Missouri Department of NATURAL RESOURCES
dnr.mo.gov
Michael L. Parson, Governor
Carol S. Comer, Director

JAN 07 2020

Mr. Curt Gardner
EHS Specialist Senior II
BASF Corporation - Hannibal Plant
3150 Highway JJ
Palmyra, MO 63461

RE: New Source Review Permit - Project Number: 2019-10-009

Dear Mr. Gardner:

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 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.

This permit may include requirements with which you may not be familiar. If you would like the department to meet with you to discuss how to understand and satisfy the requirements contained in this permit, an appointment referred to as a Compliance Assistance Visit (CAV) can be set up with you. To request a CAV, please contact your local regional office or fill out an online request. The regional office contact information can be found at the following website: http://dnr.mo.gov/regions/. The online CAV request can be found at http://dnr.mo.gov/cav/compliance.htm.

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, United States Post Office Building, 131 West High Street, Third Floor, P.O. Box 1557, Jefferson City, Missouri 65102, phone: 573-751-2422, fax: 573-751-5018, website: www.oa.mo.gov/ahc.

Recycled paper

If you have any questions regarding this permit, please do not hesitate to contact Jared Rhodes, 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:jara

Enclosures

c: Northeast Regional Office
PAMS File: 2019-10-009

Permit Number: 012020-001

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: 012020-001

Project Number: 2019-10-009
Installation Number: 127-0001

Parent Company: BASF Corporation

Parent Company Address: 100 Campus Drive, Florham Park, NJ 07832

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:
The installation of a new primary backup open flare (TC-03) at the BASF Corporation - Hannibal Plant to replace the existing backup enclosed flare (TC-03), which has reached the end of its useful life. 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.

Director or Designee
Department of Natural Resources

JAN 07 2020

Effective Date

MISSOURI
DEPARTMENT OF
NATURAL RESOURCES

MISSOURI AIR CONSERVATION COMMISSION

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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.

Director or Designee
Department of Natural Resources

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 Enforcement and Compliance Section of 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 Enforcement and Compliance Section of the Department's Air Pollution Control Program of the anticipated date of start up of this (these) air contaminant source(s). The information must be made available within 30 days of actual startup. Also, you must notify the Department's 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 the permit application and this permit and permit review shall be kept at the installation address and shall be made available to Department's 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 source(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 using the contact information below.

Contact Information:
Missouri Department of Natural Resources
Air Pollution Control Program
P.O. Box 176
Jefferson City, MO 65102-0176
(573) 751-4817

The regional office information can be found at the following website:
http://dnr.mo.gov/regions/

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 to 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 (3)(E). "Conditions required by permitting authority."

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

1. Operational Requirement
   A. The new primary backup open flare (TC-03) is an emergency backup for the "D" Incinerator at the BASF Corporation - Hannibal Plant. AMVAC process fumes are diverted from the "D" Incinerator to this flare when a loss of process fume treatment by the "D" Incinerator occurs. The resulting switch of process fumes from "D" Incinerator to the flare system for fume treatment is referred to by the BASF Corporation as a trip. When a trip occurs, reactant feeds to the AMVAC process shall be stopped in accordance with the time frames provided by the BASF Corporation, listed below.
      1) The automatic control system at the Hannibal Plant shall take [redacted] to drop from maximum flow to minimum flow venting following a Diethyl Dithio Phosphoric Acid reaction trip event.
      2) The automatic control system at the Hannibal Plant shall [redacted] to drop from maximum flow to minimum flow venting following a condensation reaction trip event.

   B. In addition to TC-03's backup role, TC-03 shall serve a continuous role of controlling background emissions from AMVAC process equipment and breathing and working losses from the chemical storage tank farm.

   C. TC-03 shall be fired using natural gas as the primary fuel with propane use only during power outages or interruption of natural gas supply.

   D. The flare shall be operated and maintained in accordance with the manufacturer's specifications and 40 CFR 60.18 as specified in the permit application.

   E. The BASF Corporation - Hannibal Plant shall maintain an operating and maintenance log for the new primary backup open flare (TC-03) which 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 replacement, etc.

