

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: 092014-007 Project Number: 2014-06-051  
Installation Number: 127-0001

Parent Company: BASF Corporation Agricultural Products  
Parent Company Address: 26 Davis Drive, Research Triangle Park, NC 27709-3528  
Installation Name: BASF Corporation - Hannibal Plant  
Installation Address: 3150 Highway JJ, Palmyra, MO 63461  
Location Information: Marion County, S14, T53N, R5W

Application for Authority to Construct was made for:

Installation of process equipment, piping, and instrumentation to allow an increase in production of herbicide 800H. 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.

SEP 24 2014  
EFFECTIVE DATE

*Kyra 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 startup 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 startup 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."*

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

1. Control Device Requirements
  - A. BASF Corporation – Hannibal Plant shall capture emissions after the 800-Cl scrubber (631-060X), IMI2-07, and the packaging baghouse (631-068), IMI2-10, using high efficiency particulate air (HEPA) filters as specified in the permit application.
  - B. The HEPA filters shall be maintained and operated in accordance with manufacturer's specifications. The HEPA filters shall be equipped with a gauge or meter, which indicates the pressure drop across the control device. These gauges or meters shall be located such that the Department of Natural Resources' employees may easily observe them.
  - C. Replacement filters for the HEPA filters shall be kept on hand at all times. The filters shall be made of fibers appropriate for operating conditions expected to occur (i.e. temperature limits, acidic and alkali resistance, and abrasion resistance).
  - D. BASF Corporation – Hannibal Plant shall monitor and record the operating pressure drop across the HEPA filter at least once every 24 hours while the device is in operation. The operating pressure drop shall be maintained within the design conditions specified by the manufacturer's performance specifications.
  - E. BASF Corporation – Hannibal Plant shall maintain a copy of the HEPA filter manufacturer's performance specification on site.
  - F. BASF Corporation – Hannibal Plant shall maintain an operating and maintenance log for the HEPA filter which shall include the following:
    - 1) Incidents of malfunction, with impacts on emissions, duration of event, probable cause, and corrective actions; and
    - 2) Maintenance activities, with inspection schedule, repair actions, and replacements, etc.

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**SPECIAL CONDITIONS:**

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

2. Record Keeping and Reporting Requirements
  - A. BASF Corporation - Hannibal Plant 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 Plant shall report to the Air Pollution Control Program's Compliance/Enforcement Section, P.O. Box 176, Jefferson City, MO 65102, no later than ten 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.

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

Project Number: 2014-06-051  
Installation ID Number: 127-0001  
Permit Number:

BASF Corporation - Hannibal Plant  
3150 Highway JJ  
Palmyra, MO 63461

Complete: June 18, 2014

Parent Company:  
BASF Corporation Agricultural Products  
26 Davis Drive  
Research Triangle Park, NC 27709-3528

Marion County, S14, T53N, R5W

REVIEW SUMMARY

- BASF Corporation - Hannibal Plant has applied for authority to install process equipment, piping, and instrumentation which will allow an increase in production of 800H herbicide from [REDACTED] lb/yr to [REDACTED] lb/yr.
- HAP emissions are expected from the production of the 800H herbicide but are expected to be below their respective SMAL.
- None of the New Source Performance Standards (NSPS) apply to the 800H production process.
- The Maximum Achievable Control Technology (MACT) standard, 40 CFR Part 63, Subpart MMM, *National Emission Standards for Hazardous Air Pollutants for Pesticide Active Ingredient Production*, and Subpart FFFF, *National Emission Standards for Hazardous Air Pollutants for Miscellaneous Organic Chemical Manufacturing*, applies to the 800H production process. MACT standard, 40 CFR Part 63, Subpart EEE, *National Emission Standards for Hazardous Air Pollutants for Hazardous Waste Combustors*, applies to the incinerators (PR-47)
- None of the NESHAPs apply to this installation.
- The VOC and HAP emissions for the storage tanks involved in 800H production (IMI2-01, IMI2-03, IMI2-04) are controlled using chilled condensers. The emissions from the 800H process vessels are either being controlled using the north waste management incinerators (PR-47, PR-53, and PR-54) or a scrubber followed by a HEPA filter, depending on the equipment. All of the incinerators (PR-47, PR-53, and PR-54) are represented in the application as one unit (PR-47). Particulate emissions from the packaging area will be vented through the packaging area baghouse (IMI2-10) followed by a HEPA filter.

