6,578	49	1,742	1.4	0.01	6	Project does not significantly change PTE	
Updated Facility -Wide Emissions	**3,071**	**1,029**	**1,029**	**1,029**	**11,178**	**1,219**	**4,725**	**1.4**	**0.02**	**10**	**1,305**	**>100,000**

Note: All Fluoride comes from burning of coal. The new PTE for fluoride is based on emissions from PB13 only.
All particulate matter emissions are represented as filterable only so that emissions may be compared to the 2006 permit renewal.

Actual Emissions

	Emissions, tpy											
	NOx	**PM (f)**	**PM_{10} (f)**	**$PM_{2.5}$ (f)**	**SO_2**	**VOC**	**CO**	**F**	**Pb**	**H_2SO_4**	**HAP**	**CO_2e**
Facility-Wide 2012 Actual Emissions	**2,645**	**222**	**222**	**222**	**7,680**	**940**	**1,407**		**0.05**	**50**	**1,036**	**>100,000**
PB13 2012 Actual Emissions (Without NCGs)	1,707	50	50	50	2,554	33	623		0.04	38	Projects do not signifcantly change Actuals	Projects do not reduce emissions such that they are less than 100,000
2014 PB13 Natural Gas Project - Projected Actual Emissions	1,256.5	33.3	25.4	15.5	408.1	40.2	1,742.0	0.99	0.01	4.04		
Projected Change in PB13 Actual Emissions	-450	-17	-25	-34	-2,146	7	1,119		-0.03	-34		
Updated Facility -Wide Emissions	**2,195**	**205**	**197**	**188**	**5,534**	**947**	**2,526**	**0.99**	**0.02**	**16**	**1,036**	**>100,000**

Note: All Fluoride comes from burning of coal. The new predicted actuals for fluoride is based on emissions from PB13 only.
All particulate matter emissions are represented as filterable only so that emissions may be compared to the 2012 actual emissions.

Appendix C

Modeling Protocol and Electronic Files

INTERNATIONAL PAPER

P.O. BOX 570
SAVANNAH, GA 31402
PHONE 912 238 6000

May 1, 2014

Mr. Eric Cornwell
Program Manager – Stationary Source Permitting
Air Protection Branch
Environmental Protection Division
4244 International Pkwy, Suite 120
Atlanta, GA 30354

RE: PSD Modeling Protocol for International Paper Company – Savannah Mill
Permit No. 2631-051-0007-V-02
No. 13 Power Boiler Natural Gas Project

Dear Mr. Cornwell:

Per our discussion during the April 24, 2014 pre-application meeting, the International Paper Savannah Mill is proposing to make modifications to the existing No. 13 Power Boiler in order to comply with Boiler MACT and Regional Haze Rule emission limits for HCl and SO_2. The modifications include the addition of load-bearing natural gas burners and removal of oil-firing capability. Post-project, the boiler will burn primarily biomass and natural gas, with limited coal burning on an annual basis, and will continue to burn NCGs.

Our analysis indicates that the project could result in a significant emissions increase of CO (minor NSR will be required for all other pollutants). The enclosed modeling protocol describes the procedures that will be followed to perform the PSD air quality impact analyses for the proposed project. The PSD permit application will include a modeling analysis for both 1-hour and 8-hour averaging periods for CO. Preliminary modeling has shown that the predicted impacts are well below the Significant Impact Levels (SIL) for CO. If the predicted impacts from CO do result in ambient concentrations greater than the PSD SIL, a new modeling protocol will be developed, and a detailed air quality analysis of the IP Savannah Mill will be performed for all emission sources emitting CO for comparison to the NAAQS and PSD increment.

International Paper requests your timely review and approval of the enclosed protocol in order to meet the project schedule we recently discussed with you. We would be happy to address any questions or comments via teleconference. We plan to submit the permit application by June 1,

2014. The technical contacts for this submittal are Amy Marshall of URS Corporation at (919) 461-1251 or Donna Katula of IP at (912) 238-7054.