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, by mail at P.O. Box 176, Jefferson City, MO 65102 or by e-mail at AirComplainceReporting@dnr.mo.gov, 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.

REVIEW OF APPLICATION FOR AUTHORITY TO CONSTRUCT AND OPERATE
SECTION (5) REVIEW
Project Number: 2019-10-009
Installation ID Number: 127-0001
Permit Number:

Installation Address:	Parent Company:
BASF Corporation - Hannibal Plant	BASF Corporation
3150 Highway JJ	100 Campus Drive
Palmyra, MO 63461	Florham Park, NJ 07832

Marion County, S14, T53N, R5W

REVIEW SUMMARY

- BASF Corporation has applied for authority to install a new primary backup open flare (TC-03) at its Hannibal Plant to replace the existing backup enclosed flare (TC-03), which has reached the end of its useful life.

- The application was deemed complete on October 4, 2019.

- HAP emissions are expected from the proposed equipment. Expected HAP emissions from this process are toluene and formaldehyde.

- 40 CFR Part 60 – Subpart Kb—*Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984* applies. The AMVAC Ethanol Storage Tank (installed in 1993) meets new source criteria under Subpart Kb. Accordingly, TC-03 will treat emissions from this vessel and must meet criteria for flares found in 40 CFR 60.18 as provided for in §60.112b(a)(3)(ii).

- 40 CFR Part 63 – Subpart MMM—*National Emission Standards for Hazardous Air Pollutants from Pesticide Active Ingredient Production* applies. The AMVAC manufacturing unit is subject to Subpart MMM. Additionally, the waste water received in the Aqueous Waste Tanks that can vent to the New Primary Backup Open Flare are generated from AMVAC and BASF production units that are all subject to Subpart MMM. Accordingly, TC-03 will treat organic HAP emissions from Subpart MMM regulated sources and must meet the requirements of §63.11(b) as provided for in §63.1362(b)(2)(iv)(B).

- No air pollution control equipment is being used in association with the new equipment.

- 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.

- This installation is located in Marion County, an attainment/unclassifiable 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 Item #9 Hydrofluoric, sulfuric, or nitric acid plants. The installation's major source level is 100 tons per year and fugitive emissions count 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 TC-03 as a part of this permit. Testing may be required as part of other state, federal or applicable rules.

- A 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

BASF Corporation operates an agricultural chemical production facility near Hannibal, Missouri. The BASF Corporation - Hannibal Plant produces a variety of insecticides and herbicides and is currently operating under the Part 70 Operating Permit No. OP 2010-064 which was issued on June 23, 2010. Additionally, the Hannibal plant has a resident pesticide manufacturing unit owned by American Vanguard Corporation (AMVAC), which BASF operates for AMVAC under a site services agreement, and which utilizes pollution control devices that are owned and operated by BASF for emissions treatment. AMVAC emission units are covered in the BASF Operating Permit.

The following NSR permits have been issued to BASF Corporation - Hannibal Plant from the Air Pollution Control Program.

Table 1: NSR Permit History

Permit Number	Description	Permit Status
0276-003	Installation of PROWL, HERBICIDE, THIMET, and COUNTER plants	Active permit
0778-038 through 0778-041	Installation of Nitric Acid Plant, storage tank, and lime storage silo	Active permit
0878-001	Installation of a temporary incinerator	Unit(s) removed from site.
1179-EPA	Major source permit for a Nitric Acid plant	Unit(s) removed from site.
0380-002	Installation of an Animal Feed Intermediate spray drying system	Unit(s) removed from site.
0385-002	Installation of a solid waste incinerator for	Unit(s) removed from site.

