

**PERMIT BOOK**

STATE OF MISSOURI



**DEPARTMENT OF NATURAL RESOURCES**

MISSOURI AIR CONSERVATION COMMISSION

**PERMIT TO CONSTRUCT**

Under the authority of RSMo 643 and the Federal Clean Air Act the applicant is authorized to construct the air contaminant source(s) described below, in accordance with the laws, rules and conditions as set forth herein.

Permit Number: **06 2015 - 006** Project Number: 2014-07-069  
Installation Number: 095-0011

Parent Company: Bayer CropScience LP  
Parent Company Address: 2 T.W. Alexander Drive, Research Triangle Park, NC 27709  
Installation Name: Bayer CropScience  
Installation Address: 8400 Hawthorn Road, Kansas City, MO 64120  
Location Information: Jackson County, S29, T50N, R32W

Application for Authority to Construct was made for:  
Installation of a new vent gas incinerator with a waste heat boiler and a quench/scrubbing system. This review was conducted in accordance with Section (5), Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*.

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- Standard Conditions (on reverse) are applicable to this permit.
  - Standard Conditions (on reverse) and Special Conditions are applicable to this permit.

**JUN 10 2015**

EFFECTIVE DATE

A handwritten signature in black ink, appearing to read "Ryan L Moore".  
\_\_\_\_\_  
DIRECTOR OR DESIGNEE  
DEPARTMENT OF NATURAL RESOURCES

## STANDARD CONDITIONS:

Permission to construct may be revoked if you fail to begin construction or modification within two years from the effective date of this permit. Permittee should notify the Air Pollution Control Program if construction or modification is not started within two years after the effective date of this permit, or if construction or modification is suspended for one year or more.

You will be in violation of 10 CSR 10-6.060 if you fail to adhere to the specifications and conditions listed in your application, this permit and the project review. In the event that there is a discrepancy between the permit application and this permit, the conditions of this permit shall take precedence. Specifically, all air contaminant control devices shall be operated and maintained as specified in the application, associated plans and specifications.

You must notify the Department's Air Pollution Control Program of the anticipated date of start up of these air contaminant sources. The information must be made available within 30 days of actual startup. Also, you must notify the Department of Natural Resources' regional office responsible for the area within which you are located within 15 days after the actual start up of these air contaminant sources.

A copy of this permit and permit review shall be kept at the installation address and shall be made available to Department of Natural Resources' personnel upon request.

You may appeal this permit or any of the listed special conditions to the Administrative Hearing Commission (AHC), P.O. Box 1557, Jefferson City, MO 65102, as provided in RSMo 643.075.6 and 621.250.3. If you choose to appeal, you must file a petition with the AHC within 30 days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed. If it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the AHC.

If you choose not to appeal, this certificate, the project review and your application and associated correspondence constitutes your permit to construct. The permit allows you to construct and operate your air contaminant sources(s), but in no way relieves you of your obligation to comply with all applicable provisions of the Missouri Air Conservation Law, regulations of the Missouri Department of Natural Resources and other applicable federal, state and local laws and ordinances.

The Air Pollution Control Program invites your questions regarding this air pollution permit. Please contact the Construction Permit Unit at (573) 751-4817. If you prefer to write, please address your correspondence to the Missouri Department of Natural Resources, Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102-0176, attention: Construction Permit Unit.

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**SPECIAL CONDITIONS:**

The permittee is authorized to construct and operate subject to the following special conditions:

*The special conditions listed in this permit were included based on the authority granted the Missouri Air Pollution Control Program by the Missouri Air Conservation Law (specifically 643.075) and by the Missouri Rules listed in Title 10, Division 10 of the Code of State Regulations (specifically 10 CSR 10-6.060). For specific details regarding conditions, see 10 CSR 10-6.060 paragraph (12)(A)10. "Conditions required by permitting authority."*

Bayer CropScience  
Jackson County, S29, T50N, R32W

1. **Superseding Condition**  
The conditions of this permit supersede all of the special conditions issued by the Kansas City Health Department Permit No. 1299.
2. **Emission Limitations**
  - A. Bayer CropScience shall not exceed the annual plant-wide emission limitations for any pollutant listed in Table 1. All limitations are based on a consecutive 12-month period. This limit applies to the emissions from all equipment/processes installed or permitted at Bayer CropScience as of the issuance date of this permit.

Table 1: Installation-Wide Emission Limitations

Pollutant	Plant-Wide Limitation
PM <sub>10</sub>	99.0
SOx	99.0
NOx	99.0
VOC	99.0
CO	99.0
Any individual HAP	9.9
Combined HAPs	24.9

- B. Bayer CropScience shall develop and use forms to demonstrate compliance with Special Condition 2.A. The forms shall contain at a minimum the following information,
  - 1) Installation name
  - 2) Installation ID
  - 3) Permit number
  - 4) Current month
  - 5) Pollutant
  - 6) Emission units
  - 7) Each emission unit's respective current monthly throughput
  - 8) Each emission unit's respective emission factor and emission factor source.
  - 9) Total pollutant emissions for the month
  - 10) 12-month rolling total pollutant emissions

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**SPECIAL CONDITIONS:**

The permittee is authorized to construct and operate subject to the following special conditions:

- 11) Indication of compliance status with Special Condition 2.A.
- C. As available, the emission factors and demonstrated control efficiencies developed from the most recent performance testing shall be used in the recordkeeping developed under Special Condition 2.B.
- 3. Vent Stream Control Devices
  - A. Source operations subject to 10 CSR 10-2.320 (see column "Subject to Special Condition 3.A." in Table 2) shall vent emissions to a VOC emission control device.
  - B. Process vents subject to 40 CFR 63 Subpart VVVVVV (MACT 6V) Table 3 emission limitations (see column "Subject to Special Condition 3.B." in Table 2) must route emissions through a closed vent system to a HAP reduction device.
  - C. Emissions from vent streams controlled through combustion must be routed to a halogen reduction device.
  - D. One or more control devices shall be in operation at all times when emissions from one or more emission units or processes associated with the vent streams specified in Special Conditions 3.A or 3.B are vented to them.

**Table 2: Emission Units<sup>1</sup>**

Emission Unit No.	Emission Unit Description	Subject to Special Condition 3.A.	Subject to Special Condition 3.B.
0.1-D1	Steam Boiler #1		
0.1-D2	Steam Boiler #2		
1.0-F1	K2, HFP - Herbicide Formulation Plant Vent		
10.0-K1 CY	Cyclanilide Process	X	
11.0-F5	K3, FPP - General Process Vent		
11.1-F2	K3, FPP - Flowable Unit Product Vent		
19.0-F1	K1, LFP Tanks: B17, B18, and B20		
19.0-F2	K1, LFP Tanks: B1-B6, B9-B12, B14-B16, and B23		
19.0-F3	K1, LFP Tanks: B1-B6, B9-B12, B14-B16, and B23		
19.0-F8	K1, LFP Tank: B19		
2.3-K3 TCH	TCH Process	X	
2.3-K6 EPX	Epoxide Process	X	
2.8-K2 JA6	JAU Process Step 6	X	X
2.8-K2 TDA	TDA Process	X	X
2.9-K1 DIC	Dicamba Process	X	
2.9-K1 PHA	Phenylaldol	X	
2.9-K1PHOS	Phosphite Process	X	
3.0-K1 FOL	Folicur General Process	X	
3.0-K1 PIN	Pinacolone Process	X	
3.0-K2 PIN	Pina-Mix Process	X	
3.6-K2 309	AE309 KSalt Process	X	
3.6-K2 747	AE747 KSalt Process	X	
4.0-F1	K4, Charging to 4.-X1/X2		
4.0-K1 BUT	Buthylthion Process	X	X

