west virginia department of environmental protection

Division of Air Quality
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Harold D. Ward, Cabinet Secretary
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Pursuant to §45-14-17.2, the Division of Air Quality presents the

PRELIMINARY DETERMINATION/FACT SHEET

for the

CONSTRUCTION

of

CMC Steel US, LLC
CMC Steel West Virginia

proposed to be located near

Martinsburg, Berkeley County, WV.

Permit Number: R14-0040
Facility Identification Number: 003-00286

Date: May 12, 2023

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BACKGROUND INFORMATION

Application No.:	R14-0040
Plant ID No.:	003-00286
Applicant:	CMC Steel US, LLC
Facility Name:	CMC Steel West Virginia
Location:	Near Martinsburg, Berkeley County
SIC/NAICS Code:	3317/331210
Application Type:	Major Source Construction
Received Date:	January 3, 2023 (Original Application) March 24, 2023 (Revised Application) May 10, 2023 (Second Revised Application)
Engineer Assigned:	Joseph R. Kessler, PE
Fee Amount:	$14,500
Date Received:	January 4, 2023
Complete Date:	May 12, 2023
Due Date:	November 8, 2023
Applicant Ad Date:	January 5, 2023
Newspaper:	*The Journal*
UTM's:	Easting: 251.73 km • Northing: 4,380.50 km • Zone: 18
Latitude/Longitude:	39.53829/-77.88892
Description:	Construction of a new micro mill with associated support operations to produce long steel products at a maximum production rate of 650,000 tons/year.

On January 3, 2023, CMC Steel US, LLC (CMC), a subsidiary of Commercial Metals Company, submitted a permit application to construct a new micro steel mill near Martinsburg, Berkeley County, WV. The proposed facility is, pursuant to 45CSR14, Section 2.43, defined as a "major stationary source" and is, therefore, required to undergo Prevention of Significant Deterioration (PSD) review according to the requirements of 45CSR14. Based on DAQ procedure, the permit application will also be concurrently reviewed under the WV minor source program administered under 45CSR13.

The following document will outline the DAQ's preliminary determination that the construction of CMC's Steel West Virginia facility will meet the emission limitations and conditions set forth in the DRAFT permit and will comply with all currently applicable state and federal air quality rules and regulations.

PUBLIC REVIEW PROCEDURES

The public review procedures for a new major source construction application, dual-reviewed under 45CSR13 and 45CSR14, require action items at the time of application submission and at the time a preliminary determination/draft permit is prepared by the DAQ. The following details compliance with the applicable rules and accepted procedures for public notification with respect to Permit Application R14-0040.

Actions Taken at Application Submission

Pursuant to §45-13-8.3 and §45-14-17.1, CMC placed a Class I legal advertisement in the following newspaper on the specified date notifying the public of the submission of a permit application:

- *The Journal* (January 5, 2023).

The DAQ sent a notice of the application submission and a link to the electronic version of the permit application to the following parties:

- The U.S. Environmental Protection Agency (USEPA) Region 3 [§45-14-13.1] - (January 4, 2023);

- The National Park Service [§45-14-13.2] - (January 5, 2023); and

- The US Forest Service [§45-14-13.2] - (January 5, 2023).

The permit application was also made available for review on DAQ's website and on DAQ's publically available database (AX) as of January 3, 2023.

Actions Taken at Completion of Preliminary Determination

Pursuant to §45-13-8.4 and §45-14-17.4, upon completion (and approval) of the preliminary determination and draft permit, a Class 1 legal advertisement will be placed in the following newspaper stating the DAQ's preliminary determination regarding R14-0040:

- *The Journal*.

Pursuant to §45-13-8.7 and §45-14-13.3, a copy of the preliminary determination, draft permit, and public notice shall be forwarded to USEPA Region 3, the National Park Service (NPS) and the US Forest Service (USFS). A copy of the application, complete file, preliminary determination and draft permit will be available on DAQ's website and on DAQ's publically available database (if unable to review online, the documents will also, by request to the DAQ, be made available at one location in the region in which the source is proposed to be located or be provided within a reasonable time-frame). Additionally, pursuant to §45-14-17.5, a copy of the public notice will be sent to the County Clerk of Berkeley County, WV, the Virginia Department of Environmental Quality (VDEQ), and the Maryland Department of the Environment (MDE). All other requests for information by interested parties for documents related to Permit Application R14-0040 shall be provided upon request.

Actions Taken at Completion of Final Determination

Pursuant to §45-14-17.7, and 17.8, upon reaching a final determination concerning R14-0040, the DAQ shall prepare a "Final Determination" document and make such determination available for review on the DAQ's website and on DAQ's publically available database (and available to any party upon request).

DESCRIPTION OF PROPOSED FACILITY

Facility Overview

CMC has submitted a permit application for the new construction of a "micro" steel mill to be located near Martinsburg, Berkeley County, WV. The process used to produce steel in micro mills (typically producing up to 650,000 tons/year) is different than that used in the more traditional "mini" steel mill (typically producing up to 1,000,000 tons/year). While both rely on Electric Arc Furnaces (EAFs) to melt the scrap (or additional sources of iron in mini mills) into molten steel, micro mills use the heat in the waste gas from the EAF to preheat the scrap that is charged to the EAF. This results in recovering energy to offset the additional energy that would be required to melt the scrap. Mini mills typically do not use such heat recovery.

The proposed facility will use the heat recovery system as described above and have the capacity to produce up to 650,000 tons of steel per year. This production process can be broken down into the following nine (9) major components: Raw Material Storage and Handling, Meltshop, Rolling Mill, Spooler, Cooling Beds, Finishing and Transportation, Slag Processing, Haulroads and Mobile Work Areas, and Auxiliary Processes/Equipment.

The basic steel producing process involves the melting of scrap metal (no additional sources of iron is added) in an EAF. The molten steel is then further refined in the Ladle Metallurgy Station (LMS) prior to being sent to the casting area where the molten steel is formed into bars (referred to as billets). During the melting process, other raw materials (carbons, fluxing agents, alloys, etc.) are added to the molten steel bath in both the EAF and LMS to remove impurities and achieve the desired metal properties. The EAF, LMS, and continuous casting operations take place in the **Meltshop** Building.

From the casting area, the solidified steel is sent though the **Rolling Mill** where it is formed into long-form steel shapes such as, most commonly, concrete reinforcing bar (referred to as "rebar"). From the Rolling Mill, heat is removed from the steel in the **Cooling Beds** and then the steel may be cut to length or sent to the **Spooler** (where steel strands are spooled into coils) as necessary before being finally being prepared for shipment in the **Finishing and Transportation** area.

Raw Material Storage and Handling and **Slag Processing** are needed at the facility to unload, store, and process feedstock materials (the majority of which is scrap metal) and slag, respectively. **Auxiliary Processes and Equipment** include the use of storage tanks, cooling towers, and emergency engines to provide electrical power and fire pump service in times of grid interruption. The facility will include multiple **Haulroads and Mobile Work Areas** to facilitate moving material and waste as needed. An illustrated and general overview of this process was obtained from CMC's website and is included as **Attachment B**.

The proposed steel mill will have a facility-wide potential-to-emit (PTE) as given in the following table:

Table 1: Facility-Wide Annual PTE

Pollutant	PTE (TPY)
CO	1,327.93
NO_x	136.83
$PM_{2.5(1)}$	138.61
$PM_{10(1)}$	145.02
$PM_{FILT}^{(2)}$	66.98
$PM^{(3)}$	155.21
SO_2	100.71
VOCs	100.49
Total HAPs	2.84
CO_{2e}	157,635

(1) Including condensable particulate matter.
(2) Filterable particulate matter only.
(3) Total particulate matter including filterable and condensable.

Process Description

The following is a summary of the process description given in Section 9 of the permit application.

Raw Material Storage and Handling

The proposed facility will use various feedstocks in the steel making process: scrap metal, carbons, alloys, and fluxing agents. The purpose of each is given in the following:

- Scrap metal is the sole iron feedstock used in the proposed CMC steel making process (no additional sources of iron are used) and will include un-shredded and shredded scrap largely from crushed automobiles but also may include old appliances, machinery, sheet metal, rectangular bundles, and miscellaneous scrap metal.

- Carbons (coal, petroleum coke, etc.) and other "fluxing agents" (lime, dolomite, spar, etc.) are materials added to the molten steel to remove impurities from the steel through the formation of slag.

- Alloys (manganese ferroalloys, ferrochrome, iron-molybdenum, ferrovanadium, etc.), in both a granular and aggregate form, are also added to the molten steel to improve specific properties such as strength, wear, and corrosion resistance and are used to vary the chemical composition of the steel to specific customer specifications.

Scrap metal (a maximum of 812,500 tons/yr) will be brought in by either truck or rail and, if space is available, loaded directly from trucks into one of the ESC Storage Piles (W51A - W51C: 16,600 ft^2 total) inside the Endless Charging System (ECS) Building. These bays are open on one side for dump trucks to direct dump onto but are under roof. A magnetic crane is available inside the ECS Building to move scrap from pile to pile to facilitate loading into the ECS system. If those bays are full, then scrap will be, if space is available, loaded directly from trucks into the ECS Overage Storage Pile (W51D: 12,100 ft^2). This pile is immediately outside and next to the ECS building. Scrap in this pile is either craned or pushed directly into one of the ESC Storage Piles to keep them full for use in the ECS system.

Scrap brought in by rail is unloaded by magnetic crane into one of the four (4) Rail Storage Piles (W51E - W51H: 36,400 ft^2 total). There are also four (4) Truck Storage Piles for direct dumping of trucks (W51K - W51N: 36,400 ft^2 total) when no space is available in on of the ECS Building Storage Piles. Both the rail and truck outdoor storage piles will be used to manage and sort scrap (based on quality and other metrics) as needed. It is important to note that, while CMC has estimated that there will be four truck and four rail outdoor scrap piles, the permit limitation on each group of piles (truck and rail) will be the aggregate foot-print of the piles and not the number of piles. Additionally, there will be one (1) Residual Scrap Storage Pile (W81: 21,200 ft^2). Residual scrap will be steel that is removed from various parts of the process and that, after crushing in the Ball Drop Crusher (CR1), will be stored in W81 before being introduced back into the scrap handing process for use in the steel making process. As scrap is not a friable material (such as coal, limestone, or other aggregates) and is not considered to have a high dust potential, no wet suppression is required on these piles. CMC will be required to minimize the drop heights on all drop points, however, including the scrap piles.

Un-shredded scrap that is too large for direct use in the steelmaking process will require cutting by natural gas-fired (0.13 mmBtu/hr) or propane-fired (0.32 mmBtu/hr) torch cutters (TORCH1) prior to use in the process. After cutting, the scrap will be sent back to one of the ESC Storage Piles or into one of the open scrap storage piles.

Alloys (non-aggregates) and other fluxing agents (35,500 tons/yr) and carbons (16,500 tons/yr) will be brought in by truck and pneumatically loaded into either one of the two (2) Fluxing Agent Storage Silos (FLXSLO11, FLXSLO12) or the Carbon Storage Silo (CARBSLO1) as applicable. The unloading process will be controlled by bin vent filters on the silos. Alloys in aggregate form (9,800 tons/yr) will be brought in by truck and direct dumped into the partially enclosed (this pile is considered partially enclosed as it is surrounded on three sides by the Meltshop building) Alloy Aggregate Storage Pile (W61: 1,000 ft^2). There will be fluxing agent and carbon hoppers inside the MeltShop Building that will store the material prior to its introduction into the steel making process.

The following is a table of the proposed feedstock and raw material storage piles/silos at the CMC Steel West Virginia facility:

Table 2: Feedstock and Raw Material Storage

Emission Unit ID	Emission Point ID	Description	Material	Base Area or Size	Annual T-put (tons)	Control Method(1)
W51A	W51A	ECS Storage Pile A	Scrap	16,600 ft^2(2)	3,380,000	PE(3)
W51B	W51B	ECS Storage Pile B	Scrap			PE(3)
W51C	W51C	ECS Storage Pile C	Scrap			PE(3)
W51D	W51D	ECS Overage Storage Pile	Scrap	12,100 ft^2	2,145,000	None
W51E	W51E	Rail Storage Pile A	Scrap	36,400 ft^2(2)	715,000	None(4)
W51F	W51F	Rail Storage Pile B	Scrap			
W51G	W51G	Rail Storage Pile C	Scrap			
W51H	W51H	Rail Storage Pile D	Scrap			
W51K	W51K	Truck Storage Pile A	Scrap	36,400 ft^2(2)	715,000	None(4)
W51L	W51L	Truck Storage Pile B	Scrap			
W51M	W51M	Truck Storage Pile C	Scrap			
W51N	W51N	Truck Storage Pile D	Scrap			
W61	W61	Alloy Aggregates Storage Pile	Alloys	1,000 ft^2	9,800	PE(5)
W81	W81	Residual Scrap Storage Pile	Scrap	21,200 ft^2	2,800	None(4)
FLXSLO11	FLXSLO11	Fluxing Agent Storage Silo 1	Flux	250 ton	35,500	BV
FLXSLO12	FLXSLO12	Fluxing Agent Storage Silo 2	Flux	250 ton		BV
CARBSLO1	CARBSLO1	Carbon Storage Silo 1	Carbon	250 ton	16,500	BV

(1) BV = Bin Vent Filter; PE=Partial Enclosure

(2) The aggregate foot-print area of all listed storage piles must be within this limit. Although listed as specific number of emission points in the permit application, there is no limit on the number of individual piles within each listed grouping.

(3) These storage piles are open bays inside the ECS Building with overhead cover.

(4) Required to minimize drop heights onto these piles pursuant to 4.1.3(c)(1). Scrap storage is not considered a high dust probable source.

(5) This pile is considered partially enclosed as it is surrounded on three sides by the Meltshop building.

Meltshop

The primary steel making process, including the melting of scrap, the removal of impurities, and the casting of the steel occurs in the Meltshop Building. The melting process occurs in one (1) 234,000 lbs/hr (117 TPH) 30 mW (peak 36mW) EAF that will be charged with scrap metal to produce up to a maximum of 650,000 tons/year of steel as cast. Electric arc steelmaking uses high-current electric arcs to melt steel scrap and convert it into molten steel of a specified chemical composition and temperature (as opposed to using coke ovens or blast furnaces at older conventional steel mills).

During the first use of the EAF, after a period of downtime (cold start), and at other times due to operational considerations, loading of scrap metal into the EAF will be accomplished using charge buckets, which are transported into position over the EAF using overhead cranes. Once in position, the charge bucket bottom will open, allowing scrap to fill the EAF. After the first heat of molten steel is made, scrap for subsequent heats (steady-state operation) will be fed to the EAF using the ECS. The ECS - which uses a sealed conveyer to charge scrap directly to the EAF - will allow for the continuous feeding of scrap to the EAF without opening the furnace, which will result in better energy and emissions efficiency as the furnace roof will not be needed to be opened (during normal operations) and the emissions control system can continue to pull emissions directly to the EAF Baghouse. Heat is provided to the furnace during both cold starts and during steady-state operations by electrical power.

During steady-state operations, furnace electrodes are used to transfer energy to the metal to raise the temperature to approximately 3,000 degrees Fahrenheit (°F) inside the furnace. Pursuant to requirements in 40 CFR Subpart AAa, CMC has proposed the use of a direct-shell evacuation control system (DEC system) for control of particulate matter emissions from the EAF and a similar system for the LMS (from this point on the DEC system will refer to both evacuation systems). A DEC system is one that maintains a negative pressure within the EAF/LMS above the molten metal and ducts emissions directly to the control device - in this case a pulse jet fabric filter baghouse (BH1) - when the furnace roof is closed.

EAF emissions are generated during charging, melting, and tapping. During EAF charging (limited through the use of the ECS), when the furnace roof is open and the DEC is not being utilized, particulate matter emissions are controlled by a canopy hood over the EAF/LMS that is designed to capture the offgases emitted by the EAF/LMS (or that are not captured by the DEC when it is engaged and the furnace roof is closed). The canopy hood also evacuates the captured offgases to the EAF Baghouse. Emissions that are not captured by the DEC system or the canopy hood are potentially released as fugitives from the Meltshop building openings.

The DEC is designed to capture a minimum of 95% of the potential emissions when the furnace roof is closed and the canopy hood is also designed and maintained under negative pressure to capture 95% of potential emissions that escape from the DEC when engaged or during times the furnace roof is open. The Meltshop building will also provide an additional capture efficiency of 90% for particulate matter emissions (they will fall out inside the building). Therefore, during times when the DEC is engaged and the roof is closed, the total particulate matter capture efficiency would be calculated at 99.975%, and during times the DEC is not engaged and the furnace roof is open it would be calculated at 99.50%.

During the melting and refining processes that will take place in the EAF, raw materials such as fluxing agents, coal or coke, and oxygen will be added to the molten steel in order to achieve the desired product chemistry and promote the formation of slag. Slag is a product of steelmaking, and is a complex solution of silicates and oxides that solidifies upon cooling. While traditional EAFs utilize oxyfuel burners to heat scrap that is piled up inside the EAF in combination with injectors, ECS EAFs use only injectors. The two injectors for the proposed EAF will utilize natural gas to create a flame "shroud" in order to improve the effectiveness of the injected oxygen, as needed. During a cold startup (which is expected to occur once per week as part of scheduled maintenance), the charged scrap is deposited in the EAF and electrical power will be applied to induce arcing that will increase the temperature of the scrap to beyond the steel melting point. As the scrap melts, the injectors will inject oxygen protected by the natural gas "shroud." After the startup sequence that uses electrical energy, the operation will be similar or the same as a normal heat and will utilize the injectors to inject oxygen. Oxygen will be supplied to the EAF using either on-site liquid oxygen or produced onsite by an air separation unit (does not produce air emissions).

When the steel melting in the EAF is complete, the contents of the furnace will be poured (tapped) into a refractory-lined chamber (ladle) which will transport the molten steel to the 234,000 lbs/hr (117 TPH) Ladle Metallurgy Station (LMS1) for further refining via a ladle car. After most tappings, a heel of molten steel is left in the furnace in order to assist in the melting of the subsequent scrap steel charges and to prevent damage to the furnace from thermal and mechanical shock during the next charge. The molten heel is, however, periodically also tapped out of the furnace so that the refractory lining can be inspected and repaired if needed. After this occurs, a cold startup is required.

In the LMS, the steel will be subjected to additional heating by electrical energy in order to maintain its molten state and will be further refined again with the injection and mixing of fluxing agents, carbon, and alloys into the molten steel. Once reaching the desired temperature and composition (dependent on the physical properties of the desired product), the ladle will transport the molten steel to the continuous casting machine. During transportation, the ladle uses (2) 8.00 mmBtu/hr natural gas/propane-fired Ladle Dryers (aggregated as LD1) and three (3) 6.00 mmBtu/hr natural gas/propane-fired Ladle Preheaters (aggregated as LPH1). As noted, the LMS will have a roof and evacuation system similar to the DEC to capture emissions and send them to the EAF Baghouse. In addition to LMS roof and evacuation system, the main canopy hood will also capture offgases from the LMS.

As noted, after reaching the desired composition in the LMS, the ladle is transported to the Continuous Caster (CAST1). During casting, steel flows out of the bottom of the ladle via a slide gate into a tundish. The steel is drained out of the bottom of the ladle into the tundish until the ladle is nearly empty. However, a small volume of residual steel remains in the ladle and is removed (known as a "skull"). Additionally, steel is drained out of the bottom of the tundish into the casting machine until the tundish is nearly emptied of steel. Slag with some residual steel that may remain in the tundish (also known as a "skull") is also removed. Skulls are collected and broken up by the Ball Drop Crusher (CR1) to be reprocessed.

"Teeming" emissions occur when the ladle is transported from the LMS to the caster to transfer the molten steel to the tundish. These caster teeming emissions are fugitive in nature and are emitted from the caster vent (CV1). A tundish is a holding vessel used to ensure continuous casting while ladles are switched out. From the tundish, the molten steel flows into a water-cooled caster mold. As the steel travels through the mold, it is cooled further and formed into an octagonal cross section (billet) shape. The billets then enter the induction furnace (an induction furnace is an electrical furnace in which the heat is applied by induction heating of metal) to be prepared for rolling in the Rolling Mill.

Natural gas/propane-fired units in this process include the two (2) 6.00 mmBtu/hr Tundish Preheaters (aggregated as LPH1), one (1) 6.00 mmBtu/hr Tundish Dryer, one (1) 1.00 mmBtu/hr Tundish Mandril Dryer, and one (1) 0.5 mmBtu/hr Shroud Heater. The LMS and Tundish dryers are used to dry the refractory materials that will line the ladles and tundishes, as these must be dried completely prior to steel production. The LMS and Tundish heaters are used to preheat the units prior to the transfer of molten steel in order to prevent heat losses. Some percentage of the combustion emissions generated during preheating and drying of the ladles and tundishes will be captured by the canopy hood and routed to the EAF Baghouse. The emissions not captured by the hood will be emitted from the caster vent (CV1).

A low-density mixture of impurities (slag) forms on the surface of the molten metal in the EAF and LMS during the melting and refining processes. The slag formed in the EAF will be emptied by tipping the EAF to the side and allowing the hot slag to be poured into a pile within the meltshop building. The slag will be subsequently removed from the pile using a front-end loader, cooled or quenched, and transported to an outdoor storage pile (W71A) before being processed on-site in the Slag Processing Plant (SPP).

"Refractory" is the layer of bricks and used in the EAF, LMS, and Tundishes. For the EAF, the refractory will be changed periodically and, for the ladles and tundishes, occasional refractory repairs and replacements will also be required. This will involve the use of organic binding agents (binder) to hold the refractory bricks in place. Some of the emissions from binder evaporation and combustion will captured by the canopy hood but CMC has conservatively estimated that all the emissions from binder use (12.03 tons/yr) will be emitted form the caster vent (CV1) as fugitive emissions. When the refractory is replaced or repaired, spent refractory will be recycled or disposed of, along with other various wastes generated in the steel production process.

In addition to the above mentioned combustion devices, the Meltshop will have an additional 8.00 mmBtu/hr of natural gas/propane-fired HVAC units to provide comfort heat. These HVAC units will vent inside the Meltshop and be released from the caster vent (CV1). EAF dust collected in the EAF Baghouse will be pneumatically transferred to the 190 ton EAF Baghouse Dust Silo (DUSTSLO1) which is equipped with a fabric filter bin vent (DUSTSLO1-BV). The dust will be loaded into trucks to be transported to off-site disposal or reclamation facilities.

Rolling Mill, Cooling Beds, & Spooler

After continuous casting, the steel is conveyed through the 234,000 lbs/hr (117 TPH) Rolling Mill (RMV1), which is a series of rolling stands that reduces the cross-sectional area and hot-forms the final rolled steel shape (such as rebar, which is expected to be the primary product at the facility). The rolling process is wet (water is continuously applied at the rolling stands) and is, therefore, not expected to generate any substantive amount of particulate matter emissions. A 0.23 mmBtu/hr natural gas/propane-fired Bit Furnace (BF1) is used to heat sample bars (or bits) and run them through a pass to check size prior to rolling. A general exhaust vent is located on the Rolling Mill Building (RMV1) to remove any particulate matter that is generated in the building. Although, as noted, the process is wet in nature and no substantive emissions are expected.

The rolled steel that exits the Rolling Mill is directed to the Cooling Beds (CBV1). The rolled steel will either first receive an initial water quench or be moved directly along the length of the bed, without this initial quench, allowing time and space to cool in the ambient air. After sufficient cooling, the steel and is then either sheared to length or sent to the "Spooler." Vents are located above both the Cooling Beds (CBV1) and the Spooler (SV1) that are for the primary purpose of heat evacuation. Steel spools are one of the primary finished products and are formed when rolling equipment further reduces the dimension of the steel rod into wires of different diameters. However, instead of being cut into different lengths, the produced wire is spooled into coils. Mill scale, which is a type of iron oxide that is formed on the surface of the steel during the rolling process, is removed in the cooling beds using water and transported to the Mill Scale Storage Pile (W111: 3,500 ft^2) for eventual disposal.

Finishing and Transportation

After the products have cooled, automated bundling systems will prepare the unspooled products in applicable packaging. Overhead cranes or forklifts will be used to transport materials, including the spooled products, to storage areas or directly to customer trucks or railcars.

Slag Processing

As discussed above, a material called slag (a hard, stony material) is formed as fluxing agents are added to the molten steel bath to remove impurities. This slag formation will occur in both the EAF and in the LMS when additional impurities are removed from the molten steel. The slag will be subsequently removed from the Meltshop and transported to an outdoor storage pile (W71A: 29,100 ft^2) before being processed on-site in the 100 TPH Slag Processing Plant (SPP). From the storage pile, the slag shall be processed in two screens, the 15 TPH Slag Triple Deck Metallics Screen (MTLSCR) and the 15 TPH Slag Triple Deck Non-Metallics Screen (NOMTLSCR). Then, with the use of six (6) belt conveyers (TR11B7 through TR11B12), the screened slag will be classified into six (6) slag product storage piles (W71B1 through W71B7: 74,100 ft^2 total). The SPP will have the capacity to process up to 65,000 TPY of slag. The slag product shall then be either used on site as a grading material for unpaved roadways/mobile work areas or sold for off-site use and/or otherwise removed from the site for disposal. CMC shall, for the SPP, ensure that the slag is maintained with a moisture level that is sufficient to mitigate the substantive fugitive escape of particulate matter. The following table contains a list of the storage piles associated with the SPP and the Mill Scale Storage Pile (not listed elsewhere).

Table 3: Slag/Mill Scale Storage Piles

Emission Unit ID	Emission Point ID	Description	Material	Base Area or Size	Annual T-put (tons)	Control Method
W71A	W71A	SPP Slag Storage Pile	Slag	29,100 ft^2	182,000	None(1)
W71B1	W71B1	SPP A-Scrap Storage Pile	Slag	74,100 ft^2(2)	182,000	None(1)
W71B2	W71B2	SPP B-Scrap Storage Pile	Slag			None(1)
W71B3	W71B3	SPP C-Scrap Storage Pile	Slag			None(1)
W71B4	W71B4	SPP Products Pile 1	Slag			None(1)
W71B5	W71B5	SPP Products Pile 2	Slag			None(1)
W71B6	W71B6	SPP Products Pile 3	Slag			None(1)
W71B7	W71B7	SPP Overs Pile	Slag			None(1)
W111	W111	Mill Scale Storage Pile	Mill Scale	3,500 ft^2	9,800	None

(1) CMC must, however, minimize all slag drop points and maintain sufficient moisture content in the slag pursuant to 4.1.3(c)(3) of the draft permit.
(2) The aggregate foot-print area of all listed storage piles, there is no limit to the number of piles within each grouping of piles.

Natural Gas/Propane Combustion Units

The proposed facility includes various natural gas or propane-fired combustion units providing direct process heat and indirect heat in many areas of the plant. The facility may need to use propane if significant a volume of natural gas is not available when the facility is started up. As noted above, some of the units emit directly inside the Meltshop where some fraction of the emissions gets pulled into the canopy hood and emitted from the EAF Baghouses. However, to be conservative, all combustion exhaust emissions are assumed to be emitted from the caster vent (CV1). The following table identifies all the proposed combustion devices (with the exception of the Emergency Engines):

Table 4: Natural Gas/Propane Combustion Devices

Emission Unit ID(s)	Emission Point ID(s)	Number of Units	Unit Description	MDHI(1) (mmBtu/hr)	MDHI(2) (mmBtu/hr)
LPH1	CV1(3)	3	Ladle Preaheaters	6.00	18.00
LD1	CV1(3)	2	Ladle Dryers	8.00	16.00
TPH1	CV1(3)	2	Tundish Preheaters	6.00	12.00
TD1	CV1(3)	1	Tundish Dryer	6.00	6.00
TMD1	CV1(3)	1	Tundish Mandril Dryer	1.00	1.00
SRDHTR1	CV1(3)	1	Shroud Heater	1.00	1.00
MSAUXHT	CV1(3)	20	Meltshop Comfort Heaters	0.40	8.00
BF1	RMV1	1	Bit Furnace	0.23	0.23

Emission Unit ID(s)	Emission Point ID(s)	Number of Units	Unit Description	MDHI(1) (mmBtu/hr)	MDHI(2) (mmBtu/hr)
RMAUXHT	RMV1	20	Rolling Mill Comfort Heaters	0.40	8.00
TORCH1	TORCH1	1	Scrap Cutting Torches	0.32	0.32

(1) Individual unit MDHI.
(2) Aggregate MDHI of all specified units. Aggregate MDHI of all units facility-wide = 70.00 mmBtu/hr.
(3) Some of the emissions from these units may get pulled into the canopy hood and emitted from the EAF Baghouse (BH1), but to be conservative, CMC has estimated all the emissions will be fugitive in nature and exist the Meltshop building through the caster vent (CV1).

Auxiliary Processes/Equipment

Storage Tanks

CMC has proposed the use of three (3) fixed roof storage tanks 500 gallons or larger as shown in the following table. The only VOL stored will be diesel for use in the Emergency Generator, Fire-Water Pump, and for use in vehicles. The maximum annual throughput of diesel at the facility will be 300,000 gallons/yr.

Table 5: Storage Tanks Information

Tank ID(s)	Material Stored	Tank Size (gallons)	Throughput (gallons/yr)	Pollutant	BACT	Subpart Kb?(1)
DSLTK-GEN1	Diesel	500	5,000	VOCs	See 4.1.6(d)	N
DSLTK-FWP1	Diesel	500	5,000	VOCs		N
DSLTK-VEH	Diesel	5,000	50,000	VOCs		N

(1) Shows if the requirements of 40 CFR 60, Subpart Kb are applicable to the storage tank.

Emergency Engines

CMC has proposed the use of one (1) 1,600 horsepower (hp) diesel-fired Emergency Engine (EGEN1) to generate backup power at the facility in the event of a power disruption and one (1) 300 horsepower (hp) diesel-fired Emergency Fire Water Pump (EFWP1). The specific make and model of these engines has not yet been determined, but they will not exceed the hp as listed and will be diesel-fired.

Cooling Towers

CMC has proposed the use of three (3) Cooling Towers, each with two cooling cells, that will provide contact (CTNC11, CTNC12) and non-contact (CTC1) cooling water to various processes throughout the mill. A cooling tower extracts waste heat into the atmosphere through the evaporative cooling of a water stream to a lower temperature. A direct contact (or open-circuit) cooling tower (DCW) operates by having the cooling water come into direct contact with the material being cooled. A non-contact (or closed-circuit) cooling tower (ICW) operates without the cooling water coming into direct contact with the material being cooled. Emissions are possible with cooling towers as particulate matter may become entrained with the water droplets of the vapor cloud as it released into the ambient air. Each of the Cooling Towers will be constructed with a high efficiency drift eliminator (rated to limit the vapor escape of only 0.001% of the total water vapor) to mitigate the drift of the entrained droplets (BACT control technology). The Cooling Towers proposed for the facility are shown in the following table:

Table 6: Cooling Tower Information

Emission ID No.	Emission Point ID No.	Description	Max Design Capacity Water Circulation Pump (gal/min)
CTNC11	CTNC11a	Non-Contact Cooling Tower 1 - Cell 1	11,000 gpm
	CTNC11b	Non-Contact Cooling Tower 1 - Cell 2	11,000 gpm
CTNC12	CTNC12a	Non-Contact Cooling Tower 2 - Cell 1	11,000 gpm
	CTNC12b	Non-Contact Cooling Tower 2 - Cell 2	11,000 gpm
CTC1	CTC1a	Contact Cooling Tower - Cell 1	5,500 gpm
	CTC1b	Contact Cooling Tower - Cell 2	5,500 gpm

Haulroads and Mobile Work Areas

The proposed facility will include paved and unpaved haulroads and mobile work areas. The total on-site road distance is calculated to be an aggregate of 11.31 miles as broken up into nineteen (19) different sections (some sections contain both paved and unpaved segments). The roads will be vacuum swept (paved) and watered (paved and unpaved) as needed to mitigate the emissions of road dust from their use.

SITE INSPECTION/IVESTIGATION

On February 28, 2023, the writer conducted an inspection of the proposed location of CMC's West Virginia Steel Mill. The proposed site is located along DuPont Road (County Route 14) in Berkeley County, WV approximately 6.78 miles north-northeast of the Martinsburg City Hall. The writer was accompanied on the inspection by Mr. Rex Compston of the WVDAQ and was met at the site by Mr. Alan Gillespie of CMC. Information concerning the site is given in the following:

- The proposed location was the former site (Potomac River Works Plant) of an explosives manufacturing facility operated by DuPont from 1953 until 1994, when all explosives manufacturing ceased. In 1999, the USEPA issued a Resource Conservation and Recovery Act (RCRA) Corrective Action Permit (WVD041952714) to DuPont to begin the process of site cleanup and remediation. On September 29, 2017, USEPA gave the site the status code "Ready for Anticipated Use," and notes that the "Solution for the Cleanup has been Implemented." Information on the history and cleanup activities of this site is located at the following EPA websites:

  https://www.epa.gov/hwcorrectiveactioncleanups/hazardous-waste-cleanup-fasloc-incorporated-potomac-river-plant-formerly https://ordspub.epa.gov/ords/cimc/f?p=CIMC:RCRA:::::P14_RCRA_HANDLER_ID:WVD041952714

- After Dupont ceased manufacturing explosives, they continued to manufacture and assemble Fasloc cartridges (non-explosive roof bolt grouting systems used in mining and construction) at the site. This operation continued under several different entities including DSI Underground Systems which was operating the facility until it was permanently shutdown in 2016. No manufacturing operations have been on-going at the site since that time;

- The Potomac River Works site (also know as the "Falling Waters" site) is a 1,200 acre property currently listed as available for proposed development by the West Virginia Department of Economic Development - the following is a link to information on their website (you must use the map search function to get to the site):

  https://westvirginia.gov/available-sites/;

- As noted, the proposed location is approximately 6.78 miles north-northeast of the Martinsburg City Hall (and approximately 5.25 miles from the northern most city limits boundary). Residential areas extend north and south from downtown Martinsburg along Interstate 81 and include several unincorporated communities to the north of Martinsburg such as Hainesville and Bedington, and the census-designated place (CDP) of Falling Waters. There is a large subdivision-type development that begins and extends to the west approximately 0.50 miles west of the facility. It is in this development, at the eastern edge, where the closest occupied residence is located (0.40 miles). Just north of this residential area and also approximately 0.50 miles west of the facility is located the Spring Mills Educational Complex that includes the Spring Mills Primary, Middle, and High Schools;

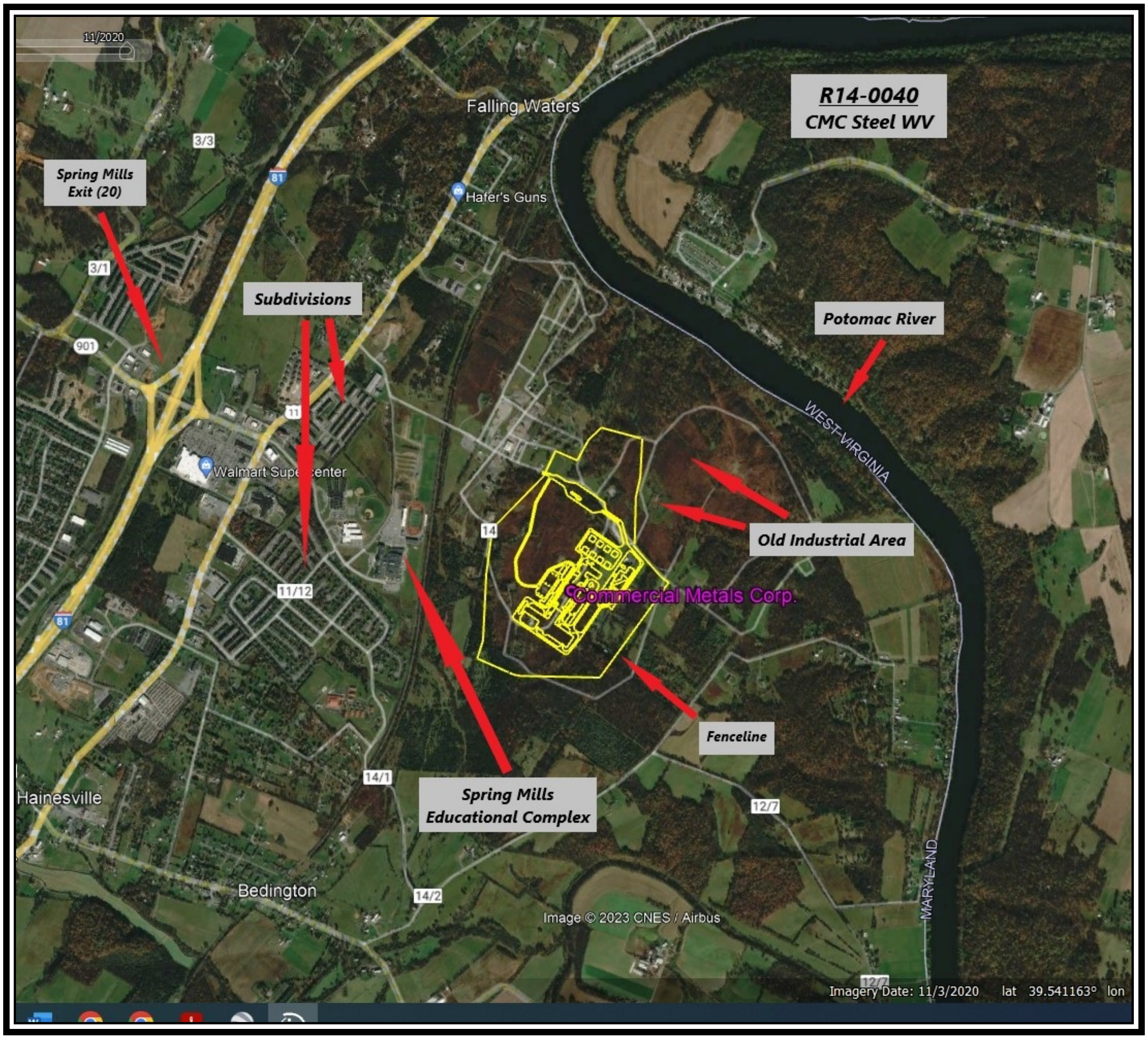
- The topography of the area is generally low rolling hills extending to the north, east and south. The hills in these directions generally do not exceed 520 feet above sea level, and only about 200 feet above the level of the Potomac River. The river runs roughly in a north-to-south direction east of the location and at its closest is approximately a mile to the east-northeast. To the west, as mentioned, the topography flattens out and is dominated by residential, commercial, and industrial development;

- There is significant existing commercial and industrial development in Berkeley County around Martinsburg, including the Quad Graphics printing and publishing facility located approximately 4.00 miles to the west-southwest of the proposed CMC location. Additionally, located south of Martinsburg are the additional manufacturing facilities owned by Argos Cement, Continental Brick, QG Printing, Proctor & Gamble, and Knauf Insulation;

- The site itself is indicative of a former industrial site overgrown with heavy vegetation and now interspersed with fields and hedgerows where the explosives and explosive materials were stored on-site. Small roads, old buildings, and bunkers that serviced the explosive manufacturing facility remain throughout the site. The immediate topography of the proposed plant site appears to be in a natural bowl slightly hidden from, most significantly, the populated areas to the west by a small rise. It is expected that this natural ridge will obscure much of the plant from western view save for the top of the EAF Baghouse stack if seen from a higher vantage point; and

- At the time of the inspection, there was no construction activity seen. Only survey stakes were visible around the site. No cleanup and site preparation activities had begun either, which will be extensive.

The following is labeled satellite imagery of the proposed site of the CMC Steel West Virginia facility. Additional pictures of the site taken on the day of the site inspection are included as Attachment C.



Directions: [Latitude/Longitude: 39.53829/-77.88892] From the junction of the Williamsport Pike (US Route 11) and Dupont Road (County Route 14), travel east approximately 0.70 miles on Dupont Road to get to the western edge of the proposed location.

AIR EMISSIONS AND CALCULATION METHODOLOGIES

CMC included as Attachment N in the permit application detailed air emissions calculations for the proposed CMC Steel West Virginia facility. The following will summarize the calculation methodologies used by CMC to calculate the PTE of the proposed facility. See Attachment N in the permit application for the complete and detailed PTE calculations.