Permit Number	Description	Permit Status
	herbicide wastes	
0885-005A	Construction of SCEPTER and ARSENEL herbicide production lines	Superseded by permit 102009-007. Superseded by permit 052015-012.
0887-003	Construction of ASSERT herbicide production line	Active permit
0488-001	Construction of a sulfuric acid regeneration facility	Active permit
0588-007A	Installation of a packaging operation for THIMET and COUNTER insecticides	Unit(s) removed from site.
0988-004	Installation of a backup flare for odor control	Active permit
0489-004	Addition of a bulk herbicide blending and storage facility	Active permit
1189-001	Installation of the PROWL “C” Incinerator and waste storage tank	Active permit
0690-005	Modification of existing equipment to increase PROWL herbicide production	Active permit
0491-002	Addition of a fermenter to expand pharmaceutical plant	Unit(s) removed from site.
0392-006	Construction of bulk lime and dicalite handling equipment and storage	Unit(s) removed from site.
0393-001	Modification of existing Animal Feed Intermediate Plant	Unit(s) removed from site.
0793-001	Construction of a pellet-coating plant	Unit(s) removed from site.
0694-008	Addition of a centrifuge to increase PROWL herbicide production	Superseded by permit 102009-007. Superseded by permit 052015-012.
0894-010	Modification to increase COUNTER insecticide production	Active permit
0696-013	Modification to imidazoline (IMI-2) line	Active permit
122000-003	Addition of pyrrole production plant	Superseded by permit 092009-005.
0997-003	Modification to increase PROWL herbicide production	Active permit
062000-019	Modification to increase PROWL herbicide production	Active permit. Special Conditions #2 and 10 superseded by permit amendment 062000-019A. Special Conditions #1 and 9 superseded by permit amendment 062000-019B.
082005-014	Modification of the IMI-2 herbicide manufacturing facility to allow the production of three new pesticide active ingredient intermediates for imidazolinone herbicides	Superseded by permit 102008-001.
022006-005	Modification of the Pyrrole/MMPDC	Superseded by permit

Permit Number	Description	Permit Status
	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 ($KCOH_3$) scrubber.	012017-006. Superseded by permit 122017-011.
102008-001	Allow production of a new active ingredient, 800H, and expand production capacity of three diacids.	Active permit
062000-019A	Reduce reporting requirements	Special Condition #1 superseded by permit amendment 062000-019C.
062000-019B	Account for cleaning emissions	Active permit
102009-007	Increasing production of Imidazolinone	Superseded by permit 052015-012.
092009-005	Increasing production of MMPDC	Superseded by permit 012017-006. Superseded by permit 122017-011.
092010-009	Conversion of herbicide storage tank to store o-xylene	Active permit
022011-009	Addition of tank into existing process	Active permit
072013-001	Construct natural gas fired boilers	Portions of Special Condition #5.A.2. superseded by permit amendment 072013-001A.
092014-007	Increase in production of 800H herbicide	Active permit
052015-012	Replacement of centrifuges for IMI-1	Expired, installation did not install equipment
062000-019C	Reducing reporting requirements for excess SO_2 emissions during startup	Active permit
072013-001A	Eliminating GHG emission rate limit	Active permit
032016-002	Temporary permit to vent fumes to the atmosphere via the incineration bypass vent to identify emission sources and investigate source reductions	Replaced by 0997-003A
012017-006	Increasing production of Chlorfenapyr active ingredient	Superseded by permit 122017-011.
122017-011	Modification of the existing Pyrrole plant to accommodate a new active ingredient called Revysol.	Active permit
0997-003A	Vent fumes to the atmosphere via the incineration bypass vent to identify emission sources and investigate source reductions	Active permit
082019-012	Increase production of PROWL plant.	Active permit

PROJECT DESCRIPTION

The BASF Corporation - Hannibal Plant is planning to install a new backup open flare (TC-03) to replace its existing backup enclosed flare (TC-03), which has reached the end of its useful life. This new flare will treat process fumes as a backup to the "D" Incinerator (TC-01). "D" Incinerator, which is regulated under 40 CFR 63 Subpart EEE for hazardous waste treatment, and which also meets 40 CFR 63 Subpart MMM for Pesticide Active Ingredient process fume treatment, is the normal fume treatment unit for the AMVAC process and the associated tank farm and South Waste Treatment storage tanks. The new flare will treat fumes from these areas whenever "D" Incinerator cannot treat process fumes. The new flare is fired primarily by natural gas with propane as a backup. The flare is designed to have a 1500 °F exit vapor temperature. The plant's automated control system has interlocks that place the AMVAC reactions, during the high-emissions steps, into hold following the loss of process fume treatment by "D" Incinerator. The AMVAC reactions consist of a Diethyl Dithio Phosphoric Acid reaction and a condensation reaction. In addition to the new flare's backup role, it also serves a continuous role of controlling low background emissions from other AMVAC process equipment and breathing and working losses from the chemical storage tank farm.