Sincerely,

Ralph S. Stagner
Mill Manager

cc: Casie Britton, EPD
Donna Katula, IP
Brittany Robinson, IP
Amy Marshall, URS Corporation

AIR DISPERSION MODELING PROTOCOL FOR NO. 13 POWER BOILER NATURAL GAS PROJECT

Prepared for:

INTERNATIONAL PAPER

International Paper
Savannah Mill
P.O. Box 570
Savannah, GA 31402

Prepared by:

URS

URS Corporation
1600 Perimeter Park Drive, Suite 400
Morrisville, North Carolina 27560
(919) 461-1100
URS Project 31829473

April 2014

TABLE OF CONTENTS

FIGURES

1.1 BACKGROUND

The purpose of this document is to present a modeling protocol for conducting an air quality modeling analysis in support of an air permit application for the proposed modifications to the existing No. 13 Power Boiler at the International Paper (IP) Savannah Mill.

The primary activities at the Savannah Mill are pulp production (Standard Industrial Classification [SIC] code 2611) and paperboard production (SIC code 2631). Primary operations at the mill include multiple fuel-fired boilers, chemical recovery operations, wood pulping operations, papermaking, and additional operations and equipment necessary to support these operations. In addition, the Containerboard Division operates an on-site converting facility as part of the Mill's Title V Permit (SIC Code 2653).

The Savannah Mill is proposing to make modifications to the existing No. 13 Power Boiler in order to comply with Boiler MACT and Regional Haze Rule emission limits for HCl and SO_2. The modifications include the addition of load-bearing natural gas burners and removal of oil-firing capability. Based on conservative estimates of emissions following the change, the project may result in a significant emissions increase in carbon monoxide (CO).

This modeling protocol describes procedures that will be followed to perform the PSD air quality impact analyses for the proposed project. The PSD permit application will include a modeling analysis for both 1-hour and 8-hour averaging periods for CO. Preliminary modeling has shown that the predicted impacts are well below the Significant Impact Levels (SIL) for CO. If the predicted impacts from CO do result in ambient concentrations greater than the PSD SIL, a new modeling protocol will be developed, and a detailed air quality analysis of the IP Savannah Mill will be performed for all emission sources emitting CO for comparison to the NAAQS and PSD increment.

The air quality impact analysis will use procedures and requirements described in the *Georgia EPD PSD Permit Application Guidance Document*. Also, modeling guidance contained in the U.S. EPA *Guideline on Air Quality Models*, U.S. DOI *Permit Application Guidance for New Air Pollution Sources*, and the U.S. EPA *New Source Review Workshop Manual* will be followed, where applicable.

2.1 GEOGRAPHICAL SETTING

The IP Savannah Mill is located near the city of Savannah, Georgia on the banks of the Savannah River in Chatham County. The approximate UTM coordinates of the mill are Zone 17, 487.9 km east and 3551.7 km north, at an elevation of approximately 15 feet above mean sea level. Figure 2-1 displays the plant site location, and Figure 2-2 displays the plant site and surrounding terrain. The Savannah area is located in the southeastern part of Georgia, and the terrain surrounding the site is relatively flat.

The current Section 107 attainment status designations for areas within the state of Georgia are summarized in 40 CFR 81.311. Chatham County is classified as "better than national standards" for total suspended particulates (TSP, also referred to as Particulate Matter, PM) and for the 1971 sulfur dioxide (SO_2) NAAQS. Chatham County is designated as "unclassifiable/attainment" for carbon monoxide (CO), particulate matter less than 10 microns (PM_{10}) and less than 2.5 microns ($PM_{2.5}$), lead, the 1-hr nitrogen dioxide (NO_2) standard, and ozone. Chatham County is designated as "cannot be classified or better than national standards" for the annual NO_2 standard. Therefore, the Savannah Mill is not located in an area currently designated as "nonattainment" for any compound regulated under the National Ambient Air Quality Standards (NAAQS) and Prevention of Significant Deterioration (PSD) is the applicable regulatory program for major new source review.

2.2 MODEL SELECTION

AERMOD (version 12345)

The modeling analysis will be performed using the most current version of the EPA AERMOD model (version 12345). Currently, AERMOD is the preferred computer dispersion model for conducting refined dispersion modeling. The AERMOD model will be used in regulatory default mode to model the No. 13 Power Boiler in order to predict maximum ambient concentrations from the facility in the near field.

The AERMOD preprocessors, AERMAP (version 11103) and BPIP-Prime (version 04274) will also be used. BPIP-Prime will be used to calculate building downwash, and AERMAP will be used to characterize the terrain.