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**SPECIAL CONDITIONS:**

The permittee is authorized to construct and operate subject to the following special conditions:

**Table 2: Emission Units<sup>1</sup>**

Emission Unit No.	Emission Unit Description	Subject to Special Condition 3.A.	Subject to Special Condition 3.B.
4.0-K1 JA5	JAU Process (Step 5)	X	
4.0-K2 FOL	Folicur Process	X	
4.0-K2 SEN	Sencor Process	X	
4.2-F5	K4, Charging to 4.2X3		
5.0-B2COMB	TDA/FOE Combined Processes	X	
5.0-B4 FOE	FOE Process	X	
5.0-B4 JA7	JAU Process Step 7	X	
5.0-K2 309	AE309 Active Ingredient Process	X	
5.0-K2 747	AE747 Active Ingredient Process	X	
5.0-K2 H61	MKH 6561 Process	X	
5.1-F7	HFP - Barden Clay Silo Vent		
5.2-F3	HFP - Sencor Silo Vent		
7.2-K1 J12	JAU Steps 1-2	X	
8.0-K1 JA4	JAU Steps 3-4 - Chloromethylketone	X	
8.7-K1 309	AE309 Acid Chloride	X	
8.7-K1 747	AE747 Acid Chloride	X	
8.7-K1 MAT	MAT Process	X	
9.2-X2 CHG	LFP: Charging Hood		
9.9-A1 CAT	Catalytic Thermal Oxidizer		
EP3-TO2TKF	WTP Tank Farm Vent		
EP3-WTP	WTP Vents to WTP Hypo Scrubber-Divert		
EP5	Thermal Oxidizer II		
EP6	T.O. II Fuel Oil Tanks		
ICE-GT600	Internal Combustion Engines (>600 Hp)		
ICE-LT600	Internal Combustion Engines (<600 Hp)		
TEMP_BOIL	Temporary Steam Boiler		
TEMPTO	Temporary Thermal Oxidizer		

<sup>1</sup> Includes all emission units included in 2014 EIQ plus emission units added since 2014 EIQ submittal.

**4. Control Device - VGI (VGI-01) Requirements**

- A. When venting emissions to the VGI in accordance with Special Condition 3.A., the VGI must achieve an instantaneous VOC destruction or removal efficiency of greater than or equal to 99%.
- B. When venting organic hazardous air pollutant (HAP) emissions to the VGI in accordance with Special Condition 3.B., the VGI must reduce emissions of total organic HAP by  $\geq 95$  percent by weight ( $\geq 85$  percent by weight during periods of startup and shutdown) or to  $\leq 20$  ppmv.
- C. The VGI shall be operated and maintained in accordance with the manufacturer's specifications, which shall be kept on site.
- D. Bayer CropScience shall establish operating limits for minimum combustion chamber temperature and maximum natural gas flow rate.
  - 1) The operating limits shall be established during the performance test specified in Special Condition 8.

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SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

- 2) Natural gas flow rate serves as a surrogate for residence time.<sup>1</sup>
- E. Bayer CropScience shall maintain an operating and maintenance log for the VGI that shall include the following:
  - 1) Incidents of malfunction, with impact on emissions, duration of event, probable cause, and corrective actions;
  - 2) Maintenance activities, with inspection schedule, repair actions, and replacements, etc.; and
  - 3) Dates of all above schedules, incidents, activities, and actions.
- F. The VGI is subject to the requirements of 40 CFR 63 Subpart VVVVVV – *National Emission Standard for Hazardous Air Pollutants for Chemical Manufacturing Area Sources and Control of Emissions From Production of Pesticides and Herbicides*, 10 CSR 10-2.320. Testing of the VGI shall be conducted in accordance with these two rules as well as any additional requirements in Special Condition 8.
- 5. Control Device – Quench/Scrubber System (VGI-CD-1) Requirements
  - A. When routing emissions subject to Special Condition 3.C., the quench/scrubber system shall reduce overall emissions of hydrogen halide and halogen HAP by greater than or equal to 95%, to less than or equal to 0.45 kilograms per hour (kg/hr), or to a concentration less than or equal to 20 parts per million by volume (ppmv).
  - B. Bayer CropScience shall establish operating limits for minimum pressure drop across the quench/scrubber system, minimum pH of the liquid in the scrubber circulation line, and minimum liquid-to-gas ratio.
    - 1) Except as noted in Special Condition 5.B.2), the operating limits shall be established during the performance test specified in Special Condition 8.
    - 2) The minimum pressure drop across the quench/scrubber system will be set based upon manufacturer specifications and specified in the performance test plan.
    - 3) The liquid-to-gas ratio is defined as the flow rate of liquid into the scrubber divided by the natural gas flow rate into the combustion chamber. Natural gas flow rate serves as a surrogate for flue gas flow rate.<sup>2</sup>
  - C. The quench/scrubber system and any related instrumentation or equipment shall be operated and maintained in accordance with the manufacturer's specifications, which shall be kept on site.

<sup>1</sup> See Appendix B for rationale on use of natural gas flowrate as surrogate for residence time.

<sup>2</sup> See Appendix B for rationale on the use of natural gas flow rate as a surrogate for flue gas flow rate.

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SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

- D. Sodium hydroxide solution shall be used as the scrubbing liquid in the scrubber.
  - E. Bayer CropScience shall maintain an operating and maintenance log for the wet scrubber that shall include the following:
    - 1) Incidents of malfunction, with impact on emissions, duration of event, probable cause, and corrective actions; and
    - 2) Maintenance activities, with inspection schedule, repair actions, and replacements, etc.
    - 3) Dates of all above schedules, incidents, activities, and actions.
  - F. The quench/scrubber system is subject to the requirements of 40 CFR 63 Subpart VVVVVV – *National Emission Standard for Hazardous Air Pollutants for Chemical Manufacturing Area Sources*. Testing of the quench/scrubber system shall be conducted in accordance with this rule as well as any addition requirements under Special Condition 8.
6. Boilers/Fuel Oil Firing Limitation
- A. Boilers shall not be fired with more than a total of 400,000 gallons of No. 2 fuel oil annually in both boilers combined except in the event of an emergency affecting the facility’s otherwise guaranteed natural gas supply. Fuel oil used during the emergency shall be excluded from the 400,000 gallon limitation.
  - B. For purposes of this limitation, an “emergency” is defined (as in 40 CFR Part 70 and 10 CSR 10-6.065(6)(C)(7)) to mean any condition arising from sudden and not reasonably foreseeable events beyond the control of Bayer CropScience, including acts of God, but not including any condition caused by improperly designed equipment, lack of preventive maintenance, careless or improper operation, or operator error.
  - C. Bayer CropScience will notify the City or another permitting authority within three days of the beginning and end of such an emergency.
7. Monitoring, Record Keeping, and Reporting Requirements
- A. Bayer CropScience shall monitor the following parameters:
    - 1) VGI chamber gas temperature (°C)
    - 2) Natural gas flowrate into the VGI(scfm)
    - 3) Pressure drop across the quench/scrubber system (in. w.c.)
    - 4) pH of the liquid in the scrubber circulation line
    - 5) Flowrate of liquid in the scrubber (gpm)
  - B. The monitoring equipment shall be located such that Department of Natural Resources’ employees may easily observe them.
  - C. Per 10 CSR 10-2.320, the combustion chamber gas temperature shall be

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**SPECIAL CONDITIONS:**

The permittee is authorized to construct and operate subject to the following special conditions:

monitored with an accuracy of the greater of +/- 0.75% of the temperature being measured expressed in degrees Celsius or 2.5 degrees Celsius.

- D. On-going compliance will be demonstrated if the daily average values of the operating parameters are above (for minimum limits) or below (for maximum limits) the operating parameter limits.
  - 1) Values for each operating parameter will be recorded no less than once per minute.
  - 2) The daily average for each operating parameter will be calculated as the average of all values for a monitored parameter recorded during the operating day. If values are measured more frequently than once per minute, a single or average value for each minute may be used to calculate the daily average instead of all measured values.
  - 3) The average shall cover a 24-hour period if operation is continuous, or the period of operating per operating day if operation is not continuous.
  
- E. Bayer CropScience shall maintain all records required by this permit for not less than five years and shall make them available immediately to any Missouri Department of Natural Resources' personnel upon request. These records shall include SDS as required by OSHA for all materials used.
  
- F. Bayer CropScience shall report to the Air Pollution Control Program's Compliance/Enforcement Section, P.O. Box 176, Jefferson City, MO 65102, no later than 10 days after the end of the month during which any record required by this permit show an exceedance of a limitation imposed by this permit.
  
- 8. Performance Testing
  - A. Bayer CropScience shall conduct an initial performance test on the VGI and quench/scrubber system to demonstrate compliance with Special Conditions 4.A., 4.B., and 5.A. and to establish operating parameter limits.
  
  - B. Bayer CropScience must demonstrate compliance with Special Conditions 4.A., 4.B., and 5.A. once provided that the VGI and the quench/scrubber system are not modified after the initial performance test in a manner that could affect the ability to achieve the requirements.
  
  - C. The initial performance test shall be conducted under two operating conditions.
    - 1) A low combustion chamber temperature test condition will be conducted to demonstrate compliance with the requirements of Special Conditions 3.A. and 4.B. This test condition will be used to establish the minimum combustion chamber temperature limit of the VGI.
    - 2) A high throughput test condition will be conducted to demonstrate compliance with the requirements of Special Conditions 4.A., 4.B., and 5.A. This test condition will be used to establish the maximum natural gas

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The permittee is authorized to construct and operate subject to the following special conditions:

- flow rate limit to the VGI, the minimum pH in the scrubber circulation line limit, and the minimum liquid-to-gas ratio limit in the quench/scrubber system.
- 3) Target values for the VOC and chlorine (expressed as Cl) loading into the VGI during the high throughput test condition shall be included in the test plan specified in Special Condition 8.H. The actual loading from the test will become the maximum loadings allowed. On-going compliance with the maximum allowable loadings will be based on established process vent emission factors.
- D. Test methods as required by 40 CFR 63 Subpart VVVVVV – *National Emission Standard for Hazardous Air Pollutants for Chemical Manufacturing Area Sources* and 10 CSR 10-2.320, *Control of Emissions From Production of Pesticides and Herbicides* shall be used.
- E. The operating parameter limits shall be established as the average of the test run averages. Test runs shall consist of three 1-hour test unless otherwise specified in the test plan required in Special Condition 8.H.
- F. The operating limits may be re-established by performing a new set of performance tests.
- G. These tests shall be performed within 180 days after initial start-up of the VGI and Quench/Scrubber system and shall be conducted in accordance with the Stack Test Procedures outlined in Special Condition 8.
- H. A completed Proposed Test Plan Form (enclosed) must be submitted to the Air Pollution Control Program at least 30 days prior to the proposed test date so that the Air Pollution Control Program may arrange a pretest meeting, if necessary, and assure that the test date is acceptable for an observer to be present. The Proposed Test Plan may serve the purpose of notification and must be approved by the Director prior to conducting the required emission testing.
- I. The test report is to fully account for all operational and emission parameters addressed both in the permit conditions as well as in any other applicable state or federal rules or regulations. At minimum, the following conditions shall be measured and recorded during performance testing and included in the report:
- 1) Natural gas input flowrate respective to the VGI, scfm.
  - 2) Chamber temperatures VGI, °C
  - 3) Pressure drop of the Quench/Scrubber System, in. w.c.
  - 4) Quench/Scrubber System exhaust flowrate, in DSCFM using EPA Method 2 or other Air Pollution Control Program preapproved method.
  - 5) Scrubbing liquid used

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SPECIAL CONDITIONS:

The permittee is authorized to construct and operate subject to the following special conditions:

- 6) pH of the scrubbing liquid
  - 7) Quench/Scrubber System liquid-to-gas ratio, gal/scf,
- J. Two copies of a written report of the performance test results shall be submitted to the Director within 60 days of completion of any required testing. The report must include legible copies of the raw data sheets, analytical instrument laboratory data, complete sample calculations from the required EPA Method or Air Pollution Control Program preapproved method for at least one sample run, and the operating limits to be used to demonstrate ongoing compliance with the requirements in Special Conditions 4.A., 4.B., and 5.A. Emission factors developed from testing shall be used for all respective compliance and emissions inventory purposes.
- K. If the results of the performance testing are less than the required control efficiencies in Special Conditions 4.A., 4.B., and 5.A., then Bayer CropScience shall evaluate what effects these lower control efficiencies would have had on the permit applicability, modeling applicability, and emission factors for compliance and emission inventory. Bayer CropScience shall submit to the Air Pollution Control Program the results of any such evaluation in a completed Application for Authority to Construct within 30 days of submitting the Performance Test Results report required in Special Condition 8.J. of this permit.

REVIEW OF APPLICATION FOR AUTHORITY TO CONSTRUCT AND OPERATE  
SECTION (5) REVIEW

Project Number: 2014-07-069  
Installation ID Number: 095-0011  
Permit Number:

Bayer CropScience  
8400 Hawthorn Road  
Kansas City, MO 64120

Complete: July 28, 2014

Parent Company:  
Bayer CropScience LP  
2 T.W. Alexander Drive  
Research Triangle Park, NC 27709

Jackson County, S29, T50N, R32W

REVIEW SUMMARY

- Bayer CropScience has applied for authority to install a new vent gas incinerator (VGI) to control a consolidated stream of vent exhausts from site operations. Currently, these streams are being controlled through the hazardous waste combustor (TOII). The VGI will also be equipped with a waste heat boiler and a quench/scrubbing system.
- HAP emissions are expected from the proposed equipment. HAPs of concern from this process are hydrogen chloride, methylene chloride, methyl bromide, methyl chloride, chloroform as well as other HAPs. All individual controlled HAPs are emitted at levels below their respective SMAL.
- 40 CFR 63 Subpart VVVVVV – *National Emission Standard for Hazardous Air Pollutants for Chemical Manufacturing Area Sources* (MACT 6V) applies to continuous vent streams being decoupled from the TOII and vented to the new VGI. MACT 6V applies to a subset of vent streams at Bayer CropScience; these include TDA, Hydroxy Salt, and JAU Step 6 processes.
- 40 CFR 63 Subpart EEE - *National Emission Standard from Hazardous Air Pollutants from Hazardous Waste Combustors* applies to the existing TOII.
- None of the New Source Performance Standards (NSPS) located in 40 CFR Part 60 apply to this project.
- None of the NESHAPs located in 40 CFR Part 61 apply to this project.
- The emissions from vent exhausts from chemical and pesticide operations are being controlled with use of a vent gas incinerator for VOC control and a quench/scrubbing system for acid gas control.
- This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of all pollutants are below their respective de minimis levels.
- This installation is located in Jackson County, a maintenance area for ozone and an attainment area for all other criteria pollutants.
- This installation is on the List of Named Installations found in 10 CSR 10-6.020(3)(B), Table 2. The installation's major source level is 100 tons per year and fugitive emissions are counted toward major source applicability.