This project does not qualify for the like-kind replacement exemption from the requirements to obtain a construction permitting due to differences between the existing flare and its replacement. The existing flare is an enclosed flare with a 5.3 MMBtu/hr design rating and the new flare is an open flare with a 6.3 MMBtu/hr design rating.

EMISSIONS/CONTROLS EVALUATION

Potential emission calculations were provided by the BASF Corporation and verified during the review of this New Source Review project.

- Calculations for the natural gas combustion in the flare use emission factors from the EPA document AP-42, *Compilation of Air Pollutant Emission Factors*, Fifth Edition, section 1.4 Natural Gas Combustion, July 1998.

- Data, provided by the BASF Corporation, indicated that the highest number of intervals of fumes being diverted from "D" Incinerator (trips) in any 12 month period was [redacted]. For a conservative estimate, the BASF Corporation used one trip per day (365 trips/yr) in calculating fumes from the AMVAC process directed to TC-03. The automatic control system at the Hannibal Plant takes [redacted] to drop from maximum flow to minimum flow venting following a Diethyl Dithio Phosphoric Acid reaction trip event. The BASF Corporation used [redacted] at maximum flow to represent emissions from the Diethyl Dithio Phosphoric Acid reaction during a trip event. The condensation reaction takes [redacted] to drop from maximum flow to minimum flow venting. The BASF Corporation used [redacted] at maximum flow to represent emissions from the condensation reaction during a trip event.

- Material balances and component molar rations were used to calculate the quantity of SO_x and CO_2 generated by the combustion of the organic

compounds. The molar ratios of natural gas and components of the fumes directed to the flare were provided as part of the design specifications for the operation of TC-03 by the manufacturer.

- Working and breathing losses from the chemical storage tank farm were calculated using worse case vapor pressures for each component and the number of tank fillings per year based on process MHDR.

The following table provides an emissions summary for this project. Existing potential emissions were taken from construction permit 082019-012. Existing actual emissions were taken from the installation's 2018 EIQ. Potential emissions of the application represent the potential of the TC-03, assuming operation within the limits of Special Condition 1.

Table 2: Emissions Summary (tpy)

Pollutant	Regulatory *De Minimis* Levels	Existing Potential Emissions	Existing Actual Emissions (2018 EIQ)	Potential Emissions of the Project[1]
PM	25.0	Major	N/R	0.2
PM_{10}	15.0	Major	78.5	0.2
$PM_{2.5}$	10.0	Major	75.0	0.2
SOx	40.0	Major	88.3	17.9
NOx	40.0	Major	323.4	2.7
VOC	40.0	Major	19.9	4.2
CO	100.0	Major	62.1	2.3
Combined HAPs	25.0	Major	19.3	0.83
Toluene	10.0	N/D	5.5	0.77
Formaldehyde	2.0	N/D	0.002	0.003

N/D = Not Determined; N/R Not Reported

[1]Potential Emissions of the Project are based on TC-03's continuous use to control emissions from the chemical storage tank farm and backup use to control emissions from the AMVAC process during 365 intervals of fumes being diverted from "D" Incinerator.

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 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

- *Operating Permits*, 10 CSR 10-6.065
- *Start-Up, Shutdown, and Malfunction Conditions,* 10 CSR 10-6.050
- *Submission of Emission Data, Emission Fees and Process Information,* 10 CSR 10-6.110
    - Per 10 CSR 10-6.110(4)(B)2.A. a full EIQ is required every year for Part 70 installations.
- *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 Standard for Hazardous Air Pollutants from Pesticide Active Ingredient Production,* 40 CFR Part 63, Subpart MMM
- *Control of Sulfur Dioxide Emissions*, 10 CSR 10-6.261

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*, it is recommended that 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 October 04, 2019, received October 4, 2019, designating BASF Corporation as the owner and operator of the installation.