- 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 de minimis levels.
- This installation is located in Marion County, an attainment area for all criteria pollutants.
- This installation is on the List of Named Installations found in 10 CSR 10-6.020(3)(B), Table 2, as Number 9, Hydrofluoric, Sulfuric, or Nitric Acid 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 since potential emissions of the application are below de minimis levels.
- Emissions testing is not required for the equipment as a condition of this permit.
- A modification to the facility's current Part 70 Operating Permit application is required for this installation within 1 year of permit issuance.
- Approval of this permit is recommended with special conditions.

### INSTALLATION DESCRIPTION

BASF – Hannibal plant is an agricultural chemical manufacturing installation in Marion County. This installation is classified as a major source for construction permits and a Part 70 installation for operating permits. The following construction permits have been issued to the installation by the Air Pollution Control Program.

**Table 1: List of Previously Issued Permits**

Permit Number	Description
1179-EPA	Major Source permit for a Nitric Acid plant
0380-002	Installation of an Animal Feed Intermediate spray drying system
0385-002	Installation of a solid waste incinerator for herbicide wastes generated during processing
0885-005	Construction of SCEPTER and ARSENEL herbicide production lines
0887-003	Construction of ASSERT herbicide production line
0488-001	Construction of a sulfuric acid regeneration facility
0588-007	Installation of a packaging operation for THIMET and COUNTER insecticides
0988-004	Installation of a back-up flare for odor control
0489-004	Addition of bulk herbicide blending and storage facility
1189-001	Installation of the PROWL-“C” incinerator and waste storage tank
0690-005	Modification of existing equipment to increase PROWL herbicide production
0491-002	Addition of a fermenter to expand pharmaceutical plant
0392-006	Construction of bulk lime and dicalite handling equipment and storage
0393-001	Modification of existing Animal Feed Intermediate Plant
0793-001	Construction of a pellet-coating plant
0694-008	Addition of a centrifuge to increase PROWL herbicide production
0894-010	Modification to increase COUNTER insecticide production

0696-013	Modification to imidazoline (IMI-2) line
122000-003	Addition of pyrrole production plant
0997-003	Modification to increase PROWL herbicide production
062000-019	Modification to increase PROWL herbicide production
082005-014	Modification of the IMI-2 herbicide manufacturing facility to allow the production of three new pesticide active ingredient intermediates for imidazolinone herbicides
022006-005	Modification of the Pyrrole/MMPDC manufacturing facility to allow for the production of a new broad-spectrum insecticide called 320I. Production will use existing equipment and a new potassium methoxide (KCOH3) scrubber.
102008-001	Allow production of a new active ingredient, 800H and expand production capacity of three (3) diacids.
062000-019A	Reduce reporting requirements for excess SO <sub>2</sub> emissions during startup.
062000-019B	Account for emissions during cleaning process.
102009-007	De-bottlenecking of the imidazolinone herbicides production process.
092009-005	Increasing the MMPDC production capacity.
092010-009	Conversion of herbicide storage tank to store and supply ortho-xylene.
022011-009	Addition of intermediate tank 150-021 to the Prowl herbicide process.
072013-001	Addition of boilers.

## PROJECT DESCRIPTION

BASF – Hannibal plant plans to install new equipment, piping, and instrumentation that will allow production expansion of the herbicide 800H from [REDACTED] lb/yr to [REDACTED] lb/yr. VOC and HAP emissions from the storage tanks (IMI2-01, IMI2-03, and IMI2-04) are already required to be controlled using chilled water condensers. PM<sub>2.5</sub>, PM<sub>10</sub>, PM and toluene emissions from the handling of intermediate for 800H (800-CI) are already required to be controlled using a scrubber. A HEPA filter is installed downstream of the scrubber to control particulate emissions that are not captured by the scrubber. VOC emissions from raw materials, reaction byproducts, and organic HAPs of N,N-dimethylformamide, methanol, methyl bromide, and toluene are controlled by three (3) incinerators. Particulate emissions from packaging operations are controlled using a baghouse followed by a HEPA filter. The previous permit issued for the 800H production process (Permit No. 102008-001) contained special conditions requiring the use of all control devices except for the HEPA filters. Therefore, this permit only contains a special condition requiring the use of the HEPA filters.

BASF – Hannibal plant has requested to be issued both a confidential and a public version of the permit. This is the public version. The confidential version is being issued under project no. 2014-06-052.

## EMISSIONS/CONTROLS EVALUATION

For modifications, the potential emissions of the project can be calculated using the new potential emissions minus the baseline actual emissions (BAE). However, the potential emissions from the equipment were already calculated to be less than their respective de minimis levels. Therefore, the baseline actual emissions were not used because they would not affect the type of permit being issued. The facility also did not provide BAE in the application for use in the calculations.

