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ENGINEERING EVALUATION / FACT SHEET

BACKGROUND INFORMATION

Application No.:	R13-0641A
Plant ID No.:	039-00007
Applicant:	Bayer CropScience
Facility Name:	Institute
Location:	Institute, Kanawha County
NAICS Code:	325320
Application Type:	Modification
Received Date:	September 2, 2011
Engineer Assigned:	Laura Jennings
Fee Amount:	$3,500.00
Date Received:	September 8, 2011
Complete Date:	December 16, 2011
Due Date:	March 15, 2012
Applicant Ad Date:	September 12, 2011
Newspaper:	*Charleston Newspapers*
UTM's:	Easting: 432.0 km Northing: 4,248.3 km Zone: 17
Description:	The changes included in this permit modification are for the installation and operation of a new Process Thermal Oxidizer to control vent gasses from the Larvin® process in preparation for the shutdown of the #1 Powerhouse at the site. There are also numerous changes to the equipment unit table associated with the shut down of the Oxime and the Methomyl units.

DESCRIPTION OF PROCESS

The Larvin® (Thiodicarb) process begins with commercially purchased Methomyl (MOM). Solvent is added to the MOM and the solution is transferred to one of three reactors where the MOM is converted to thiodicarb. Once the reaction is completed, the thiodicarb slurry is cooled and crystallization of thiodicarb is completed. A belt filter is used to separate the thiodicarb from the slurry. The separated thiodicarb is then washed. From the belt filter, the washed thiodicarb is re-slurried and transferred to one of two basket centrifuges. The wet thiodicarb cake is conveyed to a dryer. Dried thiodicarb is then stored and packaged for shipping to the customer. Solvents and materials used to wash the thiodicarb are sent to the Solvent Recovery process.

The Solvent Recovery process treats the solvents and washing materials used during the production of thiodicarb. The process involves the extraction, distillation, and drying of these materials so that they may be reused in the process.

Particulate matter emissions generated during the handling and storage of solid materials are controlled by dust collectors. Gaseous process vents are collected into a vent header system that is proposed to be controlled by the new Process Thermal Oxidizer (PTO)/ Scrubber [B332/C332], # 1 Powerhouse Boilers #3, #4, and #5 [E480], or the existing back-up process flare [B330(7c)]. The contents of the vent header are mainly composed of nitrogen, methanol, and pyridine vapors. The # 1 Powerhouse Boilers [E480] are scheduled to be shutdown; however they will remain as a control option in the permit until such time that they are shutdown.

The PTO will destroy organics/ VOCs with a minimum destruction and removal efficiency of 99.9% and simultaneously convert the sulfur and nitrogen compounds to SOx and NOx. The new scrubber (C332) is used to control SO2 and HCl combustion byproducts generated by the PTO. If the PTO or Boilers are down, the vent collection header will be sent to the backup/process flare [B330(7C)].

Much of the equipment in the Oxime Unit and the Methomyl Unit will be either out of service or will be reused in the Larvin® Unit. The emissions unit table (Table 1) captures the proposed emission units for the Larvin® Unit. Out of service (OOS) equipment has been identified in the OOS emissions unit table (Table 2).

Table 1: Emissions Unit Table for the Larvin® Unit

Emission Unit ID	Emission Point ID	Emission Unit Description	Year Installed/ Modified	Design Capacity	Control Device
B-1	A331	MOM Storage Bin	1983	292,500 lbs	Baghouse with Absolute Filter (A331)
B-2	A331	MOM Storage Bin	1983	292,500 lbs	Baghouse with Absolute Filter (A331)
B-3	332A	Storage Bin	1983	48,000 lbs	Baghouse and Absolute Filter (A332)
B-4	332A	Storage Bin	1983	48,000 lbs	Baghouse and Absolute Filter (A332)
E-26	480E 330B (15e) 332C	North Weigh Tank	1984	500 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)

E-27	480E 330B (15e) 332C	West Weigh Tank	1984	500 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
E-28	480E 330B (15e) 332C	East Weigh Tank	1984	500 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
E-29	480E 330B (15e) 332C	North Reactor	1984	6,000 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
E-30	480E 330B (15e) 332C	West Reactor	1984	6,000 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
E-31	480E 330B (15e) 332C	East Reactor	1984	6,000 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
E-32	480E 330B (15e) 332C	Methomyl Solution Tank	1996	6,000 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
E-33	480E 330B (15e) 332C	Quench Tank	1984	4,000 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
E-34	480E 330B (15e) 332C	Belt Filter	1984	8,575 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
E-35	480E 330B (15e) 332C	Reslurry Tank	1984	1,500 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
E-36	480E 330B (15e) 332C	North Centrifuge	1984	147 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
E-37	480E 330B (15e) 332C	South Centrifuge	1984	147 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
E-38	480E 330B (15e) 332C	Dryer	1984	15,835 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
E-39	332A	Larvin® Packaging	1984	1.85 ft3/min	Baghouse and Absolute Filter (A332)

E-40	480E 330B (15e) 332C	4-PPC Reactor	1983	15,674 lb/hr	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
E-41	480E 330B (15e) 332C	Neutralization Reactor	1984	6,450 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
E-42	480E 330B (15e) 332C	Toad Column	1984	17,132 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
E-43	480E 330B (15e) 332C	Toad Column Decanter	1983	n/a	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
E-44	480E 330B (15e) 332C	Drying Column	1984	11,450 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
E-45	480E 330B (15e) 332C	Recovery Column	1984	10,800 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
E-46	330A	Sump	1982	5,000 gal	Scrubber (A330)
E-47	N/A	Sump	1982	10,700 gal	N/A
E-48	480E 330B (15e) 332C	Process Vent Scrubber	1983	3,106 lb/hr	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
E-49	480E 330B (15e) 332C	Vent Blowers	1982	500 scfm	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
E-51	N/A	Instrument Air Dryer	1982	14 kW	N/A
E-52	N/A	Refrigeration	1982	629 tons of refrigerant	N/A
T-1	335A	Storage Tank	2011	282,000 gal	N/A
T-2	335B	Storage Tank	2011	282,000 gal	N/A
T-4	480E 330B (15e) 332C	Storage Tank	1984	40,000 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
T-5	480E 330B (15e) 332C	Storage Tank	1984	40,000 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)

T-6	480E 330B (15e) 332C	Storage Tank	1984	40,000 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
T-7	335C	Storage Tank	1984	40,000 gal	N/A
T-11	480E 330B (15e) 332C	Storage Tank	1984	40,000 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
T-18	480E 330B (15e) 332C	Storage Tank	1985	20,000 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
T-23	480E 330B (15e) 332C	Storage Tank	1985	44,000 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
T-24	480E 330B (15e) 332C	Storage Tank	2011	40,000 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
T-25	480E 330B (15e) 332C	Storage Tank	1984	40,000 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
T-26	480E 330B (15e) 332C	Storage Tank	1984	10,000 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
T-27	480E 330B (15e) 332C	Storage Tank	1984	15,000 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
T-28	480E 330B (15e) 332C	Storage Tank	1984	15,000 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
T-29	480E 330B (15e) 332C	Storage Tank	1984	2,000 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
T-30	480E 330B (15e) 332C	Storage Tank	1984	1,000 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)