APPENDIX A

Abbreviations and Acronyms

%.....percent
ºF.....degrees Fahrenheit
acfm.....actual cubic feet per minute
BACT.....Best Available Control Technology
BMPs.....Best Management Practices
Btu.....British thermal unit
CAM.....Compliance Assurance Monitoring
CAS.....Chemical Abstracts Service
CEMS.....Continuous Emission Monitor System
CFR.....Code of Federal Regulations
CO.....carbon monoxide
CO_2.....carbon dioxide
CO_2e.....carbon dioxide equivalent
COMS.....Continuous Opacity Monitoring System
CSR.....Code of State Regulations
dscf.....dry standard cubic feet
EIQ.....Emission Inventory Questionnaire
EP.....Emission Point
EPA.....Environmental Protection Agency
EU.....Emission Unit
fps.....feet per second
ft.....feet
GACT.....Generally Available Control Technology
GHG.....Greenhouse Gas
gpm.....gallons per minute
gr.....grains
GWP.....Global Warming Potential
HAP.....Hazardous Air Pollutant
hr.....hour
hp.....horsepower
lb.....pound
lbs/hr.....pounds per hour
MACT.....Maximum Achievable Control Technology
$\mu g/m^3$.....micrograms per cubic meter
m/s.....meters per second
Mgal.....1,000 gallons
MW.....megawatt
MHDR.....maximum hourly design rate
MMBtu....Million British thermal units
MMCF.....million cubic feet
MSDS.....Material Safety Data Sheet
NAAQS....National Ambient Air Quality Standards
NESHAPs National Emissions Standards for Hazardous Air Pollutants
NO_x.....nitrogen oxides
NSPS.....New Source Performance Standards
NSR.....New Source Review
PM.....particulate matter
$PM_{2.5}$.....particulate matter less than 2.5 microns in aerodynamic diameter
PM_{10}.....particulate matter less than 10 microns in aerodynamic diameter
ppm.....parts per million
PSD.....Prevention of Significant Deterioration
PTE.....potential to emit
RACT.....Reasonable Available Control Technology
RAL.....Risk Assessment Level
SCC.....Source Classification Code
scfm.....standard cubic feet per minute
SDS.....Safety Data Sheet
SIC.....Standard Industrial Classification
SIP.....State Implementation Plan
SMAL.....Screening Model Action Levels
SO_x.....sulfur oxides
SO_2.....sulfur dioxide
SSM.....Startup, Shutdown & Malfunction
tph.....tons per hour
tpy.....tons per year
VMT.....vehicle miles traveled
VOC.....Volatile Organic Compound

MISSOURI DEPARTMENT OF NATURAL RESOURCES

Air Pollution Control Program
Table of Hazardous Air Pollutants and Screening Model Action Levels