3.1 METEOROLOGICAL DATA

The AERMOD model requires more detailed meteorological input information than previous refined EPA dispersion models. The refined AERMOD modeling analysis will be performed using the five-year meteorological data set (2007-2011) from the Savannah/Hilton Head International Airport (Station No. 3822) surface meteorological data and Charleston International Airport in Charleston, SC (Station No. 72208) upper air observations. These data files will be obtained from the Georgia EPD web site.

The meteorological data set will consist of 8,760 hourly observations (8,784 hourly observations in 2008) of the following parameters:

- wind speed,
- wind direction,
- ambient temperature,
- atmospheric turbulence, and
- mixing heights.

3.2 COORDINATE SYSTEM

All modeling coordinates will be input into the model using the Universal Transverse Mercator (UTM) system (Zone 17) with the NAD83 datum. This includes all source, building, and receptor locations.

3.3 RECEPTOR PLACEMENT

The dispersion modeling receptor grid will be developed following procedures outlined in the New Source Review Workshop Manual (October 1990) and the Georgia EPD PSD Permit Application Guidance Document (September 2012). A preliminary PSD SIL Cartesian receptor grid system will be created to adequately assess air quality impacts in all directions from the IP Savannah Mill to a distance of up to 5 kilometers from the plant site. This preliminary grid will include ambient air boundary receptors with a receptor spacing of 100 meters, and will extend outward from the boundary to 2 kilometers at 100 meter spacing and from 2 kilometers to 5 kilometers from the plant at 500 meter spacing. The grid systems will be created using the UTM coordinate system using the NAD83 datum.

Receptor elevations will be determined using the current version of the AERMAP processor. National Elevation Data (NED) will be downloaded from the National Map Seamless Server for an area of 15 kilometers from the IP Savannah Mill.

3.4 GOOD ENGINEERING PRACTICE STACK HEIGHT ANALYSIS

A Good Engineering Practice (GEP) stack height analysis will be conducted to demonstrate compliance with stack height regulations (40 CFR Part 51) and to determine the impacts to the No. 13 Power Boiler by building wake and downwash effects. The GEP analysis will be conducted using the procedures outlined in the EPA documents Guideline for Determination of

Good Engineering Practice Stack Height (Technical Support Document For the Stack Height Regulations) Revised (EPA-450/4-80-023R) and the User's Guide to the Building Profile Input Program. The latest version of the Building Profile Input Program (BPIP) with PRIME algorithms will be used to determine calculated GEP stack heights and to develop direction-specific building dimensions for use in the dispersion models.

3.5 EMISSIONS AND STACK PARAMETERS

Stack parameters for the No.13 Power Boiler will be provided by the IP Savannah Mill. These stack parameters will not be changing with the project. The modeled emission rate for the significant impact analysis will be calculated by subtracting the baseline emissions (total emissions from most recent two years) from the projected actual emissions after the project.

3.6 NON-DEFAULT MODELING OPTIONS

Modeling will be performed using only the regulatory default modeling options.

3.7 METHODOLOGY

The air dispersion modeling will evaluate the ambient concentrations of CO associated with the proposed project. The modeling methodology for performing these analyses is described in detail below.

Class II Significant Impact Modeling Analysis

URS will perform a Class II Significant Impact Modeling Analysis for CO using five years of meteorological data. The Class II area analysis will be performed using the AERMOD model. The modeling analysis will be performed to determine whether modeled concentrations exceed the Class II PSD Ambient Significance Levels, Class II PSD Monitoring Exemption Levels, and to determine the Significant Impact Area surrounding the facility. The Significant Impact Area will include all locations where the modeled emissions result in maximum concentrations equal to or greater than the PSD Ambient Significance Levels. The significant impact area will be a circular area with a radius extending from the facility location to the most distant point where maximum predicted concentrations exceed the PSD ambient significance levels. The Class II Ambient Significance Levels and Monitoring Exemption Levels and the procedure for determining the significant impact areas will be performed following the New Source Review Workshop Manual, Prevention of Significant Deterioration and Nonattainment Area Permitting, October 1990.

Preliminary modeling results of CO concentrations are well below the Class II PSD Significant Impact Levels and therefore, refined modeling is not expected to be required.

