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: 012017-006 Project Number: 2016-11-009
Parent Company: BASF Corporation Agricultural Products
Parent Company Address: 26 Davis Drive, Research Triangle Park, NC 27709
Installation Name: BASF Corporation - Hannibal Site
Installation Address: 3150 Highway JJ, Palmyra, MO 63461
Location Information: Marion County, S14, T53N, R5W

Application for Authority to Construct was made for:

The installation of process equipment, piping and instrumentation and the modification of process chemistry to increase Chlorfenapyr production. This review was conducted in accordance with Section (5), Missouri State Rule 10 CSR 10-6.060, Construction Permits Required.

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

Prepared by
Young, Chia-Wei
New Source Review Unit

Director or Designee
Department of Natural Resources

JAN 10 2017
Effective Date
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 devises shall be operated and maintained as specified in the application, associated plans and specifications.

You must notify the Departments’ Air Pollution Control Program of the anticipated date of start up of this (these) air contaminant sources(s). The information must be made available not more than 60 days but at least 30 days in advance of this date. 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 this (these) air contaminant source(s).

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.
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.”

BASF Corporation - Hannibal Site
Marion County, S14, T53N, R5W

1. Superseding Condition
   The conditions of this permit supersede all special conditions found in the previously issued construction permits (No. 022006-005 and 092009-005) from the Air Pollution Control Program.

2. Control Equipment – Scrubbers and Thermal Oxidizer
   A. BASF Corporation – Hannibal shall install and operate a fume handling scrubber system (631-203/206/207/210), a thermal oxidizer (631-401), and a scrubber (631-402) to control process emissions (PY-06). The fume handling scrubber system (631-203/206/207/210) shall be upstream of the thermal oxidizer and the scrubber (631-402) shall be downstream of the thermal oxidizer. The fume handling scrubber system (631-203/206/207/210) shall be operated at all times during Chlorfenapyr production. The scrubber (631-402) and thermal oxidizer (631-401) shall be operated at all times during Chlorfenapyr production except during emergency shut down situations.

   B. During emergency shut down situations while producing Chlorfenapyr, BASF Corporation – Hannibal must control emissions with the fume handling system scrubber, but may by-pass the thermal oxidizer and the downstream scrubber to vent the emissions to atmosphere. The installation shall be limited to 240 hours of by-passing the thermal oxidizer and the downstream scrubber on a rolling twelve (12) month total.

   C. BASF Corporation – Hannibal shall track the hours of by-passing the thermal oxidizer and the downstream scrubber to ensure compliance with Special Condition 2.B.

   D. The scrubbers shall be maintained and operated according to manufacturer’s design specifications and the Maximum Achievable Control Technology (MACT) Standard, 40 CFR Part 63, Subpart MMM,
SPECIAL CONDITIONS:
The permittee is authorized to construct and operate subject to the following special conditions:

National Emission Standards for Pesticide Active Ingredient Production. The facility shall abide by the monitoring requirements in MACT Subpart MMM.

E. The thermal oxidizer shall be operated at a temperature of at least 1,500 degrees Fahrenheit, based on a 15-minute rolling average and shall be equipped with a continuous temperature monitoring system. The temperature monitoring system shall alert the operator(s) whenever the oxidizer temperature drops below 1,500 degrees Fahrenheit.

3. Control Equipment – Baghouses
A. BASF Corporation – Hannibal shall install and operate baghouses (631-002, 631-015) to control emissions from the dump station (PY-03) and the product sack/drum filler (PY-05) whenever the equipment is in operation.

B. The baghouses shall be equipped with gauges or meters that indicate the pressure drop across them. The gauges or meters shall be located such that they can be easily observed by the Department of Natural Resources’ personnel.

C. BASF Corporation – Hannibal shall monitor and record the operating pressure drop across the baghouses at least once a day during periods of operation. The operating pressure drop shall be maintained in accordance with the manufacturer’s performance warranty.

D. Replacement bags shall be kept on hand at all times. The bags shall be made of fibers appropriate for operating conditions expected to occur (i.e. temperature, acidic and alkali resistance, abrasion resistance and etc.)