T-31	480E 330B (15e) 332C	Storage Tank	1984	1,500 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
T-32	480E 330B (15e) 332C	Storage Tank	1984	1,000 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
T-33	480E 330B (15e) 332C	Storage Tank	1984	15,000 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
T-34	480E 330B (15e) 332C	Storage Tank	1984	6,400 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
T-35	480E 330B (15e) 332C	Storage Tank	1984	24,400 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
T-37	337A	Storage Tank	2008	50,000 gal	N/A
T-38	337B	Storage Tank	2008	50,000 gal	N/A
T-39	480E 330B (15e) 332C	Storage Tank	1985	15,000 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
T-41	480E 330B (15e) 332C	Storage Tank	1984	5,000 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
T-42	480E 330B (15e) 332C	Storage Tank	1984	5,000 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
T-43	480E 330B (15e) 332C	Storage Tank	1984	15,800 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
T-49	336B	Storage Tank	1985	396 gal	N/A
T-53	335I	Storage Tank	1984	17,800 gal	N/A
T-55	337D	Storage Tank	1984	500 gal	N/A
T-58	337E	Storage Tank	1984	1,280 gal	N/A
T-59	335K	Atm. Flash Storage Tank	1985	320 gal	N/A
T-62	331B	Foam Storage Tank	1983	45,000 gal	N/A
TT-1	480E 330B (15e) 332C	Tank Truck	2012	5,000 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)

TT-2	480E 330B (15e) 332C	Tank Truck Loading	2012	5,000 gal	Boiler (E480), Flare (B330(7c)), or PTO (B332)/Scrubber (C332)
Control Devices					
A330	330A	Packed Bed Scrubber	1983	8,400 acfm	N/A
A331 (3c)	331A (8e)	Methomyl Baghouse with Absolute Filter	1983	9,000 acfm	N/A
A332 (5c)	332A (10e)	Larvin® Baghouse with Absolute Filter	1983	7,000 acfm	N/A
B330 (7c)	330B (15e)	Backup/Process Flare	1982	17 MMBTU/hr	N/A
B330 (7c(a))	330B (15e-a)	Emergency Flare	1982	0.46 MMBTU/hr (pilot)	N/A
E-50	330B	Emergency Scrubber	1985	29,605 lb/hr	N/A
E480	480E	Boilers #3, #4, #5 (#1 Powerghouse)	1943	180 MMBTU/hr	Electrostatic Precipitators
B332	332C	PTO	2011	14 MMBTU/hr 99.9% efficiency	Scrubber C332
C332	332C	Scrubber	2011	10,500 acfm 99% SO2/HCl efficiency	N/A

Table 2: OOS Emission Units Table

Emission Unit ID	**Emission Point ID**	**Emission Unit Description**	**Year Installed / Modified**	**Design Capacity**	**Control Device**
Oxime Unit					
E-3	480E 330B(15e)	Reactor	1983	N/A	Boiler (E480)/ Flare (B330(7c))
E-4	480E 330B(15e)	EAR	1983	N/A	Boiler (E480)/ Flare (B330(7c))
E-5	480E 330B(15e)	MM Reactor	1984	1,500 gal	Boiler (E480)/ Flare (B330(7c))
E-6	480E 330B(15e)	Sub Reactor	1984	3,000 gal	Boiler (E480)/ Flare (B330(7c))
E-7	480E 330B(15e)	pH Reactor	1984	3,000 gal	Boiler (E480)/ Flare (B330(7c))
E-8	480E 330B(15e)	Primary Decanter	1983	N/A	Boiler (E480)/ Flare (B330(7c))

E-9	480E 330B(15e)	Dehydration Column	1984	2,212 gal	Boiler (E480)/ Flare (B330(7c))
E-10	480E 330B(15e)	Extractor Column	1983	N/A	Boiler (E480)/ Flare (B330(7c))
E-11	480E 330B(15e)	Brine Stripper Column	1984	670 gal	Boiler (E480)/ Flare (B330(7c))
E-12	480E 330B(15e)	Brine Stripper OH	1984	500 gal	Boiler (E480)/ Flare (B330(7c))
TT-1	330C	Storage Tank	1984	5,000 gal	N/A
T-3	335E	Storage Tank	1984	2,700 gal	N/A
T-8	335D	Storage Tank	1985	38,000 gal	N/A
T-9	480E 330B(15e)	Storage Tank	1984	4,000 gal	Boiler (E480)/ Flare (B330(7c))
T-10	480E 330B(15e)	Storage Tank	1984	1,060 gal	Boiler (E480)/ Flare (B330(7c))
T-12	480E 330B(15e)	Storage Tank	1984	500 gal	Boiler (E480)/ Flare (B330(7c))
T-44	335F	Storage Tank	1985	7,750 gal	N/A
T-46	335G	Storage Tank	1985	45,000 gal	N/A
T-47	335H	Storage Tank	1985	396 gal	N/A
T-54	335J	Storage Tank	1985	5,000 gal	N/A
T-61	480E 330B(15e)	Storage Tank	1985	130 gal	Boiler (E480)/ Flare (B330(7c))
Methomyl					
E-13	480E 330B(15e)	Methomyl Reactor	1983	N/A	Boiler (E480)/ Flare (B330(7c))
E-14	480E 330B(15e)	Stripping Still	1985	1,868 gal	Boiler (E480)/ Flare (B330(7c))
E-15	480E 330B(15e)	#1 Crystallizer	1985	5,600 gal	Boiler (E480)/ Flare (B330(7c))
E-16	480E 330B(15e)	#2 Crystallizer	1985	5,600 gal	Boiler (E480)/ Flare (B330(7c))
E-17	480E 330B(15e)	East Centrifuge	1985	147 gal	Boiler (E480)/ Flare (B330(7c))
E-18	480E 330B(15e)	West Centrifuge	1985	147 gal	Boiler (E480)/ Flare (B330(7c))
E-19	480E 330B(15e)	Settler	1985	8,500 gal	Boiler (E480)/ Flare (B330(7c))
E-20	480E 330B(15e)	ML Flasher Column	1985	800 gal	Boiler (E480)/ Flare (B330(7c))
E-21	480E 330B(15e)	Methomyl Dryer	1985	28,635 gal	Boiler (E480)/ Flare (B330(7c))