Class I Area Analysis

The project is not increasing any visibility affecting pollutants (NO_x, SO_2, PM, and H_2SO_4), therefore, a Class I Area Analysis is not expected to be required.

4.1 SUBMITTAL INFORMATION

The Air Quality Impact section of the permit application will include the following information:

A. A diagram of the industrial site including locations of all affected stacks and associated buildings.

B. A list of on-site building dimensions.

C. A diagram showing ambient air boundaries, a scale, and a direction arrow indicating true north.

D. The location of the site superimposed on a U.S. Geological Survey (USGS) map.

E. Discussion of techniques for evaluating cavity effects, impacts on rolling and complex terrain, building wake effects, urban/rural considerations, etc.

F. Discussion of reasons for model selection.

G. Discussion of meteorological data used.

H. Stack parameters for each source.

I. Discussion of receptor locations and elevations, including critical receptors.

J. Discussion of PSD baseline dates and PSD sources for PSD modeling, discussion of PSD minor source baseline dates and sources subject to Class II PSD standards.

K. Discussion of any non-attainment areas.

L. Emission rates and calculations showing how the emission rates were derived.

M. Model input and output (on CD) to support worst-case maximum concentrations of each averaging period with a table summarizing these results.

Figures

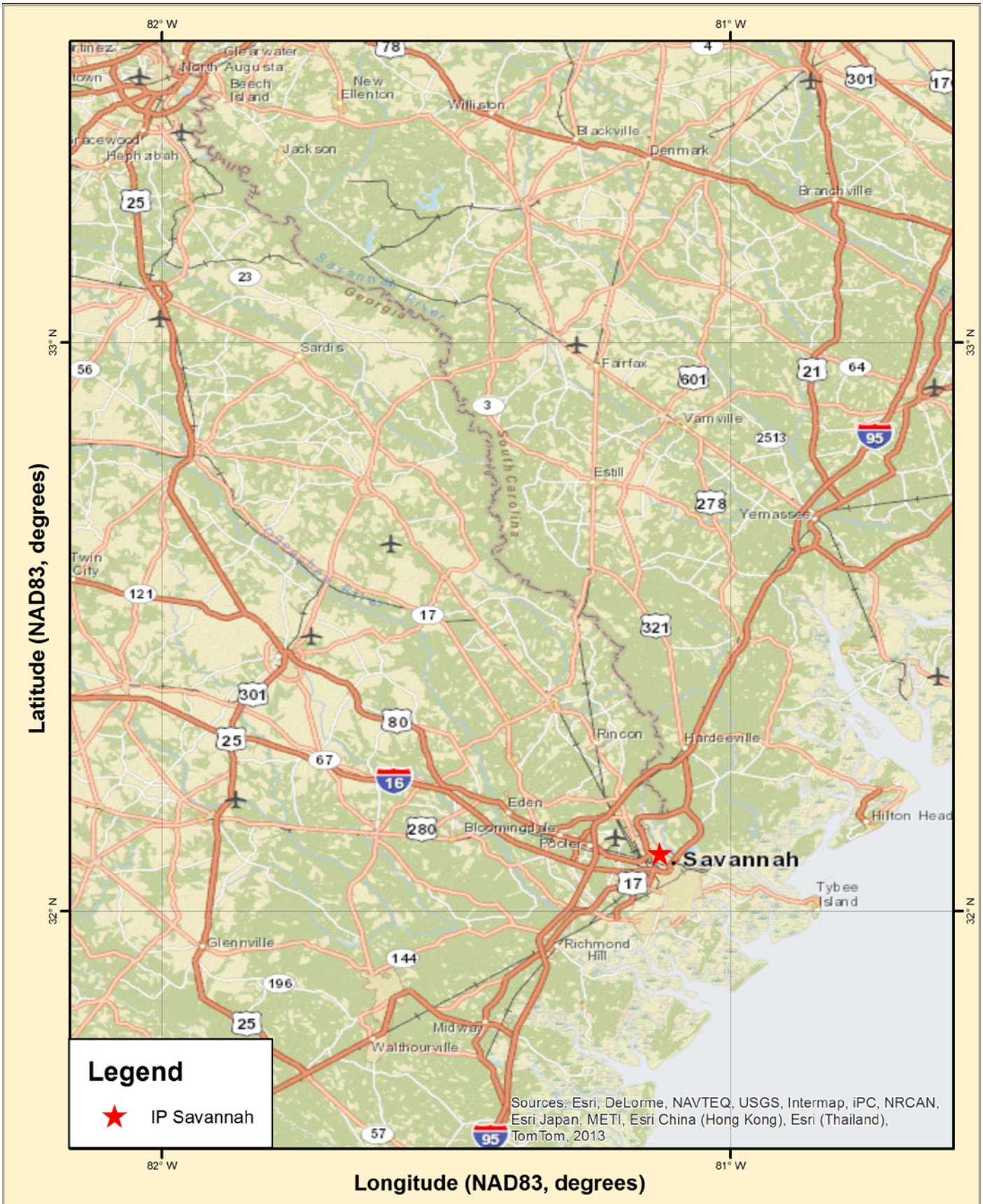

Fig. 2-1
IP Savannah Location

0 10 20 40 Kilometers

N

URS

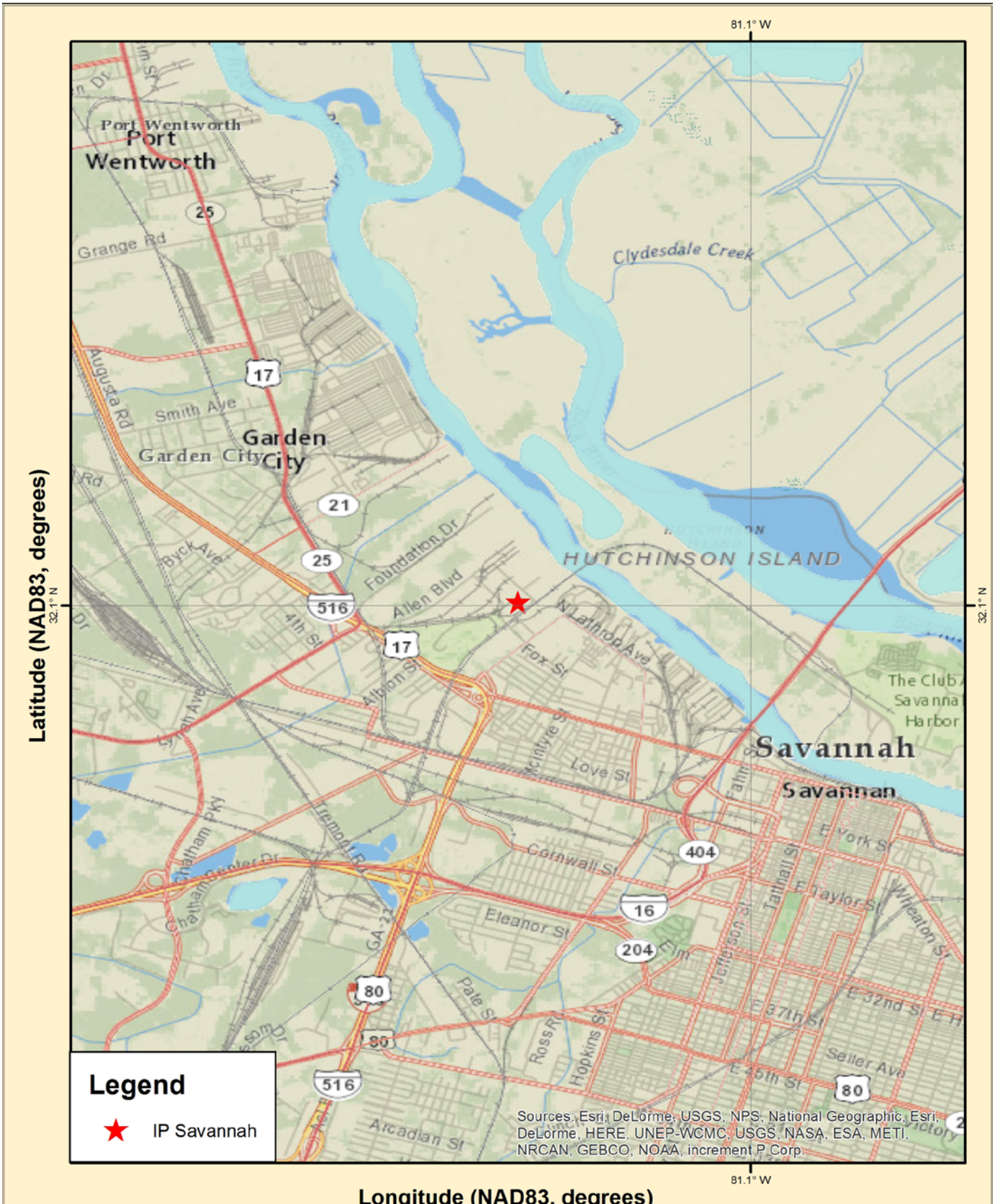

Fig. 2-2
IP Savannah Surrounding Terrain

0 0.5 1 2 Kilometers

N

URS

Georgia Department of Natural Resources
Environmental Protection Division • Air Protection Branch
4244 International Parkway • Suite 120 • Atlanta • Georgia 30354
404/363-7000 • Fax: 404/363-7100