Emissions from the project were calculated using the method described below. BASF – Hannibal plant submitted a letter to the Air Pollution Control Program on June 7, 2012, indicating that the chemicals stored in tank IMI2-03 are now stored in IMI2-04 and that the chemicals stored in tank IMI2-04 are now stored in IMI2-03. Because of this information, the descriptions given below for tanks IMI2-03 and IMI2-04 are different than the descriptions given in Permit 102008-001.

#### IMI2-01, Toluene Storage Tank

This storage tank (110-029) is used to store recycled toluene and is equipped with a chilled water vent condenser to control the toluene emissions from breathing and working losses. Toluene is considered both a HAP and a VOC. The uncontrolled toluene emissions were calculated using equation derived from the EPA TANKS 4.0 software program. Control efficiency of the condenser was calculated using a combination of vapor pressure laws and mass balances. The control efficiency was estimated to be 8.91%. Tetrahydrofuran (THF) is also emitted from the storage tank because it is a component of the recycled toluene.

#### IMI2-02, Aminocrotonate Storage

This storage tank (110-014) was included in the application submitted for Permit No. 102008-001. However, it was not mentioned in the finalized permit. This tank will be used to store aminocrotonate after this project. The tank is kept under pressure to prevent emissions to the atmosphere. A vapor balance system is used to transfer tank vapors into the delivery vessel whenever raw material is delivered to the storage tank, also preventing emissions to the atmosphere. Therefore, there should be no breathing losses. However, there would still be working losses, which are calculated using equation derived from the EPA TANKS 4.0 software program.

#### IMI2-03, Sodium Methoxide Storage

This storage tank (110-039) is used to store 30% sodium methoxide in methanol. Breathing and working losses are expected. This tank is equipped with a chilled water vent condenser. The uncontrolled methanol emissions were calculated using equation derived from the EPA TANKS 4.0 software program. Control efficiency of the condenser was calculated using a combination of vapor pressure laws and mass balances. The control efficiency was estimated to be 66.59%.

#### IMI2-04, Dimethylformamide (DMF) Storage Tank

This storage tank is used to store DMF for 800H. A chilled water vent condenser is used to control the emissions from the tank. The uncontrolled DMF emissions were calculated using equation derived from the EPA TANKS 4.0 software program. Control efficiency of the condenser was calculated using a combination of vapor pressure laws and mass balances. The control efficiency was estimated to be 11.42%.

### IMI2-07, 800-Chloride Scrubber

Emissions from this point consist of particulate matter (PM<sub>2.5</sub>, PM<sub>10</sub> and PM) and toluene from the handling of the intermediate for 800H. A high efficiency particulate air (HEPA) filter is installed downstream of the scrubber to capture particulate emissions coming from the scrubber. Particulate emissions from the scrubber were estimated from mass balances assuming that 1% of the raw material is lost, that the scrubber has 94% control efficiency, and that the HEPA filter can achieve 99.9% control efficiency.

The one percent material loss was recommended by the company and accepted for use by the Air Pollution Control Program. According to the company, the plant records the drum weight before and after each charge. More importantly, it is known that if only 99% of the solids were charged to the reactor, a particular impurity would immediately spike. The concentration of this impurity is recorded each batch and provides consistent evidence that less than one percent of the solids are lost to the vent system. The 94% scrubber efficiency is based on an emission rate of 0.05 gr/dscf for the scrubber. This rate had been used by the Air Pollution Control Program in Permit No. 102008-001. The 99.9% control efficiency was also suggested by the company. The EPA technology fact sheet suggests a 99.97% control efficiency for particles greater than 0.3 microns. Therefore, the 99.9% control efficiency was accepted by the Air Pollution Control Program as a conservative estimate.

### IMI2-08I (Also labeled as PR-47), Incinerator Stack

This emission point is designated PR-47 in previous permits but as IMI2-08I in the calculations emissions summary submitted with the application for this project. This emission point includes three (3) incinerators (PR-47, PR-53, and PR-54). Pollutants controlled by the incinerators include VOC from raw materials, reaction byproducts, and organic HAPs of N,N-dimethylformamide, ethanol, methyl bromide and toluene. The emissions of each individual VOC and HAP were estimated by taking the emissions from each individual step of the batch process, multiplying by two as a safety factor, and applying a 99.99% control efficiency from the use of the incinerator.