- Ambient air quality modeling was not performed since potential emissions of the application are below de minimis levels.
- Emissions testing is required for the VGI to confirm a VOC destruction and control efficiency (DRE) of 99% or greater in compliance with 10 CSR 10-2.320. Emissions testing is also required for the VGI and scrubber/quench system to confirm an organic HAP DRE of 95% and a hydrogen halide and halogen HAP control efficiency of 95%.
- A revision to your Part 70 Operating Permit application is required for this installation within 1 year of equipment startup.
- Approval of this permit is recommended with special conditions.

### INSTALLATION DESCRIPTION

Bayer CropScience (Bayer) operates an industrial chemical manufacturing plant at 8400 Hawthorn Road in Jackson County, Kansas City, Missouri. The main products are crop protection chemicals. The facility is comprised of chemical manufacturing, chemical formulation, and auxiliary operations. Auxiliary operations include: a wastewater treatment plant, a hazardous waste combustor, boilers, utilities, laboratories, and maintenance.

Bayer combusts the liquid hazardous wastes that result from the manufacture of agricultural chemicals. The combustor exhaust gas is controlled by a high-energy venturi wet scrubber, a low-energy packed bed wet scrubber, and a fiber bed mist eliminator.

Bayer is Part 70 source and currently has an application undergoing technical review (Project No. 2013-12-029).

The following New Source Review permits have been issued to Bayer CropScience from the Air Pollution Control Program.

Table 1: Permit History<sup>3</sup>

Permit	App Received	Permit /letter Signed	Permit /letter Sent	Purpose
US EPA			11/8/1978	PSD permit for wastewater treatment at the Chemagro Agricultural division
0697B	4/15/1998			
0781	2/4/1997	3/31/1997	4/1/1997	
0795	3/28/1997	7/23/1997	8/6/1997	Catalytic oxidizer at liquid formulation plant
0825	2/4/1998			Construction of new herbicide formulation plant
0836	3/18/1998			
0873	3/1/1999	3/9/1999	3/11/1999	
0911	6/29/2000	10/18/2000	10/18/2000	Pharmaceutical plant
0941	11/1/2000	11/13/2000	11/15/2000	MKH manufacturing
0946	1/31/2001	3/14/2001	3/14/2001	500KW EG
0976	12/31/2001	2/7/2002	2/21/2002	New Metosulam (CONFIDENTIAL)
1024	3/28/2003	7/1/2003	7/1/2003	New Fungicide (CONFIDENTIAL)

<sup>3</sup> The permit history listed in Table 1 is not complete. Permits that no longer have applicable requirements or conditions may not have been included.

1032	6/12/2003	8/8/2003	8/8/2003	Production of Phenyl Aldol (Confidential)
1035	7/1/2003	9/9/2003	9/9/2003	Production of Mesosulfuron (Confidential)
0697C	8/28/2003	9/18/2003	9/18/2003	Oxidizer Routing
1123	9/15/2005	6/20/2006		New back up TO (#3)
1234	5/14/2008	8/21/2008		New Products
1260	2/18/2009	3/13/2009	3/13/2009	Temporary Portable TO
1263	1/20/2009	3/11/2009	3/11/2009	Herbicide Production
1285	9/1/2009	11/30/2009	11/30/2009	JAU expansion project
1299	7/13/2010			To clean up both CP#1123 and 1285. No charge
1353	8/27/2012	9/13/2012	9/13/2012	Temporary thermal oxidizer.
1371	6/6/2013	9/13/2013	9/13/2013	Temporary Thermal oxidizer
1391	6/16/2014	7/22/2014	7/22/2014	Temporary Thermal oxidizer
1398	9/5/2014	9/15/2014	9/15/2014	Temporary boiler

### PROJECT DESCRIPTION

Bayer is seeking authority to install a new vent gas incinerator (VGI-01) with a waste heat boiler for heat recovery and a quench/scrubbing system (VGI-CD-1) for acid gas control. The scrubber vents to an exhaust stack. The new VGI will receive a consolidated stream of vent exhausts (containing waste gases) that currently are routed to the existing thermal oxidizer (TOII). The vent exhausts originate from the following plants and areas: 1) the Sencor/Folicur Plant (SFP), 2) Organophosphate Plant (OPP), 3) High-Active Herbicide Plant, 4) Cyclanilide production in the Process Pilot Plant (PPP), and 5) wastewater treatment plant and the thermal oxidizer tank farm.

The continuous process vents are currently controlled by the TOII. This project will decouple the control of vent exhausts from the incineration of liquid hazardous wastes by routing the process vents to a separate incinerator referred to as VGI. Hazardous wastes will continue to be burned in TOII. Decoupling will make both operations more reliable and allows TOII to serve as a backup for control of vent exhausts when the VGI is not operational.

The VGI will be natural gas-fired through an axially mounted burner rated at 10 MMBtu/hr. In addition, natural gas will be introduced with the waste gas at a rate up to 15 MMBtu/hr as controlled by the VGI temperature. The waste heat boiler will recover heat from the VGI to produce steam that will be utilized on-site. A 50% NaOH solution will be used in the acid gas scrubber to control HCl emissions not controlled by the incinerator. The HCl control efficiency of the scrubber is 95%.

The VGI will be used to control certain vent streams subject to MACT 6V requirements and 10 CSR 10-2.320 requirements. The VGI is required under MACT 6V to achieve a minimum organic HAP destruction efficiency of 95%. Under 10 CSR 10-2.320, it is required to achieve a minimum VOC destruction efficiency of 99%. (Note 10 CSR 10-2.320 is applicable only to pesticide manufacturing operations and not to other activities such as formulation and wastewater treatment.) The TOII is subject to MACT EEE as it is considered a hazardous waste combustor and is required to operate at a destruction efficiency in excess of 99.99% while burning hazardous waste. Bayer also controls certain vent streams in TOII and does so under the same operating conditions as burning hazardous waste and thus meets a destruction efficiency in excess of 99.99% for those vent streams. Because the other two rules require less control, the changing of the control device for the vent streams from the TOII to VGI is considered a relaxation in control unless Bayer chooses to operate the VGI at the same destruction levels as the TOII. Bayer has opted to operate as allowed under MACT 6V and 10 CSR 10-2.320.