4. Control Equipment – Caustic Scrubber
A. BASF Corporation – Hannibal shall install and operate a caustic scrubber (631-063) to control emissions from the tank farm (PY-09).

B. The scrubber shall be maintained and operated according to manufacturer’s design specifications and the Maximum Achievable Control Technology (MACT) Standard, 40 CFR Part 63, Subpart MMM, National Emission Standards for Pesticide Active Ingredient Production. The facility shall abide by the monitoring requirements in MACT Subpart MMM.
SPECIAL CONDITIONS:
The permittee is authorized to construct and operate subject to the following special conditions:

5. Control Equipment – Incinerators (PR-47 and/or PR-53 and/or PR-54)
   A. BASF Corporation – Hannibal shall control the emissions from the liquid waste storage tanks (633-401 and 633-421) using the North Waste Management Area’s hazardous waste incinerators (PR-47 and/or PR-53, and/or PR-54).
   B. The existing incinerators shall be operated and maintained in accordance with the manufacturer’s specifications and the Maximum Achievable Control Technology (MACT) standard, 40 CFR Part 63, Subpart EEE, National Emission Standards for Hazardous Air Pollutants from Hazardous Waste Combustors.

6. BASF Corporation – Hannibal shall maintain operating and maintenance logs for all of the control devices listed in Special Conditions 2, 3, 4, and 5 that include the following:
   A. Incidents of malfunction, with impact on emissions, duration of event, probable cause and corrective actions.
   B. Maintenance activities, with inspection schedule, repair actions, replacements, etc.

7. Operational Restrictions
   BASF Corporation – Hannibal shall only manufacture Chlorfenapyr at the Pyrrole Plant. MMPDC and 3201 have been discontinued. If the facility decides to produce MMPDC or 3201 again, it shall apply for and receive a new construction permit to manufacture these items.

8. Record Keeping and Reporting Requirements
   A. BASF Corporation – Hannibal 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 for all materials used.
   B. BASF Corporation – Hannibal 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 shows an exceedance of a limitation imposed by this permit.
SPECIAL CONDITIONS:

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

9. If a continuing situation of demonstrated nuisance odors exists in violation of Missouri State Rules 10 CSR 10-6.165, *Restriction of Emissions of Odors*, the Director may require that BASF Corporation – Hannibal submit a corrective action plan within ten (10) days adequate to timely and significantly mitigate the odors. BASF Corporation – Hannibal shall implement any such plan immediately upon its approval by the Director. Failure to either submit or implement such a plan shall be a violation of the permit.
REVIEW SUMMARY

• BASF Corporation - Hannibal Site has applied for authority to construct process equipment, piping and instrumentation and to modify process chemistry to increase production of Chlorfenapyr in the Pyrrole plant.

• Hazardous Air Pollutant (HAP) emissions are expected from the proposed equipment. HAPs of concern from this process include, but are not limited to, hydrochloric acid (HCl), toluene, and chlorine. Other HAPs of concern cannot be listed because they are components in the manufacturing process and the company has asked to keep those confidential.

• Subpart Kb of the New Source Performance Standards (NSPS), Standards of Performance for Volatile Organic Liquid Storage Vessels for Which Construction Reconstruction or Modification Commences After July 23, 1984 may apply to the storage tanks depending on volume and maximum true vapor pressure of the liquid stored. BASF Corporation – Hannibal Site shall determine applicability based on the conditions listed in the subpart.

• Existing control devices will be used to control emissions from the affected equipment. Emissions from the process area seal pots are routed to the fume scrubbing system (631-203/206/207/210) prior to the thermal oxidizer. The exit gas from the thermal oxidizer passes through a caustic scrubber (631-402) for the removal of acidic components formed in the thermal oxidizer at PY-06. Particulate emissions from raw material and product handling (PY-03, PY-05, and PY-14) are controlled by baghouses (631-002, 631-015, and 631-073) with voluntary downstream HEPA filters. Emissions from the tank farm (PY-09) are controlled by a caustic scrubber (631-063). The floor drain tank (PY-08) and sampling point and local ventilation area (PY-10) are equipped with voluntary carbon filters.

