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Golder Associates

December 22, 2004

0437536

Florida Department of Environmental Protection
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Attention: Ms. Trina L. Vielhauer, Chief, Bureau of Air Regulations

RE: GERDAU AMERISTEEL – REQUEST FOR ADDITIONAL INFORMATION FOR THE JACKSONVILLE STEEL MILL PREVENTION OF SIGNIFICANT DETERIORATION ANALYSIS
PROJECT NO.: 0310157-007-AC/PSD-FL-349

Dear Ms. Vielhauer:

This correspondence provides the additional information requested by the Florida Department of Environmental Protection (Department or FDEP) concerning the PSD Application that was submitted by Gerdau Ameristeel in October of 2004. This information is presented in the same sequence as the requested information in the Department's letters dated November 24, 2004 and December 14, 2004, respectively.

Comment 1: **In Section 2.2.1, 2nd paragraph, it is stated that the existing EAF "generates heats at 19 tons per day," which is less than a ton per hour (TPH). Is this number correct? Please explain and submit a correction, if appropriate.**

Response: The number 19 is correct. However, the units are incorrect. 19 is the number of EAF heats per day. The sentence should read as follows: The current EAF, while generating heats at an average rate of 19 per day, has many process limitations . . . .

Comment 2: **In Section 2.2.1, 2nd paragraph, it is stated that the new EAF will be "tapping 105 tons of liquid steel," which is less than the proposed "140 TPH monthly average" and "160 TPH maximum hourly average." Is this number correct or not? Please explain and submit a correction, if appropriate.**

Response: The new EAF is designed to tap 105 tons of liquid steel and the design "tap to tap" time, the time between successive heats, is 40 minutes at a minimum, generating a maximum production rate of 160 tons per hour; and, on a monthly average, 45 minutes, generating a monthly average production rate of 140 tons per hour. Based on a monthly production rate of 140 tons per hour and 8,520 hours per year, the maximum annual design production rate is 1.2 million tons per year.

Comment 3: **In Section 2.2.1, the 5th paragraph, it is stated that the new EAFs will "each have a daily maximum hourly production rate of 160 TPH and a monthly maximum hourly production rate of 140 TPH." Based on the stated existing EAF's production rate (see Issue #1, above), is this request for the modification of the meltshop operation production a net increase of 319 TPH? Please explain and submit a correction, if appropriate.**

Response: The project consists of one new electric arc furnace (EAF) and one new ladle metallurgy furnace (LMF), each of which will have a daily maximum hourly production rate of 160 TPH, and a monthly maximum hourly production rate of 140 TPH as described in Comment Response No. 2. The EAF and LMF operate in series. After the steel has been tapped (emptied) out of the EAF into a ladle, the ladle is taken to the LMF for alloy and temperature adjustment before being transported to the continuous caster.

Since the EAF and LMF operate in series, the maximum production rate of the proposed project is limited to 160 TPH and a monthly maximum of 140 TPH; and, based on the currently permitted facility production rate of 100 TPH maximum daily average, the net increase in production based on the proposed project is 60 TPH.

Comment 4: **In Section 2.2.1, 3rd paragraph, it is stated that the LMF is "a small EAF," yet it is described as and sized at the same processing level as the proposed new EAF. Are the proposed EAF and LMF identical and separate emissions units? Please explain in detail the differences, including the fuel consumption rates, processing rates (both raw material input and product output), physical layout, hooding, venting, process, materials used, heat cycle time frames, etc.**

Response: The description of the LMF as a small EAF was only in the sense that each utilizes arcing of electrodes to produce heat. The EAF accepts scrap steel which it melts to a liquid state primarily with heat that is generated by arcing of electrodes and secondarily with natural gas side wall burners inside the furnace. The LMF accepts liquid steel and which it adjusts and maintains at a desired temperature with heat generated through arcing of electrodes.

The proposed EAF has a maximum process input rate of 176 tons per hour of scrap steel and a maximum production output of 160 tons per hour of tapped steel (liquid steel). The EAF also has input of carbon and lime at approximate input rates of 64 and 72 lbs per ton of steel, respectively.

As stated previously, the EAF utilizes arcing of electrodes to produce heat as well as natural gas sidewall burners to melt the scrap steel. As stated in the application, the natural gas usage rate is approximately 200 to 300 ft^3 per ton of steel or 0.034 $MMft^3/hr$. The energy use is approximately 280 to 350 kWh per ton of steel depending on market conditions.

The proposed LMF has a maximum process input rate of 160 TPH of liquid steel and a maximum output rate of 160 TPH of liquid steel. The LMF is equipped with a bulk flux and alloys batching system, alloy wire feeders, H_2O cooled roof, and electrodes to allow temperature adjustments. Argon gas is bubbled through the ladle also to aid in refining. The LMF operator takes a sample of the steel and, based on the sample results, adds a controlled amount of lime and alloys to the steel in the ladle. Lime reacts with impurities, forming slag that floats on top of the metal. As needed, alloys are added to the steel by using the bulk alloy system, dumping bagged alloys into the

ladle, and by using the wire feeder to feed metallurgical wire-containing alloys. If necessary, the electrodes can be used to adjust or maintain steel temperature. When the chemistry and temperature at the LMF are within specifications, the ladle is taken to the caster.

Comment 5: **Referring to Item #4, above, the application's potential pollutant emissions (see Section 1 of 4, Emissions Unit Information) are only calculated for one proposed new EAF and not for two separate, but similar/identical production emissions units (EAFs: EAF and LMF). If both of the proposed new EAFs (EAF and LMF) are each separate production emissions units, then the application needs to be supplemented with additional pages related to the LMF (described as a smaller EAF). Please calculate and submit the potential pollutant emissions for the additional emissions unit (fuel related pollutants and process pollutants) on the appropriate application pages and associated appendices, if necessary.**

Response: As stated in Section 5.1 of the application, the EAF and LMF make up one emission unit and exhaust to a common baghouse. The operation of the EAF and LMF are interconnected. Without the LMF, the refinement operations will be performed in the EAF, and the emissions per ton of steel are assumed to be equal with or without the LMF. The EAF and LMF work together to produce liquid steel from scrap steel and, as such, serve as one emission unit. The addition of a LMF reduces the heat time of the EAF by moving the refining operation to the LMF. While molten steel is being refined in the LMF, the EAF can be charged with scrap and melted, thus increasing the production rate of the facility. Based on this arrangement, the proposed BACT limits applicable to the common EAF/LMF Baghouse encompass the limits for the EAF and LMF combined.

Comment 6: **Referring to Item #1, above, please adjust and submit any contemporaneous emissions calculations, if appropriate.**

Response: As stated in Comment Response No. 1, 19 is the average number of EAF heats per day for the existing EAF. No adjustments to contemporaneous emissions are appropriate.

Comment 7: **Please provide the manufacturer's specifications on the proposed new EAF and the proposed new LMF regarding their production rate(s) and operation(s). If any, please provide a picture of the proposed new EAF and the proposed new LMF.**

Response: See Attachment A. The EAF/LMF vendor has not been selected. The information submitted in Attachment A is an example of the performance expected for the EAF. It should be noted that the "Tap to Tap" time of 48.5 minutes identified in Attachment A is operation without an LMF. The addition of the LMF will reduce the EAF "Tap to Tap" time by approximately 6 minutes. At this point, specific LMF data is not available. The application is based on a minimum "Tap to Tap" time of 40 minutes, generating a maximum production rate of 160 tons per hour; and, on a monthly average, 45 minutes, generating a monthly average production rate of 140 tons per hour. Thus, the overall "Tap to Tap" time of 40 minutes results in a conservative maximum production rate.

Comment 8: **What is the maximum raw material feed input rate(s) to and their product rate(s) from each the proposed new EAF and the proposed new LMF?**

Response: See response to Comment No. 4, and see Attachment A.

Comment 9: **Please explain in more detail how the proposed new EAF and the proposed new LMF interact operation and production wise (in series or parallel or both) and show how they will be physically aligned with each other on the proposed new mezzanine pad. Please explain a "heat cycle" through each the proposed new EAF and the proposed new LMF and include a timeframe for each response.**

Response: See Attachment B for a flow diagram of the EAF and LMF. As explained previously, the EAF and LMF will operate in series.

The term "heat cycle" only applies to the EAF. A basic heat cycle includes the following steps:

1. Charging the EAF – Loading scrap steel into the EAF via charge buckets operated by crane.
2. Melting – Meltdown, superheating, and refining.
3. Tapping – Unloading of liquid steel from EAF to ladle.

Attachment A contains the estimated "tap to tap" time breakdown in tabular and pie chart format for a typical heat.

Comment 10: **For purposes of reducing nitrogen oxides (NO_x) emissions from the proposed modified Billet Reheat Furnace operations, evaluate and submit the cost analysis for the installation of SCR.**

Response: Application Section 5.3.2.3 includes a discussion of the feasibility of SCR applied to the Reheat Furnace, and Section 5.3.2.4 includes a cost analysis. Upon review of the cost analysis, an error in the calculation of project contingencies was identified. A revised cost analysis is provided in Attachment C. The total estimated capital cost of SCR for the Reheat Furnace is estimated at $1.4 million. The total annualized cost is estimated at $230,000 per year.

As stated in the application there has been only one installation of SCR on a Reheat Furnace (Beta Steel, Portage, Indiana). The SCR system at Beta Steel was unable to control NO_x emissions as originally permitted at 0.014 lb/MMBtu. As a result, Beta Steel was forced to apply for a revised permit limit equal to 0.077 lb/MMBtu (IDEM Construction Permit 127-9642-00036, May 30, 2003). This revised limit is essentially equal 0.08 lb/MMBtu proposed for the Gerdau Ameristeel project. As a result, the Indiana Department of Environmental Management (IDEM) issued Beta Steel a new permit limit and stated that "Beta Steel has demonstrated that due to the non-steady state nature of the reheat furnace process, it is not possible to maintain a consistent level of performance from SCR control. This results in lower efficiency of control of NO_x emissions." (See Application Section 5.3.2.3.) In order for a SCR system to effectively reduce NO_x emissions, the exhaust stream must have relatively stable gas flow and temperature. As stated, the reheat furnace is a non-steady state operation, and as such the flue gas emission concentration and temperature are highly variable depending upon the heat input rate and the material being heated.

In conclusion, while Beta Steel operates the only SCR controlled reheat furnace, the NO_x BACT permit limit of 0.077 lb/MMBtu is consistent with recently permitted furnaces with low NO_x burners and good combustion practice. Based on Beta Steel's experience, and IDEM's conclusions, SCR is not considered a proven technology for control of NO_x emissions from reheat furnaces.

As stated, an updated cost analysis is presented in Attachment C. The potential future NO_x emissions with SCR are based on 30 percent reduction, which is equivalent to 3 times higher reduction than the only installation of SCR, Beta Steel, has proven to maintain consistently. The resulting cost-effectiveness is estimated at nearly $10,000 per ton of NO_x removed. This is also based on a maximum reheat furnace heat input of 222 MMBtu/hr and 8,500 hours per year of operation. The actual annual average heat input will be much lower than 222 MMBtu/hr and result in much higher cost effectiveness. For these reasons, SCR is not considered to be cost effective for the project.

Comment 11: For purposes of reducing lead (Pb) emissions from the EAF and LMF operations, evaluate the feasibility and submit the cost analysis for the installation of a HEPA Filtration System in series and after the baghouse control system(s) for the EAF/LMF and Meltshop Building operations.

Response: Gerdau Ameristeel has contacted several manufacturers regarding the feasibility of HEPA filters. HEPA filters, by definition, allow only 3/10,000 particles (0.3 microns) to penetrate the media and operate at high pressure drop. Midwest Filter Resources, Inc. (e-mail dated November 29th, 2004) has indicated that they are unaware of any HEPA system in any industry that handles even 5 percent of the volume of the proposed baghouse.

Additionally, EPA's Air Pollution Control Technology Fact Sheet, Attachment D, for HEPA filters states that the "common industrial applications of HEPA filters are hospital, low-level nuclear, and mixed waste incinerators and nuclear air ventilation and safety systems. In addition, the filters are used in a number of commercial applications and manufacturing processes such as clean rooms, laboratories, food processing, and the manufacture of pharmaceuticals and microelectronics." EPA also states that "HEPA filters are limited to low capacity air flow applications. Commercial available modular systems can accommodate air flow rates in the range of 5,000 to 40,000 scfm."

Additional HEPA filters do not operate with a cleaning cycle such as baghouses. As the dust cake forms on the filter, the resistance increases; therefore, the air flow rate decreases. After the pressure drop across the filter reaches a point that prevents adequate air flow, the filter must be replaced and disposed. This type of operation is not acceptable for use in an EAF application.

For these reasons, HEPA filters are considered technically infeasible for the project.

Comment 12: For the LMF operation, are there plans to use a refractory-lined lid to reduce or minimize air emissions? If so, please provide the details.

Response: The LMF will utilize a water-cooled lid that houses the electrodes. See description of LMF in Comment Response No. 4.

Comment 13: For purposes of reducing PM/PM_{10} (particulate matter and particulate matter less than 10 microns) and Pb emissions from the EAF/LMF and Meltshop Building operations, evaluate the feasibility and submit the cost analysis for the installation of a scrubber system.

Response: Wet scrubbers are systems that involve particle collection by contacting the particles to a liquid, usually water. Wet scrubbers create a liquid waste that must be treated prior to disposal. In this case, the water will contain the hazardous waste EAF baghouse dust (RCRA Hazardous Waste K061). Typical gas flow rates for scrubbers are 500 to 100,000 scfm. The proposed project would require that the flow out of the baghouse be split into 10 separate scrubber units. EPA's Air Pollution Control Technology Fact Sheet, Attachment E, estimates the capital cost from $2.5 to $21 per scfm. Given the constituents of EAF baghouse dust, the scrubbers would likely need to be constructed of stainless steel and would likely be near the upper range of capital cost. Therefore the capital cost would be approaching $20,000,000.00. EPA states that the annualized cost range from $5.7 to $193 per scfm. Even at the low end of the range would result in nearly $6,000,000.00 annual cost for operating the scrubbers. The annual PM/PM_{10} emissions from the proposed baghouse are estimated to be 65.7 TPY. Conservatively, assuming 99 percent reduction would result in a cost-effectiveness of over $90,000 per ton of PM/PM_{10} removed.

In comparison, and as presented in Section 5.2.1.4 of the application, the estimated cost-effectiveness of the proposed baghouse is $430 per ton of PM removed.

Comment 14: Please provide an ambient air quality standards (AAQS) analysis for Pb in the Class II area, and address the impacts of the projected increase in Pb emissions in the Class I area.

Response: An AAQS analysis for Pb in the Class II area has been performed and is included as Attachment F. Impacts in the PSD Class I areas are also addressed in Attachment F. The modeling files will be sent under separate cover. As a conservative estimate, the highest monthly average Pb impact predicted using the five years of meteorological data was added to a background Pb concentration representative of the area using ambient air monitoring data. The most recent two years of Pb concentration measurements in Duval County were 2001 and 2002. The highest quarterly average concentration of these two years is 0.02 μ/m^3. As a result, the highest total lead concentration predicted for the project and background is 0.07 $\mu g/m^3$, compared to the quarterly Pb AAQS of 1.5 μ/m^3.

The highest monthly average Pb concentration from project sources in the nearest Class I area, (i.e. Okefenokee National Wilderness Area (NWA)), is equal to 0.0007 $\mu g/m^3$. Because other PSD Class I areas are located even further from the project (i.e. Wolf Island, Chassahowitzka, and St. Marks Class I NWA), they are expected to be lower than that predicted at the Okefenokee NWA. At these low levels of predicted Pb concentrations, there are expected to be no negative impacts on vegetation or wildlife in the vicinity of the project or at the PSD Class I areas.

Comment 15: In the Class II SO_2 PSD modeling input files provided to us, source CFPLPUTM is missing. This source is identified in Table E-l, which contains a summary of SO_2 sources used in the modeling analyses. In the Class II NO_x PSD modeling input files provided to us source-RECOV is missing. This source is identified in Table E-2, which contains a summary of NO_x sources used in the modeling analyses. Also St. John's River Power Park is an SO_2, NO_x and PM_{10} increment-consuming source; all of their SO_2, NO_x and PM_{10} emissions at Units 1 and 2 consume increment (1,858 grams/seconds SO_2, 928.88 grams/second NO_x and 46.48 grams/second PM10 emissions). Please update Tables E-l, E-2, E-3, and E-4 to show that these emissions are increment-consuming and remodel using the correct inputs.

Response: Revisions to the modeling files have been made and the updated results are included as Attachment G. Based on the results of these revised modeling analyses, the proposed modifications at the Gerdau Ameristeel facility will comply with applicable PSD increments. The modeling files will be sent under separate cover.

Comment 16: No table or documentation of either the current actual or PSD baseline emissions used in the significant impact and PSD increment analyses was given in the application; please provide this information. Also different values for NO_x emissions were used in the Class I and Class II PSD increment analyses. In addition, the NAAQS analyses for SO_2, PM_{10}, and NO_x contained and modeled the negative input emissions used as the current actual values in the respective significant impact analyses for these pollutants. Please address and correct these inputs and remodel where necessary.

Response: The current actual emissions used in the significant impact and PSD increment analyses were presented in Tables 2-1 through 2-6. Included in these tables are current actual emissions and stack parameters and future potential emissions and stack parameters. However, additional tables have been provided to more clearly define the modeled emissions and are included as Attachment H.