Material Handling

Emissions of particulate matter may occur from the unloading, transporting, conveying, screening, crushing, and storing of raw materials, collected baghouse material, and slag and other by-products of the steel making process. Where these emission sources (silos) are controlled by fabric filters, the filterable particulate matter emission estimate for the controlled source was based on the maximum outlet concentration of the filter. For uncontrolled emission sources, or where controlled through the use of enclosures or wet suppression, uncontrolled emissions were calculated using the appropriate section of AP-42 (AP-42 is a database of emission factors maintained by USEPA) or from other acceptable guidance. Controlled emissions were then calculated using a reasonable control efficiency based on the type of enclosure or other mitigating factor. See the following table for the source of various material handling emission factors used by CMC:

Table 7: Material Handling PM Emission Factor Sources

Emission Source	Material	Emission Factors Source	Notes
Truck/Rail/Endloader Dumping Conveyer Transfer Points & Other Drops	Scrap Alloy Aggregates Slag Mill Scale	AP-42, Section 13.2.4 (11/06)	Emission factor calculation includes material moisture content and average wind speed. Final emission factor adjusted for fines content.(1)
Ball Drop Crushing	Sculls	AP-42, Table 11.19.2-2 (8/04)	Tertiary Crushing Factor (controlled)(2)
Slag Screening	Slag	AP-42, Table 11.19.2-2 (8/04)	Screening Factor + Drop (controlled)(2)(3)
Open Storage	Scrap Alloy Aggregates Mill Scale Slag	WV G4-0C General Permit Guidance	G-40B Guidance based on emission factor given in Air Pollution Engineering Manual © 1992 pp. 136 & References.
Paved Haulroads & Mobile Work Areas	n/a	AP-42 Section 13.2.1 (1/11)	Based on average truck weights, surface material silt content, and number of precipitation days. A control percentage of 96% was used for sweeping/watering.
Unpaved Haulroads & Mobile Work Areas	n/a	AP-42 Section 13.2.2 (11/06)	Based on average truck weights, surface material silt content, and number of precipitation days. A control percentage of 70% was used for watering as per WVDAQ's General Permit G40-C Instructions Table A.
Sources Controlled by Fabric Filters	Carbons, Fluxing Agents, EAF Baghouse Dust	Maximum Outlet Loading Concentration(3)	Calculated with maximum outward airflow.

(1) Uses applied control percentages from the WVDAQ's General Permit G40-C Instructions Table A as applicable.
(2) Pursuant to AP-42, Section 11.19.2, controlled factors should be used in inherent moisture content of material is anywhere from 0.55% to 2.88%. The moisture content of these materials, according to the permit application, fall within this range.
(3) Uses controlled emission factor and adjusts for fines content as provided for in AP-42, Section 11.19.2.
(4) As based on vendor information or vendor guarantees.

For sources not controlled by a fabric filter, maximum hourly emissions were based on the worst-case hourly throughput (either as limited by a reasonable maximum based on the configuration of the plant or by the capacity of the unit) and, unless otherwise noted, annual emissions were based on a reasonable worst-case estimate of annual throughput. Maximum hourly emissions from the fabric filters/baghouses were based on the maximum expected airflow through the units (in dcfm) and annual emissions were based on the expected annual hours of operation of the unit. Where appropriate, CMC adjusted the emission rates of PM_{10} and $PM_{2.5}$ as based on appropriate particle size distribution.

EAF/LMS

The melting and casting process in the Meltshop Building is the primary source of emissions at the facility and, therefore, has a complex pollutant capture and control system that results in two main emission points: the EAF Baghouse (BH1) and the Caster Vent (CV1). The methodology for calculating and allocating the emissions from these sources are discussed below.

Particulate Matter Emissions

As noted above, particulate matter emissions are generated during the charging, melting, tapping, and casting processes. The majority of the emissions occur during melting when electrodes are in lowered into the EAF and LMS. However, emissions also occur at all times a molten steel bath is present in the EAF or LMS and as the steel is shaped in the casters. Pursuant to requirements in 40 CFR Subpart AAa, CMC has proposed the use of a direct-shell evacuation control system (DEC system) for control of particulate matter emissions from the EAF. A DEC system is one that maintains a negative pressure within the EAF above the slag or molten metal and ducts emissions to the control device - in this case a pulse jet fabric filter baghouse (BH1). The DEC is designed to achieve a minimum capture efficiency of 95% of all potential particulate matter emissions when the furnace roof is closed. The furnace roof is always closed (and DEC is engaged) when the electrodes are lowered into the EAF and during normal operations when the ECS is charging scrap into the EAF. Additionally, the LMS will have a roof and evacuation system as well (which is also always on the unit when the electrodes are engaged) to pull emissions into the EAF Baghouse. This roof system, while technically not the “DEC” (as defined under Subpart AAa), functions in the same manner and is also designed to achieve a minimum capture efficiency of 95% of all potential particulate matter emissions when the furnace roof is closed. In the following, for simplicity, both the DEC and the LMS roof (with evacuation system) together will be referred to as the DEC.

The Meltshop also includes a negative pressure canopy hood that is located over the EAF and LMS to capture any particulate matter that is not captured by the DEC. The canopy hood is designed to capture a minimum of 95% of the potential particulate matter emitted by the units and not captured by the DEC, or during times of charging when either unit’s roof is open (which will be minimized through the use of the ECS). The canopy hood also evacuates the captured particulate matter to the EAF Baghouse.

Particulate matter that is not captured by the DEC or the canopy hood is potentially released as fugitives from the Caster Vent (CV1). The Caster Vent is designed to vent heat generated from the Meltshop activities and will also, therefore, vent any remaining particulate matter that is not captured and sent to the EAF Baghouse. The enclosed Meltshop building, when openings are properly mitigated, is able to control 90% of the potential fugitive emissions. These emissions are considered to "fall out" inside the building and are not released from CV1. Therefore, during times when the DEC is engaged and the roof is closed, the total particulate matter *capture efficiency* would be calculated at 99.975% and during times the DEC is not engaged and the furnace roof is open it would be calculated at 99.50%. The capture efficiency in this context is used only to determine the amount of fugitive particulate matter that is emitted from CV1 - the particulate matter emissions from the EAF Baghouse are (as calculated) independent of the capture efficiency as the emissions from the EAF Baghouse stack are based on a worst-case calculation using outlet grain loading and exhaust flow rate.

Based on the configuration of the Meltshop as described above, there are two (2) emission points: EAF Baghouse (BH1) and the Caster Vent (CV1). While some particulates may be emitted from other Meltshop building openings, based on mitigation procedures in effect and the configuration of the equipment, it is expected that nearly all of the fugitive emissions generated in the Meltshop building will be emitted from CV1. The particulate matter emissions from the EAF Baghouse, as noted above, is based on the outlet grain loading of the control device (PM - 0.0018 gr/dscf, $PM_{2.5}/PM_{10}$ - 0.0052 gr/dscf) and is not, as calculated therefore, a function of the capture efficiency of the particulate matter collection system. These limits are based on vendor guarantees that in turn are based on the emission limits given in 40 CFR 60, Subpart AAa and 40 CFR 63, Subpart YYYYY. Maximum hourly emissions from these emission points are then based on the volumetric flow rates being pulled through each of the baghouses when the EAF is being operated at the normal maximum production rate of 117 tons-steel (cast)/hr. The annual emissions from these emission points are then conservatively based on the operation of the EAF Baghouse at that volumetric flow rate for 8,760 hours/yr.

The amount of fugitive particulate matter emissions generated in the EAF/LMS and that are ultimately emitted from the Caster Vent are a function of the particulate matter capture efficiencies as described above. However, based on information submitted by CMC in the permit application, there is a reasonable expectation that the intensity of the particulate matter emissions during times the electrodes are being used (and when the DEC is engaged) is much higher (at least an order of magnitude) than those time the DEC is not engaged. Therefore, the worst-case emissions may be based only on times the DEC is engaged and the total capture efficiency is 99.975%, and the fugitives emitted during the times the DEC is not engaged may be disregarded for the purposes of these calculations.

Therefore, to calculate the maximum hourly fugitive emissions from the EAF/LMS, CMC back-calculated the aggregate amount of uncontrolled emissions from the units by using the EAF Baghouse emissions rates. This back-calculation used a baghouse capture efficiency of 98% and the capture efficiencies noted above. Then, using the uncontrolled emissions, CMC calculated the amount of fugitive emissions again using the capture efficiencies noted above during times when the DEC is engaged - per the intensity analysis referenced above. The maximum annual emissions were based on the maximum hourly emissions and 8,760 hours/year.

The emissions of Lead (Pb) and Fluoride (F) from the EAF/LMS Baghouses are based on emission factors (0.0016 lb-Pb/ton-steel and 0.0100 lb-F/ton-steel, respectively) that are in turn based on process knowledge/engineering estimates (Pb) and the BACT determination (F) for these pollutants. The emission factors of other potential metal particulates (HAPs) from the EAF/LMS are also based on process knowledge/engineering estimates: Antimony (4.98 x 10^{-5} lb/ton-steel), Arsenic (1.10 x 10^{-5} lb/ton-steel), Beryllium (1.29 x 10^{-5} lb/ton-steel), Cadmium (2.10 x 10^{-4} lb/ton-steel), Chromium (7.53 x 10^{-4} lb/ton-steel), Colbalt (4.53 x 10^{-5} lb/ton-steel), Manganese (3.72 x 10^{-3} lb/ton-steel), Mercury (6.20 x 10^{-4} lb/ton-steel), Nickel (4.36 x 10^{-5} lb/ton-steel), and Selenium (2.74 x 10^{-5} lb/ton-steel).

The maximum hourly emissions of these pollutants from the EAF Baghouse were based on the emission factors and a steel production rate of 117 tons-steel/hr and the maximum annual emissions were based on the emission factors and an annual production rate of 650,000 tons-steel/year. As with particulates, the allocation of the emissions (either from the EAF Baghouse stack or emitted as a fugitive from CV1) of Lead, Fluoride, and other metals followed the same calculation methodology as given above for the other particulates including the applicable capture and control percentages. The substantive particulate matter emissions from the EAF/LMS are given in the following table:

Table 8: EAF/LMS Particulate Matter Emissions

Baghouse Efficiency =	***98%***		***EAF/LMS Maximum Hourly Production =***	***117***	***tons/hr***
DEC Efficiency =	***95%***				
Canopy Hood Efficiency =	***95%***		***EAF/LMS Maximum Annual Production =***	***650,000***	***tons/yr***
Building Efficiency =	***90%***				
EAF Baghouse Max Flow Rate =	***671,192***	***dcfm***			

Metric	**Pollutant**							
	$PM_{2.5}/PM_{10}/PM_{TOT}$		**PM_{FILT}**		**Lead**		**Fluorides**	
EAF Baghouse Emission Limit	*0.0052*	*gr/dscf*	*0.0018*	*gr/dscf*	*0.0016*	*lb/ton*	*0.010*	*lb/ton*
EAF Stack Hourly Emission Rate	**29.92**	**lb/hr**	**10.36**	**lb/hr**	**0.19**	**lb/hr**	**1.17**	**lb/hr**
EAF Stack Annual Emission Rate	**131.03**	**ton/yr**	**45.36**	**ton/yr**	**0.52**	**ton/yr**	**3.25**	**ton/yr**
Pre-EAF Baghouse Emission Rate	*1,495.80*	*lb/hr*	*517.78*	*lb/hr*	*9.36*	*lb/hr*	*58.50*	*lb/hr*
Uncontrolled EAF/LMS Emission Rate	*1,499.55*	*lb/hr*	*519.07*	*lb/hr*	*9.38*	*lb/hr*	*58.65*	*lb/hr*
Hourly Fugitive Emission Rate	**0.37**	**lb/hr**	**0.13**	**lb/hr**	**0.0023**	**lb/hr**	**0.0147**	**lb/hr**
Annual Fugitive Emission Rate	**1.64**	**ton/yr**	**0.57**	**ton/yr**	**0.0065**	**ton/yr**	**0.0407**	**ton/yr**

Non-Particulate Pollutants

Like the particulate matter emissions, the emissions of non-particulate pollutants (CO, NO_x, SO_2, VOCs, and GHGs) from the EAF/LMS are emitted from two (2) emission points: EAF Baghouse (BH1) and the Caster Vent (CV1). Different than the particulate matter emissions, however, the non-particulate pollutants do not benefit from any *control efficiency* based on capture and evacuation to the EAF Baghouse. The uncontrolled emission factors for each of the listed pollutants, except for GHGs, as emitted from the EAF Baghouse stack, are based on the selected aggregate (EAF/LMS) BACT emission rates (CO - 4.00 lb/ton-steel, NO_x - 0.30 lb/ton-steel, SO_2 - 0.30 lb/ton-steel, VOCs - 0.30 lb/ton-steel) for each pollutant. The DEC and the canopy hood have the same capture efficiencies (95%) for the gaseous pollutants that they have for the particulate matter emissions. However, the Meltshop building offers no control efficiency for the gaseous pollutants. The maximum hourly emissions again will occur during times when the DEC is engaged. For this reason, as with particulate matter, the fugitive emissions may be calculated by considering only times when the DEC is engaged and 99.75% of the uncontrolled gaseous emissions are captured and sent to the EAF Baghouse stack and only 0.25% of these emissions are emitted from the Caster Vent.

The maximum hourly emissions from EAF Baghouse were based on the emission factors and a steel production rate of 117 tons-steel/hr (with short-term safety factors for the appropriate pollutant averaging periods: NO_x - 1.3, CO - 2.0, SO_2 - 1.4) and the maximum annual emissions were based on the emission factors and an annual production rate of 650,000 tons-steel/year. The amount of fugitive gaseous emissions emitted from the Caster Vent were based on a back-calculation of the emissions (including the safety factors) produced at the EAF/LMS and then calculating the amount of these uncontrolled emissions that are not captured by the DEC or canopy hood (uncontrolled emission rate multiplied by 0.0025) and sent to the EAF Baghouse stack.

Greenhouse gases (GHGs) are collectively the air pollutant defined in 40 CFR 86, Section §86.1818-12(a)(1) as the aggregate group of six greenhouse gases: carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride (SF_6). GHGs are quantified by determining the CO_2 equivalent emissions (CO_2e) and are computed by multiplying the mass amount of emissions for each of the six greenhouse gases by the gas's associated global warming potential (GWP) published at Table A-1 of 40 CFR 98, Subpart A - "Global Warming Potentials."

The emissions of GHGs from the EAF/LMS occur from the carbon atoms (from the feedstock materials or from the natural gas injected into process) that are oxidized into CO_2. For this reason, the emission factor used to determine the CO_2 emission rate (and the equivalent CO_2e emission rate as the GWP of CO_2 is 1:1) was based on stack testing data from to existing CMC facilities: CMC Durant and CMC Mesa. The CMC Mesa facility is an ECS Micromill and is therefore very similar to the proposed CMC West Virginia facility. However, to determine the emission factor, CMC used the maximum emission rate tested at either facility (0.184 metric ton-CO_2/metric ton steel produced). As with the other gaseous pollutants, the maximum hourly CO_2 emissions from the EAF Baghouse were based on the emission factor and a steel production rate of 117 tons-steel/hr and the maximum annual CO_2 emissions were based on the emission factor and an annual production rate of 650,000 tons-steel/year. The allocation of the emissions (either from the EAF Baghouse stack or emitted as a fugitive from CV1) of CO_2 followed the same calculation methodology as given above for the other gaseous pollutants including the applicable capture and control percentages. The gaseous pollutant emissions from the EAF/LMS are given in the following table:

Table 9: EAF/LMS Gaseous Pollutant Emissions

Baghouse Efficiency =	*0%*		*EAF/LMS Maximum Hourly Production =*	*117*	*tons/hr*
DEC Efficiency =	*95%*				
Canopy Hood Efficiency =	*95%*		*EAF/LMS Maximum Annual Production =*	*650,000*	*tons/yr*
Building Efficiency =	*0%*				
EAF Baghouse Max Flow Rate =	*671,192*	*dcfm*			

Metric	**Pollutant**							
	CO		**NO_x**		**SO_2**		**VOCs**	
EAF/LMS BACT Limit	*4.00*	*lb/ton*	*0.30*	*lb/ton*	*0.30*	*lb/ton*	*0.30*	*lb/ton*
Safety Factor	2.00	x	1.30	x	1.40	x	1.00	x
EAF Stack Hourly Emission Rate	**936.00**	**lb/hr**	**45.63**	**lb/hr**	**49.14**	**lb/hr**	**35.10**	**lb/hr**
EAF Stack Annual Emission Rate	**1,300.00**	**ton/yr**	**97.50**	**ton/yr**	**97.50**	**ton/yr**	**97.50**	**ton/yr**
Pre-EAF Baghouse Emission Rate	*936.00*	*lb/hr*	*45.63*	*lb/hr*	*49.14*	*lb/hr*	*35.10*	*lb/hr*
Uncontrolled EAF/LMS Hourly Emission Rate	*938.35*	*lb/hr*	*45.74*	*lb/hr*	*49.26*	*lb/hr*	*35.19*	*lb/hr*
Uncontrolled EAF/LMS Annual Emission Rate	*1,303.26*	*lb/hr*	*97.74*	*lb/hr*	*97.74*	*lb/hr*	*97.74*	*lb/hr*
Hourly Fugitive Emission Rate	**2.35**	**lb/hr**	**0.11**	**lb/hr**	**0.12**	**lb/hr**	**0.09**	**lb/hr**
Annual Fugitive Emission Rate	**3.26**	**ton/yr**	**0.24**	**ton/yr**	**0.24**	**ton/yr**	**0.24**	**ton/yr**

Caster Teeming

Emissions from the transfer of (teeming) of molten steel from the ladles to the tundish may occur as the kinetic movement of the pouring the molten steel produces additional particulate matter and VOC emissions. Emission factors for these emissions in a continuous casting operation such as the proposed CMC facility will use are not available, so to calculate these emissions, CMC used the particulate matter emission factor (0.07 lb/ton) given in AP-42 Section 12.5 - "Iron And Steel Production," Table 12.5-1 for traditional ingot teeming. The VOC emission factor (0.002 lb/ton) was taken from the EPA Publication of the "Air Emissions Inventory Improvement Program (EIIP)," Volume 2 - Point Sources, Chapter 14 (July 2001).

In both cases, to account for the more enclosed nature of the CMC process and the use of water cooling during transfer, the traditional emission factors were reduced by 90%. To be conservative, however, no additional capture efficiency from the use of the canopy hood or the building enclosure was used. Therefore, all the emissions generated from caster teeming were assumed to be emitted from the Caster Vent (CV1). The maximum hourly and annual emissions from caster teeming were based on a maximum steel throughput of 117 tons/hr and 650,000 tons/yr.

The particulate matter emissions (all particulate matter emissions are assumed to be $PM_{2.5}$ or less and equal to PM_{FILT}) from caster teeming are calculated to be 0.82 lbs/hr and 2.28 tons/yr and the VOC emissions are calculated to be 0.023 lbs/hr and 0.065 tons/yr.

Binder Usage

As noted above, "refractory" is the layer of bricks and used in the EAF, LMS, and Tundishes. For the EAF, the refractory will be changed periodically and, for the ladles and tundishes, occasional refractory repairs and replacements will also be required. This will involve the use of organic binding agents (binder) to hold the refractory bricks in place. The use of these binding agents will result in small amounts of emissions during curing, evaporation, and some oxidation into CO during high temperature use. CMC has stated that the binder usage emission factors (0.010 lb/lb-binder) for particulate matter is based on "process experience from other CMC micro mills." The binder usage emission factors for VOC emissions are based on an estimated percent of binder resin pyrolyzed/oxidized.

The maximum hourly and annual emissions from caster teeming were based on a maximum binder usage (aggregate of usage in both the tundish and ladle) of 3.4 lbs/hr and 12.03 tons/yr tons/yr. The particulate matter emissions (all particulate matter emissions are assumed to be $PM_{2.5}$ or less and equal to PM_{FILT}) from binder usage are calculated to be 0.034 lbs/hr and 0.12 tons/yr, the CO emissions are calculated to be 0.51 lbs/hr and 1.80 tons/yr, and VOC emissions are calculated to be 0.068 lbs/hr and 0.24 tons/yr.

Gaseous Fuel Combustion Exhaust Emissions

The proposed facility contains various gas-fired combustion devices (see Table 4) that provide process and comfort heat to the facility (not including the Emergency Engines that will be discussed below). At this time, based on the possible unavailability of sufficient natural gas at the proposed site, it is unknown if these units will combust propane or natural gas. In the emissions calculations for these units, therefore, CMC compared the worst-case emissions from either combusting propane (also know as Liquified Petroleum Gas or LPG) or natural gas and chose the worst-case emissions as the unit's potential-to-emit (PTE).

The source of the CO, NO_x, particulate matter ($PM_{2.5}$, PM_{10}, PM_{FILT}, and PM_{TOT}), SO_2, and VOC emission factors for all units were taken either from either AP-42 Section 1.4. - "Natural Gas Combustion" Tables 1.4-1/2 or Section 1.5. - "Liquefied Petroleum Gas Combustion" Table 1.5-1. All emission factors were converted to lb/mmBtu units using heat contents of 1,020 Btu/ft^3 (natural gas) and 91.5 mmBtu/1,000 gallons (propane). There are no HAP emission factors given for propane so all HAP emissions are based on the many HAP emission factors for natural gas combustion given in Table 1.4-2. Emission factors for GHGs were taken from 40 CFR Part 98 - "Mandatory

Greenhouse Gas Reporting," Tables C-1 and C-2. The emission factors and aggregate emissions are given in the following table:

Table 10: Natural Gas/Propane Emissions

Pollutant	Natural Gas		Propane		Max	Aggregate Emissions(1)	
	lb/mmscf	lb/mmBtu	lb/10^3 gal	lb/mmBtu	lb/mmBtu	lb/hr	TPY
CO	84.00	0.082	7.50	0.082	0.082	5.76	22.32
NO_x	100.00	0.098	13.00	0.142	0.142	9.95	38.50
$PM_{2.5}$	7.60	0.007	0.70	0.008	0.008	0.54	2.07
PM_{10}	7.60	0.007	0.70	0.008	0.008	0.54	2.07
PM_{FILT}	1.90	0.002	0.20	0.002	0.002	0.15	0.59
PM_{TOT}	7.60	0.007	0.70	0.008	0.008	0.54	2.07
SO_2	0.60	0.001	1.00(2)	0.011	0.011	0.77	2.96
VOCs	5.50	0.005	0.80(3)	0.009	0.009	0.61	2.37
Total HAPs	1.89	0.0019	n/a		0.0019	0.13	0.50
CO_2	n/a	138.60	n/a	116.98	138.60	9,702.00	37,561.51
CH_4	n/a	2.20e-04	n/a	6.61e-03	6.61e-03	0.46	1.79
N_2O	n/a	2.20e-04	n/a	1.32e-03	1.32e-03	0.09	0.36
CO_2e(4)						*9,741.10*	*37,713.14*

(1) Aggregate annual emissions based on a capacity factor of 50% for the comfort heaters, 46% for the cutting torch and 100% for all other units.
(2) Based on a sulfur content of 10 gr/100 scf.
(3) Based on the TOC emission factor minus the CH_4 emission factor.
(4) As calculated using the following GWPs: CO_2 (1), CH_4 (25), N_2O (298).

Maximum hourly emissions for all units were based on the MDHI of the units and annual emissions were based on operation of 8,760 hours per year for all units other than the comfort heaters (50% capacity factor) and the cutting torches (46% capacity factor). All units utilize Low-NO_x Burner (LNB) technology to limit NO_x emissions.

As noted in Table 4, most of the units emit directly inside the Meltshop and are emitted from the Meltshop building Caster Vent (CV1) and are therefore classified as fugitive emissions. However, the Rolling Mill Comfort Heaters and the Bit Furnace are emitted inside the Rolling Mill Building (RMV1) and the Cutting Torches emit outside from where the cutting is done (TORCH1).

Torch Cutting of Scrap (Particulate Matter)

Particulate matter emissions may be generated from the torch cutting operations (the emissions from the combustion of the natural gas/propane associated with this operation was discussed above) as the act of cutting can cause small amounts of scrap to become airborne. While it is assumed most of this particulate matter will fall out before reaching the plant boundary, CMC conservatively estimated the emissions from this operation based on the maximum amount of scrap to be cut (10,000 lbs-scrap/hr, 10,000 tons-scrap/yr), the scrap removal rate per cut (approximately 1 inch of material per cut), the maximum cutting rate (approximately 0.4 cuts/ft of material to be cut), the maximum daily operation (12 hrs/day), and an emission factor (0.00016 lb/inch-cut) given by the American Welding Society (AWS) for oxyacetylene cutting. Based on this methodology, CMC estimated maximum emission rates of 0.19 lbs/hr and 0.19 tons/yr of all particulate matter pollutants.

Storage Tanks

CMC provided an estimate of the emissions of VOCs (Tanks DSLTK-GEN1, DSLTK-FWP1, and DESLTL-VEH) produced from each fixed roof diesel storage tank proposed for the facility. The emissions for all fixed roof tanks were calculated using the methodology and equations for fixed roof tanks taken from AP-42, Section 7.1 - “Organic Liquid Storage Tanks.” The total “routine” emissions from each fixed roof storage tank are the combination of the calculated “standing loss” and “working loss.” The standing loss refers to the loss of vapors as a result of tank vapor space breathing (resulting from temperature and pressure differences) that occurs continuously when the tank is storing liquid. The working loss refers to the loss of vapors as a result of tank filling or emptying operations. Standing losses are independent of storage tank throughput while working losses are dependent on throughput. The equations use many variables based on the size and construction of the tank, the vapor pressure of diesel, the annual throughput of diesel (300,000 gallons/yr), and the temperature data at the site of the tank. The aggregate VOC emissions from all storage tanks are calculated to be only about 9 lbs/yr.

Cooling Towers

CMC has proposed the use of three (3) Cooling Towers, each with two (2) cooling cells, that will provide contact (CTNC11a/b, CTNC12a/b) and non-contact (CTC1a/b) that will provide contact and non-contact cooling water to various processes throughout the mill. Emissions are possible with cooling towers as particulate matter may become entrained within the water droplets of the vapor cloud as it released into the ambient air. CMC calculated the potential emissions from the cooling towers based on the expected worst-case total dissolved solids (TDS - 2,000 ppm_w) in the cooling water, the maximum flow rate of water used in the cooling towers (varies by cooling tower, see Table 5), and the estimated maximum drift rate (0.0010% based on the use of the high-efficiency drift eliminators as BACT) of the plume. Annual emissions from the cooling towers are based on operations of 8,760 hours per year. The aggregate annual cooling tower emissions are calculated at 0.01 tons-$PM_{2.5}$/yr, 1.64 tons-PM_{10}/yr, and 2.41 tons-PM/yr (PM_{FILT}).

*Emergency Engine*s

Potential emissions from the proposed one (1) 1,600 horsepower (hp) diesel-fired Emergency Engine (EGEN1) to generate backup power at the facility in the event of a power disruption and one (1) 300 horsepower (hp) diesel-fired Emergency Fire Water Pump (EFWP1) were based, where applicable, on the standards given under 40 CFR 60, Subpart IIII. The rule has a different source for the emission standards for each unit (as one is defined as an “Emergency ICE” and the other is defined as an “Emergency Fire Pump”) but the standards are the same (see the following table):

Table 11: Subpart IIII Standards

Duty	Size (kW_m)	Displacement (L/cyl)	Source	Emission Standards - g/kW-hr (g/hp-hr)				
				NO_x	HC	NMHC + NO_x	CO	PM
Emergency	130≤kW>560	<10	§1039.1 Table 3(1)	n/a	n/a	4.0 (3.0)	3.5 (2.6)	0.20 (0.15)
Fire Pump	225≤kW>450	<10	Subpart III Table 4(2)	n/a	n/a	4.0 (3.0)	3.5 (2.6)	0.20 (0.15)

(1) Logic train is as follows: §60.4205(b) ➜ §60.4202(a)(2) ➜ Appendix I to Part 1039 (Table 3 - Tier 3)
(2) Logic train is as follows: §60.4205(c) ➜ Table 4 to Subpart IIII of Part 60

As shown above, no specific emission standards are given for NO_x and VOCs. Therefore, CMC used EPA Document EPA420-P-02-016: "Exhaust and Crankcase Emission Factors for Nonroad Engine Modeling – Compression Ignition" (Table 6) to calculate the specific emissions of NO_x and VOCs using the Subpart IIII NMHC + NO_x standard (93% of the factor is distributed to NO_x and the remaining to VOCs for emission factors of 2.78 and 0.20 g/hp-hr, respectively). SO_2 emissions for both units were based on the Subpart IIII maximum diesel sulfur content of 15 ppm_w and an assumption that all sulfur is oxidize into SO_2. HAP emissions were based on the emission factors given in AP-42, Section 3.3 - "Gasoline and Diesel Industrial Engines,", Table 3.3-2. GHG emissions were based on emission factors taken from 40 CFR Part 98 - "Mandatory Greenhouse Gas Reporting," Tables C-1 and C-2 (CO_2 - 73.96 kg/mmBtu, CH_4 - 0.0030 kg/mmBtu, N_2O - 0.00060 kg/mmBtu). The aggregate PTE from both engines is given in the following table:

Table 12: Aggregate Emergency Engines PTE

Pollutant	Emission Factor		PPH	TPY
CO	2.61	g/hp-hr	10.93	0.55
NO_x	2.78	g/hp-hr	11.66	0.58
$PM_{2.5}$ PM_{10}/PM(2)	0.15	g/hp-hr	0.62	0.03
PM_{FILT}(3)	0.15	g/hp-hr	0.62	0.03
SO_2	0.0015	S(%-wt)	0.02(4)	0.001
VOCs	0.20	g/hp-hr	0.83	0.04
Total HAPs	3.87e-03	lb/mmBtu	0.05	0.0026
CO_2	73.96	kg/mmBtu	2,168.62	108.43
CH_4	3.00e-03	kg/mmBtu	0.09	0.004
N_2O	6.00e-04	kg/mmBtu	0.02	0.001
CO_2e(5)			*2,176.06*	*108.80*

(1) Non-emergency hours of operation.
(2) Includes condensable particulate matter.
(3) Filterable particulate matter only.
(4) SO_2 emissions based on a sulfur content in the fuel of 15 ppm_w.
(5) As calculated using the following GWPs: CO_2 (1), CH_4 (25), N_2O (298).

The maximum hourly emissions were based on the rated horsepower of the engines and the MDHI of the engines (based on 7,000 Btu/hp-hr) and a diesel heat content of 19,300 Btu/lb. Annual emissions were based on 100 hours per year of non-emergency operation for each unit.

Other General Vent Emissions

CMC included three (3) general building exhaust vents (not including the Caster Vent): the Rolling Mill Vent (RMV1), the Cooling Beds Vent (CBV1), and the Spooler Vent (SPV1). The Rolling Mill Vent will exhaust the combustion emissions of the Rolling Mill Comfort Heaters but the other vents do not exhaust any direct emission units. However, to be conservative, CMC estimated a nominal amount of particulate matter (0.01 tons/yr) and VOCs (0.01 tons/yr) from each vent (and added it to the comfort heating emissions for RMV1).

Emissions Summary

Based on the above estimation methodology as submitted in Attachment N of the permit application, the facility-wide PTE of the proposed CMC Steel West Virginia Plant is given below. A more detailed facility-wide PTE is given in Attachment N of the permit application.

Table 13: CMC Steel West Virginia Plant Annual PTE

Sources	PTE (ton/year)									
	CO	NO_x	$PM_{2.5}$(1)	PM_{10}(1)	PM_{FILT}	PM_{TOT}(2)	SO_2	VOC	HAPs(3)	GHGs(4)
Material Handling	0.00	0.00	0.96	4.04	7.67	7.67	0.00	0.00	0.000	0
Haulroads	0.00	0.00	0.25	1.94	7.73	7.73	0.00	0.00	0.000	0
EAF Baghouse	1,300.00	97.50	131.03	131.03	45.36	131.03	97.50	97.50	2.310	119,513
EAF/LMS Fugitives	3.26	0.24	1.64	1.64	0.57	1.64	0.24	0.24	0.029	300
Caster Teeming	0.00	0.00	2.28	2.28	2.28	2.28	0.00	0.07	0.000	0
Binder Usage	1.80	0.00	0.12	0.12	0.12	0.12	0.00	0.24	0.000	0
PNG/LPG Combustion	22.32	38.50	2.07	2.07	0.59	2.07	2.96	2.37	0.502	37,713
Cooling Towers	0.00	0.00	0.01	1.64	2.41	2.41	0.00	0.00	0.000	0
Torch Cutting (PM)	0.00	0.00	0.19	0.19	0.19	0.19	0.00	0.00	0.000	0
Emergency Engines	0.55	0.58	0.03	0.03	0.03	0.03	0.001	0.04	0.0004	109
Storage Tanks	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.010	~0.00	0
Other Vents	0.00	0.00	0.03	0.03	0.03	0.03	0.00	0.03	0.000	0
Total(5)	***1,327.93***	***136.82***	***138.61***	***145.01***	***66.98***	***155.20***	***100.70***	***100.50***	***2.84***	***157,635***

(1) Includes condensable particulate matter where applicable.
(2) Includes filterable and condensable particulate matter.
(3) As the PTE of all individual HAPs are less than 10 TPY (the highest individual HAP emission rate is 1.21 TPY for Manganese) and the PTE of total HAPs is less than 25 TPY, the proposed CMC Steel Mill WV is defined as a minor (area) source of HAPs for purposes of 45CSR30, 40 CFR 61, and 40 CFR 63.
(4) As calculated as CO_2e.
(5) Includes only the particulate matter emissions from cutting itself, combustion exhaust emissions included under the “PNG/LPG Combustion” row above.
(6) Some small difference in total emissions may occur in comparison with those in the permit application due to rounding.

REGULATORY APPLICABILITY

The proposed CMC steel mill is subject to substantive requirements in the following state and federal air quality rules and regulations:

Table 14: Applicable State and Federal Air Quality Rules and Regulations

State Air Quality Rules	
Emissions Standards	
45CSR7	To Prevent and Control Particulate Air Pollution from Manufacturing Process Operations
45CSR10	To Prevent and Control Air Pollution from the Emission of Sulfur Oxides
Permitting Programs and Administrative Rules	
45CSR13	Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Administrative Updates, Temporary Permits, General Permits, and Procedures for Evaluation
45CSR14	Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution for the Prevention of Significant Deterioration
45CSR30	Requirements for Operating Permits
Federal Air Quality Regulations	
New Source Performance Standards (NSPS) - 40 CFR 60	
Subpart AAa	Standards of Performance for Steel Plants: Electric Arc Furnaces and Argon-Oxygen Decarburization Vessels Constructed After August 17, 1983
Subpart IIII	Standards of Performance for Stationary Compression Ignition Internal Combustion Engines
Maximum Achievable Control Technology (MACT) - 40 CFR 63	
Subpart ZZZZ	National Emission Standard for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines
Subpart YYYYY	National Emission Standards for Hazardous Air Pollutants for Area Sources: Ferroalloys Production Facilities

Each applicable rule (and any rule that requires discussion of the non-applicability) and CMC's proposed compliance therewith will be summarized below. CMC submitted a detailed regulatory applicability discussion as Section 6.0 in the permit application.

WV State Air Quality Rules

45CSR2: To Prevent and Control Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers - (Non-Applicable)

The purpose of 45CSR2 is to establish "*emission limitations for smoke and particulate matter which are discharged from fuel burning units*." A "fuel burning unit" is defined under §45-2-2.10 as any "*furnace, boiler apparatus, device, mechanism, stack or structure used in the process of* *burning fuel or other combustible material for the primary purpose of producing heat or power by indirect heat transfer.*" Based on this definition, 45CSR2 will not apply to any of the proposed heaters (see Table 4 above) at the proposed CMC Steel Mill as CMC has stated that the units are "direct-fired" and, therefore, do not meet the definition of a fuel burning unit under 45CSR2.

45CSR7: To Prevent and Control Particulate Air Pollution from Manufacturing Process Operations

45CSR7 has requirements to prevent and control particulate matter air pollution from manufacturing processes and associated operations. Pursuant to §45-7-2.20, a "manufacturing process" means "*any action, operation or treatment, embracing chemical, industrial or manufacturing efforts . . . that may emit smoke, particulate matter or gaseous matter.*" 45CSR7 has three substantive requirements potentially applicable to the particulate matter-emitting operations at CMC's West Virginia Steel Plant. These are the opacity requirements under Section 3, the mass emission standards under Section 4, and the fugitive emission standards under Section 5. Each of these sections will be discussed below.

45CSR7 Opacity Standards - Section 3

§45-7-3.1 sets an opacity limit of 20% on all "process source operations." Pursuant to §45-6-2.38, a "source operation" means the "*last operation in a manufacturing process preceding the emission of air contaminants [in] which [the] operation results in the separation of air contaminants from the process materials or in the conversion of the process materials into air contaminants and is not an air pollution abatement operation.*" This language would define all particulate matter emitting sources (excluding natural gas/propane combustion exhaust sources) as "source operations" under 45CSR7 and, therefore, these sources would be subject to the opacity limit (after any applicable control device). Based on the CMC's proposed use of BACT-level particulate matter controls (such as baghouses, fabric filters, enclosures, water suppression, etc.), these measures shall, when maintained and operated correctly, reasonably allow the particulate matter emitting sources to operate in compliance with the 20% opacity limit.

45CSR7 Weight Emission Standards - Section 4

§45-7-4.1 requires that each manufacturing process source operation or duplicate source operation meet a maximum allowable "stack" particulate matter limit based on the weight of material processed through the source operation. As the limit is defined as a "stack" limit (under Table 45-7A), the only applicable emission units are those that can be defined as non-fugitive in nature. Additionally, pursuant to §45-7-4.1, any manufacturing process that has "*a potential to emit less than one (1) pound per hour of particulate matter and an aggregate of less than one thousand (1000) pounds per year for all such sources of particulate matter located at the stationary source*" is also exempt from Section 4.1.

For the purposes of Section 4.1, a source of particulate matter emissions that are solely the result of the combustion of gaseous fuels is not considered a "source operation" as defined under §45-7-2.38. This is based on the definition that states a source operation is one that "*result in the* *separation of air contaminants from the process materials or in the conversion of the process materials into air contaminants.*" Gaseous fuels do not meet the reasonable definition of a process material. Additionally, the particulate matter limits given under 45CSR7 only address filterable particulate matter, which are only about 25% of total natural gas/propane particulate matter emissions. This determination excludes all natural gas/propane combustion (only) sources from 45CSR7 applicability. Based on the definitions and exemptions discussed above, see the following table for the 45CSR7 compliance demonstration.

Table 15: 45CSR7 Section 4.1 Compliance

Source Operation(s)(1)	EP ID	Source Type	Aggregate PWR (lb/hr)	Table 45-7A Limit (lb/hr)	PTE(2) (lb/hr)	Control Device
EAF/LMS	BH1	B	234,000	38.02	10.36	BH
Cooling Towers(3)	Various	A	27,522,000	50.00	0.55	DEs

(1) The combined total emissions from all of the fabric filters servicing the material silos is 0.40 lbs/hr and 0.42 tons/yr and, therefore, even when combined these sources do not exceed the exemption under §45-7-4.1.
(2) Filterable only if available, total particulate matter if not.
(3) Cooling Towers are not definitively a Section 4.1 source, but are included here for informational purposes.

45CSR7 Fugitive Emissions - Section 5

Pursuant to §45-7-5.1 and 5.2, each manufacturing process or storage structure generating fugitive particulate matter must include a system to minimize the emissions of fugitive particulate matter. The use of various BACT-level controls (where reasonable) on material transfer points, the use of a vacuum sweeping and watering on the haulroads, the minimization of drop heights, and maintenance of sufficient moisture content (where applicable) is considered a reasonable system of minimizing the emissions of fugitive particulate matter at the proposed facility.

45CSR7 Reporting and Testing - Section 8

Pursuant to §45-7-8.1, performance testing is only required per the Director's request. The required initial and continuing performance testing required for the proposed facility is given under Section 4.3 of the draft permit.