Chemical	CAS #	SMAL tons/yr	Group ID	VOC	PM	Chemical	CAS #	SMAL tons/yr	Group ID	VOC	PM
ACETALDEHYDE	75-07-0	9		Y	N	CHLOROMETHYL METHYL ETHER	107-30-2	0.1		Y	N
ACETAMIDE	60-35-5	1		Y	N	CHLOROPRENE	126-99-8	1		Y	N
ACETONITRILE	75-05-8	4		Y	N	CHROMIUM (VI) COMPOUNDS		0.002	L	N	Y
ACETOPHENONE	98-86-2	1		Y	N	CHROMIUM COMPOUNDS		5	L	N	Y
ACETYLAMINOFLUORINE, [2-]	53-96-3	0.005	V	Y	Y	CHRYSENE	218-01-9	0.01	V	Y	N
ACROLEIN	107-02-8	0.04		Y	N	COBALT COMPOUNDS		0.1	M	N	Y
ACRYLAMIDE	79-06-1	0.02		Y	N	COKE OVEN EMMISIONS	8007-45-2	0.03	N	Y	N
ACRYLIC ACID	79-10-7	0.6		Y	N	CRESOL, [META-]	108-39-4	1	B	Y	N
ACRYLONITRILE	107-13-1	0.3		Y	N	CRESOL, [ORTHO-]	95-48-7	1	B	Y	N
ALLYL CHLORIDE	107-05-1	1		Y	N	CRESOL, [PARA-]	106-44-5	1	B	Y	N
AMINOBIPHENYL, [4-]	92-67-1	1	V	Y	N	CRESOLS (MIXED ISOMERS)	1319-77-3	1	B	Y	N
ANILINE	62-53-3	1		Y	N	CUMENE	98-82-8	10		Y	N
ANISIDINE, [ORTHO-]	90-04-0	1		Y	N	CYANIDE COMPOUNDS		0.1	O	Y	N
ANTHRACENE	120-12-7	0.01	V	Y	N	DDE	72-55-9	0.01	V	Y	Y
ANTIMONY COMPOUNDS		5	H	N	Y	DI(2-ETHYLHEXYL) PHTHALATE, (DEHP)	117-81-7	5		Y	N
ANTIMONY PENTAFLUORIDE	7783-70-2	0.1	H	N	Y	DIAMINOTOLUENE, [2,4-]	95-80-7	0.02		Y	N
ANTIMONY POTASSIUM TARTRATE	28300-74-5	1	H	N	Y	DIAZOMETHANE	334-88-3	1		Y	N
ANTIMONY TRIOXIDE	1309-64-4	1	H	N	Y	DIBENZ(A,H)ANTHRACENE	53-70-3	0.01	V	Y	N
ANTIMONY TRISULFIDE	1345-04-6	0.1	H	N	Y	DIOXINS/FURANS		6E-07	D,V	Y	N
ARSENIC COMPOUNDS		0.005	I	N	Y	DIBENZOFURAN	132-64-9	5	V	Y	N
ASBESTOS	1332-21-4	0	A	N	Y	DIBROMO-3-CHLOROPROPANE, [1,2-]	96-12-8	0.01		Y	N
BENZ(A)ANTHRACENE	56-55-3	0.01	V	Y	N	DIBROMOETHANE, [1,2-]	106-93-4	0.1		Y	N
BENZENE	71-43-2	2		Y	N	DIBUTYL PHTHALATE	84-74-2	10		Y	Y
BENZIDINE	92-87-5	0.0003	V	Y	N	DICHLOROBENZENE, [1,4-]	106-46-7	3		Y	N
BENZO(A)PYRENE	50-32-8	0.01	V	Y	N	DICHLOROBENZIDENE, [3,3-]	91-94-1	0.2	V	Y	Y
BENZO(B)FLUORANTHENE	205-99-2	0.01	V	Y	N	DICHLOROETHANE, [1,1-]	75-34-3	1		Y	N
BENZO(K)FLUORANTHENE	207-08-9	0.01	V	Y	N	DICHLOROETHANE, [1,2-]	107-06-2	0.8		Y	N
BENZOTRICHLORIDE	98-07-7	0.006		Y	N	DICHLOROETHYLENE, [1,1-]	75-35-4	0.4		Y	N