The Class II NO_x modeling analysis included NO_2 emissions from the project equivalent to 75 percent of the total NO_x emissions. This factor of 75 percent applied to account for the portion of NO_x emission that is considered to be emitted as NO_2. This is based on the Tier 2 screening analysis approach recommended in EPA's Guideline on Air Quality Models (Appendix W, 40 CFR 51). The Class I CALPUFF modeling analysis utilized the full NO_x emissions.

The current actual emissions sources were inadvertently left in the NAAQS analysis. These model files have been revised and the results are included as Attachment I. Based on the results of these revised modeling analyses, the proposed modifications at the Gerdau Ameristeel facility will comply with applicable ambient air quality standards.

Comment 17: The Seminole Electric CEM data summarized in Table E-5 should be updated to include the most recent two years of data (preferably through October, 2004, if available). Also the department can not exclude periods when the scrubber at Seminole Electric is inoperative.

Response: The Seminole Electric CEM data has been updated to include the most recent two years of data and a revised Table E-5 is included as Attachment J. The data include the most recent data available from the EPA's Acid Rain Database for the time period of June 30th, 2002 through June 30th, 2004. As shown in Table E-5, the highest 3-hour and 24-hour total emissions from Unit 1 and Unit 2, combined, are 12,075 and 8,898 lbs, respectively. No periods of data have been excluded in this two-year period. These updated 3-hour and 24-hour emission rates are lower than the previously modeled emission rates of 12,400 and 9,850. No additional modeling was performed.

U.S. EPA REGION 4, MR. SCOTT MILLER

Comment: The applicant dismissed the use of selective non-catalytic reduction (SNCR) for the EAF/LMF installation as technically infeasible. In addition, the applicant did not consider selective catalytic reduction (SCR) for the reheat furnace. There has been successful use of SNCR for EAFs on multiple occasions. The Institute of Clean Air Companies released a White Paper entitled; "Selective Non-Catalytic Reduction for Controlling NO_x Emissions" dated May 2000. It lists several steel mini-mills where SNCR and SCR have been demonstrated and are in operation. Mills where one of both technologies have been demonstrated are National Steel (Ecorse, MI), Nucor Steel (Hickman, AR), Nucor Steel (Hugor, SC), Protec/U.S. Steel (Leipsic, OH) among others. We recommend that the applicant be required to consider both SCR and SNCR technically feasible and evaluated for installation. It is important to note that BACT is not exclusively limited to technologies that have been entered into the BACT/LAER Clearinghouse but those emission rates produced by technologies available and demonstrated.

Response: The Institute of Clean Air Companies' White Paper entitled; "Selective Non-Catalytic Reduction for Controlling NO_x Emissions", dated May 2000, shows that none of the sources of the listed steel facilities are EAFs or LMFs. The sources identified are natural gas-fired furnaces including annealing furnaces, tube furnaces, rotary hearths, etc. This document does not address the application of SNCR on electric arc furnaces and, as such, cannot be used as a basis for the determination that SNCR is a feasible and demonstrated technology for EAF/LMFs. Furthermore, not related to the White Paper, in 2,000, Nucor Steel was required to evaluate the feasibility of SNCR on an EAF as part of an EPA Consent Decree, and determined that the technology is not technically feasible. Gerdau Ameristeel is in the process of contacting Nucor Steel for documentation of the feasibility study.

As stated in the application, SNCR is only effective within a temperature window of 1,600 to 2,000 degrees Fahrenheit (°F). The temperature window is very important because, outside of this range, either more ammonia slip occurs through the system or more NO_x is generated than is being chemically reduced. The EAF/LMF operation is highly transient and the required temperature and residence time required for SNCR is not achieved in the EAF/LMF duct work. Therefore, for the project, SNCR and SCR

are not considered technically feasible for application to the Gerdau Ameristeel EAF/LMF project.

SCR was considered as a potential control for the Reheat Furnace in the application. Application Section 5.3.2.3 includes a discussion of the feasibility of SCR applied to the Reheat Furnace and Section 5.3.2.4 includes a cost analysis. Also, see Comment 10 above.

CONCLUSION

Gerdau Ameristeel wishes to resolve all of the Department's questions as expeditiously as possible so that they may move forward with the proposed project in a timely manner. Please call me or Kennard Kosky at (352) 336-5600 if you need any additional information.

Sincerely,

GOLDER ASSOCIATES INC.

Kennard F. Kosky, P.E.
Principal

David T. Larocca
Project Engineer

DTL/dmw

Enclosures

cc: Donald R. Shumake, Vice President/General Manager
James P. Wold, Environmental Specialist
R. Mitchell
C. Holladay
Y:\Projects\2004\0437536 Gerdau-Ameristeel PSD-414 I\RAI122204.doc
C. Kirts, NED
R. Robinson, Duval Co.
H. Wahby, EPA
Q. Bumpers NPS

APPLICATION INFORMATION

Owner/Authorized Representative Statement

Complete if applying for an air construction permit or an initial FESOP.

1. Owner/Authorized Representative Name :
   Donald R. Shumake, Vice President/General Manager
2. Owner/Authorized Representative Mailing Address...
   Organization/Firm: **Gerdau Ameristeel**
   Street Address: **16770 Rebar Road**
   City: **Baldwin** State: **Florida** Zip Code: **32234**
3. Owner/Authorized Representative Telephone Numbers...
   Telephone: **(904) 226-4261** ext.**100** Fax:**(904) 266-4244**
4. Owner/Authorized Representative Email Address: **shumake@gerdauameristeel.com**
5. Owner/Authorized Representative Statement:

   I, the undersigned, am the owner or authorized representative of the facility addressed in this air permit application. I hereby certify, based on information and belief formed after reasonable inquiry, that the statements made in this application are true, accurate and complete and that, to the best of my knowledge, any estimates of emissions reported in this application are based upon reasonable techniques for calculating emissions. The air pollutant emissions units and air pollution control equipment described in this application will be operated and maintained so as to comply with all applicable standards for control of air pollutant emissions found in the statutes of the State of Florida and rules of the Department of Environmental Protection and revisions thereof and all other requirements identified in this application to which the facility is subject. I understand that a permit, if granted by the department, cannot be transferred without authorization from the department, and I will promptly notify the department upon sale or legal transfer of the facility or any permitted emissions unit.

   Donald R. Shumake — Signature

   12-22-04 — Date

APPLICATION INFORMATION

Professional Engineer Certification

1. Professional Engineer Name: **Kennard F. Kosky**
   Registration Number: **14996**
2. Professional Engineer Mailing Address:
   Organization/Firm: **Golder Associates Inc.****
   Street Address: **6241 NW 23rd Street, Suite 500**
   City: **Gainesville** State: **FL** Zip Code: **32653-1500**
3. Professional Engineer Telephone Numbers:
   Telephone: **(352) 336-5600** ext. Fax: **(352) 336-6603**
4. Professional Engineer Email Address: **KKosky@golder.com**
5. Professional Engineer Statement:

I, the undersigned, hereby certify, except as particularly noted herein, that:*

(1) To the best of my knowledge, there is reasonable assurance that the air pollutant emissions unit(s) and the air pollution control equipment described in this application for air permit, when properly operated and maintained, will comply with all applicable standards for control of air pollutant emissions found in the Florida Statutes and rules of the Department of Environmental Protection; and

(2) To the best of my knowledge, any emission estimates reported or relied on in this application are true, accurate, and complete and are either based upon reasonable techniques available for calculating emissions or, for emission estimates of hazardous air pollutants not regulated for an emissions unit addressed in this application, based solely upon the materials, information and calculations submitted with this application.

(3) If the purpose of this application is to obtain a Title V air operation permit (check here ☐, if so), I further certify that each emissions unit described in this application for air permit, when properly operated and maintained, will comply with the applicable requirements identified in this application to which the unit is subject, except those emissions units for which a compliance plan and schedule is submitted with this application.

(4) If the purpose of this application is to obtain an air construction permit (check here ☒, if so) or concurrently process and obtain an air construction permit and a Title V air operation permit revision or renewal for one or more proposed new or modified emissions units (check here ☐, if so), I further certify that the engineering features of each such emissions unit described in this application have been designed or examined by me or individuals under my direct supervision and found to be in conformity with sound engineering principles applicable to the control of emissions of the air pollutants characterized in this application.

(5) If the purpose of this application is to obtain an initial air operation permit or operation permit revision or renewal for one or more newly constructed or modified emissions units (check here ☐, if so), I further certify that, with the exception of any changes detailed as part of this application, each such emissions unit has been constructed or modified in substantial accordance with the information given in the corresponding application for air construction permit and with all provisions contained in such permit.

Signature — Date: 12/22/04

(seal) KFK

* Attach any exception to certification statement.

** **Board of Professional Engineers Certificate of Authorization #00001670**

ATTACHMENT A

MANUFACTURERS SPECIFICATIONS

EAF

GERDAU AMERISTEEL

GENERAL TECHNICAL SPECIFICATION	Location: GERDAU AMERISTEEL JACKSONVILLE		Author: C Peppers	Revision:
	Issue Date: 07/16/2004	Revision Date:	Verified:	Revision:
Title: General Specification for Supply of Electric Arc Furnace Equipment and Technology			Approved:	Revision:

c. EAF Basic Operating Performance Expectations

Basic Performance 105-ton EAF	Units	
Nominal Capacity	t	**115**
Tapping Weight	t	**105**
Transformer Rating	MVA	**90**
Average Active Power	MW	**62**
Average Electrical Energy Consumption	kWh/t	**310**
Average Oxygen consumption	scf/t	**1250**
Average NG Consumption	scf/t	**250**
Average Electrode Consumption	lbs/t	**3.0**
Power-on Time	min	**33.5**
Power-off Time	min	**11**
Charging	min	**2**
Tapping	min	**2.5**
Turn-around	min	**3**
Waiting for tapping (Probe, CCM, ...)	min	**2**
Service (Electrodes, gunning, etc...)	min	**1.5**
Delays	**min**	**6.5**
Tap-to-tap Time (net)	min	**44.5**
Tap-to-tap Time	min	**51.0**
Net Productivity	t/h	141.5
Productivity	t/h	123.5
Heats per day	#	28.2
Tons/Day	t	2,963
Tons/Year (@ 5620 hours)	t	693,796
Tons/Year (@ 6000 hours)	t	740,708

EAF Nominal Capacity	**s/tons**	**120**
Hot heel	s/tons	15
EAF Tapped weight (A)	**s/tons**	**105**
Average Active Power	MW	62
Active Power ratio	**MW/ton**	**0.59**
Productivity		**124**
Net Tap-to-Tap	min/heat	44.5
Power On	min/heat	33.5
Power Off	min/heat	11
EAF Bucket Charging	min/heat	2
Tapping	min/heat	2.5
EAF general Preparation	min/heat	1,0
EAF Turn Around	min/heat	5.5
Average Tap-to-Tap	min/heat	51
Steel Shop Operational delays	min/heat	4
Steel Shop Maintenance delays	min/heat	2.5
Electrical Energy consumption	**kwh/ton**	**330**
Electrical Energy consumption - EAF	kwh/ton	360
Tapping temperature	**°F**	**2980**
Electrodes EAF	**lb/ton**	**3.4**
Oxygen Total	**scf/ton**	**1250**
Natural Gas Total	**scf/ton**	**250**
Coke Total – Melting	**lb/ton**	**32**
Coke – Bucket	**lb/ton**	**20**
Coke – Injected	**lb/ton**	**12**
Lime (inc. MgO)	**lb/ton**	**72**
Refractories	**lb/ton**	**4.1**
Refractories EAF – Bricks	**lb/ton**	**1.1**
Refractories EAF - Fettling and Gunning	**lb/ton**	**3**

GERDAU AMERISTEEL JACKSONVILLE
S.4023/701

Version 0
AE / ANNEX 1
August 2004

Revision A
MV/mt / ANNEX 1
November 2004

A N N E X 1

PRODUCTION STUDY AND DESIGN DATA

Rev_A

Tap To tap time split up

Based on the 105 t AC EAF tapping weight, the following break down of the tap to tap time is calculated:

- Charging	*2 min*
- Tapping	*2.5 min*
- Turn Around	*3 min*
- Waiting for Tapping (Probe, CCM, ...)	*2 min*
- Services (Electrodes, Gunning, ...)	*1.5 min*
- Delays	*6 min*
Power-off	17 min
Power-on (Melt down, Superheating and Refining)	31.5 min
Tap To Tap Time	**48.5 min**

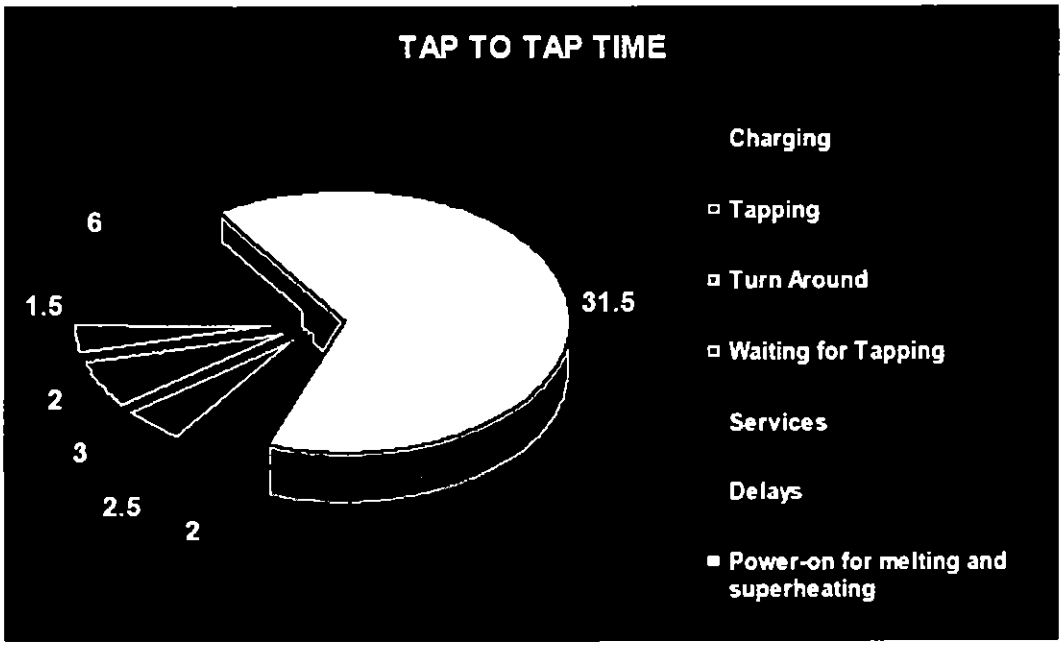
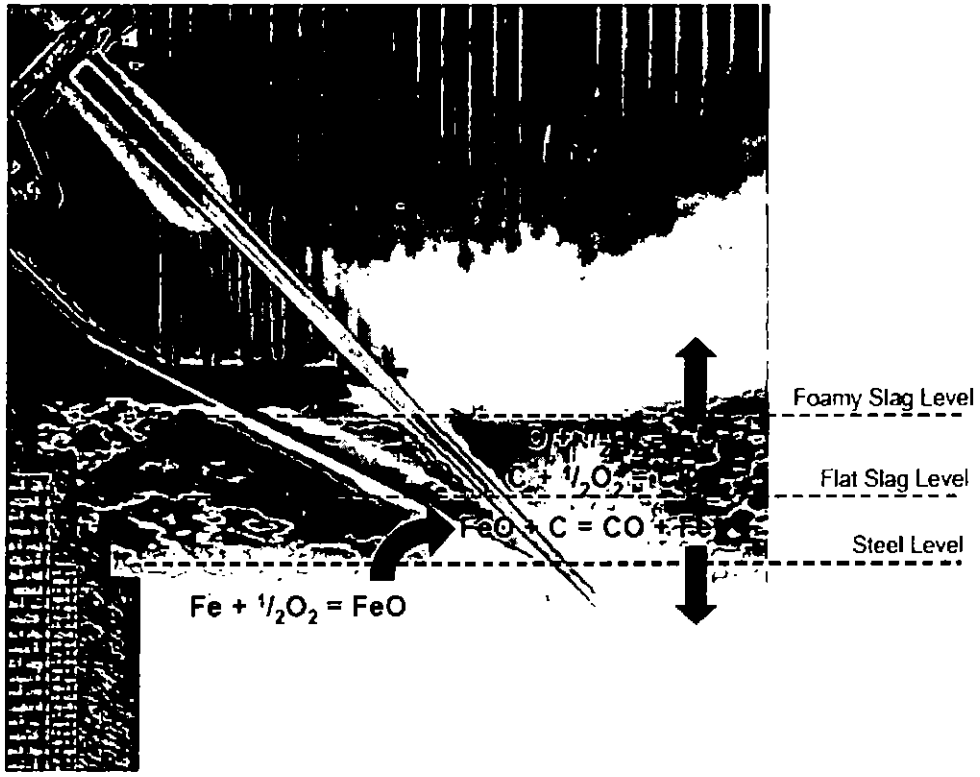


Table below shows scrap mix:

EAF CHARGE		Rebar Grades	Wire Grades	MINIMUM	MAXIMUM
Pig Iron	% Charge	0%	7%	0%	10%
Shredded	% Charge	40%	30%	25%	50%
#2 Scrap	% Charge	30%		15 %	40 %
#1 Scrap	% Charge	20%		10 %	30 %
Cast	% Charge	3%		0%	7 %
Skulls/Revert	% Charge	5%	3%	0%	8 %
Turnings	% Charge	2%		0%	10 %
P & S	% Charge	0%	40%	0%	40 %
Bushling	% Charge		20%	0%	25 %
Bundles	% Charge	0%		1 %	1%
		100 %	100 %		
Minimum Bucket Charge Density: 45 lb/cuft					
Average Bucket Charge: 47 lb/cuft					
Maximum Bucket Charge: 54 lb/cuft					