45CSR10: To Prevent and Control Air Pollution from the Emission of Sulfur Oxides

The purpose of 45CSR10 is to "*prevent and control air pollution from the emission of sulfur oxides.*" 45CSR10 has requirements limiting SO_2 emissions from "fuel burning units," limiting in-stack SO_2 concentrations of "manufacturing process source operations," and limiting H_2S concentrations in "process gas" streams that are combusted. Each substantive 45CSR10 requirement applicable to the proposed steel mill is discussed below.

45CSR10 Fuel Burning Units - Section 3

As noted under the discussion of 45CSR2 applicability, and based on the same definitions as therein, 45CSR10 Section 3 will not apply to any of the proposed heaters at the CMC Steel Mill as they do not use indirect heat transfer and are, therefore, not defined as fuel burning units.

45CSR10 Manufacturing Process Source Operations - Section 4.1

Section 4.1 of Rule 10 requires that no in-stack SO_2 concentration exceed 2,000 parts per million by volume (ppm_v) from any manufacturing process source operation except as provided in subdivisions 4.1(a) through 4.1(e). The only emission point with substantive in-stack SO_2 emissions is the EAF Baghouse stack (BH1). All other emission points with stack SO_2 emissions are on sources where the SO_2 is entirely the product of natural gas/propane combustion. Due to the low sulfur content of pipeline-quality natural gas (PNG) or propane, SO_2 emissions from natural gas/propane combustion sources are minimal. All natural gas/propane combustion sources have SO_2 emissions less than the exemption threshold of 500 lbs/year pursuant to 45CSR§10-4.1(e). Additionally, natural gas/propane combustion exhaust is not considered a "source operation" under 45CSR10 as natural gas/propane is not considered by itself as a "process material." Compliance with the limit for the EAF Baghouse stack is given in the following table:

Table 16: 45CSR10, Section 4.1 Compliance Calculation (BH1)

Data Point	Value
Stack Emission Limit (lbs/hour)	49.14
Exit Gas Volumetric Flow (ACFM)	788,000
Exit Gas Temperature (°F)	176
Calculated Concentration (ppmv)	7.54
45CSR§10-4.1(e) Limit (ppmv)	2,000
% of Limit	0.38%

45CSR10 Testing, Monitoring, Record-keeping, & Reporting (TMR&R) - Section 8

Section 8 of Rule 10 requires performance testing for initial compliance with the limits therein, monitoring for continued compliance, and record-keeping of that compliance. The relevant TMR&R requirements are clarified under 45CSR10A and discussed below.

45CSR10A (Manufacturing Process Sources) - Sections 5.2 & 6.2

Pursuant to §45-10A-5.2(a), CMC shall "*shall conduct or have conducted, compliance tests to determine the compliance of each manufacturing process source with the emission standards set forth in section 4 of 45CSR10.*" The SO_2 performance test required under 4.3.2 of the draft permit will satisfy this requirement.

Pursuant to §45-10A-6.2(a), CMC shall "*submit, to the Secretary for approval, a monitoring plan for each manufacturing process source(s) that describes the method the owner or operator will use to monitor compliance with the applicable emission standard set forth in section 4 of 45CSR10.*" CMC will be required to submit this monitoring plan per the requirements of 45CSR10.

45CSR13: Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Administrative Updates, Temporary Permits, General Permits, and Procedures for Evaluation

The proposed construction of CMC's West Virginia Steel Mill has the potential to emit a regulated pollutant in excess of six (6) lbs/hour and ten (10) TPY (see Attachment N of the permit application) and, therefore, pursuant to §45-13-2.24, the proposed facility is defined as a "stationary source" under 45CSR13. Pursuant to §45-13-5.1, "*[n]o person shall cause, suffer, allow or permit the construction . . . and operation of any stationary source to be commenced without . . . obtaining a permit to construct.*" Therefore, CMC is required to obtain a permit under 45CSR13 for the construction and operation of the proposed facility. It is noted that the proposed facility is also defined as a "major stationary source" under 45CSR14. Consistent with DAQ policy, permitting actions reviewed under 45CSR14 are concurrently reviewed under 45CSR13 and, where there is a additional or overlapping requirements, the DAQ will generally apply the stricter requirement.

As required under §45-13-8.3 ("Notice Level A"), CMC placed a Class I legal advertisement in a "newspaper of *general circulation* in the area where the source is . . . located." The legal ad ran on January 5, 2023 in *The Journal*. Verification that the legal ad ran was provided on January 16, 2023.

45CSR14: Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution for the Prevention of Significant Deterioration

45CSR14 sets the requirements for the new construction of a "major stationary source" (as defined under §45-14-2.43) of air pollution, on a pollutant-by-pollutant basis, in areas that are in attainment with the National Ambient Air Quality Standards (NAAQS). A proposed facility is defined as a "major stationary source" if, pursuant to §45-14-2.43,

(1) The source is listed as one of the source categories under §45-14-2.43(a) and has a PTE of any regulated pollutant in excess of 100 TPY (including fugitive emissions); or

(2) The source is not a source listed under §45-14-2.43(a) and has a PTE of any regulated pollutant in excess of 250 TPY (not including fugitive emissions).

Additionally, if a proposed source is determined to be a major stationary source under either (1) or (2) above for any single pollutant (with the exception of GHGs), pursuant to §45-14-8.2, Best Available Control Technology (BACT) applies to any additional pollutant proposed to be emitted in "significant" (as defined under §45-14-2.74) amounts. Further, as a result of the Supreme Court's decision in *Utility Air Regulatory Group v. Environmental Protection Agency*, GHGs may not trigger PSD alone, but are subject to PSD review if the emissions of CO_2e exceed a significance threshold of 75,000 TPY *and* if another pollutant triggers PSD review under (1) or (2) above (§45-14-2.80(d)).

The proposed West Virginia Steel Mill will be constructed in Berkeley County, WV, which is classified as in attainment with all NAAQS. As the proposed facility is listed as one of the source categories under §45-14-2.43(a) - "Iron and Steel Mill Plants" - the proposed facility is defined as a major stationary source based on the following pollutants exceeding a PTE of 100 TPY: Carbon Monoxide (CO), Oxides of Nitrogen (NO_x), Particulate Matter (PM_{10}, $PM_{2.5}$, and filterable particulate matter), Sulfur Dioxide (SO_2), and Volatile Organic Compounds (VOCs).

PSD review is additionally required for the pollutants of Greenhouse Gases (GHGs) and Fluorides (F) based on the individual significance thresholds for those pollutants (see table below). The substantive requirements of a PSD review includes a BACT analysis, an air dispersion modeling analysis (for applicable pollutants), a review of potential impacts on Federal Class I areas, and an additional impacts analysis. Each of these will be discussed in detail under the section PSD REVIEW REQUIREMENTS below.

Table 17: Pollutants Subject to PSD

Pollutant	Potential-To-Emit (TPY)	Significance Level (TPY)	PSD (Y/N)
CO	1,327.93	100	Y
NO_x	136.83	40	Y
$PM_{2.5}$	138.61	10	Y
PM_{10}	145.02	15	Y
Filterable PM	66.98	25	Y
SO_2	100.71	40	Y
VOCs	100.50	40	Y
GHGs (CO_2e)	157,635	75,000(1)	Y
Lead	0.53	0.6	N
Sulfuric Acid Mist	0.00	7	N
Fluorides(1)	3.29	3	Y
Vinyl Chloride	0.00	1	N
Total Reduced Sulfur	0.00	10	N
Reduced Sulfur Compounds	0.00	10	N

(1) GHGs cannot 'trigger" PSD review for a source, can only bring GHGs under PSD review if another pollutant has trigger major source status for the proposed facility.

(2) Excludes Hydrogen Fluoride.

45CSR30: Requirements for Operating Permits

45CSR30 provides for the establishment of a comprehensive air quality permitting system consistent with the requirements of Title V of the Clean Air Act. The proposed CMC Steel West Virginia facility will meet the definition of a "major source under §112 of the Clean Air Act" as outlined under §45-30-2.26 and clarified (fugitive policy) under 45CSR30b. The proposed facility-wide PTE (see Table 13) of a regulated pollutant exceeds 100 TPY and, therefore, the source is a major source subject to 45CSR30. The Title V (45CSR30) application will be due within twelve (12) months after the commencement date of any operation authorized by this permit.

Federal Air Quality Rules

40 CFR 60, Subpart Dc: Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units - (Non-Applicable)

40 CFR 60, Subpart Dc is the federal NSPS for small industrial/commercial/institutional "steam generating units" for which (1) construction, modification, or reconstruction is commenced after June 19, 1984, (2) that have a MDHI between 10 and 100 mmBtu/hr, and (3) meet the definition of a "steam generating unit." Subpart Dc contains within it emission standards, compliance methods, monitoring requirements, and reporting and record-keeping procedures for affected facilities applicable to the rule. Pursuant to §60.41(c), "steam generating unit" under Subpart Dc means "*a device that combusts any fuel and produces steam or heats water or heats any heat transfer medium. . . This term does not include process heaters as defined in this subpart.*" As noted under the 45CSR2 Regulatory Applicability discussion, no combustion units use a heat transfer medium that would define the unit as a "steam generating unit." Additinlaly, each individual combustion unit is proposed to have an MDHI of less than 10 mmBtu/hr. Therefore, Subpart Dc is not applicable to any combustion units proposed for the facility.

40 CFR 60, Subpart Kb: Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984 - (Non-Applicable)

40 CFR 60, Subpart Kb is the federal NSPS for storage tanks containing Volatile Organic Liquids (VOLs) which construction commenced after July 23, 1984. The Subpart applies to storage vessels used to store volatile organic liquids with a capacity greater than or equal to 75 m^3 (19,813 gallons). However, storage tanks with a capacity greater than or equal to 151 m^3 (39,890 gallons) storing a liquid with a maximum true vapor pressure less than 3.5 kilopascals (kPa) or with a capacity greater than or equal to 75 m^3 but less than 151 m^3 storing a liquid with a maximum true vapor pressure less than 15.0 kPa are exempt from Subpart Kb.

The storage tanks proposed by CMC are each less than 19,813 gallons (see Table 5) and, therefore, Subpart Kb will not apply to any tanks at the proposed steel mill.

40 CFR 60, Subpart AAa: Standards of Performance for Steel Plants: Electric Arc Furnaces and Argon-Oxygen Decarburization Vessels Constructed After August 17, 1983

40 CFR 60, Subpart AAa is the federal NSPS for steel plants that produce carbon, alloy, or specialty steels: electric arc furnaces, argon-oxygen de-carburization vessels, and dust-handling systems that commences construction, modification, or reconstruction after August 17, 1983. CMC's proposed EAF (EAF1) and associated dust-handling systems are defined as an "electric arc furnace" and therefore subject to the applicable provisions of Subpart AAa.

The substantive emission standards for EAFs are given under §60.272a and state that CMC must not discharge or cause the discharge into the atmosphere from an EAF any gases which:

- Exit from a control device and contain particulate matter in excess of 12 mg/dscm (0.0052 gr/dscf);
- Exit from a control device and exhibit 3 percent opacity or greater;
- Exit from a shop and, due solely to the operations of any affected EAF(s) or AOD vessel(s), exhibit 6 percent opacity or greater; and
- Dust-handling systems prohibited from discharging any gases that exhibit 10 percent opacity or greater.

As noted, CMC has proposed the use of a DEC system for control of particulate matter emissions from the EAF (along with the similar system for the LMS) and the evacuation of the captured emissions to a baghouse (BH1). A DEC system is one that maintains a negative pressure within the EAF above the molten metal and ducts the produced emissions to the control device - in this case, as mentioned, a pulse jet fabric filter baghouse.

CMC has proposed a combined (EAF/LMS) BACT emission rate as emitted from the controlling baghouse at the NSPS standard - 0.0052 gr/dscf. Initial compliance with this standard shall be based on the performance testing requirements given under §60.8. (and thereafter based on the periodic performance testing schedule given under 4.3.3 of the draft permit). Compliance with the opacity standard on the EAF Baghouse stack may be achieved through the use of a continuous opacity monitoring system (COMS) or by performing daily Method 9 visible emissions testing pursuant to §60.273a(c) and installation and operation of a bag leak detection system pursuant to §60.273a(e) and (f). CMC is proposing to meet this requirement by performing the Method 9 testing and is not proposing to install a COMS. As CMC has proposed the use of a DEC, compliance with the opacity standard on the Meltshop openings may be achieved through the use of a furnace static pressure monitoring device or by performing daily Method 9 visible emissions testing pursuant to §60.273a(d). CMC will choose one of these compliance methods at a later date. Additional operational monitoring is required under §60.274a.

40 CFR 60, Subpart AAb: Standards of Performance for Steel Plants: Electric Arc Furnaces and Argon-Oxygen Decarburization Vessels Constructed After August 17, 1983 - (Proposed)

On April 29, 2022, the USEPA proposed amendments to update Subpart AAa that would apply to Electric Arc Furnaces and Argon-Oxygen Decarburization Vessels Constructed After the date of publication (May 16, 2022) of the proposed rule in the Federal Register. The most substantive changes to the existing rule are:

- Lowering the opacity limit for the EAF melt shop roof vents from 6 percent to 0 percent; and

- Changing the format of the particulate matter emission limit for control devices from gr/dscf to lb/ton-steel produced; and

- Eliminating startup, shutdown and malfunction exemption for opacity and other standards consistent with a 2008 court decision.

The comment period for this proposed rule closed on August 15, 2022. As this rule is not final, a formal compliance evaluation concerning this rule will not be conducted.

40 CFR 60, Subpart IIII: Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

Subpart IIII of 40 CFR 60 is the NSPS for stationary compression ignition internal combustion engines (diesel-fired engines). Section §60.4200 states that "*provisions of [Subpart IIII] are applicable to manufacturers, owners, and operators of stationary compression ignition (CI) internal combustion engines (ICE).*" Specifically, §60.4200(a)(2) states that Subpart IIII applies to "*[o] wners and operators of stationary CI ICE that commence construction after July 11, 2005, where the stationary CI ICE are:*

(i) Manufactured after April 1, 2006, and are not fire pump engines, or

(ii) Manufactured as a certified National Fire Protection Association (NFPA) fire pump engine after July 1, 2006."

CMC has proposed the installation of one (1) 1,600 horsepower (hp) diesel-fired Emergency Engine (EGEN1) to generate backup power at the facility in the event of a power disruption and one (1) 300 horsepower (hp) diesel-fired Emergency Fire Water Pump (EFWP1). Both engines shall be engines manufactured after 2006. As applicable engines, Subpart IIII has, or references, emission standards for these engines and they are given in the following table:

Table 18: Subpart IIII Standards

Duty	Size (kW_m)	Displacement (L/cyl)	Source	Emission Standards - g/kW-hr (g/hp-hr)				
				NO_x	HC	NMHC + NO_x	CO	PM
Emergency	130≤kW>560	<10	§1039.1 Table 3$^{(1)}$	n/a	n/a	4.0 (3.0)	3.5 (2.6)	0.20 (0.15)
Fire Pump	225≤kW>450	<10	Subpart III Table 4$^{(2)}$	n/a	n/a	4.0 (3.0)	3.5 (2.6)	0.20 (0.15)

(1) Logic train is as follows: §60.4205(b) ➜ §60.4202(a)(2) ➜ Appendix I to Part 1039 (Table 3)
(2) Logic train is as follows: §60.4205(c) ➜ Table 4 to Subpart IIII of Part 60

CMC has stated they will purchase engines that are certified to meet the above requirements. Additionally, Subpart IIII has operational (§60.4207), monitoring (§60.4209), compliance demonstration (§60.42011), reporting (§60.4214), and performance testing (§60.4212) requirements.

Importantly, these include, but are not limited to the following:

- Pursuant to §60.4207(b), that in turn references §1090.305, the diesel fuel used in any applicable ICE must not exceed 15 ppm;

- Pursuant to §60.4209(a), to qualify for the emission standards applicable to "emergency" duty engines, the operator must install a non-resettable hour meter prior to startup of the engine; and

- Pursuant to §60.4211(f), there are use limitations for an engine to be qualify for the emission standards applicable to "emergency" duty engines. Specifically, while there are no limitations on the use of emergency stationary ICE in emergency situations, engines are limited to 100 hours of use in non-emergency situations with up to a maximum of 50 hours use for purposes other than maintenance and testing.

40 CFR 63, Subpart ZZZZ: National Emission Standard for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

40 CFR 63, Subpart ZZZZ is a federal MACT that establishes national emission limitations and operating limitations for HAPs emitted from stationary reciprocating internal combustion engines (RICE) located at major and area sources of HAP emissions. As the proposed steel mill is defined as an area source of HAPs (see Table 12), the facility is subject to applicable requirements of Subpart ZZZZ. Pursuant to §63.6590(c):

> An affected source that meets any of the criteria in paragraphs (c)(1) through (7) of this section must meet the requirements of this part by meeting the requirements of 40 CFR part 60 subpart IIII, for compression ignition engines or 40 CFR part 60 subpart JJJJ, for spark ignition engines. No further requirements apply for such engines under this part.

§63.6590(c)(1) specifies that "[a] *new or reconstructed stationary RICE located at an area source*" is defined as a RICE that shows compliance with the requirements of Subpart ZZZZ by "*meeting the requirements of . . . 40 CFR part 60 subpart IIII, for compression ignition engines.*" Pursuant to §63.6590(a)(2)(iii), a "[a] *stationary RICE located at an area source of HAP emissions is new if you commenced construction of the stationary RICE on or after June 12, 2006.*" The (1) 1,600 horsepower (hp) diesel-fired Emergency Engine (EGEN1) and one (1) 300 horsepower (hp) diesel-fired Emergency Fire Water Pump (EFWP1) proposed for the steel mill will each be defined as a new stationary RICE and, therefore, will show compliance with Subpart ZZZZ by meeting the requirements of 40 CFR 60, Subpart IIII. Compliance with Subpart IIII is discussed above.

40 CFR 63, Subpart DDDDD: National Emission Standards for Hazardous Air Pollutants for Hazardous Air Pollutants Air Pollutants for Industrial, Commercial, and Institutional Boilers and Process Heaters - (Non-Applicable)

40 CFR 63, Subpart DDDDD is a federal MACT rule that establishes national emission limitations and work practice standards for HAPs emitted from industrial, commercial, and institutional boilers and process heaters located at major sources of HAPs. As shown in Table 12, the proposed CMC steel mill is not defined as a major source of HAPs and, therefore, Subpart DDDDD does not apply.

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

40 CFR 63, Subpart YYYYY is a federal MACT rule that applies to Electric Arc Furnace Steelmaking Facilities that are area sources of HAPs. Pursuant to §63.10692, an "Electric Arc Furnace Steelmaking Facilities" is defined as "*a steel plant that produces carbon, alloy, or specialty steels using an EAF. This definition excludes EAF steelmaking facilities at steel foundries and EAF facilities used to produce nonferrous metals.*" The EAF proposed at the CMC Steel West Virginia Plant will meet this definition, and as shown in Table 13, the proposed facility is defined as an area source of HAPs. Therefore, Subpart YYYYY applies to the EAFs.

The applicable requirements of Subpart YYYYY are targeted at (1) the management of the scrap that is charged into the EAF, and (2) the emissions standards of the EAF stack. The requirements relating to the management of scrap are given under §63.10685 and require both a pollution prevention plan to minimize the amount of chlorinated plastics, lead, and free organic liquids that are charged to the furnace and a program to ensure that mercury switches are removed from any motor vehicle scrap charged into the EAF.

The EAF emission standards are given under §63.10686(b) for an EAF that has a production capacity of greater than 150,000 tons/year (the CMC EAF has a production capacity of 650,000 tons/year) and state that CMC must not discharge or cause the discharge into the atmosphere from an EAF any gases which:

- Exit from a control device and contain particulate matter in excess of 12 mg/dscm (0.0052 gr/dscf); and

- Exit from a shop and, due solely to the operations of any affected EAF(s) or AOD vessel(s), exhibit 6 percent opacity or greater;

Compliance with the pollution prevention plan and the mercury switch removal program is determined by the requirements of Subpart YYYYY. With respect to the emission standards, they are equivalent to those given under 40 CFR 60, Subpart AAa. The compliance demonstrations are also equivalent - see the discussion under Subpart AAa.

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

40 CFR 63, Subpart DDDDD is a federal MACT rule that establishes requirements for iron and steel foundries that are area sources of HAPs. Pursuant to §63.10906, an "Iron and Steel Foundry" is defined as "*a facility or portion of a facility that melts scrap, ingot, and/or other forms of iron and/or steel and pours the resulting molten metal into molds to produce final or near final shape products for introduction into commerce. Research and development facilities, operations that only produce non-commercial castings, and operations associated with nonferrous metal production are*

not included in this definition." The proposed CMC steel mill will not have the capability to pour molten steel directly into molds to produce final or near final shape products and, therefore, Subpart ZZZZZ will not apply.

40 CFR 63 Subpart JJJJJJ: National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources - (Not Applicable)

40 CFR 63, Subpart JJJJJJ is a federal MACT rule that establishes national emission limitations and work practice standards for HAPs emitted from industrial, commercial, and institutional boilers located at area sources of HAPs. The proposed CMC steel mill meets the definition of an area source of HAPs (see Table 12).

Pursuant to §63.11237, the definition of "boiler" covered under Subpart JJJJJJ is limited to "*an enclosed device using controlled flame combustion in which water is heated to recover thermal energy in the form of steam or hot water.*" This definition would not include any of the proposed combustion devices at the CMC steel mill.

PSD REVIEW REQUIREMENTS

In 1977, Congress passed the Clean Air Act Amendments (CAAA), which included the Prevention of Significant Deterioration (PSD) program. This program was designed to allow industrial development in areas that were in attainment with the NAAQS without resulting in an eventual non-attainment designation for the area. The program, as implied in the name, permits the deterioration of the ambient air in an area (usually a county) as long as it is within defined limits. The program, however, does not allow for a *significant deterioration* (as defined by the rule) of the existing ambient air. The program prevents a "significant deterioration" by allowing concentration levels to increase in an area within defined limits - called "increments" - as long as the pollutants never increase enough to exceed the NAAQS. Projected concentration levels are calculated using complex computer simulations that use meteorological data to predict impacts from the source's potential emission rates. The concentration levels are then, in turn, compared to the NAAQS and pollutant increments to verify that the ambient air around the source does not significantly deteriorate (violate the increments) or violate the NAAQS. The PSD program also requires application of best available control technology (BACT) to new or modified sources, protection of Class 1 areas, and an analysis of impacts on soils, vegetation, and visibility.

WV implements the PSD program as a SIP-approved state through 45CSR14. As a SIP-approved state, WV is the sole issuing authority for PSD permits. EPA has reviewed WV Legislative Rule 45CSR14 and concluded that it incorporates all the necessary requirements to successfully meet the goals of the PSD program as discussed above. EPA retains, however, an oversight role in WV's administration of the PSD program.

As stated above under the 45CSR14 Regulatory Applicability Section, the proposed CMC Steel West Virginia Plant is defined as construction of a "major stationary source" under 45CSR14 and

PSD review is required for the pollutants of CO, NO_x, $PM_{2.5}$, PM_{10}, PM (filterable), SO_2, VOCs, Fluorides, and GHGs. The substantive requirements of a PSD review include a BACT analysis, an air dispersion modeling analysis, and an additional impacts analysis - each of which will be discussed below.

BACT Analysis - 45CSR14 Section 8.2

Pursuant to 45CSR14, Section 8.2, CMC is required to apply BACT to each reasonable emission source that emits a PSD pollutant (CO, NO_x, $PM_{2.5}$, PM_{10}, PM (filterable), SO_2, VOCs, Fluorides, and GHGs) with a PTE in excess of the amount that is defined as "significant" for that pollutant. BACT is defined under §45-14-2.12 as:

> ". . .an emissions limitation (including a visible emissions standard) based on the maximum degree of reduction for each regulated NSR pollutant which would be emitted from any proposed major stationary source or major modification which the Secretary, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques for control of such pollutant. In no event shall application of best available control technology result in emissions of any pollutant which would exceed the emissions allowed by any federally enforceable emissions limitations or emissions limitations enforceable by the Secretary. If the Secretary determines that technological or economic limitations on the application of measurement methodology to a particular emissions unit would make the imposition of an emissions standard infeasible, a design, equipment work practice, operational standard or combination thereof may be prescribed instead to satisfy the requirement for the application of best available control technology. Such standard shall, to the degree possible, set forth the emissions reduction achievable by implementation of such design, equipment, work practice or operation and shall provide for compliance by means which achieve equivalent results."

Pursuant to USEPA and DAQ policy, the permit applicant determines an appropriate BACT emission limit by using a "top-down" analysis. The key steps in performing a "top-down" BACT analysis are the following: (1) Identification of all applicable control technologies; (2) Elimination of technically infeasible options; (3) Ranking remaining control technologies by control effectiveness; (4) Evaluation of most effective controls and documentation of results; and (5) the selection of BACT. Also included in the BACT selection process is, where appropriate, the review of BACT determinations at similar facilities using the RACT/BACT/LAER Clearinghouse (RBLC). The RBLC is a database of RACT, BACT, and LAER determinations maintained by EPA and periodically updated by the individual permitting authorities (it is important to note, however, that the RBLC is not exhaustive as not all determinations are uploaded to the database).

CMC included a BACT analysis in their permit application under Section 23 generally using the top-down approach as described above. For a detailed review of CMC's BACT, see Section 23 of Permit Application R14-0040. The BACT determination is summarized below.

<u>CMC's BACT Submission</u>

CMC included in the permit application a BACT Analysis reasonably performed in accordance with 45CSR14 and relevant guidance. For each pollutant, CMC generally performed, for each source or logical grouping of sources, a top-down analysis for the emissions unit(s). Where applicable, CMC included data from the RBLC to support the final selection of BACT. This section will summarize key points of the CMC BACT determination (for the detailed and complete BACT Analysis, see the permit application).

Material Handling and Storage

CMC will utilize a variety of materials in the steel making process and has proposed different BACT control technologies/mitigation strategies for the different material handling operations. Unlike other types of steel mills, however, CMC will utilize only scrap metal as the source of iron in its micro-mill steel making process. There will be no potentially high sources of particulate matter emissions (such as DRI handling) on-site and the nature of scrap metal is not the same as a friable aggregate such as coal or limestone that is prone to producing dust when stored and handled. Similarly, the other primary potential dust emitting material that is moved and stored at the site is slag and, similar to scrap, while slag has a higher potential to emit dust when handled than scrap, it does not produce particulate matter emissions comparable to coal or limestone. Additionally, it is noted that scrap must be sufficiently dry when introduced into the EAF as “wet” scrap would be an explosion risk.

Therefore, for scrap storage and handling, CMC has proposed BACT that is primarily based on using work practices (minimizing drop heights onto storage piles) and enclosures where possible to mitigate potential emissions. The storage and processing of slag, however, shall be, in addition to the above, required be done at a moisture content (inherent from the process, acquired through precipitation, or from water spraying as necessary) that is sufficient to mitigate the substantive fugitive escape of particulate matter.

For the powdered or non-aggregate material handling operations (carbons, fluxing agents, EAF Baghouse Dust), CMC has proposed that these materials will be brought in by enclosed trucks that will feed the materials into silos pneumatically. The displaced air in the silos is controlled at a BACT level with bin vent filters on the silos. These bin vents are capable of capturing up to 99.9%+ of uncontrolled emissions and are relatively easy to install and maintain operational at these high levels.

CMC has proposed a BACT for the Haulroads and Mobile Work Areas that utilizes vacuum sweeping and wet suppression on paved areas of the facility and wet suppression on the unpaved areas. The proposed CMC BACT selections for material handling & storage operations are given in the following table.

Table 19: CMC BACT Summary Table - Material Handling & Storage

Emission Unit Description	Pollutant	BACT Technology	Draft Permit Citation
All Material Drop Points	$PM_{2.5}$, PM_{10}, PM_{FILT}	Minimize Drop Height as Practicable	4.1.3(c)(1)
Rail & Truck Outdoor Scrap Storage Piles	$PM_{2.5}$, PM_{10}, PM_{FILT}	Minimize Drop Height as Practicable	4.1.3(c)(1)
ESC Building Storage Piles, Alloy Aggregates Storage Pile, Mill Scale Storage Pile	$PM_{2.5}$, PM_{10}, PM_{FILT}	Partial Enclosure	Table 1.0 Appendix A-1

Emission Unit Description	Pollutant	BACT Technology	Draft Permit Citation
Meltshop Drop Points, Inside ESC Building Drop Points	$PM_{2.5}$, PM_{10}, PM_{FILT}	Full Enclosure	Table 1.0 Appendix A-1
Slag Processing Plant	$PM_{2.5}$, PM_{10}, PM_{FILT}	Wet Suppression(1)	4.1.3(c)(3)
Fluxing Agents/Alloys Silos Carbons Silo EAF Baghouse Silo	$PM_{2.5}$, PM_{10}, PM_{FILT}	Storage Silo Bin Vent Filters	4.1.3(c)(4)
Paved & Unpaved Haulroads	$PM_{2.5}$, PM_{10}, PM_{FILT}	Vacuum Truck (Paved) Water Truck (Paved & Unpaved)	4.1.3(e)(4)

(1) Wet Suppression can include adequate inherent moisture content from process or natural sources.

Meltshop Sources: EAF/LMS and Casting Operations

The BACT determination on the EAF/LMS was based for all pollutants on the most efficient control technology/strategy that was not considered technically infeasible for use on the specific source in question.

It is important to note that the CMC facility is defined as a micro mill, which differs from a mini mill or larger mills in certain process and configuration ways. Unlike most other steel mills, a micro mill utilizes heat in the waste gas from the EAF to preheat the scrap that is charged to the EAF, which in turn results in recovering some heat energy. This is accomplished through the use of the ECS. However, the use of the ECS limits the amount of oxygen available in the furnace which in turn results in higher CO emissions (in lbs/ton) than in other larger steel mills. This should be understood in comparing the CO BACT emission rates to other recently permitted steel mills. Additionally, the proposed steel mill is involved in the production of long steel products (primarily rebar) that utilize scrap that mills producing flat steel products (flat-rolled steel or sheet metal) are not able to use. Mills producing these flat steel products require scrap that has a higher density, and often incorporate higher-quality scrap along with other metallic raw materials such as hot-briquetted iron (HBI) and direct-reduced iron (DRI) to meet the required finished steel quality standards. These characteristics, in addition to being essential to flat steel production, typically result in lower emissions of CO, SO_2, and VOC emissions from the EAF as compared to the production of long products that rely only on scrap (with the imbedded impurities).

BACT for the EAF/LMS was driven primarily by two characteristics of the emission source: the potential for high particulate matter emissions and the need to account for the variability of the scrap source in the production of VOCs and SO_2 emissions. The control of particulate matter and the BACT technology is driven by the NSPS-defined use of the DEC (and canopy hood) to achieve a very high control of the emissions generated during use in the EAFs. The use of the DEC and associated baghouses preclude the use of bolt-on NO_x and CO control technology such as catalytic reduction and oxidation as the temperature profiles of these technologies do not align with the baghouse systems. There were no examples of these technologies being used on EAFs in the RBLC. The exclusion of these technologies was therefore appropriate.

VOCs and SO_2 emissions from the EAF/LMS are related to the characteristics of the scrap. For this reason, BACT is defined as the use of a the "Scrap Management Plan" as required under 40 CFR 63, Subpart YYYYY and the use of commercially available low residue, pre-processed, and inspected scrap. The BACT emission rates were chosen so as to allow for this site-specific scrap variability while mitigating the emissions of VOCs and SO_2. The use of the Scrap Management Plan is consistently present in the RBLC entries.

In addition, CMC has noted, in response to a comment provided by the NPS concerning the consideration of lime injection in the EAF baghouses, that the proposed WV Steel Mill will be a producer of lower sulfur steel that utilizes correspondingly lower sulfur feedstocks. These feedstocks result in lower SO_2 exhaust concentrations that are below the levels generally controlled by flue gas desulfurization systems such as lime injection. While the NPS was able to provide an example from the RBLC of use of a lime-injection baghouse (Gerdau Macsteel MI-0438), it was used on a producer of higher-sulfur steel that uses a bucket charge EAF in a mini-mill. The proposed project produces common long steel products with lower sulfur content using an ECS EAF in a micro-mill. It is also noted that the BACT emission limit chosen for the Gerdau Macsteel EAF/LMFs (0.35 lb-SO_2/ton-steel) was higher than that of CMC's proposed EAF/LMS (0.30 lb-SO_2/ton-steel). For these reasons, the DAQ agrees that lime injection in the baghouse is appropriately removed from consideration as BACT for CMC's proposed low-sulfur steel production process.

As stated, the particulate matter BACT is driven by use of the DEC (and canopy hood) that evacuates to a baghouse to achieve a very high control of the emissions generated during electrode use in the EAFs. This is consistent with most of the other similar facilities listed in the RBLC.

Table 20: CMC BACT Summary Table - Meltshop

Meltshop			
EAF1/LMS1	CO	Good Combustion Practices	4.1.4
	NO_x	Good Combustion Practices	
	$PM_{2.5}$, PM_{10}, PM_{FILT}	DEC/LMS Roof/Canopy Hood/ Baghouse/ Meltshop Building (Fugitive)	
	SO_2	Scrap Management Plan	
	VOCs	Scrap Management Plan Good Combustion Practices	
	Fluorides	DEC/LMS Roof/Canopy Hood/ Baghouse/ Meltshop Building (Fugitive)	
	GHGs	Efficiency/Operating Requirements	
CAST1 (Teeming)	$PM_{2.5}$, PM_{10}, PM_{FILT}	DEC/LMS Roof/Canopy Hood/ Baghouse/ Meltshop Building (Fugitive)	

Natural Gas/Propane Combustion Sources

CMC has proposed the use of a series of relatively small gaseous (PNG/LPG) combustion units at the facility (the largest individual unit is 6.0 mmBtu/hr). The most significant result of the BACT analysis for these units was the determination that use of combustion exhaust technologies for control of NO_x (SCR, SNCR) and CO (oxidation catalysts) are not technically feasible. The elimination of these technologies were primarily based on the small sizes of the units and the exhaust characteristics of the sources in question - either outside the temperature profile or used directly for heat and not captured and vented through a stack. For this reason, CMC proposed the use of Low-NO_x Burners (LNBs) and Good Combustion Practices for the gaseous fuel combustion devices as NO_x BACT. This was consistent with the similar units in the RBLC database.

Again consistent with other units in the RBLC and conventional for gaseous combustion units of the size and characteristic of those proposed for the CMC Steel West Virginia , CMC proposed the use of Good Combustion Practices and the use of gaseous fuels as BACT for the other pollutants including CO.

BACT emission rates were based on the worst-case emisstion factor from AP-42 Section 1.4. - "Natural Gas Combustion" Tables 1.4-1/2 or Section 1.5. - "Liquefied Petroleum Gas Combustion" Table 1.5-1 for all pollutants (excluding GHGs). GHG BACT was based on the TPY limits of the units in turn based on emission factors taken from 40 CFR Part 98 - "Mandatory Greenhouse Gas Reporting," Tables C-1 and C-2. A summary of the BACT for the Natural Gas/Propane Combustion Sources is given in the following table:

Table 21: CMC BACT Summary Table - Natural Gas/Propane Combustion Sources

Natural Gas Combustion			
LPH1 LD1 TPH1 TD1 TMD1 SRDHTR1 MSAUXHT BF1 RMAUXHT TORCH1	CO	Good Combustion Practices	Table 4.1.5(a)
	NO_x	LNB, Good Combustion Practices	
	$PM_{2.5}$, PM_{10}, PM_{FILT}	Use of PNG/LPG Good Combustion Practices	
	SO_2	Use of PNG/LPG	
	VOCs	Good Combustion Practices	
	GHGs	Use of PNG/LPG Good Combustion Practices	

Auxiliary Units BACT Requirements

Cooling Towers

After eliminating the technology of dry cooling as technically infeasible for use at steel micro mills, CMC chose the use of widely demonstrated and effective mitigation technology of Drift Eliminators as BACT on the Cooling Towers and set the drift loss at 0.001% as supported by information in the RBLC.

Storage Tanks

CMC has only proposed relatively small (≤5,000 gallons) storage tanks that contain a low vapor pressure VOL - diesel. The VOC emissions from these units are very small (<9 lbs-VOC/yr). The limitation of on-site VOL storage to only diesel in small tanks precludes the formal BACT determination for the units. However, the DAQ will require BACT-level operating practices on the storage tanks such as maintaining a light color paint on the tanks, use of good operating practices in the operation of the storage tanks (4.1.6(d) of the draft permit).

Engines

The emergency engine and fire pump engine are both limited to usage of 100 hours of non-emergency use per year. This limitation and the certification of the engines to the appropriate emission standards under 40 CFR 60, Subpart IIII represents the primary BACT for the units. A summary of the BACT for the Auxiliary Sources is given in the following table:

Table 22: CMC BACT Summary Table - Auxiliary Units

Storage Tanks			
DSLTK-GEN1 DSLTK-FWP1 DSLTK-VEH	VOCs	White/Aluminum Shell Submerged Fill Good Operating Practices	4.1.6
Cooling Towers			
CTNC11 CTNC12 CTC1	$PM_{2.5}$, PM_{10}, PM_{FILT}	Drift Eliminators	4.1.7(c)
Emergency Engines			
EGEN1 EFWP1	CO	Subpart IIII Certification Annual Hrs of Op(1) Limit	Table 4.1.8(c)
	NO_x	Subpart IIII Certification Annual Hrs of Op(1) Limit	
	$PM_{2.5}$, PM_{10}, PM_{FILT}	Subpart IIII Certification Annual Hrs of Op(1) Limit	
	SO_2	Fuel composition of Sulfur < 0.0015% Annual Hrs of Op(1) Limit	
	VOCs	Annual Hrs of Op(3) Limit	
	GHGs	Good Combustion Practices	

(1) Limited to 100 hours a year of non-emergency operation.

Additional GHG BACT Requirements

The DAQ has required additional plant-wide GHG BACT Requirements under 4.1.10 of the draft permit to maximize energy efficiency so as to reduce the secondary formation of GHGs at the site of energy production.

DAQ Conclusion on BACT Analysis

The DAQ has concluded that CMC reasonably conducted a BACT analysis using, where appropriate, the top-down analysis and eliminated technologies for valid reasons. The DAQ concludes that the selected BACT emission rates given in the draft permit are achievable, are consistent where appropriate with recent applicable BACT determinations, and are accepted as BACT. Further, the DAQ accepts the selected control technologies and control strategies as BACT.

Modeling Analysis - 45CSR14, Section 9 and Section 10

Sections §45-14-9 and §45-14-10 contain requirements relating to a proposed major source's impact on air quality (Section 9) and the requirements for the air dispersion modeling used to determine the potential impact (Section 10). Specifically, §45-14-9.1 requires subject sources to demonstrate that "*allowable emission increases from the proposed source or modification, in conjunction with all other applicable emission increases or reductions (including secondary emissions), would not cause or contribute to*" (1) a NAAQS violation or (2) an exceedance of a maximum allowable increase over the baseline concentration in any area (exceed the increment).

Pursuant to the above, CMC was required to do an air dispersion modeling analysis to determine the potential impacts on Class II areas only. To this end, CMC provided a detailed Modeling Report submitted on May 10, 2023. Class I area modeling was not performed (as explained below). The pollutants required to be modeled were CO, NO_x, $PM_{2.5}$, PM_{10}, SO_2, and fluorides. GHGs are not modeled as part of the PSD application review process and VOC emissions (as a precursor to tropospheric ozone formation) were addressed in Section 6.2 of the CMC Modeling Report. The results of the modeling analyses are summarized below. More detailed descriptions of these modeling analyses and quantitative results are contained in Attachment A prepared by Mr. Jon McClung of DAQ's Planning Section.

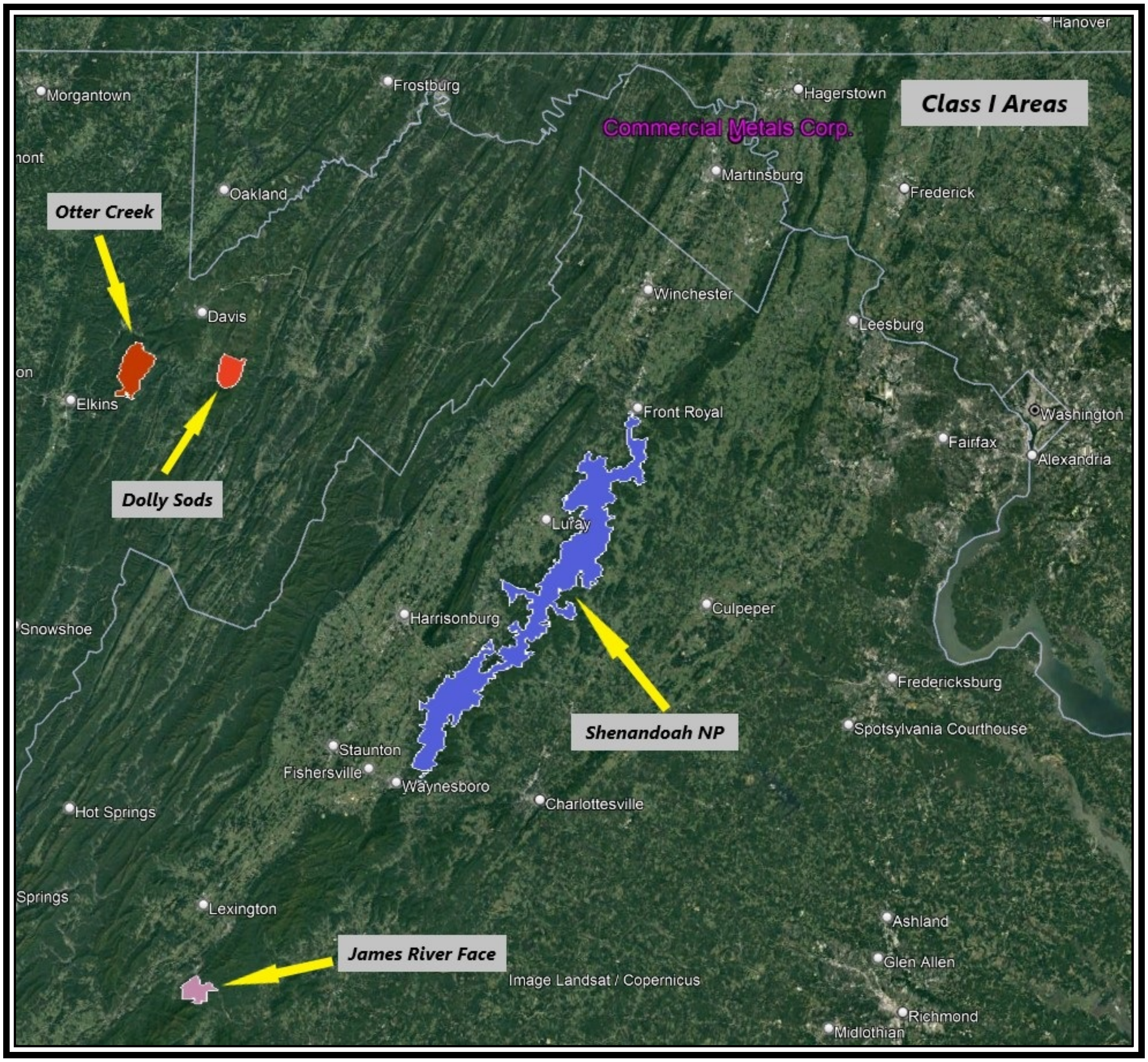
Class I Modeling

As part of the Clean Air Act Amendments (CAA) of 1977, Congress designated a list of national parks, memorial parks, wilderness areas, and recreational areas as federal Class I air quality areas. Federal Class I areas are defined as national parks over 6,000 acres, and wilderness areas and memorial parks over 5,000 acres. As part of this designation, the CAA gives designated Federal Land Managers (FLM's) an affirmative responsibility to protect the natural and cultural resources of Class I areas from the adverse impacts of air pollution. The impacts on a Class I area from an emissions source are determined through complex computer models that take into account the source's emissions, stack parameters, meteorological conditions, and terrain.

If an FLM demonstrates that emissions from a proposed source will cause or contribute to adverse impacts on the air quality related values (AQRV's) of a Class I area, and the permitting authority concurs, the permit will not be issued. The AQRVs typically reviewed, in the case of evaluating adverse impacts, are visibility (both regional and direct plume impact) and acid deposition (including both nitrogen and sulfur).

Additionally, the Class I Increments may not be exceeded. Class I Increments are limits to how much the air quality may deteriorate from a reference point (called the baseline). There are Class I Increments for NO_2, $PM_{2.5}$, PM_{10}, and SO_2. Based on EPA guidance, a full increment analysis is not required if the source's impacts alone do not exceed a calculated Class I Area Significant Impact Level (SIL) - based on the same ratio of the Class II increment levels and the associated Class II SILs as applied to the Class I Increment.

There are generally four Class I areas that may have to be considered when conducting PSD reviews in West Virginia. These are, in West Virginia, the Otter Creek Wilderness Area and the Dolly Sods Wilderness Area; both of which are managed by the US Forest Service. The Shenandoah National Park, managed by the National Park Service (NPS), and the James River Face Wilderness Area, managed by the US Forest Service (USFS), are in Virginia. The proposed CMC steel mill is approximately 158 kilometers (km) from the Otter Creek Wilderness Area, 135 km from the Dolly Sods Wilderness Area, 74 km from the Shenandoah National Park, and 251 km from the James River Face Wilderness Area. The following shows the location of the proposed source in relation to the Class I areas within 300 miles of the site:



The FLMs responsible for evaluating affects on AQRVs for federally protected Class I areas were, through standard procedure, provided with information concerning the proposed facility upon the submission of the permit application. On January 31, 2023 (NPS) and on February 10, 2023 (USFS), the NPS and the USFS notified the DAQ that an AQRV analysis was not required for the proposed CMC Steel West Virginia Mill.

CMC evaluated the project related increase of NO_2, PM_{10}, $PM_{2.5}$, and SO_2 against the Class I SILs by placing an arc of receptors at a distance of 50 km in the direction each Class I area within 300 km, to demonstrate that impacts are below the Class I SILs. Using this methodology, the maximum modeled concentrations at the 50 km receptors were less than the Class I SILs for all modeled pollutants (see Table 7-3 of the CMC Modeling Report), and it is therefore reasonable to assume that the project also had maximum potential impacts that were less than the Class I SILs at the much more distant Class I areas. As stated above, pollutants modeled below the Class I SILs are not required to perform a full Class I increment modeling analysis.

Class II Modeling

A Class II Modeling analysis can require up to three runs to determine compliance with Rule 14. First, the proposed source is modeled by itself, on a pollutant by pollutant basis, to determine if it produces a "significant impact" - an ambient concentration published by US EPA (the Class II SIL). If the dispersion model determines that the proposed source produces significant impacts, then the demonstration proceeds to the second stage. If the model finds that the proposed source produces "insignificant impacts", no further modeling is needed (on a pollutant-by-pollutant basis). The modeling, the results of which are given in Tables 7-1 (Class II Significance Analysis Results), 7-4 (Class II NAAQS Cumulative Impact Analysis Results), and 7-5 (PSD Class II Increment Cumulative Impact Analysis Results) of the CMC Modeling Report, and indicated that CO (both 1-hr and 8-hr), certain SO_2 averaging periods (3-hr, 24-hour, and annual), the annual NO_2 were not "significant." Pursuant to45CSR14, no further modeling was therefore required for these pollutants and the associated averaging times. The other pollutants (NO_2 1-hour, $PM_{2.5}$ 24-hour and annual, PM_{10} 24-hour and annual, and the SO_2 1-hour) were "significant," thereby requiring the applicant to proceed to the next stage of the modeling process for those pollutants and the associated averaging times.

The next tier of the modeling analysis is to determine if the proposed facility, in combination with the existing sources, will produce an ambient impact that is less than the National Ambient Air Quality Standards (NAAQS). As shown in Table 7-4 of the CMC Modeling Report, the total concentration of each pollutant required to be modeled (see above) is less than the NAAQS for all relevant averaging periods.

This final stage is usually to determine how much of the PSD Increment the proposed construction of the facility consumes, along with all other increment consuming sources. This value may not exceed the PSD Increment. PSD Increments are the maximum concentration increases above a baseline concentration that are allowed in a specific area (note there are not increments for the NO_2 and SO_2 1-hour standards). As shown in Table 7-5 of the CMC Modeling Report, the total concentration is less than the PSD increment for each pollutant and all relevant averaging times.

CMC, therefore, passes all the required Air Quality Impact Analysis tests as required for Class II Areas under 45CSR14. Attachment A to this evaluation is a report prepared by Jon McClung (for the complete report with all the attachments, please see CMC's Modeling Report) that discusses in depth the above summarized analysis.

Additional Impacts Analysis - 45CSR14, Section 12

§45-14-12 requires an applicant to provide "*an analysis of the impairment to visibility, soils, and vegetation that would occur as a result of the source or modification and general commercial, residential, industrial, and other growth associated with the source or modification*." CMC provided an Additional Impacts Analysis in Section 5 of their Modeling Report (and summarized under Section 7.3) submitted on May 10, 2023. The following is a summary of that analysis. It is important to note that no specific thresholds (other than indirectly the secondary NAAQS) have been promulgated by USEPA to determine if any quantified additional impacts are beyond those considered reasonable for a proposed source.

Growth Analysis

CMC provided a qualitative growth analysis in determining the impact of the proposed operation of the facility. While they expect the CMC facility to "employ approximately 200 permanent staff," they state that "many of the construction workers and permanent staff will be hired locally and will already reside and conduct business in the surrounding area" and that "the proposed Project is not expected to cause a substantial shift of population or a substantial increase in industrial, commercial, and residential growth in the area." Based on this, CMC concludes "because limited commercial, industrial, or residential growth is expected as a result of the proposed Project, negligible growth-related ambient air impacts are expected."

Soil and Vegetation Analysis

The USEPA developed the secondary NAAQS to represent levels that "provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings." Therefore, if the impacts from a source are found to be less than the secondary NAAQS, emissions from that project may be reasonably determined to not result in harmful effects to either soils or vegetation. Based on the air dispersion modeling report, (see Attachment A), the facility has shown that the impacts from the facility will be below the secondary NAAQS.

In addition to meeting the secondary NAAQS, CMC also conducted a quantitative analysis on the potential impact on soils and vegetation that are present near the proposed project. These analyses are present in detail in Sections 5.2.1 and 5.2.2 of the CMC Modeling Report, respectively, and summarized in Section 7.3.2 of the same report. Using the screening values and analysis methodology contained within the EPA Document 450/2-81-078 "A Screening Procedure for the Impacts of Air Pollution Sources on Plants, Soils, and Animals," CMC concluded that the potential impacts from the proposed facility would not exceed the screening values that indicate a potential impact on soils or vegetation.

Additional Visibility Analysis

In addition to CMC's visibility analysis contained within the review of a source's secondary NAAQS impact, they also provided a specific screening analysis (Sections 5.3 and 7.3.4 of the CMC Modeling Report) to determine the impact on visibility at five (5) locations:

- Fort Frederick State Park (11.83 km: ~39.61350/-78.00623);
- Antietam National Battlefield (11.81 km: ~39.46844/-77.73884);
- Harpers Ferry National Historical Park (24.78 km: ~39.31793/–77.75819);
- C&O Canal: Williamsport Visitor Center (8.68 km: ~39.60108/–77.82670); and
- C&O Canal: Ferry Hill Visitor Center (13.31 km: ~39.43597/–77.79838).

To conduct the visibility analysis, CMC used the EPA VISCREEN Model. Emission sources of particulates and NO_x can cause visible plumes if emission rates are sufficiently large. VISCREEN is designed to (very conservatively) calculate the potential impact of a plume of specified emissions for specific transport and dispersion conditions. The VISCREEN model uses two levels of analysis to determine if impacts will potentially impact visibility at a specific point. Level 1 screening, the easiest to set up and run, is designed to provide a very conservative estimate of plume visual impacts and uses worst case potential meteorological conditions to transport the plume to the observer. Level 2 VISCREEN modeling is a refined version of Level 1 screening that a dispersion coefficient and wind speed representative of the region encompassing both the proposed source and area. Based on the VISCREEN Level 1 results, impacts at Harper's Ferry were screened out and did not require Level 2 analysis. The outcome of the Level 2 analysis screened out the remaining locations specified above (and, therefore, even more refined analysis methods were not required). Based on the VISCREEN analysis, CMC concluded that there would be no substantive visibility impairment at the five (5) sensitive locations listed above.

Conclusions Regarding Additional Impacts Analysis

As noted above, no quantified state or federal standards have been promulgated concerning the potential impacts analyzed under Section 12. In the absence of statutory thresholds, it is the role of the regulatory agency to make a qualitative assessment of the potential impacts on the values identified under Section 12. Based on the size, nature, and location of the proposed source, as well as the submitted analysis (including the quantitative analyses submitted), the DAQ concludes that none of the metrics identified in Section 12 (visibility, soils, and vegetation) will be substantively impaired from the proposed construction of the steel mill.

Minor Source Baseline Date - Section 2.42.b

On May 12, 2023, Permit Application R14-0040 was deemed complete. When a PSD application is deemed complete, the minor source baseline date (MSBD) is triggered in the county where the source is proposed for each pollutant that is subject to PSD analysis. In addition, the MSBD is also triggered in any other in-state county where the proposed source has impacts that exceed the significant impact level (SIL) for that pollutant. A MSBD may only be triggered once. As shown in the table below, each MSBD has already been triggered in Berkeley County and in Jefferson County, so this permit application can have no impact on the MSBD's in either of those counties. Based on the modeling report submitted by CMC, there were receptors in Morgan County that were triggered for the 1-hour NO_2 and 1-hour SO_2 NAAQS standards. However, as there is no 1-hour NO_2 or 1-hour SO_2 increment, there is not at this time any MSBD for the 1-hour NO_2 or 1-hour SO_2 increment. Therefore, the 1-hour NO_2 and 1-hour SO_2 increment MSBD is not triggered for Morgan County as it is only applicable to the SIL exceeded.

Table 23: Minor Source Baseline Date Triggering

Pollutant	Morgan County	Berkeley County	Jefferson County
NO_2	n/a(2)	6/04/01(1)	12/21/17(1)
$PM_{2.5}$	n/a	3/03/17(1)	12/21/17(1)
PM_{10}	n/a	12/27/01(1)	12/21/17(1)
SO_2	n/a	12/21/17(1)	12/21/17(1)

(1) Previously Triggered.
(2) There were no SIL exceedances in Morgan County for the annual NO_2 standard, only the 1-hour NO_2 standard (see discussion above).

ANALYSIS OF NON-CRITERIA REGULATED POLLUTANTS

This section provides information on those regulated pollutants that may be emitted from CMC's proposed steel mill and that are not classified as "criteria pollutants." Criteria pollutants are defined as Carbon Monoxide (CO), Lead (Pb), Oxides of Nitrogen (NO_x), Ozone, Particulate Matter (PM_{10} and $PM_{2.5}$), and Sulfur Dioxide (SO_2). These pollutants have NAAQS set for each that are designed to protect the public health and welfare. Other pollutants of concern, although designated as non-criteria *and without national concentration standards*, are regulated through various state and federal programs designed to limit their emissions and public exposure. These programs include federal source-specific HAP regulations promulgated under 40 CFR 61 and 40 CFR 63 (NESHAPS/MACT), and WV Legislative Rule 45CSR27 that regulates certain HAPs defined as Toxic Air Pollutants (TAPs). Any potential applicability to these programs is discussed above under REGULATORY APPLICABILITY.

The majority of non-criteria regulated pollutants fall under the definition of HAPs which are compounds identified under Section 112(b) of the Clean Air Act (CAA) as pollutants or groups of pollutants that EPA knows or suspects *may* cause cancer or other serious human health effects. These adverse health affects, however, may be associated with a wide range of ambient concentrations and exposure times and are influenced by source-specific characteristics such as emission rates and local meteorological conditions. Health impacts are also dependent on a multiplicity of factors that affect variability in humans such as genetics, age, health status (e.g., the presence of pre-existing disease), and lifestyle. As stated previously, *there are no applicable federal* *or state ambient air quality standards for these specific chemicals*. For a complete discussion of the potential health effects of each compound listed in this section, refer to the IRIS database located at www.epa.gov/iris. It is important to note that the USEPA does not divide the various HAPs into further classifications based on toxicity or if the compound is a suspected carcinogen.

The following table lists each HAP currently identified in the permit application as potentially emitted in an amount greater than 20 lbs/year (0.01 tons/year) from the proposed facility (a full list of all HAPs emitted and their associated emission rates is included as Table A-18a in the permit application). Additionally, information concerning the pollutant, and the associated carcinogenic risk (as based on analysis provided in the Integrated Risk Information System (IRIS)), and any potentially applicable MACT is provided in Attachment D.

Table 24: Hazardous Air Pollutants

Pollutant	CAS #	PTE (tons/yr)
VOC-HAPs		
Formaldehyde	50-00-0	0.021
n-Hexane	110-54-3	0.474
PM-HAPs(1)		
Antimony	7440-36-0	0.016
Cadmium	7440-4309	0.069
Chromium	7440-47-3	0.248
Cobalt	7440-48-4	0.015
Lead	7439-92-1	0.527
Manganese	7439-96-5	1.226
Mercury	7439-97-6	0.204
Nickel	7440-02-0	0.015

(1) The PM-HAPs identified by CMC as emitted from the EAF/LMS (some trace amounts of several of the PM-HAPs are also emitted from PNG/LPG combustion sources but can be neglected as the vast majority is emitted from the EAF/LMS) are all defined by EPA as inclusive of the elemental form of the pollutant (where applicable) and the compounds formed by such elements. The following emission rates are inclusive of all species of emissions that may contain the elements listed.

Fluoride

CMC has estimated a facility-wide PTE of Fluoride (16984-48-8) of 3.24 tons/year. Fluoride is not defined as a HAP under Section 112(b) but is defined under this section as a non-criteria regulated pollutant (regulated under 45CSR14). Fluoride is a naturally-occurring component of rocks and soil (the largest emitter of which is volcanoes) and is also found naturally in the air, water, plants, and animals. Fluoride in many areas is added to drinking water to promote healthy teeth. Anthropogenic sources of fluoride air emissions include many industrial sources including steel production. The fluorides emitted from the proposed CMC facility are in the form of particulate matter and are emitted only from the EAF/LMS. Particulate matter emissions of fluoride settle in the environment and may then be introduced into the ecosystem through absorption and consumption by animals. There is no entry in the IRIS database for fluoride. An article on the extant toxicology studies of fluoride is located at:

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7261729/.

As a pollutant subject to BACT, the emissions of fluoride are strongly controlled through the use of BACT-level particulate matter control technology as described above: the EAF/LMS DEC system, canopy hood, and the EAF Baghouse.

GHGs

GHGs (gases that trap heat in the atmosphere) is collectively the air pollutant defined in 40 CFR 86, Section §86.1818-12(a)(1) as the aggregate group of six greenhouse gases: carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride (SF_6). GHGs are included in this section as they are regulated under 45CSR14 and are subject to the BACT requirements therein (see PSD Requirements above). GHGs as regulated collectively have no direct toxicity and have no entry in the IRIS database. For information on GHGs, see the information on EPA's website:

https://www.epa.gov/ghgemissions.

MONITORING, COMPLIANCE DEMONSTRATIONS, REPORTING, AND RECORDING OF OPERATIONS

Monitoring and Compliance Demonstrations

The primary purpose of emissions monitoring is to determine continuous compliance with emission limits and operating restrictions in the permit over a determined averaging period. Emissions monitoring may include any or all of the following:

- Real-time continuous emissions monitoring to sample and record pollutant emissions (CEMS, COMS);
- Monitoring of plant-wide variables to limit the scope of the plant as applied for;
- Parametric monitoring of variables pre-determined to be proportional (at a known ratio) to emissions (recording of material throughput, fuel usage, production, etc.);
- Real-time tracking of materials and pollutant percentages used in processes where evaporation emissions are expected;
- Monitoring of control device performance indicators (pressure drops, liquid flow rates, oxidizer temperatures, etc.) to guarantee efficacy of pollution control equipment; and
- Visual stack observations to monitor opacity.

It is the permittee's responsibility to record, certify, and report the monitoring results so as to verify compliance with the emission limits. Where emissions are based on the maximum rated short and long-term capacity of units, generally no continuous emissions or parametric monitoring is required as compliance with the emission limits is based on the specific limited capacity of the units.

For the proposed CMC Steel Mill, a mix of the above methods are used to give a reasonable assurance that continuous compliance with emission limits is being maintained. Specifically, some examples include:

- Use of CEMS (for CO and NO_x) on the EAF Baghouse [4.2.4];
- Monitoring of the production of steel cast [Table 4.2.3];
- Parametric throughput monitoring on selected material handling throughputs, storage tank throughputs, and hours of operation on the emergency engines [Table 4.2.3];
- Control device monitoring on EAF Baghouse [Table 4.2.10]; and
- Visible emissions monitoring, both based on statutory requirements and source specific requirements, will be required on all applicable sources with opacity requirements [Table 4.2.11].

In addition to site-specific monitoring and compliance demonstrations, CMC is required to meet all applicable statutory requirements including those given under 40 CFR 60, Subpart AAa and 40 CFR 63, Subpart YYYYY. Refer to Section 4.2 of the draft permit for all the unit-specific monitoring, compliance demonstration, reporting, and record-keeping requirements (MRR).

Record-Keeping

CMC will be required to follow the standard record-keeping boilerplate language as given under Section 4.4 of the draft permit. This will require CMC to maintain records of all data monitored in the permit and keep the information for a minimum of five years. All collected data will be available to the Director upon request. CMC will also be required to follow all the record-keeping requirements as applicable under the variously applicable state and federal rules and regulations.

Reporting

Beyond the requirement to follow all reporting requirements as applicable under the variously applicable state and federal rules and regulations, CMC will be required to submit the following substantive reports:

- The results of stack testing within sixty (60) days of completion of the test. The test report shall provide the information necessary to document the objectives of the test and to determine whether proper procedures were used to accomplish these objectives [3.3.1(d)];

- When necessary, any deviation of the allowable visible emission requirement for any emission source discovered during observation using 40CFR Part 60, Appendix A, Method 9 must be reported in writing to the Director of the DAQ as soon as practicable, but within ten (10) calendar days, of the occurrence and shall include, at a minimum, the following information: the results of the visible determination of opacity of emissions, the cause or suspected cause of the violation(s), and any corrective measures taken or planned [4.2.11(e)];

- A report detailing all required monitoring (with the exception of visibility monitoring required under 4.2.11(c)) on or before September 15 for the reporting period January 1 to June 30 and March 15 for the reporting period July 1 to December 31. All instances of deviation from permit requirements must be clearly identified in such reports [4.5.1(a)]; and

- On or before March 15, a certification of compliance with all requirements of the draft permit for the previous calendar year ending on December 31 [4.5.1(b)].

PERFORMANCE TESTING OF OPERATIONS

Performance testing is required to verify, where reasonable and appropriate, the emissions or emission factors used to determine emission units' potential-to-emit and to show initial or periodic compliance with permitted emission limits. Performance testing must be conducted in accordance with accepted test methods and according to a protocol approved by the Director prior to testing (as outlined under 3.3 of the draft permit). The following table details the initial (within 60 days after achieving the maximum permitted production rate of the emission unit in question, but not later than 180 days after initial startup of the unit) performance testing required of specific emission units:

Table 25: Performance Testing Requirements

Emission Unit(s)	Emission Point(s)	Pollutants	Limit(1)
EAF1/LMS1	BH1(2)	All Pollutants under Table 4.1.4(a) with the exception of Total HAPs, and CO_2e.	PPH gr/dcsf (PM)

(1) Where applicable, test results shall also be used to show compliance with lb/ton, lb/mmBtu, or other BACT performance limits.

(2) Initial and periodic performance testing on PM emitted from BH1 shall be in accordance with the procedures outlined under §60.18 and §60.275a.

Periodic testing will then be required as based on the schedule given in Table 4.3.3. of the draft permit. Refer to Section 4.3 of the draft permit for all performance testing requirements.

RECOMMENDATION TO DIRECTOR

The WVDAQ has preliminarily determined that the proposed construction of CMC Steel US, LLC's steel mill located near Martinsburg, Berkeley County will meet the emission limitations and conditions set forth in the DRAFT permit and will comply with all current applicable state and federal air quality rules and regulations including 45CSR14, the WV Legislative Rule implementing the Prevention of Significant Deterioration (PSD) program. A final decision regarding the DRAFT permit will be made after consideration of all public comments. It is the recommendation of the undersigned, upon review and approval of this document and the DRAFT permit, that the WVDAQ, pursuant to §45-14-17, go to public notice on Permit Application R14-0040.

Joseph Kessler

Digitally signed by: Joseph Kessler
DN: CN = Joseph Kessler email = joseph.r.kessler@wv.gov C = US O = WV Department of Environmental Protection OU = Division of Air Quality
Date: 2023.05.12 08:29:14 -04'00'

Joseph R. Kessler, PE
Engineer

Attachment A: Air Dispersion Modeling Report

CMC Corporation: West Virginia Steel Mill

Permit Number R14-0040: Facility ID 003-00286

MEMO

Jonathan D. McClung

Digitally signed by: Jonathan D. McClung
DN: CN = Jonathan D. McClung email = JON.D.MCCLUNG@WV.GOV C = AD O = Department of Environmental Protection OU = Division of Air Quality
Date: 2023.05.11 20:08:00 -04'00'

To: Joe Kessler
From: Jon McClung
CC: Laura Jennings, Bev McKeone, Ed Andrews, Steve Pursley, Rex Compston
Date: May 11, 2023
Re: Air Quality Impact Analysis Review
CMC Steel US, LLC
CMC Steel West Virginia
PSD Permit Application: R14-0040
Plant ID: 003-00286

I have completed my review and replication of the air quality impact analysis submitted by CMC Steel US, LLC (CMC) in support of the PSD permit application (R14-0040) for the proposed construction of a steel making plant in Martinsburg, West Virginia, within Berkeley County. Review and replication of various components of the modeling analysis were performed by Ed Andrews, Joe Kessler, Steve Pursley, and Rex Compston. This dispersion modeling analysis is required pursuant to §45-14-9 (Requirements Relating to the Source's Impact on Air Quality). CMC has demonstrated that the proposed project will not cause or contribute to any violations of applicable NAAQS or increment standards.

CMC submitted an air quality modeling protocol, prepared by Trinity Consultants, to the Division of Air Quality (DAQ) via hand-delivery on December 7, 2022 and via e-mail on December 14, 2022. A revised protocol was submitted on March 10, 2023. Electronic modeling files supporting the modeling protocol were submitted on March 10, 2023 and March 14, 2023. The DAQ approved the revised protocol on March 28, 2023. A modeling report (marked draft) and associated electronic modeling files were submitted on April 7, 2023. A revised modeling report was submitted on May 9, 2023. A revised table in the report was submitted on May 11, 2023. Additional and/or revised electronic modeling files were submitted on April 13, 19, 21, 25, 26, 2023 and May 2 & 9, 2023.

As part of the review process, an applicant for a PSD permit performs the air quality impact analysis and submits a report and the results to the DAQ. The DAQ then reviews and replicates the modeling analysis to confirm the modeling inputs, procedures, and results. This memo contains a synopsis of the modeling analysis. For a complete technical description of the modeling analysis, please consult the complete administrative record that contains communications with the applicant, the protocol, modeling analysis reports, and electronic modeling files submitted by the applicant.

This review is for the Class II area surrounding the proposed project site. Class I areas within 300 km of the project site are: Dolly Sods Wilderness (WV), Otter Creek Wilderness (WV), James River Face Wilderness (Virginia), and Shenandoah National Park (Virginia). The Federal Land Managers (FLMs) responsible for evaluating potential affects on Air Quality Related

Values (AQRVs) for federally protected Class I areas were consulted. Based on the emissions from the proposed project and the distances to the Class I areas the National Park Service and U.S. Forest Service have stated a Class I analysis for this project is not required.

The proposed Project will manufacture long steel products, including rebar and rebar spools, from scrap metal. New equipment to be authorized for construction and operation at the new steel mill will include an electric arc furnace (EAF), a ladle metallurgy station (LMS), a continuous caster, and ancillary emission sources.

The following air emission sources are proposed for the steel manufacturing plant:

A. Point Sources
    1. Meltshop Baghouse (Model ID BH1)
    2. Fluxing Agent Storage Silo No. 1 (Model ID FLXSLO11)
    3. Fluxing Agent Storage Silo No. 2 (Model ID FLXSLO12)
    4. Carbon Storage Silo No. 1 (Model ID CARBSLO1)
    5. EAF Baghouse Dust Silo (Model ID DUSTSLO1)
    6. Non-Contact Cooling Tower 1 - Cell 1 (Model ID CTNC11a)
    7. Non-Contact Cooling Tower 1 - Cell 2 (Model ID CTNC11b)
    8. Non-Contact Cooling Tower 2 - Cell 1 (Model ID CTNC12a)
    9. Non-Contact Cooling Tower 2 - Cell 2 (Model ID CTNC12b)
    10. Contact Cooling Tower - Cell 1 (Model ID CTC1a)
    11. Contact Cooling Tower - Cell 2 (Model ID CTC1b)
    12. Emergency Generator 1 (Model ID EGEN1)
    13. Emergency Fire Water Pump 1 (Model ID EFWP1)
    14. Cutting Torches (Model ID TORCH1)

B. Area Sources
    1. ECS Scrap Building Storage Pile A (Model ID W51A)
    2. ECS Scrap Building Storage Pile B (Model ID W51B)
    3. ECS Scrap Building Storage Pile C (Model ID W51C)
    4. ECS Scrap Building Overage Scrap Pile (Model ID W51D)
    5. Outside Rail Scrap 5k Pile A (Model ID W51E)
    6. Outside Rail Scrap 5k Pile B (Model ID W51F)
    7. Outside Rail Scrap 5k Pile C (Model ID W51G)
    8. Outside Rail Scrap 5k Pile D (Model ID W51H)
    9. Outside Truck Scrap 5k Pile A (Model ID W51K)
    10. Outside Truck Scrap 5k Pile B (Model ID W51L)
    11. Outside Truck Scrap 5k Pile C (Model ID W51M)
    12. Outside Truck Scrap 5k Pile D (Model ID W51N)
    13. Alloy Aggregate Storage Pile (Model ID W61)
    14. SPP Slag Storage Pile (Model ID W71A)
    15. SPP Piles (Model ID W71B)

16. Residual Scrap Storage Pile in Scrap Yard (Model ID W81)
17. Mill Scale Pile (Model ID W111)

C. Volume Sources - Drop Points
   1. Inside ECS Building Drop Points, Scrap (Model ID TR51A)
   2. Outside ECS Building Drop Points, Scrap, Storage Area (Model ID TR51B)
   3. Outside Rail Bins Drop Point, Scrap (Model ID TR51C)
   4. Outside Truck Bins Drop Point, Scrap (Model ID TR51E)
   5. Inside ECS Building Drop Points, Fluxing Agent (Model ID TR71)
   6. Outside Drop Points, Alloy Aggregate (Model ID TR81)
   7. Inside Drop Points, Spent Refractory and Other Waste (Model ID TR91A)
   8. Outside Drop Points, Spent Refractory and Other Waste (Model ID TR91B)
   9. Outside SPP Pile Drop Points, Slag (Model ID TR11A)
   10. SPP Material Transfers, Crusher, and Screen (Model ID TR11B)
   11. Outside Drop Points, Residual Scrap Pile (Model ID TR131)
   12. Outside Drop Points, Mill Scale Pile (Model ID TR141)
   13. Ball Drop Crushing (Model ID CR1)
   14. Trailer Parking Area (Model ID TRAILER1 through TRAILER5)

D. Volume Sources - Roads - The roads were modeled as a series of adjacent volume sources.

E. Building Vent Sources
   1. Caster Vent (Model ID CV1), modeled as bouyant line
   2. Rolling Mill Vent (Model ID RMV1), modeled as bouyant line
   3. Cooling Bed Vents (Model ID CBV1), modeled as bouyant line
   4. Spooler Vent (Model ID SPV1), modeled as line

Berkeley County, WV is in attainment or unclassifiable/attainment status for all criteria pollutants. The following pollutants are emitted in excess of the significant emission rate and are subject to PSD review though dispersion modeling: NO_x, CO, SO_2, PM_{10}, $PM_{2.5}$, and Flourides (F). Also, CMC addressed secondary formation of $PM_{2.5}$ as a result of NO_x and SO_2 emissions as well as formation of ozone from NO_x and VOC emissions. No NAAQS or PSD increment standards exist for flourides - CMC demonstrated that the maximum modeled concentration of F is below the significant monitoring concentration. The facility wide maximum Project emission rates are in Table 1 (from Page 6-3 of Permit Application, 5/9/2023).

Table 1. Project Emission Rates (Annual tpy)

Pollutant	PM_{10}	$PM_{2.5}$	NO_x	CO	VOC	SO_2	Flourides
Emissions	145	139	137	1,328	100	101	3.29

Table 2 presents a summary of the air quality standards that were addressed for the CMC Project. The pollutants, averaging times, increments, significant impact levels (SILs) and National Ambient Air Quality Standards (NAAQS) are listed. The NAAQS are incorporated by reference in WV Legislative Rule 45CSR8 and the PSD increments are found in 45CSR14. The SIL for 1-hour NO_2 and 1-hour SO_2 represents the values the Division of Air Quality has implemented as described in the memorandum included in Attachment A.

Table 2. Ambient Air Quality Standards, SILs, and PSD Increments (µg/m3)

Pollutant	Averaging Period	SIL	Class II PSD Increment	NAAQS
Ozone	8-hr	1 ppb	-	70 ppb
CO	1-hour	2000	-	40,000
	8-hour	500	-	10,000
SO_2	1-hr	7.8	-	196
	3-hr	25	512	-
	24-hr	5	91	-
	Annual	1	20	-
NO_2	1-hour	7.5	-	188
	Annual	1	25	100
PM_{10}	24-hour	5	30	150
	Annual	1	17	-
$PM_{2.5}$	24-hour	1.2	9	35
	Annual	0.2	4	12

An air quality impact analysis, as a part of the PSD review process, is a two tiered process. First, a proposed facility is modeled by itself, on a pollutant-by-pollutant and averaging-time basis, to determine if ambient air concentrations estimated by the model exceed the significant impact level (SIL). If ambient impacts are below the SIL then the proposed source is deemed to not have a significant impact and no further modeling is required. If ambient impacts exceed the SIL, then the modeling analysis proceeds to the second tier of cumulative modeling. The cumulative modeling analysis consists of modeling the proposed facility with existing off-site sources and adding representative background concentrations and comparing the results to PSD increments (increment consuming and expanding sources only, no background concentration) and NAAQS. To receive a PSD permit, the proposed source must not cause or contribute to an exceedance of the NAAQS or PSD increments. In cases where the PSD increments or NAAQS are predicted to be exceeded in the cumulative analysis, the proposed source would not be considered to cause or contribute to the exceedance if the project-only impacts are less than the SIL, and the applicant may still receive a permit if all other requirements are met.

On January 22, 2013, the U.S. Court of Appeals for the District of Columbia Circuit vacated two provisions in EPA's PSD regulations containing SILs for $PM_{2.5}$. The court granted the EPA's request to remand and vacate the SIL provisions in Sections 51.166(k)(2) and 52.21(k)(2) of the regulations so that EPA could address corrections. EPA's position remains that the court decision does not preclude the use of SILs for $PM_{2.5}$ but special care should be taken in applying the SILs for $PM_{2.5}$. This special care involves ensuring that the difference between the NAAQS and the representative measured background concentration is greater than the SIL. If this difference is greater than the SIL, then it is appropriate to use the SIL as a screening tool to inform the decision as to whether to require a cumulative air quality impact analysis. As shown in Table 3, for both the 24-hr and annual averaging time for $PM_{2.5}$, this difference is greater than the SIL and it is appropriate to use the SIL as a screening tool.

Table 3. NAAQS, Monitor Design Values, and Significant Impact Levels

Pollutant	Avg. Period	NAAQS ($\mu g/m^3$)	SIL ($\mu g/m^3$)	Background ($\mu g/m^3$)	NAAQS - Background difference ($\mu g/m^3$)	Greater than SIL?
$PM_{2.5}$	24-hr	35	1.2	23	12	Yes
$PM_{2.5}$	Annual	12	0.2	8	4	Yes

Modeling Basis

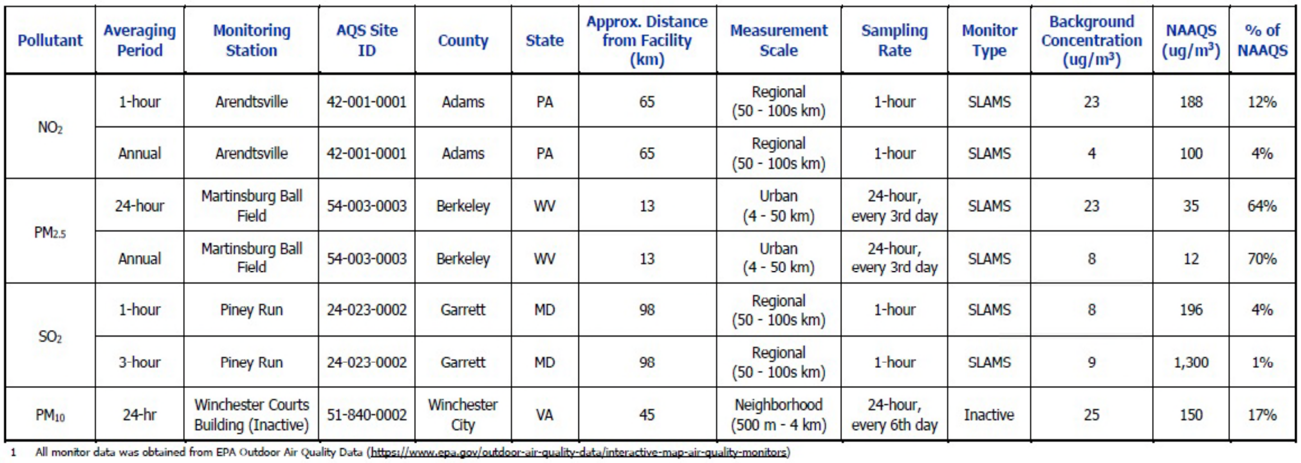
The modeling system used conforms to 40 CFR 51 Appendix W, applicable guidance, the approved protocol, and is summarized below:

- CMC used the regulatory dispersion model and supporting programs: AERMOD (version 22112), AERMET (version 22112), AERMINUTE (version 15272), AERMAP (version 18081), AERSURFACE (version 20060), and BPIPPRM (version 04274). The AERMOD modeling system (AERMOD, AERMET, AERMAP) is the regulatory default modeling system for near-field (<50km) regulatory dispersion modeling.
- AERMET was used to process five years of surface meteorological data from the Martinsburg, WV Airport (ICAO code: KMRB; WBAN Station ID 13734). Upper air data from Washington Dulles Airport (ICAO code: KIAD; WBAN

Station ID 93734) were used.

- AERSURFACE was used to develop appropriate surface characteristic (albedo, Bowen ratio, surface roughness length) inputs to AERMET.
- A nested receptor grid was developed and AERMAP was used to determine terrain heights and hill height scales for use by AERMOD to determine maximum modeled concentrations.
- The background monitoring data used in the cumulative modeling analysis is in Table 4 (from Page 3-51 of the CMC modeling report, 5/9/2023).