• 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 Marion County, an attainment area for all criteria air pollutants.

• This installation is on the List of Named Installations [10 CSR 10-6.020(3)(B), Table 2]. It is listed under number 9, hydrofluoric, sulfuric or nitric acid plants, and number 20, chemical processing plants. 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 for any criteria pollutants since potential emissions of the application for them are below their respective de minimis levels. Emissions of chlorine (Cl₂) are greater than the SMAL, but since MACT, Subpart MMM, applies to the installation and the EPA has performed a Risk and Technology Review (RTR) for this MACT, ambient air quality modeling was not performed.

• Emissions testing is not required for the equipment as a condition of this permit.

• A Part 70 Operating Permit modification request is required for this installation within 1 year of equipment startup.

• Approval of this permit is recommended with special conditions.

INSTALLATION DESCRIPTION

BASF-Corporation – Hannibal is an agricultural chemical manufacturing installation in Marion County, Missouri. This installation is classified as a major source for construction permits and a Part 70 source for Operating Permits. The following construction permits have been issued to the installation from the Air Pollution Control Program.
<table>
<thead>
<tr>
<th>Permit Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1179-EPA</td>
<td>Major Source permit for a Nitric Acid plant</td>
</tr>
<tr>
<td>0380-002</td>
<td>Installation of an Animal Feed Intermediate spray drying system</td>
</tr>
<tr>
<td>0385-002</td>
<td>Installation of a solid waste incinerator for herbicide wastes generated during processing</td>
</tr>
<tr>
<td>0885-005</td>
<td>Construction of SCEPTER and ARSENEL herbicide production lines</td>
</tr>
<tr>
<td>0887-003</td>
<td>Construction of ASSERT herbicide production line</td>
</tr>
<tr>
<td>0488-001</td>
<td>Construction of a sulfuric acid regeneration facility</td>
</tr>
<tr>
<td>0588-007</td>
<td>Installation of a packaging operation for THIMET and COUNTER insecticides</td>
</tr>
<tr>
<td>0988-004</td>
<td>Installation of a back-up flare for odor control</td>
</tr>
<tr>
<td>0489-004</td>
<td>Addition of bulk herbicide blending and storage facility</td>
</tr>
<tr>
<td>1189-001</td>
<td>Installation of the PROWL-“C” incinerator and waste storage tank</td>
</tr>
<tr>
<td>0690-005</td>
<td>Modification of existing equipment to increase PROWL herbicide production</td>
</tr>
<tr>
<td>0491-002</td>
<td>Addition of a fermenter to expand pharmaceutical plant</td>
</tr>
<tr>
<td>0392-006</td>
<td>Construction of bulk lime and dicalite handling equipment and storage</td>
</tr>
<tr>
<td>0393-001</td>
<td>Modification of existing Animal Feed Intermediate Plant</td>
</tr>
<tr>
<td>0793-001</td>
<td>Construction of a pellet-coating plant</td>
</tr>
<tr>
<td>0694-008</td>
<td>Addition of a centrifuge to increase PROWL herbicide production</td>
</tr>
<tr>
<td>0894-010</td>
<td>Modification to increase COUNTER insecticide production</td>
</tr>
<tr>
<td>0996-013</td>
<td>Modification to imidazoline (IMI-2) line</td>
</tr>
<tr>
<td>122000-003</td>
<td>Addition of pyrrole production plant</td>
</tr>
<tr>
<td>0997-003</td>
<td>Modification to increase PROWL herbicide production</td>
</tr>
<tr>
<td>062000-019</td>
<td>Modification to increase PROWL herbicide production</td>
</tr>
<tr>
<td>082005-014</td>
<td>Modification of the IMI-2 herbicide manufacturing facility to allow the production of three new pesticide active ingredient intermediates for imidazolinone herbicides</td>
</tr>
<tr>
<td>022006-005</td>
<td>Modification of the Pyrrole/MMPDC manufacturing facility to allow for the production of a new broad-spectrum insecticide called 3201. Production will use existing equipment and a new potassium methoxide (KCOH₃) scrubber.</td>
</tr>
<tr>
<td>102008-001</td>
<td>Allow production of a new active ingredient, 800H and expand production capacity of three (3) diacids.</td>
</tr>
<tr>
<td>062000-019A</td>
<td>Reduce reporting requirements.</td>
</tr>
<tr>
<td>062000-019B</td>
<td>Account for cleaning emissions.</td>
</tr>
<tr>
<td>102009-007</td>
<td>Increasing production of Imidazolinone.</td>
</tr>
<tr>
<td>092009-005</td>
<td>Increasing production of MMPDC.</td>
</tr>
<tr>
<td>092010-009</td>
<td>Conversion of herbicide storage tank to store o-xylene</td>
</tr>
<tr>
<td>022011-009</td>
<td>Addition of tank into existing process.</td>
</tr>
<tr>
<td>072013-001</td>
<td>Construct natural gas fired boilers.</td>
</tr>
<tr>
<td>092014-007</td>
<td>Increase in production of 800H herbicide.</td>
</tr>
<tr>
<td>052015-012</td>
<td>Replacement of centrifuges for IMI-1.</td>
</tr>
<tr>
<td>062000-019C</td>
<td>Reducing reporting requirements for excess SO₂ emissions during startup.</td>
</tr>
<tr>
<td>072013-001A</td>
<td>Eliminating GHG emission rate limit.</td>
</tr>
<tr>
<td>032016-002</td>
<td>Temporary permit to vent fumes to the atmosphere via the incineration bypass vent to identify emission sources and investigate source reductions.</td>
</tr>
</tbody>
</table>
PROJECT DESCRIPTION