The basic furnace shell dimensions have been developed for 105 t heat size and 2 bucket charging practice

In the table below a verification of the furnace charging conditions is showed:

Tapped steel	105 t	95 mt
Charge Yield	90.0 %	
Total Metallic Charge	117 t	106 mt
Raw Material Composition	100 % Scrap	
Charging Practice	2 buckets (72% - 28%)	
Shell Volume	4'167 cuft	118 m^3
Max. Scrap Weight 1st Bucket	84 t	76 mt
Average Scrap Density	47 pounds/ cft	0.75 t/m^3
Max. Scrap Volume	3'566 cft	102 m^3
Shell Filling Percentage	85 %	

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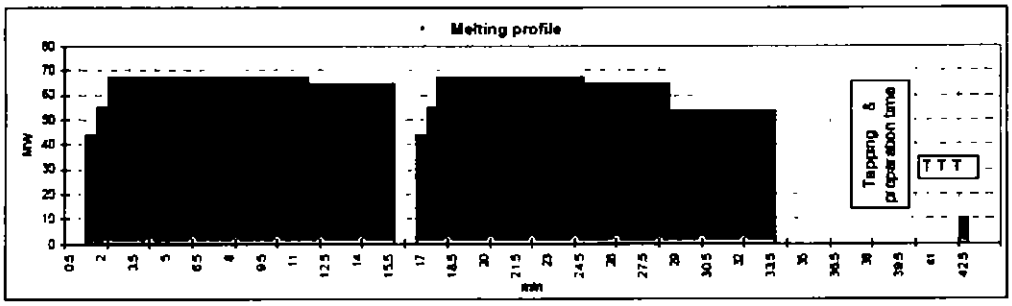
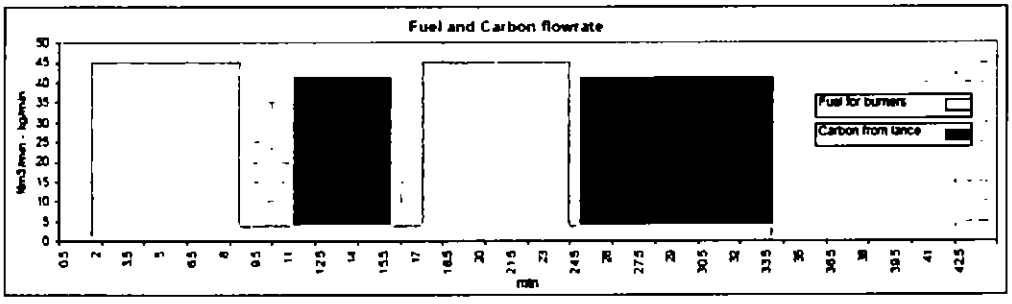
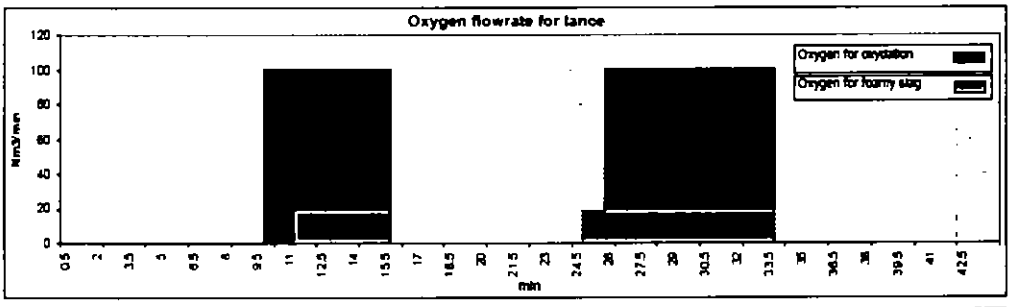
Shell Filling Percentage	85 %	

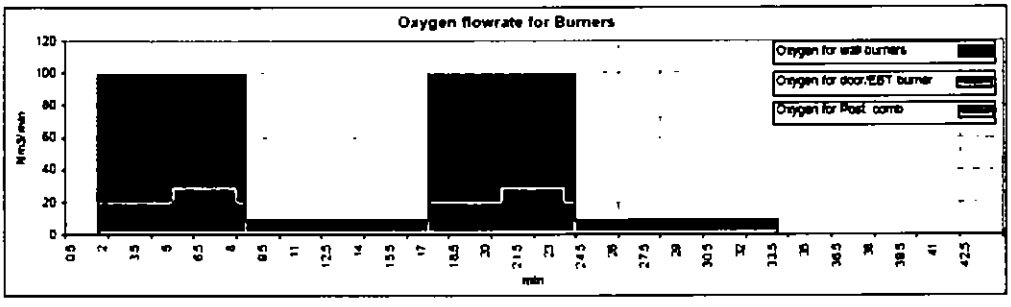
EAF Melting Profile

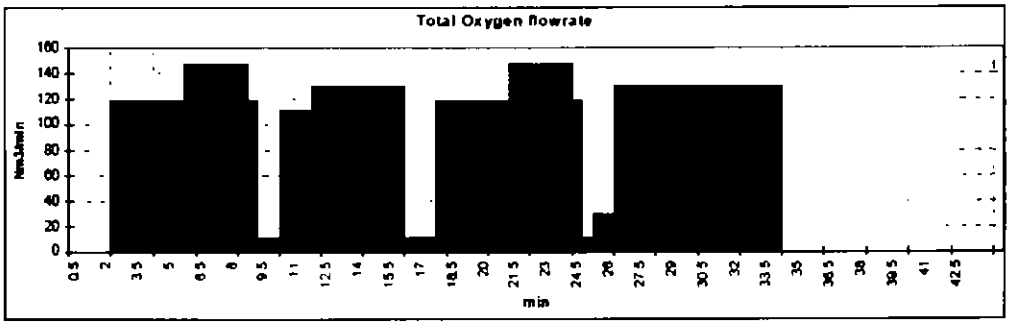
Meltdown diagram - Charge mix: 100 % scrap











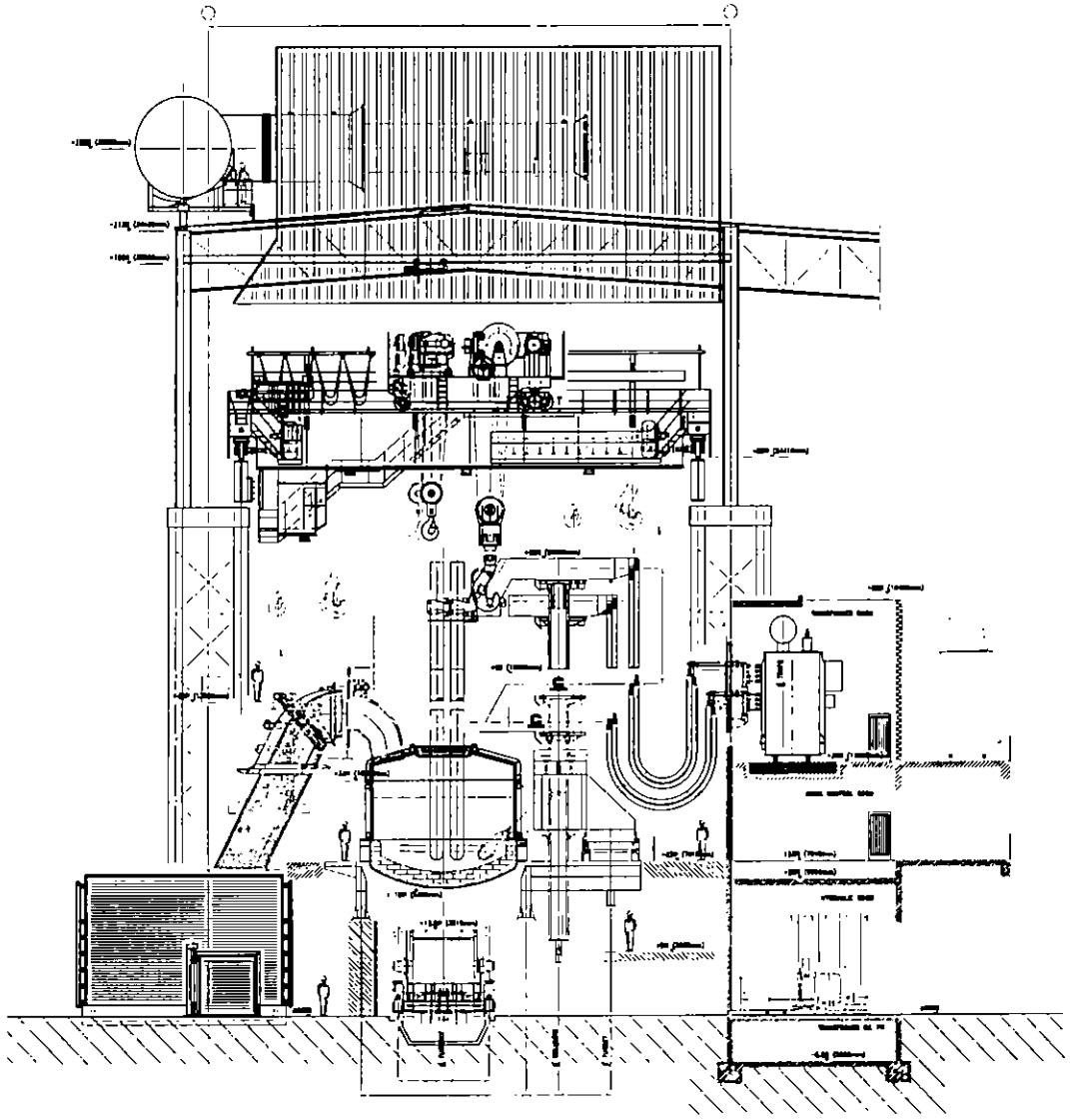


Figure A-1 - EAF
Gerdau Ameristeel - Concast Drawing S.4023/701.01

Source: Golder, 2004.

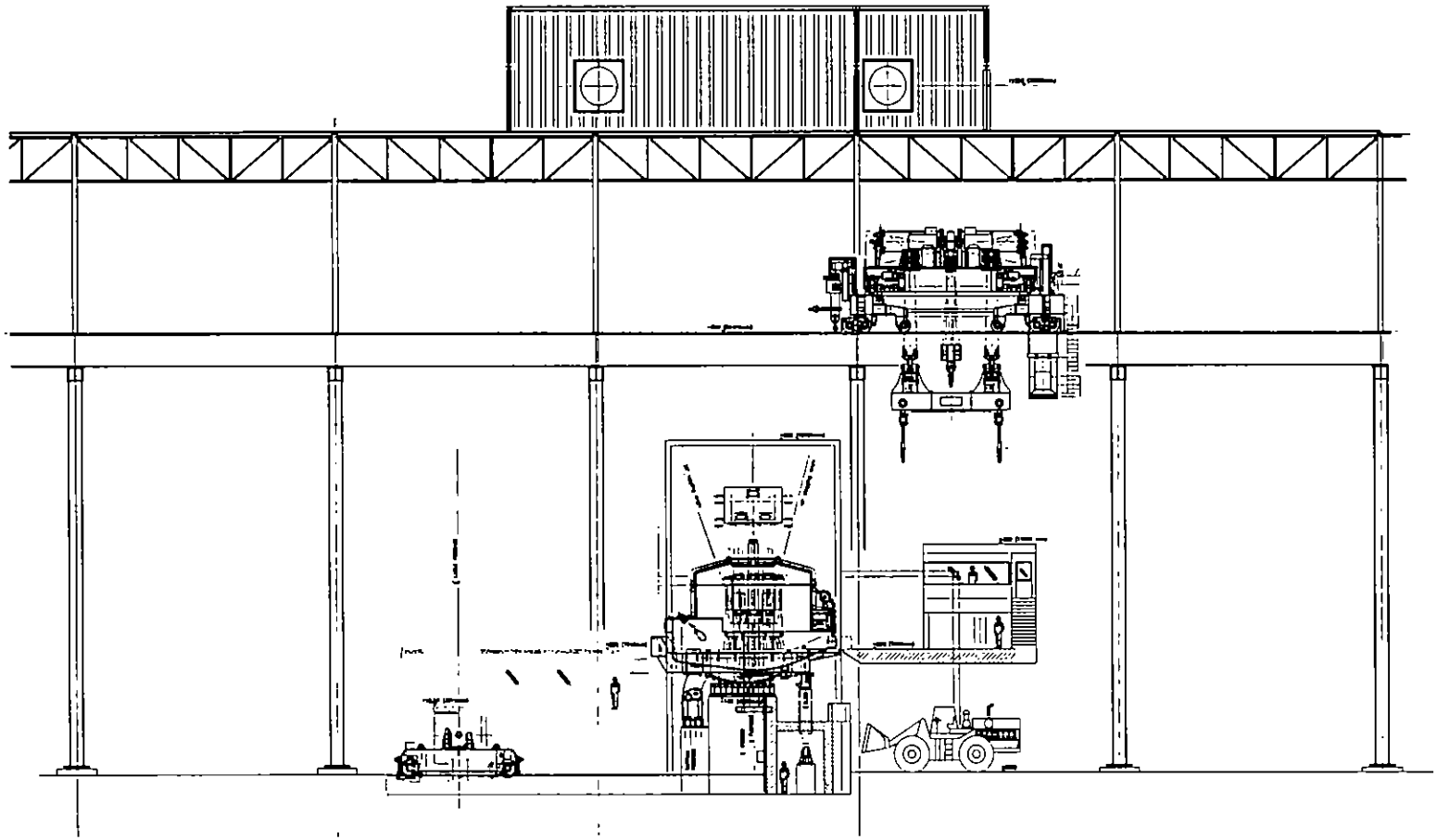


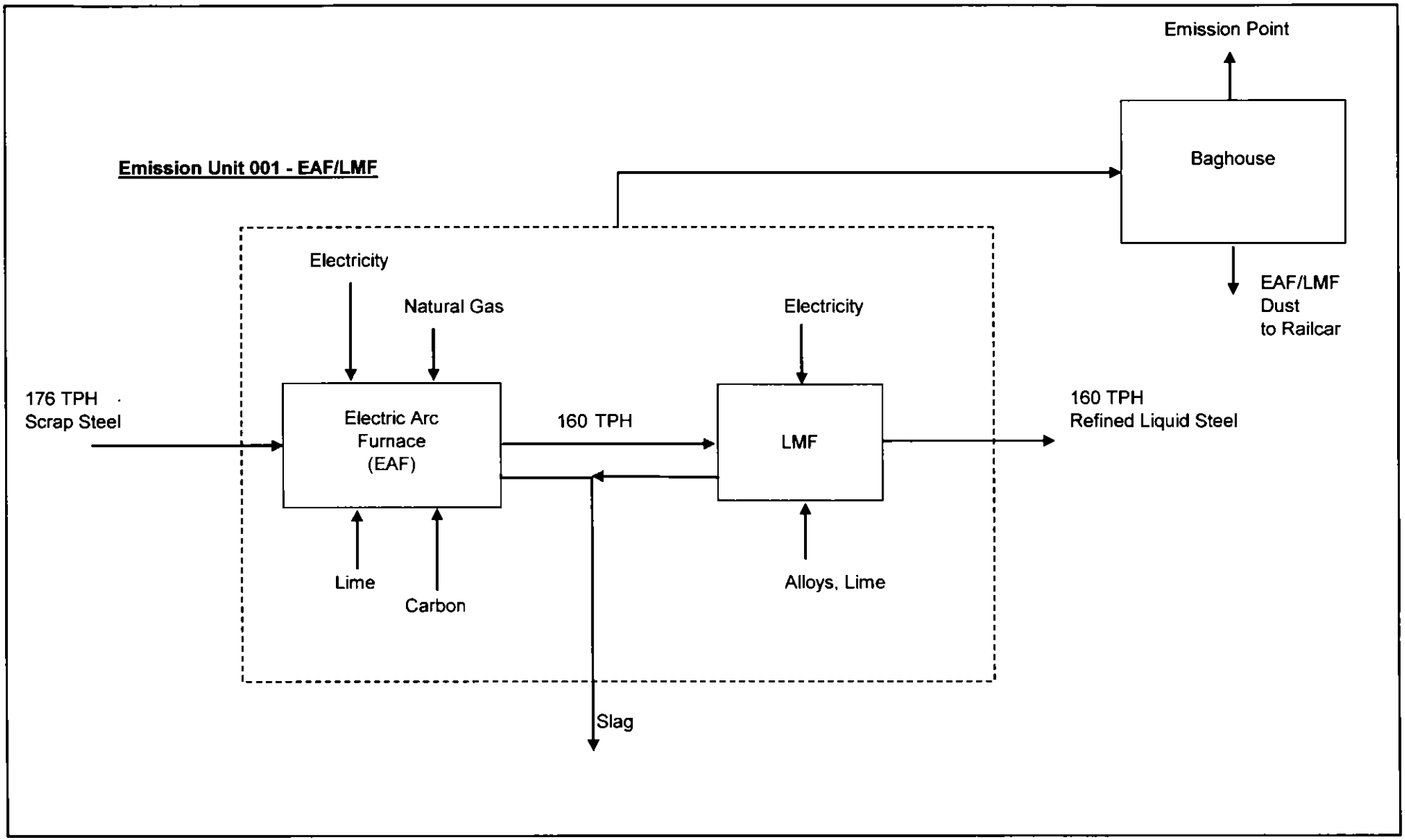
Figure A-2 EAF
Process Flow Diagram

Source: Golder, 2004.