E-22	331A	Methomyl Packaging	1985	2 ft3/min	Baghouse/Absolute Filter (A331)
E-23	480E 330B(15e)	Residue Treater	1985	4,000 gal	Boiler (E480)/ Flare (B330(7c))
E-24	480E 330B(15e)	Solvent Column	1985	794 gal	Boiler (E480)/ Flare (B330(7c))
E-25	480E 330B(15e)	Hexane/Water Decanter	1983	N/A	Boiler (E480)/ Flare (B330(7c))
T-13	480E 330B(15e)	Storage Tank	1985	6,700 gal	Boiler (E480)/ Flare (B330(7c))
T-14	480E 330B(15e)	Storage Tank	1985	9,092 gal	Boiler (E480)/ Flare (B330(7c))
T-15	480E 330B(15e)	Storage Tank	1985	3,000 gal	Boiler (E480)/ Flare (B330(7c))
T-16	480E 330B(15e)	Storage Tank	1985	3,000 gal	Boiler (E480)/ Flare (B330(7c))
T-17	480E 330B(15e)	Storage Tank	1985	15,780 gal	Boiler (E480)/ Flare (B330(7c))
T-19	480E 330B(15e)	Storage Tank	1985	5,900 gal	Boiler (E480)/ Flare (B330(7c))
T-20	480E 330B(15e)	Storage Tank	1985	4,000 gal	Boiler (E480)/ Flare (B330(7c))
T-21	480E 330B(15e)	Storage Tank	1985	4,000 gal	Boiler (E480)/ Flare (B330(7c))
T-22	480E 330B(15e)	Storage Tank	1985	15,000 gal	Boiler (E480)/ Flare (B330(7c))
T-45	480E 330B(15e)	Storage Tank	1985	42,000 gal	Boiler (E480)/ Flare (B330(7c))
T-48	336A	Storage Tank	1985	396 gal	N/A
T-50	480E 330B(15e)	Storage Tank	1985	6,300 gal	Boiler (E480)/ Flare (B330(7c))
T-51	480E 330B(15e)	Storage Tank	1985	200 gal	Boiler (E480)/ Flare (B330(7c))
T-60	480E 330B(15e)	Storage Tank	1985	280 gal	Boiler (E480)/ Flare (B330(7c))
Larvin®					
E-53	N/A	Refrigeration	2008	N/A	N/A
E-54	331A	Vacuum System	1983	N/A	Baghouse (A331)
T-36	480E 330B(15e)	Storage Tank	1984	1,510 gal	Boiler (E480)/ Flare (B330(7c))
T-40	337C	Storage Tank	1984	541,000 gal	Scrubber (C337)
T-52	480E 330B(15e)	Storage Tank	1982	130 gal	Boiler (E480)/ Flare (B330(7c))

T-56	480E 330B(15e)	Storage Tank	1984	300 gal	Boiler (E480)/ Flare (B330(7c))
T-57	480E 330B(15e)	Storage Tank	1984	300 gal	Boiler (E480)/ Flare (B330(7c))
MOM	N/A	MOM Storage Tank	2008	1,070 gal	N/A
Control Devices					
C337	337C	T-40 Storage Tank Scrubber	2002	26 gal	N/A

SITE INSPECTION

Bayer CropScience's Institute, WV site is well known by WV Division of Air Quality. The writer had a complete tour of the facility that included the Larvin® Unit within the last year in conjunction with a permit application for another production unit at the site. A site inspection is not necessary specific to this permit application.

ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Regulated emissions from storage tanks that vent directly to the atmosphere were calculated using the EPA AP-42 Tanks emission software. Some of these tanks contain water or other materials that do not emit a regulated pollutant. Emissions from storage tanks T-37, T-38, T-53, T-55 were calculated using TANKS 4.09 software and were reviewed by the writer. The tanks were installed after permit R13-641 was issued. Tanks T-37 and T-38 are over 20,000 gallons and therefore, emission limits will be added to permit R13-641A. Tanks T-53 and T-55 are less than 20,000 gallons and will not have permitted emissions per DAQ policy.

The Larvin® Unit will continue to use the existing particulate matter control technology (baghouse followed by an absolute filter). The particulate matter emissions from the storage bins [331A and 331B] are based on the emissions provided in the original R13-641 permit application. There are no requested changes to this system as a result of this application.

Total VOC emissions from the Fugitive Air Pickups and the Lab that are controlled by Scrubber A330 and emitted through emission point 330A. The VOC emissions through this emission point have been reduced because there are no longer Hexane and MIBK emissions as a result of the Oxime and Methomyl Units shutting down. There are no requested changes to this system as a result of this application.

Process Emissions:

Process emissions collected and transferred through the process vent system are controlled either by the existing Boilers [480E], through the existing back-up process flare

[15e], or through the proposed PTO/Scrubber [332C]. The process gases are controlled by only one of these control devices at any given time. The composition of the vent stream used for the emissions calculations from the Flare [330B(15e)] is the same as from the PTO/Scrubber [332C]. Emissions from the site Boilers [480E] are permitted under the site utilities permit R13-1308A.

Process emissions were calculated using the volume of vapor displaced during the filling of a vessel and represent maximum emission rates. As material is added to a vessel, the volume of air or nitrogen displaced by the incoming liquid is assumed to be saturated by the incoming liquid based on the mole fraction of the various components in the liquid and the components vapor pressure at the vessel's working temperature. The maximum emission rates for each piece of equipment are not added together because all vessels are not filled at the same time. The PTO's design capacity is 3,000 lb/hr including combustible and inert materials, which is approximately 1/3 of the sum of all of the equipment specific maximum emission rates. Fill rates and materials filled are based on the Unit's current hourly production rate and process chemistry.

No changes to the hourly production rate or the annual production limit are being requested by Bayer CropScience. With this application, Bayer CropScience is however requesting that the annual hours of operation be increased from 6,500 hours per year to 8,760 hours per year.

The PTO/Scrubber [332C] emissions are based on vendor PTO and scrubber design data and maximum inlet process gas composition. The guaranteed destruction and removal efficiency of the PTO for organics/VOCs is 99.9% minimum. The PTO/Scrubber [332C] also carries a manufacturer's guarantee for NOx, CO, SO2, and HCl emissions.

It should be noted that this proposed change results in an increase of emissions within the Larvin® production unit because the PTO/Scrubber is located and permitted within the Larvin® production unit. Bayer CropScience expects that emissions from the overall site will be significantly decreased when the #1 Powerhouse shuts down although such decreases are not evaluated as part of this engineering evaluation.

With this application, Bayer CropScience has requested an increase in the hours of operation of the back-up/process flare [B330(7c)] to 1,200 hours per year. The flare destruction efficiency is 99.5%. This request is being made because of bringing the proposed PTO/Scrubber on-line.

Criteria Pollutants:

In the case of the proposed PTO/Scrubber [B332/C332] and the back-up process flare [B330(7c)], emissions of the criteria pollutants are generated from both the combustion of the natural gas and from the combustion of the components within the process vent stream. The emissions from both components are added together to determine the maximum emissions from each emission point. As mentioned in the process emissions section above, the characteristic of the process vent stream are the same for both emission points.

Emissions for the criteria pollutants from the PTO/Scrubber [B332/C332] were verified by the writer using vendor guarantee information provided for CO, NOX, and SO2 and AP-42 emission factors for PM and VOC and the PTO design capacity of 6 MMBtu/hr for emissions only as a result of combustion of natural gas. In addition to the natural gas emissions, there are also emissions of criteria pollutants as a result of the combustion of the process gas that occurs in the PTO.