Table 4. Background Monitor Design Values



Pollutant	Averaging Period	Monitoring Station	AQS Site ID	County	State	Approx. Distance from Facility (km)	Measurement Scale	Sampling Rate	Monitor Type	Background Concentration (ug/m^3)	NAAQS (ug/m^3)	% of NAAQS
NO_2	1-hour	Arendtsville	42-001-0001	Adams	PA	65	Regional (50 - 100s km)	1-hour	SLAMS	23	188	12%
	Annual	Arendtsville	42-001-0001	Adams	PA	65	Regional (50 - 100s km)	1-hour	SLAMS	4	100	4%
$PM_{2.5}$	24-hour	Martinsburg Ball Field	54-003-0003	Berkeley	WV	13	Urban (4 - 50 km)	24-hour, every 3rd day	SLAMS	23	35	64%
	Annual	Martinsburg Ball Field	54-003-0003	Berkeley	WV	13	Urban (4 - 50 km)	24-hour, every 3rd day	SLAMS	8	12	70%
SO_2	1-hour	Piney Run	24-023-0002	Garrett	MD	98	Regional (50 - 100s km)	1-hour	SLAMS	8	196	4%
	3-hour	Piney Run	24-023-0002	Garrett	MD	98	Regional (50 - 100s km)	1-hour	SLAMS	9	1,300	1%
PM_{10}	24-hr	Winchester Courts Building (Inactive)	51-840-0002	Winchester City	VA	45	Neighborhood (500 m - 4 km)	24-hour, every 6th day	Inactive	25	150	17%

1 All monitor data was obtained from EPA Outdoor Air Quality Data (https://www.epa.gov/outdoor-air-quality-data/interactive-map-air-quality-monitors)

Ozone Analysis and Secondary Formation of $PM_{2.5}$

EPA released guidance relating to ozone and $PM_{2.5}$ permit modeling in July 2022[1]. The final guidance reflects the EPA's recommendations for how a stationary source seeking a Prevention of Significant Deterioration (PSD) permit may demonstrate that it will not cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) for ozone (O_3) and fine particulate matter ($PM_{2.5}$) and PSD increments for $PM_{2.5}$, as required under Section 165(a)(3) of the Clean Air Act and 40 CFR sections 51.166(k) and 52.21(k). This guidance provides the framework for assessing the single source impacts of ozone and secondarily formed $PM_{2.5}$ from precursor emissions. In April 2019, EPA released a guidance memorandum[2] (MERP Memorandum), referenced by the July 2022 EPA guidance document, that describes how modeled emission rates of precursors (MERPs) could be calculated as part of a Tier 1 ozone and secondary

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[1] Guidance for Ozone and Fine Particulate Matter Permit Modeling (EPA-454/R-22-005)

[2] Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone and PM2.s under the PSD Permitting Program (4/30/19)

$PM_{2.5}$ formation analysis to assess a project's emissions of precursor pollutants. The MERPs may be used to describe an emission rate of a precursor that is expected to result in ambient ozone (O_3) or fine particulate matter ($PM_{2.5}$) impact that would be less than a specific air quality concentration threshold for O_3 or $PM_{2.5}$ that a permitting authority chooses to use to determine whether an impact is significant. Additionally, the methods in this guidance can be used to quantify an estimate of impact to perform a cumulative impact analysis. Based on this guidance, CMC has quantified the potential secondary formation of $PM_{2.5}$ from NO_x and SO_2 and the quantified the impact of the Project's NO_x and VOC emissions on ozone.

The MERP Memorandum (Page 6) defines a MERP (tons/yr) and the project impact ($\mu g/m^3$) as:

$$\textbf{Eq. 1} \quad \text{MERP} = \text{appropriate SIL value} \times \frac{\text{Modeled emission rate (tpy) from hypothetical source}}{\text{Modeled air quality impact from hypothetical source}}$$

And defines the project impact as (MERP Memorandum, Page 55):

$$\text{Eq. 2} \quad \text{Project Impact} = \text{Project emission rate} \times \frac{\text{Modeled air quality impact from hypothetical source}}{\text{Modeled emission rate from hypothetical source}}$$

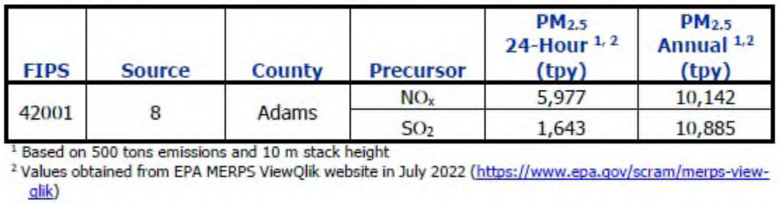
Substituting Eq. 1 into Eq. 2 yields:

$$\text{Project Impact} = \text{Project emissions} \;/\; \text{SIL x} \frac{\text{Modeled emission rate hypothetical}}{\text{Modeled impact hypothetical}} \;\text{x}\; \text{SIL}$$

$$\text{Project Impact} = \text{Project emissions} \;/\; \text{MERP} \;\text{x}\; \text{SIL}$$

CMC appropriately selected hypothetical source 8 in Adams County, PA as the most representative source from EPA's database of hypothetical modeled sources. Source 8 is the closest to the CMC Project site, approximately 84 km away. CMC utilized EPA's website at https://www.epa.gov/scram/merps-view-qlik to obtain information necessary to assess the Project's formation of secondary $PM_{2.5}$ from NO_x and SO_2 and to assess ozone impacts. Table 5 lists the MERP values for the secondary $PM_{2.5}$ assessment and Table 6 lists the MERP values for the ozone assessment.

Table 5. MERP Values for Secondary $PM_{2.5}$ assessment

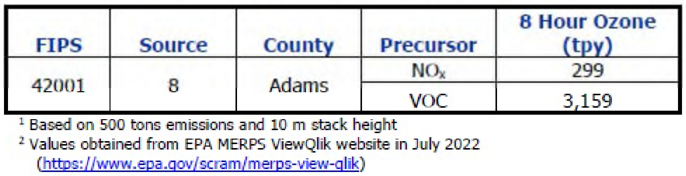


FIPS	Source	County	Precursor	$PM_{2.5}$ 24-Hour [1, 2] (tpy)	$PM_{2.5}$ Annual [1,2] (tpy)
42001	8	Adams	NO_x	5,977	10,142
			SO_2	1,643	10,885

[1] Based on 500 tons emissions and 10 m stack height

[2] Values obtained from EPA MERPS ViewQlik website in July 2022 (https://www.epa.gov/scram/merps-view-qlik)

Table 6. MERP Values for Ozone assessment



FIPS	Source	County	Precursor	8 Hour Ozone (tpy)
42001	8	Adams	NO_x	299
			VOC	3,159

[1] Based on 500 tons emissions and 10 m stack height

[2] Values obtained from EPA MERPS ViewQlik website in July 2022 (https://www.epa.gov/scram/merps-view-qlik)

For ozone, EPA has proposed a Significant Impact Level (SIL) of 1 ppb. A Project impact of less than 1 ppb is less than the SIL and is deemed insignificant and a cumulative analysis is not required. Table 7 shows the ozone SIL analysis for the Project (from Page 6-4 of the CMC modeling report, 5/9/2023). Since the estimated ozone impacts from the proposed CMC facility are below the SIL, a cumulative analysis for ozone is not necessary.

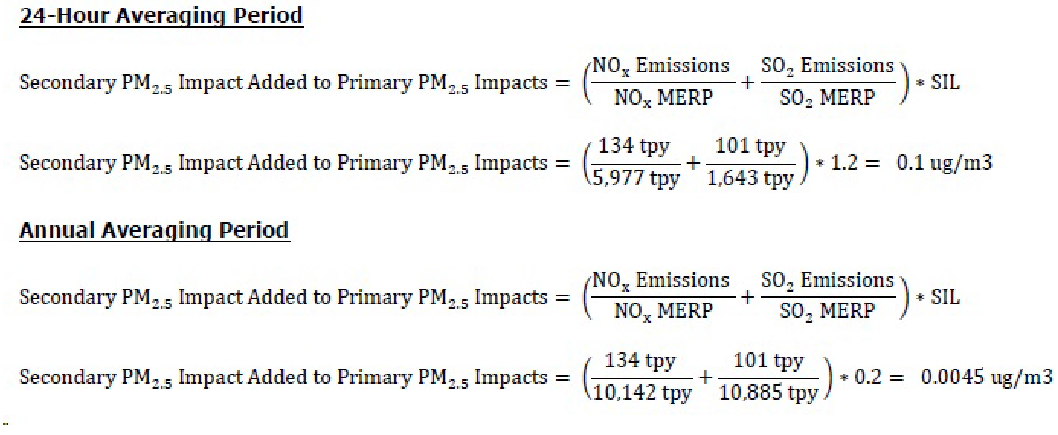
Table 7. Ozone SIL Analysis Results

$$\text{Secondary Ozone Impact} = \left(\frac{NO_x\ \text{Emissions}}{NO_x\ \text{MERP}} + \frac{\text{VOC Emissions}}{\text{VOC MERP}}\right) < 1$$

$$\text{Secondary Ozone Impact} = \left(\frac{134\ \text{tpy}}{299\ \text{tpy}} + \frac{100\ \text{tpy}}{3{,}159\ \text{tpy}}\right) = 0.48 < 1$$

Table 8 shows the results of the analysis used to determine the impact of the Project on the formation of secondary $PM_{2.5}$ (From Page 6-4 of the CMC modeling report, 5/9/2023). These values are added to the AERMOD-modeled direct impact of 24-hr $PM_{2.5}$ and Annual $PM_{2.5}$, respectively, in the SIL, NAAQS, and increment analyses.

Table 8. Assessment of Secondary Formation of $PM_{2.5}$



24-Hour Averaging Period

$$\text{Secondary } PM_{2.5} \text{ Impact Added to Primary } PM_{2.5} \text{ Impacts} = \left(\frac{NO_x \text{ Emissions}}{NO_x \text{ MERP}} + \frac{SO_2 \text{ Emissions}}{SO_2 \text{ MERP}}\right) * \text{SIL}$$

$$\text{Secondary } PM_{2.5} \text{ Impact Added to Primary } PM_{2.5} \text{ Impacts} = \left(\frac{134 \text{ tpy}}{5{,}977 \text{ tpy}} + \frac{101 \text{ tpy}}{1{,}643 \text{ tpy}}\right) * 1.2 = \ 0.1 \text{ ug/m3}$$

Annual Averaging Period

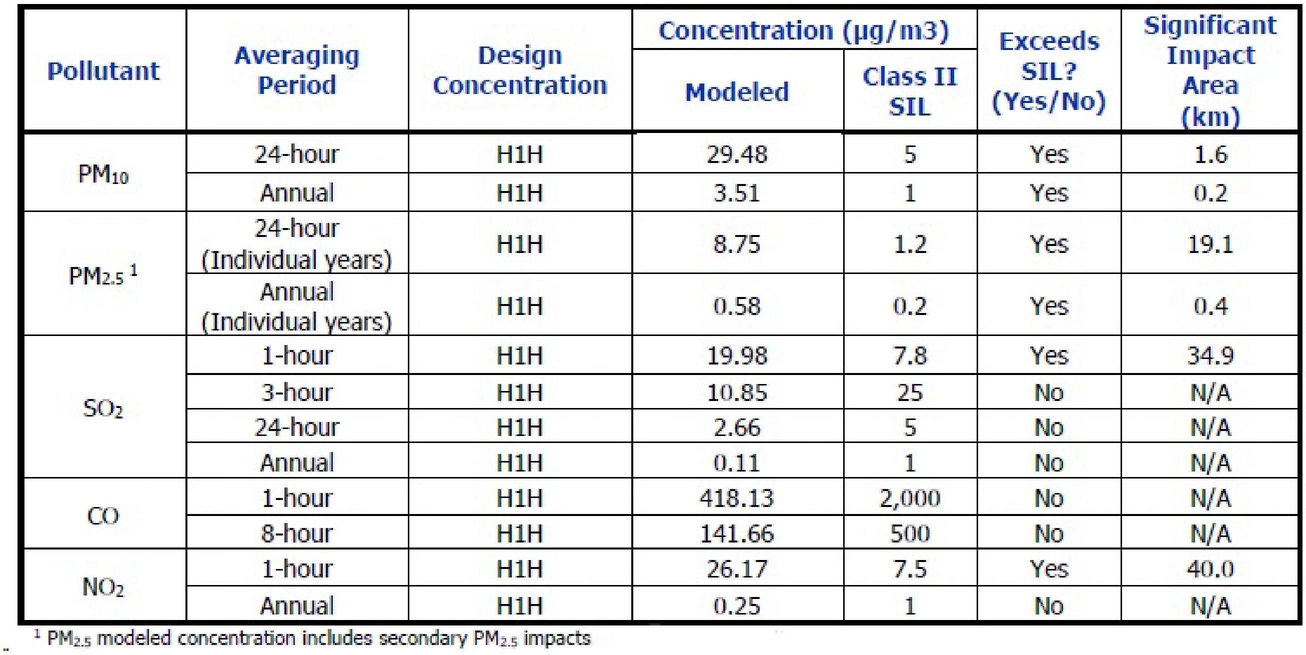
$$\text{Secondary } PM_{2.5} \text{ Impact Added to Primary } PM_{2.5} \text{ Impacts} = \left(\frac{NO_x \text{ Emissions}}{NO_x \text{ MERP}} + \frac{SO_2 \text{ Emissions}}{SO_2 \text{ MERP}}\right) * \text{SIL}$$

$$\text{Secondary } PM_{2.5} \text{ Impact Added to Primary } PM_{2.5} \text{ Impacts} = \left(\frac{134 \text{ tpy}}{10{,}142 \text{ tpy}} + \frac{101 \text{ tpy}}{10{,}885 \text{ tpy}}\right) * 0.2 = \ 0.0045 \text{ ug/m3}$$

Class II SIL Analysis Results (Tier I)

The results of the Significant Impact Analysis for the CMC Project sources are included in Table 9. (from Page 7-1 of the CMC modeling report, 5/9/2023). Secondary impacts of $PM_{2.5}$ are added to the direct impacts of $PM_{2.5}$ to compare to the $PM_{2.5}$ SILs. Any pollutant/averaging time result exceeding the Significant Impact Level (SIL) must be addressed in a cumulative analysis. A pollutant/averaging time with a result below the SIL is considered insignificant and no further modeling analysis is required. A cumulative modeling analysis is required for the following pollutant(s)/averaging time(s): 1-hr NO_2, 24-hr and annual PM_{10}, 24-hr and Annual $PM_{2.5}$, and 1-hr SO_2. No further modeling is required for the pollutants below the respective SILs.

Table 9. Class II SIL Analysis



Pollutant	Averaging Period	Design Concentration	Concentration (µg/m3)		Exceeds SIL? (Yes/No)	Significant Impact Area (km)
			Modeled	Class II SIL		
PM_{10}	24-hour	H1H	29.48	5	Yes	1.6
	Annual	H1H	3.51	1	Yes	0.2
$PM_{2.5}$ [1]	24-hour (Individual years)	H1H	8.75	1.2	Yes	19.1
	Annual (Individual years)	H1H	0.58	0.2	Yes	0.4
SO_2	1-hour	H1H	19.98	7.8	Yes	34.9
	3-hour	H1H	10.85	25	No	N/A
	24-hour	H1H	2.66	5	No	N/A
	Annual	H1H	0.11	1	No	N/A
CO	1-hour	H1H	418.13	2,000	No	N/A
	8-hour	H1H	141.66	500	No	N/A
NO_2	1-hour	H1H	26.17	7.5	Yes	40.0
	Annual	H1H	0.25	1	No	N/A

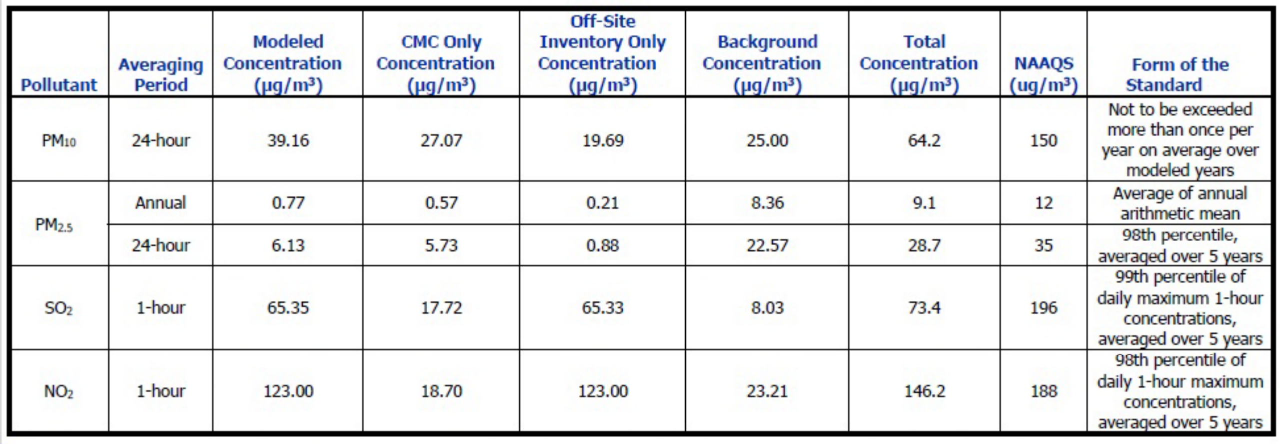
[1] $PM_{2.5}$ modeled concentration includes secondary $PM_{2.5}$ impacts

<u>Cumulative Analysis Results (Tier II)</u>

The cumulative analysis consists of both the NAAQS analysis and PSD increment analysis. The cumulative analysis for demonstrating compliance with the applicable NAAQS includes the modeled impacts from the CMC Project sources, off-site existing sources, and representative monitored background concentrations. For off-site existing sources, the modeled emission rates represent the two-year average actual emissions. CMC proposed and followed a procedure to identify the appropriate off-site sources to include in the NAAQS modeling source inventory. The background concentration data is summarized above with detailed information in the applicant's modeling report. Secondary impacts of $PM_{2.5}$ are added to the direct impacts of $PM_{2.5}$ to compare to the $PM_{2.5}$ NAAQS.

The SIL analysis is based on the highest-first-high modeled concentration. The cumulative analysis is based on the modeled concentration in the form of the standard for each pollutant and averaging time and varies for NAAQS and PSD increments. The results of the NAAQS analysis are included in Table 10 (From Page 7-1 of the CMC modeling report, revised 5/11/2023). No modeled violations of the NAAQS are predicted.

Table 10. Class II NAAQS Analysis Results

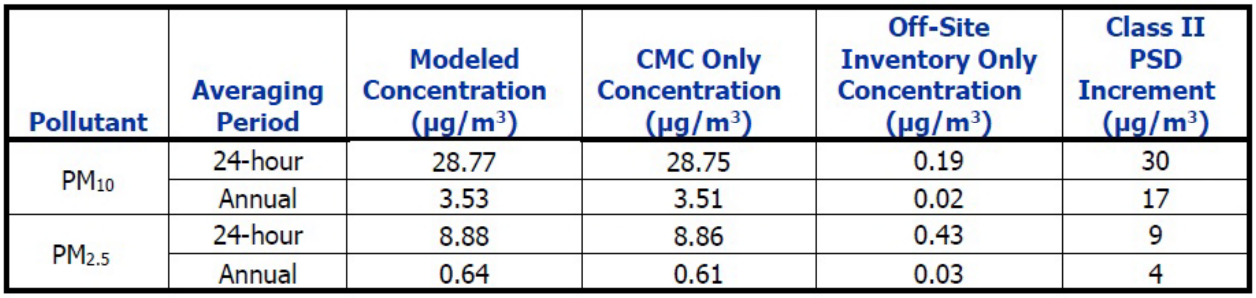


Pollutant	Averaging Period	Modeled Concentration (µg/m³)	CMC Only Concentration (µg/m³)	Off-Site Inventory Only Concentration (µg/m³)	Background Concentration (µg/m³)	Total Concentration (µg/m³)	NAAQS (ug/m³)	Form of the Standard
PM_{10}	24-hour	39.16	27.07	19.69	25.00	64.2	150	Not to be exceeded more than once per year on average over modeled years
$PM_{2.5}$	Annual	0.77	0.57	0.21	8.36	9.1	12	Average of annual arithmetic mean
	24-hour	6.13	5.73	0.88	22.57	28.7	35	98th percentile, averaged over 5 years
SO_2	1-hour	65.35	17.72	65.33	8.03	73.4	196	99th percentile of daily maximum 1-hour concentrations, averaged over 5 years
NO_2	1-hour	123.00	18.70	123.00	23.21	146.2	188	98th percentile of daily 1-hour maximum concentrations, averaged over 5 years

Table 11 shows the results of the Class II PSD Increment Analysis (From Page 7-1 of the CMC modeling report, 5/9/2023). Pursuant to 45CSR14, actual emissions from any major stationary source on which construction commenced after the major source baseline date and actual emissions increases at any stationary source occurring after the minor source baseline date affect the baseline concentration by consuming increment.

The major source baseline dates are: January 6, 1975 for PM_{10} and and October 20, 2010 for $PM_{2.5}$. For Berkeley County, WV the minor source baseline date is for March 3, 2017 for $PM_{2.5}$ and December 27, 2001 for PM_{10}. No increment standards have been proposed for 1-hr NO_2 and 1-hr SO_2. CMC included the appropriate increment consuming emission sources from Argos USA and Knauf Insulation in the increment analysis.

Table 11. PSD Class II Increment Analysis Results



Pollutant	Averaging Period	Modeled Concentration (µg/m³)	CMC Only Concentration (µg/m³)	Off-Site Inventory Only Concentration (µg/m³)	Class II PSD Increment (µg/m³)
PM_{10}	24-hour	28.77	28.75	0.19	30
	Annual	3.53	3.51	0.02	17
$PM_{2.5}$	24-hour	8.88	8.86	0.43	9
	Annual	0.64	0.61	0.03	4

Summary

The air quality impact analysis prepared and submitted by CMC to the DAQ has been reviewed and replicated and conforms to 40 CFR 51 Appendix W, applicable guidance, and the modeling protocol. No modeled violations are predicted for the applicable NAAQS and PSD increment standards, and, accordingly, CMC does not cause or contribute to any violations of the applicable NAAQS or PSD increments. No further modeling is required by CMC.

ATTACHMENT A

Division of Air Quality Memorandum regarding Interim 1-Hour Significant
Impact Levels for Nitrogen Dioxide and Sulfur Dioxide

west virginia department of environmental protection

Division of Air Quality
601 57th Street SE
Charleston, WV 25304

Earl Ray Tomblin, Governor
Randy C. Huffman, Cabinet Secretary
dep.wv.gov

MEMORANDUM

To: Jay Fedczak
Fred Durham

Cc: John Benedict
Bev McKeone
Joe Kessler
Steve Pursley

From: Jon McClung JDM

Date: January 28, 2014

Subject: Interim 1-Hour Significant Impact Levels for Nitrogen Dioxide and Sulfur Dioxide

Summary

As a follow-up to our discussions regarding the use of interim significant impact levels (SILs) for the 1-hour nitrogen dioxide (NO_2) and 1-hour sulfur dioxide (SO_2) National Ambient Air Quality Standards (NAAQS), I have conducted a detailed review of EPA's relevant guidance concerning their recommended SILs. EPA's guidance provides recommended SILs for 1-hr NO_2 and 1-hr SO_2 to serve as a useful screening tool for implementing the PSD requirements for an air quality analysis. EPA has provided recommended interim SILs since they have not yet codified final SILs through rulemaking. I have confirmed via discussions with the EPA Region 3 Modeler, Timothy A. Leon Guerrero, that the recommended SILs are consistent for use with EPA's PSD permitting program, as codified in 40 CFR 51. We have reviewed EPA's recommended interim SILs for 1-hr NO_2 and 1-hr SO_2 and concur with EPA's finding that an applicant for a PSD permit demonstrating an air quality impact at or below the SIL is *de minimis* in nature and would not cause a violation of the NAAQS. The interim SILs should be used in air quality impact assessments for PSD permit applications until EPA issues a final rule establishing SILs for 1-hr NO_2 and 1-hr SO_2.

Discussion

On February 9, 2010, EPA published a final rule, which became effective on April 12, 2010, establishing a new 1-hour NO_2 NAAQS at 100 ppb (188 $\mu g/m^3$ at 25 °C and 760 mm Hg), based on the 3-year average of the 98th-percentile of the annual distribution of the daily maximum 1-hour concentrations.

On June 22, 2010, EPA published a final rule, which became effective on August 23, 2010, establishing a new 1-hour SO_2 NAAQS at 75 ppb (196 $\mu g/m^3$ at 25 °C and 760 mm Hg), based on the 3-year average of the 99th-percentile of the annual distribution of the daily maximum 1-hour concentrations.

EPA guidance establishes that an air quality assessment for a PSD application begins with the applicant estimating the potential air quality impacts from the project source alone. If a source demonstrates an impact above a SIL then a cumulative impact analysis and PSD increment analysis is required. If modeled impacts do not exceed the SIL, the permitting authority may conclude that the project would not cause or contribute to a violation of the NAAQS and EPA would not consider it necessary to conduct a more comprehensive cumulative impact assessment. Establishing an appropriate SIL is an integral part of the PSD air quality analysis process since without it a permitting authority may not conclude that impacts below a SIL are *de minimis* and further analyses that may not be necessary to demonstrate compliance would automatically be required.

Interim 1-Hour NO_2 and 1-Hour SO_2 SILs

This memo documents the establishment, for the West Virginia PSD program, of an interim 1-hour NO_2 SIL of 4 ppb (7.5 $\mu g/m^3$), which is the same as that recommended by EPA in the June 29, 2010 memorandum from Stephen D. Page, *Guidance Concerning the Implementation of the 1-hour NO_2 NAAQS for the Prevention of Significant Deterioration Program*. This memorandum, which contains the technical analysis to determine the SIL, is appended as Attachment 1.

This memo also documents the establishment, for the West Virginia PSD program, an interim 1-hour SO_2 SIL of 3 ppb (7.8 $\mu g/m^3$), which is the same as that recommended by EPA in the August 23, 2010 memorandum from Stephen D. Page, *Guidance Concerning the Implementation of the 1-hour SO_2 NAAQS for the Prevention of Significant Deterioration Program*. This memorandum, which contains the technical analysis to determine the SIL, is appended as Attachment 2.

DAQ Attachment 1

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

JUN 29 2010

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

MEMORANDUM

SUBJECT: Guidance Concerning the Implementation of the 1-hour NO_2 NAAQS for the Prevention of Significant Deterioration Program

FROM: Stephen D. Page, Director Stephen Page
Office of Air Quality Planning and Standards

TO: Regional Air Division Directors

On January 22, 2010, the Environmental Protection Agency (EPA) announced a new 1-hour nitrogen dioxide (NO_2) National Ambient Air Quality Standard (hereinafter, either the 1-hour NO_2 NAAQS or 1-hour NO_2 standard) of 100 parts per billion (ppb), which is attained when the 3-year average of the 98th-percentile of the annual distribution of daily maximum 1-hour concentrations does not exceed 100 ppb at each monitor within an area. EPA revised the primary NO_2 NAAQS to provide the requisite protection of public health. The final rule for the new 1-hour NO_2 NAAQS was published in the Federal Register on February 9, 2010 (75 FR 6474), and the standard became effective on April 12, 2010. EPA policy provides that any federal Prevention of Significant Deterioration (PSD) permit issued under 40 CFR 52.21 on or after that effective date must contain a demonstration of source compliance with the new 1-hour NO_2 standard.

EPA is aware of reports from stakeholders indicating that some sources—both existing and proposed—are modeling potential violations of the 1-hour NO_2 standard. In many cases, the affected units are emergency electric generators and pump stations, where short stacks and limited property rights exist. However, larger sources, including coal-fired and natural gas-fired power plants, refineries, and paper mills, could also model potential violations of the new NO_2 NAAQS.

To respond to these reports and facilitate the PSD permitting of new and modified major stationary sources, we are issuing the attached guidance, in the form of two memoranda, for implementing the new 1-hour NO_2 NAAQS under the PSD permit program. The guidance contained in the attached memoranda addresses two areas. The first memorandum, titled, "General Guidance for Implementing the 1-hour NO_2 National Ambient Air Quality Standard in Prevention of Significant Deterioration Permits, Including an Interim 1-hour NO_2 Significant Impact Level," includes guidance for the preparation and review of PSD permits with respect to the new 1-hour NO_2 standard. This guidance memorandum sets forth a recommended interim 1-hour NO_2 significant impact level (SIL) that states may consider when carrying out the required

PSD air quality analysis for NO_2, until EPA promulgates a 1-hour NO_2 SIL via rulemaking. The second memorandum, titled "Applicability of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard," includes specific modeling guidance for estimating ambient NO_2 concentrations and determining compliance with the new 1-hour NO_2 standard.

This guidance does not bind state and local governments and the public as a matter of law. Nevertheless, we believe that state and local air agencies and industry will find this guidance useful when carrying out the PSD permit process. We believe it will provide a consistent approach for estimating NO_2 air quality impacts from proposed construction or modification of NOx emissions sources. For the most part, the attached guidance reiterates existing policy and guidance, but focuses on how this information is relevant to implementation of the new 1-hour NO_2 NAAQS.

Please review the guidance included in the two attached memoranda. If you have questions regarding the general implementation guidance contained in the first memorandum, please contact Raj Rao (rao.raj@epa.gov). If you have questions regarding the modeling guidance in the second memorandum, please contact Tyler Fox (fox.tyler@epa.gov). We are continuing our efforts to address permitting issues related to NO_2 and other NAAQS including the recently-signed 1-hour sulfur dioxide NAAQS. We plan to issue additional guidance to address these new 1-hour standards in the near future.

Attachments:

1. Memorandum from Anna Marie Wood, Air Quality Policy Division, to EPA Regional Air Division Directors, "General Guidance for Implementing the 1-hour NO_2 National Ambient Air Quality Standard in Prevention of Significant Deterioration Permits, Including an Interim 1-hour NO_2 Significant Impact Level" (June 28, 2010).
2. Memorandum from Tyler Fox, Air Quality Modeling Group, to EPA Regional Air Division Directors, "Applicability of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard" (June 28, 2010).

cc: Anna Marie Wood
Richard Wayland
Raj Rao
Tyler Fox
Dan deRoeck
Roger Brode
Rich Ossias
Elliott Zenick
Brian Doster

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

June 28, 2010

MEMORANDUM

SUBJECT: General Guidance for Implementing the 1-hour NO_2 National Ambient Air Quality Standard in Prevention of Significant Deterioration Permits, Including an Interim 1-hour NO_2 Significant Impact Level

FROM: Anna Marie Wood, Acting Director /s/
Air Quality Policy Division

TO: Regional Air Division Directors

INTRODUCTION

We are issuing the following guidance to explain and clarify the procedures that may be followed by applicants for Prevention of Significant Deterioration (PSD) permits and permitting authorities reviewing such applications to properly demonstrate that proposed construction will not cause or contribute to a violation of the new 1-hour nitrogen dioxide (NO_2) National Ambient Air Quality Standard (hereinafter, either the 1-hour NO_2 NAAQS or 1-hour NO_2 standard) that became effective on April 12, 2010. EPA revised the primary NO_2 NAAQS by promulgating a 1-hour NO_2 NAAQS to provide the requisite protection of public health. Under section 165(a)(3) of the Clean Air Act (the Act) and sections 52.21(k) and 51.166(k) of EPA's PSD regulations, to obtain a permit, a source must demonstrate that its proposed emissions increase will not cause or contribute to a violation of any NAAQS.

This guidance is intended to: (1) explain the recommended procedures for stakeholders to follow to properly address concerns over high preliminary modeled estimates of ambient NO_2 concentrations that suggest potential violations of the new 1-hour NO_2 standard under some modeling and permitting scenarios; (2) help reduce the burden of modeling for the hourly NO_2 standard where it can be properly demonstrated that a source will not have a significant impact on ambient 1-hour NO_2 concentrations; and (3) identify approaches that allow sources and permitting authorities to mitigate, in a manner consistent with existing regulatory requirements, potential modeled violations of the 1-hour NO_2 NAAQS, where appropriate. Accordingly, the techniques described in this memorandum may be used by permit applicants and permitting authorities to configure projects and permit conditions in order to reasonably conclude that a proposed source's emissions do not cause or contribute to modeled 1-hour NO_2 NAAQS violations so that permits can be issued in accordance with the applicable PSD program requirements.

This guidance discusses existing provisions in EPA regulations and previous guidance for applying those provisions but focuses on the relevancy of this information for implementing the new NAAQS for NO_2. Importantly, however, this guidance also sets forth a recommended interim 1-hour NO_2 significant impact level (SIL) that EPA will use for implementing the federal PSD program, and that states may choose to rely upon to implement their PSD programs for NOx if they agree that these values represent *de minimis* impact levels and incorporate into each permit record a rationale supporting this conclusion. This interim SIL is a useful screening tool that can be used to determine whether or not the emissions from a proposed source will significantly impact hourly NO_2 concentrations, and, if significant impacts are predicted to occur, whether the source's emissions "cause or contribute to" any modeled violations of the new 1-hour NO_2 NAAQS.

BACKGROUND

On April 12, 2010, the new 1-hour NO_2 NAAQS became effective. EPA interprets its regulations at 40 CFR 52.21 (the federal PSD program) to require permit applicants to demonstrate compliance with "any" NAAQS that is in effect on the date a PSD permit is issued. (See, e.g., EPA memo dated April 1, 2010, titled "Applicability of the Federal Prevention of Significant Deterioration Permit Requirements to New and Revised National Ambient Air Quality Standards.") Due to the introduction of a short-term averaging period for the 1-hour NO_2 NAAQS, we anticipate that some stationary sources with relatively short stacks may experience increased difficulty demonstrating that emissions from new construction or modifications will not cause or contribute to a violation of the 1-hour NO_2 NAAQS.

We are responding to reports from stakeholders which indicate that some sources, existing and proposed, are modeling high hourly NO_2 concentrations showing violations of the 1-hour NO_2 NAAQS—based only on the source's projected emissions of NOx under some modeling and permitting scenarios. We find that, in many cases, the modeled violations are resulting from emissions at emergency electric generators and pump stations, where short stacks and limited property rights exist. In other cases, the problem may occur during periods of unit startup, particularly where controls may initially not be in operation. Finally, certain larger sources, including coal-fired and natural gas-fired power plants, refineries, and paper mills could also experience problems in meeting the new 1-hour NO_2 NAAQS using particular modeling assumptions and permit conditions.

We believe that, in some instances, the projected violations result from the use of maximum modeled concentrations that do not adequately take into account the form of the 1-hour standard, and are based on the conservative assumption of 100% NOx-to-NO_2 conversion in the ambient air. To the extent that this is the case, it may be possible to provide more accurate projections of ambient NO_2 concentrations by applying current procedures which account for the statistical form of the 1-hour NO_2 standard, as well as more realistic estimates of the rate of conversion of NOx emissions to ambient NO_2 concentrations. See EPA Memorandum from Tyler Fox, Air Quality Modeling Group, to EPA Regional Air Division Directors, "Applicability of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard" (June 28, 2010) for specific modeling guidance for estimating ambient NO_2 concentrations consistent with the new 1-hour NO_2 NAAQS. In addition, where short stacks are currently being used, or are under design, it may be possible to lessen the source's air quality impacts without improper dispersion by implementing "good engineering practice" (GEP) stack heights to increase the height of existing or designed stacks to avoid excessive concentrations due to downwash, as described in the guidance below.

It is EPA's expectation that the guidance in this memorandum and available modeling guidance for NO_2 assist in resolving some of the issues arising from preliminary analyses that are reportedly showing potential exceedances of the new 1-hour NO_2 NAAQS that would not be present under more refined modeling applications. In addition, the techniques described in this memorandum may also help avoid violations of the standard through design of the proposed source or permit conditions, consistent with existing regulatory requirements, which enable the source to demonstrate that its proposed emissions increase will not cause or contribute to a modeled violation of the 1-hour NO_2 standard. Moreover, the interim 1-hour NO_2 SIL that is included in this guidance will provide a reasonable screening tool for efficiently implementing the PSD requirements for an air quality impact analysis.

The following discussion provides guidance concerning demonstrating compliance with the new NAAQS and mitigating modeled violations using air quality-based permit limits more stringent than what the Best Available Control Technology provisions may otherwise require, air quality offsets, the use of GEP stack heights, possible permit conditions for emergency generators, and an interim 1-hour NO_2 SIL.

AIR-QUALITY BASED EMISSIONS LIMITATIONS

Once a level of control required by the Best Available Control Technology provisions is proposed by the PSD applicant, the proposed source's emissions must be modeled at the BACT emissions rate(s) to demonstrate that those emissions will not cause or contribute to a violation of any NAAQS or PSD increment. EPA's 1990 Workshop Manual (page B.54) describes circumstances where a source's emissions based on levels proposed through the top-down process may not be sufficiently controlled to prevent modeled violations of an increment or NAAQS. In such cases, it may be appropriate for PSD applicants to propose a more stringent control option (that is, beyond the level identified via the top-down process) as a result of an adverse impact on the NAAQS or PSD increments.

DEMONSTRATING COMPLIANCE WITH THE NEW NAAQS & MITIGATING MODELED VIOLATIONS WITH AIR QUALITY OFFSETS

A 1988 EPA memorandum provides procedures to follow when a modeled violation is identified during the PSD permitting process. See Memorandum from Gerald A. Emison, EPA OAQPS, to Thomas J. Maslany, EPA Air Management Division, "Air Quality Analysis for Prevention of Significant Deterioration (PSD)." (July 5, 1988). In brief, a reviewing authority may issue a proposed new source or modification a PSD permit only if it can be shown that the proposed project's emissions will not "cause or contribute to" any modeled violations.

To clarify the above statement, in cases where modeled violations of the 1-hour NO_2 NAAQS are predicted, but the permit applicant can show that the NOx emissions increase from the proposed source will not have a significant impact *at the point and time of any modeled violation*, the permitting authority has discretion to conclude that the source's emissions will not contribute to the modeled violation. As provided in the July 5, 1988, guidance memo, in such instances, because of the proposed source's *de minimis* contribution to any modeled violation, the source's impact will not be considered to cause or contribute to such modeled violations, and the permit could be issued. This concept continues to apply, and the significant impact level (described further below) may be used as part of this analysis. A 2006 decision by the EPA Environmental Appeals Board (EAB) provides detailed reasoning that demonstrates the permissibility of finding that a PSD source would not be considered to cause or contribute to a modeled NAAQS violation because its estimated air quality impact was insignificant at the time and place of the modeled violations.[1] See In re *Prairie State Gen. Co.*, 13 E.A.D. ___, ___, PSD Appeal No. 05-05, Slip. Op. at 137-144 (EAB 2006)

However, where it is determined that a source's impact does cause or contribute to a modeled violation, a permit cannot be issued without some action taken to mitigate the source's impact. In accordance with 40 CFR 51.165(b)[2], a major stationary source or major modification (as defined at §51.165(a)(1)(iv) and (v)) that locates in an NO_2 attainment area, but would cause or contribute to a violation of the 1-hour NO_2 NAAQS anywhere may "reduce the impact of its emissions upon air quality by obtaining sufficient emission reductions to, at a minimum, compensate for its adverse ambient [NO_2] impact where the major source or major modification would otherwise cause or contribute to a violation ...." An applicant can meet this requirement for obtaining additional emissions reductions by either reducing its emissions at the source, e.g., promoting more efficient production methodologies and energy efficiency, or by obtaining air quality offsets (see below). See, e.g., In re *Interpower of New York, Inc.*, 5 E.A.D. 130, 141 (EAB 1994).[3] A State may also provide the necessary emissions reductions by imposing emissions limitations on other sources through an approved State Implementation Plan (SIP) revision. These approaches may also be combined as necessary to demonstrate that a source will not cause or contribute to a violation of the NAAQS.

Unlike emissions offset requirements in nonattainment areas, in addressing the air quality offset concept, it may not be necessary for a permit applicant to fully offset the proposed emissions increase if an emissions reduction of lesser quantity will mitigate the adverse air quality impact on a modeled violation. ("Although full emission offsets are not required, such a source must obtain emission offsets sufficient to compensate for its air quality impact where the violation occurs." 44 FR 3274, January 16, 1979, at 3278.) To clarify this, the 1988 guidance memo referred to above states that:

> offsets sufficient to compensate for the source's significant impact must be obtained pursuant to an approved State offset program consistent with State Implementation Plan (SIP) requirements under 40 CFR 51.165(b). Where the source is contributing to an

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[1] While there is no 1-hour NO_2 significant impact level (SIL) currently defined in the PSD regulations, we believe that states may adopt interim values, with the appropriate justification for such values, to use for permitting purposes. In addition, we are recommending an interim SIL as part of this guidance for implementing the NO_2 requirements in the federal PSD program, and in state programs where states choose to use it.

[2] The same provision is contained in EPA's Interpretative Ruling at 40 CFR part 51 Appendix S, section III.