Golder Associates

ATTACHMENT B

EAF/LMF FLOW DIAGRAM



Attachment B
EAF/LMF Process Flow Diagram

Source: Golder, 2004.

Golder Associates

ATTACHMENT C

SCR COST ANALYSIS

Table 5-12 Cost Effectiveness of SCR , Billet Reheat Furnace.

Cost Items	Cost Factors[a]	Max Permit Cost Per Boiler ($)
DIRECT CAPITAL COSTS (DCC):		
SCR Basic Process	Vendor quote[b]	494,554
Emission Monitoring	15% of SCR equipment cost	74,183
Ammonia Storage System	Vendor quote[c], 10,000 gallon storage tank	170,000
Foundation and Structure Support	8% of equipment cost	53,164
Control Room and Enclosures	4% of equipment cost, engineering estimate	26,582
Transition Ducts to and from SCR	4% of equipment cost, engineering estimate	19,782
Wiring and Conduit	2% of equipment cost, engineering estimate	13,291
Insulation	2% of equipment cost, engineering estimate	13,291
Motor Control and Motor Starters	4% of equipment cost, engineering estimate	26,582
SCR Bypass Duct	$127 per MMBtu/hr	42,037
Induced Draft Fan	5% of SCR equipment cost, engineering estimate	24,728
Taxes	Florida sales tax, 6%	39,873
Total DCC:		998,069
INDIRECT CAPITAL COSTS (ICC)		
General Facilities	5% of DCC	49,903
Engineering Fees	10% of DCC	99,807
Performance test	1% of DCC	9,981
Process Contingencies	5% of DCC	49,903
Total ICC:		209,594
Project Contingencies:	15% of DCC and ICC	181,149
TOTAL CAPITAL INVESTMENT OF SCR (TCI).	DCC + ICC + Project Contingencies	1,388,813
TOTAL CAPITAL INVESTMENT		1,388,813
DIRECT OPERATING COSTS (DOC)		
(1) Operating Labor		
Operator	24 hrs wk, $16 hr, 26 wks yr	9,984
Supervisor	15% of operator cost	1,498
(2) Maintenance	Engineering estimate, 5% of catalyst replacement cost	1,649
(3) SCR Energy Requirement	163 Hp Blower, 16 Hp Ammonia Pump, 82kW/h for SCR @ $0.04 kWh	12,595
(4) Ammonia Cost	$495/ton NH3 19% Aqueous(Tanner,02)	23,982
(6) Catalyst Replacement and disposal	$148,366 per catalyst[d], 17,520 hrs or every 4.5 years	32,970
Total DOC:		82,678
CAPITAL RECOVERY COSTS (CRC).	CRF of 0.0944 times TCI (20 yrs @ 7%)	131,104
ANNUALIZED COSTS of SCR (AC):	DOC+ CRC	213,782
TOTAL ANNUALIZED COST		213,782
BASELINE NO_x EMISSIONS (TPY) :	Max - 222 MMBtu/hr, 8500 hr/yr, 0.08 lb NOx / MMBtu	75.5
MAXIMUM NO_x EMISSIONS (TPY) :	11 therms/billet ton, 1,375,000 MMBtu/yr, 0.08 lb NOx/MMBtu 30% Control; 3 times higher than proven achieable in practice	52.8
REDUCTION IN NO_x EMISSONS (TPY).		22.6
COST EFFECTIVENESS:	$ per ton of NO_x Removed	9,441

Footnotes:

[a] Unless otherwise specified, factors and cost estimates reflect OAQPS Cost Manual, Section 3, Sixth edition.

[b] 2002 CSM Industries cost quote.

[c] Ammonia storage tank vendor's quotation for RM Technologies, for a 10,000-gallon anhydrous ammonia tank. Includes stainless steel horizontal tank, valves, and transfer station.

[d] SCR catalyst replacement based on CSM Industries catalyst quote and 17,520 hrs guarantee

Source Golder, 2004

ATTACHMENT D

EPA AIR POLLUTION CONTROL TECHNOLOGY FACT SHEET

HEPA FILTRATION

EPA-452/F-03-023

Air Pollution Cocntrol Technology Fact Sheet

Name of Technology: Paper/Nonwoven Filter - High Efficiency Particle Air (HEPA) Filter
- Ultra Low Penetration Air (ULPA) Filter
(also referred to as Extended Media)

Type of Technology: Control Device - Capture/Disposal

Applicable Pollutants: Submicron Particulate Matter (PM) greater than or equal to 0.3 micrometer (µm) in aerodynamic diameter, and PM greater than or equal to 0.12 µm in aerodynamic diameter that is chemically, biologically, or radioactively toxic; hazardous air pollutants (HAPs) that are in particulate form, such as most metals (mercury is the notable exception, as a significant portion of emissions are in the form of elemental vapor).

Achievable Emission Limits/Reductions:

HEPA and ULPA filters are classified by their minimum collection efficiency. Many international standards and classes currently exist for high efficiency filters (Osborn, 1989). In general, HEPA and ULPA filters are defined as having the following minimum efficiency rating (Heumann, 1997):

HEPA: 99.97% efficiency for the removal of 0.3 µm diameter or larger PM,
ULPA: 99.9995% efficiency for the removal of 0.12 µm diameter or larger PM

Some extended media filters are capable of much higher efficiencies. Commercially available filters can control PM with 0.01 µm diameter at efficiencies of 99.99+% and PM with 0.1 µm diameter at efficiencies of 99.9999+% (Gaddish, 1989; Osborn, 1989). Several factors determine HEPA and ULPA filter collection efficiency. These include gas filtration, velocity, particle characteristics, and filter media characteristics. In general, the collection efficiency increases with increasing filtration velocity and particle size. In addition, the collection efficiency increases as the dust cake thickness and density increases on the filter (EPA, 1998a).

Testing of the collection efficiency for HEPA and ULPA filters is performed under clean filter conditions. This is in contrast to continuously cleaned-type filters, such as baghouses, which are tested after reaching a steady-state pressure drop. Cleaned-type filters have nearly constant effluent particle concentration, whereas HEPA and ULPA filters have overall efficiencies which vary with particulate loading. (Heumann, 1997)

The efficiency of each filter is tested by the manufacturer before shipping. For nuclear applications, additional tests are required by the Department of Energy (DOE) and by the owner/operator after installation (Burchsted et al, 1979). There are two separate tests for HEPA and ULPA filter collection efficiencies. HEPA efficiency is rated using a thermal dioctyl phthalate (DOP) test. The test dust for HEPA filters is mono-sized, 0.3 µm diameter, DOP particles, generated by vaporization and condensation. Alternative aerosols can also be used as specified or required for given applications. A photometer measures the particle penetration of the HEPA filter by sensing the scattering of light. ULPA efficiency is tested using a particle counter upstream and downstream of the filter. An atomizer injects a solution of DOP, alcohol, and mineral oil in hexane to generate particles ranging from of 0.1 to 0.2 µm in diameter (Heumann, 1997).

Applicable Source Type: Point

Typical Industrial Applications:

HEPA and ULPA filters are best applied in situations where high collection efficiency of submicron PM is required, where toxic and/or hazardous PM cannot be cleaned from the filter, or where the PM is difficult to clean from the filter. HEPA and ULPA filters are typically utilized for applications involving chemical, biological, and radioactive PM. HEPA and ULPA filters are installed as the final component in a PM collection system, downstream from other PM collection devices such as electrostatic precipitators or baghouses. (Heumann, 1997)

Common industrial applications of HEPA and ULPA filters are hospital, low-level nuclear, and mixed waste incinerators and nuclear air ventilation and safety systems. In addition, the filters are used in a number of commercial applications and manufacturing processes such as clean rooms, laboratories, food processing, and the manufacture of pharmaceuticals and microelectronics (Osborn, 1989). The filters can be utilized in any application where dust is generated and can be collected and ducted to a central location.

Emission Stream Characteristics:

a. **Air Flow:** HEPA and ULPA filters are currently limited to low capacity air flow applications. Standard filter packs are factory-built, off the shelf units. They may handle from less than 0.10 up to 1.0 standard cubic meters per second (sm^3/sec) (("hundreds" to 2,000 standard cubic feet per minute (scfm)) (AAF, 2000; Vokes,1999). HEPA filter systems designed for nuclear applications require higher capacities. For these applications, filter banks, or modules are ducted together in parallel to increase air flow capacity (EPA, 1991). Commercially available modular systems can accommodate air flow rates in the range of 5 to 12 sm^3/sec (5,000 to 40,000 scfm) (AAF, 2000; Vokes, 1999).

   Air flow capacity is a function of the resistance, or pressure drop across the filter and particle loading. As the dust cake forms on the filter, the resistance increases, therefore, the air flow rate decreases. Since the filter is not cleaned, the air flow rate continues to decrease as the system operates. After the pressure drop across the filter reaches a point that prevents adequate air flow, the filter must be replaced and disposed. For these reasons, HEPA and ULPA filters are used in applications that have low air flow rates or have low concentrations of PM (Heumann 1997).

b. **Temperature:** Temperatures are limited by the type of filter media and sealant used in the filter packs. Standard cartridges can accommodate gas temperatures up to about 93°C (200°F). With the appropriate filter media and sealant material, commercial HEPA filters can accept temperatures of up to 200°C (400°F). HEPA filters with ceramic or glass packing mechanical seals can accept temperatures up to 537°C (1000°F). (EPA, 1991)

   Spray coolers or dilution air can be used to lower the temperature of the pollutant stream. This prevents the temperature limits of the filter from being exceeded (EPA, 1998b). Lowering the temperature, however, increases the humidity of the pollutant stream. HEPA and ULPA filters can tolerate some humidity. Humidity higher than 95%, however, can cause the filter media to plug, resulting in failure (EPA, 1991). Therefore, the minimum temperature of the pollutant stream must remain above the dew point of any condensable in the stream. The filter and associated ductwork should be insulated and possibly heated if condensation may occur (EPA, 1998b).

c. **Pollutant Loading:** Typical pollutant loading ranges from 1 to 30 grams per cubic meter (g/m^3) (0.5 to 13 grains per cubic foot (gr/ft^3)) (Novick, et al, 1992). Dust holding capacity compares the weight gain of the filter to the rise in pressure drop during a specific period of

time (air flow volume). Typical inlet dust holding capacity range from 500-1000 g/1000 scfm (Gadish, 1989). As discussed above, the pressure drop across the filter is a function of pollutant loading. HEPA and ULPA filters are best used in applications that have low concentrations of PM, or prohibit cleaning of the filter (Heumann, 1997).

d. **Other Considerations:** Moisture and corrosives content are the major gas stream characteristics requiring design consideration. As discussed previously, humidity up to 95% is acceptable with the proper filter media, coatings, and filter construction. Filters are available which can accommodate corrosive gas streams with concentrations up to several percent. These filters are constructed of special materials and are generally more expensive. (EPA, 1991)

HEPA and ULPA filters are monitored for pressure drop across the filter media. Once the pressure drop becomes unacceptable, the filter must be replaced. The typical pressure drop for a clean filter is 25 millimeters (mm) of water column (1 inches (in.) of water column). An increase of the pressure drop in the range of 51 to 102 mm of water column (2 to 4 in. of water column) indicates the end of the service life of the filter (EPA, 1991, Burchsted et al, 1979). Newer filters are available which have clean filter pressure drops in the range of 6 to 13 mm of water column (0.25 to 0.5 in. of water column) (Burchsted et al, 1979).

HEPA and ULPA filters are typically operated under pressure of approximately 203 mm of water column (8 in. of water column) High operating pressures may rupture the filter. HEPA filters utilized in the nuclear industry have seismic requirements in addition to the performance characteristics discussed above. (EPA, 1991)

Emission Stream Pretreatment Requirements:

HEPA and ULPA filters require pre-filtering to remove large PM or for dust concentrations greater 0.03 grams per centimeter squared (g/cm^2) (0.06 pounds per feet squared (lbs/ft^2)). Pre-filtering may be performed in several stages. Mechanical collectors, such as cyclones or venturi scrubbers may be required to reduce large diameter PM. Standard baghouse or cartridge filters are required to filter out PM greater than 2.5 μm in diameter. (EPA, 1991)

In high temperature applications, the cost of high temperature-resistant filter designs must be weighed against the cost of cooling the inlet temperature with spray coolers or dilution air (EPA, 1998b).

Cost Information:

The capital cost for a HEPA filter system is given below. The cost estimate assumes a factory-built, off the shelf modular design under typical operating conditions. The filter system is for a nuclear application and includes one test section and a pair of pressure sensors. Auxiliary equipment, such as fans and ductwork, is not included.

The estimate is based on a manufacturer quote for only the purchased equipment cost in 1999 dollars (AAF, 2000). The vendor did not provide operational and maintenance (O&M) cost, annualized cost, and cost effectiveness because they are application specific. The capital cost for HEPA and ULPA filters are significantly lower than for a baghouse, however, the O&M cost tends to be much higher. Requirements such as the frequency of filter replacement, monitoring and testing procedures, maintenance procedures, and waste profiles impact the O&M cost.

Costs are primarily driven by the waste stream volumetric flow rate and pollutant loading. In general, a small unit controlling a low pollutant loading will not be as cost effective as a large unit controlling a high pollutant

loading (EPA, 1998b). HEPA and ULPA filters are currently limited to low flow rate applications. The capital cost range presented is for flow rates of 1.5 m^3/s (3,000, scfm) and 19 m^3/s (40,000 scfm), respectively.

Pollutants that require an unusually high level of control or that require the filter media, adhesives, or the filter unit to be constructed of special materials, such as stainless steel, will increase the costs of the system. The additional costs for controlling more complex waste streams are not reflected in the estimates given below. (EPA, 1991)

a. **Capital Cost:** $6,400 to $8,500 per sm^3/s ($3 to $4 per scfm)

b. **O & M Cost:** Application specific

c. **Annualized Cost:** Application specific

d. **Cost Effectiveness:** Application specific

Theory of Operation:

HEPA and ULPA filters generally contain a paper media. Newer filter designs may contain nonwoven media which utilizes recently developed fine fiber technology (INDA, 2000). Generally, the filter media is fabricated of matted glass fiber such as borosilicate microfiber (EPA, 1991). The small fiber diameter and high packing density of both the paper and nonwoven media allow for the efficient collection of submicrom PM (Gaddish, 1989). The waste gas stream is passed through the fibrous filter media causing PM in the gas stream to be collected on the media by sieving and other mechanisms. The dust cake that forms on the filter media from the collected PM can increase collection efficiency (EPA, 1998a).

The filter media is pleated to provide a larger surface area to volume flow rate. For this reason, HEPA and ULPA filters are often referred to as extended media filters. Close pleating, however, can cause the PM to bridge the pleat bottom, reducing the surface area (EPA, 1998a). Corrugated aluminum separators are often employed to prevent the media from collapsing (Heumann, 1997). The pleat depth can vary from 2.5 centimeters (cm) (1 in.) up to 40 cm (16 in.). Pleat spacing is generally between 12 to 16 pleats per in., with certain conditions requiring fewer pleats, 4 to 8 pleats per in. (EPA, 1998a).

The most common designs are a box filter cell and a cylindrical filter cell. In a box cell, the pleated media is placed in a rigid, square frame constructed of wood or metal. The air flows from the front to the back of the filter. Box packs are approximately 60 cm (24 in.) in height and width and 6 to 30 cm (3 to 12 in.) in length (EPA, 1991). The media in a cylindrical filter cell is supported by inner and outer wire frameworks. A metal cap seals the media at one end. Air flows from the outside to the inside of the filter. This allows a higher air flow rate than a box cell since more surface area is exposed (Vokes, 1999). Typical cylindrical packs are 50 centimeters (cm) (20 in.) in diameter and 35 to 60 cm (14 to 24 in.) in length (Vokes, 1999).

Both the box and cylindrical cells seal the media to the frame or cap using polyurethane, epoxy, or other commercially available adhesive. A metal grill protects the media face from damage. The filter cell is mounted to a holding frame using a gasket or fluid seal. The filter is generally mounted on the clean air plenum (EPA, 1991). The filter can be mounted directly in the duct or in a separate housing. HEPA and ULPA filter systems require pre-filtering for large diameter PM. HEPA and ULPA filter systems are generally the final component in a PM removal system (Heumann, 1997).

The HEPA and ULPA filter cells are generally utilized as a disposable-type filter. As discussed previously, when the filter cake buildup results in unacceptable air flow rates, the filters are replaced. In most designs, replacement of the filter cell takes place at the clean air plenum and outside of the housing unit. This reduces the risk of exposure to PM by the maintenance workers. This feature is especially important

for applications were HAPs or toxic PM are being filtered. The Occupational Safety and Health Administration (OSHA) requires special filter replacement procedures, commonly referred to as bag in/bag out procedures, for many HAP or toxic PM applications. (Heumann, 1997)

The operation of the filter may require additional equipment. Pressure sensors at the inlet and outlet may be required to measure the change in the pressure drop across the filter. This not only indicates when the filter should be replaced but also monitors the integrity of the filter system (EPA, 1991). For applications that require a DOP efficiency test to be administered in place, sampling and injection ports and a test apparatus may be required (EPA, 1991). A special fitting may be installed to facilitate bag in/bag out procedures (Vokes, 1999).