The installation will add process equipment, piping and instrumentation and change the process chemistry to allow increased production of Chlorfenapyr. Additionally, the installation will add a scenario to the existing Chlorfenapy manufacturing process by substituting Triethylamine (TEA) with N-N-Diisopropylethylamine (EDIPA). Chlorfenapyr will be the only product manufactured in the Pyrrole plant. Two other permitted products, MMPDC and 3201, that were manufactured with some of the same equipment, will be discontinued.

The production capacity increase will utilize existing equipment at the Pyrrole plant, along with the installation of a condenser on the vent path from the second decant tank, 150-031. TEA, used as an acid scavenger, may also be replaced by EPIDA, which may allow increased production rates due to higher yields.

Existing emissions control devices will control air emissions from the modifications.

For product transfer (PY-14), the system is pneumatic, so the baghouse (631-073) is considered an inherent part of the operation. Therefore, there are no special conditions in this permit that requires the operation of the baghouses. For the glycine charge system (PY-03) and product bag/drum filling (PY-05), the baghouses (631-002 and 631-015) are not considered an inherent part of the process and pressure monitoring requirements are included.

In the previous permits issued to the installation (No. 122000-003 and No. 092009-005), the baghouses for the production transfer system (PY-14) are required by special conditions. However, because the baghouse is considered inherent part of the pneumatic transfer system, that special condition is no longer needed.

The facility operates HEPA filters downstream of the baghouses (PY-03, PY-05, and PY-14) to further control particulate emissions. In Permit No. 092009-005, the facility is required to operate HEPA filters because the facility took credit for them in the emissions calculations. However, that project only involved the production of MMPDC, which will no longer be produced by the facility. BASF did not take credit for the HEPA filters during the emissions calculations for Chlorfenapyr in this project. Therefore, these devices are considered voluntary and are not required by special condition.

EMISSIONS/CONTROLS EVALUATION

The emission points affected by the debottlenecking project are listed below, with an explanation on the types of emissions being emitted from each point. Emissions from these points are expected to increase as a result of higher Chlorfenapyr production capacity.
Table 2: List of Emission Points Affected by the Project.

<table>
<thead>
<tr>
<th>Emission Point</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>PY-01</td>
<td>50% NaOH Tank</td>
</tr>
<tr>
<td>PY-02</td>
<td>3-NOX Storage Tank</td>
</tr>
<tr>
<td>PY-03</td>
<td>Glycine Charge System</td>
</tr>
<tr>
<td>PY-04</td>
<td>Fugitive Emissions from Equipment Leaks</td>
</tr>
<tr>
<td>PY-05</td>
<td>Product Baghouse</td>
</tr>
<tr>
<td>PY-06</td>
<td>Thermal Oxidizer/Scrubber Discharge</td>
</tr>
<tr>
<td>PY-07</td>
<td>Fume Scrubber Emergency (Thermal Oxidizer Bypass) Vent</td>
</tr>
<tr>
<td>PY-08</td>
<td>Floor Drain Tank</td>
</tr>
<tr>
<td>PY-09</td>
<td>Tank Farm Scrubber</td>
</tr>
<tr>
<td>PY-10</td>
<td>Sample Point and Local Equipment Ventilation</td>
</tr>
<tr>
<td>PY-12</td>
<td>Sulfuric Acid Storage Tank</td>
</tr>
<tr>
<td>PY-14</td>
<td>Product Transfer System Baghouse</td>
</tr>
</tbody>
</table>

Emission Point PY-01: NaOH Storage Tank

This tank vents to the atmosphere and does not emit any regulated pollutants.

Emission Point PY-02: 3-NOX Storage Tank

Emissions from this point consist of the breathing and working losses from an existing 3-nitro-ortho-xylene (3-NOX) storage tank. 3-NOX is a VOC. Emissions were calculated using equations found in EPA document AP-42, Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, Fifth Edition, Chapter 7.1, Organic Liquid Storage Tanks.

Emission Point PY-03: Glycine Charge System

Emissions from this point consist of PM$_{2.5}$, PM$_{10}$, and PM controlled by a baghouse and is inside a building. A voluntary HEPA filter has been installed downstream of the baghouse. There are no known emission factors for this process, so the emission factor for lime transfer (scc 3-05-016-027) in Chapter 11.17, Lime Manufacturing, (2/1998) of EPA document AP-42, Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, Fifth Edition was used instead to estimate emissions for charging Glycine solids into the process. AP-42 only includes emission factor for PM so PM$_{2.5}$ and PM$_{10}$ emissions were assumed to be the same as PM. The equipment is completely enclosed so the capture efficiency was assumed to be high. For the baghouse, a value of 95% capture and 99% control efficiency was used. The 99% control efficiency is the default value used by the Air Pollution Control Program.

Emission Point PY-04: Equipment Leaks

VOC emissions from equipment leaks were calculated using factors and efficiencies from EPA document, Protocol for Equipment Leak Emission Estimates, Table 2-9 and Table 5-2. The individual HAP emissions were calculated by taking the VOC emissions and multiplying by the weighted average concentration of that specific HAP.
Emission Point PY-05: Product Packaging

Emissions from this point consist of PM$_{2.5}$, PM$_{10}$, and PM. Emissions were calculated using the same factors and efficiencies as emission point PY-03.

Emission Point PY-06: Thermal Oxidizer and Packed Tower Scrubber

Emissions from this point consist of the neutralized combustion products of storage tanks and process emissions. The emissions are first treated by the fume handling system scrubber prior to combustion. The scrubber system exhaust is next vented to the thermal oxidizer. The thermal oxidizer exit gas is vented to a caustic scrubber to neutralize acidic components. This scrubber then vents to the atmosphere.

VOC and HAP emissions were calculated using ideal gas law and vapor compositions, which were estimated using process simulator ChemCad. Combustion emissions (i.e. NO$_x$, CO, VOC, SO$_x$, PM$_{2.5}$, PM$_{10}$, PM, NH$_3$, CO$_2$, CH$_4$, N$_2$O) from natural gas combustion were calculated using emission factor from AP-42, Chapter 1.4, Natural Gas Combustion, (7/1998). GHG-mass emissions were calculated by summing the CO$_2$, CH$_4$, and N$_2$O emissions while the GHG-CO$_2$e emissions were calculated by multiplying the CO$_2$, CH$_4$, and N$_2$O emissions by their respective Global Warming Potentials and summing the results.