Judson H. Turner, Director

May 13, 2014

Amy M. Marshall
URS Corporation – North Carolina
Tel: 919-461-1251
Amy.Marshall@urs.com

Subject: **Review of PSD Air Dispersion Modeling Protocol**
International Paper – Savannah Mill Modification Project
Savannah, Chatham County, GA

Dear Ms. Marshall:

We have reviewed the air quality dispersion modeling protocol submitted by URS Corporation-NC, on behalf of the International Paper – Savannah Mill, dated on May 1, 2014. The applicant proposed to make modifications to the existing No. 13 Power Boiler in order to comply with the Boiler MACT and Regional Haze Rule emission limits for HCl and SO_2. The modifications include the addition of load-bearing natural gas burners and removal of oil-firing capability. The modification project could result in a significant emission increase of CO. The modeling protocol discusses the applicant's proposed approach to show modeled conformance with the applicable air quality standards. We find that it generally conforms to the procedures and guidelines we use to assess Prevention of Significant Deterioration (PSD) projects. Following are GA EPD's comments:

1. Class I Increment Analysis: EPA/EPD retain purview over Class I Increment consumption, so both agencies should get a copy of any project correspondence you may have with any FLMs. Since there would be no increase in any of the visibility-affecting pollutants, the applicant is not required to perform Class I area significance screening with AERMOD or ISCST3.

2. Air Toxics: GA EPD Stationary Source Permitting Program will advise the applicant whether the toxic air pollutant (TAP) analysis is required, and the list of TAPs that need to be assessed for this modification project.

   Air toxics modeling should be conducted in accordance with the GA EPD Guideline for Ambient Impact Assessment of Toxic Air Pollutant Emissions, 1998. Air toxics modeling may use either AERMOD, version 13350, with downwash, or ISCST3, version 02035 without downwash. Air toxics model receptors should extend to at least 2 km outward from the project site, and there must be sufficient receptors to resolve the Maximum Ground-Level Concentration (MGLC). If any receptors are located at terrain elevations in excess of the lowest stack height in the model, AERMOD must be used to assess impacts at those receptors. The SCREEN3 model should not be used without specific justification, due to the number of sources and the range of source emission characteristics at the site. The air toxics modeling must be conducted to involve all on-site sources of the same pollutant.

   The most recent version of the GA EPD AAC spreadsheet can be found at http://www.georgiaair.org/airpermit/html/sspp/modeling.htm. Please review the AACs values at the applicable averaging periods to ensure they have not been updated with more recent

values. Georgia EPD no longer requires derivation of Acceptable Ambient Concentrations (AACs) from NIOSH LD_{50} threshold concentration data.

3. Class II criteria pollutant dispersion modeling should use the latest version of AERMOD (version 13350). Standards discussed in the draft 1990 New Source Review Workshop Manual (referred to here as pre-2008) should be evaluated using that draft guidance. Recent standards (post-2007, i.e., 1-hour NO_2, 1-hour SO_2, annual PM2.5, and 24-hour PM2.5) should be evaluated using the guidance memos listed at the EPA web: http://www.epa.gov/ttn/scram/guidance_clarificationmemos.htm. The emissions modeled in the significant analysis should reflect the proposed potential emission increase for this application, rather than the actual emission increase as stated in Section 3.5 of the protocol.

4. Offsite Inventory, NAAQS and Increment Issues: If the project is significant for any averaging period of any criteria pollutants with their emissions greater than their respective SERs, a refined air quality analysis (both NAAQS and Increment, if applicable) will be required. Please document all sources of information used to compile the offsite inventories for the project. Please follow the generic inventory development and receptor placement guidance in the Georgia EPD PSD Permit Application Guidance Document (September, 2012).

   The GA EPD Stationary Source Permitting Program will review and, if acceptable, approve your on- and off-site emissions inventories including the stack parameters and emission rates. Rather than use average or typical emissions data, we would prefer that you identify missing inventory information and allow EPD the opportunity to provide the information to you or confirm that it is missing and approve your specific missing data handling technique.

5. Ambient Concentrations: The ambient concentrations for year 2010-2012 period can be found at GA EPD website http://www.georgiaair.org/airpermit/html/sspp/modeling.htm. We will update with you the 2011-2013 ambient concentrations when they become available.

6. General Modeling considerations: Please use BPIP PRIME (version 04274) to assess building downwash dimensions and GEP stack heights. Stacks of heights equal to, or in excess of GEP height should be modeled using the GEP height. Please use AERMAP (version 11103) to assess all model receptor elevations above sea level with the USGS National Elevation Dataset (NED) (all model coordinates, including building corners, should be referenced using the NAD83 datum). Please assess source base elevations using AERMAP, if appropriate, otherwise, use plant grade elevations.

   For all criteria pollutant modeling, please use AERMOD (version 13350). The AERMOD meteorological data set (Savannah surface data, and Charleston (SC) upper air data, for the period 2007-2011) can be downloaded at GA EPD website at http://www.georgiaair.org/airpermit/html/sspp/modeling.htm. The applicant is expected to provide the meteorological data representativeness analysis.

7. Model Receptors: For the pre-2008 air quality standards, the extent of the receptors modeled should be 100-m at the fence-line and out to 2 km from the primary project emission source, 250-m from 2 km to 5 km, and 500-m beyond 5 km to 10 km, or the extent of the largest SIA. GA EPD approves the receptor grid proposed in the protocol. All design concentrations and all concentrations equal to or greater than 90% of the design concentrations should be resolved at the 100-m or less grid resolution. The receptors in the significant impact analysis should have at least one 100-m spaced receptor located farther from the project than the farthest receptor showing a concentration greater than or equal to the respective SIL. For the

post-2007 air quality standards, please follow the EPA guidance memos listed at: http://www.epa.gov/ttn/scram/guidance_clarificationmemos.htm. In addition to the facility fence line, receptors also need to be placed with at least 100-m spacing on the roads across the facility with public access.

GA EPD requests that a facility plot showing the anticipated fence-line for the proposed project be submitted in the permit application. Any areas outside the proposed facility fence-line will be considered ambient air.

8. Preconstruction Monitoring Evaluation: The applicant should submit the Monitoring *De Minimis* concentration comparison to determine whether the proposed facility is required to conduct preconstruction monitoring for the applicable criteria pollutants. Ozone Impact Analysis is not required since NOx or VOC emissions would not exceed 100 tons per year. Please check the Georgia EPD PSD Permit Application Guidance Document (September 2012) for details.

9. Additional Impacts: All additional impacts studies will be limited to no more than the largest significant impact distance from the project site. Additional impacts studies do not include National Monuments, unless specifically requested by a Federal Land Manager. Please check the Georgia EPD PSD Permit Application Guidance Document (September, 2012) for details.

10. Worst-Case Scenario Determination: The applicant is suggested to model the maximum short-term hourly emission rate for all sources by representing all process sources operating 8760 hours per year simultaneously and continuously as its worst-case scenario. Or submit an analysis to demonstrate the worst-case scenario, with various fuels (biomass, natural gas, limited coal burning), various loads, etc.

Please refer to Georgia EPD PSD Permit Application Guidance Document (September 2012) Appendix A and B for completeness of your application. If EPA issues any guidance, or models which you believe may affect the modeling of this project subsequent to this protocol approval letter, please contact EPD to verify the ability to incorporate such guidance or models into the assessments of this application.