Since this project is relaxing the control efficiency for the applicable vent stream, it is viewed as a modification. Note that the TOII is only required to operate at a 99.99% destruction efficiency when burning hazardous waste. From a practical standpoint, the unit is usually burning hazardous waste and

therefore operating at the required destruction efficiency. The emissions for a modification are typically determined by a potentials-minus-actuals test. However, since potential emissions from the applicable vent streams after controls are below de minimis thresholds, subtracting the baseline actuals from the total potential emissions of the project does not change the type of project review or eliminate additional requirements. Therefore, this project's emissions are based on the potential emissions of the combined applicable vent streams after controls.

#### DISCUSSION OF SUPERSEDING CONDITIONS OF PERMIT#1299

Many of the special conditions contained in Kansas City Health Department construction permit #1299 were a direct result of an agreement between Miles Inc. (former company name) and the Kansas City Health Department to resolve appeals of Permit No. 562 (Sencor construction permit), Permit No. 594 (Tamaron construction permit, and Permit No. 594 (Tamaron operating permit) that was finalized on May 19, 1999. Most of the agreement outlined the terms to be contained in a "consolidated permit" which would be used to establish agreed upon VOC emission limits on individual plants located at the Hawthorn Road facility with provisions to redistribute the limits "as needed" without being required to obtain a permit. The combined plants were initially limited to a cap of 96.5 tons of VOC per year and later 99.0 tpy. In addition to the limitations, the agreement contained the outline for VOC emissions testing protocol at the facility.

This current project will supersede many of the special conditions that were specific to the agreement. The 7<sup>th</sup> point in the agreement states that

"This Agreement and the consolidated permit to be issued pursuant to the Agreement will remain in effect until such time as they are superseded by an operating permit or construction permit issued pursuant to Missouri's new operating permit regulations (10 CSR 10-6.065) and construction permit regulations (10 CSR 10-6.060) or new Kansas City Air Quality Control Code operating and construction permit provisions"

Based upon internal discussions and discussions with Bayer personnel, the following conditions from #1299 are being superseded. A description of each superseded special condition with the rationale for its removal is included below.

- Special Condition 1. General: This special condition contains a superseding condition as well as requires compliance with 10 CSR 10-2.320, *Control of Emissions from Production of Pesticides and Herbicides*.
  - This special condition was not brought forward into this permit because a permit only needs to be superseded once. In addition, the facility will have to comply with 10 CSR 10-2.320 regardless of whether it is contained in a special condition or not.
- Special Condition 2.a) Emission Limitations: This special condition contained specified NOx and VOC emissions limitations for individual plants and areas which when totaled together equaled 99 tons per year for each pollutant. It also contains a provision for 7 business day advance notice to the City for redistribution of the amounts amongst the listed plants and areas.
  - Bayer's individual plants and areas will no longer contain separate limits, and as such redistribution of limited amounts will no longer be required or needed. Installation-wide limitations will replace the individual plant and area limitations.
  - In the event of new construction or modification to existing equipment and processes, Bayer will follow the normal procedures outlined in 10 CSR 10-6.060 for construction permitting needs.
- Special Condition 2.b) Emission Limitations: This special condition contained installation-wide limitations of 99.0 tpy for all criteria pollutants, 9.9 tpy for lead, 9.9 tpy for individual HAPs and 24.9 tpy for combined HAPs.
  - This special condition is reinstated in this permit, except for lead.
  - Permit No. 1299 contained a lead limit of 9.9 tpy. "Lead compounds" are considered HAPs and are subject to the 9.9 tpy individual HAP threshold. Therefore, a separate lead compound limitation is not needed. Lead, by itself, has a de minimis level of 0.6 tpy. Since lead potential emissions for the installation do not exceed 0.6 tpy, a limit replacing

the existing limit is not needed.

- Special Condition 3.a) Stack Testing: This special condition contained a VOC Testing Program originating from the May 19, 1994 Agreement between Bayer (formerly Miles) and the Kansas City Health Department.
  - The requirements under this special condition have been completed prior to the issuance of permit 1299 and thus will not be reestablished.
- Special Condition 3.b) Stack Testing: This special condition contained on-going testing requirements which required Bayer to conduct no less than one emissions test per calendar year.
  - At the time of the Agreement, many of the emissions associated with the Bayer plant were either unknown or not well-defined. In an effort to better quantify the emissions and spread out the testing burden, the involved parties set up an on-going testing program to test different areas of the installation each year. In the time since the agreement, the vast majority of emissions sources at the facility have been tested and emission factors have been developed.
  - Future testing requirements will be determined on a permit by permit basis. The terms for future testing will be laid out in individual permits as Bayer adds new equipment/process or modifies existing equipment/processes. The operating permit may add to testing requirements laid out in future construction permits, as needed.
  - Testing requirements including testing frequency for TOII are outlined in MACT EEE.
- Special Condition 4. Control Devices: This special condition contained a requirement to vent all applicable vent streams to TOII.
  - This special condition is superseded and replaced with an updated special condition in order to replace the TOII and its associated pollution control equipment (venturi scrubber, acid gas scrubber, and Brinks mist eliminator) with the VGI and quench/scrubber system as the primary control devices for the applicable vent streams. The TOII will still be used as a back-up control device in the event the VGI cannot be used.
  - In this permit, the applicable vent streams have been individually identified in the special condition in order to clearly define which vent streams are being controlled by the VGI and quench/scrubber system and which rules apply to those vent streams.
- Special Condition 5. Monitoring and Record Keeping: This special condition states the following – “Compliance with the emission limitations set forth in Table 2 shall be based on , where applicable, on recorded daily measurements of off-gas vent temperature at sampling locations and the time distribution of venting into TOII. Records of these two parameters, as related to emission factors resulting from Bayer stack tests, shall be used to determinate compliance with the applicable emission limitations.”
  - The rationale behind the special condition wording pertaining to daily sampling of the *off-gas* vent temperature is not known. Future ongoing compliance of the VGI control device and quench/scrubber system is outlined in the special conditions and will correlate with requirements that are typically put in place for oxidizer devices and scrubber systems as well as MACT 6V and 10 CSR 10-2.320.
  - Ongoing compliance of the TOII will follow MACT EEE requirements. Provisions in the MACT require the monitoring of operating Parameter Limits (OPLs) that include the minimum combustion chamber temperature..
  - Since TOII will serve as the backup to the VGI, Bayer will be required to keep records of times when the vent streams are being routed to TOII.
- Special Condition 6. Reporting: This special condition requires the submittal of an annual emissions report, along with the facility’s annual EIQ. There are also provisions to allow for Air Quality Program to ask more frequent reporting.
  - Other Missouri state rules such as the 10 CSR 6-110 *Submission of Emission Data, Emission Fees and Process Information* and 10 CSR 6.065, *Operating Permits* require compliance reports whether they are contained in a special condition or not. Therefore, this special condition is not brought forward

- Tracking and reporting of installation-wide limits is still required to show compliance as outlined in the special conditions.
- Special Condition 7. Boilers/Fuel Oil Firing Limitation
  - This special condition has been brought forward into this permit with no significant changes.

## EMISSIONS/CONTROLS EVALUATION

The vent streams that will be routed to the VGI come from four separate manufacturing plants, the Thermal Oxidizer II tank farm, and the waste water treatment plant. Within three of the four manufacturing plants, multiple intermediates or products are produced, each of which typically includes multiple process steps. Some of the intermediates/products are only operated seasonally and others can operate year round. The seasonal intermediate/products typically share equipment with another intermediate/product such that only one of the two can be produced at a time. In this case, the emission analysis is dependent on the intermediate/product scenario that produced the highest VOC and HAP emissions. A complete summary of the various operating scenarios resulting in the highest potential emissions can be found in Appendix C. The emission factors used in the analysis are based primarily on process specific emission tests.