Particulate matter emission calculations from the PTO/Scrubber are based on PM (Total) which is the sum of the filterable PM and condensable PM. All PM is assumed to be less than 1.0 micrometer in diameter. Therefore, the PM emissions may be used to estimate PM10 or PM2.5 based on the information in AP-42, Table 1.4-2. Because the PTO/Scrubber will be a new combustion source, the permit limits will be represented as PM2.5.

Emissions for the criteria pollutants from the back-up process flare [B330(7c)] were verified by the writer using AP-42 emission factors. The emissions from the back-up process flare are a combination of the natural gas emissions for the pilot light in addition to the combustion of the process gas. Characteristics of the process gas are the same for the back-up process flare as they are in the PTO/Scrubber. Particulate matter emission calculations are based on PM (Total) which is the sum of the filterable PM and condensable PM. All PM is assumed to be less than 1.0 micrometer in diameter. Therefore, the PM emissions may be used to estimate PM10 or PM2.5 based on the information in AP-42, Table 1.4-2.

Total Emissions:

Emissions for all emission points within the Larvin production unit are provided in the emissions table (Table 3) below:

Table 3: Emissions Table

Emission Point ID	**Previous Emission Point ID**	**Source ID**	**Control Device ID**	**Regulated Pollutant**	**Maximum Potential Uncontrolled Emissions**		**Maximum Potential Controlled Emissions**	
					lb/hr	**tpy**	**lb/hr**	**tpy**
331A	8e	B-1 B-2	A331	PM_{10}	10.8	47.3	0.01	0.01
332A	10e	B-3 B-4 E-39	A332	PM_{10}	8.6	37.7	0.01	0.01
337D	n/a	T-55	n/a	PM_{10}	0.01	0.01	0.01	0.01
				Phosphoric Acid	0.01	0.01	0.01	0.01
337A	n/a	T-37	n/a	Total VOC	0.01	0.01	0.01	0.01
337B	n/a	T-38	n/a	Total VOC	0.01	0.01	0.01	0.01

330A	2e	fugitive air pickups, lab	A330	Total VOC	17.5	14.0	16.5	13.2
				Methanol	16.4	13.1	16.4	13.1
				Total HAPs	16.4	13.1	16.4	13.1
330B (15e)	15e	**	B330 (7c)	Total VOC	480	288	2.49	1.81
				Acetonitrile	30	131	0.15	0.09
				Aniline	30	131	0.15	0.09
				Methyl Chloride	0.18	0.79	0.01	0.01
				Methanol	180	108	0.90	0.54
				CO	150	90	2.14	6.56
				PM_{10}*	n/a	n/a	2.23	1.83
				$PM_{2.5}$	n/a	n/a	2.23	1.83
				HCl	n/a	n/a	2.10	1.26
				NO_X	n/a	n/a	6.67	10.30
				SO_X	n/a	n/a	58.01	34.84
				Total HAPs	240	144	3.30	1.98
332C	n/a	**	B332 C332	Total VOC	480	288	0.51	0.18
				Acetonitrile	30	131	0.03	0.13
				Aniline	30	131	0.03	0.13
				Methyl Chloride	0.18	0.79	0.01	0.01
				Methanol	180	108	0.18	0.79
				CO	n/a	n/a	0.64	2.81
				PM_{10}*	n/a	n/a	0.07	0.29
				$PM_{2.5}$	n/a	n/a	0.07	0.29
				HCl	n/a	n/a	0.02	0.09
				NO_X	n/a	n/a	8.68	37.98
				SO_X	n/a	n/a	0.58	2.56
				Total HAPs	240	1051	0.26	1.14
335I	13e	T-53	n/a	Total VOC	0.01	0.04	0.01	0.04
				Ethlyene Glycol	0.01	0.04	0.01	0.04
				Total HAPs	0.01	0.04	0.01	0.04

*PM10 emissions include HCl acid mist

** Emissions sources vented through 330B(15e) or 332C include: E-26, E-27, E-28, E-29, E-30, E-31, E-32, E-33, E-34, E-35, E-36, E-37, E-38, E-40, E-41, E-42, E-43, E-44, E-45, E-48, E-49, T-4, T-5, T-6, T-11, T-18, T-23, T-24, T-25, T-26, T-27, T-28, T-29, T-30, T-31, T-32, T-33, T-34, T-35, T-39, T-41, T-42, T-43, TT-1, and TT-2.

Permitted Emission Changes:

As previously stated in this evaluation, the PTO/Scrubber [332C] will be replacing the existing #1 Powerhouse Boilers [E-480]. The permit conditions for the existing residue and natural gas fired boilers are maintained with the utility permits at the site and not within the Larvin® unit. The changes to emissions within the Larvin® permit described in this evaluation do not include any emission changes to the Institute site that will occur when the #1 Powerhouse Boiler [E-480] is shut down. All emissions from the proposed PTO/Scrubber are considered new emissions.

Tanks T-37 and T-38 were installed after permit R13-641 is issued and are included as new permitted emissions.

The existing back-up process flare [B330(7c)] was installed in 1982. The flare previously was permitted with emission limits for SO_X, Total VOCs, and Total HAPs. The table below reflects the addition of emission limits for CO, PM_{10}, $PM_{2.5}$, and NO_x into permit R13-0641A although these are not actually new emissions, only newly permitted emission limits. The increase in PM_{10} emissions reflects that HCl acid mist emissions are now included in the PM_{10} emissions from the back-up process flare. The decrease in hourly SO_2 emissions from the back-up process flare is attributed to the change in the AP-42 emission factors that were issued in 1998 from what was used when the original R13-0641 permit application that was submitted in 1982. Because the hourly operating limit is increasing with this permit application, there is only a decrease in the hourly SO_2 emission limit and not the annual SO_2 limit.

For comparison with the previous permit, the table below includes the addition of both the back-up process flare [B330(7c)] and the PTO/Scrubber [B332/C332] even though they will not be operational at the same time. A more detailed emissions analysis is provided in the regulatory section of this engineering evaluation concerning PSD applicability.

The decrease in VOC emissions are a reflection of the shut-down of the Methomyl and Oxime Units. This decrease in total VOC emissions are from the Fugitive Air Pickups and the Lab that are controlled by Scrubber [A330] and emitted through emission point 330A. The decrease in total VOCs are because there are no longer emissions of Hexane or MIBK through the fugitive air scrubber [330A]. There is also a decrease in total HAPs through this emission point because Hexane and MIBK are also classified as HAPs.

Table 4: Change in permitted emissions

Regulated Pollutant	**Permitted emissions R13-0641**		**Permitted emissions R13-0641A**		**Change in permitted emissions**	
	lb/hr	**tpy**	**lb/hr**	**tpy**	**lb/hr**	**tpy**
PM_{10}*	0.01	0.01	2.33	2.14	2.32	2.13
$PM_{2.5}$	n/a	n/a	0.07	0.29	0.07	0.29
CO	n/a	n/a	2.78	9.37	2.78	9.37

NO_x	n/a	n/a	15.35	48.28	15.35	48.28
SO_x	104	3.12	58.59	37.40	-45.41	34.28
Total VOC	42.6	45.3	19.53	15.25	-23.07	-30.05
Total HAPs	39.79	44.1	19.97	16.26	-19.82	-27.84

*PM10 emissions include HCl acid mist

Greenhouse Gases:
Greenhouse gas emissions were calculated using AP-42 factors and the maximum BTU rating of the back-up process flare [330B(15e)] and the PTO/Scrubber [332C]. The annual greenhouse gas emissions from the flare and PTO/Scrubber are based on 8,760 hours of operation per year for the pilot light. Carbon Dioxide equivalent calculations are based on the equivalent values as determined by Table A-1 in 40 CFR 98, Subpart A.