[3] In contrast to Nonattainment New Source Review permits, offsets are not mandatory requirements in PSD permits if it can otherwise be demonstrated that a source will not cause or contribute to a violation of the NAAQS. See, In re *Knauf Fiber Glass, GMBH*, 8 E.A.D. 121, 168 (EAB 1999).

> existing violation, the required offset may not correct the violation. Such existing violations must be addressed [through the SIP].

In addition, in order to determine the appropriate emissions reductions, the applicant and permitting authority should take into account modeling procedures for the form of the 1-hour standard and for the appropriate NOx-NO_2 conversion rate that applies in the area of concern. As part of this process, existing ambient ozone concentrations and other meteorological conditions in the area of concern may need to be considered. Note that additional guidance for this and other aspects of the modeling analysis for the impacts of NOx emissions on ambient concentrations of NO_2 are addressed in EPA modeling guidance, including the June 28, 2010, Memorandum titled, "Applicability of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard."

"GOOD ENGINEERING PRACTICE" STACK HEIGHT & DISPERSION TECHNIQUES

If a permit applicant is unable to show that the source's proposed emissions increase will not cause or contribute to a modeled violation of the new 1-hour NO_2 NAAQS, the problem could be the result of plume downwash effects which may cause high ambient concentrations near the source. In such cases, a source may be able to raise the height of its existing stacks (or designed stacks if not yet constructed) to a GEP stack height of at least 65 meters, measured from the ground-level elevation at the base of the stack.

While not necessarily totally eliminating the effects of downwash in all cases, raising stacks to GEP height may provide substantial air quality benefits in a manner consistent with statutory provisions (section 123 of the Act) governing acceptable stack heights to minimize extensive concentrations due to atmospheric downwash, eddies or wakes. Permit applicants should also be aware of the regulatory restrictions on stack heights for the purpose of modeling for compliance with NAAQS and increments. Section 52.21(h) of the PSD regulations currently prohibits the use of dispersion techniques, such as stack heights above GEP, merged gas streams, or intermittent controls for setting NOx emissions limits or to meet the annual and 1-hour NAAQS and annual NO_2 increments. However, stack heights in existence before December 31, 1970, and dispersion techniques implemented before then, are not affected by these limitations. EPA's general stack height regulations are promulgated at 40 CFR 51.100(ff), (gg), (hh), (ii), (jj), (kk) and (nn), and 40 CFR 51.118.

a. *Stack heights*: A source cannot take credit for that portion of a stack height in excess of the GEP height when modeling to develop the NOx emissions limitations or to determine source compliance with the annual and 1-hour NO_2 NAAQS. It should be noted, however, that this limitation <u>does not limit</u> the actual height of any stack constructed by a new source or modification.

The following limitations apply in accordance with §52.21(h):

- For a stack height less than GEP, the actual stack height must be used in the source impact analysis for NOx emissions;

- For a stack height equal to or greater than 65 meters, the impact on NOx emission limits may be modeled using the greater of:
    - A *de minimis* stack height equal to 65 meters, as measured from the ground-level elevation at the base of the stack, without demonstration or calculation (40 CFR 51.100(ii)(1));
    - The refined formula height calculated using the dimensions of nearby structures in accordance with the following equation:

  GEP = H + 1.5L, where H is the height of the nearby structure and L is the lesser dimension of the height or projected width of the nearby structure (40 CFR 51.100(ii)(2)(ii)).[4]

- A GEP stack height exceeding the refined formula height may be approved when it can be demonstrated to be necessary to avoid "excessive concentrations" of NO_2 caused by atmospheric downwash, wakes, or eddy effects by the source, nearby structures, or nearby terrain features.
  (40 CFR 51.100(ii)(3), (jj), (kk));

- For purposes of PSD (and NOx/NO_2), "excessive concentrations" means a maximum ground-level concentration of NO_2 due to NOx emissions from a stack due in whole or in part to downwash, wakes, and eddy effects produced by nearby structures or nearby terrain features which individually is at least 40 percent in excess of the maximum NO_2 concentration experienced in the absence of such effects and (a) which contributes to a total NO_2 concentration due to emissions from all sources that is greater than the annual or 1-hour NO_2 NAAQS or (b) greater than the PSD (annual) increment for NO_2.
  (40 CFR 51.100(kk)(1)).

Reportedly, for economic and other reasons, many existing source stacks have been constructed at heights less than 65 meters, and source impact analyses may show that the source's emissions will cause or contribute to a modeled violation of the annual or 1-hour NO_2 NAAQS. Where this is the case, sources should be aware that they can increase their stack heights up to 65 meters without a GEP demonstration.

b. *Other dispersion techniques*: The term "dispersion technique" includes any practice carried out to increase final plume rise, subject to certain exceptions (40 CFR 51.100(hh)(1)(iii), (2)(i) – (v)). Beyond the noted exceptions, such techniques are not allowed for getting credit for modeling source compliance with the annual and 1-hour NO_2 NAAQS and annual NO_2 increment.

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[4] For stacks in existence on January 12, 1979, the GEP equation is GEP = 2.5 H (provided the owner or operator produces evidence that this equation was actually relied on in establishing an emission limitation for NOx (40 CFR 51.100(ii)(2)(i)

OPERATION OF EMERGENCY EQUIPMENT & GENERAL STARTUP CONDITIONS

In determining an emergency generator's potential to emit, existing guidance (EPA memo titled "Calculating Potential to Emit (PTE) for Emergency Generators," September 6, 1995) allows a default value of 500 hours "for estimating the number of hours that an emergency generator could be expected to operate under worst-case conditions." The guidance also allows for alternative estimates to be made on a case-by-case basis for individual emergency generators. This time period must also consider operating time for both testing/maintenance as well as for emergency utilization. Likewise, existing EPA policy does not allow NOx emissions to be excluded from the source impact analysis (NAAQS and increments) when the emergency equipment is operating during an emergency. EPA provides no exemption from compliance with the NAAQS during periods of emergency operation. Thus, it is not sufficient to consider only emissions generated during periods of testing/maintenance in the source impact analysis.

If during an emergency, emergency equipment is never operated simultaneously with other emissions units at the source that the emergency equipment will back up, a worst-case hourly impact analysis may very well occur during periods of normal source operation when other emissions units at the facility are likely to be operating simultaneously with the scheduled testing of emergency equipment. To avoid such worst-case modeling situations, a permit applicant may commit to scheduling the testing of emergency equipment during times when the source is not otherwise operating, or during known off-peak operating periods. This could provide a basis to justify not modeling the 1-hour impacts of the emergency equipment under conditions that would include simultaneous operation with other onsite emissions units. Accordingly, permits for emergency equipment may include enforceable conditions that specifically limit the testing/maintenance of emergency equipment to certain periods of time (seasons, days of the week, hours of the day, etc.) as long as these limitations do not constitute dispersion techniques under 40 CFR 51.1(hh)(1)(ii).

We also note that similar problems associated with the modeling of high 1-hour NO_2 concentrations have been reported to occur during startup periods for certain kinds of emissions units—often because control equipment cannot function during all or a portion of the startup process. EPA currently has no provisions for exempting emissions occurring during equipment startups from the air quality analysis to demonstrate compliance with the NAAQS. Startup emissions may occur during only a relatively small portion of the unit's total annual operating schedule; however, they must be included in the required PSD air quality analysis for the NAAQS. Sources may be willing to accept enforceable permit conditions limiting equipment startups to certain hours of the day when impacts are expected to be lower than normal. Such permit limitations can be accounted for in the modeling of such emissions. Applicants should direct other questions arising concerning procedures for modeling startup emissions to the applicable permitting authority to determine the most current modeling guidance.

SCREENING VALUES

In the final rule establishing the hourly NO_2 standard, EPA discussed various implementation considerations for the PSD permitting program. 75 FR.6474, 6524 (Feb. 9, 2010). This discussion included the following statements regarding particular screening values that have historically been used on a widespread basis to facilitate implementation of the PSD permitting program:

> We also believe that there may be a need to revise the screening tools currently used under the NSR/PSD program for completing NO_2 analyses. These screening tools include the significant impact levels (SILs), as mentioned by one commenter, but also include the significant emissions rate for emissions of NOx and the significant monitoring concentration (SMC) for NO_2. EPA intends to evaluate the need for possible changes or additions to each of these important screening tools for NOx/NO_2 due to the addition of a 1-hour NO_2 NAAQS. If changes or additions are deemed necessary, EPA will propose any such changes for public notice and comment in a separate action. 75 FR 6525.

EPA intends to conduct an evaluation of these issues and submit our findings in the form of revised significance levels under notice and comment rulemaking if any revisions are deemed appropriate. In the interim, for the reasons provided below, we recommend the continued use of the existing significant emissions rates (SER) for NOx emissions as well as an interim 1-hour NO_2 SIL that we are setting forth today for conducting air quality impact analyses for the 1-hour NO_2 NAAQS. As described in the section titled Introduction, EPA intends to implement the interim 1-hour NO_2 SIL contained herein under the federal PSD program and offers states the opportunity to use it in their PSD programs if they choose to do so. EPA is not addressing the significant monitoring concentrations in this memorandum.

SIGNIFICANT EMISSIONS RATE

Under the terms of existing EPA regulations, the applicable significant emissions rate for nitrogen oxides is 40 tons per year. 40 CFR 52.21(b)(23); 40 CFR 51.166(b)(23). The significant emissions rates defined in those regulations are specific to individual pollutants but are not differentiated by the averaging times of the air quality standards applicable to some of the listed pollutants. Although EPA has not previously promulgated a NO_2 standard using an averaging time of less than one year, the NAAQS for SO_2 have included standards with 3-hour and 24-hour averaging times for many years. EPA has applied the 40 tons per year significant emissions rate for SO_2 across all of these averaging times. Until the evaluation described above and any associated rulemaking is completed, EPA does not believe it has cause to apply the NO_2 significant emissions rate any differently than EPA has historically applied the SO_2 significant emissions rate and others that apply to standards with averaging times less than 1 year.

Under existing regulations, an ambient air quality impact analysis is required for "each pollutant that [a source] would have the potential to emit in significant amounts." 40 CFR 52.21(m)(1)(i)(a); 40 CFR. 51.166(m)(1)(i)(a). For modifications, these regulations require this analysis for "each pollutant for which [the modification] would result in a significant net emissions increase." 40 CFR.52.21(m)(1)(i)(b); 40 CFR.51.166(m)(1)(i)(b). EPA construes this regulation to mean that an ambient impact analysis is not necessary for pollutants with emissions rates below the significant emissions rates in paragraph (b)(23) of the regulations. No additional action by EPA or permitting authorities is necessary at this time to apply the 40 tpy significant emissions rate in existing regulations to the hourly NO_2 standard.

INTERIM 1-HOUR NO_2 SIGNIFICANT IMPACT LEVEL

A significant impact level (SIL) serves as a useful screening tool for implementing the PSD requirements for an air quality analysis. The primary purpose of the SIL is to serve as a screening tool to identify a level of ambient impact that is sufficiently low relative to the NAAQS or PSD increments such that the impact can be considered trivial or *de minimis*. Hence, the EPA considers a source whose individual impact falls below a SIL to have a *de minimis* impact on air quality concentrations that already exist. Accordingly, a source that demonstrates that the projected ambient impact of its proposed emissions increase does not exceed the SIL for that pollutant at a location where a NAAQS or increment violation occurs is not considered to cause or contribute to that violation. In the same way, a source with a proposed emissions increase of a particular pollutant that will have a significant impact at some locations is not required to model at distances beyond the point where the impact of its proposed emissions is below the SILs for that pollutant. When a proposed source's impact by itself is not considered to be "significant," EPA has long maintained that any further effort on the part of the applicant to complete a cumulative source impact analysis involving other source impacts would only yield information of trivial or no value with respect to the required evaluation of the proposed source or modification. The concept of a SIL is grounded on the *de minimis* principles described by the court in *Alabama Power Co. v. Costle*, 636 F.2d 323, 360 (D.C. Cir. 1980); See also *Sur Contra La Contaminacion v. EPA*, 202 F.3d 443, 448-49 (1st Cir. 2000) (upholding EPA's use of SIL to allow permit applicant to avoid full impact analysis); *In re: Prairie State Gen. Co.*, PSD Appeal No. 05-05, Slip. Op. at 139 (EAB 2006)

EPA has codified several SILs into regulations at 40 CFR 51.165(b). EPA plans to undertake rulemaking to develop a 1-hour NO_2 SIL for the new NAAQS for NO_2. However, EPA has recognized that the absence of an EPA-promulgated SIL does not preclude permitting authorities from developing interim SILs for use in demonstrating that a cumulative air quality analysis would yield trivial gain. Response to Comments, Implementation of New Source Review (NSR) Program for Particulate Matter Less Than 2.5 Micrometers in Diameter ($PM_{2.5}$), pg. 82 (March 2008) [EPA-HQ-OAR-2003-0062-0278].

Until such time as a 1-hour NO_2 SIL is defined in the PSD regulations, we are herein providing a recommended interim SIL that we intend to use as a screening tool for completing the required air quality analyses for the new 1-hour NO_2 under the federal PSD program at 40 CFR 52.21. To support the application of this interim SIL in each instance, a permitting authority that utilizes this SIL as part of an ambient air quality analysis should include in the permit record the analysis reflected in this memorandum and the referenced documents to demonstrate that an air quality impact at or below the SIL is *de minimis* in nature and would not cause a violation of the NAAQS.

Using the interim 1-hour NO_2 SIL, the permit applicant and permitting authority can determine: (1) whether, based on the proposed increase in NOx emissions, a cumulative air quality analysis is required; (2) the area of impact within which a cumulative air quality analysis should focus; and (3) whether, as part of a cumulative air quality analysis, the proposed source's NOx emissions will cause or contribute to a modeled violation of the 1-hour NO_2 NAAQS.

In this guidance, EPA recommends an interim 1-hour NO_2 SIL value of 4 ppb. To determine initially whether a proposed project's emissions increase will have a significant impact (resulting in the need for a cumulative air quality analysis), this interim SIL should be compared to either of the following:

- The highest of the 5-year averages of the maximum modeled 1-hour NO_2 concentrations predicted each year at each receptor, based on 5 years of National Weather Service data; or
- The highest modeled 1-hour NO_2 concentration predicted across all receptors based on 1 year of site-specific meteorological data, or the highest of the multi-year averages of the maximum modeled 1-hour NO_2 concentrations predicted each year at each receptor, based on 2 or more, up to 5 complete years of available site-specific meteorological data.

Additional guidance will be forthcoming for the purpose of comparing a proposed source's modeled impacts to the interim 1-hour NO_2 SIL in order to make a determination about whether that source's contribution is significant when a cumulative air quality analysis identifies violations of the 1-hour NO_2 NAAQS (i.e., "causes or contributes to" a modeled violation).

We derived this interim 1-hour NO_2 SIL by using an impact equal to 4% of the 1-hour NO_2 NAAQS (which is 100 ppb). We have chosen this approach because we believe it is reasonable to base the interim 1-hour NO_2 SIL directly on consideration of impacts relative to the 1-hour NO_2 NAAQS. In 1980, we defined SER for each pollutant subject to PSD. 45 FR 52676, August 7, 1980 at 52705-52710. For PM and SO_2, we defined the SER as the emissions rate that resulted in an ambient impact equal to 4% of the applicable short-term NAAQS. The 1980 analysis focused on levels no higher than 5% of the primary standard because of concerns that higher levels were found to result in unreasonably large amounts of increment being consumed by a single source. Within the range of impacts analyzed, we considered two factors that had an important influence on the choice of *de minimis* emissions levels: (1) cumulative effect on increment consumption of multiple sources in an area, each making the maximum *de minimis* emissions increase; and (2) the projected consequence of a given *de minimis* level on administrative burden. As explained in the preamble to the 1980 rulemaking and the supporting documentation,[5] EPA decided to use 4% of the 24-hour primary NAAQS for PM and SO_2 to define the significant emissions rates (SERs) for those pollutants. It was noted that, at the time, only an annual NO_2 NAAQS existed. Thus, for reasons explained in the 1980 preamble, to define the SER for NOx emissions we used a design value of 2% of the annual NO_2 NAAQS. See 45 FR 52708. Looking now at a short-term NAAQS for NO_2, we believe that it is reasonable as an interim approach to use a SIL value that represents 4% of the 1-hour NO_2

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[5] EPA evaluated de minimis levels for pollutants for which NAAQS had been established in a document titled "Impact of Proposed and Alternative De Minimis Levels for Criteria Pollutants"; EPA-450/2-80-072, June 1980.

NAAQS. EPA will consider other possible alternatives for developing a 1-hour NO_2 SIL in a future rulemaking that will provide an opportunity for public participation in the development of a SIL as part of the PSD regulations.

Several state programs have already adopted interim 1-hour NO_2 SILs that differ (both higher and lower) from the interim value being recommended herein. The EPA-recommended interim 1-hour NO_2 SIL is not intended to supersede any interim SIL that is now or may be relied upon to implement a state PSD program that is part of an approved SIP, or to impose the use of the SIL concept on any state that chooses to implement the PSD program—in particular the ambient air quality analysis—without using a SIL as a screening tool. Accordingly, states that implement the PSD program under an EPA-approved SIP may choose to use this interim SIL, another value that may be deemed more appropriate for PSD permitting purposes in the state of concern, or no SIL at all. The application of any SIL that is not reflected in a promulgated regulation should be supported by a record in each instance that shows the value represents a *de minimis* impact on the 1-hour NO_2 standard, as described above.

In the event of questions regarding the general implementation guidance contained in this memorandum, please contact Raj Rao (rao.raj@epa.gov).

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June 28, 2010

MEMORANDUM

SUBJECT: Applicability of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard

FROM: Tyler Fox, Leader
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TO: Regional Air Division Directors

INTRODUCTION

On January 22, 2010, EPA announced a new 1-hour nitrogen dioxide (NO_2) National Ambient Air Quality Standard (1-hour NO_2 NAAQS or 1-hour NO_2 standard) which is attained when the 3-year average of the 98th-percentile of the annual distribution of daily maximum 1-hour concentrations does not exceed 100 ppb at each monitor within an area. The final rule for the new 1-hour NO_2 NAAQS was published in the Federal Register on February 9, 2010 (75 FR 6474-6537), and the standard became effective on April 12, 2010 (EPA, 2010a). This memorandum clarifies the applicability of current guidance in the *Guideline on Air Quality Models* (40 CFR Part 51, Appendix W) for modeling NO_2 impacts in accordance with the Prevention of Significant Deterioration (PSD) permit requirements to demonstrate compliance with the new 1-hour NO_2 standard.

SUMMARY OF CURRENT GUIDANCE

While the new 1-hour NAAQS is defined relative to ambient concentrations of NO_2, the majority of nitrogen oxides (NOx) emissions for stationary and mobile sources are in the form of nitric oxide (NO) rather than NO_2. Appendix W notes that the impact of an individual source on ambient NO_2 depends, in part, "on the chemical environment into which the source's plume is to be emitted" (see Section 5.1.j). Given the role of NOx chemistry in determining ambient impact levels of NO_2 based on modeled NOx emissions, Section 5.2.4 of Appendix W recommends the following three-tiered screening approach for NO_2 modeling for annual averages:

- Tier 1 - assume full conversion of NO to NO_2 based on application of an appropriate refined modeling technique under Section 4.2.2 of Appendix W to estimate ambient NOx concentrations;
- Tier 2 - multiply Tier 1 result by empirically-derived NO_2/NOx ratio, with 0.75 as the annual national default ratio (Chu and Meyer, 1991); and

- Tier 3 - detailed screening methods may be considered on a case-by-case basis, with the Ozone Limiting Method (OLM) identified as a detailed screening technique for point sources (Cole and Summerhays, 1979).

Tier 2 is often referred to as the Ambient Ratio Method, or ARM. Site-specific ambient NO_2/NOx ratios derived from appropriate ambient monitoring data may also be considered as detailed screening methods on a case-by-case basis, with proper justification. Consistent with Section 4.2.2, AERMOD is the current preferred model for "a wide range of regulatory applications in all types of terrain" for purposes of estimating ambient concentrations of NO_2, based on NOx emissions, under Tiers 1 and 2 above. We discuss the role of AERMOD for Tier 3 applications in more detail below.

APPLICABILITY OF CURRENT GUIDANCE TO 1-HOUR NO_2 NAAQS

In general, the Appendix W recommendations regarding the annual NO_2 standard are also applicable to the new 1-hour NO_2 standard, but additional issues may need to be considered in the context of a 1-hour standard, depending on the characteristics of the emission sources, and depending on which tier is used, as summarized below:

- Tier 1 applies to the 1-hour NO_2 standard without any additional justification;
- Tier 2 may also apply to the 1-hour NO_2 standard in many cases, but some additional consideration will be needed in relation to an appropriate ambient ratio for peak hourly impacts since the current default ambient ratio is considered to be representative of "area wide quasi-equilibrium conditions"; and
- Tier 3 "detailed screening methods" will continue to be considered on a case-by-case basis for the 1-hour NO_2 standard. However, certain input data requirements and assumptions for Tier 3 applications may be of greater importance for the 1-hour standard than for the annual standard given the more localized nature of peak hourly vs. annual impacts. In addition, use of site-specific ambient NO_2/NOx ratios based on ambient monitoring data will generally be more difficult to justify for the 1-hour NO_2 standard than for the annual standard.

While Appendix W specifically mentions OLM as a detailed screening method under Tier 3, we also consider the Plume Volume Molar Ratio Method (PVMRM) (Hanrahan, 1999a) discussed under Section 5.1.j of Appendix W to be in this category at this time. Both of these options account for ambient conversion of NO to NO_2 in the presence of ozone, based on the following basic chemical mechanism, known as titration, although there are important differences between these methods:

$$NO + O_3 \rightarrow NO_2 + O_2 \qquad \text{(Eq. 1)}$$

As noted in Section 5.1.j, EPA is currently testing the PVMRM option to determine its suitability as a refined method. Limited evaluations of PVMRM have been completed, which show encouraging results, but the amount of data currently available is too limited to justify a designation of PVMRM as a refined method for NO_2 (Hanrahan, 1999b; MACTEC, 2005). EPA is currently updating and extending these evaluations to examine model performance for predicting hourly NO_2 concentrations, including both the OLM and PVMRM options, and results of these additional evaluations will be provided at a later date. A sensitivity analysis of the OLM and PVMRM options in AERMOD has been conducted that compares modeled concentrations based on OLM and PVMRM with Tiers 1 and 2 for a range of source characteristics (MACTEC, 2004). This analysis serves as a useful reference to understand how ambient NO_2 concentrations may be impacted by application of this three-tiered screening approach, and includes comparisons for both annual average and maximum 1-hour NO_2 concentrations.

Key model inputs for both the OLM and PVMRM options are the in-stack ratios of NO_2/NOx emissions and background ozone concentrations. While the representativeness of these key inputs is important in the context of the annual NO_2 standard, they will generally take on even greater importance for the new 1-hour NO_2 standard, as explained in more detail below. Recognizing the potential importance of the in-stack NO_2/NOx ratio for hourly NO_2 compliance demonstrations, we recommend that in-stack ratios used with either the OLM or PVMRM options be justified based on the specific application, i.e., there is no "default" in-stack NO_2/NOx ratio for either OLM or PVMRM.

The OLM and PVMRM methods are both available as non-regulatory-default options within the EPA-preferred AERMOD dispersion model (Cimorelli, *et al.*, 2004; EPA, 2004; EPA, 2009). As a result of their non-regulatory-default status, pursuant to Sections 3.1.2.c, 3.2.2.a, and A.1.a(2) of Appendix W, application of AERMOD with the OLM or PVMRM option is no longer considered a "preferred model" and, therefore, requires justification and approval by the Regional Office on a case-by-case basis. While EPA is continuing to evaluate the PVMRM and OLM options within AERMOD for use in compliance demonstrations for the 1-hour NO_2 standard, as long as they are considered to be non-regulatory-default options, their use as alternative modeling techniques under Appendix W should be justified in accordance with Section 3.2.2, paragraph (e), as follows:

> "e. Finally, for condition (3) in paragraph (b) of this subsection [preferred model is less appropriate for the specific application, or there is no preferred model], an alternative refined model may be used provided that:
>
> i. The model has received a scientific peer review;
> ii. The model can be demonstrated to be applicable to the problem on a theoretical basis;
> iii. The data bases which are necessary to perform the analysis are available and adequate;
> iv. Appropriate performance evaluations of the model have shown that the model is not biased toward underestimates; and
> v. A protocol on methods and procedures to be followed has been established."

Since AERMOD is the preferred model for dispersion for a wide range of application, the focus of the alternative model demonstration for use of the OLM and PVMRM options within AERMOD is on the treatment of NOx chemistry within the model, and does not need to address basic dispersion algorithms within AERMOD. Furthermore, items i and iv of the alternative model demonstration for these options can be fulfilled in part based on existing documentation (Cole and Summerhays, 1979; Hanrahan, 1999a; Hanrahan, 1999b; MACTEC, 2005), and the remaining items should be routinely addressed as part of the modeling protocol, irrespective of the regulatory status of these options. The issue of applicability to the problem on a theoretical basis (item ii) is a case-by-case determination based on an assessment of the adequacy of the ozone titration mechanism utilized by these options to account for NOx chemistry within the AERMOD model based on "the chemical environment into which the source's plume is to be emitted" (Appendix W, Section 5.1.j). The adequacy of available data bases needed for application of OLM and PVMRM (item iii), including in-stack NO_2/NOx ratios and background ozone concentrations, is a critical aspect of the demonstration which we discuss in more detail below. It should also be noted that application of the OLM or PVMRM methods with other Appendix W models or alternative models, whether as a separate post-processor or integrated within the model, would require additional documentation and demonstration that the methods have been implemented and applied appropriately within that context, including model-specific performance evaluations which satisfy item iv under Section 3.2.2.e.

Given the form of the new 1-hour NO_2 standard, some clarification is needed regarding the appropriate data periods for modeling demonstrations of compliance with the NAAQS vs. demonstrations of attainment of the NAAQS through ambient monitoring. While monitored design values for the 1-hour NO_2 standard are based on a 3-year average (in accordance with Section 1(c)(2) of Appendix S to 40 CFR Part 50), Section 8.3.1.2 of Appendix W addresses the length of the meteorological data record for dispersion modeling, stating that "[T]he use of 5 years of NWS [National Weather Service] meteorological data or at least 1 year of site specific data is required." Section 8.3.1.2.b further states that "one year or more (including partial years), up to five years, of site specific data . . . are preferred for use in air quality analyses." Although the monitored design value for the 1-hour NO_2 standard is defined in terms of the 3-year average, this definition does not preempt or alter the Appendix W requirement for use of 5 years of NWS meteorological data or at least 1 year of site specific data. The 5-year average based on use of NWS data, or an average across one or more years of available site specific data, serves as an unbiased estimate of the 3-year average for purposes of modeling demonstrations of compliance with the NAAQS. Modeling of "rolling 3-year averages," using years 1 through 3, years 2 through 4, and years 3 through 5, is not required. Furthermore, since modeled results for NO_2 are averaged across the number of years modeled for comparison to the new 1-hour NO_2 standard, the meteorological data period should include complete years of data to avoid introducing a seasonal bias to the averaged impacts. In order to comply with Appendix W recommendations in cases where partial years of site specific meteorological data are available, while avoiding any seasonal bias in the averaged impacts, an approach that utilizes the most conservative modeling result based on the first complete-year period of the available data record vs. results based on the last complete-year period of available data may be appropriate, subject to approval by the appropriate reviewing authority. Such an approach would ensure that all available site specific data are accounted for in the modeling analysis without imposing an undue burden on the applicant and avoiding arbitrary choices in the selection of a single complete-year data period.

The form of the new 1-hour NO_2 standard also has implications regarding appropriate methods for combining modeled ambient concentrations with monitored background concentrations for comparison to the NAAQS in a cumulative modeling analysis. As noted in the March 23, 2010 memorandum regarding "Modeling Procedures for Demonstrating Compliance with $PM_{2.5}$ NAAQS" (EPA, 2010b), combining the 98th percentile monitored value with the 98th percentile modeled concentrations for a cumulative impact assessment could result in a value that is below the 98th percentile of the combined cumulative distribution and would, therefore, not be protective of the NAAQS. However, unlike the recommendations presented for $PM_{2.5}$, the modeled contribution to the cumulative ambient impact assessment for the 1-hour NO_2 standard should follow the form of the standard based on the 98th percentile of the annual distribution of daily maximum 1-hour concentrations averaged across the number of years modeled. A "first tier" assumption that may be applied without further justification is to add the overall highest hourly background NO_2 concentration from a representative monitor to the modeled design value, based on the form of the standard, for comparison to the NAAQS. Additional refinements to this "first tier" approach based on some level of temporal pairing of modeled and monitored values may be considered on a case-by-case basis, with adequate justification and documentation.

DISCUSSION OF TECHNICAL ISSUES

While many of the same technical issues related to application of Appendix W guidance for an annual NO_2 standard would also apply in the context of the new 1-hour NO_2 standard, there are some important differences that may also need to be considered depending on the specific application. This section discusses several aspects of these technical issues related to the new 1-hour NO_2 NAAQS, including a discussion of source emission inventories required for modeling demonstrations of compliance with the NAAQS and other issues specific to each of the three tiers identified in Section 5.2.4 of Appendix W for NO_2 modeling.

Emission Inventories

The source emissions data are a key input for all modeling analyses and one that may require additional considerations under the new 1-hour NO_2 standard is the source emissions data. Section 8.1 of Appendix W provides guidance regarding source emission input data for dispersion modeling and Table 8-2 summarizes the recommendations for emission input data that should be followed for NAAQS compliance demonstrations. Although existing NOx emission inventories used to support modeling for compliance with the annual NO_2 standard should serve as a useful starting point, such inventories may not always be adequate for use in assessing compliance with the new 1-hour NO_2 standard since some aspects of the guidance in Section 8.1 differs for long-term (annual and quarterly) standards vs. short-term ($\leq$ 24 hours) standards. In particular, since maximum ground-level concentrations may be more sensitive to operating levels and startup/shutdown conditions for an hourly standard than for an annual standard, emission rates and stack parameters associated with the maximum ground-level concentrations for the annual standard may underestimate maximum concentrations for the new 1-hour NO_2 standard. Due to the importance of in-stack NO_2/NOx ratios required for application of the OLM and PVMRM options within AERMOD discussed above, consideration should also be given to the potential variability of in-stack NO_2/NOx ratios under different operating conditions when those non-regulatory-default options are applied. We also note that source emission input data recommendations in Table 8-2 of Appendix W for "nearby sources" and "other sources" that may be needed to conduct a cumulative impact assessment include further differences between emission data for long-term vs. short-term standards which could also affect the adequacy of existing annual NOx emission inventories for the new 1-hour NO_2 standard. The terms "nearby sources" and "other sources" used in this context are defined in Section 8.2.3 of Appendix W. Attachment A provides a more detailed discussion on determining NOx emissions for permit modeling.

While Section 8.2.3 of Appendix W emphasizes the importance of professional judgment by the reviewing authority in the identification of nearby and other sources to be included in the modeled emission inventory, Appendix W establishes "a significant concentration gradient in the vicinity of the source" under consideration as the main criterion for this selection. Appendix W also indicates that "the number of such [nearby] sources is expected to be small except in unusual situations." See Section 8.2.3.b. Since concentration gradients will vary somewhat depending on the averaging period being modeled, especially for an annual vs. 1-hour standard, the criteria for selection of "nearby" and "other" sources for inclusion in the modeled inventory may need to be reassessed for the 1-hour NO_2 standard.

The representativeness of available ambient air quality data also plays an important role in determining which nearby sources should be included in the modeled emission inventory. Key issues to consider in this regard are the extent to which ambient air impacts of emissions from nearby sources are reflected in the available ambient measurements, and the degree to which emissions from those background sources during the monitoring period are representative of allowable emission levels under the existing permits. The professional judgments that are required in developing an appropriate inventory of background sources should strive toward the proper balance between adequately characterizing the potential for cumulative impacts of emission sources within the study area to cause or contribute to violations of the NAAQS, while minimizing the potential to overestimate impacts by double-counting of modeled source impacts that are also reflected in the ambient monitoring data. We would also caution against the literal and uncritical application of very prescriptive procedures for identifying which background sources should be included in the modeled emission inventory for NAAQS compliance demonstrations, such as those described in Chapter C, Section IV.C.1 of the draft *New Source Review Workshop Manual* (EPA, 1990), noting again that Appendix W emphasizes the importance of professional judgment in this process. While the draft workshop manual serves as a useful general reference regarding New Source Review (NSR) and PSD programs, and such procedures may play a useful role in defining the spatial extent of sources whose emissions may need to be considered, it should be recognized that "[i]t is not intended to be an official statement of policy and standards and does not establish binding regulatory requirements." See, Preface.

Given the range of issues involved in the determination of an appropriate inventory of emissions to include in a cumulative impact assessment, the appropriate reviewing authority should be consulted early in the process regarding the selection and proper application of appropriate monitored background concentrations and the selection and appropriate characterization of modeled background source emission inventories for use in demonstrating compliance with the new 1-hour NO_2 standard.

Tier-specific Technical Issues

This section discusses technical issues related to application of each tier in the three-tiered screening approach for NO_2 modeling recommended in Section 5.2.4 Appendix W. A basic understanding of NOx chemistry and "of the chemical environment into which the source's plume is to be emitted" (Appendix W, Section 5.1.j) will be helpful for addressing these issues based on the specific application.

Tier 1:

Since the assumption of full conversion of NO to NO_2 will provide the most conservative treatment of NOx chemistry in assessing ambient impacts, there are no technical issues associated with treatment of NOx chemistry for this tier. However, the general issues related to emission inventories for the 1-hour NO_2 standard discussed above and in Attachment A apply to Tier 1.

Tier 2:

As noted above, the 0.75 national default ratio for ARM is considered to be representative of "area wide quasi-equilibrium conditions" and, therefore, may not be as appropriate for use with the 1-hour NO_2 standard. The appropriateness of this default ambient ratio will depend somewhat on the characteristics of the sources, and as such application of Tier 2 for 1-hour NO_2 compliance demonstrations may need to be considered on a source-by-source basis in some cases. The key technical issue to address in relation to this tier requires an understanding of the meteorological conditions that are likely to be associated with peak hourly impacts from the source(s) being modeled. In general, for low-level releases with limited plume rise, peak hourly NOx impacts are likely to be associated with nighttime stable/light wind conditions. Since ambient ozone concentrations are likely to be relatively low for these conditions, and since low wind speeds and stable atmospheric conditions will further limit the conversion of NO to NO_2 by limiting the rate of entrainment of ozone into the plume, the 0.75 national default ratio will likely be conservative for these cases. A similar rationale may apply for elevated sources where plume impaction on nearby complex terrain under stable atmospheric conditions is expected to determine the peak hourly NOx concentrations. By contrast, for elevated sources in relatively flat terrain, the peak hourly NOx concentrations are likely to occur during daytime convective conditions, when ambient ozone concentrations are likely to be relatively high and entrainment of ozone within the plume is more rapid due to the vigorous vertical mixing during such conditions. For these sources, the 0.75 default ratio may not be conservative, and some caution may be needed in applying Tier 2 for such sources. We also note that the default equilibrium ratio employed within the PVMRM algorithm as an upper bound on an hourly basis is 0.9.

Tier 3:

This tier represents a general category of "detailed screening methods" which may be considered on a case-by-case basis. Section 5.2.4(b) of Appendix W cites two specific examples of Tier 3 methods, namely OLM and the use of site-specific ambient NO_2/NOx ratios supported by ambient measurements. As noted above, we also believe it is appropriate to consider the

PVMRM option as a Tier 3 detailed screening method at this time. The discussion here focuses primarily on the OLM and PVMRM methods, but we also note that the use of site-specific ambient NO_2/NOx ratios will be subject to the same issues discussed above in relation to the Tier 2 default ARM, and as a result it will generally be much more difficult to determine an appropriate ambient NO_2/NOx ratio based on monitoring data for the new 1-hour NO_2 standard than for the annual standard.

While OLM and PVMRM are both based on the same simple chemical mechanism of titration to account for the conversion of NO emissions to NO_2 (see Eq. 1) and therefore entail similar technical issues and considerations, there are some important differences that also need to be considered when assessing the appropriateness of these methods for specific applications. While the titration mechanism may capture the most important aspects of NO-to-NO_2 conversion in many applications, both methods will suffer from the same limitations for applications in which other mechanisms, such as photosynthesis, contribute significantly to the overall process of chemical transformation.· Sources located in areas with high levels of VOC emissions may be subject to these limitations of OLM and PVMRM. Titration is generally a much faster mechanism for converting NO to NO_2 than photosynthesis, and as such is likely to be appropriate for characterizing peak 1-hour NO_2 impacts in many cases.

Both OLM and PVMRM rely on the same key inputs of in-stack NO_2/NOx ratios and hourly ambient ozone concentrations. Although both methods can be applied within the AERMOD model using a single "representative" background ozone concentration, it is likely that use of a single value would result in very conservative estimates of peak hourly ambient concentrations since its use for the 1-hour NO_2 standard would be contingent on a demonstration of conservatism for all hours modeled. Furthermore, hourly monitored ozone concentrations used with the OLM and PVMRM options must be concurrent with the meteorological data period used in the modeling analysis, and thus the temporal representativeness of the ozone data for estimating ambient NO_2 concentrations could be a factor in determining the appropriateness of the meteorological data period for a particular application. As noted above, the representativeness of these key inputs takes on somewhat greater importance in the context of a 1-hour NO_2 standard than for an annual standard, for obvious reasons. In the case of hourly background ozone concentrations, methods used to substitute for periods of missing data may play a more significant role in determining the 1-hour NO_2 modeled design value, and should therefore be given greater scrutiny, especially for data periods that are likely to be associated with peak hourly concentrations based on meteorological conditions and source characteristics. In other words, ozone data substitution methods that may have been deemed appropriate in prior applications for the annual standard may not be appropriate to use for the new 1-hour standard.

While these technical issues and considerations generally apply to both OLM and PVMRM, the importance of the in-stack NO_2/NOx ratios may be more important for PVMRM than for OLM in some cases, due to differences between the two methods. The key difference between the two methods is that the amount of ozone available for conversion of NO to NO_2 is based simply on the ambient ozone concentration and is independent of source characteristics for OLM, whereas the amount of ozone available for conversion in PVMRM is based on the amount of ozone within the volume of the plume for an individual source or group of sources. The plume volume used in PVMRM is calculated on an hourly basis for each source/receptor combination, taking into account the dispersive properties of the atmosphere for that hour. For a low-level release where peak hourly NOx impacts occur close to the source under stable/light wind conditions, the plume volume will be relatively small and the ambient NO_2 impact for such cases will be largely determined by the in-stack NO_2/NOx ratio, especially for sources with relatively close fenceline or ambient air boundaries. This example also highlights the fact that the relative importance of the in-stack NO_2/NOx ratios may be greater for some applications than others, depending on the source characteristics and other factors. Assumptions regarding in-stack NO_2/NOx ratios that may have been deemed appropriate in the context of the annual standard may not be appropriate to use for the new 1-hour standard. In particular, it is worth reiterating that the 0.1 in-stack ratio often cited as the "default" ratio for OLM should not be treated as a default value for hourly NO_2 compliance demonstrations.

Another difference between OLM and PVMRM that is worth noting here is the treatment of the titration mechanism for multiple sources of NOx. There are two possible modes that can be used for applying OLM to multiple source scenarios within AERMOD: (1) apply OLM to each source separately and assume that each source has all of the ambient ozone available for conversion of NO to NO_2; and (2) assume that sources whose plumes overlap compete for the available ozone and apply OLM on a combined plume basis. The latter option can be applied selectively to subsets of sources within the modeled inventory or to all modeled sources using the OLMGROUP keyword within AERMOD, and is likely to result in lower ambient NO_2 concentrations in most cases since the ambient NO_2 levels will be more ozone-limited. One of the potential refinements in application of the titration method incorporated in PVMRM is a technique for dynamically determining which sources should compete for the available ozone based on the relative locations of the plumes from individual sources, both laterally and vertically, on an hourly basis, taking into account wind direction and plume rise. While this approach addresses one of the implementation issues associated with OLM by making the decision of which sources should compete for ozone, there is only very limited field study data available to evaluate the methodology.

