Prevention of Significant Air Quality Deterioration Review

Preliminary Determination

September 5, 2008

Facility Name: Gerdau Ameristeel
City: Cartersville
County: Bartow
AIRS Number: 04-13-01500032
Application Number: 17915
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Review Conducted by:
State of Georgia - Department of Natural Resources
Environmental Protection Division - Air Protection Branch
Stationary Source Permitting Program

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SUMMARY

The Environmental Protection Division (EPD) has reviewed the application submitted by Gerdau Ameristeel Cartersville Steel Mill for a permit to increase the stainless steel cast limit on the 4-Strand Caster (Source Code E03). The proposed project will increase the current limit on the 4-Strand Caster (Source Code E03) of 1.0 million tons per year of steel cast for any 12 consecutive months to a facility limit of stainless steel cast to 1.34 million tons per year for any 12 consecutive months to reflect 153 tons per hour production from the Electric Arc Furnace (EAF).

The proposed project will result in an increase in emissions from the facility. The sources of these increases in emissions include the EAF and the Ladle Manufacturing Furnace (LMF) and the Steel and Lime Charging and the Crude Steel and Slag Handling Operations.

The modification of the Gerdau Ameristeel due to this project will result in an emissions increase in CO, NOx, PM and PM10 emissions. A Prevention of Significant Deterioration (PSD) analysis was performed for the facility for all pollutants to determine if any increase was above the "significance" level. The CO emissions increase was above the PSD significant level threshold.

The Gerdau Ameristeel Cartersville Steel Mill is located in Bartow County, which is classified as "attainment" or "unclassifiable" for SO_2, PM_{10}, NO_X and CO. Bartow County is part of the Atlanta nonattainment areas for ozone and PM2.5.

The EPD review of the data submitted by Gerdau Ameristeel related to the proposed modifications indicates that the project will be in compliance with all applicable state and federal air quality regulations.

It is the preliminary determination of the EPD that the proposal provides for the application of Best Available Control Technology (BACT) for the control of CO as required by federal PSD regulation 40 CFR 52.21(j).

It has been determined through approved modeling techniques that the estimated emissions will not cause or contribute to a violation of any ambient air standard or allowable PSD increment in the area surrounding the facility or in Class I areas located within 300 km of the facility. It has further been determined that the proposal will not cause impairment of visibility or detrimental effects on soils or vegetation. Any air quality impacts produced by project-related growth should be inconsequential.

This Preliminary Determination concludes that an Air Quality Permit should be issued to Gerdau Ameristeel Cartersville Steel Mill for the modifications necessary to increase the facility's stainless steel cast limit to 1.34 million tons per year for any 12 consecutive months. Various conditions have been incorporated into the current Title V operating permit to ensure and confirm compliance with all applicable air quality regulations. A copy of the draft permit amendment is included in Appendix A. This Preliminary Determination also acts as a narrative for the Title V Permit.

1.0 INTRODUCTION – FACILITY INFORMATION AND EMISSIONS DATA

On January 8, 2008, Gerdau Ameristeel submitted an application for an air quality permit to operate at an increased steel cast limit of 1.34 million tons per year at the facility located at 384 Old Grassdale Road in Cartersville, Georgia (Bartow County). The current permit limit is for 1.0 million tons per year. The Electric Arc Furnace (EAF) has the capacity of 153 tons per hour with a 45 minute heat cycle. The facility wishes to operate at 153 tons per hour on a long-term basis.

The Gerdau Ameristeel Cartersville Steel Mill (GACSM) facility has shortened the EAF heat cycle from 75 to 45 minutes. This change has been brought about through a reduction in the EAF downtime as well as optimization of the material and charge sequence. Examples of such improvement include a reduction in time required for charging the furnace, matching the charge bucket size to the desired product, optimizing the mix of scrap, shred, and alloys, and greater dependence on chemical energy derived from oxygen than the electric arc.

Table 1-1: Title V Major Source Status

Pollutant	Is the Pollutant Emitted?	If emitted, what is the facility's Title V status for the Pollutant?		
		Major Source Status	Major Source Requesting SM Status	Non-Major Source Status
PM	✓	✓	n/a	n/a
PM_{10}	✓	✓	n/a	n/a
SO_2	✓	n/a	n/a	✓
VOC	✓	✓	n/a	n/a
NO_x	✓	✓	n/a	n/a
CO	✓	✓	n/a	n/a
TRS	n/a	n/a	n/a	n/a
H_2S	n/a	n/a	n/a	n/a
Individual HAP	✓	n/a	n/a	✓
Total HAPs	✓	n/a	n/a	✓

Table 1-2 below lists all current Title V permits, all amendments, 502(b)(10) changes, and off-permit changes, issued to the facility, based on a review of the "Permit" file(s) on the facility found in the Air Branch office.

Table 1-2: List of Current Permits, Amendments, and Off-Permit Changes

Permit Number and/or Off-Permit Change	Date of Issuance/ Effectiveness	Purpose of Issuance
3312-015-0032-V-04-0	January 30, 2008	Renewal Issue
3312-015-0032-V-04-1	June 18, 2008	Modification of the Caster (Source Code E03) limit from a monthly limit to an equivalent 12 consecutive month limit.

Based on the proposed project description and data provided in the permit application, the estimated incremental increases of regulated pollutants from the facility are listed in Table 1-3 below:

Table 1-3: Emissions Increases from the Project

Pollutant	Baseline Years	Potential Emissions Increase (tpy)	PSD Significant Emission Rate (tpy)*	Subject to PSD Review
PM	November, 2005-October, 2007	11	25	No
$PM_{2.5}$	November, 2005-October, 2007	6.3**	10	No
PM_{10}	November, 2005-October, 2007	11	15	No
VOC	n/a	n/a	40	No
NO_X	November, 2005-October, 2007	25	40	No
CO	November, 2005-October, 2007	712	100	Yes
SO_2	n/a	n/a	40	No
TRS	n/a	n/a	10	No
Pb	n/a	0.157	0.6	No
Fluorides	n/a	n/a	3	No
H_2S	n/a	n/a	10	No
SAM	n/a	n/a	7	No

* $PM_{2.5}$ is NAA NSR threshold. VOC is NAA NSR threshold. NOx is PSD threshold and NAA NSR threshold (ozone). SO_2 is PSD threshold and NAA NSR threshold.
**Source: GACSM calculations

The definition of baseline actual emissions is the average emission rate, in tons per year, at which the emission unit actually emitted the pollutant during any consecutive 24-month period selected by the facility within the 10-year period immediately proceeding the date a complete permit application was received by EPD. The net increases were calculated by subtracting the past actual emissions (based upon the annual average emissions from November 2005 thru October 2007 from the future projected actual emissions of the EAF and associated emission increases from non-modified equipment. Table 1-4 details this emissions summary. The emissions calculations for Tables 1-3 and 1-4 can be found in detail in the facility's PSD application (see Section 2.3 of Application No. 17915). While the facility has determined an average CO rate for Baseline emissions, a worst case would be to select the BACT limit proposed and approved by GA EPD for CO at 1.34 lb/ton and there would have a significant increase for CO for 712 tpy rather than the 116.4 tpy as submitted in the application. These calculations have been reviewed and approved by the Division.