Table 5: Greenhouse Gas Emissions

Emission Point ID	**CO_2**	**CH_4**	**N_20**
	(tpy)	**(tpy)**	**(tpy)**
330B (15e)	8756.5	0.15	0.15
332C	3090.53	0.06	0.06
TOTAL	11847.03	0.21	0.21
CO_2e	11847.03	62.47	4.23
			Total CO_2e = 11,914 tpy

Fugitive Emissions:
The existing Leak Detection and Repair (LDAR) program will be revised to remove those components that are no longer in service. With the shutdown of the equipment, there will be a decrease in overall fugitive emission components.

REGULATORY APPLICABILITY

One of the reasons for this modification permit is to reflect the changes associated with the shut down of the Oxime (330) and Methomyl (331) Units and to affirm the equipment that will remain in operation at the Larvin® Unit (332). The updating of the equipment lists as a result of the unit shutdowns do not affect any of the current regulatory requirements that apply to the Larvin® Unit.

STATE REGULATIONS:

45CSR6 CONTROL OF AIR POLLUTION FROM COMBUSTION OF REFUSE

Bayer CropScience is proposing a new PTO/Scrubber for the Larvin® unit at the Institute facility. The PTO/Scrubber will be burning vent header gas from the unit and therefore

meets the definition of refuse and is subject to this rule.

The estimated mass flow rate of waste gas (total combustible) to the flare is 660 lb/hr, so F Factor A (5.43) applies for §45-6-4.1, Table I. As determined from the calculation in 4.1, particulate matter emissions shall not exceed 1.79 lb/hr. The applicant is in compliance with this requirement as their particulate matter emissions are below 1.79 lb/hr as shown in the emissions table in the previous section.

The applicant will demonstrate compliance with the opacity requirements 4.3, 4.4, 4.5, 4.6, and 7.1 by demonstrating compliance with permit limits.

45CSR7 TO PREVENT AND CONTROL PARTICULATE MATTER AIR POLLUTION FROM MANUFACTURING PROCESSES AND ASSOCIATED OPERATIONS

Bayer CropScience was previously subject to this rule and will continue to be subject to this rule. The evaluation in this section is specific to the proposed construction of the PTO/Scrubber [B332/C332]. Particulate matter and opacity limits for the PTO/Scrubber are not subject to the limits in 45CSR7-3.1, -3.2 and -4.1 in 45CSR7 because they are subject to the limits in 45CSR6.

The PTO/Scrubber is subject to the mineral acids limit of 210 mg/m^3 for Hydrochloric Acid in Table 45-7B. Bayer CropScience has demonstrated compliance with this requirement based on the HCl emissions concentration provided in the Emission Points Data Summary Sheet in the application as 13 mg/m^3.

The back-up process flare [B330(7c)] is subject to the mineral acids limit of 210 mg/m^3 for Hydrochloric Acid in Table 45-7B. Bayer CropScience has demonstrated compliance with this requirement based on the HCl emissions concentration of 59 mg/m^3.

45CSR10 TO PREVENT AND CONTROL AIR POLLUTION FROM THE EMISSION OF SULFUR OXIDES

The increase in annual operating hours of the back-up flare [B330(7c)] requested by this permit does not affect compliance with the regulation.

The PTO/Scrubber [B332/C332] is subject to 45CSR10 because it is a fuel burning unit with a capacity greater than 10 MMBtu/hr. The PTO/Scrubber is classified as a Type ‘b’ unit because it burns process fuel and natural gas. The SO_2 limit for the 14 MMBtu/hr PTO is 22.4 lb/hr per the calculation in 45CSR10-3.2.c. The controlled potential emissions limit for SO_2 is 0.54 lb/hr clearly demonstrating compliance with the standard.

The PTO/Scrubber [B332/C332] is not subject to the testing, monitoring, recordkeeping and reporting requirements of 45CSR10-8 because it combusts natural gas, alone or in combination and therefore meets the exemption requirements of 45CSR10-10.3.

45CSR13 PERMITS FOR CONSTRUCTION, MODIFICATION, RELOCATION AND OPERATION OF STATIONARY SOURCES OF AIR POLLUTANTS, NOTIFICATION REQUIREMENTS, ADMINISTRATIVE UPDATES, TEMPORARY PERMITS, GENERAL PERMITS, PERMISSION TO COMMENCE CONSTRUCTION, AND PROCEDURES FOR EVALUATION

Bayer CropScience is subject to 45CSR13 and meets the definition of a "modification" permit.

The facility has met the applicable requirements of this rule by publishing a Class I Legal Advertisement, paid the $1000.00 application fee for a modification permit for a major stationary source, the $2,500 NESHAP fee, and submitted a complete permit application.

45CSR14 PERMITS FOR CONSTRUCTION AND MAJOR MODIFICATION OF MAJOR STATIONARY SOURCES OF AIR POLLUTION FOR THE PREVENTION OF SIGNIFICANT DETERIORATION (PSD)

Determination of Existing Major Source Status:

Bayer CropScience (BCS), Institute facility is located in Kanawha County. Kanawha County was designated as nonattainment for the regulated pollutant $PM_{2.5}$ annual for the 1997 annual standards and 24-hour by the 2006 24-hr standards by the EPA in 2009. NO_X and SO_2 have been designated by the EPA as precursors to PM2.5 and therefore, the major source status of the source for PM2.5, NO_X, and SO_2 is determined under 45CSR19.

Kanawha County is in attainment with the National Ambient Air Quality Standards (NAAQS) for all other regulated pollutants. The major source status of the source for PM, PM10, ozone (VOCs), and CO is therefore determined under 45CSR14 .

BCS, Institute facility is an existing "major" source with regard to PSD with facility-wide emissions of at least one PSD pollutant greater than 100 tpy which is the "major" source PSD threshold for chemical process plants per 45CSR14-2.43.a and 45CSR19-2.35.a.

Determination of Major Modification:

BCS, Institute is proposing a "physical change in or change in the method of operation of a major stationary source" and therefore a determination must be made regarding whether or not the proposed changes described in the permit application meet the definition of a major modification.

A "major modification" is defined under section 2.40 of 45CSR14 as a:

> . . . physical change in or change in the method of operation of a major stationary source which results in: a significant emissions increase (as

> defined in subsection 2.75) of any regulated NSR pollutant (as defined in subsection 2.66); and a significant net emissions increase of that pollutant from the major stationary source. [. . .]