Individual HEPA and ULPA filter cells accommodate air flow capacities up to 1.0 sm^3/sec (2,000 scfm) (Vokes, 1999). Larger air flow capacities are required for some applications, such as the nuclear industry. To increase capacity, multiple filters are housed in banks or modules which are ducted together. This allows a standard, off the shelf, filter unit to be utilized for a variety of applications and air flow rates (Osborn, 1998). In this type of design, dampers can be used to seal off a portion of the filters for maintenance (Vokes, 1999).

The number of filter cells utilized in a particular system is determined by the air-to-cloth ratio, or the ratio of volumetric air flow to cloth area. The selection of air-to-cloth ratio is based on the particulate loading characteristics and the pressure drop across the filter media. Practical application of fibrous media filters requires the use of large media areas to minimize the pressure drop across the filter (EPA 1998a). The paper and nonwoven filter media used in HEPA and ULPA filters have a larger pressure drop across the filter than the woven fabrics used in bags. For this reason, HEPA and ULPA filters are utilized at lower airflow rates and lower particulate loadings than baghouse designs. As discussed previously, once the air flow rate through the filter system decreases to an unacceptable point, the filter must be replaced (Heumann, 1997).

Operating conditions are important determinants of the choice of materials used in HEPA and ULPA filter cells. Pollutant streams with high operating temperatures, high humidity, or corrosives require special filter media, sealant, materials, and coatings. These special materials increase the cost of the system. (EPA, 1991).

HEPA and ULPA filters are generally not cleaned. A dynamic cleaning system may result in the filter not maintaining its rated efficiency. Mechanical stresses caused by air impingement and vibration from the cleaning system may cause leakage (Heumann, 1997).

Advantages:

HEPA and ULPA filters are specifically designed for the collection of submicron PM at high collection efficiencies. They are best utilized in applications with a low flow rate and low pollutant concentration. Filter outlet air is very clean and may be recirculated within the plant, in many cases (AWMA, 1992). They are not sensitive to minor fluctuations in gas stream conditions (Heumann, 1997). Corrosion and rusting of components are usually not problems. Operation is relatively simple. Unlike electrostatic precipitators, HEPA and ULPA filter systems do not require the use of high voltage, therefore, flammable dust may be collected with proper care (AWMA, 1992). Filters are available for a range of dimensions and operating conditions. Commercial filter systems and housings are available in several types of configurations to suit a variety of installation and operation requirements. These systems have many built in features such as testing and monitoring equipment (AAF, 2000; Vokes, 1999).

Disadvantages:

The paper and nonwoven media used in HEPA and ULPA filters have a significantly higher resistance than the woven fabrics that are used in bag filters. The high efficiencies of HEPA and ULPA filters require that the integrity of the filter seals be maintained. The filter media is subject to physical damage from mechanical stress (Heumann, 1997). Temperatures in excess of 95°C (200°F) or corrosive pollutant streams require the use of special materials in the filter, which are more expensive (EPA, 1991). Concentrations of some dusts in the filter housing may represent an explosion hazard if a spark is accidentally admitted. Filter media can burn if readily oxidizable dust is being collected (AWMA, 1992). HEPA and ULPA filter systems require high maintenance and frequent filter replacement. Filter life may be shortened in the presence of high temperatures and acid or alkaline particulates or gas constituents. High flow rates or dust loads will also decrease the operational life of the filter. HEPA and ULPA filters cannot be operated in moist environments. Hydroscopic materials, condensation of moisture, or tarry adhesive components may cause plugging of the filter media (EPA, 1991).

A specific disadvantage of HEPA and ULPA units is that they may generate a high volume waste product with a low density of pollutant. For HAP applications and chemical, biological, or radioactive toxic PM applications, the filters must be disposed of as hazardous waste. The waste is composed of the wood or metal frames, organic binders and gaskets, glass fiber media, and hazardous contaminants. (EPA, 1991).

Other Considerations:

HEPA and ULPA filters are useful for collecting particles with resistivities either too low or too high for collection with electrostatic precipitators (AWMA, 1992). Unlike baghouses which require workers to enter the collector to replace bags, HEPA and ULPA filters systems are designed to replace filters outside the collector housing. This makes them ideal for applications involving HAPs or toxic PM. The collected PM is tightly adhered to the filter media for subsequent disposal. Bag in/bag out procedures that may be required by OHSA are easily performed with the filters (Heumann, 1997).

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ATTACHMENT E

EPA AIR POLLUTION CONTROL TECHNOLOGY FACT SHEET

SCRUBBER

EPA-452/F-03-017

Air Pollution Control Technology Fact Sheet

Name of Technology: Venturi Scrubber

This type of technology is a part of the group of air pollution controls collectively referred to as "wet scrubbers." Venturi scrubbers are also known as venturi jet scrubbers, gas-atomizing spray scrubbers, and ejector-venturi scrubbers.

Type of Technology: Removal of air pollutants by inertial and diffusional interception.

Applicable Pollutants:

Venturi scrubbers are primarily used to control particulate matter (PM), including PM less than or equal to 10 micrometers (μm) in aerodynamic diameter (PM_{10}), and PM less than or equal to 2.5 μm in aerodynamic diameter ($PM_{2.5}$). Though capable of some incidental control of volatile organic compounds (VOC), generally venturi scrubbers are limited to control PM and high solubility gases (EPA, 1992; EPA, 1996).

Achievable Emission Limits/Reductions:

Venturi scrubbers PM collection efficiencies range from 70 to greater than 99 percent, depending upon the application. Collection efficiencies are generally higher for PM with aerodynamic diameters of approximately 0.5 to 5 μm. Some venturi scrubbers are designed with an adjustable throat to control the velocity of the gas stream and the pressure drop. Increasing the venturi scrubber efficiency requires increasing the pressure drop which, in turn, increases the energy consumption (Corbitt, 1990; EPA, 1998).

Applicable Source Type: Point

Typical Industrial Applications:

Venturi scrubbers have been applied to control PM emissions from utility, industrial, commercial, and institutional boilers fired with coal, oil, wood, and liquid waste. They have also been applied to control emission sources in the chemical, mineral products, wood, pulp and paper, rock products, and asphalt manufacturing industries; lead, aluminum, iron and steel, and gray iron production industries; and to municipal solid waste incinerators. Typically, venturi scrubbers are applied where it is necessary to obtain high collection efficiencies for fine PM. Thus, they are applicable to controlling emission sources with high concentrations of submicron PM (EPA, 1995; Turner, 1999).

Emission Stream Characteristics:

a. **Air Flow:** Typical gas flow rates for a single-throat venturi scrubber unit are 0.2 to 478 standard cubic meters per second (sm^3/sec) (500 to 100,000 standard cubic feet per minute (scfm)). Flows higher then this range use either multiple venturi scrubbers in parallel or a multiple throated venturi (EPA, 2001).

b. **Temperature:** Inlet gas temperatures are usually in the range of 4 to 400°C (40 to 750°F) (EPA 2002).

c. **Pollutant Loading:** Waste gas pollutant loadings can range from 1 to 115 grams per standard cubic meter (g/sm^3) (0.1 to 50 grains per standard cubic foot (gr/scf)) (Turner, 1999; Dixit, 1999).

d. **Other Considerations:** In situations where waste gas contains both particulates and gases to be controlled, venturi scrubbers are sometimes used as a pretreatment device, removing PM to prevent clogging of a downstream device, such as a packed bed scrubber, which is designed to collect primarily gaseous pollutants.

Emission Stream Pretreatment Requirements:

Generally, no pretreatment is required for venturi scrubbers, though in some cases the waste gas is quenched to reduce the temperature for scrubbers made of materials affected by high temperatures (Dixit, 1999)

Cost Information:

The following are cost ranges (expressed in 2002 dollars) for venturi wet scrubbers of conventional design under typical operating conditions, developed using the *EPA Air Pollution Control Cost Manual.* For purposes of calculating the example cost effectiveness, the pollutant is assumed to be PM at an inlet loading of approximately 7 g/sm^3 (3 gr/scf) and the control efficiency is 99%. The costs do not include costs for fans and pumps or costs for treatment/disposal of used solvent and waste. Actual costs can be substantially higher than in the ranges shown for applications which require expensive materials, solvents, or treatment methods. As a rule, smaller units controlling a low concentration waste stream will be much more expensive (per unit volumetric flow rate) than a large unit cleaning a high pollutant load flow.

a. **Capital Cost:** $5,300 to $45,000 per sm^3/sec ($2.5 to $21 per scfm)

b. **O & M Cost:** $9,300 to $254,000 per sm^3/sec ($4.4 to $120 per scfm), annually

c. **Annualized Cost:** $12,000 to $409,000 per sm^3/sec ($5.7 to $193 per scfm), annually

d. **Cost Effectiveness:** $77 to $2,600 per metric ton ($70 to $2,400 per short ton), annualized cost per ton per year of pollutant controlled

Theory of Operation:

A venturi scrubber accelerates the waste gas stream to atomize the scrubbing liquid and to improve gas-liquid contact. In a venturi scrubber, a "throat" section is built into the duct that forces the gas stream to accelerate as the duct narrows and then expands. As the gas enters the venturi throat, both gas velocity and turbulence increase. Depending upon the scrubber design, the scrubbing liquid is sprayed into the gas stream before the gas encounters the venturi throat, or in the throat, or upwards against the gas flow in the throat. The scrubbing liquid is then atomized into small droplets by the turbulence in the throat and droplet-particle interaction is increased. Some designs use supplemental hydraulically or pneumatically atomized sprays to augment droplet creation. The disadvantage of these designs is that clean liquid feed is required to avoid clogging (EPA, 1998; AWMA, 1992; Corbitt, 1990).

After the throat section, the mixture decelerates, and further impacts occur causing the droplets to agglomerate. Once the particles have been captured by the liquid, the wetted PM and excess liquid droplets are separated from the gas stream by an entrainment section which usually consists of a cyclonic separator and/or a mist eliminator (EPA, 1998; Corbitt, 1990).

Current designs for venturi scrubbers generally use the vertical downflow of gas through the venturi throat and incorporate three features: (1) a "wet-approach" or "flooded-wall" entry section to avoid a dust buildup at a wet-dry junction; (2) an adjustable throat for the venturi throat to provide for adjustment of the gas velocity and the pressure drop; and (3) a "flooded" elbow located below the venturi and ahead of the entrainment separator, to reduce wear by abrasive particles. The venturi throat is sometimes fitted with a refractory lining to resist abrasion by dust particles (Perry, 1984).

Advantages:

Advantages of venturi scrubbers include (Cooper, 1994).

1. Can handle flammable and explosive dusts with little risk;
2. Can handle mists;
3. Relatively low maintenance;
4. Simple in design and easy to install;
5. Collection efficiency can be varied;
6. Provides cooling for hot gases; and
7. Corrosive gases and dusts can be neutralized.

Disadvantages:

Disadvantages of impingement plate scrubbers include (Perry, 1984, Cooper, 1994):

1. Effluent liquid can create water pollution problems;
2. Waste product collected wet;
3. High potential for corrosion problems;
4. Protection against freezing required;
5. Off gas may require reheating to avoid visible plume;
6. Collected PM may be contaminated, and may not be recyclable; and
7. Disposal of waste sludge may be very expensive.

Other Considerations:

For PM applications, wet scrubbers generate waste in the form of a slurry or wet sludge. This creates the need for both wastewater treatment and solid waste disposal. Initially, the slurry is treated to separate the solid waste from the water. The treated water can then be reused or discharged. Once the water is removed, the remaining waste will be in the form of a solid or sludge. If the solid waste is inert and nontoxic, it can generally be landfilled. Hazardous wastes will have more stringent procedures for disposal. In some cases, the solid waste may have value and can be sold or recycled (EPA, 1998).

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ATTACHMENT F

LEAD AAQS MODELING RESULTS

LEAD CLASS I IMPACTS

Table F-1. Maximum Predicted Lead Impacts for Comparison to AAQS

Pollutant, Averaging Time, and Rank	Concentration ($\mu g/m^3$) [a]			Receptor Location		Time Period	AAQS[c]
	Total	Modeled Sources	Background[b]	x (m)	y (m)	(YYMMDDHH)	($\mu g/m^3$)
Lead							
Monthly, Highest	0.061	0.0412	0.02	-141.3	-12.9	84073124	1.5
	0.045	0.0246	0.02	-201.6	-199.4	85113024	
	0.069	0.0491	0.02	-141.3	-12.9	86033124	
	0.070	0.0504	0.02	-171.4	-106.2	87053124	
	0.064	0.0440	0.02	-201.6	-199.4	88063024	

Note: YYMMDDHH = Year, Month, Day, Hour Ending

[a] Based on 5-year surface and upper air meteorological data for 1984 to 1988 from the National Weather Service Stations in Jacksonville and Waycross, respectively.

[b] Background concentration is highest quarterly concentration measured in Duval County from 2001 to 2002 (Site ID 12-031-0032).

[c] Lead AAQS is based on calendar quarter arithmetic mean. As a concervative approach, the highest monthly average concentration predicted for the project is added to the background concentration and compared to AAQS.

Table F-2. Maximum Predicted Lead Impacts for the Project at the PSD Class I Area of Okefenokee NWA for Locations within 50 Kilometers of the Project Site.

Pollutant, Averaging Time, and Rank	Concentration ($\mu g/m^3$) [a]		Receptor Location		Time Period (YYMMDDHH)
	Total	Modeled Sources	x (m)	y (m)	
Lead					
Monthly, Highest	0.001	0.0007	388,530.0	3,383,358.0	84053124
	0.001	0.0005	378,941.0	3,383,461.0	85113024
	0.001	0.0007	388,549.0	3,385,205.0	86053124
	0.001	0.0006	386,932.0	3,383,374.0	87063024
	0.001	0.0006	377,343.0	3,383,479.0	88033124

Note: YYMMDDHH = Year, Month, Day, Hour Ending

[a] Based on 5-year surface and upper air meteorological data for 1984 to 1988 from the National Weather Service Stations in Jacksonville and Waycross, respectively.

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ISCST3 OUTPUT FILE NUMBER 1 :leadaq.o84
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ISCST3 OUTPUT FILE NUMBER 5 :leadaq.o88
First title for last output file is: 1984 GERDAU-AMERISTEEL NOX SIG ANALYSIS 3/16/04
Second title for last output file is: JAX/WAYCROSS MET 1984-1989

AVERAGING TIME	YEAR	CONC (ug/m3)	X (m)	Y (m)	PERIOD ENDING (YYMMDDHH)
SOURCE GROUP ID: ALL					
HIGH -Hour					
	1984	0.04122	-141.3	-12.9	84073124
	1985	0.02457	-201.6	-199.4	85113024
	1986	0.04910	-141.3	-12.9	86033124
	1987	0.05035	-171.4	-106.2	87053124
	1988	0.04402	-201.6	-199.4	88063024

All receptor computations reported with respect to a user-specified origin

GRID	0.00	0.00
DISCRETE	0.00	0.00

ISCBOB3R RELEASE 00285

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ISCST3 OUTPUT FILE NUMBER 5 :leadc1.o88
First title for last output file is: 1984 GERDAU-AMERISTEEL Lead CLASS I SIG ANALYSIS 3/16/04
Second title for last output file is: AT OKEFENOKEE AND WOLF IS. NWAS, JAX/WAYCROSS MET 1984-1989

AVERAGING TIME	YEAR	CONC (ug/m3)	X (m)	Y (m)	PERIOD ENDING (YYMMDDHH)
SOURCE GROUP ID: ALL					
HIGH -Hour					
	1984	0.00073	388530.0	3383358.0	84053124
	1985	0.00053	378941.0	3383461.0	85113024
	1986	0.00070	388549.0	3385205.0	86053124
	1987	0.00064	386932.0	3383374.0	87063024
	1988	0.00062	377343.0	3383479.0	88033124

All receptor computations reported with respect to a user-specified origin

GRID	0.00	0.00
DISCRETE	0.00	0.00

ATTACHMENT G

CLASS II PSD RESULTS

TABLES E-1, E-2, E-3 & E-4

Table 6-9. Maximum Predicted SO_2, NO_2, and PM_{10} Impacts for Comparison to the PSD Class II Increments Screening Analysis

Pollutant, Averaging Time, and Rank	Concentration ($\mu g/m^3$) [a] Modeled Sources	Receptor Location x (m)	Receptor Location y (m)	Time Period (YYMMDDHH)	PSD Class II Increment ($\mu g/m^3$)
SO_2					
24-Hour, HSH	14.1	-141	-13	84102124	91
	16.8	-156	-60	85032124	
	19.7	-126	34	86031224	
	16.8	-141	-13	87121924	
	16.4	-156	-60	88032524	
3-Hour, HSH	52.2	-111	80	84022709	512
	54.6	-156	-60	85112121	
	64.1	-126	34	86031224	
	50.9	-141	-13	87041321	
	51.5	-126	34	88112612	
NO_2					
Annual, Highest	3.9	-171.4	-106.2	84123124	25
	3.8	-156.4	-59.5	85123124	
	3.4	-156.4	-59.5	86123124	
	4.4	-171.4	-106.2	87123124	
	4.1	-156.4	-59.5	88123124	
PM_{10}					
24-Hour, HSH	4.3	-186.5	-152.8	84100724	30
	5.0	-186.5	-152.8	85083124	
	4.4	-171.4	-106.2	86062124	
	5.1	-186.5	-152.8	87110324	
	4.5	-171.4	-106.2	88093024	

Note: YYMMDDHH = Year, Month, Day, Hour Ending
HSH = Highest, Second-Highest

[a] Based on 5-year surface and upper air meteorological data for 1984 to 1988 from the National Weather Service Stations in Jacksonville and Waycross, respectively.