Table 1-4: Net Change in Emissions Due to the Major PSD Modification

Pollutant	Increase from EAF		Associated Units Increase (tpy)	Total Increase (tpy)
	Past Actual	Future Actual		
PM/PM_{10}	184	195	-	11
$PM_{2.5}$	66*	70*	-	4
VOC	n/a	n/a	-	n/a
NO_X	107	132	-	25
CO	186	898	-	712
SO_2	-	-	-	-
TRS	-	-	-	-
Pb	4.1e-1	1.98e-1	-	1.57e-1

Pollutant	Increase from EAF		Associated Units Increase (tpy)	Total Increase (tpy)
	Past Actual	Future Actual		
Fluorides	-	-	-	-
H_2S	-	-	-	-
SAM	-	-	-	-

*Source: According to GACSM calculations, $PM_{2.5}$ is 36% of PM_{10}.

Based on the information presented in Tables 1-3 and 1-4 above, GACSM's proposed modification, as specified per Georgia Air Quality Application No. 17915, is classified as a major modification under PSD because the potential emissions of CO is greater than 100 tons per year.

Through its new source review procedure, EPD has evaluated GACSM's proposal for compliance with State and Federal requirements. The findings of EPD have been assembled in this Preliminary Determination.

2.0 PROCESS DESCRIPTION

According to Application No. 17915, GACSM has proposed to operate at an increased steel cast limit of 1.34 million tons per year at the facility located at 384 Old Grassdale Road in Cartersville, Georgia (Bartow County). The current permit limit is for 1.0 million tons per year on the 4-Strand Caster (Source Code E03) for twelve consecutive months. The facility currently maintains monthly steel cast records to demonstrate compliance with this limit. Currently, the Electric Arc Furnace (EAF) has the capacity of 153 tons per hour with a 45 minute heat cycle. The facility wishes to operate at 153 tons per hour on a long-term basis.

The GACSM facility has shortened the EAF heat cycle from 75 to 45 minutes. This change has been brought about through a reduction in the EAF downtime as well as optimization of the material and charge sequence. Examples of such improvement include a reduction in time required for charging the furnace, matching the charge bucket size to the desired product, optimizing the mix of scrap, shred, and alloys, and greater dependence on chemical energy derived from oxygen rather than the electric arc furnace.

GACSM is classified as a PSD major source. It is one of the 28 source categories defined in the regulation governing PSD and therefore is a major source because it has the potential to emit more than 100 tons per year of at least one PSD-regulated pollutant.

The regulated pollutant, which will be emitted in significant quantities from the production increase to 1.34 million ton per year (tpy) cast limit is carbon monoxide (CO).

The project potential emissions increase of PSD regulated pollutants from the facility and the significant emission levels as defined by the PSD regulations are shown in Table 1-3.

The GACSM permit application and supporting documentation are included in Appendix B of this Preliminary Determination and can be found online at www.georgiaair.org/airpermit.

3.0 REVIEW OF APPLICABLE RULES AND REGULATIONS

State Rules

Georgia Rule for Air Quality Control (Georgia Rule) 391-3-1-.03(1) requires that any person prior to beginning the construction or modification of any facility which may result in an increase in air pollution shall obtain a permit for the construction or modification of such facility from the Director upon a determination by the Director that the facility can reasonably be expected to comply with all the provisions of the Act and the rules and regulations promulgated there under. Georgia Rule 391-3-1-.03(8)(b) continues that no permit to construct a new stationary source or modify an existing stationary source shall be issued unless such proposed source meets all the requirements for review and for obtaining a permit prescribed in Title I, Part C of the Federal Act [i.e., Prevention of Significant Deterioration of Air Quality (PSD)], and Section 391-3-1-.02(7) of the Georgia Rules (i.e., PSD).

Georgia Rule 391-3-1-.02(2)(b)1 limits opacity from the increased production limit at sources (Source Codes E06, IE01, IE02, IE03, IE08, IE09, IE10, IE11, N04, N06, N07, or N08) to forty (40) percent opacity. This Rule is already included in the existing permit.

Georgia Rule 391-3-1-.02(2)(e)(1)i limits particulate matter emissions from the increased production limit at sources (Source Codes E06, IE01, IE02, IE03, IE08, IE09, IE10, IE11, N04, N06, N07, or N08) to:

$E = 4.1P^{0.67}$; for process input weight rate up to and including 30 tons per hour
$E = 55P^{0.11} - 40$; for process input weight rate above 30 tons per hour
E = emission rate in pounds per hour
P = process input weight in tons per hour
This Rule is already included in the existing permit.

Georgia Rule 391-3-1-.02(2)(g)2 limits the fuel sulfur content of the fuels consumed in sources to not equal or exceed 2.5 weight percent. This Rule is already included in the existing permit.

Georgia Rule 391-3-1-.02(2)(n)2 limits the percent opacity from any fugitive dust source to twenty percent. This Rule is already included in the existing permit.

Georgia Rule 391-3-1-.02(2)(yy) requires that the facility have proper operation and a NOx emission limit derived from the RACT regulations. This limit is currently set at 0.15 lb/ton molten steel produced. In a letter dated March 6, 2008, GACSM revisited and resubmitted the RACT plan for emissions of nitrogen oxides (NOx) from the EAF. The March 6, 2008 NOx RACT plan supported an earlier comprehensive NOx RACT analysis for the facility that was conducted by Birmingham Southeast, LLC and submitted to Georgia EPD on September 29, 2000. This earlier RACT for NOx emissions from the EAF was determined to be proper operation and the corresponding emission limit is the current permit limit defined as 0.15 lb/ton steel produced. From the current review of the control technologies adopted for EAFs operating throughout the U.S. and the corresponding NOx emission rates as listed in the RBLC database, GACSM has concluded the following:

- The current method of NOx emission control (i.e., Process Control) is the most effective technology considering the technical feasibility, energy efficiency consideration, and environmental impacts.
- The current NOx emission rate defined in the permit is 0.15 lb/ton steel produced and is one of the lowest NOx emission rates for an EAF operating in the U.S. that has similar capacity and process parameters.
- GACSM proposes “Process Control” to be adopted as RACT with a NOx emission rate of 0.15 lb/ton steel produced.

As such, GA EPD agrees that the NOx emission rate of 0.15 lb/ton steel and the existing natural gas-fired oxy-fuel burners, along with good process controls are RACT for the EAF.

In a letter dated Jan 24, 2002, GA EPD agreed that no additional add-on pollution control equipment should be required as VOC RACT under Georgia Rule 391-1-1-.02(2)(tt). As such, there are no limits for VOC emissions since the electric arc furnace is not considered to be a significant source of VOC emissions. This Rule is already included in the existing permit.