Section 3.4 of 45CSR14 provides guidance on the process of determining if proposed changes are a major modification. §45-14-3.4(a) states that:

> . . . consistent with the definition of major modification contained in subsection 2.40, a project is a major modification for a regulated NSR pollutant if it causes two types of emissions increases -- a significant emissions increase (as defined in subsection 2.75), and a significant net emissions increase (as defined in subsections 2.46 and 2.74). The proposed project is not a major modification if it does not cause a significant emissions increase. [. . .]

Therefore, for the proposed changes to meet the definition of a major modification, the changes themselves must result in a significant emissions increase. The methodology for calculating the emissions increase under the first step is given under Sections 3.4(b), 3.4(c), 3.4(d) and 3.4(f). The substantive language of each is given below:

> [§45-14-3.4(b)]
> The procedure for calculating (before beginning actual construction) whether a significant emissions increase (i.e., the first step of the process) will occur depends upon the type of emissions units being modified, according to subdivisions 3.4.c through 3.4.f.
>
> [§45-14-3.4(c)]
> Actual-to-projected-actual applicability test for projects that only involve existing emissions units. -- A significant emissions increase of a regulated NSR pollutant is projected to occur if the sum of the difference between the projected actual emissions (as defined in subsection 2.63) and the baseline actual emissions (as defined in subdivisions 2.8.a and 2.8.b), for each existing emissions unit, equals or exceeds the significant amount for that pollutant (as defined in subsection 2.74).
>
> [§45-14-3.4(d)]
> Actual-to-potential test for projects that only involve construction of a new emissions unit(s). – A significant emissions increase of a regulated NSR pollutant is projected to occur if the sum of the difference between the potential to emit (as defined in subsection 2.58) from each new emissions unit following completion of the project and the baseline actual emissions (as defined in subdivision 2.8.c) of these units before the project equals or exceeds the significant amount for that pollutant (as defined in subsection 2.74).

[§45-14-3.4(f)]
Hybrid test for projects that involve multiple types of emissions units. -- A significant emissions increase of a regulated NSR pollutant is projected to occur if the sum of the emissions increases for each emissions unit, using the method specified in subdivisions 3.4.c through 3.4.d as applicable with respect to each emissions unit, for each type of emissions unit equals or exceeds the significant amount for that pollutant (as defined in subsection 2.74).

Further, under the definition of "projected actual emissions" - Section 2.63(a)(4), the applicant may use an emission unit's PTE in lieu of projecting actual emissions.

It is important to note that when any emissions decrease is claimed (including those associated with the proposed modification), the second step of the test is triggered - a determination if the project results in a "significant net emissions increase." This determination is defined under the definition of "net emissions increase" [§45-14-2.46] and must include "any other increases and decreases in actual emissions at the major source that are contemporaneous with the particular change and are otherwise creditable." A change is contemporaneous if it "occurs not more than five (5) years prior to the date on which construction on the particular change commences nor later than the date on which the increase from the particular change occurs." This determination will not include any decreases in emissions and will stay within the first step of the test.

Because of the various changes requested in this permit application, it was decided for the sake of simplicity to evaluate the entire Larvin unit in the applicability analysis. The installation of a new PTO/Scrubber is being evaluated with the existing back-up process flare as one process for the combustion of the process gas. The process vent stream cannot vent to both control devices at the same time and the process vent characteristics are the same regardless of which control device they are routed to for destruction of the VOCs and HAPs. The back-up process flare was installed in 1982 and the emissions associated with the combustion of the natural gas have been present since installation because of the requirement to keep a continuous pilot light. The determination will be conducted in accordance with §45CSR14-3.4(d).

PSD Applicability Analysis:

Step 1 - Determination of Emission increase under 45CSR14 for the NSR regulated pollutants PM, PM10, Ozone (VOC), and CO for the Larvin production unit are provided below in Table 6 for each emission point within the production unit. For the analysis presented in Table 6, it is assumed for simplicity that all past actual emissions are zero and that the entire unit is being evaluated as new operations with no credit for past actual emissions. Table 7 provides the summary of the Greenhouse Gases.

Table 6: Step 1 - Determination of Emission Increase under 45CSR14

Regulated NSR Pollutant: PM				
Emission Point ID	Past Actual Emissions	Maximum Potential Emissions	Emission Increase	Significant Limit
331A	0	0.01	0.01	25
332A	0	0.01	0.01	25
337D	0	0.01	0.01	25
330B	0	1.83	1.83	25
332C	0	0.29	0.29	25
Total	0	2.15	2.15	25
Regulated NSR Pollutant: PM_{10}				
Emission Point ID	Past Actual Emissions	Maximum Potential Emissions	Emission Increase	Significant Limit
331A	0	0.01	0.01	15
332A	0	0.01	0.01	15
337D	0	0.01	0.01	15
330B	0	1.83	1.83	15
332C	0	0.29	0.29	15
Total	0	2.15	2.15	15
Regulated NSR Pollutant: Ozone (VOCs)				
Emission Point ID	Past Actual Emissions	Maximum Potential Emissions	Emission Increase	Significant Limit
330A	0	13.2	13.2	40
330B	0	1.81	1.81	40
332C	0	0.18	0.18	40
337A	0	0.01	0.01	40
337B	0	0.01	0.01	40
Total	0	15.21	15.21	40
Regulated NSR Pollutant: CO				
Emission Point ID	Past Actual Emissions	Maximum Potential Emissions	Emission Increase	Significant Limit
330B	0	6.56	6.56	100

332C	0	2.81	2.81	100
Total	0	9.37	9.37	100

* All PM is considered PM10

Table 7: Greenhouse Gas Determination

Greenhouse Gases:		
Greenhouse Gas Pollutant	Maximum Potential Controlled Emissions (TPY)	CO_2e (TPY)
CO_2	11,847	11,847
CH_4	0.21	62.47
N_20	0.21	4.23
Total		11,914

For new emission units, the "baseline actual emissions" for the purpose of determining the emissions increase that will result from the initial construction and operation of such unit shall equal zero; and thereafter for all other purposes shall equal the potential to emit (PTE) according to subsection 2.8c of 45CSR14.

The proposed changes described in this engineering evaluation of the Larvin production unit do not meet the definition of a major modification of an existing major stationary source because there is not a "significant emissions increase" per the definitions provided in 45CSR14-2.40, 2.74 and 2.75. This proposed project is not a major modification if it does not cause a significant emissions increase as stated in the applicability criteria provided in section 45CSR14-3.4 and no additional analysis is required.

The proposed new GHG Source [PTO/Scrubber B332/C332] is *not subject to regulation* as defined in 40 CFR §51.166(b)(48) to PSD rule 45CSR14 because it falls below 75,000 TPY for existing sources that are not otherwise subject to PSD.

45CSR19 PERMITS FOR CONSTRUCTION AND MAJOR MODIFICATION OF MAJOR STATIONARY SOURCES OF AIR POLLUTION WHICH CAUSE OR CONTRIBUTE TO NONATTAINMENT (NNSR)

Bayer CropScience, Institute facility is located in Kanawha County, WV. Kanawha County was designated as nonattainment for the regulated pollutant $PM_{2.5}$ (annual) by the EPA in 2005. Kanawha County is in attainment for all other regulated pollutants. NO_X and SO_2 have been designated by the EPA as precursors to PM2.5 and therefore, the major source status of the source for PM2.5, NO_X, and SO_2 is determined under 45CSR19.