Table 6-10. Maximum Predicted SO_2, NO_2, and PM_{10} Impacts for Comparison to the PSD Class II Increments
Refined Analysis

Pollutant, Averaging Time, and Rank	Concentration ($\mu g/m^3$) [a] Modeled Sources	Receptor Location x (m)	Receptor Location y (m)	Time Period (YYMMDDHH)	PSD Class II Increment ($\mu g/m^3$)
SO_2					
24-Hour, HSH	19.7	-156.4	-59.5	85082324	91
3-Hour, HSH	64.1	-126.3	33.7	86061003	512
NO_2					
Annual, Highest	4.4	-171.4	-106.2	86123124	25
PM_{10}					
24-Hour, HSH	5.1	-187	-153	87110324	30

Note: YYMMDDHH = Year, Month, Day, Hour Ending
HSH = Highest, Second-Highest
H6H = Highest, Sixth-Highest

[a] Based on 5-year surface and upper air meteorological data for 1984 to 1988 from the National Weather Service Stations in Jacksonville and Waycross, respectively.

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ISCST3 OUTPUT FILE NUMBER 3 :SO2PSD.o86
ISCST3 OUTPUT FILE NUMBER 4 :SO2PSD.o87
ISCST3 OUTPUT FILE NUMBER 5 :SO2PSD.o88
First title for last output file is: 1984 GERDAU-AMERISTEEL SO2 SIG ANALYSIS 3/16/04
Second title for last output file is: JAX/WAYCROSS MET 1984-1989

AVERAGING TIME	YEAR	CONC (ug/m3)	X (m)	Y (m)	PERIOD ENDING (YYMMDDHH)
SOURCE GROUP ID:	ALL				
Annual					
	1984	0.79673	-156.4	-59.5	84123124
	1985	0.50367	-156.4	-59.5	85123124
	1986	0.59430	-156.4	-59.5	86123124
	1987	1.10498	-156.4	-59.5	87123124
	1988	0.68594	-156.4	-59.5	88123124
HIGH 24-Hour					
	1984	22.89130	-111.2	80.3	84080224
	1985	23.14128	-156.4	-59.5	85112124
	1986	35.67673	-141.3	-12.9	86031824
	1987	22.13420	-141.3	-12.9	87031824
	1988	18.37955	-156.4	-59.5	88040124
HSH 24-Hour					
	1984	14.14075	-141.3	-12.9	84102124
	1985	16.83179	-156.4	-59.5	85032124
	1986	19.70634	-126.3	33.7	86031224
	1987	16.75634	-141.3	-12.9	87121924
	1988	16.42592	-156.4	-59.5	88032524
HIGH 3-Hour					
	1984	60.36850	-111.2	80.3	84080221
	1985	73.07061	-156.4	-59.5	85112118
	1986	71.64457	-126.3	33.7	86031821
	1987	58.42284	-141.3	-12.9	87121915
	1988	58.37082	-126.3	33.7	88040109
HSH 3-Hour					
	1984	52.16908	-111.2	80.3	84022709
	1985	54.64285	-156.4	-59.5	85112121
	1986	64.12525	-126.3	33.7	86031224
	1987	50.89435	-141.3	-12.9	87041321
	1988	51.49979	-126.3	33.7	88112612

All receptor computations reported with respect to a user-specified origin

GRID	0.00	0.00
DISCRETE	0.00	0.00

ISCBOB3R RELEASE 00285

ISCST3 OUTPUT FILE NUMBER 1 :NOXPSD.o84
ISCST3 OUTPUT FILE NUMBER 2 :NOXPSD.o85
ISCST3 OUTPUT FILE NUMBER 3 :NOXPSD.o86
ISCST3 OUTPUT FILE NUMBER 4 :NOXPSD.o87
ISCST3 OUTPUT FILE NUMBER 5 :NOXPSD.o88
First title for last output file is: 1984 GERDAU-AMERISTEEL NOX SIG ANALYSIS 3/16/04
Second title for last output file is: JAX/WAYCROSS MET 1984-1989

AVERAGING TIME	YEAR	CONC (ug/m3)	X (m)	Y (m)	PERIOD ENDING (YYMMDDHH)
SOURCE GROUP ID: ALL					
Annual					
	1984	3.94774	-171.4	-106.2	84123124
	1985	3.80149	-156.4	-59.5	85123124
	1986	3.39801	-156.4	-59.5	86123124
	1987	4.41444	-171.4	-106.2	87123124
	1988	4.05553	-156.4	-59.5	88123124

All receptor computations reported with respect to a user-specified origin

GRID	0.00	0.00
DISCRETE	0.00	0.00

ISCBOB3R RELEASE 00285

ISCST3 OUTPUT FILE NUMBER 1 :PMPSD.o84
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ISCST3 OUTPUT FILE NUMBER 4 :PMPSD.o87
ISCST3 OUTPUT FILE NUMBER 5 :PMPSD.o88
First title for last output file is: 1984 GERDAU-AMERISTEEL PM10 SIG ANALYSIS 3/16/04
Second title for last output file is: JAX/WAYCROSS MET 1984-1989

AVERAGING TIME	YEAR	CONC (ug/m3)	X (m)	Y (m)	PERIOD ENDING (YYMMDDHH)
SOURCE GROUP ID: ALL					
Annual					
	1984	0.63826	-171.4	-106.2	84123124
	1985	0.57070	-186.5	-152.8	85123124
	1986	0.53984	-171.4	-106.2	86123124
	1987	0.71862	-171.4	-106.2	87123124
	1988	0.66747	-171.4	-106.2	88123124
HIGH 24-Hour					
	1984	4.98642	-186.5	-152.8	84092224
	1985	7.30979	-156.4	-59.5	85112124
	1986	9.40141	-141.3	-12.9	86031824
	1987	5.54312	-186.5	-152.8	87032324
	1988	5.04575	-171.4	-106.2	88081224
HSH 24-Hour					
	1984	4.27083	-186.5	-152.8	84100724
	1985	4.96313	-186.5	-152.8	85083124
	1986	4.35812	-171.4	-106.2	86062124
	1987	5.11874	-186.5	-152.8	87110324
	1988	4.50167	-171.4	-106.2	88093024

All receptor computations reported with respect to a user-specified origin

GRID	0.00	0.00
DISCRETE	0.00	0.00

Table E-1 Summary of SO2 Sources Included in the Class II Air Modeling Analysis

Facility	Modeling ID Name	UTM Location East (m)	UTM Location North (m)	Relative Location X (km)	Relative Location Y (km)	Distance (km)	Stack and Operating Parameters Height (m)	Diameter (m)	Temper (K)	Velocity (m/s)	Emission Rate(g/s) SO2	PSD Source? (EXP,CON)	Modeled in AAQS	Modeled in Class II
JEA Brandy Branch	S1NG	408,835	3,354,492	3 14	4 29	5 31	57.91	5 49	403	21 28	4 12	C	Y	Y
	S2NG	408,713	3,354,531	3 01	4 33	5.28	57 91	5 49	403	21 28	4.12	C	Y	Y
	S3FO	408,774	3,354,531	3 07	4 33	5 31	57.91	5 49	403	21 28	4 12	C	Y	Y
	SFP	408,894	3,354,536	3 19	4 34	5.39	7 32	0 15	616	60 02	0 00	C	Y	Y
IFF CHEMICAL HOLDINGS, INC	BOILER1	427,600	3,357,300	21 90	7 10	23 02	22 86	0 76	338	14 23	44 56	N	Y	N
	BOILER2	427,600	3,357,300	21 90	7 10	23 02	15 50	1 20	586	0 90	7 19	N	Y	N
	BOILER3	427,600	3,357,300	21 90	7.10	23 02	20 10	1 20	586	11 60	7 19	N	Y	N
Millennium Specialty Chemical	BOILER4	436,790	3,360,740	31 09	10 54	32 83	38 10	1 10	405	14 02	25 20	C	Y	Y
	BOILER5	436,790	3,360,740	31 09	10 54	32 83	38 10	1 16	450	23 29	24 32	C	Y	Y
	BOILER6	436,790	3,360,740	31 09	10 54	32 83	38 10	1 55	450	22 71	30.52	C	Y	Y
	BOILER7	436,790	3,360,740	31 09	10 54	32 83	38 10	1 55	450	22 71	10 33	C	Y	Y
	EBOILER3	436,790	3,360,740	31 09	10 54	32 83	12.20	1 10	658	10 10	-8 49	E	Y	Y
JEA South Side	JEASS1	437,670	3,353,890	31 97	3 69	32 18	40 70	2 44	446	15 50	-52 70	E	N	Y
	JEASS2	437,670	3,353,910	31 97	3.71	32 18	40 70	2 44	446	15 50	-52 70	E	N	Y
	JEASS5B	437,682	3,353,841	31 98	3 64	32 19	44 20	2 96	415	21 30	-103 95	E	N	Y
	JEASS5A	437,682	3,353,849	31.98	3 65	32 19	44 20	2 96	415	21 30	-103 95	E	N	Y
	JEASS4	437,670	3,353,962	31 97	3 76	32 19	43 70	3 25	408	18 50	-110 32	E	N	Y
	JEASS3	437,678	3,353,933	31.98	3 73	32 20	40 70	3 05	424	13 40	-79 80	E	N	Y
Jefferson Smurfit Jacksonville Mill	CMILL1	439,900	3,359,300	34 20	9.10	35 39	53 40	3 20	410	22 90	36 78	C	Y	Y
	CMILL2	439,900	3,359,300	34 20	9 10	35 39	61 00	3 00	335	10 70	25 65	C	Y	Y
	CMILL3	439,900	3,359,300	34 20	9 10	35 39	64 00	1 40	346	11 00	1 31	C	Y	Y
	EMILL1	439,900	3,359,300	34 20	9 10	35 39	53 40	3 20	410	22 90	-16 81	E	N	Y
	EMILL2	439,900	3,359,300	34 20	9 10	35 39	15 80	1 50	347	6 70	-0 98	E	N	Y
	EMILL3	439,900	3,359,300	34 20	9 10	35 39	76 20	3 80	455	8 00	-36 51	E	N	Y
JEA Kennedy	EKEN	440,000	3,359 200	34 30	9 00	35 46	45 70	3 20	394	10 40	-75 05	E	N	Y
	KNDY9	440,070	3,359,130	34 37	8 93	35 51	45 70	3 20	416	12 20	-75 00	E	N	Y
	KNDY10A	440,085	3,359,090	34 39	8 89	35 52	41 50	2.74	427	24 30	-92.50	E	N	Y
	KNDY10B	440,085	3,359,100	34 39	8.90	35 52	41 50	2 74	427	24 30	-92 50	E	N	Y
	CT3	440,085	3,359,100	34 39	8 90	35 52	9 14	3 93	700	7 98	47 34	N	Y	N
	CT4	440,085	3,359,100	34 39	8 90	35 52	9 14	3 93	700	7.98	47 34	N	Y	N
	CT5	440,085	3 359 100	34 39	8 90	35 52	9 14	3 93	700	7 98	47 34	N	Y	N
	CT7	440,085	3 359 100	34 39	8 90	35 52	27 40	7.32	875	26 60	12 35	N	Y	N
Anheuser Busch	BLR1	440,580	3,359,300	34 88	9 10	36 05	30 48	1 10	489	16 15	5 84	C	Y	Y
	BLR2	440,580	3 359 300	34.88	9 10	36 05	30 48	1.10	489	16 15	5 84	C	Y	Y
	BLR3	440,580	3,359,300	34 88	9 10	36 05	30 48	1 10	489	16 15	5 84	C	Y	Y
	BLR4	440,580	3,359,300	34 88	9 10	36 05	30 48	1 10	489	16 15	5 84	C	Y	Y
	SOLAR	440,580	3 359 300	34 88	9 10	36 05	30 48	1.77	413	19 51	4 73	C	Y	Y
Cedar Bay	CCBAY1	441,610	3 365 540	35 91	15 34	39 05	122 90	4 10	327	36 60	32 17	C	Y	Y
	CCBAY2	441,610	3,365,540	35 91	15 34	39 05	122 90	4 10	327	36 60	32 17	C	Y	Y
	CCBAY3	441,610	3 365 540	35.91	15 34	39 05	122 90	4 10	327	36 60	32 17	C	Y	Y
	CCBAY4	441,610	3,365,540	35 91	15 34	39 05	19 20	1.30	301	28 40	0 03	C	Y	Y
	CCBAY5	441,610	3,365 540	35.91	15 34	39 05	19 20	1.30	301	28 40	0.03	C	Y	Y
JEA Northside	CJEAN1	446,670	3,365 070	40.97	14.87	43 59	151 00	4.57	331	19 20	69 55	C	Y	Y
	CJEAN2	446,670	3,365,070	40 97	14 87	43.59	151 00	4 57	331	19 20	69 55	C	Y	Y
	CJEAN3	446 740	3,365 240	41.04	15 04	43 71	91 40	7.01	438	18 90	1255 59	C	Y	Y
	CT3	446,810	3,365,620	41 11	15 42	43 91	9 10	3 90	700	8 80	57 33	N	Y	N
	CT4	446,800	3,365 650	41.10	15 45	43 91	9 10	3.90	700	8 80	57 33	N	Y	N
	CT5	446,790	3,365,690	41 09	15.49	43 91	9 10	3 90	700	8 80	57 33	N	Y	N
	CT6	446,770	3,365,730	41 07	15 53	43 91	9 10	3.90	700	8 80	57 33	N	Y	N
	EJEAN2	446,910	3,365,220	41.21	15.02	43 86	88 40	5 00	394	13 10	-584 55	E	N	Y
	EJEAN1	446 970	3,365,230	41 27	15 03	43 92	76 20	4 87	403	23 10	-690 92	E	N	Y

Table E-1 Summary of SO2 Sources Included in the Class II Air Modeling Analysis

Facility	Modeling ID Name	UTM Location East (m)	UTM Location North (m)	Relative Location X (km)	Relative Location Y (km)	Distance (km)	Stack and Operating Parameters Height (m)	Diameter (m)	Temper (K)	Velocity (m/s)	Emission Rate(g/s) SO2	PSD Source? (EXP,CON)	Modeled in AAQS	Modeled in Class II
St. Johns River Power Park	UNIT1	447,080	3,366,660	41 38	16 46	44.53	195 10	6 79	342	27 40	929 00	C	Y	Y
	UNIT2	447,100	3,366,660	41 40	16 46	44 55	195 10	6 79	342	27 40	929 00	C	Y	Y
Rayonier	CRAY1	454,700	3,392,200	49 00	42 00	64.54	54 90	3 00	336	9 80	53 21	C	Y	Y
	CRAY2	454,700	3,392,200	49 00	42 00	64 54	54 90	3 00	336	9 80	50 56	C	Y	Y
	CRAY3	454,700	3,392,200	49 00	42 00	64 54	54 90	3 00	329	9 80	55.51	C	Y	Y
	ERAY	454,700	3,392,200	49 00	42 00	64 54	54 90	3 00	329	9 80	-39 82	E	N	Y
GA Gilman Paper Company	CPAPER1	448,200	3,401,300	42 50	51 10	66 46	83 80	4 30	450	2 80	87 36	C	Y	Y
	CPAPER2	448,200	3,401,300	42 50	51 10	66.46	45 70	3 10	326	7 80	88 82	C	Y	Y
	CPAPER3	448,200	3,401,300	42 50	51 10	66 46	54 90	2 10	425	16.80	15 20	C	Y	Y
	CPAPER4	448,200	3,401,300	42 50	51.10	66 46	76 20	2.60	411	12 20	15 81	C	Y	Y
	CPAPER5	448,200	3,401,300	42 50	51 10	66 46	30 50	1 50	350	11 60	2 13	C	Y	Y
	EPAPER1	448,200	3,401,300	42 50	51.10	66 46	83 80	4.30	450	7 30	-281 25	E	N	Y
	EPAPER2	448,200	3,401,300	42 50	51 10	66 46	38 60	1 80	700	20 00	-59 95	E	N	Y
	EPAPER3	448,200	3,401,300	42 50	51.10	66 46	47 20	2.30	426	13.10	-7 60	E	N	Y
	EPAPER4	448,200	3,401,300	42 50	51 10	66 46	53 30	1 60	394	25 20	-7.60	E	N	Y
	EPAPER5	448,200	3,401,300	42.50	51.10	66 46	76 20	2 60	427	22.10	-15 81	E	N	Y
Jefferson Smurfit Corp Fernandina	CBMILL1	456,200	3,394,200	50 50	44 00	66 98	78 40	3 40	454	15 20	190 57	C	Y	Y
	CBMILL2	456,200	3,394,200	50 50	44 00	66 98	80 80	3 50	493	18 60	40 46	C	Y	Y
	CBMILL3	456,200	3,394 200	50.50	44 00	66 98	88 10	3 90	484	18 90	45 12	C	Y	Y
	CBMILL4	456,200	3,394,200	50 50	44 00	66 98	103 70	4 50	441	12 80	154 51	C	Y	Y
	CBMILL5	456,200	3,394 200	50.50	44 00	66 98	22.90	1 70	436	16 80	3 37	C	Y	Y
	EBMILL1	456,200	3 394 200	50.50	44 00	66 98	69 20	2 40	483	16 90	-144 83	E	N	Y
	EBMILL2	456,200	3,394,200	50 50	44 00	66 98	69 20	3 40	480	16 30	-170 16	E	N	Y
	EBMILL3	456,200	3 394 200	50.50	44 00	66 98	75 90	3 50	493	18 80	-35 13	E	N	Y
	EBMILL4	456,200	3,394,200	50 50	44 00	66 98	40 80	2 70	390	13 30	-10 51	E	N	Y
	EBMILL5	456,200	3 394 200	50 50	44 00	66 98	13 40	1 10	361	12 30	-1 30	E	N	Y
	EBMILL6	456,200	3,394,200	50 50	44 00	66 98	13 40	1 40	360	17 60	-1 30	E	N	Y
	EBMILL7	456,200	3,394,200	50 50	44 00	66 98	69.50	1 80	350	5 20	-0 20	E	N	Y
	EBMILL8	456 200	3,394,200	50 50	44 00	66 98	33 20	0 60	360	5 80	-0 69	E	N	Y
Seminole Electric	CSEMELEC	438,800	3,289,200	33 10	-61.00	69 40	205 74	10 97	327	7 99	2168 80	C	Y	Y
GRU Deer Haven	GRUDH2	365,700	3,292,600	-40 00	-57.60	70 13	106 68	5 64	408	15 24	367 16	C	Y	Y
	GRUDHCC	365,500	3,292,600	-40 20	-57 60	70 24	15 85	4 30	866	51 21	6 68	C	Y	Y
Georgia Pacific Palatka	CCB4	434,000	3,283,400	28 30	-66 80	72.55	72 20	2 44	500	21 88	223 10	C	Y	Y
	CLK4	434,000	3,283,400	28 30	-66 80	72 55	39 90	1.35	339	18 53	1 37	C	Y	Y
	CPB4	434,000	3,283,400	28 30	-66 80	72.55	61 00	1 22	475	21 82	46.15	C	Y	Y
	CPB5	434,000	3,283,400	28 30	-66 80	72 55	70 70	2.74	503	18 47	206 30	C	Y	Y
	CPB6	434,000	3,283,400	28 30	-66 80	72.55	18 30	1 83	622	17 43	1 40	C	Y	Y
	CRB4	434,000	3,283,400	28 30	-66 80	72 55	70 10	3 66	478	19 42	55 36	C	Y	Y
	CSDT4	434,000	3,283,400	28 30	-66 80	72.55	62 80	1 52	344	6 46	1 00	C	Y	Y
	CTRS	434,000	3,283,400	28 30	-66 80	72 55	76 20	0.94	533	32 03	75 60	C	Y	Y
	ECB4	434,000	3,283,400	28 30	-66 80	72 55	72 90	3 05	477	10 52	-121.28	E	N	Y
	ELK1	434,000	3,283,400	28 30	-66 80	72 55	15 20	1 28	401	5 24	-0 24	E	N	Y
	ELK2	434,000	3,283,400	28 30	-66 80	72 55	15 90	1 71	341	10 67	-0 24	E	N	Y
	ELK3	434,000	3,283,400	28 30	-66 80	72 55	15 90	1.71	342	8 47	-0 48	E	N	Y
	ELK4	434,000	3,283,400	28 30	-66 80	72 55	45 40	1 31	351	16 46	-1 40	E	N	Y
	EPB4	434,000	3,283,400	28 30	-66 80	72 55	37 20	1 22	477	14 54	-45 22	E	N	Y
	EPB5	434,000	3,283 400	28 30	-66 80	72 55	72.90	2 74	520	15 97	-161.15	E	N	Y
	ERB1	434,000	3,283,400	28 30	-66 80	72 55	76 20	3 66	360	8 80	-6 21	E	N	Y
	ERB2	434,000	3,283 400	28 30	-66 80	72 55	76.20	3 66	372	8 80	-8 88	E	N	Y
	ERB3	434,000	3,283,400	28.30	-66 80	72 55	40.50	3 41	372	7.28	-8 58	E	N	Y
	ERB4	434,000	3,283,400	28 30	-66 80	72 55	70.10	3 66	474	16 86	-34.97	E	N	Y
	ESDT1	434,000	3,283,400	28.30	-66 80	72 55	30.50	0.76	366	7.53	-0 13	E	N	Y
	ESDT2	434 000	3,283,400	28 30	-66 80	72 55	30 50	0 91	375	9 51	-0 18	E	N	Y
	ESDT3	434,000	3,283,400	28.30	-66 80	72 55	33 20	0 76	369	3.57	-0 18	E	N	Y

Table E-1 Summary of SO2 Sources Included in the Class II Air Modeling Analysis

Facility	Modeling ID Name	UTM Location East (m)	UTM Location North (m)	Relative Location X (km)	Relative Location Y (km)	Distance (km)	Stack and Operating Parameters Height (m)	Diameter (m)	Temper (K)	Velocity (m/s)	Emission Rate(g/s) SO2	PSD Source (EXP,COS)	Modeled in AAQS	Modeled in Class II
	ESDT4	434,000	3,283,400	28 30	-66 80	72 55	62 80	1 52	346	8 26	-0 71	E	N	Y
PCS Phosphate	SULACC&D	328,300	3,368 800	-77 40	18 60	79 60	45 70	1 59	356	28 70	96 60	C	Y	Y
	SULACE&F	328,300	3,368,800	-77 40	18 60	79 60	61 00	2.90	356	9.30	105 00	C	Y	Y
	AUXBLRE	328,300	3,368 800	-77 40	18 60	79 60	15 30	1 60	428	15 90	21.50	C	Y	Y
	AUXBLRB	328,300	3 368,800	-77 40	18 60	79 60	10 70	1.46	468	9.50	22.00	C	Y	Y
	AUXBLRC&	328,300	3,368,800	-77 40	18 60	79 60	31 70	1 98	468	15 20	41 88	C	Y	Y
	DAP2ZTR	328,300	3,368,800	-77.40	18 60	79 60	42 70	2.44	325	13 10	0 69	C	Y	Y
	SULACA&B	328,300	3 368 800	-77 40	18 60	79 60	61 00	1 80	350	15 50	-304 50	E	N	Y
	SULACC&D	328,300	3 368,800	-77 40	18 60	79 60	45 70	1 59	356	28 70	-75 60	E	N	Y
Florida Power & Light (FPL)- Putnam Plant	CFPLPUTM	443 300	3 277,600	37 60	-72 60	81.76	22 30	3 15	437	58 60	195 20	C	Y	Y
Florida Power & Light (FPL)- Palatka Plant	FPLPALAT	442,800	3,277,600	37 10	-72 60	81.53	45.70	3 96	408	9 50	-257 03	E	N	Y

Table E-2. Summary of NO_x Sources Included in the Air Modeling Analysis

Facility	Modeling ID Name	UTM Location East (m)	UTM Location North (m)	Relative Location X (km)	Relative Location Y (km)	Distance (km)	Stack and Operating Parameters Height (m)	Diameter (m)	Temper (K)	Velocity (m/s)	Emission Rate(g/s) NOx	PSD Source[a] (EXP/CON)	Modeled in AAQS	Modeled in Class II
JEA Brandy Branch	S1FO	408,835	3,354,492	3 14	4 29	5 3	57 91	5 49	403	21 28	12.87	C	Y	Y
	S2FO	408,713	3,354,531	3 01	4 33	5 3	57 91	5 49	403	21 28	12 87	C	Y	Y
	S3FO	408,774	3,354,531	3 07	4 33	5 3	57 91	5 49	403	21.28	12.87	C	Y	Y
ANCHOR GLASS CONTAINER CORPORA	GFNO3	431,500	3,357,500	25 80	7 30	26 8	34 44	1 52	589	13 59	9.20	N	Y	N
	GFNO4	433,750	3,358,700	28 05	8 50	29 3	37 19	1.52	488	11 58	6 84	N	Y	N
Baptist Medical Center	WICKES	435,400	3,352,000	29 70	1 80	29 8	11.90	0 80	504	2 40	0 78	C	Y	Y
	NATCO	435,400	3,352,000	29 70	1 80	29 8	15 20	0 90	436	45.70	2 15	C	Y	Y
	SOLAR	435,400	3,352,000	29 70	1 80	29 8	15 20	1 10	436	24.70	2 08	C	Y	Y
	REC1	435,400	3,352,000	29 70	1 80	29 8	10.70	0 20	450	43 30	2 88	C	Y	Y
	REC2	435,400	3,352,000	29 70	1 80	29 8	10.70	0 20	450	43.30	2 88	C	Y	Y
	REC3	435,400	3,352,000	29 70	1 80	29 8	10 70	0 20	450	43.30	2 88	C	Y	Y
	REC4	435,400	3,352,000	29 70	1 80	29.8	10 70	0 20	450	43 30	2 88	C	Y	Y
	BOILER2	435,400	3,352,000	29 70	1 80	29 8	11.90	0 80	505	2 40	0 78	C	Y	Y
	VALLEY	435,400	3,352,000	29 70	1 80	29.8	15 20	1 10	436	21 30	2 19	C	Y	Y
	TG4	435,400	3,352,000	29 70	1 80	29 8	15 20	1 10	436	25 60	2 77	C	Y	Y
JEA South Side	JEASS5B	437,682	3,353,841	31 98	3 64	32.2	44 20	2 96	415	21 30	-42.25	E	N	Y
	JEASS5A	437,682	3,353,849	31.98	3 65	32 2	44 20	2 96	415	21 30	-42 25	E	N	Y
	JEASS4	437,670	3,353,962	31 97	3 76	32 2	43.70	3 25	408	18 50	-44 83	E	N	Y
Jefferson Smurfit Jacksonville Mill	SMELT	439,900	3,359,300	34 20	9 10	35 4	53 40	1 60	355	6 70	9 89	C	Y	Y
	BOILER9	439,900	3,359,300	34 20	9 10	35 4	53.40	3 20	410	22 90	34.02	C	Y	Y
	BOILER10	439,900	3,359,300	34 20	9 10	35 4	61 00	3 00	355	10 70	4 49	C	Y	Y
ANHEUSER BUSCH, INC JACKSONVILI	BLR1	440,580	3,359,300	34 88	9 10	36 0	30 48	1 10	489	16 15	4.25	N	Y	N
	BLR2	440,580	3,359,300	34 88	9 10	36 0	30 48	1 10	489	16 15	4 25	N	Y	N
	BLR3	440,580	3,359,300	34.88	9 10	36 0	30 48	1 10	489	16 15	4.25	N	Y	N
	BLR4	440,580	3,359,300	34 88	9 10	36 0	30 48	1 10	489	16 15	4 25	N	Y	N
	SOLAR	440,580	3,359,300	34.88	9 10	36 0	30 48	1 77	413	19.51	10.08	N	Y	N
Cedar Bay	CCBAY1	441,610	3,365,540	35 91	15 34	39 0	122 90	4 10	327	36 60	22.77	C	Y	Y
	CCBAY2	441,610	3,365,540	35.91	15.34	39 0	122 90	4 10	327	36 60	22.77	C	Y	Y
	CCBAY3	441,610	3,365,540	35 91	15 34	39 0	122 90	4 10	327	36 60	22.77	C	Y	Y
	CCBAY4	441,610	3,365,540	35 91	15.34	39 0	19 20	1 30	301	28 40	0.36	C	Y	Y
	CCBAY5	441,610	3,365,540	35 91	15 34	39 0	19 20	1 30	301	28 40	0.36	C	Y	Y
JEA Northside	CJEAN1	446,670	3,365,070	40.97	14 87	43.6	151 00	4 57	331	19 20	31 34	N	Y	N
	CJEAN2	446,670	3,365,070	40 97	14 87	43 6	151 00	4 57	331	19 20	31 34	N	Y	N
	CJEAN3	446,740	3,365,240	41 04	15 04	43.7	91 40	7 01	438	18 90	190 26	N	Y	N
	CT3	446,810	3,365,620	41.11	15 42	43 9	9 10	3 90	700	8.80	46 99	C	Y	Y
	CT4	446,800	3,365,650	41 10	15 45	43 9	9.10	3 90	700	8 80	46 99	C	Y	Y
	CT5	446,790	3,365,690	41.09	15.49	43.9	9 10	3 90	700	8.80	46 99	C	Y	Y
	CT6	446,770	3,365,730	41 07	15 53	43 9	9.10	3 90	700	8 80	46.99	C	Y	Y
	EJEAN1	446,970	3,365,230	41.27	15.03	43.9	76 20	4 87	403	23 10	-112 19	E	N	Y
St. Johns River Power Park	UNIT1	447,080	3,366,660	41 38	16 46	44 5	195 10	6 79	342	27 40	464.44	C	Y	Y
	UNIT2	447,100	3,366,660	41.40	16.46	44.6	195 10	6 79	342	27 40	464 44	C	Y	Y
Rayonier	CRAY1	454,700	3,392,200	49 00	42 00	64 5	54 90	3 00	336	9 80	3.54	N	Y	N
	CRAY2	454,700	3,392,200	49.00	42.00	64.5	54 90	3 00	336	9.80	2 10	N	Y	N
	CRAY3	454,700	3,392,200	49.00	42 00	64 5	54 90	3 00	329	9.80	3.14	N	Y	N
	RECOV	454,700	3,392,200	49.00	42.00	64.5	76 20	2 30	325	17 40	36 80	E	N	Y
Jefferson Smurfit Corp Fernandina	PBNO5	456,200	3,394,200	50 50	44 00	67 0	78 40	3 40	454	15 20	32.54	C	Y	Y

Table E-2. Summary of NO_x Sources Included in the Air Modeling Analysis

Facility	Modeling ID Name	UTM Location East (m)	UTM Location North (m)	Relative Location X (km)	Relative Location Y (km)	Distance (km)	Stack and Operating Parameters Height (m)	Diameter (m)	Temper. (K)	Velocity (m/s)	Emission Rate(g/s) NOx	PSD Source? (EXP/CON)	Modeled in AAQS	Modeled in Class II
	RBNO4	456,200	3,394,200	50 50	44 00	67 0	80 80	3 50	493	18 60	5 78	C	Y	Y
	RBNO5	456,200	3,394 200	50 50	44 00	67.0	88 10	3 90	484	18 90	6 45	C	Y	Y
	PBNO7	456,200	3,394,200	50 50	44 00	67 0	103.70	4 50	441	12 80	77.26	C	Y	Y
	LKNO4	456,200	3,394,200	50 50	44 00	67.0	22.90	1.70	436	16 80	23 61	C	Y	Y
Seminole Electric	CSEMELEC	438,800	3,289,200	33 10	-61 00	69 4	205 74	10 97	327	7 99	1084 36	C	Y	Y
Georgia Pacific Palatka	CCB4	434,000	3,283,400	28 30	-66 80	72.5	72 20	2.44	500	21 88	16.53	C	Y	Y
	CLK4	434,000	3,283,400	28 30	-66 80	72 5	39.90	1.35	339	18 53	6 34	C	Y	Y
	CPB4	434,000	3,283,400	28 30	-66 80	72 5	61 00	1 22	475	21 82	5 29	C	Y	Y
	CPB5	434,000	3,283,400	28 30	-66 80	72 5	70.70	2 74	503	18 47	22 46	C	Y	Y
	CPB6	434,000	3,283,400	28 30	-66 80	72 5	18 30	1 83	622	17 43	1.13	C	Y	Y
	CRB4	434,000	3 283,400	28 30	-66 80	72 5	70.10	3 66	478	19 42	21 23	C	Y	Y
	CSDT4	434,000	3 283,400	28 30	-66 80	72 5	62 80	1 52	344	6 46	1.98	C	Y	Y

Table E-3 Summary of PM Sources Included in the Class II Air Modeling Analysis

Facility	Modeling ID Name	UTM Location East (m)	UTM Location North (m)	Relative Location X (km)	Relative Location Y (km)	Distance (km)	Stack and Operating Parameters Height (m)	Diameter (m)	Temper (K)	Velocity (m/s)	Emission Rate(g/s) PM	PSD Source? (EXP,CON)	Modeled in AAQS	Modeled in Class II
JEA Northside	CJEAN1	446,670	3,365,070	41 0	14 9	43 6	151 00	4 57	331	19 20	3 83	C	Y	Y
	CJEAN2	446,670	3,365,070	41 0	14 9	43 6	151 00	4.57	331	19 20	3 83	C	Y	Y
	CJEAN3	446,740	3,365,240	41 0	15 0	43 7	91 40	7.01	438	18 90	63 38	C	Y	Y
	CT3	446,810	3 365,620	41 1	15 4	43 9	9.10	3 90	700	8.80	3 47	N	Y	N
	CT4	446 800	3 365,650	41 1	15 5	43 9	9.10	3 90	700	8.80	3 47	N	Y	N
	CT5	446,790	3 365,690	41 1	15 5	43 9	9 10	3 90	700	8 80	3 47	N	Y	N
	CT6	446,770	3,365,730	41 1	15 5	43 9	9 10	3.90	700	8 80	3 47	N	Y	N
	EJEAN2	446 910	3,365,220	41 2	15 0	43 9	88 40	5 00	394	13 10	-43 62	E	N	Y
	EJEAN1	446 970	3 365,230	41 3	15 0	43 9	76 20	4 87	403	23 10	-36.90	E	N	Y
St Johns River Power Park	UNIT1	447,080	3,366,660	41 4	16 5	44 5	195 10	6.79	342	27 40	23 24	C	Y	Y
	UNIT2	447 100	3 366,660	41 4	16 5	44 6	195 10	6 79	342	27 40	23 24	C	Y	Y
Jefferson Smurfit Corp Fernandina	CBMILL1	456 200	3 394,200	50 5	44 0	67 0	78 40	3 40	454	15 20	21 66	C	Y	Y
	CBMILL2	456 200	3 394,200	50 5	44 0	67 0	80 80	3 50	493	18 60	17 33	C	Y	Y
	CBMILL3	456,200	3,394,200	50 5	44 0	67 0	88 10	3 90	484	18 90	10 50	C	Y	Y
	SMDT4	456,200	3,394,200	50 5	44 0	67 0	74 40	1 80	334	8 80	3 59	C	Y	Y
	SMDT5	456,200	3,394,200	50 5	44 0	67 0	74 40	1 80	334	8 80	1.98	C	Y	Y
	CBMILL4	456 200	3,394,200	50 5	44 0	67 0	103 70	4 50	441	12 80	12 86	C	Y	Y
	CBMILL5	456,200	3,394 200	50 5	44 0	67.0	22 90	1 70	436	16 80	5 48	C	Y	Y
Seminole Electric	CSEMELEC	438,800	3,289 200	33 1	-61 0	69.4	205.74	10 97	327	7 99	54 22	C	Y	Y