NO$_x$ will be produced during the combustion process from organic nitrogen in the fumes. It was assumed that 10% of the nitrogen will be converted to NO$_x$. This conversion rate is taken from an emissions report prepared in 1998 by Anderson 2000, Inc.

Emission Point PY-07: Fume Scrubber Emergency or Thermal Oxidizer By-Pass Stack

Emission from this point consists of storage tank and process emissions during emergency thermal oxidizer system trip events resulting in a bypass of the thermal oxidizer and the downstream scrubber control devices. The storage tank and process emissions are first treated by the fume handling system scrubber and then released directly to the atmosphere during a bypass event. The facility calculated emissions using a maximum of 240 hours of by-pass, which is now a limit in Special Condition 2.B. of this permit.

Emission Point PY-08: Floor Drain Tank

Emissions from this point consists of VOC from breathing and working losses. Emissions were calculated using equations from EPA document AP-42, Compilation of Air Pollutant Emission Factors, Volume 1: Stationary Point and Area Sources, Fifth Edition, Chapter 7.1, Organic Liquid Storage Tanks. A carbon canister has been voluntarily added to reduce organic emissions from this tank. No credit is taken in the potential emissions calculation for the use of the carbon filter since it is not required by special condition.
Emission Point PY-09: Tank Farm Scrubber for Acid Gases

VOC and HAP emissions from this point were calculated using mass balances and the ideal gas law. The capture efficiency was assumed to be 100% since the emission point is completely enclosed. The installation suggested using a scrubber control efficiency of 95%. Due to the small amount of VOC and HAPs being emitted at this point, using a smaller efficiency would not change the type of permit that should be issued to the facility nor would it trigger any modeling requirements for HAPs. Therefore, this number was accepted for use.

Emission Point PY-10: Sample Point and Local Equipment Ventilation

Emissions from this point consist of VOC and HAPs displaced from sample jars during routine collection of process samples and emissions from equipment enclosures when equipment is opened for maintenance. Emissions were calculated using material balances on the number of samples that will be taken and the expected loss per sample. A carbon filter has been voluntarily added to reduce organic emissions. No credit is taken in the potential emissions calculation for the use of the carbon filter since it is not required by special condition.

Emission Point PY-12: 98% H₂SO₄ Storage Tank

Sulfuric acid mist is a regulated pollutant. It is not known whether the sulfuric acid emissions from the working and breathing losses will become a mist. To be conservative, sulfuric emissions from the tank were calculated using the EPA Tanks 4.09d Program and all emissions are considered to be mist.

Emission Point PY-14: Product Pneumatic Transfer System

PM₂.₅, PM₁₀, and PM emissions were calculated using the PM emission factor in AP-42, Table 11.17-04, Product Transfer and Conveying, SCC 3-05-016-15 and assuming that all PM are PM₂.₅ and PM₁₀.

Potential-Minus-Actual Emissions

Normally, to calculate the emissions from the modification, the potential-minus-actual emissions method would be used. However, since the potential emissions of each pollutant from the entire process are less than their respective de minimis levels, the use of this method would not change the type of permit required. Therefore, the potential-minus-actual method was not used. Instead, the potential emissions of the Chlorfenapyr manufacturing process were calculated and used as the potential emissions of the application.

The existing potential emissions of all criteria pollutants are greater than major source levels.
Table 3: Emissions Summary (tons per year)

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>PM$_{2.5}$</td>
<td>10.0</td>
<td>Major</td>
<td>102.45</td>
<td>0.51</td>
<td>0.52</td>
<td>N/A</td>
</tr>
<tr>
<td>PM$_{10}$</td>
<td>15.0</td>
<td>Major</td>
<td>119.92</td>
<td>0.51</td>
<td>0.52</td>
<td>N/A</td>
</tr>
<tr>
<td>PM</td>
<td>25.0</td>
<td>Major</td>
<td>N/D</td>
<td>0.51</td>
<td>0.52</td>
<td>N/A</td>
</tr>
<tr>
<td>SO$_x$</td>
<td>40.0</td>
<td>Major</td>
<td>1339.79</td>
<td>0.03</td>
<td>0.03</td>
<td>N/A</td>
</tr>
<tr>
<td>NO$_x$</td>
<td>40.0</td>
<td>Major</td>
<td>356.57</td>
<td>6.80</td>
<td>5.02</td>
<td>N/A</td>
</tr>
<tr>
<td>VOC</td>
<td>40.0</td>
<td>Major</td>
<td>31.96</td>
<td>15.97</td>
<td>14.47</td>
<td>N/A</td>
</tr>
<tr>
<td>CO</td>
<td>100.0</td>
<td>Major</td>
<td>94.64</td>
<td>0.00</td>
<td>0.00</td>
<td>N/A</td>
</tr>
<tr>
<td>Combined HAPs</td>
<td>25.0</td>
<td>Major</td>
<td>23.36</td>
<td>13.89</td>
<td>11.00</td>
<td>N/A</td>
</tr>
<tr>
<td>Lead</td>
<td>0.6</td>
<td>N/D</td>
<td>0.10</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>HCl</td>
<td>10.00</td>
<td>N/D</td>
<td>N/D</td>
<td>0.86</td>
<td>0.86</td>
<td>N/A</td>
</tr>
<tr>
<td>Chloroethane</td>
<td>10.0</td>
<td>N/D</td>
<td>N/D</td>
<td>4.27</td>
<td>4.27</td>
<td>N/A</td>
</tr>
<tr>
<td>Chlorine</td>
<td>2.0/10.0</td>
<td>N/D</td>
<td>N/A</td>
<td>0.102</td>
<td>0.102</td>
<td>N/A</td>
</tr>
<tr>
<td>Sulfuric Acid Mist</td>
<td>7.0</td>
<td>N/D</td>
<td>N/A</td>
<td>0.01</td>
<td>0.01</td>
<td>N/A</td>
</tr>
</tbody>
</table>

N/A = Not Applicable; N/D = Not Determined
Note 1: Hydrogen Chloride
Note 2: 0.1 tpy is the SMAL. Although the chlorine emissions are greater than the SMAL, modeling is not required because the facility is subject to MACT, Subpart MMM, and the RTR has been performed by the EPA for this MACT.

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

BASF Corporation - Hannibal Site 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
  The emission fee is the amount established by the Missouri Air Conservation Commission annually under Missouri Air Law 643.079(1). Submission of an Emissions Inventory Questionnaire (EIQ) is required June 1 for the previous year's emissions.

- 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 10-3.090

SPECIFIC REQUIREMENTS


- Maximum Achievable Control Technology (MACT) Regulations, 10 CSR 10-6.075, National Emission Standards for Pesticide Active Ingredient Production, 40 CFR Part 63, Subpart MMM

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.

PERMIT DOCUMENTS

The following documents are incorporated by reference into this permit:

- The Application for Authority to Construct form, dated November 3, 2016, received November 3, 2016, designating BASF Corporation Agricultural Products as the owner and operator of the installation.
• E-mail communications between Missouri Air Pollution Control Program and BASF Corporation Agricultural Products

Other documents relied upon during technical review:

• Draft permits sent by the Missouri Air Pollution Control Program to BASF Corporation Agricultural Products.
• 40 CFR 98, Table A-1.
Dear Mr. Hoac:

Enclosed with this letter is your permit to construct. Please study it carefully. Also, note the special conditions, if any, 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 have any questions regarding this permit, please do not hesitate to contact Chia-Wei Young at the Departments' Air Pollution Control Program, P.O. Box 176, Jefferson City, MO 65102, or by telephone at (573) 751-4817. Thank you for your time and attention to this matter.

Sincerely,

AIR POLLUTION CONTROL PROGRAM

Susan Heckenkamp
New Source Review Unit Chief

KBH:cyj

Enclosures

c: Northeast Regional Office
PAMS File: 2016-11-009
Permit Number:

012017-006