Georgia Rule 391-3-1-.03(2)(f) requires that any person operating a facility or performing activity from which air contaminants are emitted, may be required to obtain a Permit by Rule, a Generic Permit or a Part 70 Permit from the Director in addition to an operating (SIP) permit. The application submitted requests a change in operation of the EAF as provided under Georgia Rule 391-3-1-.03(7). GACSM is subject to Georgia Rule 391-3-1-.03(10)(e)5(iii) which requires the submittal of an application to address a significant modification. GACSM currently operates under Title V Operating Permit Number 3312-015-0032-V-04-0 and Permit Amendment Number 3312-015-0032-V-04-1. The increase of the production limit will require a revision of the permit. The facility has submitted the applicable application forms to address the revision of Permit Number 3312-015-0032-V-04-0.

Federal Rule - PSD

The regulations for PSD in 40 CFR 52.21 require that any new major source or modification of an existing major source be reviewed to determine the potential emissions of all pollutants subject to regulations under the Clean Air Act. The PSD review requirements apply to any new or modified source which belongs to one of 28 specific source categories having potential emissions of 100 tons per year or more of any regulated pollutant, or to all other sources having potential emissions of 250 tons per year or more of any regulated pollutant. They also apply to any modification of a major stationary source which results in a significant net emission increase of any regulated pollutant.

Georgia has adopted a regulatory program for PSD permits, which the Unites States Environmental Protection Agency (EPA) has approved as part of Georgia's State Implementation Plan (SIP). This regulatory program is located in the Georgia Rules at 391-3-1-.02(7). This means that Georgia EPD issues PSD permits for new major sources pursuant to the requirements of Georgia's regulations. It also means that Georgia EPD considers, but is not legally bound to accept, EPA comments or guidance. A commonly used source of EPA guidance on PSD permitting is EPA's Draft October 1990 New Source Review Workshop Manual for Prevention of Significant Deterioration and Nonattainment Area Permitting (NSR Workshop Manual). The NSR Workshop Manual is a comprehensive guidance document on the entire PSD permitting process.

The PSD regulations require that any major stationary source or major modification subject to the regulations meet the following requirements:

- Application of BACT for each regulated pollutant that would be emitted in significant amounts;
- Analysis of the ambient air impact;
- Analysis of the impact on soils, vegetation, and visibility;
- Analysis of the impact on Class I areas; and
- Public notification of the proposed plant in a newspaper of general circulation

Definition of BACT

The PSD regulation requires that BACT be applied to all regulated air pollutants emitted in significant amounts. Section 169 of the Clean Air Act defines BACT as an emission limitation reflecting the maximum degree of reduction that the permitting authority (in this case, EPD), on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such a facility through application of production processes and available methods, systems, and techniques. In all cases BACT must establish emission limitations or specific design characteristics at least as stringent as applicable New Source Performance Standards (NSPS). In addition, if EPD determines that there is no economically reasonable or technologically feasible way to measure the emissions, and hence to impose an enforceable emissions standard, it may require the source to use a design, equipment, work practice or operations standard or combination thereof, to reduce emissions of the pollutant to the maximum extent practicable.

EPA's NSR Workshop Manual includes guidance on the 5-step top-down process for determining BACT. In general, Georgia EPD requires PSD permit applicants to use the top-down process in the BACT analysis, which EPA reviews. The five steps of a top-down BACT review procedure identified by EPA per BACT guidelines are listed below:

Step 1: Identification of all control technologies;
Step 2: Elimination of technically infeasible options;
Step 3: Ranking of remaining control technologies by control effectiveness;
Step 4: Evaluation of the most effective controls and documentation of results; and
Step 5: Selection of BACT.

The following is a discussion of the applicable federal rules and regulations pertaining to the equipment that is the subject of this preliminary determination, which is then followed by the top-down BACT analysis.

New Source Performance Standards

40 CFR 60, Subpart A and Subpart AAa – General Provisions and Standards of Performance for Steel Plants: Electric Arc Furnaces and Argon-Oxygen De-carburization Vessels Constructed After August 17, 1983

Applicability: The facility is subject to all applicable provisions of the New Source Performance Standards for Steel Plants which are contained in 40 CFR 60, Subpart A, "General Provisions", and Subpart AAa, "Standards of Performance for Steel Plants: Electric Arc Furnaces and Argon-Oxygen De-carburization Vessels Constructed After August 17, 1983."

National Emissions Standards For Hazardous Air Pollutants

40 CFR 63, Subpart YYYYY - National Emission Standards for Hazardous Air Pollutants (NESHAP) for Area Sources: Electric Arc Furnace Steelmaking Facilities

Applicability: NESHAP Subpart YYYYY is an applicable requirement for the Electric Arc Furnace because the facility operates an EAF for steelmaking purposes. The facility is required to control contaminants such as chlorinated plastics, lead, and free organic liquids. The facility is required to follow the requirements of 63.10685 through 63.10690 which includes a scrap management plan as part of the pollution prevention plan and mercury requirements. However, GA EPD does not yet have delegation of this rule, so GA EPD is not incorporating these requirements in the permit at this time.

40 CFR 63, Subpart ZZZZZ - National Emission Standards for Hazardous Air Pollutants (NESHAP) for Iron and Steel Foundries Area Sources

Applicability: NESHAP Subpart ZZZZZ is not an applicable requirement for the Electric Arc Furnace because it is located at a source since it is not a steel foundry rather it is a secondary steel production facility and is subject to 40 CFR 63, Subpart YYYYY.

State and Federal – Startup and Shutdown and Excess Emissions

Excess emission provisions for startup, shutdown, and malfunction are provided in Georgia Rule 391-3-1-.02(2)(a)7. Excess emissions from the EAF associated with the proposed project would most likely result from a malfunction of the associated control equipment. The facility cannot anticipate or predict malfunctions. However, the facility is required to minimize emissions during periods of startup, shutdown and malfunction.

Federal Rule – 40 CFR 64 – Compliance Assurance Monitoring

Under 40 CFR 64, the *Compliance Assurance Monitoring* Regulations (CAM), facilities are required to prepare and submit monitoring plans for certain emission units with the Title V application. The CAM Plans provide an on-going and reasonable assurance of compliance with emission limits. Under the general applicability criteria, this regulation applies to units that use a control device to achieve compliance with an emission limit and whose pre-controlled emissions levels exceed the major source thresholds under the Title V permitting program. Although other units may potentially be subject to CAM upon renewal of the Title V operating permit, such units are not being modified under the proposed project and need not be considered for CAM applicability at this time.

4.0 CONTROL TECHNOLOGY REVIEW

The proposed project will result in emissions that are significant enough to trigger PSD review for the following pollutants: CO.