ATTACHMENT H

MODELING PARAMETERS

Gerdau Ameristeel Modeling Parameters with 1,000,000 ACFM Baghouse

Existing Sources

		TPY	hours	lb/hr	Short term g/s	Annual g/s	temp F	K	Stack Dimensions H(m)	Dia(ft)	Dia(m)	Area(ft2)	flow rate ACFM	Velocity fpm	m/s
Stack 1-2	CO	292.94	7637	76.72	9.67	8.43	230	383.15	35.05	10	3.048	78.54	305540	3890.3	19.76
	NOx(NO2)	41.49	7637	10.87	1.37	1.19	230	383.15	35.05	10	3.048	78.54	305540	3890.3	19.76
	VOC	32.18	7637	8.43	1.06	0.93	230	383.15	35.05	10	3.048	78.54	305540	3890.3	19.76
	SO2	38.70	7637	10.13	1.28	1.11	230	383.15	35.05	10	3.048	78.54	305540	3890.3	19.76
	PM/PM-10	9.10	7637	2.38	0.300	0.26	230	383.15	35.05	10	3.048	78.54	305540	3890.3	19.76
Stack 3-4	CO	32.55	7637	8.52	1.07	0.94	230	383.15	35.05	10	3.048	78.54	320000	4074.4	20.70
	NOx(NO2)	4.61	7637	1.21	0.15	0.13	230	383.15	35.05	10	3.048	78.54	320000	4074.4	20.70
	VOC	3.58	7637	0.94	0.12	0.10	230	383.15	35.05	10	3.048	78.54	320000	4074.4	20.70
	SO2	4.30	7637	1.13	0.142	0.12	230	383.15	35.05	10	3.048	78.54	320000	4074.4	20.70
	PM/PM-10	9.98	7637	2.61	0.329	0.29	230	383.15	35.05	10	3.048	78.54	320000	4074.4	20.70

Assume that 90% of gaseous pollutants, and PM based on flowrate (acfm)

		TPY	hours	lb/hr	Short term g/s	Annual g/s	temp F	K	Stack Dimensions H(m)	Dia(ft)	Dia(m)	Area(ft2)	flow rate ACFM	Velocity fpm	m/s
Reheat	CO	0.066018	8072	0.02	2.06E-03	1.90E-03	900	755.4	48.77	6.9	2.103	37.39	43620	1166.5	5.93
	NOx(NO2)	65.01821	8072	16.11	2.03E+00	1.87E+00	900	755.4	48.77	6.9	2.103	37.39	43620	1166.5	5.93
	VOC	2.006	8072	0.50	6.26E-02	5.77E-02	900	755.4	48.77	6.9	2.103	37.39	43620	1166.5	5.93
	SO2	0.217144	8072	0.05	6.78E-03	6.25E-03	900	755.4	48.77	6.9	2.103	37.39	43620	1166.5	5.93
	PM-10	5.948934	8072	1.47	1.86E-01	1.71E-01	900	755.4	48.77	6.9	2.103	37.39	43620	1166.5	5.93

PM assumed to be all PM-10

Expected Future Emissions

		TPY	hours	lb/hr	Short term g/s	Annual g/s	temp F	K	Stack Dimensions H(m)	Dia(ft)	Dia(m)	Area (ft^2)	flow rate ACFM	Velocity fpm	m/s
Stack 3-4															
	PM/PM-10	12.05	8520	2.83	0.36	0.35	230	383.15	35.05	10	3.048	78.54	150000	1909.9	9.7

New Sources		TPY	hours	lb/hr	Short term g/s	Annual g/s	temp F	K	Stack Dimensions H(m)	H(ft)	Dia(ft)	Dia(m)	Maximum flow rate ACFM	Minimum flow rate ACFM	Baghouse Stack Dia(m)	Baghouse Stack* ft/min	Baghouse Stack* m/s
Baghouse	CO	600.00	8520	160.00	20.16	17.26	230	383.15	33.528	110	12	3.6576	500000	375,000	3.6576	4420.97	22.46
Stack 1	NOx(NO2)	99.00	8520	26.40	3.33	2.85	230	383.15	33.528	110	12	3.6576	500000	375,000	3.6576	4420.97	22.46
	VOC	39.00	8520	10.40	1.31	1.12	230	383.15	33.528	110	12	3.6576	500000	375,000	3.6576	4420.97	22.46
	SO2	60.00	8520	16.00	2.02	1.73	230	383.15	33.528	110	12	3.6576	500000	375,000	3.6576	4420.97	22.46
	Lead	1.5	8520	0.38	0.044	0.0431	230	383.15	33.528	110	12	3.6576	500000	375,000	3.6576	4420.97	22.46
	PM/PM-10C	32.86	8520	7.71	0.97	0.95	230	383.15	33.528	110	12	3.6576	500000	375,000	3.6576	4420.97	22.46

* Based on minimum baghouse flow rate

New Sources		TPY	hours	lb/hr	Short term g/s	Annual g/s	temp F	K	Stack Dimensions H(m)	H(ft)	Dia(ft)	Dia(m)	Maximum flow rate ACFM	Minimum flow rate ACFM	Baghouse Stack Dia(m)	Baghouse Stack* ft/min	Baghouse Stack* m/s
Baghouse	CO	600.00	8520	160.00	20.16	17.26	230	383.15	33.528	110	12	3.6576	500000	375,000	3.6576	4420.97	22.46
Stack 2	NOx(NO2)	99.00	8520	26.40	3.33	2.85	230	383.15	33.528	110	12	3.6576	500000	375,000	3.6576	4420.97	22.46
	VOC	39.00	8520	10.40	1.31	1.12	230	383.15	33.528	110	12	3.6576	500000	375,000	3.6576	4420.97	22.46
	SO2	60.00	8520	16.00	2.02	1.73	230	383.15	33.528	110	12	3.6576	500000	375,000	3.6576	4420.97	22.46
	Lead	1.5	8520	0.38	0.044	0.0431	230	383.15	33.528	110	12	3.6576	500000	375,000	3.6576	4420.97	22.46

PM/PM-10C	32 86	8520	7 71	0.97	0.95	230	383.15	33 528	110	12	3.6576	500000	375.000	3 6576	4420.97	22.46

* Based on minumum baghouse flow rate

Reheat		TPY	hours	lb/hr	Short term g/s	Annual g/s	temp F	K	Stack Dimensions H(m)	Dia(ft)	Dia(m)	Area(ft2)	flow rate ACFM	Velocity fpm*	m/s
	CO	33 0225	8500	7 77	0.98	0.95	480	522	20.12	5 8	1 770	26	71336.1444	2700 0	13 72
	NOx	75 48	8500	17 76	2.24	2.17	480	522	20.12	5 8	1 770	26	71336 1444	2700 0	13.72
	VOC	4 7175	8500	1 11	0.14	0.14	480	522	20 12	5 8	1.770	26	71336 1444	2700 0	13.72
	SO2	0 5661	8500	0 13	0.02	0.02	480	522	20 12	5.8	1.770	26	71336 1444	2700 0	13.72
	PM-10	7 07625	8500	1 67	0 21	0.20	480	522	20.12	5 8	1 770	26	71336 1444	2700 0	13.72

*Based on an estimated flow rate of 47 8 ft/sec

ATTACHMENT I

NAAQS MODELING RESULTS

Table 6-7. Maximum Predicted SO_2, NO_2, and PM_{10} Impacts for Comparison to AAQS - Screening Analysis

Pollutant, Averaging Time, and Rank	Concentration ($\mu g/m^3$) [a] Modeled Total	Modeled Sources	Background	Receptor Location x (m)	Receptor Location y (m)	Time Period (YYMMDDHH)	AAQS ($\mu g/m^3$)
SO_2							
24-Hour, HSH	87.9	45.9	42	1,879.9	-785.1	84092224	260
	94.6	52.6	42	1,075.1	347.9	85082324	
	78.3	36.3	42	1,707.6	-319.2	86091524	
	83.2	41.2	42	-216.6	-246.0	87071924	
	92.0	50.0	42	1,879.9	-785.1	88122724	
3-Hour, HSH	332	175	157	1,604.2	-39.6	84102706	1,300
	323	166	157	1,673.1	-226.0	85043006	
	301	144	157	1,621.4	-86.2	86061003	
	334	177	157	1,742.0	-412.4	87112318	
	332	175	157	1,879.9	-785.1	88122721	
NO_2							
Annual, Highest	31.6	4.6	27	-171.4	-106.2	84123124	100
	31.5	4.5	27	-156.4	-59.5	85123124	
	31.0	4.0	27	-156.4	-59.5	86123124	
	32.0	5.0	27	-171.4	-106.2	87123124	
	31.8	4.8	27	-156.4	-59.5	88123124	
PM10							
24-Hour, H6H	61.4	5.4	56	-186.5	-152.8	87060724	150

Note: YYMMDDHH = Year, Month, Day, Hour Ending
HSH = Highest, Second-Highest
H6H = Highest, Sixth-Highest

[a] Based on 5-year surface and upper air meteorological data for 1984 to 1988 from the National Weather Service Stations in Jacksonville and Waycross, respectively.

Table 6-8. Maximum Predicted SO_2, NO_2, and PM_{10} Impacts for Comparison to AAQS - Refined Analysis

Pollutant, Averaging Time, and Rank	Concentration ($\mu g/m^3$) [a]			Receptor Location		Time Period (YYMMDDHH)	AAQS ($\mu g/m^3$)
	Total	Modeled Sources	Background	x (m)	y (m)		
SO_2							
24-Hour, HSH	95	53	42	1,075.1	347.9	85082324	260
3-Hour, HSH	334	177	157	1,621.4	-86.2	86061003	1,300
NO_2							
Annual, Highest	32	5	27	-156.4	-59.5	86123124	100
PM_{10}							
24-Hour, H6H	61	5	56	-187	-153	87060724	150

Note: YYMMDDHH = Year, Month, Day, Hour Ending
HSH = Highest, Second-Highest
H6H = Highest, Sixth-Highest

[a] Based on 5-year surface and upper air meteorological data for 1984 to 1988 from the National Weather Service Stations in Jacksonville and Waycross, respectively

ISCBOB3R RELEASE 00285

ISCST3 OUTPUT FILE NUMBER 1 :SO2aq.o84
ISCST3 OUTPUT FILE NUMBER 2 :SO2aq.o85
ISCST3 OUTPUT FILE NUMBER 3 :SO2aq.o86
ISCST3 OUTPUT FILE NUMBER 4 :SO2aq.o87
ISCST3 OUTPUT FILE NUMBER 5 :SO2aq.o88
First title for last output file is: 1984 GERDAU-AMERISTEEL SO2 SIG ANALYSIS 3/16/04
Second title for last output file is: JAX/WAYCROSS MET 1984-1989

AVERAGING TIME	YEAR	CONC (ug/m3)	X (m)	Y (m)	PERIOD ENDING (YYMMDDHH)
SOURCE GROUP ID: ALL					
Annual					
	1984	6.48096	-156.4	-59.5	84123124
	1985	6.32733	1759.3	-458.9	85123124
	1986	5.56160	-156.4	-59.5	86123124
	1987	6.47336	-156.4	-59.5	87123124
	1988	6.62162	-156.4	-59.5	88123124
HIGH 24-Hour					
	1984	61.07787	1879.9	-785.1	84121624
	1985	54.14146	-201.6	-199.4	85032624
	1986	56.17794	1879.9	-785.1	86051024
	1987	47.10000	-201.6	-199.4	87071924
	1988	58.38363	1828.2	-645.3	88083124
HSH 24-Hour					
	1984	45.87337	1879.9	-785.1	84092224
	1985	52.58748	1075.1	347.9	85082324
	1986	36.34015	1707.6	-319.2	86091524
	1987	41.18542	-216.6	-246.0	87071924
	1988	50.03485	1879.9	-785.1	88122724
HIGH 3-Hour					
	1984	235.35139	1828.2	-645.3	84121621
	1985	175.09804	1604.2	-39.6	85062121
	1986	182.71783	1707.6	-319.2	86091521
	1987	201.73541	1879.9	-785.1	87092721
	1988	199.14307	1879.9	-785.1	88091224
HSH 3-Hour					
	1984	175.04736	1604.2	-39.6	84102706
	1985	166.38875	1673.1	-226.0	85043006
	1986	144.00121	1621.4	-86.2	86061003
	1987	177.48042	1742.0	-412.4	87112318
	1988	174.51050	1879.9	-785.1	88122721

All receptor computations reported with respect to a user-specified origin

GRID	0.00	0.00
DISCRETE	0.00	0.00

ISCBOB3R RELEASE 00285

ISCST3 OUTPUT FILE NUMBER 1 :NOXaq.o84
ISCST3 OUTPUT FILE NUMBER 2 :NOXaq.o85
ISCST3 OUTPUT FILE NUMBER 3 :NOXaq.o86
ISCST3 OUTPUT FILE NUMBER 4 :NOXaq.o87
ISCST3 OUTPUT FILE NUMBER 5 :NOXaq.o88
First title for last output file is: 1984 GERDAU-AMERISTEEL NOX SIG ANALYSIS 3/16/04
Second title for last output file is: JAX/WAYCROSS MET 1984-1989

AVERAGING TIME	YEAR	CONC (ug/m3)	X (m)	Y (m)	PERIOD ENDING (YYMMDDHH)
SOURCE GROUP ID: ALL					
Annual					
	1984	4.59667	-171.4	-106.2	84123124
	1985	4.46994	-156.4	-59.5	85123124
	1986	3.95455	-156.4	-59.5	86123124
	1987	5.04365	-171.4	-106.2	87123124
	1988	4.75322	-156.4	-59.5	88123124

All receptor computations reported with respect to a user-specified origin

GRID	0.00	0.00
DISCRETE	0.00	0.00

```
 *** ISCST3 - VERSION 02035 ***     *** 1988 GERDAU-AMERISTEEL PM10 SIG ANALYSIS
3/16/04           ***          12/10/04
                                     *** JAX/WAYCROSS MET 1984-1989
***         11:16:32
**MODELOPTs:
PAGE  25
CONC                       RURAL FLAT          DFAULT
MULTYR

                                                    *** THE SUMMARY OF HIGHEST 24-HR
RESULTS ***


                                               ** CONC OF PM10      IN MICROGRAMS/M**3
**

                                                                      DATE
NETWORK
GROUP ID                                  AVERAGE CONC      (YYMMDDHH)
RECEPTOR   (XR, YR, ZELEV, ZFLAG)      OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
- - - - - - - - - - - - - - - - - - - - - - - -

ALL       HIGH  6TH HIGH VALUE IS        5.44008c ON 87060724: AT (     -186.50,
-152.77,       0.00,       0.00)  DC       NA

 *** RECEPTOR TYPES:  GC = GRIDCART
                      GP = GRIDPOLR
                      DC = DISCCART
                      DP = DISCPOLR
                      BD = BOUNDARY□
```

ATTACHMENT J

SEMINOLE ELECTRIC ACTUAL EMISSION DATA

Table E-5 Seminole Electric CEM Data Included in the AAQS and PSD Class I Air Modeling Analyses

Facility				UTM Coordinates		Relative to Gerdau Ameristeel [a]		Stack Parameters								Emission Rate				PSD [b] Consuming (C) or Expanding (E)	Modeled in	
								Height		Diameter		Temperature		Velocity		24-Hour		3-Hour				
ID	Facility	Units	Model ID Name	East (km)	North (km)	X (km)	Y (km)	(ft)	(m)	(ft)	(m)	(°F)	(K)	(ft/s)	(m/s)	(lb/hr)	(g/s)	(lb/hr)	(g/s)		AAQS	Class II
1070025	Seminole Electric Cooperative, Inc. (SEC)	Seminole Power Plant, Palatka																				
	Units 1 and 2		SEMELECT	438.8	3259.2	33.10	-61.00	674.7	205.7	36.0	10.97	126	325	33.6	10.24	17,212.7	2168.80 [c]	17,212.7	2,168.8 [c]	C	Yes	Yes
																8,998	1121.15 [d]	12,075 [d]	1,521.5 [d]			

[a] Gerdau Ameristeel UTM east and north coordinates are 405.7 and 3351.2 km, respectively

[b] Consuming (C) sources are sources that were constructed or modified after the PSD baseline date
Expanding (E) sources are sources that have shutdown or have been modified since the baseline date

[c] Maximum allowable emissions for each unit based on 1.2 lb MMBtu and maximum heat input rate of 2,122 MMBtu/hr. For two units, SO2 emissions are 17,212.7 lb/hr

[d] Actual emissions for the two units were obtained from the EPA Acid Rain Program using the 2001 to 2003 CEM data (excluding periods when the scrubber was inoperative)
12,075 lb/hr, 3-hour average
8,998 lb/hr, 24-hour average
These emissions were used in the PSD Class II increment consumption analysis

[e] Stack temperature and velocity were obtained from stack tests performed in April 2003 and provided by SEC.