The emission factors used for combustion of natural gas in the VGI were obtained from the EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition, Section 1.4 Natural Gas Combustion (July 2008).

The following table provides an emissions summary for this project. Existing potential emissions were taken from Kansas City Health Department Permit No. 1299. Existing actual emissions were taken from the installation's 2014 EIQ. Potential emissions of the application represent the potential of the natural gas combustion associated with the VGI as well as the exhaust emissions of controlled vent streams, assuming continuous operation (8760 hours per year).-

Table 2: Emissions Summary (tons per year)

Pollutant	Regulatory <i>De Minimis</i> Levels	Existing Potential Emissions	Existing Actual Emissions (2014 EIQ)	Potential Emissions of the Application <sup>1</sup>	New Installation Conditioned Potential
PM	25.0	N/D	N/D	2.88	N/D
PM <sub>10</sub>	15.0	<99.0	4.94	3.49	<99.0
PM <sub>2.5</sub>	10.0	N/D	4.94	3.49	N/D
SO <sub>x</sub>	40.0	<99.0	2.18	0.30	<99.0
NO <sub>x</sub>	40.0	<99.0	57.75	10.74	<99.0
VOC	40.0	<99.0	20.64	14.65	<99.0
CO	100.0	<99.0	30.37	9.21	<99.0
GHG (CO <sub>2</sub> e)	N/A	N/D	N/D	13,592	N/D
GHG (mass)	N/A	N/D	N/D	12,885	N/D
Combined HAPs	10.0/25.0	<24.9	N/D	12.67	
Chloroform	0.9 <sup>2</sup>	<9.9	N/D	0.63	N/A
Hydrogen Chloride	10.0 <sup>2</sup>	<9.9	N/D	5.85	N/A
Methyl Bromide	10.0 <sup>2</sup>	<9.9	N/D	0.98	N/A
Methyl	10.0 <sup>2</sup>	<9.9	N/D	0.54	N/A

Chloride					
Toluene	10.0 <sup>2</sup>	<9.9	N/D	2.72	N/A

N/A = Not Applicable; N/D = Not Determined

<sup>1</sup> Only individual HAPs with emission levels above 0.5 tpy are listed. A complete list of HAPs and the emitted levels can be found in calculations associated with the project.

<sup>2</sup> These values represent the SMAL of the respective compound.

#### PERMIT RULE APPLICABILITY

This review was conducted in accordance with Section (5) of Missouri State Rule 10 CSR 10-6.060, *Construction Permits Required*. Potential emissions of all pollutants are below de minimis levels.

#### APPLICABLE REQUIREMENTS

Bayer CropScience shall comply with the following applicable requirements. The Missouri Air Conservation Laws and Regulations should be consulted for specific record keeping, monitoring, and reporting requirements. Compliance with these emission standards, based on information submitted in the application, has been verified at the time this application was approved. For a complete list of applicable requirements for your installation, please consult your operating permit.

#### GENERAL REQUIREMENTS

- *Submission of Emission Data, Emission Fees and Process Information*, 10 CSR 10-6.110
- *Operating Permits*, 10 CSR 10-6.065
- *Restriction of Particulate Matter to the Ambient Air Beyond the Premises of Origin*, 10 CSR 10-6.170
- *Restriction of Emission of Visible Air Contaminants*, 10 CSR 10-6.220
- *Restriction of Emission of Odors*, 10 CSR 10-6.165

#### SPECIFIC REQUIREMENTS

- *Restriction of Emission of Particulate Matter From Industrial Processes*, 10 CSR 10-6.400
- *MACT Regulations*, 10 CSR 10-6.075
  - *National Emission Standards for Hazardous Air Pollutants for Chemical Manufacturing Area Sources* (40 CFR Part 63, Subpart VVVVVV)
- *Restriction of Emission of Sulfur Compounds*, 10 CSR 10-6.260
- *Restriction of Particulate Matter Emissions From Fuel Burning Equipment Used for Indirect Heating*, 10 CSR 10-6.405
- *Control of Emissions From Production of Pesticides and Herbicides*, 10 CSR 10-2.320  
This rule applies since the uncontrolled potential emissions are greater than 100 tons per year. This rule requires that a control device to achieve a destruction and removal efficiency (DRE) of 99% or greater.

#### STAFF RECOMMENDATION

On the basis of this review conducted in accordance with Section (5), Missouri State Rule 10 CSR 10-

6.060, *Construction Permits Required*, I recommend this permit be granted with special conditions.

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Susan Heckenkamp  
New Source Review Unit

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Date

#### PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, dated July 22, 2014, received July 28, 2014, designating Bayer CropScience LP as the owner and operator of the installation.
- U.S. EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition.

## APPENDIX A

### Abbreviations and Acronyms

<b>%</b> ..... percent	<b>m/s</b> .....meters per second
<b>°F</b> ..... degrees Fahrenheit	<b>Mgal</b> ..... 1,000 gallons
<b>acfm</b> ..... actual cubic feet per minute	<b>MW</b> .....megawatt
<b>BACT</b> ..... Best Available Control Technology	<b>MHDR</b> .....maximum hourly design rate
<b>BMPs</b> ..... Best Management Practices	<b>MMBtu</b> .....Million British thermal units
<b>Btu</b> ..... British thermal unit	<b>MMCF</b> .....million cubic feet
<b>°C</b> ..... degrees Celsius	<b>MSDS</b> ..... Material Safety Data Sheet
<b>CAM</b> ..... Compliance Assurance Monitoring	<b>NAAQS</b> ..... National Ambient Air Quality Standards
<b>CAS</b> ..... Chemical Abstracts Service	<b>NESHAPs</b> National Emissions Standards for Hazardous Air Pollutants
<b>CEMS</b> ..... Continuous Emission Monitor System	<b>NO<sub>x</sub></b> .....nitrogen oxides
<b>CFR</b> ..... Code of Federal Regulations	<b>NSPS</b> .....New Source Performance Standards
<b>CO</b> ..... carbon monoxide	<b>NSR</b> .....New Source Review
<b>CO<sub>2</sub></b> ..... carbon dioxide	<b>PM</b> .....particulate matter
<b>CO<sub>2e</sub></b> ..... carbon dioxide equivalent	<b>PM<sub>2.5</sub></b> .....particulate matter less than 2.5 microns in aerodynamic diameter
<b>COMS</b> ..... Continuous Opacity Monitoring System	<b>PM<sub>10</sub></b> .....particulate matter less than 10 microns in aerodynamic diameter
<b>CSR</b> ..... Code of State Regulations	<b>ppm</b> .....parts per million
<b>dscf</b> ..... dry standard cubic feet	<b>PSD</b> ..... Prevention of Significant Deterioration
<b>EIQ</b> ..... Emission Inventory Questionnaire	<b>PTE</b> .....potential to emit
<b>EP</b> ..... Emission Point	<b>RACT</b> ..... Reasonable Available Control Technology
<b>EPA</b> ..... Environmental Protection Agency	<b>RAL</b> ..... Risk Assessment Level
<b>EU</b> ..... Emission Unit	<b>SCC</b> .....Source Classification Code
<b>fps</b> ..... feet per second	<b>Scf</b> .....standard cubic feet
<b>ft</b> ..... feet	<b>scfm</b> .....standard cubic feet per minute
<b>GACT</b> ..... Generally Available Control Technology	<b>SDS</b> ..... Safety Data Sheet
<b>gal</b> .....gallons	<b>SIC</b> ..... Standard Industrial Classification
<b>GHG</b> ..... Greenhouse Gas	<b>SIP</b> ..... State Implementation Plan
<b>gpm</b> ..... gallons per minute	<b>SMAL</b> ..... Screening Model Action Levels
<b>gr</b> ..... grains	<b>SO<sub>x</sub></b> .....sulfur oxides
<b>GWP</b> ..... Global Warming Potential	<b>SO<sub>2</sub></b> .....sulfur dioxide
<b>HAP</b> ..... Hazardous Air Pollutant	<b>tph</b> .....tons per hour
<b>In. w.c.</b> .....inches of water column	<b>tpy</b> .....tons per year
<b>hr</b> ..... hour	<b>VMT</b> .....vehicle miles traveled
<b>hp</b> ..... horsepower	<b>VOC</b> ..... Volatile Organic Compound
<b>lb</b> ..... pound	
<b>lbs/hr</b> ..... pounds per hour	
<b>MACT</b> ..... Maximum Achievable Control Technology	
<b>µg/m<sup>3</sup></b> ..... micrograms per cubic meter	