BENZYL CHLORIDE	100-44-7	0.1		Y	N	DICHLOROMETHANE	75-09-2	10		N	N
BERYLLIUM COMPOUNDS		0.008	J	N	Y	DICHLOROPHENOXY ACETIC ACID, [2,4-]	94-75-7	10	C	Y	Y
BERYLLIUM SALTS		2E-05	J	N	Y	DICHLOROPROPANE, [1,2-]	78-87-5	1		Y	N
BIPHENYL, [1,1-]	92-52-4	10	V	Y	N	DICHLOROPROPENE, [1,3-]	542-75-6	1		Y	N
BIS(CHLOROETHYL)ETHER	111-44-4	0.06		Y	N	DICHLORVOS	62-73-7	0.2		Y	N
BIS(CHLOROMETHYL)ETHER	542-88-1	0.0003		Y	N	DIETHANOLAMINE	111-42-2	5		Y	N
BROMOFORM	75-25-2	10		Y	N	DIETHYL SULFATE	64-67-5	1		Y	N
BROMOMETHANE	74-83-9	10		Y	N	DIETHYLENE GLYCOL MONOBUTYL ETHER	112-34-5	5	P	Y	N
BUTADIENE, [1,3-]	106-99-0	0.07		Y	N	DIMETHOXYBENZIDINE, [3,3-]	119-90-4	0.1	V	Y	Y
BUTOXYETHANOL ACETATE, [2-]	112-07-2	5	P	Y	N	DIMETHYL BENZIDINE, [3,3-]	119-93-7	0.008	V	Y	Y
BUTYLENE OXIDE, [1,2-]	106-88-7	1		Y	N	DIMETHYL CARBAMOYL CHLORIDE	79-44-7	0.02		Y	N
CADMIUM COMPOUNDS		0.01	K	N	Y	DIMETHYL FORMAMIDE	68-12-2	1		Y	N
CALCIUM CYANAMIDE	156-62-7	10		Y	Y	DIMETHYL HYDRAZINE, [1,1-]	57-14-7	0.008		Y	N
CAPROLACTAM (Delisted)	105-60-2					DIMETHYL PHTHALATE	131-11-3	10		Y	N
CAPTAN	133-06-2	10		Y	Y	DIMETHYL SULFATE	77-78-1	0.1		Y	N
CARBARYL	63-25-2	10	V	Y	Y	DIMETHYLAMINOAZOBENZENE, [4-]	60-11-7	1		Y	N
CARBON DISULFIDE	75-15-0	1		Y	N	DIMETHYLANILINE, [N-N-]	121-69-7	1		Y	N
CARBON TETRACHLORIDE	56-23-5	1		Y	N	DINITRO-O-CRESOL, [4,6-] (Note 6)	534-52-1	0.1	E	Y	Y
CARBONYL SULFIDE	463-58-1	5		Y	N	DINITROPHENOL, [2,4-]	51-28-5	1		Y	N
CATECHOL	120-80-9	5		Y	N	DINITROTOLUENE, [2,4-]	121-14-2	0.02		Y	N
CHLORAMBEN	133-90-4	1		Y	Y	DIOXANE, [1,4-]	123-91-1	6		Y	N
CHLORDANE	57-74-9	0.01		Y	Y	DIPHENYLHYDRAZINE, [1,2-]	122-66-7	0.09	V	Y	Y
CHLORINE	7782-50-5	0.1		N	N	DIPHENYLMETHANE DIISOCYANATE, [4,4-]	101-68-8	0.1	V	Y	N
CHLOROACETIC ACID	79-11-8	0.1		Y	N	EPICHLOROHYDRIN	106-89-8	2		Y	N
CHLOROACETOPHENONE, [2-]	532-27-4	0.06		Y	N	ETHOXYETHANOL, [2-]	110-80-5	10	P	Y	N
CHLOROBENZENE	108-90-7	10		Y	N	ETHOXYETHYL ACETATE, [2-]	111-15-9	5	P	Y	N
CHLOROBENZILATE	510-15-6	0.4	V	Y	Y	ETHYL ACRYLATE	140-88-5	1		Y	N
CHLOROFORM	67-66-3	0.9		Y	N	ETHYL BENZENE	100-41-4	10		Y	N

