TECHNICAL EVALUATION
AND
PRELIMINARY DETERMINATION

Applicant

Gerdau Ameristeel - Jacksonville Steel Mill
16770 Rebar Road
Baldwin, Florida 32234

Facility ID No. 0310157

County

Duval County, Florida

Project

Project No. 0310157-011-AC/PSD-FL-349C
Expiration Date Extension of Project No. 0310157-009-AC/PSD-FL-349B

Permitting Authority

Florida Department of Environmental Protection
Division of Air Resource Management
Bureau of Air Regulation – New Source Review Section
2600 Blair Stone Road, Mail Station #5505
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1. APPLICATION INFORMATION

Facility Location

Gerdau Ameristeel's Jacksonville Steel Mill is located at 16770 Rebar Road, Duval County, Florida. The UTM coordinates of this facility are: Zone 17; 405.7 km East; 3350.2 km North (Latitude is 30° 16' 52" North / Longitude is 81° 58' 50'').

Facility Classification

The facility belongs to Major Group No. 33 (Primary Metal Industries), Group No. 339 (Miscellaneous Primary Metal Products), and Industry No. 3390 (Steel Mills). The North American Industry Classification System (NAICS) Code is No. 331111 (Steel Manufacturing Facilities That Operate Electric Arc Furnaces). The facility is regulated according to the following categories.

Title III: The existing facility is not a major source of hazardous air pollutants (HAP).

Title IV: The existing facility operates no units subject to the acid rain provisions of the Clean Air Act.

Title V: The existing facility is a Title V major source of air pollution in accordance with Chapter 213, F.A.C.

PSD: The existing facility is a major stationary source in accordance with Rule 62-212.400, F.A.C for the Prevention of Significant Deterioration (PSD) of Air Quality. This facility belongs to one of the 28 major facility categories (Secondary Metal Production Plants) specified in the definition of a major stationary source.

NSPS: The existing facility operates an electric arc furnace operation consisting of a melt shop, electric arc furnace (EAF) and ladle metallurgical furnace (LMF), which is subject to the New Source Performance Standards (NSPS) in Subpart AAa of Part 60 in Title 40 of the Code of Federal Regulations (CFR).

General Facility and Process Description

Gerdau Ameristeel operates the existing Jacksonville Steel Mill near Baldwin in Duval County, Florida. The facility is a scrap iron and steel recycling (secondary metal production) plant that has been operating since 1975. The existing and modified plant receives scrap steel by truck and rail and processes it into steel rebar, wire and rod. Main components of the plant include: a new EAF and associated melt shop building; a new LMF (under construction) and associated building (to house the new LMF, continuous caster and support activities); a scrap handling building; an existing continuous caster operation; a new continuous caster machine (under construction); an existing billet reheat furnace (BRF; under modification) for making rebar; a new BRF #2 (under construction) for making wire and rod; an existing rolling mill; an existing rod mill; an existing slag handling and storage operation; and a new #5 baghouse control system to control particulate matter and visible emissions from the EAF and LMF operations. The original air construction permit allowed an increase in the permitted steel production capacity from 720,000 to 1,192,800 tons per year of liquid steel.

The secondary steel production plant melts and refines scrap steel materials into usable steel. Refining simply means to remove undesirable elements from the molten steel and add alloys to reach the final metal chemistry. The production of steel is a series of batch processes including charging, melting, refining, slagging, tapping, further refining, and casting.

The process begins by adding a "charge" of iron and steel scrap to the top of the electric arc furnace (EAF). Other materials, such as lime and carbon, may also be charged. The EAF consists of a furnace shell, furnace roof and the transformer. The EAF melts the charge by heating with electric arcs from carbon electrodes and secondarily with gas-fired sidewall burners inside the furnace. Molten steel is then tapped (poured) from the EAF into a ladle metallurgical furnace (LMF). A "heat cycle", sometimes referred to as a "heat", is the period of time beginning when scrap is charged to an empty EAF and ending when the EAF tap is completed.

The LMF is a second electric arc furnace that provides further refinement of the material to produce a desired liquid steel specification. It is equipped with a bulk flux and alloy batching system, alloy wire feeders, water-cooled roof, and electrodes to allow temperature adjustments. Argon gas is also bubbled through the ladle to aid in the refining. Lime is added to react with impurities to form "slag", which floats on top of the liquid steel.

Periodically, the operator takes a sample of the steel for analysis. Based on the sample results, the operator adds controlled amounts of lime and alloys. 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. Alloys ensure that certain material properties are met. The electrodes may be used to adjust or maintain steel temperature. When the chemistry and temperature of the steel are within specifications, the LMF ladle is taken to the continuous caster. Before tapping, the furnace is tilted to pour slag into the furnace pit.

Refined liquid steel is gravity fed from the LMF ladle into the refractory-lined tundish (reservoir) of the continuous caster, which may generate small amounts of particulate matter. The continuous caster feeds numerous molds that form steel billets or bars. Billets are stored and later melted in an existing billet reheat furnace, which fires natural gas as the exclusive fuel. Various rolling and wire machines are used to process the refined molten steel from the billet recovery furnace into rebar, wire, and rod.

Hot slag is poured off of the top of the steel bath from the electrical arc furnaces into the slag pit located in the Melt Shop building. Here it cools and solidifies. Front-end loaders remove slag from the pit and transport it to the slag processing area, where it is screened and sized for transport off site. The following process flow diagram is from EPA's draft AP-42 Section 12.5.1 for "minimills" and shows the general steel production process.

Figure 12.5.1-1. General flow diagram for a minimill.

Project Description

On September 21, 2005, the Department issued Permit No. 0310157-007-AC/PSD-FL-349 to Gerdau Ameristeel for the construction of a new melt shop, EAF, LMF and continuous caster machine. On May 5, 2006, the Department issued Permit No. 0310157-008-AC/PSD-FL-349A, which modified the original permit to also include a new gas-fired BRF #2 and a modification of the existing BRF #1. The existing BRF #1 will be used to produce rebar and the new BRF #2 will be dedicated to producing wire or rod. On April 6, 2007, the Department issued Permit No. 0310157-009-AC/PSD-FL-349B, which modified the original permit to include tires as a source of carbon for the EAF.

The expiration date of Permit No. 0310157-009-AC/PSD-FL-349B is September 28, 2008. On July 28, 2008, the permittee requested an 18-month extension of the expiration date in order to complete the authorized construction for the new LMF, continuous caster machine and BRF #2 as well as the modification of existing BRF #1. Based on a request for additional information dated August 19, 2008, the permittee submitted a

response on September 15, 2008 that included a review of previous Best Available Control Technology (BACT) determinations, which completed the application.

The following construction authorized by Permit No. 0310157-009-AC/PSD-FL-349B has been completed.

- Baghouse #5. Construction was started in October 2005 and completed in November 2006. Compliance testing was conducted in April 2007, February 2008 and June 2008.
- Melt Shop Building. Construction was started in February 2006 and completed in May 2007. Compliance testing was conducted in February 2008 and June 2008.
- EAF. Construction was started in February 2006 and completed in May 2007. Compliance testing was conducted in February 2008 and June 2008.
- LMF. Construction was started in January 2006 and ceased in August 2006. Site clearing for the project was completed. The combined water system to provide cooling water to the EAF and LMF was completed. The building to house the LMF was completed. Duct work from the baghouse #5 to the LMF was partially completed. The overhead crane rails were installed in the building for the LMF was completed. Design work is ongoing.
- Continuous Caster Machine (CCM). Construction was started in January 2006 and ceased in April 2007. Site clearing for the project was completed. The part of the building to house the CCM was completed. Overhead crane rails were installed in the building for the LMF was completed. Design work is ongoing.
- BRF #1 and BRF #2. Construction was started in January 2007 and ceased in April 2007. Initial site clearing for the project was completed. Required improvements to the plant storm water drainage system were partially completed. Relocation of utilities is ongoing. Design work is ongoing.

On September 15, 2007, the EAF suffered a catastrophic failure of the transformer. Smaller replacement transformers have been used to operate the unit at reduced capacity. The plant is still awaiting a new replacement transformer that will operate at the permitted capacity.

2. REVIEW OF THE PREVIOUS BACT DETERMINATIONS

Construction and modification authorized by the original Permit No. 0310157-009-AC/PSD-FL-349B was discontinued for a period of 18 months or more on some of these emissions units. Pursuant to Rule 62-212.400(12)(Source Obligation), F.A.C., the previous BACT determinations must be revalidated for the new LMF, the new BRF #2 and the existing BRF #1 that will be modified. Rule 62-210.200(Definitions), F.A.C. defines BACT as:

> *An emission limitation, including a visible emissions standard, based on the maximum degree of reduction of each pollutant emitted which the Department, on a case by case basis, taking into account:*
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> 1. *Energy, environmental and economic impacts, and other costs;*
> 2. *All scientific, engineering, and technical material and other information available to the Department; and*
> 3. *The emission limiting standards or BACT determinations of Florida and any other state;*
>
> *determines is achievable through application of production processes and available methods, systems and techniques (including fuel cleaning or treatment or innovative fuel combustion techniques) for control of each such pollutant.*
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> *If the Department determines that technological or economic limitations on the application of measurement methodology to a particular part of an emissions unit or facility would make the imposition of an emission standard infeasible, a design, equipment, work practice, operational standard or combination thereof, may be prescribed instead to satisfy the requirement for the application of BACT. Such standard shall, to the degree possible, set forth the emissions reductions achievable by implementation of such design,*

equipment, work practice or operation.

Each BACT determination shall include applicable test methods or shall provide for determining compliance with the standard(s) by means which achieve equivalent results.

In no event shall application of best available control technology result in emissions of any pollutant which would exceed the emissions allowed by any applicable standard under 40 CFR Parts 60, 61, and 63.

In the Technical Evaluation and Preliminary Determinations associated with the original project, the Department conducted a case-by-case BACT determination in accordance with the above requirements and the "Top-Down Methodology" described by EPA. The following tables summarize the current BACT determinations for particulate matter (PM), particulate matter with a mean aerodynamic particle diameter of 10 microns or less (PM_{10}), nitrogen oxides (NO_X), sulfur dioxides (SO_2), carbon monoxide (CO) and volatile organic compound (VOC).

Table 1. New EAF and LMF Operations

Pollutant	Emission Limits [1]	Control Technology	Test Methods [2 and 3]
PM/PM_{10}	0.0018 grains/dscf	Direct-shell evacuation control (DEC) systems (fourth hole vent with O_2), canopy hoods and new No. 5 baghouse control system	EPA Reference Method 5 40 CFR 60, Appendix A
NO_x	0.33 lb/ton tapped steel	Low-NO_x oxy-fuel sidewall burners and furnace pressure control (good combustion practices – low excess air by the DEC systems)	EPA Reference Method 7, 7A or 7E; 40 CFR 60, Appendix A
SO_2	0.2 lb/ton tapped steel	Scrap management plan and supplemental firing of natural gas	EPA Reference Method 8; 40 CFR 60, Appendix A
CO	2.0 lbs/ton tapped steel	DEC systems and proper design, operation and control of the combustion process	EPA Reference Method 10; 40 CFR 60, Appendix A
VOCs	0.13 lb/ton tapped steel	DEC systems, scrap management plan, and proper design, operation and control of the combustion process	EPA Reference Method 18, 25 or 25A; 40 CFR 60, Appendix A
Visible Emissions	<3% Opacity from No. 5 baghouse control system <6% Opacity from Melt Shop Roof and Continuous Caster Building Roof	No. 5 baghouse control system, associated roof canopy hoods, and usage of the associated DEC systems	EPA Reference Method 9; 40 CFR 60, Appendix A
Visible Emissions	<10% Opacity from miscellaneous pickup and transfer points along the dust-handling system for the No. 5 baghouse control system	No. 5 baghouse control system	EPA Reference Method 9; 40 CFR 60, Appendix A

1 Unless otherwise specified, the averaging time for each limit shall be in accordance with the test method.

2 For the EAF and LMF operations, the sampling time and sample volume of each PM test run shall be at least 4 hours and 160 dscf, respectively, and the sampling time shall include an integral number of heats. Compliance with the CO standard shall be based on the average of three, 3-hour test runs. [Rule 62-204.800, F.A.C., and 40 CFR 60.275a(e)(1)]

3 Pursuant to Rules 62-297.310(2) and (2)(b), F.A.C., compliance tests on the EAF and LMF operations shall be conducted at a minimum production rate of 144 tons per hour tapped steel, which is 90% of permitted capacity.

Table 2. Modified BRF #1 and New BRF #2

Pollutant	Emission Limits [1]	Control Technology	Test Methods [2]
PM/PM_{10}	--	Firing natural gas	
NO_x	0.08 lb/MMBtu	Low-NO_x burners (LNBs); and, good combustion practices and low excess air	EPA Reference Method 7, 7A or 7E; 40 CFR 60, Appendix A
SO_2		Firing natural gas	
CO	0.035 lb/MMBtu	Proper furnace design and good combustion practices, including control of combustion air and temperature	EPA Reference Method 10; 40 CFR 60, Appendix A
VOCs		Firing natural gas; and, proper furnace design and good combustion practices, including control of combustion air and temperature	
Visible Emissions	≤10% opacity, except for one 6-minute period per hour in which the opacity shall not exceed 20%	Firing natural gas	EPA Reference Method 9; 40 CFR 60, Appendix A

[1] The averaging time for each limit shall be in accordance with the test method.

[2] Pursuant to Rules 62-297.310(2) and (2)(b), F.A.C., compliance tests on each BRF operation shall be conducted at a minimum rate of 144 billet tons per hour, which is 90% of permitted capacity.

There does not appear to be any new control technologies recently introduced for these types of emissions units. A review of recent BACT determinations listed in the EPA's BACT/LAER Clearinghouse shows no new entries with emissions limits less than those established in the original permit for this project. However, there is one previous listing for an EAF (CO-0054, 2004) that indicates a NOx limit of 0.150 lb/ton of steel product, which appears lower. No add-on control technologies were specified for achieving this level of emissions. The Department contacted the reviewing agency and discovered that the limit has never been achieved to date and that the company recently submitted a request to relax this limit. Based on the application and available information, the Department determines that the current BACT determinations in Permit No. 0310157-009-AC/PSD-FL-349B remain valid for the affected emissions units. Therefore, the expiration date will be revised from September 28, 2008 to October 1, 2010.

3. CONCLUSION

The Department makes a preliminary determination that the proposed project will comply with all applicable state and federal air pollution regulations as conditioned by the permit. This determination is based on a technical review of the complete application, reasonable assurances provided by the applicant, and the conditions specified in the permit. Bruce Mitchell is the project engineer responsible for reviewing the application and drafting the permit changes. Additional details of this analysis may be obtained by contacting the project engineer at the Department's Bureau of Air Regulation at Mail Station #5505, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400.