Emission of each individual VOC and HAP from each step of the batch process were provided by the company. However, the company did not supply the calculations because they implicitly describe the full recipe for a highly confidential process that is considered business critical. Considering that the facility must maintain a 99.99% control efficiency for the incinerator due to MACT subpart EEE, the HAP and VOC emissions from the incinerators are expected to be small. Furthermore, the same calculation method had been approved by the Air Pollution Control Program in previous permits. Therefore, the emissions data supplied by the company was accepted by the Air Pollution Control Program for use for this project.

### IMI2-10, Packaging Area Baghouse

Emissions from this point consists of particulate (PM<sub>2.5</sub>, PM<sub>10</sub>, and PM) from the packaging of the dried products. Uncontrolled emissions were calculated assuming a one percent loss, a 99% control efficiency for the baghouse, and a 99.9% control efficiency for the HEPA filter.

### IMI2-11, Drain Hold Tank

This tank stores water from floor washing. This vessel is also used to collect incidental losses from infrequent equipment leaks. While there normally would not be emissions of regulated pollutants from this emission point, it is possible that a toluene layer could form on top of the water. Emissions include breathing and working losses and were calculated using equation derived from the EPA TANKS 4.0 software program.

### IMI2-12, Sampling Losses

Emissions from sampling include VOC and HAPs and were calculated by assuming a one ounce loss per sample. This loss rate was recommended by the company. The losses during sampling is expected to be small and one ounce should provide a conservative estimate of emissions.

### IMI2-13, Process Building Vents

This emission point consists of the fugitive and other losses from potential LDAR component failure, sampling points, and equipment maintenance activities. N,N-dimethylformamide (DMF), methanol, methyl bromide and toluene are the organic HAP emissions from this emission point.

Emissions from maintenance were calculated using a combination of vapor pressure laws and mass balances. Emissions from connector, valve and seal were calculated assuming that there is constant leakage of small amounts of VOC and HAP and using emission factor equations from the *Protocol for Equipment Leak Emission Estimates*, EPA, 11/1995. For the equations, values of 5.34, 5.54, 5.68, and 3.80 ppmv/connection were used for the screening concentration at connectors, valves, pump seals, and agitator seals, respectively. These values were obtained using data from the installation's Leak Detection and Repair (LDAR) program. Emissions from actual leakage events were also calculated using the same equations. Concentrations used in the equation were obtained from data gathered during previous leaks and assumed that each leak has a duration of no more than 30 days. (Typically, the leaks are repaired in much less time than 30 days, but the facility suggested 30 days as worst-case scenario).

The following table provides an emissions summary for this project. Existing actual emissions were taken from the installation's 2013 EIQ. Potential emissions of the application represent the potential of the modified equipment. Emissions of PM<sub>10</sub> and VOCs are less than the permit exemption levels of 1.0 lb/hr and 2.75 lb/hr in 10 CSR 10-6.061(3)(A)3.A, respectively. However, a permit is being issued for this project due to the toluene emissions. The annual toluene emissions are expected to be 1.9 tons per year. If divided by 8,760 hours, the average hourly toluene emissions would be 0.43 lb/hr, which is less than the 0.5 lb/hr exemption level for individual HAP given in 10 CSR 10-6.061(3)(A)3.B. However, the toluene emissions are not spread out evenly during the year. During certain hours of the operation, it is possible that the toluene emissions could be greater than 0.5 lb/hr.

**Table 2: Emissions Summary (U.S. short tons per year)**

Pollutant	Regulatory <i>De Minimis</i> Levels	Existing Potential Emissions	Existing Actual Emissions (2013EIQ)	Potential Emissions of the Application	New Installation Conditioned Potential
PM	25.0	Major	N/D	0.0038	N/A
PM <sub>10</sub>	15.0	Major	156.89	0.0038	N/A
PM <sub>2.5</sub>	10.0	Major	129.21	0.0038	N/A
SO <sub>x</sub>	40.0	Major	2556.77	N/A	N/A
NO <sub>x</sub>	40.0	Major	460.99	N/A	N/A
<sup>1</sup> VOC	40.0	Major	28.94	4.4	N/A
CO	100.0	Major	149.19	N/A	N/A
GHG (CO <sub>2</sub> e)	75,000	N/D	N/D	N/A	N/A
GHG (mass)	100.0	N/D	N/D	N/A	N/A
Combined HAPs	10.0/25.0	Major	33.56	2.4	N/A
Toluene	10.0	N/D	N/D	1.9	N/A

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

Note 1: VOC emissions also contain HAPs that are considered VOCs.