## APPENDIX B

### Basis for Proposed VGI Operating Parameters\

The following text lists the VGI operating parameters for VOC/HAP control and hydrogen halide and halogen HAP control as well as the rationale for each operating parameter.

#### **VOC/HAP Control Operating Parameters**

- Combustion chamber temperature
  - *Rationale* – The rate of organic destruction decreases with decreasing temperature. A minimum temperature limit will be established to ensure that the destruction and removal efficiency demonstrated during the performance test is maintained in continuing operation.
- Natural gas flow rate (as a surrogate for residence time)
  - *Rationale* – The extent of organics destruction increases with increasing residence time. Residence time is inversely proportional to the flue gas flow rate. Flue gas flow rate is directly proportional to both the thermal input into the combustion chamber and combustion air input into the combustion chamber. At a given combustion chamber temperature, the thermal input is also directly proportional to the combustion air input. That is, if additional combustion air is added to the unit, then additional thermal input will be required in order to maintain the temperature. The thermal input is primarily based on fuel consumption. A small amount of thermal input is contributed by the organics in the vent stream. The fuel for the VGI is natural gas which has a very constant heating value, especially when from the same source. Therefore, the flow rate of natural gas into the combustion chamber will be inversely proportional to residence time. The higher the flow rate of natural gas into the combustion chamber, the lower the residence time. A maximum natural gas flow rate will be established to ensure that the destruction and removal efficiency demonstrated during the performance test is maintained in continuing operation.

#### **Hydrogen Halide/Halogen HAP Control Operating Parameters**

- Pressure drop across the quench/scrubber system
  - *Rationale* - Generally speaking, pressure drop is not a significant indicator of system performance for “low energy” wet scrubbers. For a packed bed type scrubber, pressure drop may offer limited indication of the degree of gas/liquid mixing. A minimum quench/scrubber system pressure drop will be set based on manufacturer specifications.
- pH of the scrubbing liquid
  - *Rationale* – At lower pH levels (more acidic), scrubbing liquids have decreased acid gas solubility. This adversely affects capture performance. Additionally, the pH should be maintained to ensure that the scrubbing liquid has adequate capacity to remove acid gases. A minimum pH limit will be established to ensure that the hydrogen halide and halogen HAP removal efficiency demonstrated during the performance test is maintained in continuing operation.
- Liquid-to-Gas ratio
  - *Rationale* – A limit on liquid-to-gas ratio ensures proper wetting of the scrubber internal packings to facilitate sufficient liquid and gas contacting. The liquid flow will be measured as the liquid flow into the scrubber. Natural gas flow rate into the combustion chamber will serve as a surrogate for the gaseous flow into the scrubber. Natural gas flow as a surrogate for the gaseous flow follows the same rationale as described above for residence time. The natural gas flow is directly proportional to the amount of flue gas flow into the scrubber. Therefore, a minimum limit on the liquid-to-gas ratio, recorded as the liquid flow rate into the scrubber divided by the natural gas flow rate into the combustion chamber, will be established to ensure that the hydrogen halide and halogen HAP removal efficiency demonstrated during the performance test is maintained in continuing operation.

## APPENDIX C

### Intermediate/Product Combinations

The following is a description of the Bayer CropScience, Kansas City site's potential operating scenarios of intermediate and product production processes. This forms the basis from which the operating scenarios that result in the highest emissions were selected for use in the VGI net emissions increase analysis.

#### I. Sencor/Folicur Plant (SFP)

A total of four pesticide active ingredients are made in SFP: Sencor (Metribuzin), Folicur (Tebuconazole), FOE (Flufenacet), and JAU (Prothioconazole). The production of any one of the active ingredient involves multiple steps that may share equipment with other active ingredient production steps such that only one can be operating at a given point in time.

In general, the plant operates under two campaigns as shown in the table below. Sencor and Folicur production processes share the same equipment so only one of those products can be produced at one time. Sencor is made during the summer campaign (Scenario #1 below) and Folicur is made during the winter campaign (Scenario #2 below). Similarly, FOE and JAU Steps 6 and 7 share the same equipment so only one of those can operate at one time. JAU Steps 1 through 5 do not share equipment with any of the other processes and can operate year round without interfering with the production of other products.

Table 1: Sencor/Folicur Plant (SFP) Operating Scenarios

Intermediate/ Product Combinations	Emission Factors (E.F.)		Scenario #1		Scenario #2		Comments
	VOC (lbs/hr)	Total HAP (lbs/hr)	VOC E.F. (lbs)	HAP E.F. (lbs)	VOC E.F. (lbs)	HAP E.F. (lbs)	
Folicur	29.67	6.22			29.67	6.22	Folicur and Sencor share the same equipment. Only one may operate at a time.
Sencor	88.57	50.11	88.57	50.11			
FOE	36.14	34.48	36.14	34.48			FOE and JAU 6-7 share the same equipment. Only one may operate at a time.
JAU 6-7	20.61	19.71			20.61	19.71	
JAU 1-5	6.82	3.76	6.82	3.76	6.82	3.76	Can operate year round
	181.81	114.29	131.53	88.35	57.10	29.70	

The total volatile organic compound (VOC) and hazardous air pollutant (HAP) emission factors are larger for Scenario #1 and this was the scenario that was assumed to operate year round for the net emission increase analysis.

#### II. Organophosphate Plant (OPP) and High-Active Herbicide (HAH) Plant

Two pesticide active ingredients (MAT-Tebupirimphos and Dicamba) are produced in OPP and six intermediates (Phenylaldol, Phosphite, AE747 Acid Chloride, AE747 KSalt, AE309 Acid Chloride, and AE309 KSalt) are produced in OPP. Three pesticide active ingredients are produced in HAH: MKH 6561 (Propoxycarbazone-sodium), AE747 A.I. (Tembotrione), and AE309 A.I. (Pyrasulfatole). The potential operating scenarios are shown in the Table 2 and are more fully described below.