BCS, Institute facility is an existing "major" source with regard to PSD with facility-

wide emissions of at least one PSD pollutant greater than 100 tpy which is the "major" source PSD threshold for chemical process plants per 45CSR14-2.43.a and 45CSR19-2.35.a.

Determination of Major Modification:

The methodology that was described under 45CSR14 will be used in the determination of a major modification for $PM_{2.5}$, NO_X, and SO_2 under 45CSR19.

PSD Applicability Analysis:

Step 1 - Determination of emission increase under 45CSR19 for the NSR regulated pollutants $PM_{2.5}$, NO_X, and SO_2 for the Larvin production unit are provided below in Table 8 for each emission point within the production unit. For simplicity and consistency with the analysis under 45CSR14, all past actual emissions for the Larvin production unit are considered zero for this analysis with the exception of the contribution of NO_X emissions from the burning on natural gas to keep the pilot light burning that was required at all times. The contribution of NO_X emissions from the combustion of process vent gas within the Larvin production unit are considered new emissions. The process vent gas can be routed either to the PTO/Scrubber or to the back-up process flare.

Table 8: Step 1 - Determination of emission increase under 45CSR19

Regulated NSR Pollutant: PM2.5				
Emission Point ID	Past Actual Emissions	Maximum Potential Emissions	Emission Increase	Significant Limit
330B	0	1.83	1.83	10
332C	0	0.29	0.29	10
Total	0	2.12	2.12	10
Regulated NSR Pollutant: SO2				
Emission Point ID	Past Actual Emissions	Maximum Potential Emissions	Emission Increase	Significant Limit
330B	0	34.84	34.84	40
332C	0	2.56	2.56	40
Total	0	37.4	37.4	40

Regulated NSR Pollutant: NO_X				
Emission Point Description	Past Actual Emissions	Maximum Potential Emissions	Emission Increase	Significant Limit
NG for back-up process flare pilot	7.30	7.30	0	40
NG for new PTO pilot	0	2.58	2.58	40
Process Vent Gas to either back-up process flare or new PTO	0	35.4	35.4	40
Total	7.30	45.28	37.98	40

The preconstruction permit program requirements apply to the construction of any new major stationary source or major modification that is major for the pollutant for which the area is designated nonattainment under 40 CFR Part 81, Subpart C. The proposed project is not a major modification because it does not cause a "significant emissions increase" per the applicability criteria in section 3.4.a. This proposed project is not a major modification and no additional analysis is required.

45CSR21 REGULATION TO PREVENT AND CONTROL AIR POLLUTION FROM THE EMISSION OF VOLATILE ORGANIC COMPOUNDS

There is no change in applicability to 45CSR21 as a result of this application. The increase in VOC emissions is less than six pounds per hour and does not trigger a RACT analysis. The conditions from the Rule 21 consent order (CO-R21-97-4) are currently referenced in the related Title V operating permit and are described below as they relate to this application.

CO-R21-97-4, Condition III.2 is referenced in the operating permit R30-03900007-2011 (Part 6 of 8), condition 4.1.19 and states that the Oxime, Methomyl, are Larvin® units are subject to the LDAR monitoring requirements of 40CFR§63.160, Subpart H. The applicant will continue to be subject to this requirement for the Larvin® unit. The Oxime and Methomyl requirement will be removed because they are permanently shut down.

CO-R21-97-4, Condition III.1 is referenced in the operating permit R30-03900007-2011 (Part 6 of 8), condition 4.1.20 and provides VOC emission limits, control device efficiencies, and maximum hours of operation. The table and condition will be deleted because the equipment in the table is no longer in service. The Fugitive Scrubber [A330] that is in the table is for emission limits only from the Methomyl

Process Area 331 that is no longer in service. The writer consulted with Todd Shrewsbury of the Compliance & Enforcement Group of the DAQ prior to deleting requirements that referenced the consent order.

CO-R21-97-4, Condition III.3 is referenced in the operating permit R30-03900007-2011 (Part 6 of 8), conditions 4.5.3 and 4.5.4 describe reporting requirements for excess emissions. No changes will be made as a result of this application.

45CSR27 TO PREVENT AND CONTROL THE EMISSIONS OF TOXIC AIR POLLUTANTS

There is no change in applicability to 45CSR27 as a result of this application. The conditions from the Rule 27 consent order (CO-R27-92-12) and are currently referenced in the related Title V operating permit are described below as they relate to this application.

CO-R27-92-12, Condition III.3 is referenced in the operating permit R30-03900007-2011 (Part 6 of 8), condition 4.1.19 and states that the Oxime, Methomyl, are Larvin® units are subject to the LDAR monitoring requirements of 40CFR§63.160, Subpart H. The applicant will continue to be subject to this requirement for the Larvin® unit. The Oxime and Methomyl requirement will be removed because they are permanently shut down. The writer consulted with Todd Shrewsbury of the Compliance & Enforcement Group of the DAQ prior to deleting requirements that referenced the consent order.

CO-R27-92-12, Condition III.2 is referenced in the operating permit R30-039000007-2011 (Part 6 of 8), condition 4.1.21 and provides a limit for chloroform emissions from Boilers #3 and #4 [E480]. This condition will be deleted because the condition in the consent order for the chloroform emission limits is specifically associated with the Methomyl Process ID 331 that is now shutdown.

CO-R27-92-12, Condition III.5 is referenced in the operating permit R30-039000007-2006 (Part 6 of 8), condition 4.1.22 and provides a notification requirement for any TAP unknown to be occurring at the time of the CO. This condition will not be changed as a result of this permit application.

45CSR30 REQUIREMENTS FOR OPERATING PERMITS

Bayer CropScience is currently subject to 45CSR30. This application does not change the applicability. The Larvin® unit is currently operating under R30-03900007-2011 (Part 6 of 8).

45CSR34 EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

There is no change in applicability as a result of the application. The Pesticide Active Ingredient Production MACT continues to apply and is described further in the Federal Regulations section.

FEDERAL REGULATIONS:

40CFR63,
Subpart MMM

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS FOR PESTICIDE ACTIVE INGREDIENT PRODUCTION (PAI MACT)

There is no change in applicability as a result of the application. The PAI MACT continues to apply.

The changes described in the application do not meet the definition of "construction", nor do they meet the definition of "reconstruction" as defined in §63.1361. The Larvin® unit is considered an "existing affected source".

Process Vents:
Bayer CropScience currently demonstrates compliance with the Process Vent Standards of §63.1362(b)(2)(iv)(c) by controlling all PAI "Group 1" process vents with the #1 powerhouse boilers [E480] as the primary control device as stated in Subpart MMM periodic reports.

With this application, Bayer CropScience is proposing that the new PTO/Scrubber [B332/C332] become the primary control device when the #1 powerhouse boilers are permanently shutdown. The PTO/Scrubber does not meet the exemptions from compliance demonstrations of §63.1365(a)(4) as stated in §63.1362(b)(2)(iv(c) that was applicable for compliance of the #1 Powerhouse Boilers [E480].