This protocol approval is valid for 6 months from today, unless otherwise stipulated. If you have specific questions on issues discussed in this protocol approval letter or issues that develop after you receive this letter, please contact Yan Huang at Yan.Huang@dnr.state.ga.us or 404-363-7072.

Sincerely,

James Boylan, Ph.D.
Manager, Data & Modeling Unit
Georgia Department of Natural Resources
Environmental Protection Division - Air Protection Branch

Attachments: Generally Applicable Modeling References

Generally Applicable Modeling References

1990, Draft New Source Review Workshop Manual.

1995, SCREEN3 Model User's Guide, EPA-454/B-95-004, Version 96043.

1995, User's Guide for the Industrial Source Complex (ISC3) Dispersion Models, Volume I - User Instructions, Volume II – Description of Model Algorithms. EPA-454/B-95-003a & b, September, 1995.

1998, Guideline for Ambient Impact Assessment of Toxic Air Pollutant Emissions, Revised June 21, 1998, Georgia Environmental Protection Division (GA EPD), http://www.georgiaair.org/airpermit/downloads/otherforms/infodocs/toxguide.pdf

2002, User Instructions for the Revised ISCST3 Model (Version 02035), Feb 4, 2002.

2004, User's Guide for the AERMOD Terrain Preprocessor (AERMAP, Version 04300), Under Revision, EPA-454/B-03-003, October 2004.

2004, User's Guide for the AMS/EPA Regulatory Model – AERMOD, Under Revision, (EPA-454/B-03-001, September 2004) (Version 04300)

2004, User's Guide to the Building Profile Input Program (BPIP), updated to include the PRIME algorithm (BPIPPRM, version 04274, EPA-454/R-93-038, (Revised April 21, 2004), (Electronic copy only). See also bpiprz1.txt, changes to the BPIPPRM utility.

2005, 40 CFR 51, Appendix W, Guideline on Air Quality Models.

2009, AERMOD Implementation Guide, Last Revised: March 19, 2009

2010, Guidance Concerning the Implementation of the 1-hour NO2 NAAQS for the Prevention of Significant Deterioration Program, EPA Memorandum from Stephen D. Page, Director, OAQPS, to EPA Regional Air Division Directors, June 29, 2010.

2010, Guidance Concerning the Implementation of the 1-hour SO2 NAAQS for the Prevention of Significant Deterioration Program, EPA Memorandum from Stephen D. Page, Director, OAQPS, to EPA Regional Air Division Directors, August 23, 2010.

2010, Modeling Procedures for Demonstrating Compliance with PM2.5 NAAQS, EPA Memorandum from Stephen D. Page, Director, OAQPS, to EPA Regional Modeling Contacts and selected OAQPS Personnel, March 23, 2010.

2010, Prevention of Significant Deterioration (PSD) for Particulate Matter Less Than 2.5 Micrometers (PM2.5)--Increments, Significant Impact Levels (SILs) and Significant Monitoring Concentration (SMC), Final rule, Federal Register vol. 75, No. 202, pgs. 64863-64907, October 20, 2010.

2011, ADDENDUM, User's Guide for the AERMOD Terrain Preprocessor (AERMAP Version 11103), EPA-454/B-03-003, October 2004.

2011, ADDENDUM, User's Guide for the AMS/EPA Regulatory Model – AERMOD, (EPA-454/B-03-001, September 2004), March 2011 (version 11103)

2011, Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO2 National Ambient Air Quality Standard, EPA Memorandum from Stephen D. Page, Director, OAQPS, to EPA Regional Air Division Directors, March 1, 2011.

2012, Georgia EPD PSD Permit Application Guidance Document, GA EPD, http://www.georgiaair.org/airpermit/html/sspp/psd_guidance_document.htm

2012, Interim Dispersion Modeling Guidance, Last Revised April 23, 2012, GA EPD (georgiaair.org),

http://www.georgiaair.org/airpermit/downloads/sspp/modeling/airdispmodelguidance_april2012.pdf

2013, Draft Guidance for PM2.5 Permit Modeling, http://www.epa.gov/ttn/scram/guidance/guide/Draft_Guidance_for_PM25_Permit_Modeling.pdf

2013, AERMOD User's Guide Addendum, http://www.epa.gov/ttn/scram/models/aermod/aermod_userguide.zip