EAF- Background

The EAF (Source Code E01) is an Electric Arc Furnace. The current furnace was constructed and installed in 1989 and is rated at 115 tons capacity and it equipped with an 85 MVA transformer. Due to increased utilization and a shorter heat cycle, the production of molten steel from this unit has increased. This change has been brought about through a reduction in the EAF downtime as well as optimization of the material and charge sequence. Examples of such improvement include a reduction in the time required for charging the furnace, matching the charge bucket size to the desired product, optimizing the mix of scrap, shred and alloys, and greater dependence on chemical energy derived from oxygen rather than the electric arc. Such improvements have resulted in shorter heat cycle and furnace downtime. In addition, the maintenance related downtime of the EAF has been minimized. All these factors have lead to an improvement in the furnace utilization without any additional changes to the raw material or process inputs. Based on the current operating parameters, the molten steel capacity of this unit is estimated as approximately 1,340,000 tons per year which is based on a 45 minute heat cycle.

EAF – CO Emissions

Applicant's Proposal

GACSM consulted the EPA maintained RACT/BACT/LAER Clearinghouse (RBLC) to identify the available CO technologies for EAF. GACSM reviewed seven BACT alternatives; namely Operating Practices, Flaring of CO Emissions, CO Oxidation Catalysts, Post-Combustion Reaction Chamber, Catalytic Incineration, Oxygen Injection and Direct Evacuation Control (DEC).

CO is emitted as a byproduct of incomplete combustion from the following potential sources – charged and injected carbon, scrap steel, electrodes and "foaming slag" operating practice. EAF's generate CO as a result of oxidation of carbon introduced into the furnace charge to refine the steel and as a result of sublimation/oxidation of the carbon electrode. At present, the CO emissions for the baghouses BH-01 and BH-02 are limited to 60 ppm for an eight-hour average.

Operating Practice Modifications (OPM)

Due to customer demands on quality and to stay competitive in the marketplace, GACSM incorporates an improved foamy process to produce steel. In this process carbon and oxygen are blown into the furnace below the slag line, creating an expanding "foam" zone. The process utilizes charge and injection carbon to produce a competitive, marketable product. In this process, additional chemical energy is produced along with CO and that is intrinsically related to product quality. This process reduces electrical usage and extends equipment life. Due to marketplace demands on the type of products to be manufactured at the mill and the required product quality, GACSM does not propose any additional operating practice modifications that will alter CO emissions from the existing EAF.

Flaring of CO Emissions

Flaring of EAF exhaust gases to destruct CO emissions would require a temperature of 1,300 ^oF at a residence time of 0.5 second. The volumetric flowrate is very high at this temperature and the flare's auxiliary fuel requirements would be substantial. This increased auxiliary fuel requirement could result in an increase of CO and NOx emissions. In addition, based upon GACSM's review of the RBLC, there is no known application of flaring EAF exhaust gases.

CO Oxidation Catalysts

Based upon GACSM's review of the RBLC there is no known application of CO oxidation catalysts to control CO emissions from an EAF. The optimal working temperature range for CO oxidation catalysts is approximately 850 ^oF – 1100 ^oF with a minimum exhaust gas stream temperature of 500 ^oF for minimally acceptable CO control. Exhaust gases from the EAF undergo rapid cooling as they are ducted from the furnace and the temperature is far below the minimum 500 ^oF for minimally acceptable CO control. Additionally, the particulate loading in the exhaust gas stream is anticipated to be too high for efficient operation of a CO oxidation catalyst. Masking effects such as plugging and coating of the catalyst surface would almost certainly result in impractical maintenance requirements, and would significantly degrade the performance of the catalyst. Consequently, this control alternative is considered technically infeasible for this application and is not considered any further in this BACT analysis.

Post-Combustion Reaction Chambers

Based upon GACSM's review of the previously listed information resources, there is no known successful application of duct burners or thermal incinerators to control CO emissions from an EAF. It should be noted this type of technology has recently been proposed for EAFs in the United States; however the feasibility of these units to effectively reduce CO emissions, without resulting in severe operational problems, is unknown. Further, such units are expected to consume large quantities of natural gas and oxygen; resulting in excessive annual operating costs and increases in NOx emissions.

The principle of destruction within post combustion chambers is to raise the EAF exhaust gases to a sufficiently high temperature and for a minimum amount of time to facilitate oxidation. The combustion chamber configuration must provide effective mixing within the chamber with an acceptable residence time. Recuperative heat exchangers can be used with these systems to recover a portion of the exiting exhaust gas heat and reduce the auxiliary fuel consumption.

The amount of CO which could be oxidized with post combustion systems is uncertain, and precise performance guarantees are expected to be difficult to obtain from equipment manufacturers because of the lack of operating experience. In addition, there is the potential for additional emissions of NOx from auxiliary fuel combustion. Further, due to the heat and particulate loading, the burners would have a short life expectancy, and may sustain severe maintenance and reliability problems. Additionally, a single or multiple direct burner system would not be able to heat the relatively cool gases from the EAF during cold cycling.

Potentially, there are two locations where post combustion chambers can be installed, i.e. upstream or downstream of an EAF baghouse. Locating upstream of the baghouse would take advantage of slightly elevated temperatures in the exhaust gas stream. However, at this location, the post combustion chamber would be subject to high particulate loading. The units would be expected to foul frequently from the particulate accumulation, and the burners would have severe maintenance and reliability problems. Thus, the installation of the post combustion chamber upstream of the baghouse is considered technically infeasible. Alternatively, the post combustion chamber could be located downstream of the EAF baghouse. However, even at this location, fouling due to particulate matter can occur and more importantly, even cooler exhaust temperatures would be encountered. These cooling temperatures would greatly increase the auxiliary fuel requirements. The associated combustion of additional auxiliary fuel requirements will result in unacceptable increase in operating costs. Further, the combustion of additional fuel will result in increases in emissions to the atmosphere.

The only known proposed use of post combustion for CO was an initial minor source permit application (early 1990's) for Gallatin Steel, located in Ghent, Kentucky. This was proposed to control CO emissions less than 100 tons per year. This control application was unsuccessful and the standard DEC was subsequently proposed and accepted as BACT (2.0 lbs/ton) for the PSD permit.

Based upon the above discussions, the use of a post combustion chamber is considered technically infeasible for the existing EAFs and is not considered any further in this BACT analysis.

Catalytic Incineration

Based upon a review of the previously listed information resources, there is no known application of catalytic incineration to control CO emissions from EAFs. Catalytic incinerators use a bed of catalyst that facilitates the overall combustion of combustible gases. The catalyst increases the reaction rate and allows the conversion of CO to CO_2 at lower temperatures than a thermal incinerator. The catalyst is typically a porous noble metal material which is supported in individual compartments within the unit. An auxiliary fuel-fired burner ahead of the bed heats the entering exhaust gases to 500 ^oF – 600 ^oF to maintain proper bed temperature. Recuperative heat exchangers are used to recover the exiting exhaust gas heat and reduce the auxiliary fuel consumption. Secondary energy recovery is typically 70 percent.