### 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 the de minimis levels.

### APPLICABLE REQUIREMENTS

BASF Corporation - Hannibal Plant 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

- *MACT Regulations*, 10 CSR 10-6.075
  - *National Emission Standards for Hazardous Air Pollutants for Pesticide Active Ingredient Production*, 40 CFR Part 63, Subpart MMM
  - *National Emission Standards for Hazardous Air Pollutants for Miscellaneous Organic Chemical Manufacturing*, 40 CFR Part 63, Subpart FFFF.
  - *National Emission Standards for Hazardous Air Pollutants for Hazardous Waste Combustors*, 40 CFR 63, Subpart EEE

#### 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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Chia-Wei Young  
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 June 16, 2014, received June 18, 2014, designating BASF Corporation Agricultural Products 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>CAM</b> ..... Compliance Assurance Monitoring	<b>MSDS</b> ..... Material Safety Data Sheet
<b>CAS</b> ..... Chemical Abstracts Service	<b>NAAQS</b> ... National Ambient Air Quality Standards
<b>CEMS</b> ..... Continuous Emission Monitor System	<b>NESHAPs</b> National Emissions Standards for Hazardous Air Pollutants
<b>CFR</b> ..... Code of Federal Regulations	<b>NO<sub>x</sub></b> ..... nitrogen oxides
<b>CO</b> ..... carbon monoxide	<b>NSPS</b> ..... New Source Performance Standards
<b>CO<sub>2</sub></b> ..... carbon dioxide	<b>NSR</b> ..... New Source Review
<b>CO<sub>2</sub>e</b> ..... carbon dioxide equivalent	<b>PM</b> ..... particulate matter
<b>COMS</b> ..... Continuous Opacity Monitoring System	<b>PM<sub>2.5</sub></b> ..... particulate matter less than 2.5 microns in aerodynamic diameter
<b>CSR</b> ..... Code of State Regulations	<b>PM<sub>10</sub></b> ..... particulate matter less than 10 microns in aerodynamic diameter
<b>dscf</b> ..... dry standard cubic feet	<b>ppm</b> ..... parts per million
<b>EQ</b> ..... Emission Inventory Questionnaire	<b>PSD</b> ..... Prevention of Significant Deterioration
<b>EP</b> ..... Emission Point	<b>PTE</b> ..... potential to emit
<b>EPA</b> ..... Environmental Protection Agency	<b>RACT</b> ..... Reasonable Available Control Technology
<b>EU</b> ..... Emission Unit	<b>RAL</b> ..... Risk Assessment Level
<b>fps</b> ..... feet per second	<b>SCC</b> ..... Source Classification Code
<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>GHG</b> ..... Greenhouse Gas	<b>SIC</b> ..... Standard Industrial Classification
<b>gpm</b> ..... gallons per minute	<b>SIP</b> ..... State Implementation Plan
<b>gr</b> ..... grains	<b>SMAL</b> ..... Screening Model Action Levels
<b>GWP</b> ..... Global Warming Potential	<b>SO<sub>x</sub></b> ..... sulfur oxides
<b>HAP</b> ..... Hazardous Air Pollutant	<b>SO<sub>2</sub></b> ..... sulfur dioxide
<b>hr</b> ..... hour	<b>tph</b> ..... tons per hour
<b>hp</b> ..... horsepower	<b>tpy</b> ..... tons per year
<b>lb</b> ..... pound	<b>VMT</b> ..... vehicle miles traveled
<b>lbs/hr</b> ..... pounds per hour	<b>VOC</b> ..... Volatile Organic Compound
<b>MACT</b> ..... Maximum Achievable Control Technology	
<b>µg/m<sup>3</sup></b> .....micrograms per cubic meter	

Mr. Minh Hoac  
Senior EHS Specialist - Central Hub  
BASF Corporation - Hannibal Plant  
3150 Highway JJ  
Palmyra, MO 63461

RE: New Source Review Permit - Project Number: 2014-06-051

Dear Mr. Hoac:

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, 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 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 of 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)

Mr. Minh Hoac  
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If you have any questions regarding this permit, please do not hesitate to contact Chia-Wei Young, 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 time and attention to this matter.

Sincerely,

AIR POLLUTION CONTROL PROGRAM

Susan Heckenkamp  
New Source Review Unit Chief

SH:cyl

Enclosures

c: Northeast Regional Office  
PAMS File: 2014-06-051

Permit Number: