ANALYSIS AND PRELIMINARY DETERMINATION FOR THE CONSTRUCTION PERMIT FOR THE PROPOSED INSTALLATION OF DRY SORBENT AND CALCIUM BROMIDE INJECTION SYSTEMS ON BOILERS B26 AND B27, EXPANSION OF AN EXISTING POWDERED ACTIVATED CARBON INJECTION SYSTEM TO INCLUDE BOILER B26, AND INCORPORATION OF CONDITIONS OF THE CONSENT DECREE FOR CASE NO. 13-C-10

FOR
WISCONSIN PUBLIC SERICE CORPORATION – J.P. PULLIAM GENERATING STATION
LOCATED AT
1501 BYLSBY AVENUE
GREEN BAY, BROWN COUNTY, WISCONSIN

Construction Permit No.: 13-DMM-177
Facility ID No.: 405031990

This review was performed by the Wisconsin Department of Natural Resources, Northeast Region Air Program, Green Bay Service Center in accordance with Chapter 285, Wis. Stats., and Chapters NR 400 to NR 499, Wis. Adm. Code.

Reviewed by: Dave Minkey Date: 03/03/14

Peer review conducted by: /s/ Dave Minkey *for Jonathan Wright* Date: 03/03/14

Preliminary Determination Approved by:	**Signature**	**Date**
Regional Supervisor or Central Office Designee:	/s/ Imelda Hofmeister	03/03/14
Stationary Source Modeling Team Leader:	/s/ Dave Minkey *for John Roth*	03/03/14
Compliance Engineer (reviewed/approved):	/s/ Imelda Hofmeister *for Randy Matty*	03/03/14

cc: Bureau of Air Management (AM/7) – Construction Permits
Brown County Library, 515 Pine Street, Green Bay, WI 54301

INTRODUCTION

Stationary sources that are not specifically exempt from the requirement to obtain a construction permit under s. 285.60(5), Wis. Stats. or ch. NR 406, Wis. Adm. Code may not commence construction, reconstruction, replacement, relocation or modification unless a construction permit for the project has been issued by the Department of Natural Resource's (DNR's) Air Management Program. Owners or operators subject to the construction permit requirements must submit a construction permit application to the DNR. The application is reviewed following the applicable provisions set forth in ss. 285.60 to 285.67, Wis. Stats. The criteria for permit issuance vary depending on whether the source is major or minor and whether the source is or proposed to be located in an attainment or nonattainment area.

Subject sources are to be reviewed with respect to the equipment and facility description provided in the application and for the resulting impact upon the air quality. The review ensures compliance with all applicable rules and statutory requirements. The preliminary determination will show why the source(s) should be approved, conditionally approved, or disapproved. It will encompass emission calculations and an air quality analysis using US EPA models, if applicable. Emissions from volatile organic compound (VOC) sources and small sources whose emissions are known to be insignificant are normally not modeled. As a precautionary note, the emission estimates are based on US EPA emission factors (AP-42) or theoretical data and can vary from actual stack test data.

A final decision on the construction permit will not be made until the public has had an opportunity to comment on the Department's analysis, preliminary determination and draft permit. The conditions proposed in the draft permit may be revised in any final permit issued based on comments received or further evaluation by the Department.

GENERAL APPLICATION INFORMATION

Owner/Operator:	Wisconsin Public Service Corporation P.O. Box 19002 Green Bay, WI 54307
Responsible Official:	Mr. Len Rentmeester, General Manager (920) 433-5402
Application Contact Person:	Ms. Cindy Brandt (920) 433-1830
Application Submitted By:	Mr. Len Rentmeester, General Manager (920) 433-5402
Application Receipt Date:	December 6, 2013
Additional Information Submitted:	January 8, 2014; January 10, 2014; January 22, 2014; January 29, 2014; February 6, 2014; February 7, 2014; February 10, 2014; February 19, 2014; March 3, 2014
Date of Complete Application:	March 3, 2014

PROJECT DESCRIPTION

Wisconsin Public Service (WPS) Corporation – Pulliam Generating Station is proposing to install dry sorbent injection (DSI) and calcium bromide injection systems on Pulliam Units 7 and 8 (boilers B26 and B27) and expand the existing powdered activated carbon (PAC) injection system currently installed on boiler B27 to include boiler B26. These pollution controls are being installed to comply with the Mercury and Air Toxics Standards (MATS) of 40 CFR Subpart UUUUU which has a compliance date of April 16, 2015. WPS has also requested that the conditions of the consent decree for Civil Action No. 13-C-10 be incorporated into the construction permit.

The DSI injection system will consist of a storage silo, two mills, systems to inject the DSI into the boiler flue gas stream and associated piping. DSI will be delivered by truck to a new DSI silo (process P72) where emissions from loading and unloading will be controlled by a bin vent filter. The DSI material will be either trona or sodium bicarbonate. Only one of these sorbents can be injected at a time. From the silo, the DSI will be pneumatically conveyed through fully enclosed piping to the new Pulliam Unit 7 mill (process P73) or Pulliam Unit 8 mill (process P74). The piping and mills are totally enclosed processes and the mills will be contained within enclosed semi-trailers. The milled dry material is then pneumatically conveyed through enclosed piping and injected into the boiler flue gas path between the air heaters and the electrostatic precipitator (ESP). Alternatively, DSI material can bypass the mills and be conveyed through enclosed piping and directly injected into the boiler flue gas path between the air heaters and the electrostatic precipitator.

The expansion of the PAC injection system includes the addition of an injection system for boiler B26 and associated piping. PAC will be delivered by truck to an existing PAC storage silo (process P66) where emissions from loading and unloading will be controlled by a bin vent. From the silo, the PAC will be pneumatically conveyed through fully enclosed piping and injected into the boiler flue gas path between the economizer and the air heaters.

The new calcium bromide injection system will consist of a storage tank for the liquid $CaBr_2$ solution and piping to deliver the solution to the boiler B26 and B27 coal feeders. The storage tank is not a significant source of emission. Addition of $CaBr_2$ to the coal being fed to the boilers will enhance the collection of mercury, as demonstrated during a research and testing project authorized under Research and Testing Exemption 11-JGB-233-EXM.

The proposed project will increase the amount of ash generated by the facility. This will result in an increase in emissions from miscellaneous ash handling processes at the facility, including: two mechanical exhausters (processes P46A and P46B) used to pull ash from the ESP hoppers and deposit it into one of the two ash storage silos, the east and west ash storage silos (processes P64A and P64B), where emissions from loading and unloading are controlled by bin vent filters, ash loadout from the silos to trucks (fugitives F46A and F46B), and an ash storage pile and associated activities (F47). For emission calculation purposes, the ash storage pile and associated activities have been split into four sub-processes: pile maintenance and dozer activity (F47A), wind erosion (F47B), load-in to pile (F47C) and load-out from pile (F47D).

The consent decree for Civil Action No. 13-C-10 includes a number of provisions including:

- Retirement, Refueling or Repowering of Pulliam Units 5 and 6 (boilers B24 and B25) by June 1, 2015;
- Unit-specific, plant-wide and system wide sulfur dioxide (SO_2) and nitrogen oxides (NOx) emission limitations;
- Surrender of excess SO_2 and NOx allowances;
- Optimization of boiler particulate matter (PM) control devices; and
- Annual particulate matter stack testing or installation and operation of PM continuous emissions monitoring systems (CEMS)

Provisions of the consent decree will be incorporated into the construction permit as Part III of the permit.

WPS has also elected to change the baghouse bag filter material for processes P41 (rail unloading) and P44B (coal crusher) to a material that is expected to provide a higher control efficiency for small particulate. With the improved bag material, the baghouses are expected to have pressure drops that are somewhat higher than the pressure drop range currently allowed by the facility's operation permit. WPS has proposed that the pressure drop range be changed to 1 to 9 inches of water column instead of the current range of 1 to 6 inches of water column.

Because this facility is considered a major source under ch. NR 405, Wis. Adm. Code, this project must first be reviewed to determine whether it constitutes a major modification. Based on the information provided by facility, the Department has determined that this project does not constitute a major modification under ch. NR 405, Wis. Adm. Code. See the *Ch. NR 405, Wis. Adm. Code, Applicability* section of this document for additional information.

The proposed project is subject to construction permitting under ch. NR 406, Wis. Adm. Code, because maximum theoretical particulate matter, PM_{10}, $PM_{2.5}$, calcium oxide, bromine and hydrogen bromide emissions exceed the exemption thresholds in s. NR 406.04(2), Wis. Adm. Code.

Other Actions:
The Department will add reference test methods for $PM_{2.5}$ and PM_{10} emissions to the permit.

SOURCE DESCRIPTION
The J.P. Pulliam Plant is an electric generation facility located near the mouth of the Fox River in Green Bay, Wisconsin. The primary emission sources at this location are four coal-fired boilers, rated between 693 and 1510 million BTU (mmBtu) per hour. These boilers were built between 1949 and 1964. Natural gas is burned in a series of burners located on each boiler as a startup and supplemental fuel. Exhaust from the boilers vents to the atmosphere through three 377 foot flues, all of which are housed in a single concrete stack. Electrostatic precipitators are used to control particulate matter emissions from the boiler exhaust gases. Other significant emission sources at the plant include a combustion turbine, natural gas heaters used to thaw frozen coal contained in rail cars, two natural gas pipeline station heaters rated at 4.0 million Btu/hr each, and particulate matter emissions associated with coal and ash handling at the site.

This facility is located in a commercial/industrial area on the northern edge of the city of Green Bay, Wisconsin.

Description of New or Modified Units.

A. Emission Unit Information.

Process number:	P46A
Unit description:	Ash transfer from ESP hopper into west silo
Control technology status:	Controlled
Maximum process throughput:	90 tons/hr
Date of construction or last modification:	Constructed in 1962, last changed in 2011
Construction Permit:	None

Stack Information.

Stack identification number(s):	S46A
Exhausting unit(s):	P46A

A. Emission Unit Information.

This stack has an actual exhaust point:	Yes
Discharge height above ground level (ft):	22.8
Inside dimensions at outlet (ft):	1.1
Exhaust flow rate (normal) (ACFM):	1,000
Exhaust flow rate (maximum) (ACFM):	3,380
Exhaust gas temperature (normal) (°F):	Ambient
Exhaust gas temperature (maximum) (°F):	Ambient
Exhaust gas discharge direction:	Up
Stacks equipped with any obstruction?	No

Control Device Information.

Control Device identification number:	C46A
Exhausting emissions unit(s):	P46A
Control device description	Baghouse
Control Efficiency:	99 %
Date of construction or last modification:	2011

B. Emission Unit Information.

Process number:	P46B
Unit description:	Ash transfer from ESP hopper into east silo
Control technology status:	Controlled
Maximum process throughput:	90 tons/hr
Date of construction or last modification:	Constructed in 1962, last changed in 2011
Construction Permit:	None

Stack Information.

Stack identification number(s):	S46B
Exhausting unit(s):	P46B
This stack has an actual exhaust point:	Yes
Discharge height above ground level (ft):	22.8
Inside dimensions at outlet (ft):	1.1
Exhaust flow rate (normal) (ACFM):	1,000
Exhaust flow rate (maximum) (ACFM):	3,380
Exhaust gas temperature (normal) (°F):	Ambient
Exhaust gas temperature (maximum) (°F):	Ambient
Exhaust gas discharge direction:	Up
Stacks equipped with any obstruction?	No

Control Device Information.

Control Device identification number:	C46B
Exhausting emissions unit(s):	P46B
Control device description	Baghouse
Control Efficiency:	99 %
Date of construction or last modification:	2011

C. Emission Unit Information.

Fugitive number:	F46A
Unit description:	Wet ash transfer into trucks

C. Emission Unit Information.

Control technology status:	Uncontrolled
Maximum process throughput:	60 tons/hr
Date of construction or last modification:	Constructed 1962
Construction Permit:	None

D. Emission Unit Information.

Fugitive number:	F46B
Unit description:	Wet ash transfer into trucks
Control technology status:	Uncontrolled
Maximum process throughput:	60 tons/hr
Date of construction or last modification:	Constructed 1962
Construction Permit:	None

E. Emission Unit Information.

Fugitive number:	F47A
Unit description:	Outdoor ash storage pile – Pile Maintenance
Control technology status:	Uncontrolled
Maximum process throughput:	173 tons pushed/hr
Date of construction or last modification:	Constructed in 1970, last changed in 1993
Construction Permit:	None

F. Emission Unit Information.

Fugitive number:	F47B
Unit description:	Outdoor ash storage pile – Wind Erosion
Control technology status:	Uncontrolled
Maximum process throughput:	7 acres
Date of construction or last modification:	Constructed in 1970, last changed in 1993
Construction Permit:	None

G. Emission Unit Information.

Fugitive number:	F47C
Unit description:	Outdoor ash storage pile – Ash Unloading onto Ash Pile
Control technology status:	Uncontrolled
Maximum process throughput:	60 tons/hr
Date of construction or last modification:	Constructed in 1970, last changed in 1993
Construction Permit:	None

H. Emission Unit Information.

Fugitive number:	F47D
Unit description:	Outdoor ash storage pile – Ash Loading from Pile to Haul Trucks
Control technology status:	Uncontrolled
Maximum process throughput:	700 tons/hr
Date of construction or last modification:	Constructed in 1970, last changed in 1993
Construction Permit:	None

I. Emission Unit Information.

Fugitive number:	F62
Unit description:	Paved Haul Roads
Control technology status:	Uncontrolled
Maximum process throughput:	61.2 VMT/year
Date of construction or last modification:	To be modified in 2013 (paving portions of unpaved roads)
Construction Permit:	13-DMM-177

J. Emission Unit Information.

Process number:	P64A
Unit description:	Ash transfer through bin vent at west silo
Control technology status:	Controlled
Maximum process throughput:	90 tons/hr
Date of construction or last modification:	Constructed in 1962, last changed in 2007
Construction Permit:	None

Stack Information.

Stack identification number(s):	S64A
Exhausting unit(s):	P64A
This stack has an actual exhaust point:	Yes
Discharge height above ground level (ft):	92
Inside dimensions at outlet (ft):	1.4
Exhaust flow rate (normal) (ACFM):	1,000
Exhaust flow rate (maximum) (ACFM):	2,240
Exhaust gas temperature (normal) (°F):	Ambient
Exhaust gas temperature (maximum) (°F):	Ambient
Exhaust gas discharge direction:	Horizontal
Stacks equipped with any obstruction?	No

Control Device Information.

Control Device identification number:	C64A
Exhausting emissions unit(s):	P64A
Control device description	Bin vent filter
Control Efficiency:	99 %
Date of construction or last modification:	2007

K. Emission Unit Information.

Process number:	P64B
Unit description:	Ash transfer through bin vent at east silo
Control technology status:	Controlled
Maximum process throughput:	90 tons/hr
Date of construction or last modification:	Constructed in 1962, last changed in 2007
Construction Permit:	None

Stack Information.

Stack identification number(s):	S64B
Exhausting unit(s):	P64B
This stack has an actual exhaust point:	Yes

K. Emission Unit Information.

Discharge height above ground level (ft):	96
Inside dimensions at outlet (ft):	1.35
Exhaust flow rate (normal) (ACFM):	1,000
Exhaust flow rate (maximum) (ACFM):	2,240
Exhaust gas temperature (normal) (°F):	Ambient
Exhaust gas temperature (maximum) (°F):	Ambient
Exhaust gas discharge direction:	Horizontal
Stacks equipped with any obstruction?	No

Control Device Information.

Control Device identification number:	C64B
Exhausting emissions unit(s):	P64B
Control device description	Bin vent filter
Control Efficiency:	99 %
Date of construction or last modification:	2007

L. Emission Unit Information.

Process number:	P66
Unit description:	PAC Silo
Control technology status:	Controlled
Maximum process throughput:	21 tons/hr of PAC
Date of construction or last modification:	2010
Construction Permit:	None

Stack Information.

Stack identification number(s):	S66
Exhausting unit(s):	P66
This stack has an actual exhaust point:	Yes
Discharge height above ground level (ft):	50.5
Inside dimensions at outlet (ft):	1.5 x 1.66
Exhaust flow rate (normal) (ACFM):	500
Exhaust flow rate (maximum) (ACFM):	500
Exhaust gas temperature (normal) (°F):	Ambient
Exhaust gas temperature (maximum) (°F):	Ambient
Exhaust gas discharge direction:	Down
Stacks equipped with any obstruction?	No

Control Device Information.

Control Device identification number:	C66
Exhausting emissions unit(s):	P66
Control device description	Bin vent filter
Control Efficiency:	99 %
Date of construction or last modification:	2010

M. Emission Unit Information.

Process number:	P72
Unit description:	DSI Silo
Control technology status:	Controlled

M. Emission Unit Information.

Maximum process throughput:	24.6 tons/hr of DSI
Date of construction or last modification:	To be constructed in 2013
Construction Permit:	13-DMM-177

Stack Information.

Stack identification number(s):	S72
Exhausting unit(s):	P72
This stack has an actual exhaust point:	Yes
Discharge height above ground level (ft):	117.3
Inside dimensions at outlet (ft):	1.16 x 0.66
Exhaust flow rate (normal) (ACFM):	1,000
Exhaust flow rate (maximum) (ACFM):	1,000
Exhaust gas temperature (normal) (°F):	Ambient
Exhaust gas temperature (maximum) (°F):	Ambient
Exhaust gas discharge direction:	Down
Stacks equipped with any obstruction?	No

Control Device Information.

Control Device identification number:	C72
Exhausting emissions unit(s):	P72
Control device description	Bin vent filter
Control Efficiency:	99 %
Date of construction or last modification:	To be constructed in 2013

N. Emission Unit Information.

Process number:	P73
Unit description:	Pulliam Unit 7 Mill
Control technology status:	Uncontrolled
Maximum process throughput:	2,498 lb DSI/hr
Date of construction or last modification:	To be constructed in 2013
Construction Permit:	13-DMM-177

Stack Information.

Stack identification number(s):	S73
Exhausting unit(s):	P73
This stack has an actual exhaust point:	Yes
Discharge height above ground level (ft):	10.08
Inside dimensions at outlet (ft):	22 x 24
Exhaust flow rate (normal) (ACFM):	1,000
Exhaust flow rate (maximum) (ACFM):	Not specified
Exhaust gas temperature (normal) (°F):	Ambient
Exhaust gas temperature (maximum) (°F):	Ambient
Exhaust gas discharge direction:	Horizontal
Stacks equipped with any obstruction?	No

O. Emission Unit Information.

Process number:	P74
Unit description:	Pulliam Unit 8 Mill

O. Emission Unit Information.

Control technology status:	Uncontrolled
Maximum process throughput:	3,775 lb DSI/hr
Date of construction or last modification:	To be constructed in 2013
Construction Permit:	13-DMM-177

Stack Information.

Stack identification number(s):	S74
Exhausting unit(s):	P74
This stack has an actual exhaust point:	Yes
Discharge height above ground level (ft):	10.08
Inside dimensions at outlet (ft):	22 x 24
Exhaust flow rate (normal) (ACFM):	1,000
Exhaust flow rate (maximum) (ACFM):	Not specified
Exhaust gas temperature (normal) (°F):	Ambient
Exhaust gas temperature (maximum) (°F):	Ambient
Exhaust gas discharge direction:	Horizontal
Stacks equipped with any obstruction?	No

Stack Parameter Summary For Stacks Included in Permit 13-DMM-177.

Stack ID	Circular or Rectangular	Discharge Direction (U, D, H)	Exhaust Obstacle (Yes/No)	Diameter or Width (if rect.) (ft)	Length (if rect.) (ft)	Height (ft)	Temp. (°F)	Normal Flow Rate (ACFM)	Maximum Flow Rate (ACFM)
S46A	Circular	U	No	1.1	--	22.8	Ambient	1,000	3,380
S46B	Circular	U	No	1.1	--	22.8	Ambient	1,000	3,380
S64A	Circular	H	No	1.4	--	92	Ambient	1,000	2,240
S64B	Circular	H	No	1.35	--	96	Ambient	1,000	2,240
S66	Rectangular	D	No	1.5	1.66	50.5	Ambient	500	500
S72	Rectangular	D	No	1.16	0.66	117.3	Ambient	1,000	1,000
S73[1]	Rectangular	H	No	22	24	10.08	Ambient	1,000	N/A
S74[1]	Rectangular	H	No	22	24	10.08	Ambient	1,000	N/A

CROSS MEDIA IMPACTS

The proposed project will increase the amount of ash that is generated, collected and disposed of.

EMISSION CALCULATIONS.

The applicant provided emission calculations in the construction permit application dated December 4, 2013. These emission calculations were later revised in an addendum to the permit application dated January 22, 2014.

Increase in Ash Production

The injection of PAC and DSI and addition of $CaBr_2$ to the coal feed will result in additional ash. The amount of additional ash that will be produced was calculated in the permit application as follows:

- The maximum PAC injection rates are 140 and 255 pounds per hour for boilers B26 and B27, respectively.
- It was assumed that all PAC injected is converted to ash.
- The maximum DSI rate for boilers B26 and B27 is 2.5 pounds per million Btu (mmBtu) heat input, which equates to 2,498 pounds per hour for boiler B26 and 3,775 pounds per hour for boiler B27.

[1] Stacks S73 and S74 are not actual stacks. They represent the semi-trailers that house the sorbent mills.

- Based on a mass balance, it was estimated that 75% of the dry sorbent injected is converted to ash.
- The maximum $CaBr_2$ injection rate is 34.08 pounds per hour for boiler B26 and 46.86 pounds per hour for boiler B27.
- It was assumed that all of the $CaBr_2$ solution injected is converted to ash.
- It was conservatively assumed that the capacity factor for both boilers is 100%.
- It was conservatively assumed that all additional ash produced by the project is collected by the ESP and processed in the ash handling processes.

Based on these assumptions, the maximum amount of additional ash produced from the injection of PAC, dry sorbent and $CaBr_2$ is 22,690 tons per year.

Boilers B26, B27 – 999 and 1,510 mmBtu/hr Boilers

According to the permit application, the projected actual heat input to the boilers for the five year period after the project is expected to decrease to below the 2009 and 2010 calendar year baseline emissions. As such there is no projected increase in fuel combustion emissions for the boilers.

The permit application states that the injection of PAC, DSI and $CaBr_2$ will not result in additional PM emissions from the boilers stacks. The article "Early Lessons Learned from Implementation of Dry Sorbent Injection Systems" (Fischer & Tempero, 2012) indicates that typically the injection of trona or sodium bicarbonate lowers the resistivity of the fly ash which can have a favorable impact on the performance of electrostatic precipitators (ESPs). Stack testing of boiler B27 in 2012, while injecting DSI, PAC and $CaBr_2$, supports this. The2012 stack test showed a PM emission rate of 0.0067 pounds per million Btu heat input, while previous stack testing of boiler B27 in 2004, 2008 and 2010, while not injecting DSI, PAC and $CaBr_2$, showed PM emission rates of 0.07, 0.035 and 0.029 pounds per million Btu, respectively. The 2012 test result was 4 to 10 times lower than previous stack test results. Based on this information, it is expected that the addition of DSI, PAC and $CaBr_2$ will not result in a PM emissions increase from the boilers.

The reaction of the DSI chemicals with the SO_2 in the flue gas will produce CO_2 as a reaction product. The following chemical reactions occur when trona is injected:

$$2(Na_2CO_3 * NaHCO_3 * 2H_2O) \rightarrow 3Na_2CO_3 + 5H_2O + CO_2$$
$$Na_2CO_3 + SO_2 + ½O_2 \rightarrow Na_2SO_4 + CO_2$$

The following chemical reactions occur when sodium bicarbonate is injected:

$$2NaHCO_3 \rightarrow Na_2CO_3 + CO_2 + H_2O$$
$$Na_2CO_3 + SO_2 + ½O_2 \rightarrow Na_2SO_4 + CO_2$$

The maximum amount of trona or sodium bicarbonate to be injected is based on testing conducted on boiler B27 for 40% SO_2 removal for trona and 50% SO_2 removal for sodium bicarbonate. Note that only one sorbent can be injected at a time. The sodium bicarbonate sorbent will produce more CO_2 than the trona, so worst-case CO_2 emissions were calculated assuming sodium bicarbonate injection. The maximum sodium bicarbonate injection rate is 1,800 lb/hr for boiler B26 and 2,800 lb/hr for boiler B27. Based on a mass balance, the CO_2 potential to emit is 686 lb/hr for boiler B26 and 1,053 lb/hr for boiler B27. Assuming a conservative 100% capacity factor for these boilers, these CO_2 emission rates equate to 3,005 ton/yr of CO_2 from boiler B26 and 4,612 ton/yr of CO_2 from boiler B27, for a potential CO_2 emission increase for the project of 7,617 ton/yr.

Chemical reactions inside the boiler involving the $CaBr_2$ are expected to produce calcium oxide (CaO), hydrogen bromide (HBr) and bromine (Br_2). The permit application conservatively assumes that all of the calcium in the $CaBr_2$ is converted to CaO and all of the bromine in the $CaBr_2$ is converted to both HBr and Br_2, and that 100% of these pollutants are emitted from the boiler stacks. Note that the reaction of $CaBr_2$ will produce either HBr or Br_2, but the application calculates the worst-case emission rates for these pollutants assuming that all of the bromine in the $CaBr_2$ is converted to HBr and that all of the bromine in the $CaBr_2$ is converted to Br_2, essentially double-counting the bromine in the $CaBr_2$. Based on a mass balance, the maximum theoretical emission rates of CaO, HBr and Br_2 are 22.71, 65.53, and 64.71 lb/hr, respectively. These values are extremely conservative since they assume full conversion of $CaBr_2$ to the other pollutants and do not take credit for any emission control provided by the ESPs.

P46A, P46B - Ash Transfer From ESP Hopper Into East and West Silos

The hourly emissions from these processes are not expected to increase since there will be no increase in the hourly throughput capacity of the processes. However, the annual hours of operation for these processes will increase in order to handle the additional ash. The maximum ash processing rate for this process is 90 tons per hour. As discussed above, the maximum increase in ash production due to the project is 22,690 tons per year. This equates to an additional 252.11 hours of operation per year. The permit application utilized a safety factor of 1.25 which results in an additional 315.14 hours of operation per year for this process.

Hourly PM emissions for these processes are currently limited to 0.58 pounds per hour for each stack. Based on the design exhaust flow rate of 3,375 acfm and the vendor provided outlet grain loading of 0.02 grains of PM per actual cubic feet specified in the application, the potential PM emissions from each stack are:

PM PTE = 3,375 acfm * 60 min/hr * 0.02 gr/acf ÷ 7,000 gr/lb = 0.58 lb/hr

PM_{10} emissions were conservatively assumed to be equal to PM emissions. To calculate $PM_{2.5}$ emissions, the application conservatively assumed a more conservative flow rate of 4,000 acfm and the vendor supplied $PM_{2.5}$ grain loading of 0.0000245 grains per actual cubic feet. This emission rate was then added to the condensable particulate matter emission rate from the most recent stack test (0.111 pounds per hour). A safety factor of 1.5 was then applied to this number. This calculation is shown below:

$PM_{2.5}$ PTE = ((4,000 acfm * 60 min/hr * 0.0000245 gr/acf ÷ 7,000 gr/lb) + 0.111 lb/hr) * 1.5 = 0.17 lb/hr

The potential PM, PM_{10} and $PM_{2.5}$ emissions for the project are:

Process ID	PM PTE		PM_{10} PTE		$PM_{2.5}$ PTE	
	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)
P46A	0.58	0.09	0.58	0.09	0.17	0.026
P46B	0.58	0.09	0.58	0.09	0.17	0.026

Note that as part of this permit, the applicant is electing to restrict the operation of P46A and P46B such that only one of the two processes can operate at any one time.

Ash Loading/Unloading – F46A, F46B, F47C, F47D

Emissions of PM, PM_{10} and $PM_{2.5}$ for these fugitive emission sources were calculated using the aggregate transfer equation (often referred to as the drop equation), found in AP-42 Section 13.2.4, *Aggregate Handling and Storage Piles* (11/06):

$$E = k \times 0.0032 \times \frac{\left(\frac{U}{5}\right)^{1.3}}{\left(\frac{M}{2}\right)^{1.4}}$$

Where:
E = emission factor in pounds of PM/PM_{10}/$PM_{2.5}$ per ton of material dropped,
k = particle size multiplier = 1.0 for PM; 0.35 for PM_{10}; 0.053 for $PM_{2.5}$,
U = mean wind speed in miles per hour (mph) = 10.3 mph (per WDNR guidance), and
M = material moisture content (%) = 4.7% for ash (based on analysis of Pulliam fly ash sample in February 2007)

Based on this equation, the emission factors for ash handling are 0.00248 lb/ton for PM, 0.00087 lb/ton for PM_{10} and 0.00013 lb/ton for $PM_{2.5}$. A control efficiency of 50% was applied for loading onto the storage piles and loading from the storage pile to haul trucks. This control efficiency was from "Review of Particulate Matter Reporting for Coal Burning Facilities", December 14, 2005.

The maximum throughputs for these processes are 60 tons per hour each for F46A, F46B and F47C, and 700 tons per hour for F47D. As discussed above, the maximum increase in ash production due to the project is 22,690 tons per year, which results in an additional 378 hours of operation for F46A, F46B and F47C and an additional 32.4 hours of operation for F47D. The applicant applied a safety factor of 1.25 to these values to come up with additional hours of 473 hours of operation for F46A, F46B and F47C and an additional 40.5 hours of operation for F47D.

The calculated PM, PM_{10} and $PM_{2.5}$ potential emissions for the project are:

Process ID	PM PTE		PM_{10} PTE		$PM_{2.5}$ PTE	
	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)
F46A	0.15	0.035	0.05	0.012	0.008	0.002
F46B	0.15	0.035	0.05	0.012	0.008	0.002
F47C	0.07	0.018	0.03	0.006	0.004	0.001
F47D	0.75	0.014	0.26	0.005	0.04	0.001

Note that as part of this permit, the applicant is electing to restrict the operation of F46A and F46B such that only one of the two processes can operate at any one time.

F47A – Ash Storage Pile – Pile Maintenance

There will be increased ash pile maintenance necessary as a result of the additional ash produced by the project. The emissions produced due to vehicular traffic by the D-39 PX bulldozer are assumed to be equal to those of unpaved haul roads. The equations used to calculate emissions are from AP-42, Section 13.2.2, "Unpaved Haul Roads" (11/06) and are:

Total Emissions = E * VMT

Where,
E = size-specific emission factor in pounds per vehicle mile traveled (VMT), as calculated below, and
VMT = vehicle miles traveled.

$$E = k \times \left(\frac{s}{12}\right)^a \times \left(\frac{W}{3}\right)^b \times \left(\frac{365 - P}{365}\right)$$

Where,

k = particle size multiplier (lb/VMT) from AP-42, Table 12.2.2-2 =4.9 for PM, 1.5 for PM_{10}, 0.15 for $PM_{2.5}$,

a,b = empirical constants from AP-42, Table 13.2.2-2, a=0.7 for PM, a=0.9 for PM_{10} and $PM_{2.5}$, b=0.45,

s = road surface material silt content (%), s = 9.0%, from AP-42, Table 13.2.4-1 for municipal solid waste landfill cover,

W = mean vehicle weight (tons), and

P = number of days in a year with at least 0.01 in. of precipitation, from AP-42 Figure 13.2.2-1 = 120 days.

The mean vehicle weight is 10 tons and the maximum hourly vehicle miles traveled is 3.46 miles per hour. The applicant used the silt content of municipal solid waste landfill cover because the wetted fly ash is similar to wetted flyash used as landfill cover at municipal solid waste landfills.

The table below contains the hourly and annual PM, PM_{10} and $PM_{2.5}$ potential emissions from ash pile maintenance. Note that the applicant conservatively calculated the ash pile maintenance emissions increase for the project by assuming all ash pile maintenance emissions from all of the ash produced at the facility are a result of the project. In reality, only a small fraction of the emissions from the ash pile maintenance are because of this project.

Process ID	PM PTE		PM_{10} PTE		$PM_{2.5}$ PTE	
	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)
F47A	1.60	7.01	0.46	2.02	0.05	0.20

F47B – Ash Storage Pile – Wind Erosion

Emissions arising from wind erosion of the ash pile were calculated using the methodology contained in the DNR guidance document "Review of Particulate Matter Reporting for Coal Burning Facilities" (10/06). This document specifies the use of the following equation for wind erosion from storage piles:

$$E = A \times D \times 1.7 \times \left(\frac{s}{1.5}\right) \times \left(\frac{365 - P}{235}\right) \times \left(\frac{f}{15}\right) \times k \times \left(\frac{1}{2{,}000}\right)$$

Where,

E = emissions from the pile in tons per year,

A = acres of storage pile = 7,

D = days in storage pile = 365,

s = road surface material silt content (%), s = 9.0%, from AP-42, Table 13.2.4-1 for municipal solid waste landfill cover,

P = number of days in a year with at least 0.01 in of precipitation, from AP-42 Figure 13.2.2-1 = 120 days,

f = percent of time with wind > 12 miles per hour at mean pile height = 34%, and

k = particle size multiplier, =1.0 for PM, 0.5 for PM_{10} and 0.075 for $PM_{2.5}$.

A control efficiency of 90% was applied in accordance with Pulliam's Fugitive Dust Control Plan and DNR guidance. The table below contains the hourly and annual PM, PM_{10} and $PM_{2.5}$ potential emissions from wind erosion. Note that the applicant conservatively calculated the wind erosion emissions increase for the project by assuming all wind erosion emission from the entire pile are a result of the project. In reality, only a small fraction of the emissions from

wind erosion of the ash pile are because of this project. The hourly emission rates assumed 8,760 hours of operation per year.

Process ID	PM PTE		PM_{10} PTE		$PM_{2.5}$ PTE	
	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)
F47B	0.70	3.08	0.35	1.54	0.05	0.23

F62 – Haul Roads

All haul roads at the facility are paved with the exception of the route used to haul ash from the storage pile off-site, which has some paved and unpaved sections. As part of the project, the applicant will be paving the unpaved road section. Therefore, potential emissions from all haul roads were calculated using the following equation from AP-42, Section 13.2.1, *Paved Roads* (1/11):

$$E = k(sL)^{0.91} \times (W)^{1.02}$$

Where:

E = particulate emission factor in pounds per vehicle mile traveled (VMT),

K = particle size multiplier = 0.011 for PM, 0.0022 for PM_{10}; 0.00054 for $PM_{2.5,}$

sL = road surface silt loading (g/m^2) = 8.2g/m^2, and

W = average weight (tons) of the vehicles traveling the road.

The application contains detailed information about the vehicle weights and the calculated emission factors for each type of activity. Using the number of truck loads necessary to transport the additional materials resulting from this project, the number of vehicle miles traveled for each activity were calculated. These calculations were reviewed and appear to be correct. The table below contains the potential emissions from the paved haul roads as a result of this project:

Activity	PM PTE		PM_{10} PTE		$PM_{2.5}$ PTE	
	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)
PAC Delivery	0.16	0.007	0.03	0.001	0.01	0.000
DSI Delivery	0.08	0.047	0.02	0.009	0.00	0.002
$CaBr_2$ Delivery	0.18	0.001	0.04	0.000	0.01	0.000
Ash haul truck to storage	6.80	0.127	1.36	0.025	0.33	0.006
Ash Haul truck offsite	3.88	0.073	0.78	0.014	0.17	0.003
Total	**11.11**	**0.255**	**2.22**	**0.051**	**0.52**	**0.012**

P64A, P64B – East and West Ash Silo Bin Vents

The hourly emissions from these processes are not expected to increase since there will be no increase in the hourly throughput capacity. However, the annual hours of operation that these processes will operate will increase in order to handle the additional ash produced by this project. The maximum ash processing rate for this process is 90 tons per hour. As discussed above, the maximum increase in ash production due to the project is 22,335 tons per year. This equates to an additional 252.1 hours of operation per year. The applicant utilized a safety factor of 1.25 which results in 315.1 additional hours of operation per year for this process.

Hourly PM emissions from these processes are currently limited to 0.919 pounds per hour per stack and will not change. PM_{10} emissions were conservatively assumed to be equal to PM emissions. To calculate $PM_{2.5}$ emissions, the exhaust flow rate of 2,000 acfm at ambient temperature, a vendor supplied grain loading of 0.02 gr/scf and a settling factor of 50% were used. This calculation is shown below:

$PM_{2.5}$ PTE = (2,000 scfm * 60 min/hr * 0.02 gr/acf ÷ 7,000 gr/lb) * (1 – 0.5) = 0.17 lb/hr

The table below contains the potential PM, PM_{10} and $PM_{2.5}$ emissions for this project:

Process ID	PM PTE		PM_{10} PTE		$PM_{2.5}$ PTE	
	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)	(lb/hr)	(ton/yr)
P64A	0.92	0.15	0.92	0.15	0.17	0.03
P64B	0.92	0.15	0.92	0.15	0.17	0.03

Note: Either of processes P46A or P46B will operate at one time. Similarly, either of processes F46A or F46B will operate at one time. So, there is the possibility that P46A and F46B could operate simultaneously, thereby utilizing both bin vents P64A and P64B at the same time. For this reason, the permit allows both P64A and P64B to operate simultaneously and the emission rates used in the modeling analysis reflect this.

P66, P72 – PAC and DSI Silos

Hourly PM emissions from these silos were calculated using their design exhaust flow rates of 500 acfm for P66 and 1,000 acfm for P72 and an outlet grain loading of 0.01 grains per actual cubic feet. PM_{10} and $PM_{2.5}$ emissions were conservatively assumed to be equal to PM emissions. The hourly potential emissions from these silos are:

P66 $PM/PM_{10}/PM_{2.5}$ PTE = 500 acfm * 60 min/hr * 0.01 gr/acf ÷ 7,000 gr/lb = 0.043 lb/hr
P72 $PM/PM_{10}/PM_{2.5}$ PTE = 1,000 acfm * 60 min/hr * 0.01 gr/acf ÷ 7,000 gr/lb = 0.086 lb/hr

The hours of operation were assumed to be 8,760 hours per year so the annual potential emissions are:

P66 $PM/PM_{10}/PM_{2.5}$ PTE = 0.043 lb/hr * 8,760 hr/yr ÷ 2,000 lb/ton = 0.188 ton/yr
P72 $PM/PM_{10}/PM_{2.5}$ PTE = 0.086 lb/hr * 8,760 hr/yr ÷ 2,000 lb/ton = 0.375 ton/yr

P73, P74 – P7 and P8 DSI mills

According to the application, emission factors for sorbent milling were not found. Therefore, emission factors for milling gypsum were used since they are expected to be comparable. Table 11.16-2 of AP-42 indicates that the PM emission factor for a gypsum roller mill with a cyclone is 2.6 lb/ton. To back-calculate an uncontrolled emission factor, the applicant conservatively assumed the cyclone provides a 90% control, resulting in an uncontrolled emission factor of 26 lb/ton. The mills are totally enclosed and the trailer that houses the mills is also enclosed. No emissions are expected, but to be conservative the applicant assumed that a very small amount (0.01%) of material entering the mills may escape from the mill enclosure and trailer. The maximum process throughput for the mills is 1.89 ton/hr for P73 and 1.25 ton/hr for P74**.** PM_{10} and $PM_{2.5}$ emissions were conservatively assumed to be equal to PM emissions. Potential emissions are calculated below:

P73 $PM/PM_{10}/PM_{2.5}$ PTE = 1.25 ton/hr * 26 lb/ton * (1 - 0.9999) = 0.003 lb/hr
P74 $PM/PM_{10}/PM_{2.5}$ PTE = 1.89 ton/hr * 26 lb/ton * (1 - 0.9999) = 0.005 lb/hr

The hours of operation were assumed to be 8,760 hours per year so the annual potential emissions are:

P73 $PM/PM_{10}/PM_{2.5}$ PTE = 0.0033 lb/hr * 8,760 hr/yr ÷ 2,000 lb/ton = 0.014 ton/yr
P74 $PM/PM_{10}/PM_{2.5}$ PTE = 0.0049 lb/hr * 8,760 hr/yr ÷ 2,000 lb/ton = 0.021 ton/yr

WISCONSIN HAZARDOUS AIR POLLUTANT (NR 445) REVIEW

The proposed project will result in additional material being collected in the ESPs and processed at the facility. This will not impact the facility's NR 445 emissions. The only impact the proposed project has on the facility's hazardous air pollutant emissions is the emission of calcium oxide, hydrogen bromide and bromine due to the addition of $CaBr_2$ into the coal feed. The table below compares the potential emissions of these pollutants with their NR 445 Table A Threshold Values:

Pollutant	CAS No.	Stack Height Class (ft)	PTE		NR 445 Table A Values	
			(lb/hr)	(lb/yr)	(lb/hr)	(lb/yr)
Calcium Oxide	1305-78-8	>75	22.7	198,940	3.24	--
Hydrogen Bromide	10035-10-6	>75	65.5	574,043	12.2	--
Bromine	7726-95-6	>75	64.7	566,860	1.06	--

As can be seen from this table, the potential emissions of all three pollutants exceed the NR 445 Table A threshold values. These pollutants were modeled and the results indicate that the ambient air standards for these pollutants will not be exceeded. Please refer to the *Air Quality Review* section of this document for additional information. Because the concentrations predicted by the modeling analysis were far below the ambient air standards, not emission limits for these pollutants will be set in the permit.

CH. NR 405, WIS. ADM. CODE, APPLICABILITY.

This facility is a major source under ch. NR 405, Wis. Adm. Code. As such, any modifications or the addition of new emission units at the facility must be reviewed to determine whether the change will result in a major modification under ch. NR 405, Wis. Adm. Code.

The proposed project will result in increased ash production at the facility. This will cause an increase in emissions from the ash handling operations, including the mechanical exhausters that transfer ash from the ESP hoppers to the ash silos, bin vents on the ash silos, ash transfer from the silos to trucks, fugitive dust from vehicular travel on paved roads and the ash storage pile and associated activities. These emission increases are included in the determination of whether a significant modification will occur as a result of the proposed project.

For the existing ash handling processes at the facility that are affected by this project, there is no change in the method of operation of the processes and they will not be physically modified. Therefore, for purposes of ch. NR 405, Wis. Adm. Code, their emission increases are calculated as the PTE of the processes based on the additional amount of ash produced and handled. For new emission units being installed as part of this project, the emission increase is calculated as the total PTE of each process. The project potential emissions increase is shown in the table below:[2]

Emission Unit	PM (ton/yr)	PM10 (ton/yr)	PM2.5 (ton/yr)	CO2e (ton/yr)
P46A/B – Ash transfer from ESP hopper to west/east silos	0.09	0.09	0.03	--
F46A/B – Wet ash transfer from west/east silos into trucks	0.04	0.02	0.004	--
F47A to D – Ash storage pile and associated activities	10.12	3.57	0.43	--
F62 – Paved Haul Roads	0.26	0.05	0.01	--
P64A/B –West/east ash silo bin vents	0.15	0.15	0.03	--
P66 – PAC silo	1.88	0.36	0.36	--

[2] In some cases, the emission rates in the table below are not equal to the emission rates calculated in the Emission Calculation section of this document because the permittee elected to limit emissions to a higher value. These higher values were modeled and demonstrated compliance with the applicable air quality standards and increments.

Emission Unit	PM (ton/yr)	PM10 (ton/yr)	PM2.5 (ton/yr)	CO2e (ton/yr)
P72 – DSI silo	3.77	0.38	0.38	--
P73 – Pulliam unit 8 mill	0.13	0.02	0.02	--
P74 – Pulliam unit 7 mill	0.13	0.01	0.01	--
B26 and B27 - CO_2 from DSI reactions	--	--	--	7,617
Total Emissions Increase from Project[3]	**16.57**	**4.65**	**1.27**	**7,617**
PSD Significance Thresholds	25	15	10	75,000
PSD Review Required?	No	No	No	No

As can be seen from the table above, the project does not exceed the PSD significance threshold for any regulated pollutant. Therefore, the project is not subject to review under ch. NR 405, Wis. Adm. Code.

COMPLIANCE AND TECHNOLOGY REVIEW

The proposed project includes the addition of a new PAC silo, DSI silo, and two mills for milling dry sorbent. Emissions from the silos are controlled by bin vent filters with control efficiencies of approximately 99%. The mills and associated piping are totally enclosed and the semi-trailer that houses the mills is also totally enclosed. Since the trailer has vents and doors that may be opened during process operation, the applicant conservatively assumed that some very small portion (0.01%) of the sorbent material may be emitted during the milling process.

AIR QUALITY REVIEW

A. INTRODUCTION

A dispersion modeling analysis was completed on March 3, 2014 to assess the impact to ambient air of the particulate matter (PM_{10} & $PM_{2.5}$) and hazardous air pollutant emissions from sources at Wisconsin Public Service Corporation (WPSC) Pulliam facility in Green Bay, Brown County. The analysis was performed in support of construction permit 13-DMM-177.

B. MODELING ANALYSIS

- WPSC supplied the emission parameters used in this analysis. Building dimensions were determined using BPIP-PRIME with measurements taken on plot plans provided with the application. Please refer to the source parameter table.
- Five years (2006-2010) of preprocessed meteorological data was used in this analysis. The surface data was collected in Green Bay, and the upper air meteorological data originated in Green Bay.
- The AERMIC (AMS/EPA Regulatory Model Improvement Committee) Model (AERMOD) was also used in the analysis. The model used rural dispersion coefficients with the regulatory default options. These allow for calm wind and missing data correction, buoyancy induced dispersion, and building downwash including recirculation cavity effects.
- Regional background concentrations were found to be as follows:

BACKGROUND CONCENTRATIONS (Concentrations are in $\mu g/m^3$)		
Pollutant	Averaging Period	Concentration
SO_2	3 hour	43.2
	24 hour	30.5
	Annual	8.6

[3] WPS has elected to limit operation of processes P46A/B, F46A/B and P64A/B such that only the A or B side can operate at any one time. The emission totals for the project reflect this restriction.

BACKGROUND CONCENTRATIONS (Concentrations are in μg/m^3)		
Pollutant	Averaging Period	Concentration
NO_2	Annual	24.1
CO	1 hour 8 hour	1,362.7 1,191.2
$PM_{2.5}$	24 hour Annual	28.9 10.2
PM_{10}	24 hour	47.0

- The receptors used in this analysis consisted of approximately 9630 points in a rectangular grid with 25-meter resolution extending 900 meters from the sources surrounded by points in a 50-meter spaced grid extending 1200 meters, surrounded by a 100-meter spaced grid extending to 2600 meters, surrounded by a 250-meter spaced grid extending 5600 meters with additional points extending 12 kilometers from the facility. Points within known fences or on top of buildings were not considered. Receptor elevations were derived from AERMAP using National Elevation Dataset (NED) tiles.
- The Brown County minor source PSD baselines for PM_{10}, SO_2, and NO_x were set in 1988, 1983, and 1988 respectively. Construction or modification of sources since that date that resulted in increased emissions consumes increment. The new material handling sources have an impact less than the PM_{10} significant impact level, so no increment analysis was performed.

C. MODEL RESULTS

The results of the dispersion modeling analysis indicate that all air quality standards will be met assuming the emission rates and stack parameters listed in the source tables. The impact of the particulate emissions from the new material handling sources was analyzed and found to be below the PM_{10} significant impact but above the $PM_{2.5}$ SIL, so a full facility analysis of $PM_{2.5}$ emissions was performed.

Modeling Analysis Results (All Concentrations in μg/m^3)		
	PM_{10} – 24 hour	PM_{10} – Annual
New Source Impact	2.10	0.23
SIL	5.0	1.0
% SIL	42.0	23.0

Modeling Analysis Results (All Concentrations in μg/m^3)		
	$PM_{2.5}$ – 24 hour	$PM_{2.5}$ – Annual
Facility Impact	6.1	1.4
Background Concentration	28.9	10.2
Total Concentration	35.0	11.6
NAAQS	35.0	15.0
% NAAQS	100.0	77.3

Modeling Analysis Results (All Concentrations in μg/m^3)			
	Br – 24 hr	HBr – 1 hr	CaO – 24 hr
Facility Impact	1.96	15.4	1.07
AAS	15.7	993.0	48.0
% AAS	12.5	1.6	2.2

D. CONCLUSION

The results of the modeling analysis demonstrate that the applicable air quality and increment standards will be satisfied assuming the emissions rates and stack parameters listed in the source table.

WPSC PULLIAM – GREEN BAY Stack Parameters					
ID	LOCATION (UTM83)	HEIGHT (M)	TEMP (K)	VELOCITY (M/S)	DIAMETER (M)
S12B24	419896, 4932	114.9	455.4	8.38	4.57
S12B25	419896, 4932	114.9	455.4	8.38	4.57
S13	419891, 4932	114.9	443.7	9.45	3.35
S14	419894, 4932	114.9	444.8	8.23	4.72
S32	419775, 4932	17.37	785.4	30.48	4.88
S41	419699, 4932	19.81	Ambient	23.03	1.62
S43	419702, 4932	6.86	Ambient	24.50	0.399
S44A	419892, 4932	42.98	Ambient	10.26	1.19
S44B	419908, 4932	14.63	Ambient	10.67	1.16
S46A	419936, 4932	6.95	422.0	15.24	0.335
S46B	419934, 4932	6.95	422.0	15.24	0.326
S60A	419663, 4932	7.32	699.8	5.01	0.518
S60B	419661, 4932	7.32	699.8	5.01	0.518
S64A	419900, 4932	28.04	422.0	3.30	0.427
S64B	419936, 4932	29.26	422.0	3.55	0.412
RC7	419848, 4932	45.72	Ambient	0.1	0.305
S66	*419899, 4932*	*15.39*	*Ambient*	*0.1*	*0.543*
S72	*419802, 4932*	*35.75*	*Ambient*	*0.1*	*0.305*
S73	*419806, 4932*	*3.07*	*Ambient*	*1.18*	*0.659*
S74	*419811, 4932*	*3.07*	*Ambient*	*1.18*	*0.659*

Note: Stacks S66, S72, S73, and S74 are the new proposed stacks

WPSC PULLIAM – GREEN BAY Volume Parameters					
ID	LOCATION (UTM83)	HEIGHT (M)	SIGMA-Y (M)	SIGMA-Z (M)	
S31A	419725, 4932259	6.49	6.88	3.02	
S31B	419738, 4932252	6.49	6.88	3.02	
S31C	419751, 4932246	6.49	6.88	3.02	
S31D	419764, 4932239	6.49	6.88	3.02	
S31E	419777, 4932233	6.49	6.88	3.02	
S31F	419790, 4932226	6.49	6.88	3.02	
F46A	419895, 4932486	4.01	2.13	3.73	
F46B	419939, 4932472	4.27	3.12	3.97	

WPSC PULLIAM – GREEN BAY Emission Rates					
ID	$PM_{2.5}$ #1 (#/hr)	PM_{10} #2 (#/hr)	Br (#/hr)	HBr (#/hr)	CaO (#/hr)
S12B24	31.19	n/a	-	-	-
S12B25	39.38	n/a	-	-	-
S13	44.96	n/a	27.25	27.59	13.15
S14	67.95	n/a	37.47	37.94	22.71
S32	26.10	n/a	-	-	-
S41	0.46	n/a	-	-	-
S43	0.016	n/a	-	-	-
S44A	0.23	n/a	-	-	-

WPSC PULLIAM – GREEN BAY Emission Rates					
ID	$PM_{2.5}$ #1 (#/hr)	PM_{10} #2 (#/hr)	Br (#/hr)	HBr (#/hr)	CaO (#/hr)
S44B	0.32	n/a	-	-	-
S46A	0.17	n/a	-	-	-
S46B	0.17	n/a	-	-	-
S60A	0.0017	n/a	-	-	-
S60B	0.0017	n/a	-	-	-
S64A	0.17	n/a	-	-	-
S64B	0.17	n/a	-	-	-
RC7	0.017	n/a	-	-	-
S66	*0.083*	*0.083*	-	-	-
S72	*0.086*	*0.086*	-	-	-
S73	*0.005*	*0.005*	-	-	-
S74	*0.003*	*0.003*	-	-	-
S31A	0.0022	n/a	-	-	-
S31B	0.0022	n/a	-	-	-
S31C	0.0022	n/a	-	-	-
S31D	0.0022	n/a	-	-	-
S31E	0.0022	n/a	-	-	-
S31F	0.0022	n/a	-	-	-
F46A	0.015	n/a	-	-	-
F46B	0.015	n/a	-	-	-

Notes:
- Stacks S66, S72, S73, & S74 are the new proposed sources
- PM_{10} Impact from the new proposed sources is below SIL, so full facility PM_{10} modeling was not performed
- Of the sources S46A, S46B, F46A, & F46B, only two operate at any time as noted:
  - S46A & F46A - S46A & F46B
  - S46B & F46A - S46B & F46B

EMISSIONS FROM NEW EQUIPMENT OR MODIFICATION

Notes:

- For existing emission units, the annual emission rates in the tables below represent the increase in potential emissions as a result of the project, not the total process potential to emit, except for fugitives F47A and F47B where the applicant conservatively assumed that the project increase was equal to the total process PTE.
- When an emission rate for a process used in the modeling analysis was greater than the calculated potential to emit for the process, the higher modeled emission rate is used as the PTE.

A. Stack Emissions

Stacks S26 and S27, Boilers B26 and B27 – Criteria Pollutant & Greenhouse Gas Emissions

	Potential to Emit (PTE)	
Pollutant	**(lb/hr)**	**(ton/yr)**
Greenhouse Gases, as CO_2e	N/A	7,617

Stacks S26 and S27, Boilers B26 and B27 – Hazardous Air Pollutant Emissions

	Potential to Emit (PTE)	
Pollutant (CAS No.); s,f*	**(lb/hr)**	**(ton/yr)**
Calcium Oxide (1305-78-8); s	22.71	99.5
Hydrogen Bromide (10035-10-6); s	65.53	287.0
Bromine (7726-95-6); s	64.71	283.4

*s=NR 445 State HAP, f = s. 112(b) Federal HAP

Stack S46A, Process P46A – Criteria Pollutant Emissions

	Potential to Emit (PTE)	
Pollutant	**(lb/hr)**	**(ton/yr)**
Particulate Matter	0.58	0.09
PM_{10}	0.58	0.09
$PM_{2.5}$	0.17	0.03

Stack S46B, Process P46B – Criteria Pollutant Emissions

	Potential to Emit (PTE)	
Pollutant	**(lb/hr)**	**(ton/yr)**
Particulate Matter	0.58	0.09
PM_{10}	0.58	0.09
$PM_{2.5}$	0.17	0.03

Fugitive F46A – Criteria Pollutant Emissions

	Potential to Emit (PTE)	
Pollutant	**(lb/hr)**	**(ton/yr)**
Particulate Matter	0.15	0.04
PM_{10}	0.10	0.02
$PM_{2.5}$	0.02	0.004

Fugitive F46B – Criteria Pollutant Emissions

	Potential to Emit (PTE)	
Pollutant	**(lb/hr)**	**(ton/yr)**
Particulate Matter	0.15	0.04
PM_{10}	0.10	0.02
$PM_{2.5}$	0.02	0.004

Fugitive F47 (F47A to F47D) - Criteria Pollutant Emissions

	Potential to Emit (PTE)	
Pollutant	**(lb/hr)**	**(ton/yr)**
Particulate Matter	3.12	10.12
PM_{10}	1.10	3.57
$PM_{2.5}$	0.15	0.43

Fugitive F62 – Criteria Pollutant Emissions

	Potential to Emit (PTE)	
Pollutant	**(lb/hr)**	**(ton/yr)**
Particulate Matter	11.11	0.26
PM_{10}	2.22	0.05
$PM_{2.5}$	0.52	0.01

Stack S64A, Process P64A – Criteria Pollutant Emissions

	Potential to Emit (PTE)	
Pollutant	**(lb/hr)**	**(ton/yr)**
Particulate Matter	0.92	0.15
PM_{10}	0.92	0.15
$PM_{2.5}$	0.17	0.03

Stack S64B, Process P64B – Criteria Pollutant Emissions

	Potential to Emit (PTE)	
Pollutant	**(lb/hr)**	**(ton/yr)**
Particulate Matter	0.92	0.15

Pollutant	Potential to Emit (PTE)	
	(lb/hr)	(ton/yr)
PM_{10}	0.92	0.15
$PM_{2.5}$	0.17	0.03

Stack S66, Process P66 – Criteria Pollutant Emissions

Pollutant	Potential to Emit (PTE)	
	(lb/hr)	(ton/yr)
Particulate Matter	0.43	1.88
PM_{10}	0.08	0.36
$PM_{2.5}$	0.08	0.36

Stack S72, Process P72 – Criteria Pollutant Emissions

Pollutant	Potential to Emit (PTE)	
	(lb/hr)	(ton/yr)
Particulate Matter	0.86	3.77
PM_{10}	0.09	0.38
$PM_{2.5}$	0.09	0.38

Stack S73, Process P73 – Criteria Pollutant Emissions

Pollutant	Potential to Emit (PTE)	
	(lb/hr)	(ton/yr)
Particulate Matter	0.03	0.13
PM_{10}	0.005	0.02
$PM_{2.5}$	0.005	0.02

Stack S74, Process P74 – Criteria Pollutant Emissions

Pollutant	Potential to Emit (PTE)	
	(lb/hr)	(ton/yr)
Particulate Matter	0.03	0.13
PM_{10}	0.003	0.01
$PM_{2.5}$	0.003	0.01

B. Total Emissions From New Equipment or Modification

Criteria Pollutant and Greenhouse Gas Emissions

Pollutant	Potential to Emit (PTE)	
	(lb/hr)	(ton/yr)
Particulate Matter	18.0	16.6
PM_{10}	5.4	4.7
$PM_{2.5}$	1.2	1.3
Greenhouse Gases, as CO_2e	N/A	7,617

Hazardous Air Pollutant Emissions

Pollutant (CAS No.); s,f*	Potential to Emit (PTE)	
	(lb/hr)	(ton/yr)
Calcium Oxide (1305-78-8); s	22.7	99.5
Hydrogen Bromide (10035-10-6); s	65.5	287.0
Bromine (7726-95-6); s	64.7	283.4

*s=NR 445 State HAP, f = s. 112(b) Federal HAP

FACILITY AND PROJECT CLASSIFICATION

1. Existing Facility Status.

The existing facility is a major source for PSD, Part 70 and Federal HAPs.

2. Project Status.

The proposed project is a minor modification to a major PSD source. The proposed project is a minor source of Federal HAPs.

3. Facility Status after Completion of the Project.

After completion of the project, the facility will remain a major source for PSD, Part 70 and Federal HAPs.

4. Summary.

NSR Applicability	Existing Facility		Proposed Project		Facility After Project	
	Major	Minor	Major	Minor	Major	Minor
PSD	X			X	X	
Non-Attainment		NA		NA		NA
Federal HAP	X			X	X	

Part 70 Applicability	Existing Facility			Facility After Project		
	Part 70	FESOP (Syn. Minor)	non-part 70	Part 70	FESOP (Syn. Minor)	non-part 70
Status	X			X		

FACILITY EPA CLASS CODE

☒ "A" [Means the source's maximum theoretical emissions ***and*** potential to emit for one or more pollutants are greater than major source thresholds. The source is a major source (has a FOP)];

☐ "SM80" [Means the source's maximum theoretical emissions of one or more pollutants are greater than major source thresholds and potential to emit is at least 80% but less than 100% of major source thresholds. The source is a non-major source (has a FESOP)];

☐ "SM" [Means the source's maximum theoretical emissions of one or more pollutants are greater than major source thresholds but potential to emit for all pollutants is less than 80% of major source thresholds. The source is a non-major source (usually has a FESOP or a ROP)];

☐ "B" [Means the source's maximum theoretical emissions and potential to emit for all pollutants are less than major source thresholds. The source is a non-major source (has a SOP or a ROP)].

ENVIRONMENTAL ANALYSIS

The proposed project is a Type III action under Chapter NR 150, Wis. Adm. Code, because the potential to emit of the project is less than 100 TPY for each criteria pollutant and there is a potential for increased hazardous air contaminants.

A news release is required for this proposal and is included in the public comment notice. It is proposed that an environmental assessment not be completed.

RULE APPLICABILITY

PAC and Dry Sorbent Injection and $CaBr_2$ addition to boilers B26 and B27

Sec. 285.65(7), Wis. Stats. – Elective Limitations

The applicant has elected to limit the amount of dry sorbent and PAC injected and the amount of $CaBr_2$ added to the coal feed of boilers B26 and B27 to the following:

Material	Boiler B26 Injection Rate (lb/hr)	Boiler B27 Injection Rate (lb/hr)
Dry sorbent	2,498	3,775
PAC	140	255
$CaBr_2$	34.08	46.86

These limitations are being taken so that the project will constitute a minor modification under PSD.

$CaBr_2$ Injection

NR 445 – Control of Hazardous Air Pollutants

The injection of $CaBr_2$ results in calcium oxide, bromine and hydrogen bromide emissions that exceed the ch. NR 445, Wis. Adm. Code, Table A thresholds. Modeling of the maximum theoretical emission rates of these pollutants demonstrates that the ambient air standards will be met. The permit will limit the $CaBr_2$ injection rates to the amounts used to calculate the HAP emission rates in the application: 34.08 pounds per hour for boiler B26 and 46.86 pounds per hour for boiler B27.

Processes P46A & P46B – Ash transfer from ESP hopper into west and east silos

NR 404 – Ambient Air Quality

In order to meet the National Ambient Air Quality Standards and PSD increments, emissions from these processes will be limited to 0.58 pounds of PM_{10} per hour and 0.17 pounds of $PM_{2.5}$ per hour, and only one of the two processes will be allowed to operate at any one time. The permit will also require that the stacks meet the parameters used in the modeling analysis.

NR 415 - Control of Particulate Emissions

Because these processes were last modified after April 1, 1972, the applicable particulate matter emission limit is the more restrictive of the process weight rate equation under s. NR 415.05(2), Wis. Adm. Code and the direct source limit of 0.20 pounds of particulate matter per 1,000 pounds of exhaust gas under s. NR 415.05(1)(m), Wis. Adm. Code.

Based on a maximum throughput of 90 of ash per hour per process, the process weight rate equation for process weight rates greater than 60,000 pounds per hour gives a maximum allowable particulate matter emission rate of the following for each stack:

$$17.31 \cdot P^{0.16} = 17.31 \cdot \left(90 \frac{tons}{hr}\right)^{0.16} = 35.6 \frac{lb\,PM}{hr}$$

Based on a process air flow rate of 3,380 acfm at ambient temperature, the maximum allowable particulate matter emission rate for each process based on the direct source limit of 0.20 pounds per 1,000 pounds of exhaust gas is:

$$\left(0.075 \frac{lb\,gas}{ft^3}\right) \cdot \left(3{,}380 \frac{ft^3}{\min}\right) \cdot \left(\frac{460^o F + 68^o F}{460^o F + 68^o F}\right) \cdot \left(60 \frac{\min}{hr}\right) \cdot \left(\frac{0.20\,lb\,PM}{1{,}000\,lb\,gas}\right) = 3.04 \frac{lb\,PM}{hr}$$

The more restrictive limit is the direct source limit of 0.20 pounds per 1,000 pounds of gas. The applicant has also requested that the particulate matter emission limit of 0.58 pounds per hour contained in the facility's current permit be included in the construction permit.

NR 431 – Control of Visible Emissions
Because these processes were last modified after April 1, 1972, they are subject to a visible emissions limit of 20% opacity.

Sec. 285.65(7), Wis. Stats. – Elective Limitations
The applicant has elected to limit these processes such that only one of the two processes can operate at any one time. This limitation, along with the PM, PM_{10} and $PM_{2.5}$ hourly emission limits discussed above ensure that the emissions increase from the proposed project constitutes a minor modification under PSD. These processes will be equipped with an interlock that prevents the A and B sides of this process from operating simultaneously.

F46A & F46B – Ash transfer to trucks
NR 404 – Ambient Air Quality
In order to meet the National Ambient Air Quality Standards and PSD increments, emissions from these processes will be limited to 0.10 pounds of PM_{10} per hour and 0.02 pounds of $PM_{2.5}$ per hour each, and only one of the two processes will be allowed to operate at any one time.

NR 415 - Control of Particulate Emissions
The transfer of ash from the east and west ash silos to trucks is subject to fugitive dust requirements under s. NR 415.04, Wis. Adm. Code. The current permit and the facility's Fugitive Dust Control Plan require the following measures be taken during loading:

- Water is applied to ash via a wet ash mixer prior to ash being loaded into dump trucks;
- Wet ash unloading dock is partially enclosed;
- A telescopic chute is used for dry ash tanker truck loading and unloading; and
- Loading and unloading areas and roadways can be sprayed with water via the watering truck.

These same requirements will be included in the construction permit.

NR 431 – Control of Visible Emissions
Because these processes were last modified after April 1, 1972, they are subject to a visible emissions limit of 20% opacity.

Sec. 285.65(7), Wis. Stats. – Elective Limitations
The applicant has elected to limit these processes such that only one of the two processes can operate at any one time and the processes may only operate between the hours of 9 a.m. and 3 p.m., and limit particulate matter emissions from each process to 0.15 pounds per hour. These limits ensure that the emissions increase from the proposed project constitutes a minor modification under PSD and that the facility meets all NAAQS and PSD increments. These processes will be equipped with an interlock that prevents the A and B sides of this process from operating simultaneously.

F47A, F47B, F47C & F47D – Ash Storage Pile and Associated Activities
NR 415 - Control of Particulate Emissions
The ash storage pile and associated activities are subject to fugitive dust requirements under s. NR 415.04, Wis. Adm. Code. The current permit requires that the applicant apply water and/or chemical dust suppressants as needed in accordance with the Fugitive Dust Control Plan. This requirement will continue to apply.

NR 431 – Control of Visible Emissions

Because these processes were last modified after April 1, 1972, it is subject to a visible emissions limit of 20% opacity.

F62 – Haul Roads

NR 415 - Control of Particulate Emissions

Emissions from the haul roads are subject to fugitive dust requirements under s. NR 415.04, Wis. Adm. Code. The haul roads are not listed as a specific process in Part I of the current permit but instead are covered under the general limitations in Part II of the permit. The facility's Fugitive Dust Control Plan also specifies that during periods of increased probability of outdoor fugitive dust emissions, roadways may be sprayed with water via a watering truck.

NR 431 – Control of Visible Emissions

Because the haul roads were last modified after April 1, 1972, they are subject to a visible emissions limit of 20% opacity. The haul roads are not listed as a specific process in Part I of the current permit but instead are covered under the general limitations in Part II of the permit.

Sec. 285.65(7), Wis. Stats. – Elective Limitations

All of the haul roads at the facility are paved except for one small section. As part of this project, the applicant has elected to pave this section of haul road. The applicant used the AP-42 equation for paved roads in calculating the increase in fugitive dust emissions from the project. The requirement to pave the haul road will be included in the construction permit transition section of the permit. This requirement ensures that the emissions increase from the proposed project constitutes a minor modification under PSD.

P64A, P64B – East and West Ash Silo Bin Vents

NR 404 – Ambient Air Quality

In order to meet the National Ambient Air Quality Standards and PSD increments, emissions from each of these processes will be limited to 0.92 pounds of PM_{10} and 0.17 pounds of $PM_{2.5}$ per hour. The permit will also require that the stacks meet the parameters used in the modeling analysis.

NR 415 - Control of Particulate Emissions

Because these processes were last modified after April 1, 1972, the applicable particulate matter emission limit is the more restrictive of the process weight rate equation under s. NR 415.05(2), Wis. Adm. Code and the direct source limit of 0.20 pounds of particulate matter per 1,000 pounds of exhaust gas under s. NR 415.05(1)(m), Wis. Adm. Code.

Based on a maximum throughput of 90 of ash per hour per process, the process weight rate equation for process weight rates greater than 60,000 pounds per hour gives a maximum allowable particulate matter emission rate of the following for each stack:

$$17.31 \cdot P^{0.16} = 17.31 \cdot \left(90 \frac{tons}{hr}\right)^{0.16} = 35.6 \frac{lb\,PM}{hr}$$

Based on a process air flow rate of 2,240 acfm at ambient temperature, the maximum allowable particulate matter emission rate for each process based on the direct source limit of 0.20 pounds per 1,000 pounds of exhaust gas is:

$$\left(0.075\frac{lb\,gas}{ft^3}\right)\cdot\left(2{,}240\frac{ft^3}{\min}\right)\cdot\left(\frac{460^o F+68^o F}{460^o F+68^o F}\right)\cdot\left(60\frac{\min}{hr}\right)\cdot\left(\frac{0.20\,lb\,PM}{1{,}000\,lb\,gas}\right)=2.02\frac{lb\,PM}{hr}$$

The more restrictive limit is the direct source limit of 0.20 pounds per 1,000 pounds of gas. The applicant has also requested that the particulate matter emission limit of 0.919 pounds per hour contained in the facility's permit be included in the construction permit.

NR 431 – Control of Visible Emissions
Because these processes were last modified after April 1, 1972, they are subject to a visible emissions limit of 20% opacity.

Sec. 285.65(7), Wis. Stats. – Elective Limitations
The applicant has elected to limit PM, PM_{10} and $PM_{2.5}$ emissions to ensure that the emissions increase from the proposed project constitutes a minor modification under PSD.

P66 – PAC Silo
NR 404 – Ambient Air Quality
In order to meet the National Ambient Air Quality Standards and PSD increments, PM_{10} and $PM_{2.5}$ emissions from this process will be limited to 0.083 pounds per hour. The permit will also require that the stack meets the parameters used in the modeling analysis.

NR 415 - Control of Particulate Emissions
Because this this process is being constructed after April 1, 1972, the applicable particulate matter emission limit is the more restrictive of the process weight rate equation under s. NR 415.05(2), Wis. Adm. Code and the direct source limit of 0.20 pounds of particulate matter per 1,000 pounds of exhaust gas under s. NR 415.05(1)(m), Wis. Adm. Code.

Based on a maximum throughput of 21.04 tons per hour, the process weight rate equation for process weight rates up to 60,000 pounds per hour gives a maximum allowable particulate matter emission rate of the following:

$$3.59\cdot P^{0.62}=3.59\cdot\left(21.04\frac{tons}{hr}\right)^{0.62}=23.7\frac{lb\,PM}{hr}$$

Based on a process design air flow rate of 500 acfm at ambient temperature, the maximum allowable particulate matter emission rate for each process based on the direct source limit of 0.20 pounds per 1,000 pounds of exhaust gas is:

$$\left(0.075\frac{lb\,gas}{ft^3}\right)\cdot\left(500\frac{ft^3}{\min}\right)\cdot\left(\frac{460^o F+68^o F}{460^o F+68^o F}\right)\cdot\left(60\frac{\min}{hr}\right)\cdot\left(\frac{0.20\,lb\,PM}{1{,}000\,lb\,gas}\right)=0.45\frac{lb\,PM}{hr}$$

The more restrictive limit is the direct source limit of 0.20 pounds per 1,000 pounds of gas.

NR 431 – Control of Visible Emissions
Because this process will be constructed after April 1, 1972, it is subject to a visible emissions limit of 20% opacity.

Sec. 285.65(7), Wis. Stats. – Elective Limitations

The permittee has elected to limit particulate matter emissions from this process to 0.43 pounds per hour. This limit, along with the PM_{10} and $PM_{2.5}$ emission limits discussed above, ensure that the emissions increase from the proposed project constitutes a minor modification under PSD.

P72 –DSI Silo

NR 404 – Ambient Air Quality

In order to meet the National Ambient Air Quality Standards and PSD increments, PM_{10} and $PM_{2.5}$ emissions from this process will be limited to 0.086 pounds per hour. The permit will also require that the stack meets the parameters used in the modeling analysis.

NR 415 - Control of Particulate Emissions

Because this process will be constructed after April 1, 1972, the applicable particulate matter emission limit is the more restrictive of the process weight rate equation under s. NR 415.05(2), Wis. Adm. Code and the direct source limit of 0.20 pounds of particulate matter per 1,000 pounds of exhaust gas under s. NR 415.05(1)(m), Wis. Adm. Code.

Based on a maximum throughput of 24.61 tons per hour, the process weight rate equation for process weight rates up to 60,000 pounds per hour gives a maximum allowable particulate matter emission rate of the following:

$$3.59 \cdot P^{0.62} = 3.59 \cdot \left(24.61 \frac{tons}{hr}\right)^{0.62} = 26.2 \frac{lb\,PM}{hr}$$

Based on a process design air flow rate of 1,000 acfm at ambient temperature, the maximum allowable particulate matter emission rate for each process based on the direct source limit of 0.20 pounds per 1,000 pounds of exhaust gas is:

$$\left(0.075 \frac{lb\,gas}{ft^3}\right) \cdot \left(1{,}000 \frac{ft^3}{\min}\right) \cdot \left(\frac{460^o F + 68^o F}{460^o F + 68^o F}\right) \cdot \left(60 \frac{\min}{hr}\right) \cdot \left(\frac{0.20\,lb\,PM}{1{,}000\,lb\,gas}\right) = 0.90 \frac{lb\,PM}{hr}$$

The more restrictive limit is the direct source limit of 0.20 pounds per 1,000 pounds of gas.

NR 431 – Control of Visible Emissions

Because this process will be constructed after April 1, 1972, it is subject to a visible emissions limit of 20% opacity.

Sec. 285.65(7), Wis. Stats. – Elective Limitations

The permittee has elected to limit particulate matter emissions from this process to 0.86 pounds per hour. This limit, along with the PM_{10} and $PM_{2.5}$ emission limits discussed above, ensure that the emissions increase from the proposed project constitutes a minor modification under PSD.

P73, P74 – P7 and P8 DSI mills

NR 404 – Ambient Air Quality

In order to meet the National Ambient Air Quality Standards and PSD increments, PM_{10} and $PM_{2.5}$ emissions from process P73 will be limited to 0.005 pounds per hour and PM_{10} and $PM_{2.5}$ emissions from process P74 will be limited to 0.003 pounds per hour.

NR 415 - Control of Particulate Emissions

Because these processes will be constructed after April 1, 1972, the applicable particulate matter emission limit is the more restrictive of the process weight rate equation under s. NR 415.05(2), Wis. Adm. Code and the direct source limit of 0.20 pounds of particulate matter per 1,000 pounds of exhaust gas under s. NR 415.05(1)(m), Wis. Adm. Code. However, because there is no significant air flow from the semi-trailers that contain the mills, only the process weight rate limit will apply.

Based on maximum throughputs of 1.89 tons per hour for process P73 and 1.25 tons per hour for process P74, the process weight rate equation for process weight rates up to 60,000 pounds per hour gives maximum allowable particulate matter emission rates of the following:

$$\text{P73} = 3.59 \cdot P^{0.62} = 3.59 \cdot \left(1.89 \frac{tons}{hr}\right)^{0.62} = 5.3 \frac{lb\,PM}{hr}$$

$$\text{P74} = 3.59 \cdot P^{0.62} = 3.59 \cdot \left(1.25 \frac{tons}{hr}\right)^{0.62} = 4.1 \frac{lb\,PM}{hr}$$

NR 431 – Control of Visible Emissions

Because these processes will be constructed after April 1, 1972, they are subject to a visible emissions limit of 20% opacity.

Sec. 285.65(7), Wis. Stats. – Elective Limitations

The permittee has elected to limit particulate matter emissions from each of these processes to 0.03 pounds per hour. These limits, along with the PM_{10} and $PM_{2.5}$ emission limits discussed above, ensure that the emissions increase from the proposed project constitutes a minor modification under PSD.

NEW SOURCE PERFORMANCE STANDARDS (NSPS) APPLICABILITY
For proposed construction of a source:

1. Is the proposed source in a source category for which there is an existing or proposed NSPS?
   ☐ Yes ☒ No ☐ Not applicable. (If yes, identify the source category.)

2. Is the proposed source an affected facility?
   ☐ Yes ☐ No ☒ Not applicable. (Explain if necessary to clarify.)

For the proposed modification of an existing source:

1. Is the existing source, which is being modified, in a source category for which there is an existing or proposed NSPS?
   ☐ Yes ☒ No ☐ Not applicable. (If yes, identify the source category.)

2. Is the existing source, which is being modified, an affected facility (prior to modification)?
   ☐ Yes ☒ No ☐ Not applicable. (Explain if necessary to clarify here and in the following items)

3. Does the proposed modification constitute a modification **under NSPS** to the existing source?
   ☐ Yes ☐ No ☒ Not applicable.

4. Will the existing source be an affected facility after modification?
   ☐ Yes ☐ No ☒ Not applicable.

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAPS) APPLICABILITY

Part 61 NESHAPS:

1. Will the proposed new or modified source emit a pollutant controlled under an existing or proposed NESHAPS?
   ☐ Yes ☒ No (if yes, identify the pollutant).

2. Is the proposed new or modified source subject to an existing or proposed NESHAPS?
   ☐ Yes ☒ No (if yes, identify NESHAPS).

Part 63 NESHAPS:

1. Will the proposed new or modified source emit a pollutant controlled under an existing Part 63 NESHAPS?
   ☐ Yes ☒ No (if yes, identify the pollutant).

2. Is the proposed new or modified source subject to an existing Part 63 NESHAPS?
   ☐ Yes ☒ No (if yes, identify NESHAPS).

3. Is the proposed project subject to s. 112(g) of the Clean Air Act?
   ☐ Yes ☒ No.

The section 112(g) rules only apply to case-by-case MACT standards that are developed for new construction or reconstruction of sources that (by themselves) constitutes a new major source of federal hazardous air pollutants (for source categories not covered under an existing Part 63 MACT standard).

CAM - COMPLIANCE ASSURANCE MONITORING.

The Compliance Assurance Monitoring (CAM) rule applies to pollutant-specific emission units (PSEU) at major sources that are required to obtain a Part 70 permit if the unit satisfies all of the following:

- The unit is subject to an emission limitation or standard for the applicable regulated air pollutant
- The unit uses a control device to achieve compliance with any such emission limitation or standard; and
- The unit has potential pre-control device emissions of the regulated air pollutant that are greater than or equal to 100% of the amount required for a source to be classified a Part 70 major source.

Boilers B24, B25, B26 and B27 and processes P46A and P46B are subject to CAM rule and the facility's current operation permit contains CAM requirements that remain unchanged as a result of this construction permit. The other sources being modified or added as part of this project all have potential pre-control device emissions that are less than 100% of the major source threshold and are not subject to the CAM rule.

CRITERIA FOR CONSTRUCTION PERMIT APPROVAL

Section 285.63, Wis. Stats., sets forth the specific language for permit approval criteria. The Department finds that:

1. The source will meet emission limitations.
2. The source will not cause nor exacerbate a violation of an air quality standard or ambient air increment.
3. The source is operating or seeks to operate under an emission reduction option. Not Applicable.
4. The source will not preclude the construction or operation of another source for which an air pollution control permit application has been received.

PRELIMINARY DETERMINATIONS FOR CONSTRUCTION PERMIT NO. 13-DMM-177

The Wisconsin Department of Natural Resources has reviewed the construction permit application and other materials submitted by Wisconsin Public Service Corporation – Pulliam Generating Station and hereby makes a preliminary

determination that this project, when constructed or modified and operated consistent with the application and subsequent information submitted, will be able to meet the emission limits and conditions included in the attached draft permit. A final decision regarding emission limits and conditions will be made after the Department has reviewed and evaluated all comments received during the public comment period. The proposed emission limits and other proposed conditions in the draft permit are written in the same form that they will appear in the construction permit. These proposed conditions may be changed as a result of public comments or further evaluation by the Department.

PERMIT FEE CALCULATION

Basic Fees.

PSD or NAA minor modification of a Part 70 major source. [$7,500]	$7,500.00
Total Basic Fees	$7,500.00

Additional Fees.

The permit application required review and analysis of two or more basic emissions units. [$800 x 14 units]	$11,200.00
The permit application is for a PSD or NAA minor source or minor modification to a major PSD or NAA source whose projected air quality impact requires a detailed air quality modeling analysis. [$1,000]	$1,000.00
A public hearing on the application is held at the request of the permit applicant or its agent. [$1,500]	$1,500.00
The application is for a source which requires specific permit conditions limiting the potential to emit to make the source a minor source or to make the modification a minor modification [$3,500].	$3,500.00
Total Additional Fee	$17,200.00
Total Fees (Total Basic Fees + Total Additional Fees)	$24,700.00

Credit(s).

The initial fee submitted with the application. [$7,500]	-$7,500.00
Total Credits	-$7,500.00
TOTAL AMOUNT DUE (Total Fee + Total Credit)	$17,200.00