Based on information provided in the application from the PTO/Scrubber vendor, the destruction and removal efficiency for Organics/VOCs emissions are reduced by 99.9 wt% minimum, indicating compliance with either §63.1362(b)(2)(ii) or §§63.1362(b)(2)(iii).

Control device C337 is currently referenced in the Title V permit as being subject to the PAI MACT requirements for Process Vents. This control device was identified as being permanently out of service in the permit application and therefore, the reference will be removed.

Storage Vessels:

Bayer CropScience currently has three storage tanks [T-24, T-25, and T-40] within

the Larvin® Unit that are defined as “Group 1 tanks” that are subject to the provisions of §63.1362(c) based on information submitted in the Subpart MMM periodic reports. Storage tanks [T-24 and T-25] will vent to the new PTO/Scrubber [B332/C332]. Based on information provided in the application from the PTO/Scrubber vendor, the destruction and removal efficiency for Organics/VOCs emissions are reduced by 99.9 wt% minimum, thus demonstrating compliance with §63.1362(c)(2)(iv)(A).

In the permit application, storage Tank T-40 has been identified as being permanently out of service and therefore, no further action is required.

Closed Vent Systems:

There are no changes in requirements to the closed vent systems as a result of this permit application.

Equipment Leaks:

There are no change to the LDAR requirements as a result of this permit application.

Test methods and initial compliance procedures (§63.1365):
The new PTO/Scrubber [B332/C332] must demonstrate initial compliance as a control device for the process vents. The test methods and initial compliance procedures for the thermal oxidizer and for the scrubber in this section must be followed. The “group 1 storage tanks” also are subject to the initial compliance and test methods procedures with the new PTO/Scrubber control device.

Monitoring and inspection requirements (§63.1366):
The new PTO/Scrubber [B332/C332] will be subject to the Thermal Incinerator requirements in §§63.1366(a), (b)(i), (b)(vii). The application stated that the temperature of the gases exiting the combustion chamber will be measured and recorded every 15 minutes which demonstrates compliance with the requirement.

Recordkeeping and reporting requirements (§63.1367 and §63.1368):
The new PTO/Scrubber [B332/C332] will be subject to any of the recordkeeping and reporting requirements associated with the new requirements identified in this section of the engineering evaluation. Compliance will be demonstrated by meeting permit requirements.

TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

There are no new materials or pollutants associated with this application.

AIR QUALITY IMPACT ANALYSIS

The proposed project does not meet the definition of a major modification according to the definitions in 45CSR14 and 45CSR19; therefore, modeling is not required for this permit application.

MONITORING OF OPERATIONS

New monitoring requirements only are provided in this section.

- Initial performance testing of PTO/Scrubber.
- Initial performance testing of Group 1 storage tanks with the new PTO/Scrubber control device.
- Exit gas temperature from the PTO combustion chamber
- Liquor flow rate of the PTO/Scrubber
- Throughput records for Tanks T-37 and T-38
- Process vent gas flow rate to either the PTO/Scrubber or back-up process flare.

CHANGES TO PERMIT R13-0641

R13-0641 was originally issued in 1982. At that time, the permits were one page documents and the approval of permits was based on the information provided in the permit application. The Title V Operating Permit R30-03900007-2011 (Group 6 of 8), Section 4.0 includes conditions that reference permit application R13-641. Permit changes referenced in this section will reference those R13 permit application conditions from the Title V permit.

- Permit R13-0641A has been updated to the current permit template
- Out of service equipment (OOS) and control devices described in this evaluation have been deleted from the equipment table and references to them throughout the permit limitations and standards in section 4.0 have been removed
- The equipment table in the permit reflects the equipment table reference in this evaluation
- All Title V specific references were removed
- Changes were made to numbering as necessary to delete limits and standards that are no longer applicable and to add new requirements as necessary
- Added an emissions unit table
- 4.1.1 was deleted (Methomyl Process)
- 4.1.3 - removed references to the Methomyl and Oxime processes and referenced Equipment Table 1.0
- 4.1.4 - revised operational limit of the process flare to 1,200 hrs/yr and added PTO/Scrubber
- 4.1.5 - clarified “emergency”

- 4.1.6, 4.1.7, and 4.1.8 - deleted emission limits from the baghouses, air scrubber, and process flare because they were replaced with emissions unit table.
- 4.1.9 - removed requirements for OOS scrubber C337
- 4.1.11. - removed PM emissions limit for Flare B330(7c) because it is included in the emissions unit table & combined with other 45CSR6 requirements
- 4.1.12, 4.1.13, and 4.1.14 - Combined all 45CSR6 requirements and added PTO Scrubber
- 4.1.16 - removed OOS Scrubber [C337] from reference and added PTO/Scrubber [B332/C332]
- 4.1.17 - removed OOS Tank [T-40] from reference
- 4.1.19 - removed the Oxime and Methomyl units from the requirement and removed reference to Appendix A. Appendix A contains the language of 40CFR63, Subpart H and is redundant
- 4.1.20 - deleted. The VOC emission limit table included all OOS equipment with the exception of the Fugitive Scrubber [A330]. This was also deleted because the emission limits in the table was specifically for the Methomyl process area (Process ID 331) that is shutdown.
- 4.1.21 - deleted the Chloroform emissions requirement from Boilers #3 and #4 [E480] because the condition was specific to the Methomyl Process ID 331 that is shutdown. 4.1.23 - did not include this 45CSR30 requirement
- 4.1.24 - added PTO/Scrubber to the 45CSR10 requirements
- Added a throughput limit for Tanks T-37 and T-38 along with associated monitoring and recordkeeping requirements
- Added operating requirements for the PTO/Scrubber
- Added initial compliance testing for the PTO/Scrubber [B332/C332]
- Added process vent flow rate requirement to ensure compliance with NO_X emission limits.
- 4.2.1, 4.2.2, and 4.2.3 - reworded the requirements for consistency
- Added monitoring requirements for the emergency flare as provided in the application
- Added monitoring requirements for the PTO/Scrubber and for Storage Tanks T-37 and T-38
- 4.2.5 - deleted reference to OOS scrubber C337 and added (vii) requirements for the PTO/Scrubber [B332/C332] from the PAI MACT.
- Deleted Title V only conditions 4.2.6 and 4.2.7.
- Section 4.3 - added initial compliance testing requirements to the PTO/Scrubber, including the process vents and Group 1 storage vessels control requirements for the new control device
- 4.4.3 - removed references to Methomyl process that is shut down.
- 4.4.4 - deleted the recordkeeping requirements for heat excahangers because there are no heat exchangers
- Added record keeping requirement in section 4.4 for each monitoring requirement in section 4.2.
- Added opacity reporting requirement using standard language.
- Added Appendix A - example opacity record.

RECOMMENDATION TO DIRECTOR

It is the writer's recommendation that the modification permit R13-0641A be granted to Bayer CropScience, Institute facility located in Kanawha County, WV. Based on the information provided in the permit application including all supplemental information received, the applicant meets all applicable state and federal regulations.

Laura Jennings
Permit Engineer

Date