Catalytic incineration systems are limited in application due to potential poisoning, deactivation, and/or blinding of the catalyst. Lead, argon, vanadium, and phosphorous are generally considered poisons to catalysts and deactivate the available reaction sites on the catalyst surface. Particulate matter can also build up on the catalyst, effectively blocking the porous catalyst matrix and rendering the catalyst inactive. In cases of significant levels of poisoning compounds and particulate loading, catalyst replacement costs are significant.

As in the thermal incineration discussion, potentially, there are two locations where the incinerator can be installed, i.e. upstream or downstream of the EAF baghouse. For the same reasons discussed earlier (e.g. fouling due to particulate matter), the upstream location is considered technically infeasible. Alternatively, the incinerator can be installed downstream of the EAF baghouse. However, even at this location, fouling due to particulate matter can occur, and further, the exhaust will be at lower temperature. These cooler temperatures would greatly increase the auxiliary fuel requirements. The associated combustion of additional auxiliary fuel will result in an unacceptable increase in operating costs. Further, the combustion of additional fuel will result in increases in emissions to the atmosphere.

Due to the lack of application of catalytic incineration in the steel industry and potentially adverse technology applicability issues, this control alternative is considered technically infeasible and is not considered any further in this BACT analysis.

Oxygen Injection

Based upon a review of the previously-listed information resources, there is no known application of oxygen injection to control CO emissions from an EAF.

A theoretical means of reducing CO would be oxygen injection at the entrance of the ductwork to increase oxidation of the available CO to CO_2. The increase in CO oxidation that could be achieved, however, is unknown. This approach would be purely experimental and is a procedure that is currently not conducted in EAF operations in steel mills in the United States. Oxygen injection directly in the furnace is an experimental operating practice in Europe used to increase the heat input to the melt, but the practice has not been demonstrated to reduce CO emissions.

Typically, the system will draw air into the duct, creating an oxygen-rich mixture of EAF exhaust gases where CO is oxidized. The addition of oxygen is expected to provide little if any additional conversion of CO. The capability is also limited due to the cyclic operating schedule (i.e. hot-cold cycling). Exhaust gas temperatures will fluctuate during each melt and at times, drop below 1,350 ^oF. It is estimated that this will occur for 5 to 10 minutes during each melt. The minimum temperature encountered is estimated at approximately 350 ^oF. Thus during these periods, the thermal destruction efficiency is expected to decrease, resulting in elevated CO emissions. Consequently, this control alternative is considered technically infeasible for this application and is not considered any further in this BACT analysis.

Direct Evacuation Control

In the steel industry, there are generally two principal capture systems employed during EAF operation to control the process emissions generated during melting and refining. One is the DEC system and the other is the side draft hood system. Side draft hoods require higher air flow rates than a DEC system and are not widely used. Based upon a review of the previously listed information resources, DEC system continues to be the primary control technology for controlling CO emissions from an EAF. The existing EAF at GACSM is equipped with a DEC system for mitigation of CO emissions.

A DEC system is connected to the melt shop canopy collector system which further directs exhaust gases to the EAF baghouse. During melting and refining, a slight negative pressure is maintained within the furnace to withdraw exhaust gases through the DEC duct. The DEC system allows excellent process emissions capture and combustion of CO, and requires the lowest air volume of other EAF capture devices.

Without manifestation of a DEC system on the EAF, a greater quantity of CO would exit the furnace. Also, during operation, the furnace shell would develop a negative pressure, thus preventing an indraft of air/oxygen at the doors which facilitates CO oxidation in the furnace shell. The lack of negative pressure would also prevent the indraft of air/oxygen at the gap between the fourth-hole elbow and duct, thereby preventing additional CO oxidation in the water-cooled evacuation ductwork.

GACSM has determined that all of the control alternatives with the exception of the DEC system that were reviewed for technical feasibility in controlling CO emissions from the existing EAFs were technically infeasible. Based on a review of the information resources referenced earlier, GACSM has determined that none of the control alternatives with the exception of the DEC system reviewed have been successfully implemented to reduce CO emissions from EAFs.

GACSM has reviewed the RBLC database and has stated that other steel mills have an emission limit of about 2.0 lbs CO/ton of steel. GACSM states that no other mills have proposed or successfully implemented any controls besides DEC combustion.

Based on a review of similar EAF/LMF melt shop applications, GACSM believes that the DEC system and the BACT limit of 1.34 lb CO/ton as set for the Keystone Steel and Wire Company, Peoria, IL Mill represent the best available control technology for the existing EAFs/LMF melt shop application. Currently the facility has a CO limit of 60 ppm for an eight (8) hour average, which is a concentration based standard. The proposed BACT for CO is a mass unit instead of a concentration unit so that a direct comparison can be made with the CO emissions performance of other mills.

EPD Review – CO Control

State regulator, Shawn Hutchins of Arkansas DEQ, who prepared PSD permits for Arkansas Steel Association (ASA) and Nucor and Nucor Yamato and Ed Ferguson of the ASA facility were contacted to investigate for the new and modified facilities what modifications/ upgrades and monitoring were completed to improve CO combustion efficiency. The facilities have an EAF and DEC system with an adjustable air gap on the EAF lid. The Nucor facilities had CO monitors in the off-gas duct. The ASA facility performs semi-annual stack testing. See the attached spreadsheet for details of the PSD permitted facilities from the RBLC database, internet and telephone contacts.

The Internet along with the RBLC database was searched to ascertain what CO Control Technology is available to reduce CO emissions. The EFSOP (Expert Furnace System Optimisation Process) technology created by Goodfellow Technologies was discovered as an available control technology. It is an off-gas based process control system which measures off-gas from the melting process on a continuous basis and uses the output in conjunction with a computer model to optimize furnace operations and reduce overall conversion costs. A rugged conditioning system cleans the offgas sample and a portion of it is analyzed for carbon monoxide (CO), carbon dioxide (CO_2), hydrogen (H_2) and oxygen (O_2).

This technology has been established and the Goodfellow Technology (formerly Stantec) had seven systems installed and operating worldwide which have measured and analyzed data from over 100,000 heats as of the 1990's.[1] Table 1 lists some of the facilities that currently use this technology. Typical combustion efficiency of CO conversion to CO_2 varies from 25-70% for the heat cycle.

Table 1
Locations of EFSOP Installation
IPSCO Regina (SK)
NUCOR Seattle WA
NUCOR Auburn (NY)
MACSTEEL (2) AR
Deacero (Saltillo) Mexico
Deacero (Celaya) Mexico
Hylsa (3) Monterrey, Mexico
Posco (2) South Korea
Dongkuk
Thamesteel, UK
RIVA Verona, Italy
Topy, Japan

There is not sufficient evidence with the GACSM current vertical exhaust duct system that this monitor will be technically feasible to install at this time.

[1] Goodfellow, Howard D.; Process control for EAFs using Goodfellow EFSOP, February 1, 2004

In addition to a DEC system, good operating practices, selective scrap mix, an adjustable air gap, use of or varying the length of a combustion chamber to increase residence time, oxyburners, oxygen lancing, water-cooled ducts are some of the CO BACT controls that other steel mills have employed (see attached spreadsheet).

Steel Dynamics Inc, has installed a Thermal Oxidizer with a 99% destruction efficiency. Due to the lack of application of thermal oxidation in the steel industry and potentially adverse technology applicability issues, this control alternative is considered technically infeasible and is not considered any further in this BACT analysis.

Conclusion – CO Control

The Division has determined that GACSM's proposal to use the current EAF and DEC system (which includes scrap management program, oxy-burners, oxygen lancing, increased water-cooled duct length, 2 dampers and actuators, dilution air cross connection to allow canopy air to be mixed with DEC emissions, fourth hole (air gap) and adapter, media cyclone and spark box chamber) and the CO BACT limit of 1.34 lb/ton meets the requirements of BACT. This CO BACT limit applies during all periods of the EAF heat cycle, including startup, shutdown and malfunction. The DEC system must be operating at all times and the current CO monitoring system can be used to provide a reasonable assurance of compliance.

Table 4-1: BACT Summary for the EAF (Source Code E01)

Pollutant	Control Technology	Proposed BACT Limit	Averaging Time	Compliance Determination Method
CO	DEC	1.34 lb/ton	8 hours	Method 10

5.0 TESTING AND MONITORING REQUIREMENTS

Testing Requirements:

There are no new applicable testing requirements being imposed due to this permit amendment.

Monitoring Requirements:

There are no new applicable monitoring requirements being imposed due to this permit amendment.

CAM Applicability:

There are no new CAM applicable requirements being triggered by the proposed modification.

6.0 AMBIENT AIR QUALITY REVIEW

An air quality analysis is required to determine the ambient impacts associated with the construction and operation of the proposed modifications. The main purpose of the air quality analysis is to demonstrate that emissions emitted from the proposed modifications, in conjunction with other applicable emissions from existing sources (including secondary emissions from growth associated with the new project), will not cause or contribute to a violation of any applicable National Ambient Air Quality Standard (NAAQS) or PSD increment in a Class I or Class II area. NAAQS exist for NO_2, CO, $PM_{2.5}$,, PM_{10}, SO_2, Ozone (O_3), and lead. PSD increments exist for SO_2, NO_2, and PM_{10}.

The proposed project at the GACSM triggers PSD review for CO. An air quality analysis was conducted to demonstrate the facility's compliance with the NAAQS. An additional analysis was conducted to demonstrate compliance with the Georgia air toxics program. This section of the application discusses the air quality analysis requirements, methodologies, and results. Supporting documentation may be found in the Air Quality Dispersion Report of the application and in the additional information packages.

Modeling Requirements

The air quality modeling analysis was conducted in accordance with Appendix W of Title 40 of the Code of Federal Regulations (CFR) §51, *Guideline on Air Quality Models*, and Georgia EPD's *Guideline for Ambient Impact Assessment of Toxic Air Pollutant Emissions (Revised).*

The proposed project will cause net emission increases of CO that are greater than the applicable PSD Significant Emission Rates. Therefore, air dispersion modeling analyses are required to demonstrate compliance with the NAAQS.

Significance Analysis: Ambient Monitoring Requirements and Source Inventories

Initially, a Significance Analysis is conducted to determine if the CO emissions increases at the GACSM would significantly impact the area surrounding the facility. Maximum ground-level concentrations are compared to the pollutant-specific U.S. EPA-established monitoring significant level (MSL). The MSL for the pollutants of concern are summarized in Table 6-1.

If a significant impact (i.e., an ambient impact above the MSL) does not result, no further modeling analyses is conducted for that pollutant for NAAQS or PSD Increment. If a significant impact does result, further refined modeling is completed to demonstrate that the proposed project does not cause or contribute to a violation of the NAAQS or consume more than the available Class II Increment.

Under current U.S. EPA policies, the maximum impacts due to the emissions increases from a project are also assessed against monitoring *de minimis* levels to determine whether pre-construction monitoring should be considered. These monitoring *de minimis* levels are also listed in Table 6-1. If the predicted modeled impact from an emission increase is less than the monitoring *de minimis* concentration, the permitting agency has the discretionary authority to exempt an applicant from pre-construction ambient monitoring. This evaluation is required for this project.

If any off-site pollutant impacts calculated in the Significance Analysis exceed the MSL, a Significant Impact Area (SIA) is determined. The SIA encompasses a circle centered on the facility with a radius extending out to (1) the farthest location where the emissions increase of a pollutant from the project causes a significant ambient impact, or (2) a distance of 50 km, whichever is less. All sources within a distance of 50 km of the edge of a SIA are assumed to potentially contribute to ground-level concentrations within the SIA and are evaluated for possible inclusion in the NAAQS and PSD Increment analyses.

Table 6-1: Summary of Modeling Significance Levels

Pollutant	Averaging Period	PSD Significant Impact Level (ug/m^3)	PSD Monitoring Deminimis Concentration (ug/m^3)
CO	8-Hour	500	575
	1-Hour	2000	--

NAAQS Analysis

The primary NAAQS are maximum concentration ceilings, measured in terms of total concentration of pollutant in the atmosphere, which define the "levels of air quality which the U.S. EPA judges are necessary, with an adequate margin of safety, to protect the public health." Secondary NAAQS define the levels that "protect the public welfare from any known or anticipated adverse effects of a pollutant." The primary and secondary NAAQS applicable to this project are listed in Table 6-2 below.

Table 6-2: Summary of National Ambient Air Quality Standards

Pollutant	Averaging Period	NAAQS	
		Primary / Secondary (ug/m^3)	Primary / Secondary (ppm)
CO	8-Hour	10,000 / None	9 / None
	1-Hour	40,000 / None	35 / None

If the maximum pollutant impact calculated in the Significance Analysis exceeds the MSL at an off-property receptor, a NAAQS analysis is required. The NAAQS analysis would include the potential emissions from all emission units at the GACSM, except for units that are generally exempt from permitting requirements and are normally operated only in emergency situations. The emissions modeled for this analysis reflect the results of the BACT analysis for the modified emission unit. Facility emissions are combined with the allowable emissions of sources included in the regional source inventory. The resulting impacts, added to appropriate background concentrations, are assessed against the applicable NAAQS to demonstrate compliance. For an annual average NAAQS analysis, the highest modeled concentration among five consecutive years of meteorological data is assessed, while the highest second-high impact is assessed for the short-term averaging periods, except that 24-hr PM10 is assessed against the highest 6th high concentration over the 5-year period modeled.

PSD Increment Analysis

The PSD Increments were established to "prevent deterioration" of air quality in certain areas of the country where air quality was better than the NAAQS. To achieve this goal, U.S. EPA established PSD Increments for certain pollutants. The sum of the PSD Increment concentration and a baseline concentration defines a "reduced" ambient standard, either lower than or equal to the NAAQS that must be met in an attainment area. Significant deterioration is said to have occurred if the change in emissions occurring since the baseline date results in an off-property impact greater than the PSD Increment (i.e., the increased emissions "consume" more that the available PSD Increment).

U.S. EPA has established PSD Increments for NO_X, SO_2, and PM_{10}; no increments have been established for CO or $PM_{2.5}$ (however, $PM_{2.5}$ increments are expected to be added soon. No increment analysis was performed since there is no PSD increment established for CO.

Modeling Methodology

Details on the dispersion model, including meteorological data, source data, and receptors can be found in EPD's PSD Dispersion Modeling and Air Toxics Assessment Review in Appendix C of this Preliminary Determination and in Section 6 of the permit application.

Modeling Results

Table 6-4 shows that the proposed project will cause ambient impacts of CO above the appropriate MSL. Because the emissions increases from the proposed project result in ambient impacts more than the MSL, further PSD analyses were conducted for this pollutant.

Since, ambient impacts above the MSL were predicted for CO for the 8-hour averaging period, NAAQS analyses were performed for CO.

Table 6-4: Class II Significance Analysis Results – Comparison to MSLs

Pollutant	Averaging Period	Year	UTM East (km)	UTM North (km)	Maximum Impact (ug/m^3)	MSL (ug/m^3)	Significant?
CO	1-hour	2003	702.6	3791	1737	2000	No
	8-hour	2003	702.6	3791	1013	500	**Yes**

Data for worst year provided only.

As indicated in the table above, maximum modeled impacts were below the corresponding MSL for CO for the 1-hour averaging period. However, maximum modeled impacts were above the MSL for CO for the 8-hour averaging period. Therefore, a Full Impact Analysis was conducted for CO for both averaging periods.

Significant Impact Area

For any off-site pollutant impact calculated in the Significance Analysis that exceeds the MSL, a Significant Impact Area (SIA) must be determined. The SIA encompasses a circle centered on the facility being modeled with a radius extending out to the lesser of either: 1) the farthest location where the emissions increase of a pollutant from the proposed project causes a significant ambient impact, or 2) a distance of 50 kilometers. All sources of the pollutants in question within the SIA plus an additional 50 kilometers are assumed to potentially contribute to ground-level concentrations and must be evaluated for possible inclusion in the NAAQS Analysis.

Based on the results of the Significance Analysis, the distance between the facility and the furthest receptor from the facility that showed a modeled concentration exceeding the corresponding MSL was determined to be less than 1 kilometer for CO. To be conservative, a regional source inventory for CO was prepared consisting of sources located within 51 kilometers of the mill.

NAAQS Modeling

The next step in completing the NAAQS analyses was the development of a regional source inventory. Nearby sources that have the potential to contribute significantly within the facility's SIA are ideally included in this regional inventory. GACSM requested and received an inventory of NAAQS sources from Georgia EPD. GACSM reviewed the data received and calculated the distance from the mill to each facility in the inventory.

The distance from the facility of each source listed in the regional inventories was calculated, and all sources located more than 51 kilometers from the mill were excluded from the analysis. Additionally, pursuant to the "20D Rule," facilities outside the SIA but within 51 km of the project were also excluded from the inventory if the entire facility's emissions (expressed in tons per year) were less than 20 times the distance (expressed in kilometers) from the facility to the edge of the SIA. In applying the 20D Rule, facilities in close proximity to each other (within approximately 2 kilometers of each other) were considered as one source. By applying the 20D rule for the offsite emission sources within 50 km plus SIA (Significant Impact Area) of the Gerdau Ameristeel, only one facility – Georgia Power Plant Bowen, was identified as a significant offsite source of CO emissions. Two stacks operated at this facility with a potential for CO emission were included in the list of point sources in the NAAQS analysis. Stack parameters can be seen in Table 1 of the attached modeling report.

The regional source inventory used in the analysis is included in the permit application and the attached modeling report.

NAAQS Analysis

In the NAAQS analysis, impacts within the facility's SIA due to the potential emissions from all sources at the facility and those sources included in the regional inventory were calculated. Since the modeled ambient air concentrations only reflect impacts from industrial sources, a "background" concentration was added to the modeled concentrations prior to assessing compliance with the NAAQS. The source of ambient concentrations is the GA EPD Monitoring Site ID# 132230003, Paulding County.

The results of the NAAQS analysis are shown in Table 6-5. For the short-term averaging periods, the design-limiting impacts are the highest second-high impacts. When the total impact at each receptor within the SIA is below the corresponding NAAQS, compliance is demonstrated.

Table 6-5: NAAQS Analysis Results

Pollutant	Averaging Period	Year	UTM East (km)	UTM North (km)	Maximum Impact (ug/m^3)	Background (ug/m^3)	Total Impact (ug/m^3)	NAAQS (ug/m^3)	Exceed NAAQS?
	8-hour	2003	702.6	3791	1243	802	2045	10,000	No
	1-hour	2006	702.6	3791	2161	1008	3169	40,000	No

Data for worst year provided only.

As indicated in Table 6-5 above, all of the total modeled impacts at all significant receptors within the SIA are below the corresponding NAAQS.

Increment Analysis

No increment assessment was conducted since no increment has been promulgated for CO.

Ambient Monitoring Requirements

Table 6-7: Significance Analysis Results – Comparison to Monitoring *De Minimis* Levels

Pollutant	Averaging Period	Year*	UTM East (km)	UTM North (km)	Monitoring De Minimis Level (ug/m^3)	Modeled Maximum Impact (ug/m^3)	Significant?
CO	8-hour	2003	702.6	3791	575	1013	**Yes**

Data for worst year provided only

The impacts for CO quantified in Table 6-4 of the Class I Significance Analysis are compared to the Monitoring *de minimis* concentrations, shown in Table 6-1, to determine if ambient monitoring requirements need to be considered as part of this permit action. No pre-construction monitoring is required for CO because the GA EPD monitoring network ambient CO monitoring data is contemporaneous, representative and regularly QA/QC'd.

The VOC *de minimis* concentration is mass-based (100 tpy) rather than ambient concentration-based (ppm or $\mu g/m^3$). Projected VOC emissions increases resulting from the proposed modification do not exceed the 100 tpy monitoring deminimis level.

Class I Area Analysis

Federal Class I areas are regions of special national or regional value from a natural, scenic, recreational, or historic perspective. Class I areas are afforded the highest degree of protection among the types of areas classified under the PSD regulations. U.S. EPA has established policies and procedures that generally restrict consideration of impacts of a PSD source on Class I Increments to facilities that are located near a federal Class I area. Historically, a distance of 100 km has been used to define "near", but more recently, a distance of 300 kilometers has been used for all facilities.

The Class I areas within approximately 300 kilometers of the Gerdau Ameristeel-Cartersville facility are the Cohutta Wilderness Area, Great Smoky N.P. and Sipsey, W.A.. The U.S. Forest Service (USFS) for the Wilderness Areas and National Park Service for the National Park are the designated Federal Land Managers (FLMs) responsible for oversight of these Class I areas.

CO is not considered as a visibility affecting pollutant and visibility issues are not addressed. No Air Quality Related Values (AQRV) analysis was deemed necessary since only CO is proposed to be emitted at a significant rate.

7.0 ADDITIONAL IMPACT ANALYSES

PSD requires an analysis of impairment to visibility, soils, and vegetation that will occur as a result of a modification to the facility and an analysis of the air quality impact projected for the area as a result of the general commercial, residential, and other growth associated with the proposed project.

Soils and Vegetation

The CO maximum modeled 1-hr impact of 1737 ug/m^3 is <0.1% of maximum 1-week concentration of 1,800,000 ug/m^3 (the threshold of harm to sensitive plants). All other criteria pollutants do not require such assessment due to their insignificant emission rates. The CO emissions from the facility are not expected to have any impact on soils that would affect vegetative growth or chemical composition of the soil.

The facility reported vegetative impacts in Section 6.5 of the application and concluded they were insignificant.

Growth

With respect to growth impacts, the proposed project will not materially affect the general commercial, residential or other growth in the vicinity of the facility.

Visibility

CO is not considered a visibility-affecting pollutant thus visibility issues are not addressed.

Georgia Toxic Air Pollutant Modeling Analysis

Georgia EPD regulates the emissions of toxic air pollutant (TAP) emissions through a program covered by the provisions of *Georgia Rules for Air Quality Control*, 391-3-1-.02(2)(a)3.(ii). A TAP is defined as any substance that may have an adverse effect on public health, excluding any specific substance that is covered by a State or Federal ambient air quality standard. Procedures governing the Georgia EPD's review of TAP emissions as part of air permit reviews are contained in the agency's "*Guideline for Ambient Impact Assessment of Toxic Air Pollutant Emissions (Revised)*."

Selection of Toxic Air Pollutants for Modeling

For projects with quantifiable increases in TAP emissions, an air dispersion modeling analysis is generally performed to demonstrate that off-property impacts are less than the established Acceptable Ambient Concentration (AAC) values. The TAP evaluated are restricted to those that may increase due to the proposed project. Thus, the TAP analysis would generally be an assessment of off-property impacts due to facility-wide emissions of any TAP emitted by a facility. To conduct a facility-wide TAP impact evaluation for any pollutant that could conceivably be emitted by the facility is impractical. A literature review would suggest that at least one molecule of hundreds of organic and inorganic chemical compounds could be emitted from the various combustion units. This is understandable given the nature of the natural gas fed to the combustion sources, and the fact that there are complex chemical reactions and combustion of fuel taking place in some sources. The vast majority of compounds potentially emitted however are emitted in only trace amounts that are not reasonably quantifiable.

The air toxics concentrations in Table 2 (TIA-Toxic Impact Assessment) of the Modeling Memo in Appendix C are different than those submitted because the applicant incorporated in AERMOD modeling submittals dated March 3, 2008 and July 17, 2008 with building downwash effects in the submitted analysis. The Georgia Air Toxics Guideline employs Safety factors, rather than assess the effects of downwash, to assure a sufficient margin of safety for public health.

For each TAP identified for further analysis, both the short-term and long-term AAC were calculated following the procedures given in Georgia EPD's *Guideline*. Figure 8-3 of Georgia EPD's *Guideline* contains a flow chart of the process for determining long-term and short-term ambient thresholds. GACSM referenced the resources previously detailed to determine the long-term (i.e., annual or 24-hr average) and short-term AAC (i.e., 15-minute). The AACs were verified by the EPD.

All air toxics evaluated by the applicant meet the applicable Georgia Air Toxics Guideline Acceptable Ambient Concentrations (AACs). The ISCST3 model was conservatively used in review of the air toxics

Determination of Toxic Air Pollutant Impact

The Georgia EPD *Guideline* recommends a tiered approach to model TAP impacts, beginning with screening analyses using SCREEN3, followed by refined modeling, if necessary, with ISCST3 or ISCLT3. For the refined modeling completed, the infrastructure setup for the SIA analyses was relied upon with appropriate sources for the TAP modeling. Note that per the Georgia EPD's *Guideline*, downwash was not considered in the TAP assessment.

8.0 EXPLANATION OF DRAFT PERMIT CONDITIONS

The permit requirements for this proposed facility are included in draft Permit Amendment No. 3312-015-0032-V-04-2 in Appendix A.

Section 1.0: Facility Description

The steel mill requested an increased molten steel limit on the 4-Strand Caster (Source Code 03) of 1,340,000 tons per year of steel cast in 12 consecutive months.

Section 2.0: Requirements Pertaining to the Entire Facility

No conditions in Section 2.0 are being added, deleted or modified as part of this permit action.

Section 3.0: Requirements for Emission Units

Condition No. 3.2.3 was modified to change the limit on the 4-Strand Caster (Source Code 03) from 1,000,000 to 1,340,000 tons per year of steel cast in 12 consecutive months.

Condition No. 3.2.4 was added to address the DEC system as BACT for CO and require that it remain in operation at all times.

Condition No. 3.3.2 c was modified to reflect the CO BACT limit for the EAF of 1.34 lb/ton of steel cast.

Section 4.0: Requirements for Testing

No conditions in Section 4.0 are being added, deleted or modified as part of this permit action.

Section 5.0: Requirements for Monitoring

No conditions in Section 5.0 are being added, deleted or modified as part of this permit action.

Section 6.0: Other Recordkeeping and Reporting Requirements

Condition 6.1.7.a.iii. stating reporting requirements for excess emissions was modified to reflect the BACT CO limit of 1.34 lb/ton for a 8-hour average instead of 60 ppmw CO for an 8-hour average from the baghouses.

Condition 6.1.7.b.i. stating reporting requirements for exceedances was modified to reflect the increased steel cast limit of 1,340,000 tons per year.

Section 7.0: Other Specific Requirements

No conditions in Section 7.0 are being added, deleted or modified as part of this permit action.

APPENDIX A

Draft Revised Title V Operating Permit Amendment
Gerdau Ameristeel - Cartersville Steel Mill
Cartersville (Bartow County), Georgia

APPENDIX B

GACSM PSD Permit Application and Supporting Data

Contents Include:

1. PSD Permit Application No. 17915, dated January 4, 2008.
2. Additional Information Packages Received February 29, 2008, March 5, 2008, March 7. 2008, March 12, 2008, April 18, 2008 and July 21, 2008.

APPENDIX C

EPD'S PSD Dispersion Modeling and Air Toxics Assessment Review