Given the importance of the issue of whether to combine plumes for the OLM option, EPA has addressed the issue in the past through the Model Clearinghouse process. The general guidance that has emerged in those cases is that the OLM option should be applied on a source-by-source basis in most cases and that combining plumes for application of OLM would require a clear demonstration that the plumes will overlap to such a degree that they can be considered as "merged" plumes. However, much of that guidance was provided in the context of applying the OLM method outside the dispersion model in a post-processing mode on an annual basis. The past guidance on this issue is still appropriate in that context since there is no realistic method to account for the degree of plume merging on an hourly basis throughout the modeling analysis when applied as a post-processor. However, the implementation of the OLM option within the AERMOD model applies the method on a source-by-source, receptor-by-receptor, and hour-by-hour basis. As a result, the application of the OLMGROUP option within AERMOD is such that the sources only compete for the available ozone to the extent that each source contributes to the cumulative NOx concentration at each receptor for that hour. Sources which contribute significantly to the ambient NOx concentration at the receptor will compete for available ozone in proportion to their contribution, while sources that do not contribute significantly to the ambient NOx concentration will not compete for the ozone. Thus, the OLMGROUP option implemented in AERMOD will tend to be "self-correcting" with respect to concerns that combining plumes for OLM will overestimate the degree of ozone limiting potential (and therefore underestimate ambient NO_2 concentrations). As a result of these considerations, we recommend that use of the "OLMGROUP ALL" option, which specifies that all sources will potentially compete for the available ozone, be routinely applied and accepted for all approved applications of the OLM option in AERMOD. This recommendation is supported by model-to-monitor comparisons of hourly NO_2 concentrations from the application of AERMOD for the Atlanta NO_2 risk and exposure assessment (EPA, 2008), and recent re-evaluations of hourly NO_2 impacts from the two field studies (New Mexico and Palaau) that were used in the evaluation of PVMRM (MACTEC, 2005). These model-to-monitor comparisons of hourly NO_2 concentrations show reasonably good performance using the "OLMGROUP ALL" option within AERMOD, with no indication of any bias to underestimate hourly NO_2 concentrations with OLMGROUP ALL. Furthermore, model-to-monitor comparisons based on OLM without the OLMGROUP option do exhibit a bias to overestimate hourly NO_2 concentrations. We will provide further details regarding these recent hourly NO_2 model-to-monitor comparisons at a later date.

SUMMARY

To summarize, we emphasize the following points:

1. The 3-tiered screening approach recommended in Section 5.2.4 of Appendix W for annual NO_2 assessments generally applies to the new 1-hour NO_2 standard.
2. While generally applicable, application of the 3-tiered screening approach for assessments of the new 1-hour NO_2 standard may entail additional considerations, such as the importance of key input data, including appropriate emission rates for the 1-hour standard vs. the annual standard for all tiers, and the representativeness of in-stack NO_2/NOx ratios and hourly background ozone concentrations for Tier 3 detailed screening methods.
3. Since the OLM and PVMRM methods in AERMOD are currently considered non-regulatory-default options, application of these options requires justification and approval by the Regional Office on a case-by-case basis as alternative modeling techniques, in accordance with Section 3.2.2, paragraph (e), of Appendix W.
4. Applications of the OLM option in AERMOD, subject to approval under Section 3.2.2.e of Appendix W, should routinely utilize the "OLMGROUP ALL" option for combining plumes.
5. While the 1-hour NAAQS for NO_2 is defined in terms of the 3-year average for monitored design values to determine attainment of the NAAQS, this definition does not preempt or alter the Appendix W requirement for use of 5 years of NWS meteorological data or at least 1 year of site specific data.

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ATTACHMENT A

Background on Hourly NOx Emissions for Permit Modeling for the 1-hour NO_2 NAAQS

Introduction

The purpose of this attachment is to address questions about availability of hourly NOx emissions for permit modeling under the new NO_2 NAAQS. It summarizes existing guidance regarding emission input data requirements for NAAQS compliance modeling, and provides background on the historical approach to development of inventories for NO_2 permit modeling and computation of hourly emissions appropriate for assessing the new 1-hour NO_2 standard. Although the NAAQS is defined in terms of ambient NO_2 concentrations, source emission estimates for modeling are based on NOx.

Under the PSD program, the owner or operator of the source is required to demonstrate that the source does not cause or contribute to a violation of a NAAQS (40 CFR 51.166 (k)(1) and 40 CFR 52.21 (k)(1)) and/or PSD increments (40 CFR 51.166 (k)(2) and 52.21 (k)(2)). However, estimation of the necessary emission input data for NAAQS compliance modeling entails consideration of numerous factors, and the appropriate reviewing authority should be consulted early in the process to determine the appropriate emissions data for use in specific modeling applications (see 40 CFR 51, Appendix W, 8.1.1.b and 8.2.3.b)

Summary of Current Guidance

Section 8.1 of the *Guideline on Air Quality Models*, Appendix W to 40 CFR Part 51, provides recommendations regarding source emission input data needed to support dispersion modeling for NAAQS compliance demonstrations. Table 8-2 of Appendix W provides detailed guidance regarding the specific components of the emission input data, including the appropriate emission limits (pounds/MMBtu), operating level (MMBtu/hr), and operating factor (e.g., hr/yr or hr/day), depending on the averaging time of the standard. Table 8-2 also distinguishes between the emission input data needed for the new or modified sources being assessed, and "nearby" and "other" background sources included in the modeled emission inventory.

Based on Table 8-2, emission input data for new or modified sources for annual and quarterly standards are essentially the same as for short-term standards ($\leq$ 24 hours), based on maximum allowable or federally enforceable emission limits, design capacity or federally enforceable permit conditions, and the assumption of continuous operation. However, there are a few additional considerations cited in Appendix W that could result in different emission input data for the 1-hour vs. annual NO_2 NAAQS. For example, while design capacity is listed as the recommended operating level for the emission calculation, peak hourly ground-level concentrations may be more sensitive than annual average concentrations to changes in stack parameters (effluent exit temperature and exit velocity) under different operating capacities. Table 8-2 specifically recommends modeling other operating levels, such as 50 percent or 75 percent of capacity, for short-term standards (see footnote 3). Another factor that may affect maximum ground-level concentrations differently between the 1-hour vs. annual standard is restrictions on operating factors based on federally enforceable permit conditions. While federally enforceable operating factors other than continuous operation may be accounted for in the emission input data (e.g., if operation is limited to 8 am to 4 pm each day), Appendix W also states that modeled emissions should not be averaged across non-operating time periods (see footnote 2 of Table 8-2).

While emission input data recommendations for "nearby" and "other" background sources included in the modeled emission inventory are similar to the new or modified source emission inputs in many respects, there is an important difference in the operating factor between annual and short-term standards. Emission input data for nearby and other sources may reflect actual operating factors (averaged over the most recent 2 years) for the annual standard, while continuous operation should be assumed for short-term standards. This could result in important differences in emission input data for modeled background sources for the 1-hour NO_2 NAAQS relative to emissions used for the annual standard.

Model Emission Inventory for NO_2 Modeling

For the existing annual NO_2 NAAQS, the permit modeling inventory has generally been compiled from the annual state emission inventory questionnaire (EIQ) or Title V permit applications on file with the relevant permitting authority (state or local air program). Since a state uses the annual EIQ for Title V fee assessment, the state EIQ typically requires reporting of unit capacity, total fuel combusted, and/or hours of operation to help verify annual emissions calculations for fee accuracy purposes. Likewise, Title V operating permit applications contain all of the same relevant information for calculating emissions. While these emission inventories are important resources for gathering emission input data on background sources for NAAQS compliance modeling, inventories which are based on actual operations may not be sufficient for short-term standards, such as the new 1-hour NO_2 NAAQS. However, appropriate estimates of emissions from background sources for the 1-hour NO_2 standard may be derived in many cases from information in these inventories regarding permitted emission limits and operating capacity.

Historically, it has not been a typical practice for an applicant to use the EPA's national emission inventory (NEI) as the primary source for compiling the permit modeling inventory. Since the emission data submitted to the NEI represents annual emission totals, it may not be suitable for use in NAAQS compliance modeling for short-term standards since modeling should be based on continuous operation, even for modeled background sources. Although the NEI may provide emission data for background sources that are more appropriate for the annual NO_2 standard, the utility of the NEI for purposes of NAAQS compliance modeling is further limited due to the fact that additional information regarding stack parameters and operating rates required for modeling may not be available from the NEI. While records exist in the NEI for reporting stack data necessary for point source modeling (i.e., stack coordinates, stack heights, exit temperatures, exit velocities), some states do not report such information to the NEI, or there are may be errors in the location data submitted to the NEI. Under such conditions, default stack information based upon SIC is substituted and use of such data could invalidate modeling results. Building locations and dimensions, which may be required to account for building downwash influences in the modeling analysis, may also be missing or incomplete in many cases.

A common and relatively straightforward approach for compiling the necessary information to develop an inventory of emissions from background sources for a permit modeling demonstration is as follows, patterned after the draft *New Source Review Workshop Manual* (EPA, 1990). The applicant completes initial modeling of allowable emission increases associated with the proposed project and determines the radii of impact (ROI) for each pollutant and averaging period, based on the maximum distance at which the modeled ambient concentration exceeds the Significant Impact Level (SIL) for each pollutant and averaging period. Typically, the largest ROI is selected and then a list of potential background sources within the ROI plus a screening distance beyond the ROI is compiled by the permitting authority and supplied to the applicant. The applicant typically requests permit applications or EIQ submittals from the records department of the permitting authority to gather stack data and source operating data necessary to compute emissions for the modeled inventory. Once the applicant has gathered the relevant data from the permitting authorities, model emission rates are calculated. While this approach is fairly common, it should be noted that the draft workshop manual "is not intended to be an official statement of policy and standards and does not establish binding regulatory requirements" (see, Preface), and the appropriate reviewing authority should be consulted early in the process regarding the selection of appropriate background source emission inventories for the 1-hour NO_2 standard. We also note that Appendix W establishes "a significant concentration gradient in the vicinity of the source" under consideration as the main criterion for selection of nearby sources for inclusion in the modeled inventory, and further indicates that "the number of such [nearby] sources is expected to be small except in unusual situations." See Section 8.2.3.b.

As mentioned previously, modeled emission rates for short-term NAAQS are computed consistent with the recommendations of Section 8.1 of Appendix W, summarized in Table 8-2. The maximum allowable (SIP-approved process weight rate limits) or federally enforceable permit limit emission rates assuming design capacity or federally enforceable capacity limitation are used to compute hourly emissions for dispersion modeling against short-term NAAQS such as the new 1-hour NO_2 NAAQS. If a source assumes an enforceable limit on the hourly firing capacity of a boiler, this is reflected in the calculations. Otherwise, the design capacity of the source is used to compute the model emission rate. A load analysis is typically necessary to determine the load or operating condition that causes the maximum ground-level concentrations. In addition to 100 percent load, loads such as 50 percent and 75 percent are commonly assessed. As noted above, the load analysis is generally more important for short-term standards than for annual standards. For an hourly standard, other operating scenarios of relatively short duration such as "startup" and "shutdown" should be assessed since these conditions may result in maximum hourly ground-level concentrations, and the control efficiency of emission control devices during these operating conditions may also need to be considered in the emission estimation.

Emission Calculation Example

The hourly emissions are most commonly computed from AP-42 emission factors based on unit design capacity. For a combustion unit, the source typically reports both the unit capacity and the actual total amount of fuel combusted annually (gallons, millions of cubic feet of gas, etc.) to the permitting authority for the EIQ. Likewise, Title V operating permit applications will contain similar information that can be used to compute hourly emissions.

For example, assume you are modeling an uncontrolled natural gas package boiler with a design firing rate of 30 MMBtu/hr. The AP-42 emission factor for an uncontrolled natural gas external combustion source (AP-42, Section 1.4) for firing rates less than 100 MMBtu/hr is 100 lbs. NOx/10^6 SCF natural gas combusted. The hourly emission rate is derived by converting the emission factor expressed in terms of lbs. NOx/10^6 SCF to lbs. NOx/MMBtu. The conversion is done by dividing the 100 lbs. NOx/10^6 SCF by 1,020 to convert the AP-42 factor to lbs. NOx/MMBtu. The new emission factor is now 0.098 lbs. NOx/MMBtu.

For this example, the source has no limit on the hourly firing rate of the boiler; therefore, the maximum hourly emissions are computed by multiplying the design firing rate of the boiler by the new emission factor.

E_{hourly} = 0.098 lbs/MMBtu x 30MMBtu/hr = 2.94 lbs/hr

Thus 2.94 lbs/hr represents the emission rate that would be input into the dispersion model for modeling against the 1-hour NO_2 NAAQS to comport with emission rate recommendations of Section 8.1 of Appendix W.

It is important to note that data derived for the annual state emission inventory (EI) is based on actual levels of fuel combusted for the year, and is therefore different than how allowable emissions are computed for near-field dispersion modeling. For the annual EI report, a source computes their annual emissions based upon the AP-42 emission factor multiplied by the actual total annual throughput or total fuel combusted.

In the 30 MMBtu/hr boiler example, the annual NOx emissions reported to the NEI is computed by:

E_{annual} = (AP-42 emission factor) x (total annual fuel combusted)

E_{annual} = (100 lbs/10^6 SCF) x (100 10^6 SCF/yr) = 10,000 lbs. NOx/yr or 5 tons NOx/yr

DAQ Attachment 2

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

AUG 23 2010

MEMORANDUM

SUBJECT: Guidance Concerning the Implementation of the 1-hour SO_2 NAAQS for the Prevention of Significant Deterioration Program

FROM: Stephen D. Page, Director
Office of Air Quality Planning and Standards

TO: Regional Air Division Directors

On June 2, 2010, the U.S. Environmental Protection Agency (EPA) announced a new 1-hour sulfur dioxide (SO_2) National Ambient Air Quality Standard (hereinafter, either the 1-hour SO_2 NAAQS or 1-hour SO_2 standard) of 75 ppb, which is attained when the 3-year average of the annual 99th-percentile of 1-hour daily maximum concentrations does not exceed 75 ppb at each monitor within an area. EPA revised the primary SO_2 NAAQS to provide the requisite protection of public health. The final rule for the new 1-hour SO_2 NAAQS was published in the Federal Register on June 22, 2010 (75 FR 35520), and the standard becomes effective on August 23, 2010. In the same notice, we also announced that we are revoking both the existing 24-hour and annual primary SO_2 standards. However, as explained in this guidance, those SO_2 standards, as well as the 24-hour and annual increments for SO_2, remain in effect for a while further and must continue to be protected.

EPA interprets the Prevention of Significant Deterioration (PSD) provisions of the Clean Air Act and EPA regulations to require that any federal permit issued under 40 CFR 52.21 on or after that effective date must contain a demonstration of source compliance with the new 1-hour SO_2 NAAQS. We anticipate that some new major stationary sources or major modifications, especially those involving relatively short stacks, may experience difficulty demonstrating that emissions from proposed projects will not cause or contribute to a modeled violation of the new 1-hour SO_2 NAAQS. We also anticipate problems that sources may have interpreting the modeled 1-hour SO_2 impacts if the form of the hourly standard is not properly addressed. To respond to these and other related issues, we are providing the attached guidance, in the form of two memoranda, for implementing the new 1-hour SO_2 NAAQS under the PSD permit program.

The first memorandum, titled "General Guidance for Implementing the 1-hour SO_2 National Ambient Air Quality Standard in Prevention of Significant Deterioration Permits, Including an Interim 1-hour SO_2 Significant Impact Level," includes guidance for the preparation and review of PSD permits with respect to the new 1-hour SO_2 standard. That guidance memorandum sets forth a recommended interim 1-hour SO_2 significant impact level (SIL) that states may consider for carrying out the required PSD air quality analysis for SO_2, until EPA promulgates a 1-hour SO_2 SIL via rulemaking, and addresses the continued use of the existing SO_2 Significant Emissions Rate (SER) and Significant Monitoring Concentration (SMC) to implement the new 1-hour SO_2 standard.. The second memorandum, titled "Applicability of Appendix W Modeling Guidance for the 1-hour SO_2 National Ambient Air Quality Standard," includes specific modeling guidance for estimating ambient SO_2 concentrations and determining compliance with the new 1-hour SO_2 standard.

This guidance does not bind state and local governments and permit applicants as a matter of law. Nevertheless, we believe that state and local air agencies and industry will find this guidance useful for carrying out the PSD permit process and it will provide a consistent approach for estimating SO_2 air quality impacts from proposed construction or modification of SO_2 emissions sources. For the most part, the attached guidance focuses on how existing policy and guidance is relevant to and should be used for implementing the new 1-hour SO_2 NAAQS.

Please review the guidance included in the two attached memoranda. In the event of questions regarding the general implementation guidance contained in the first memorandum, please contact Raj Rao (rao.raj@epa.gov). For questions pertaining to the modeling guidance in the second memorandum, please contact Tyler Fox (fox.tyler@epa.gov). We are continuing our efforts to address permitting issues related to the implementation of new and revised NAAQS, and will issue additional guidance to address the NAAQS as appropriate.

Attachments:

1. Memorandum from Anna Marie Wood, Air Quality Policy Division, to EPA Regional Air Division Directors, "General Guidance for Implementing the 1-hour SO_2 National Ambient Air Quality Standard in Prevention of Significant Deterioration Permits, Including an Interim 1-hour SO_2 Significant Impact Level" (August 23, 2010).
2. Memorandum from Tyler Fox, Air Quality Modeling Group, to EPA Regional Air Division Directors, "Applicability of Appendix W Modeling Guidance for the 1-hour SO_2 National Ambient Air Quality Standard" (August 23, 2010).

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

August 23, 2010

MEMORANDUM

SUBJECT: General Guidance for Implementing the 1-hour SO_2 National Ambient Air Quality Standard in Prevention of Significant Deterioration Permits, Including an Interim 1-hour SO_2 Significant Impact Level

FROM: Anna Marie Wood, Acting Director /s/
Air Quality Policy Division

TO: Regional Air Division Directors

INTRODUCTION

We are issuing the following guidance to explain and clarify the procedures that may be followed by applicants for Prevention of Significant Deterioration (PSD) permits, and permitting authorities reviewing such applications, to properly demonstrate that proposed projects to construct and operate will not cause or contribute to a modeled violation of the new 1-hour sulfur dioxide (SO_2) National Ambient Air Quality Standard (hereinafter, either the 1-hour SO_2 NAAQS or 1-hour SO_2 standard) that becomes effective on August 23, 2010. The EPA revised the primary SO_2 NAAQS by promulgating a 1-hour SO_2 NAAQS to provide the requisite protection of public health. Under section 165(a)(3) of the Clean Air Act (the Act) and sections 52.21(k) and 51.166(k) of EPA's PSD regulations, to obtain a permit, a source must demonstrate that its proposed emissions increase will not cause or contribute to a violation of "any NAAQS."

This guidance is intended to (1) highlight the importance of a 1-hour averaging period for setting an emissions limitation for SO_2 in the PSD permit (2) reduce the modeling burden to implement the 1-hour SO_2 standard where it can be properly demonstrated that a source will not have a significant impact on ambient 1-hour SO_2 concentrations, and (3) identify approaches that allow sources and permitting authorities to mitigate, in a manner consistent with existing regulatory requirements, potential modeled violations of the 1-hour SO_2 NAAQS, where appropriate. Accordingly, the techniques described in this memorandum may be used by permit applicants and permitting authorities to perform an acceptable 1-hour SO_2 NAAQS compliance modeling assessment and/or properly configure projects and permit conditions in order that a proposed source's emissions do not cause or contribute to modeled 1-hour SO_2 NAAQS violations, so that permits can be issued in accordance with the applicable PSD program requirements.

This guidance discusses existing provisions in EPA regulations and guidance, and focuses on the relevancy of this information for implementing the new NAAQS for SO_2. Importantly, however, this guidance also sets forth a recommended interim 1-hour SO_2 significant impact level (SIL) that EPA will use when it evaluates applications and issues permits under the federal PSD program, and that states may choose to rely upon to implement their PSD programs for SO_2 if they agree that the value represents a reasonable threshold for determining a significant ambient impact, and they incorporate into each permit record a rationale supporting this conclusion. This interim SIL is a useful screening tool that can be used to determine whether or not the predicted ambient impacts caused by a proposed source's emissions increase will be significant and, if so whether the source's emissions should be considered to "cause or contribute to" modeled violations of the new 1-hour SO_2 NAAQS.

BACKGROUND

On August 23, 2010, the new 1-hour SO_2 NAAQS will become effective. Regulations at 40 CFR 52.21 (the federal PSD program) require permit applicants to demonstrate compliance with "any" NAAQS that is in effect on the date a PSD permit is issued. (See, e.g., EPA memo dated April 1, 2010, titled "Applicability of the Federal Prevention of Significant Deterioration Permit Requirements to New and Revised National Ambient Air Quality Standards.") Due to the promulgation of this short-term averaging period (1-hour) for the SO_2 NAAQS, we anticipate that some new major stationary sources or major modifications, especially those involving relatively short stacks may experience increased difficulty demonstrating that emissions from proposed project will not cause or contribute to a modeled violation.

We believe that, in some instances, preliminary predictions of violations could result from the use of maximum modeled concentrations that do not adequately take into account the form of the 1-hour standard. To the extent that is the case, ambient SO_2 concentrations in the form of the new 1-hour NAAQS should be estimated by applying the recommended procedures that account for the statistical form of the standard. See EPA Memorandum from Tyler Fox, Air Quality Modeling Group, to EPA Regional Air Division Directors, "Applicability of Appendix W Modeling Guidance for the 1-hour SO_2 National Ambient Air Quality Standard" (August 23, 2010) for specific modeling guidance for estimating ambient SO_2 concentrations consistent with the new 1-hour SO_2 NAAQS.

It is EPA's expectation that currently available SO_2 guidance, including the guidance presented in this memorandum, will assist in resolving some of the issues arising from preliminary analyses that show potential exceedances of the new 1-hour SO_2 NAAQS that would not be present under more refined modeling applications. In addition, the techniques described in this memorandum may also help avoid violations of the standard through design of the proposed source or permit conditions, consistent with existing regulatory requirements. Moreover, the interim 1-hour SO_2 SIL that is included in this guidance will provide a reasonable screening tool for effectively implementing the PSD requirements for an air quality impact analysis.

The following discussion provides guidance for establishing a 1-hour emissions limitation to demonstrate compliance with the new NAAQS, and for possibly mitigating modeled violations using any of the following: air quality-based permit limits more stringent than what the Best Available Control Technology provisions may otherwise require, air quality offsets, "good engineering practice" (GEP) stack heights, and an interim 1-hour SO_2 SIL. The continued use of the existing SO_2 Significant Emissions Rate (SER) and Significant Monitoring Concentration (SMC) to implement the new 1-hour SO_2 standard is also discussed.

SCREENING VALUES

In the final rule establishing the 1-hour SO_2 standard, EPA discussed various implementation considerations for the PSD permitting program. 75 FR.35520 (June 22, 2010). That discussion included the following statements regarding particular screening values that have historically been used on a widespread basis to facilitate implementation of the PSD permitting program:

> We agree with the commenters that there may be a need for EPA to provide additional screening tools or to revise existing screening tools that are frequently used under the NSR/PSD program for reducing the burden of completing SO_2 ambient air impact analyses. These screening tools include the SILs, as mentioned by the commenter, but also include the SER for emissions of SO_2 and the SMC for SO_2. The existing screening tools apply to the periods used to define the existing NAAQS for SO_2, including the annual, 24-hour, and 3-hour averaging periods. EPA intends to evaluate the need for possible changes or additions to each of these useful screening tools for SO_2 due to the revision of the SO_2 NAAQS to provide for a 1-hour standard. We believe it is highly likely that in order to be most effective for implementing the new 1-hour averaging period for NSR purposes, new 1-hour screening values will be appropriate.

75 FR 35579. EPA intends to conduct an evaluation of these issues and submit our findings in the form of revised significance levels under notice and comment rulemaking if any revisions are deemed appropriate. In the interim, for the reasons provided below, we recommend the continued use of the existing SER for SO_2 emissions as well as an interim 1-hour SO_2 SIL that we are setting forth today for conducting air quality impact analyses for the 1-hour SO_2 NAAQS. As described in the section titled Introduction, EPA intends to implement the interim 1-hour SO_2 SIL contained herein under the federal PSD program and offers states the opportunity to use it in their PSD programs if they choose to do so. EPA is not addressing the significant monitoring concentration (SMC) for SO_2 in this memorandum; the existing SMC for SO_2, at 40 CFR 52.21(i)(5)(i) should continue to be used.

SIGNIFICANT EMISSIONS RATE

The PSD regulations define SER for various regulated NSR pollutants. When a proposed new source's potential to emit a pollutant, or a modified source's net emissions increase of a pollutant, would be less than the SER, the source is not required to undergo the requisite PSD analyses (BACT and air quality) for that particular emissions increase. Under the terms of existing EPA regulations, the applicable SER for SO_2 is 40 tons per year (tpy). 40 CFR 52.21(b)(23); 40 CFR 51.166(b)(23). Each of the significant emissions rates defined in those regulations is specific to an individual pollutant with no differentiation by averaging time with regard to NAAQS. The NAAQS for SO_2 have included standards with 3-hour and 24-hour and annual averaging times for many years. The EPA has applied the 40 tpy SER for SO_2 across all of these averaging times, and we are aware of no reason why it should not be used for the 1-hour averaging period for the present time. Therefore, until the evaluation described above and any associated rulemaking are completed, we will use 40 tpy as the SER for the 1-hour standard.

Under existing regulations, an ambient air quality impact analysis is required for "each pollutant that [a source] would have the potential to emit in significant amounts." [40 CFR 52.21(m)(1)(i)(a); 40 CFR. 51.166(m)(1)(i)(a)]. For modifications, these regulations require this analysis for "each pollutant for which [the modification] would result in a significant net emissions increase." 40 CFR.52.21(m)(1)(i)(b); 40 CFR.51.166(m)(1)(i)(b). EPA construes this regulation to mean that an ambient impact analysis is not necessary for pollutants with emissions rates below the significant emissions rates in paragraph (b)(23) of the regulations. No additional action by EPA or permitting authorities is necessary at this time to apply the 40 tpy significant emissions rate in existing regulations to the hourly SO_2 standard.

INTERIM 1-HOUR SO_2 SIGNIFICANT IMPACT LEVEL

Under the PSD program, a proposed new major stationary source or major modification must, among other things, complete an air quality impact analysis that involves performing an analysis of air quality modeling and ambient monitoring data, where appropriate, to demonstrate compliance with applicable NAAQS. In order to implement this requirement, EPA traditionally has provided a screening tool known as the Significant Impact Level (SIL) to help applicants and permitting authorities determine whether a source's modeled ambient impact is significant so as to warrant a comprehensive, cumulative air quality analysis to demonstrate compliance with the NAAQS. Accordingly, where a proposed source's modeled impact is deemed insignificant, or *de minimis*, using the SIL as a threshold for significance, the applicant is not required to model anything besides its own proposed emissions increase to show that the proposed source or modification will not cause or contribute to a violation of the NAAQS.[1]

If, on the other hand, the source's modeled impact is found to be significant, based on the SIL, the applicant will need to complete a comprehensive, cumulative air quality impact analysis to demonstrate that the source's emissions will not cause or contribute to a modeled violation of any NAAQS. To make this demonstration, EPA has recommended that a cumulative analysis cover a circular area measuring out from the source to the maximum distance where the source's impact is equal to the SIL. Within this modeling area, the source should also model the impacts of other sources (existing and newly permitted), including applicable SO_2 sources located outside the circular area described above, to account for the cumulative hourly SO_2 air quality impacts

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[1] When a proposed source's impact by itself is not considered to be "significant," EPA has long maintained that any further effort on the part of the applicant to complete a cumulative source impact analysis involving other source impacts would only yield information of trivial or no value with respect to the required evaluation of the proposed source or modification. The concept of a SIL is grounded on the *de minimis* principles described by the court in *Alabama Power Co. v. Costle*, 636 F.2d 323, 360 (D.C. Cir. 1980); See also *Sur Contra La Contaminacion v. EPA*, 202 F.3d 443, 448-49 (1st Cir. 2000) (upholding EPA's use of SIL to allow permit applicant to avoid full impact analysis); *In re: Prairie State Gen. Co.*, PSD Appeal No. 05-05, Slip. Op. at 139 (EAB 2006).

that are predicted to occur. The applicant may also have to gather ambient monitoring data as part of the total air quality analysis that is required for demonstrating compliance with the NAAQS.[2] Accordingly, the source will evaluate its contribution to any modeled violation of the 1-hour SO_2 NAAQS to determine whether the source's emissions contribution will cause or contribute to the modeled violation at any receptor. Note that in the accompanying modeling guidance memorandum we are providing recommended procedures and guidance for completing the modeling analysis to demonstrate compliance with the new 1-hour SO_2 NAAQS.

We plan to undertake rulemaking to adopt a 1-hour SO_2 SIL value. However, until such time as a 1-hour SO_2 SIL is defined in the PSD regulations, we are providing an interim SIL of 3 ppb, which we intend to use as a screening tool for completing the required air quality analyses for the new 1-hour SO_2 NAAQS under the federal PSD program at 40 CFR 52.21. We are also making the interim SIL available to States with EPA-approved implementation plans containing a PSD program to use at their discretion. To support the application of this interim 1-hour SO_2 SIL in each instance, a permitting authority that utilizes it as part of an ambient air quality analysis should include in the permit record the analysis reflected in this memorandum and the referenced documents to demonstrate that a modeled air quality impact is *de minimis,* and thereby would not be considered to cause or contribute to a modeled violation of the NAAQS.[3]

States may also elect to choose another value that they believe represents a significant air quality impact relative to the 1-hour SO_2 NAAQS. The EPA-recommended interim 1-hour SO_2 SIL is not intended to supersede any interim SIL that any state chooses to rely upon to implement a state PSD program that is part of an approved SIP, or to impose the use of the SIL concept on any state that chooses to implement the PSD program—in particular the ambient air quality analysis—without using a SIL as a screening tool. Accordingly, states that implement the PSD program under an EPA-approved SIP may choose to use this interim SIL, another value that may be deemed more appropriate for PSD permitting purposes in the state of concern, or no SIL at all. The application of any SIL that is not reflected in a promulgated regulation should be supported by a record in each instance that shows the value represents a *de minimis* impact on the 1-hour SO_2 standard, as described above.

As indicated above, using the interim 1-hour SO_2 SIL, the permit applicant and permitting authority can determine: (1) whether, based on the proposed increase in SO_2 emissions, a cumulative air quality analysis is required; (2) the area of impact within which a cumulative air quality analysis should focus; and (3) whether, as part of a cumulative air quality analysis, the proposed source's SO_2 emissions will cause or contribute to any modeled violation of the 1-hour SO_2 NAAQS.

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[2] A screening tool known as the Significant Monitoring Concentration (SMC) for SO_2 already exists in the PSD regulations. EPA plans to evaluate the existing SMC in light of the new 1-hour SO_2 NAAQS; however, the existing value of 13 $\mu g/m^3$, 24-hour average, should continue to be used until and unless a revised value is issued through rulemaking.

[3] Where the cumulative air quality analysis identifies a modeled violation of the NAAQS or increments, and the proposed source is issued its permit by virtue of the fact that its proposed emissions increase is not considered to cause or contribute to the modeled violation, it is still the permitting authority's responsibility to address such modeled violations independently from the PSD permitting process to determine the nature of the problem and to mitigate it accordingly,

As mentioned above, we are providing an interim 1-hour SO_2 SIL value of 3 ppb to implement the federal PSD program. To determine initially whether a proposed project's emissions increase will have a significant impact (resulting in the need for a cumulative air quality analysis), this interim SIL should be compared to either of the following:

- The highest of the 5-year averages of the maximum modeled 1-hour SO_2 concentrations predicted each year at each receptor, based on 5 years of National Weather Service data; or
- The highest modeled 1-hour SO_2 concentration predicted across all receptors based on 1 year of site-specific meteorological data, or the highest of the multi-year averages of the maximum modeled 1-hour SO_2 concentrations predicted each year at each receptor, based on 2 or more, up to 5 complete years of available site-specific meteorological data.

Additional guidance will be forthcoming for the purpose of comparing a proposed source's modeled impacts to the interim 1-hour SO_2 SIL in order to make a determination about whether that source's contribution is significant when a cumulative air quality analysis identifies violations of the 1-hour SO_2 NAAQS (i.e., "causes or contributes to" a modeled violation).

We derived this interim 1-hour SO_2 SIL by using an impact equal to 4% of the 1-hour SO_2 NAAQS (which is 75 ppb). On June 29, 2010, we issued an interim 1-hour NO_2 SIL that used an impact equal to 4% of the 1-hour NO_2 standard. As explained in the June memorandum, we have chosen this approach because we believe it is reasonable to base the interim 1-hour SIL directly on consideration of impacts relative to the corresponding 1-hour NAAQS. In 1980, we defined SER for each pollutant subject to PSD. 45 FR 52676 (August 7, 1980) at 52705-52710. For PM and SO_2, we defined the SER as the emissions rate that resulted in an ambient impact equal to 4% of the applicable short-term NAAQS. The 1980 analysis focused on levels no higher than 5% of the primary standard because of concerns that higher levels were found to result in unreasonably large amounts of increment being consumed by a single source. Within the range of impacts analyzed, we considered two factors that had an important influence on the choice of the significant impact levels: (1) cumulative effect on increment consumption of multiple sources in an area, each making the maximum *de minimis* emissions increase; and (2) the projected consequence of a given significant impact level on administrative burden. As explained in the preamble to the 1980 rulemaking and the supporting documentation,[4] EPA decided to use 4% of the 24-hour primary NAAQS for PM and SO_2 to define the significant emissions rates (SERs) for those pollutants. See 45 FR 52708. Looking now at a 1-hour NAAQS for SO_2, we believe that it is reasonable as an interim approach to use a SIL value that represents 4% of the 1-hour SO_2 NAAQS. EPA will consider other possible alternatives for developing a 1-hour SO_2 SIL in a future rulemaking that will provide an opportunity for public participation in the development of a SIL as part of the PSD regulations.

AIR-QUALITY BASED EMISSIONS LIMITATIONS

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[4] EPA evaluated *de minimis* levels for pollutants for which NAAQS had been established in a document titled "Impact of Proposed and Alternative De Minimis Levels for Criteria Pollutants"; EPA-450/2-80-072, June 1980.

Once a level of control is determined by the PSD applicant via the Best Available Control Technology (BACT) top-down process, the applicant must model the proposed source's emissions at the BACT emissions rate(s) to demonstrate that those emissions will not cause or contribute to a violation of any NAAQS or PSD increment. However, the EPA 1990 Workshop Manual (page B.54) describes circumstances where a proposed source's emissions based on levels determined via the top-down process may not be sufficiently controlled to prevent modeled violations of an increment or NAAQS. In such cases, it may be appropriate for PSD applicants to propose a more stringent control option (that is, beyond the level identified via the top-down process) as a result of an adverse impact on the NAAQS or PSD increments. In addition, the use of certain dispersion techniques is permissible for certain proposed projects for SO_2 that may need to be considered where emissions limitations alone may not enable the source to demonstrate compliance with the new 1-hour SO_2 NAAQS. This is discussed in greater detail below in the section addressing GEP stack height requirements.

Because compliance with the new SO_2 NAAQS must be demonstrated on the basis of a 1-hour averaging period, the reviewing authority should ensure that the source's PSD permit defines a maximum allowable hourly emissions limitation for SO_2, regardless of whether it is derived from the BACT top-down approach or it is the result of an air-quality based emissions rate. Hourly limits are important because they are the foundation of the air quality modeling demonstration relative to the 1-hour SO_2 NAAQS. For estimating the impacts of existing sources, if necessary, existing SO_2 emission inventories used to support modeling for compliance with the 3-hour and 24-hour SO_2 standards should serve as a useful starting point, and may be adequate in many cases for use in assessing compliance with the new 1-hour SO_2 standard. The PSD applicant's coordination with the reviewing authority is important in this matter to obtain the most appropriate estimates of maximum allowable hourly SO_2 emissions.

DEMONSTRATING COMPLIANCE WITH THE NAAQS AND INCREMENTS & MITIGATING MODELED VIOLATIONS WITH AIR QUALITY OFFSETS

A 1988 EPA memorandum provides procedures to follow when a modeled violation is identified during the PSD permitting process. [See Memorandum from Gerald A. Emison , EPA OAQPS, to Thomas J. Maslany, EPA Air Management Division, "Air Quality Analysis for Prevention of Significant Deterioration (PSD)." (July 5, 1988.)] In cases where the air quality analysis predicts violations of the 1-hour SO_2 NAAQS, but the permit applicant can show that the SO_2 emissions increase from the proposed source will not have a significant impact *at the point and time of any modeled violation*, the permitting authority has discretion to conclude that the source's emissions will not contribute to the modeled violation. As provided in the July 5, 1988 guidance memo, because the proposed source only has a *de minimis* contribution to the modeled violation, the source's impact will not be considered to cause or contribute to such modeled violations, and the permit could be issued. This concept continues to apply, and the significant impact level (described further below) may be used as part of this analysis. A 2006 decision by the EPA Environmental Appeals Board (EAB) provides detailed reasoning that demonstrates the permissibility of a finding that a PSD source would not be considered to cause or contribute to a modeled NAAQS violation because its estimated air quality impact was insignificant at the time and place of the modeled violations.[5] [See In re *Prairie State Gen. Co.*, 13 E.A.D. ___, ___, PSD Appeal No. 05-05, Slip. Op. at 137-144 (EAB 2006)]

However, where it is determined that a source's impact does cause or contribute to a modeled violation, a permit cannot be issued without some action to mitigate the source's impact. In accordance with 40 CFR 51.165(b)[6], a major stationary source or major modification (as defined at §51.165(a)(1)(iv) and (v)) that locates in a SO_2 attainment area for the 1-hour SO_2 NAAQS and would cause or contribute to a violation of the 1-hour SO_2 NAAQS may "reduce the impact of its emissions upon air quality by obtaining sufficient emission reductions to, at a minimum, compensate for its adverse ambient [SO_2] impact where the major source or major modification would otherwise cause or contribute to a violation ...." An applicant can meet this requirement for obtaining additional emissions reductions either by reducing its emissions at the source (e.g., promoting more efficient production methodologies and energy efficiency) or by obtaining air quality offsets (see below). [See, e.g., In re *Interpower of New York, Inc.*, 5 E.A.D. 130, 141 (EAB 1994)].[7] A State may also provide the necessary emissions reductions by imposing emissions limitations on other sources through an approved SIP revision. These approaches may also be combined as necessary to demonstrate that a source will not cause or contribute to a violation of the NAAQS.

Unlike emissions offset requirements in areas designated as nonattainment, in addressing the air quality offset concept, it may not be necessary for a permit applicant to fully offset the proposed emissions increase if an emissions reduction of lesser quantity will mitigate the adverse air quality impact where the modeled violation was originally identified. ("Although full emission offsets are not required, such a source must obtain emission offsets sufficient to compensate for its air quality impact where the violation occurs." 44 FR 3274, January 16, 1979, at 3278.) To clarify this, the 1988 guidance memo referred to above states that:

> offsets sufficient to compensate for the source's significant impact must be obtained pursuant to an approved State offset program consistent with State Implementation Plan (SIP) requirements under 40 CFR 51.165(b). Where the source is contributing to an existing violation, the required offset may not correct the violation. Such existing violations must be addressed [through the SIP].

Note that additional guidance for this and other aspects of the modeling analysis for the impacts of SO_2 emissions on ambient concentrations of SO_2 are addressed in EPA modeling guidance, including the attached August 23, 2010 Memorandum titled "Applicability of Appendix W Modeling Guidance for the 1-hour SO_2 National Ambient Air Quality Standard."

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[5] While there is no 1-hour SO_2 significant impact level (SIL) currently defined in the PSD regulations, we believe that states may adopt interim values, with the appropriate justification for such values, to use for permitting purposes. In addition, we are recommending an interim SIL as part of this guidance for implementing the SO_2 requirements in the federal PSD program, and in state programs where states choose to use it.

[6] The same provision is contained in EPA's Interpretative Ruling at 40 CFR part 51 Appendix S, section III.

[7] In contrast to Nonattainment New Source Review permits, offsets are not mandatory requirements in PSD permits if it can otherwise be demonstrated that a source will not cause or contribute to a violation of the NAAQS. See, In re *Knauf Fiber Glass, GMBH*, 8 E.A.D. 121, 168 (EAB 1999).

Although EPA announced that it is revoking the annual and 24-hour SO_2 NAAQS, the June 22, 2010 preamble to the final rule announcing the new 1-hour SO_2 NAAQS explained that those standards will remain in effect for a limited period of time as follows: for current SO_2 nonattainment areas and SIP call areas, until attainment and maintenance SIPs are approved by EPA for the new 1-hour SO_2 NAAQS; for all other areas, for one year following the effective date of the initial designations under section 107(d)(1) for the new 1-hour SO_2 NAAQS. Accordingly, the annual and 24-hour SO_2 NAAQS must continue to be protected under the PSD program for as long as they remain in effect for a PSD area. There is a more detailed discussion of the transition from the existing SO_2 NAAQS to a revised SO_2 NAAQS in that preamble. Also, the same preamble includes a footnote listing the current nonattainment areas and SIP call areas. 75 FR 35520, at 35580-2.

In addition, the existing SO_2 increments (class I, II and III) for the annual and 24-hour averaging periods will not be revoked in conjunction with our decision to revoke the corresponding SO_2 NAAQS. Instead, the annual and 24-hour SO_2 increments (Class I, II and III increments) will remain in effect because they are defined in the Clean Air Act at title I, part C, section 163. The annual and 24-hour SO_2 increments in section 163 are considered part of the suite of statutory increments applicable to sulfur dioxide that Congress expressly included in the statutory provisions for PSD. As such, those increments cannot be revoked simply because we have decided to revoke the annual and 24-hour SO_2 NAAQS, upon which the SO_2 increments are based. Consequently, sources must continue to demonstrate that their proposed emissions increases of SO_2 emissions will not cause or contribute to any modeled violation of the existing annual and 24-hour SO_2 increments for as long as those statutory increments remain in effect. Increments for the 1-hour averaging period do not yet exist; the Act provides a specific schedule for the promulgation of additional regulations, which may include new increments, following the promulgation of new or revised NAAQS. EPA plans to begin that rulemaking process in the near future to consider the need for such increments.

"GOOD ENGINEERING PRACTICE" STACK HEIGHT AND DISPERSION TECHNIQUES

If a permit applicant is unable to show that the source's proposed emissions increase will not cause or contribute to a modeled violation of the new 1-hour SO_2 NAAQS, the problem could be the result of plume downwash effects causing high ambient concentrations near the source. In such cases, a source may be able to raise the height of its existing stacks (or designed stacks if not yet constructed) to a "good engineering practice" (GEP) stack height, or at least 65 meters, measured from the ground-level elevation at the base of the stack.

While not necessarily eliminating the full effect of downwash in all cases, raising stacks to GEP height may provide substantial air quality benefits in a manner consistent with statutory provisions (section 123 of the Act) governing acceptable stack heights to minimize excessive concentrations due to atmospheric downwash, eddies or wakes. Permit applicants should also be aware of the regulatory restrictions on stack heights for the purpose of modeling for compliance with NAAQS and increments. Section 52.21(h) of the PSD regulations currently prohibits the use of dispersion techniques, such as stack heights above GEP, merged gas streams, or intermittent controls for setting SO_2 emissions limits to meet the NAAQS and PSD increments.

However, stack heights in existence before December 31, 1970, and dispersion techniques implemented before then, are not affected by these limitations. EPA's general stack height regulations are promulgated at 40 CFR 51.100(ff), (gg), (hh), (ii), (jj), (kk) and (nn), and 40 CFR 51.118.

a. *Stack heights*: A source can include only the actual stack height up to GEP height when modeling to develop the SO_2 emissions limitations or to determine source compliance with the SO_2 NAAQS and increments. This is not a limit on the actual height of any stack constructed by a new source or modification, however, and there may be circumstances where a source owner elects to build a stack higher than GEP height. However, such additional height may not be considered when determining an emissions limitation or demonstrating compliance with an applicable NAAQS or PSD increment. Thus, when modeling, the following limitations apply in accordance with §52.21(h):

- For a stack height less than GEP, the actual stack height must be used in the source impact analysis for emissions;
- For a stack height equal to or greater than 65 meters the impact may be modeled using the greater of:
    - A *de minimis* stack height equal to 65 meters, as measured from the ground-level elevation at the base of the stack, without demonstration or calculation (40 CFR 51.100(ii)(1));
    - The refined formula height calculated using the dimensions of nearby structures in accordance with the following equation:

  GEP = H + 1.5L, where H is the height of the nearby structure and L is the lesser dimension of the height or projected width of the nearby structure (40 CFR 51.100(ii)(2)(ii)).[8]

- A GEP stack height exceeding the refined formula height may be approved when it can be demonstrated to be necessary to avoid "excessive concentrations" of SO_2 caused by atmospheric downwash, wakes, or eddy effects by the source, nearby structures, or nearby terrain features.
  (40 CFR 51.100(ii)(3), (jj), (kk));

- For purposes of PSD, "excessive concentrations" means a maximum ground-level concentration from a stack due in whole or in part to downwash, wakes, and eddy effects produced by nearby structures or nearby terrain features which individually is at least 40 percent in excess of the maximum concentration experienced in the absence of such effects and (a) which contributes to a total concentration due to emissions from all sources that is greater than the applicable NAAQS or (b) greater than the applicable PSD increments.
  (40 CFR 51.100(kk)(1)).

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[8] For stacks in existence on January 12, 1979, the GEP equation is GEP = 2.5 H (provided the owner or operator produces evidence that this equation was actually relied on in establishing an emission limitation for SO_2 (40 CFR 51.100(ii)(2)(i)

Reportedly, for economic and other reasons, many existing source stacks have been constructed at heights less than 65 meters, and source impact analyses may show that the source's emissions will cause or contribute to a modeled violation of the 1-hour SO_2 NAAQS. Where this is the case, sources should be aware that it is permissible for them to increase their stack heights up to 65 meters without a GEP demonstration.

b. *Other dispersion techniques*: The term "dispersion technique" includes any practice carried out to increase final plume rise, subject to certain exceptions (40 CFR 51.100(hh)(1), (2)(i) – (v)). Beyond the noted exceptions, such techniques are not allowed for getting credit for modeling source compliance with the NAAQS and PSD increments. One such exception is for sources of SO_2. Section 51.100(hh)(2)(v) provides that identified techniques that increase final exhaust gas plume rise are not considered prohibited dispersion techniques pursuant to section 51.100(hh)(1)(iii) "where the resulting allowable emissions of sulfur dioxide from the facility do not exceed 5,000 tons per year." Thus, proposed modifications that experience difficulty modeling compliance with the new 1-hour SO_2 NAAQS when relying on BACT or an air quality-based emissions limit alone may permissibly consider techniques to increase their final exhaust gas plume rise consistent with these provisions.

The definition of "dispersion technique" at 40 CFR 51.100(hh)(1)(iii) describes techniques that are generally prohibited, but which do not apply with respect to the exemption for SO_2. Accordingly, it is permissible for eligible SO_2 sources to make adjustments to source process parameters, exhaust gas parameters, stack parameters, or to combine exhaust gases from several existing stacks into one stack, so as to increase the exhaust gas plume rise. It is important to remember that the exemption applies to sources that have facility-wide allowable SO_2 emissions of less than 5,000 tpy resulting from the increase in final exhaust gas plume rise. Thus, proposed modifications should not base their eligibility to use dispersion on the amount of the proposed net emissions increase, but on the total source emissions of SO_2.

The EPA does not recommend or encourage sources to rely on dispersion to demonstrate compliance with the NAAQS; however, we acknowledge the fact that certain SO_2 sources may legally do so. For example, while increasing stack height is a method of dispersion, EPA's rules allow use of that approach to the extent the resulting height meets EPA's requirements defining "good engineering practice (GEP)" stack height. See 40 CFR 50.100(hh)(1)(i), 50.100(ii)(1)-(3). Nevertheless, EPA encourages PSD applicants to seek other remedies, including the use of the most stringent controls (beyond top-down BACT) feasible or the acquisition of emissions reductions (offsets) from other existing sources, to address situations where proposed emissions increases would result in modeled violations of the SO_2 NAAQS.

GENERAL START-UP CONDITIONS

We do not anticipate widespread problems associated with high short-term SO_2 emissions resulting from start-up/shutdown conditions. Many sources are capable of starting a unit with natural gas or low-sulfur fuel to avoid significant start-up emissions problems. However, some sources could experience short-term peaks of SO_2 during start-up or shutdown that could adversely affect the new 1-hour SO_2 NAAQS. The EPA currently has no provisions for exempting emissions occurring during equipment start-up/shutdown from the BACT requirements or for air quality analyses to demonstrate compliance with the SO_2 NAAQS and increments. Therefore, such emissions should be addressed in the required BACT and air quality analyses.

There are approaches to addressing issues related to start-up/shutdown emissions. For example, sources may be willing to accept enforceable permit conditions limiting equipment start-up/shutdown to certain hours of the day when impacts are expected to be lower than normal. Such permit limitations can be accounted for in the modeling of such emissions. Applicants should direct other questions arising concerning procedures for modeling start-up/shutdown emissions to the applicable permitting authority to determine the most current modeling guidance.

In the event of questions regarding the general implementation guidance contained in this memorandum, please contact Raj Rao (rao.raj@epa.gov).

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Office of Air Quality Planning and Standards
Research Triangle Park, North Carolina 27711

August 23, 2010

MEMORANDUM

SUBJECT: Applicability of Appendix W Modeling Guidance for the 1-hour SO_2 National Ambient Air Quality Standard

FROM: Tyler Fox, Leader /s/
Air Quality Modeling Group, C439-01

TO: Regional Air Division Directors

INTRODUCTION

On June 2, 2010, EPA announced a new 1-hour sulfur dioxide (SO_2) National Ambient Air Quality Standard (1-hour SO_2 NAAQS or 1-hour SO_2 standard) which is attained when the 3-year average of the 99th-percentile of the annual distribution of daily maximum 1-hour concentrations does not exceed 75 ppb at each monitor within an area. The final rule for the new 1-hour SO_2 NAAQS was published in the Federal Register on June 22, 2010 (75 FR 35520-35603), and the standard becomes effective on August 23, 2010 (EPA, 2010a). This memorandum clarifies the applicability of current guidance in the *Guideline on Air Quality Models* (40 CFR Part 51, Appendix W) for modeling SO_2 impacts in accordance with the Prevention of Significant Deterioration (PSD) permit requirements to demonstrate compliance with the new 1-hour SO_2 standard.

SUMMARY OF CURRENT GUIDANCE

Current modeling guidance for estimating ambient impacts of SO_2 for comparison with applicable NAAQS is presented in Section 4 of Appendix W under the general heading of "Traditional Stationary Source Models." This guidance acknowledges the fact that ambient SO_2 impacts are largely a result of emissions from stationary sources. Section 4.2.2 provides specific recommendations regarding "Refined Analytical Techniques," stating that "For a wide range of regulatory applications in all types of terrain, the recommended model is AERMOD" (see Section 4.2.2.b). As described in Section 4.1.d, the AERMOD dispersion model "employs best state-of-practice parameterizations for characterizing the meteorological influences and dispersion" (Cimorelli, *et al.*, 2004; EPA, 2004; EPA, 2009).

Section 7.2.6 of Appendix W addresses the issue of chemical transformation for modeling SO_2 emissions, stating that:

> The chemical transformation of SO_2 emitted from point sources or single industrial plants in rural areas is generally assumed to be relatively unimportant to the estimation of maximum concentrations when travel time is limited to a few hours. However, in urban areas, where synergistic effects among pollutants are of considerable consequence, chemical transformation rates may be of concern. In urban area applications, a half-life of 4 hours may be applied to the analysis of SO_2 emissions. Calculations of transformation coefficients from site specific studies can be used to define a ''half-life'' to be used in a steady-state Gaussian plume model with any travel time, or in any application, if appropriate documentation is provided. Such conversion factors for pollutant half-life should not be used with screening analyses.

The AERMOD model incorporates the 4 hour half-life for modeling ambient SO_2 concentrations in urban areas under the regulatory default option.

General guidance regarding source emission input data requirements for modeling ambient SO_2 impacts is provided in Section 8.1 of Appendix W and guidance regarding determination of background concentrations for purposes of a cumulative ambient air quality impact analysis is provided in Section 8.2.

APPLICABILITY OF CURRENT GUIDANCE TO 1-HOUR SO_2 NAAQS

The current guidance in Appendix W regarding SO_2 modeling in the context of the previous 24-hour and annual primary SO_2 NAAQS and the 3-hour secondary SO_2 NAAQS is generally applicable to the new 1-hour SO_2 standard. Since short-term SO_2 standards ($\leq$ 24 hours) have been in existence for decades, existing SO_2 emission inventories used to support modeling for compliance with the 3-hour and 24-hour SO_2 standards should serve as a useful starting point, and may be adequate in many cases for use in assessing compliance with the new 1-hour SO_2 standard, since issues identified in Table 8-2 of Appendix W related to short-term vs. long-term emission estimates may have already been addressed. However, the PSD applicant and reviewing authority may need to reassess emission estimates for very short-term emission scenarios, such as start-up and shut-down operations, for purposes of estimating source impacts on the 1-hour SO_2 standard. This is especially true if existing emission estimates for 3-hour or 24-hour periods are based on averages that include zero (0) or reduced emissions for some of the hours.

Given the form of the new 1-hour SO_2 standard, we are providing clarification regarding the appropriate data periods for modeling demonstrations of compliance with the NAAQS vs. demonstrations of attainment of the NAAQS through ambient monitoring. While monitored design values for the 1-hour SO_2 standard are based on a 3-year average (in accordance with Section 1(c) of Appendix T to 40 CFR Part 50), Section 8.3.1.2 of Appendix W addresses the length of the meteorological data record for dispersion modeling, stating that "[T]he use of 5 years of NWS [National Weather Service] meteorological data or at least 1 year of site specific data is required." Section 8.3.1.2.b further states that "one year or more (including partial years), up to five years, of site specific data . . . are preferred for use in air quality analyses." Although the monitored design value for the 1-hour SO_2 standard is defined in terms of the 3-year average, this definition does not preempt or alter the Appendix W requirement for use of 5 years of NWS meteorological data or at least 1 year of site specific data. The 5-year average based on use of NWS data, or an average across one or more years of available site specific data, serves as an unbiased estimate of the 3-year average for purposes of modeling demonstrations of compliance with the NAAQS. Modeling of "rolling 3-year averages," using years 1 through 3, years 2 through 4, and years 3 through 5, is not required. Furthermore, since modeled results for SO_2 are averaged across the number of years modeled for comparison to the new 1-hour SO_2 standard, the meteorological data period should include complete years of data to avoid introducing a seasonal bias to the averaged impacts. In order to comply with Appendix W recommendations in cases where partial years of site specific meteorological data are available, while avoiding any seasonal bias in the averaged impacts, an approach that utilizes the most conservative modeling result based on the first complete-year period of the available data record vs. results based on the last complete-year period of available data may be appropriate, subject to approval by the appropriate reviewing authority. Such an approach would ensure that all available site specific data are accounted for in the modeling analysis without imposing an undue burden on the applicant and avoiding arbitrary choices in the selection of a single complete-year data period.

The form of the new 1-hour SO_2 standard also has implications regarding appropriate methods for combining modeled ambient concentrations with monitored background concentrations for comparison to the NAAQS in a cumulative modeling analysis. As noted in the March 23, 2010 memorandum regarding "Modeling Procedures for Demonstrating Compliance with $PM_{2.5}$ NAAQS" (EPA, 2010b), combining the 98th percentile monitored value with the 98th percentile modeled concentrations for a cumulative impact assessment could result in a value that is below the 98th percentile of the combined cumulative distribution and would, therefore, not be protective of the NAAQS. However, unlike the recommendations presented for $PM_{2.5}$, the modeled contribution to the cumulative ambient impact assessment for the 1-hour SO_2 standard should follow the form of the standard based on the 99th percentile of the annual distribution of daily maximum 1-hour concentrations averaged across the number of years modeled. A "first tier" assumption that may be applied without further justification is to add the overall highest hourly background SO_2 concentration from a representative monitor to the modeled design value, based on the form of the standard, for comparison to the NAAQS. Additional refinements to this "first tier" approach based on some level of temporal pairing of modeled and monitored values may be considered on a case-by-case basis, subject to approval by the reviewing authority, with adequate justification and documentation.

Section 8.2.3 of Appendix W provides recommendations regarding the determination of background concentrations for multi-source areas. That section emphasizes the importance of professional judgment by the reviewing authority in the identification of nearby and other sources to be included in the modeled emission inventory, and establishes "a significant concentration gradient in the vicinity of the source" under consideration as the main criterion for this selection. Appendix W also indicates that "the number of such [nearby] sources is expected to be small except in unusual situations." See Section 8.2.3.b.

The representativeness of available ambient air quality data also plays an important role in determining which nearby sources should be included in the modeled emission inventory. Key issues to consider in this regard are the extent to which ambient air impacts of emissions from nearby sources are reflected in the available ambient measurements, and the degree to which emissions from those background sources during the monitoring period are representative of allowable emission levels under the existing permits. The professional judgments that are required in developing an appropriate inventory of background sources should strive toward the proper balance between adequately characterizing the potential for cumulative impacts of emission sources within the study area to cause or contribute to violations of the NAAQS, while minimizing the potential to overestimate impacts by double counting modeled source impacts that are also reflected in the ambient monitoring data.

We would also caution against the literal and uncritical application of very prescriptive procedures for identifying which background sources should be included in the modeled emission inventory for NAAQS compliance demonstrations, including those described in Chapter C, Section IV.C.1 of the draft *New Source Review Workshop Manual* (EPA, 1990), noting again that Appendix W emphasizes the importance of professional judgment in this process. While the draft workshop manual serves as a useful general reference that provides potential approaches for meeting the requirements of New Source Review (NSR) and PSD programs, it is not the only source of EPA modeling guidance. The procedures described in the manual may be appropriate in some circumstances for defining the spatial extent of sources whose emissions may need to be considered, but not in others. While the procedures described in the NSR Workshop Manual may appear very prescriptive, it should be recognized that "[i]t is not intended to be an official statement of policy and standards and does not establish binding regulatory requirements." See, Preface.

Given the range of issues involved in the determination of an appropriate inventory of emissions to include in a cumulative impact assessment, the PSD applicant should consult with the appropriate reviewing authority early in the process regarding the selection and proper application of appropriate monitored background concentrations and the selection and appropriate characterization of modeled background source emission inventories for use in demonstrating compliance with the new 1-hour SO_2 standard.

SUMMARY

To summarize, we emphasize the following points:

1. Current guidance in Appendix W for modeling to demonstrate compliance with the previous 24-hour and annual primary SO_2 standards, and 3-hour secondary SO_2 standard, is generally applicable for the new 1-hour SO_2 NAAQS.
2. While the 1-hour NAAQS for SO_2 is defined in terms of the 3-year average for monitored design values to determine attainment of the NAAQS, this definition does not preempt or alter the Appendix W requirement for use of 5 years of NWS meteorological data or at least 1 year of site specific data.

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Attachment B: Illustrated General Facility Overview

CMC Corporation: West Virginia Steel Mill

Permit Number R14-0040: Facility ID 003-00286

Yard

YARD OPERATIONS

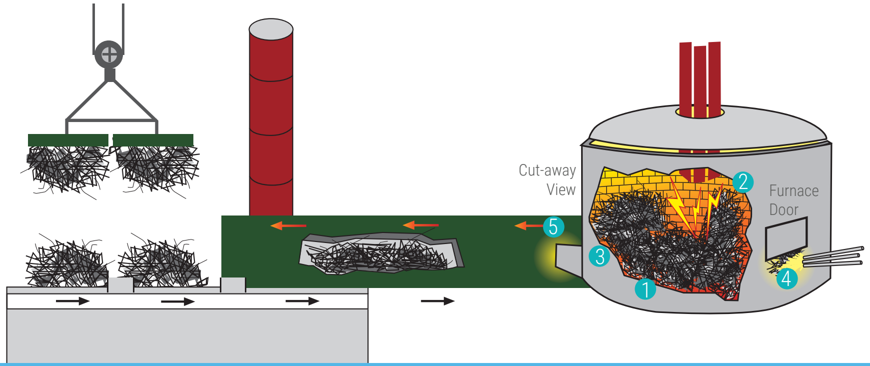
- > Provides over 1,200 tons of scrap metal to the Melt Shop per day
- > Handles 400,000 tons per year of incoming scrap from trucks and rail
- > Provides support services for outbound products shipped by truck and rail
- > Supports baghouse operations; plant sweeping operations

Electric Arc Furnace (EAF)

MELTING PROCESS

Scrap steel is melted in 5 Ways

① "Hot heel" practice
② Electrical energy
③ Natural gas energy
④ Chemical energy
⑤ Exhaust heat

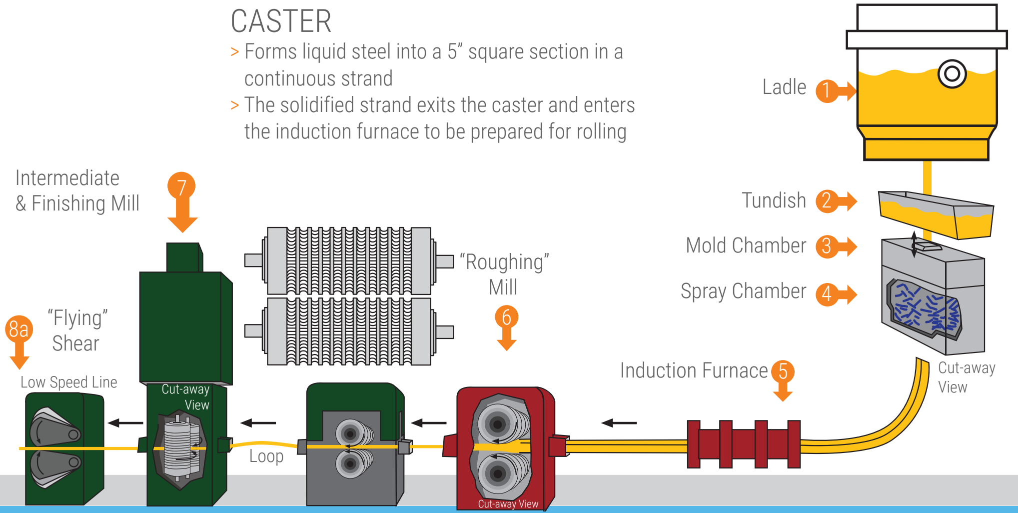


Rolling Mill

Continuous Caster

CASTER

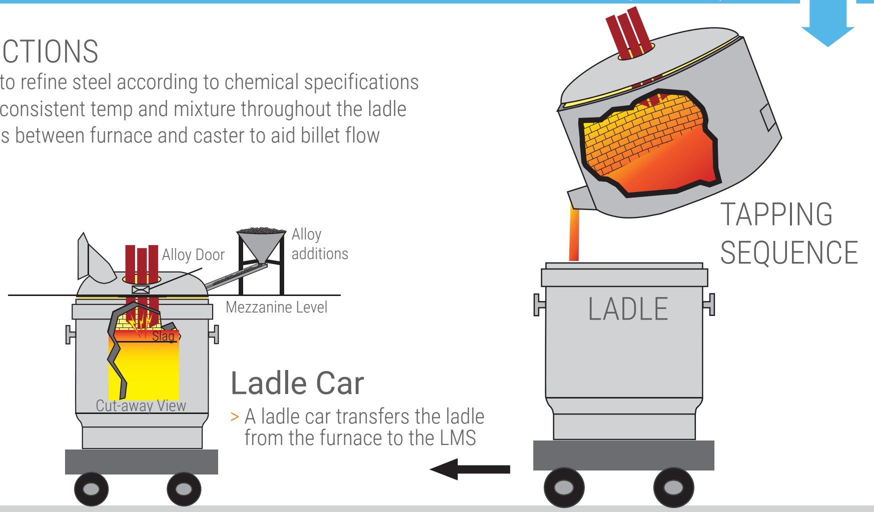
- > Forms liquid steel into a 5" square section in a continuous strand
- > The solidified strand exits the caster and enters the induction furnace to be prepared for rolling



Ladle Metallurgical Station (LMS)

LMS FUNCTIONS

- > Adds alloys to refine steel according to chemical specifications
- > Establishes consistent temp and mixture throughout the ladle
- > Stages ladles between furnace and caster to aid billet flow



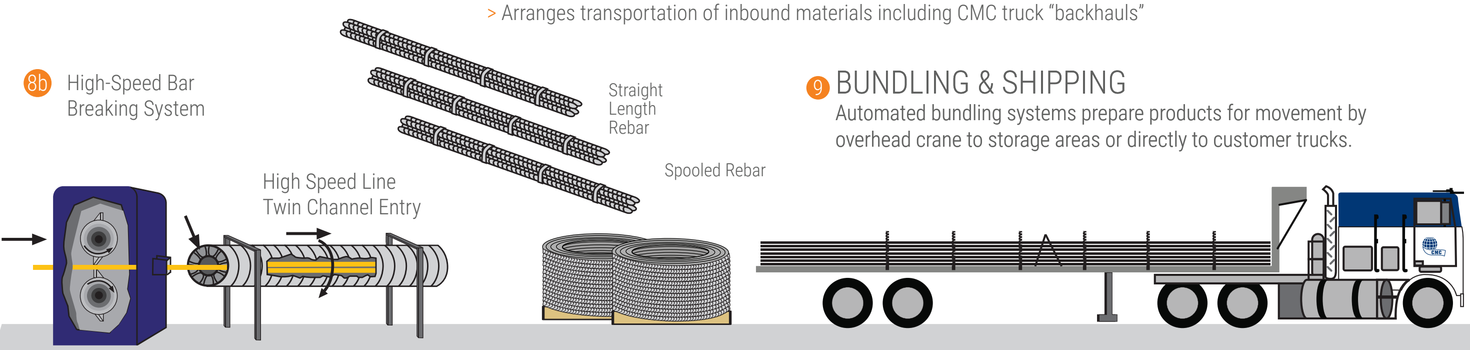
Ladle Car

- > A ladle car transfers the ladle from the furnace to the LMS

Finishing & Transportation

FINISHING & TRANSPORTATION

- > Loads CMC trucks, customer trucks, and commercial carriers
- > Arranges shipment of all finished products
- > Arranges transportation of inbound materials including CMC truck "backhauls"



⑨ BUNDLING & SHIPPING

Automated bundling systems prepare products for movement by overhead crane to storage areas or directly to customer trucks.

Micro Mill Process

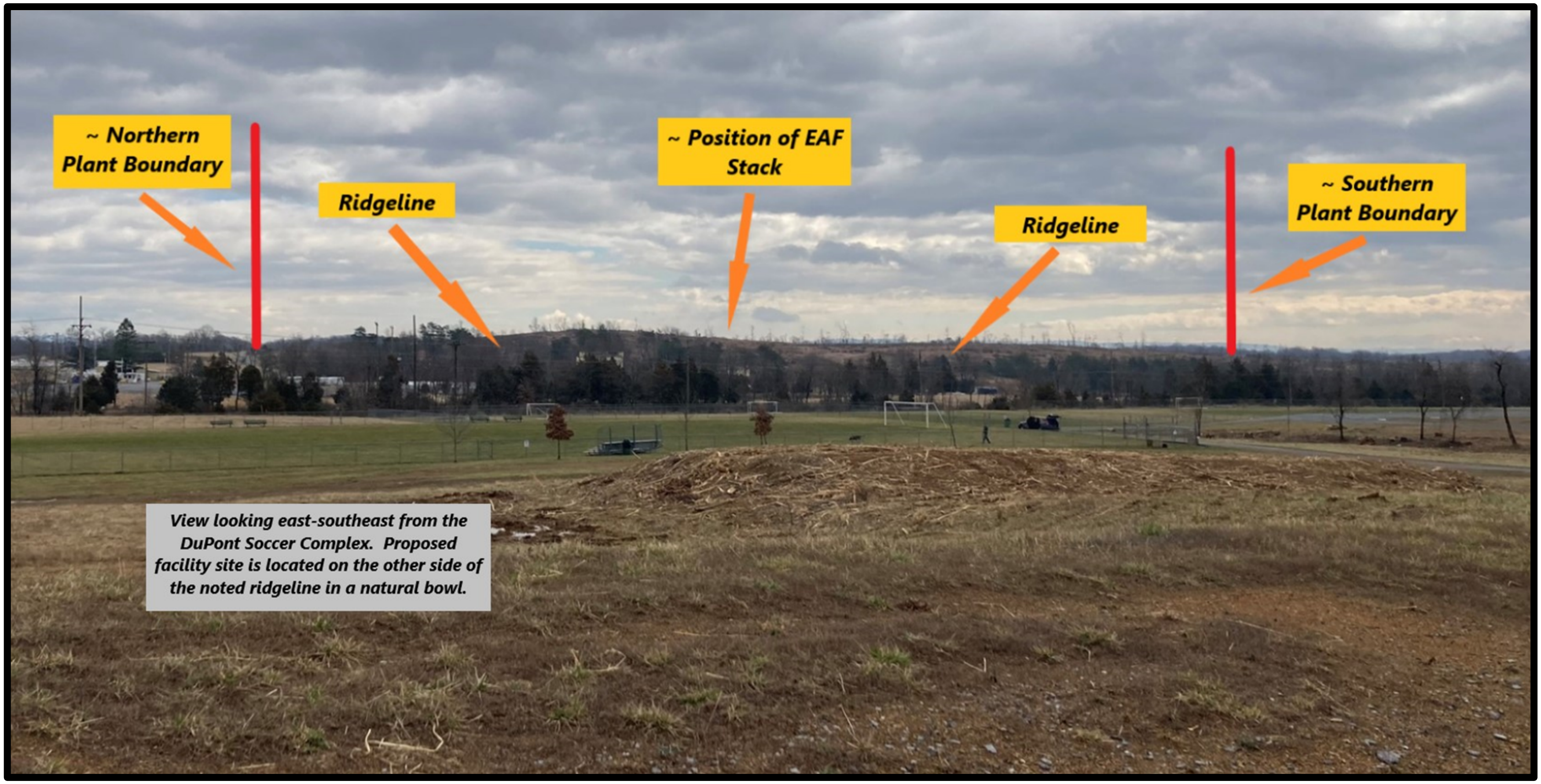
CMC Commercial Metals

Attachment C: Additional Site Inspection Pictures

CMC Corporation: West Virginia Steel Mill

Permit Number R14-0040: Facility ID 003-00286

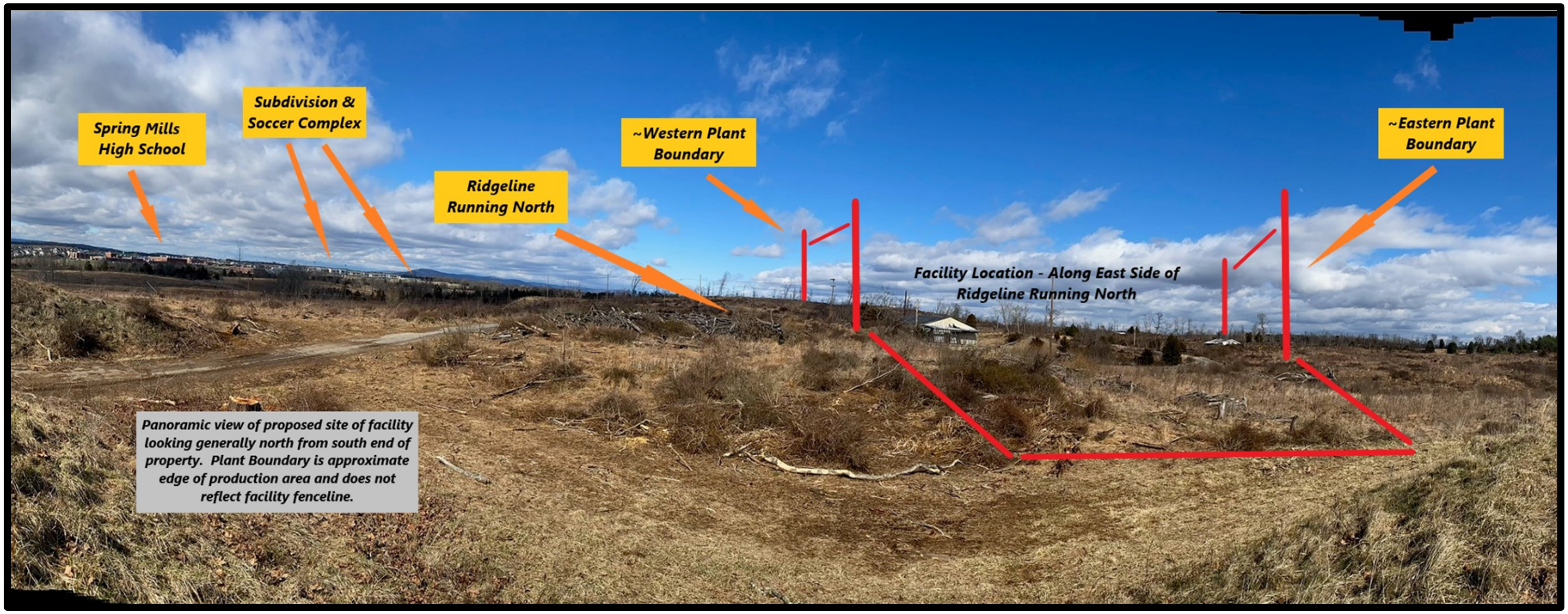
Picture 1: View from DuPont Soccer Complex*



View looking east-southeast from the DuPont Soccer Complex. Proposed facility site is located on the other side of the noted ridgeline in a natural bowl.

****All labeled points are approximate based on information submitted in Permit Application R14-0040.***

Picture 2: View from Southern Edge of the Property*



****All labeled points are approximate based on information submitted in Permit Application R14-0040.***

Attachment D: Non-Criteria Regulated Pollutant Information

CMC Steel US, LLC: CMC Steel West Virginia

Permit Number R14-0040: Facility ID 003-00286

Pollutant	CAS #	PTE (tons/yr)	Source	Known/Suspected Carcinogen	Classification	MACT(1)
VOC-HAPs						
Formaldehyde	50-00-0	0.416	RICE PNG/LPG Combustion	Yes	B1 - Probable Human Carcinogen(2)	ZZZZ
n-Hexane	110-54-3	0.427	RICE PNG/LPG Combustion	No	Inadequate Data(3)	ZZZZ
PM-HAPs(4)						
Antimony	7440-36-0	0.016	EAF/LMS	No	Not Assessed(5)	YYYYY
Cadmium	7440-4309	0.069	EAF/LMS	Yes	B1 - Probable Human Carcinogen(6)	YYYYY
Chromium (III)(7)	16065-83-1	0.248	EAF/LMS	No	D - Not Classifiable(8)	YYYYY
Chromium (VI)(7)	18540-29-9		EAF/LMS	Yes	A - Human Carcinogen(9)	YYYYY
Cobalt	7440-48-4	0.015	EAF/LMS	No	Not Assessed(10)	YYYYY
Lead	7439-92-1	0.527	EAF/LMS	No	Not Assessed(11)	YYYYY
Manganese	7439-96-5	1.226	EAF/LMS	No	D - Not Classifiable(12)	YYYYY
Mercury	7439-97-6	0.204	EAF/LMS	No	D - Not Classifiable(13)	YYYYY
Nickel(14)	12035-72-2	0.015	EAF/LMS	Yes	A - Human Carcinogen(15)	YYYYY

(1) Does a MACT apply to one of the emission units contributing emissions of this specific HAP? See "Regulatory Applicability" section for discussion.

(2) [**Formaldehyde**] From IRIS: "*Based on limited evidence in humans, and sufficient evidence in animals. Human data include nine studies that show statistically significant associations between site-specific respiratory neoplasms and exposure to formaldehyde or formaldehyde-containing products. An increased incidence of nasal squamous cell carcinomas was observed in long-term inhalation studies in rats and in mice. The classification is supported by in vitro genotoxicity data and formaldehyde's structural relationships to other carcinogenic aldehydes such as acetaldehyde.*"

(3) [**n-Hexane**] From IRIS: *"Under the Guidelines for Carcinogen Risk Assessment, there is inadequate information to assess the carcinogenic potential of n-hexane.*"

(4) The PM-HAPs identified by CMC as emitted from the EAF/LMS (some trace amounts of several of the PM-HAPs are also emitted from PNG/LPG Combustion but can be neglected as the vast majority is emitted from the EAF/LMS), are all defined by EPA (with the exception of Lead) as both the elemental form and the compounds formed by such elements.

(5) [**Antimony**] No entry in the IRIS Database for inhalation. There is an entry for oral entry, but carcinogenic risk "*[n]ot assessed under the IRIS Program.*" Additional information on Antimony located at https://www.epa.gov/sites/default/files/2016-09/documents/antimony-compounds.pdf.

(6) [**Cadmium**] From IRIS: "*Limited evidence from occupational epidemiologic studies of cadmium is consistent across investigators and study populations. There is sufficient evidence of carcinogenicity in rats and mice by inhalation and intramuscular and subcutaneous injection. Seven studies in rats and mice wherein cadmium salts (acetate, sulfate, chloride) were administered orally have shown no evidence of carcinogenic response.*" Additional information on Antimony located at https://www.epa.gov/sites/default/files/2016-09/documents/cadmium-compounds.pdf.

(7) Chromium occurs in the environment primarily in two valence states, trivalent chromium (Cr III) and hexavalent chromium (Cr VI). Additional information on Chromium is located at: https://www.epa.gov/sites/default/files/2016-09/documents/chromium-compounds.pdf.

(8) [**Chromium III**] From IRIS: "*Applying the criteria for evaluating the overall weight-of-evidence for carcinogenicity to humans outlined in EPA's guidelines for carcinogen risk assessment (U.S. EPA, 1986), trivalent chromium is most appropriately designated a Group D -- Not classified as to its human carcinogenicity. Using the Proposed Guidelines for Carcinogen Risk Assessment (EPA, 1996), there are inadequate data to determine the potential carcinogenicity of trivalent chromium, as discussed below. However, the classification of hexavalent chromium as a known human carcinogen raises a concern for the carcinogenic potential of trivalent chromium.*"

(9) [**Chromium VI**] From IRIS: "*Under the current guidelines (EPA, 1986), Cr(VI) is classified as Group A - known human carcinogen by the inhalation route of exposure.*"

(10) [**Cobalt**] From IRIS: No entry include in the IRIS Database. Additional Information on Cobalt located at: https://www.epa.gov/sites/default/files/2016-09/documents/cobalt-compounds.pdf.

(11) [**Lead**] No entry in the IRIS Database. Information on Lead toxicity at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4961898/.

(12) [**Manganese**] From IRIS: "*Existing studies are inadequate to assess the carcinogenicity of manganese.*" Additional Information on Manganese is located at: https://www.epa.gov/sites/default/files/2014-09/documents/support_cc1_magnese_healtheffects_0.pdf.

(13) [**Mercury**] From IRIS: "*Based on inadequate human and animal data. Epidemiologic studies failed to show a correlation between exposure to elemental mercury vapor and carcinogenicity; the findings in these studies were confounded by possible or known concurrent exposures to other chemicals, including human carcinogens, as well as lifestyle factors (e.g., smoking). Findings from genotoxicity tests are severely limited and provide equivocal evidence that mercury adversely affects the number or structure of chromosomes in human somatic cells.*" Additional information on Mercury is located at: https://www.epa.gov/mercury/health-effects-exposures-mercury.

(14) CMC has not speciated the form of the nickel as emitted. The following carconegic information is based on the emission of nickel subsulfide. Additional information on Nickel is located at: https://www.epa.gov/sites/default/files/2016-09/documents/nickle-compounds.pdf.

(15) [**Nickel Subsulfide**] From IRIS: "*Increased risks of lung and nasal cancer in humans exposed to nickel refinery dust, most of which was believed to have been nickel subsulfide; increased tumor incidences in animals by several routes of administration in several animal species and strains; and positive results in genotoxicity assays form the basis for this classification.*"