## APPENDIX C

### *Organophosphate Plant (OPP)*

There are three operating units in the OPP. Phenylaldol, Dicamba, and Phosphite are produced in one unit and share equipment, hence only one can operate at a time. AE747 Acid Chloride, AE309 Acid Chloride, and MAT are produced in the second unit. AE747 Acid Chloride and AE309 Acid Chloride generally share the same equipment and cannot operate at the same time. MAT shares some equipment with AE309 Acid Chloride but not with AE747 Acid Chloride and so it can operate concurrently with AE747 Acid Chloride but not with AE309 Acid Chloride. AE747 KSalt and AE309 KSalt are produced in the third operating unit in OPP and both processes share the same equipment so only one of the two can be operating at a time.

### *High-Active Herbicide (HAH) Plant*

In the HAH Plant, there are three production trains: A, B, and C. AE747 A.I. can be produced in all three trains, while AE309 A.I. uses only trains A and B. During AE309 A.I. production, MKH 6561 can be produced in train C.

Table 2: OPP and HAH Operating Scenarios

Intermediate/ Product Combinations	Emission Factors (E.F.)		Scenario #1		Scenario #2		Comments
	VOC (lbs/hr)	Total HAP (lbs/hr)	VOC E.F. (lbs)	HAP E.F. (lbs)	VOC E.F. (lbs)	HAP E.F. (lbs)	
MAT	11.70	10.12	11.70	10.12			Can operate concurrently with AE747 production but not with AE309 production
Phenylaldol	11.44	-	11.44	-	11.44	-	Phenylaldol, Dicamba, and Phosphite share the same equipment. Only one may operate at a time.
Dicamba	1.51	-					
Phosphite	0.90	0.53					
AE309 Intermediates	27.09	23.87			27.09	23.87	AE309 and AE747 intermediate production share the same equipment. Only one may operate at a time.
AE747 Intermediates	27.09	23.87	27.09	23.87			
AE309 A.I./MKH 6561	3.72	4.67			3.72	4.67	AE309 A.I./MKH 6561 and AE747 A.I. share the same equipment. Only one may operate at a time.
AE747 A.I.	4.72	1.80	4.72	1.80			
	88.17	64.87	54.95	35.79	42.25	28.54	

Scenario #1 in Table 2 represents a condition where MAT, Phenylaldol, the AE747 Intermediates (AE747 Acid Chloride and AE747 KSalt), and AE747 A.I. are being produced. This scenario results in the highest total emission factors for VOCs and HAPs and was used in the net emission increase analysis.

### III. Other Areas

Two other areas that will vent to the VGI include Cyclanilide production in the Process Pilot Plant (PPP) and emissions from the wastewater treatment plant and the thermal oxidizer tank farm. Both can operate year round. The operating scenario is shown in Table 3.

Table 3: Operating Scenario for Other Areas

Intermediate/ Product Combinations	Emission Factors (E.F.)		Scenario #1		Scenario #2		Comments
	VOC (lbs/hr)	Total HAP (lbs/hr)	VOC E.F. (lbs)	HAP E.F. (lbs)	VOC E.F. (lbs)	HAP E.F. (lbs)	
Cyclanilide	2.25	2.25	2.25	2.25	NA	NA	Can operate year round
WTP/T.O. II Tank Farm	3.21	1.23	3.21	1.23	NA	NA	Can operate year round
	5.46	3.48	5.46	3.48	-	-	

## APPENDIX C

### IV. Summary

For the VGI net emission increase analysis (see Figure 1), the scenarios from above that resulted in the highest emissions were used. In each area it was Scenario #1. For VOCs, the sum of the emissions factors from SFP, OPP/HAH, and Other Areas result in the emission factor used in the analysis (131.53 lbs/hr + 54.95 lbs/hr + 5.46 lbs/hr = 191.94 lbs/hr). For HAPs the total is less than used in the analysis because the analysis also accounts for hydrogen chloride that is generated in the VGI from the combustion of chlorinated compounds.

Bayer has opted to use controls of the VGI only when it is required by either MACT 6V or by 10 CSR 10-2.320. Bayer has chosen to operate the quench/scrubber system at all times a vent stream from any of the processes or areas is being vented to the VGI. Because of the different product/intermediate/process combinations possible, the unique pollutant emissions from each process and area, and the different control requirements, a total of 12 different scenarios were evaluated to determine the maximum PTE associated with the vent streams. A summary of the maximum emissions, not including the emissions from the natural gas combustion in the VGI, are shown in Figure 1.

Figure 1: VGI Net Emissions Increase Analysis

Chemical	Maximum PTE (lbs)
Bromoform	237
Carbon disulfide	729
Carbonyl sulfide	25
Chlorine	103
Chloroform	1,255
Dimethyl sulfate	0
Ethyl benzene	12
Ethyl chloride	447
Hydrazine	1
Hydrogen chloride <sup>1</sup>	11,706
Methanol	164
Methyl bromide	1,953
Methyl chloride	1,084
Methyl isobutyl ketone	841
Methylene chloride	762
o-Xylenes	1
Styrene	0
Toluene	5,431
Triethylamine	79
Xylenes (mixed isomers)	78
Vinyl chloride	30
<b>Total HAPs<sup>1</sup></b>	<b>24,940</b>
VOC	28,120

<sup>1</sup> Total HAPs are the sum of the individual HAPs listed in the table. This is not a realistic scenario as the individual HAP PTEs were maximized by taking the highest PTE among the different scenarios evaluated. The highest total HAP PTE from a single scenario is 22,960 lbs.

Mr. Scott Munk  
Air Quality Specialist  
Bayer CropScience  
P.O. Box 4913  
Kansas City, MO 64120

RE: New Source Review Permit - Project Number: 2014-07-069

Dear Mr. Munk:

Enclosed with this letter is your permit to construct. Please study it carefully and refer to Appendix A for a list of common abbreviations and acronyms used in the permit. Also, note the special conditions on the accompanying pages. The document entitled, "Review of Application for Authority to Construct," is part of the permit and should be kept with this permit in your files. Operation in accordance with these conditions, your new source review permit application and with your amended operating permit is necessary for continued compliance. The reverse side of your permit certificate has important information concerning standard permit conditions and your rights and obligations under the laws and regulations of the State of Missouri.

If you were adversely affected by this permit decision, you may be entitled to pursue an appeal before the administrative hearing commission pursuant to Sections 621.250 and 643.075.6 RSMo. To appeal, you must file a petition with the administrative hearing commission within thirty days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed; if it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the administrative hearing commission, whose contact information is: Administrative Hearing Commission, Truman State Office Building, Room 640, 301 W. High Street, P.O. Box 1557, Jefferson City, Missouri 65102, phone: 573-751-2422, fax: 573-751-5018, website: [www.oa.mo.gov/ahc](http://www.oa.mo.gov/ahc).

If you have any questions regarding this permit, please do not hesitate to contact Susan Heckenkamp, at the Department of Natural Resources' Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102 or at (573) 751-4817. Thank you for your attention to this matter.

Sincerely,

AIR POLLUTION CONTROL PROGRAM

Susan Heckenkamp  
New Source Review Unit Chief

SH:sh

Enclosures