ETHYL CHLORIDE	75-00-3	10		Y	N	NITROBENZENE	98-95-3	1		Y	N
ETHYLENE GLYCOL	107-21-1	10		Y	N	NITROBIPHENYL, [4-]	92-93-3	1	V	Y	N
ETHYLENE GLYCOL MONOBUTYL ETHER (Delisted)	111-76-2					NITROPHENOL, [4-]	100-02-7	5		Y	N
ETHYLENE GLYCOL MONOHEXYL ETHER	112-25-4	5	P	Y	N	NITROPROPANE, [2-]	79-46-9	1		Y	N
ETHYLENE IMINE [AZIRIDINE]	151-56-4	0.003		Y	N	NITROSODIMETHYLAMINE, [N-]	62-75-9	0.001		Y	N
ETHYLENE OXIDE	75-21-8	0.1		Y	N	NITROSOMORPHOLINE, [N-]	59-89-2	1		Y	N
ETHYLENE THIOUREA	96-45-7	0.6		Y	Y	NITROSO-N-METHYLUREA, [N-]	684-93-5	0.0002		Y	N
FORMALDEHYDE	50-00-0	2		Y	N	OCTACHLORONAPTHALENE	2234-13-1	0.01	V	Y	N
GLYCOL ETHER (ETHYLENE GLYCOL ETHERS)		5	P	Y	N	PARATHION	56-38-2	0.1		Y	Y
GLYCOL ETHER (DIETHYLENE GLYCOL ETHERS)		5	P	Y	N	PCB [POLYCHLORINATED BIPHENYLS]	1336-36-3	0.009	X	Y	Y
HEPTACHLOR	76-44-8	0.02		Y	N	PENTACHLORONITROBENZENE	82-68-8	0.3		Y	N
HEXACHLOROBENZENE	118-74-1	0.01		Y	N	PENTACHLOROPHENOL	87-86-5	0.7		Y	N
HEXACHLOROBUTADIENE	87-68-3	0.9		Y	N	PHENOL	108-95-2	0.1		Y	N
HEXACHLOROCYCLOHEXANE, [ALPHA-]	319-84-6	0.01	F	Y	N	PHENYLENEDIAMINE, [PARA-]	106-50-3	10		Y	N
HEXACHLOROCYCLOHEXANE, [BETA-]	319-85-7	0.01	F	Y	N	PHOSGENE	75-44-5	0.1		Y	N
HEXACHLOROCYCLOHEXANE, [DELTA-]	319-86-8	0.01	F	Y	N	PHOSPHINE	7803-51-2	5		N	N
HEXACHLOROCYCLOHEXANE, [TECHNICAL]	608-73-1	0.01	F	Y	N	PHOSPHOROUS (YELLOW OR WHITE)	7723-14-0	0.1		N	N
HEXACHLOROCYCLOPENTADIENE	77-47-4	0.1		Y	N	PHTHALIC ANHYDRIDE	85-44-9	5		Y	N
HEXACHLOROETHANE	67-72-1	5		Y	N	POLYCYLIC ORGANIC MATTER		0.01	V	Y	N
HEXAMETHYLENE,-1,6-DIISOCYANATE	822-06-0	0.02		Y	N	PROPANE SULTONE, [1,3-]	1120-71-4	0.03		Y	Y
HEXAMETHYLPHOSPHORAMIDE	680-31-9	0.01		Y	N	PROPIOLACTONE, [BETA-]	57-57-8	0.1		Y	N
HEXANE, [N-]	110-54-3	10		Y	N	PROPIONALDEHYDE	123-38-6	5		Y	N
HYDRAZINE	302-01-2	0.004		N	N	PROPOXUR [BAYGON]	114-26-1	10		Y	Y
HYDROGEN CHLORIDE	7647-01-0	10		N	N	PROPYLENE OXIDE	75-56-9	5		Y	N
HYDROGEN FLUORIDE	7664-39-3	0.1		N	N	PROPYLENEIMINE, [1,2-]	75-55-8	0.003		Y	N
HYDROQUINONE	123-31-9	1		Y	N	QUINOLINE	91-22-5	0.006		Y	N
INDENO(1,2,3CD)PYRENE	193-39-5	0.01	V	Y	N	QUINONE	106-51-4	5		Y	N
ISOPHORONE	78-59-1	10		Y	N	RADIONUCLIDES		Note 1	Y	N	Y
LEAD COMPOUNDS		0.01	Q	N	Y	SELENIUM COMPOUNDS		0.1	W	N	Y
LINDANE [GAMMA-HEXACHLOROCYCLOHEXANE]	58-89-9	0.01	F	Y	N	STYRENE	100-42-5	1		Y	N
MALEIC ANHYDRIDE	108-31-6	1		Y	N	STYRENE OXIDE	96-09-3	1		Y	N
MANGANESE COMPOUNDS		0.8	R	N	Y	TETRACHLORODIBENZO-P-DIOXIN,[2,3,7,8]	1746-01-6	6E-07	D,V	Y	Y
MERCURY COMPOUNDS		0.01	S	N	N	TETRACHLOROETHANE, [1,1,2,2-]	79-34-5	0.3		Y	N
METHANOL	67-56-1	10		Y	N	TETRACHLOROETHYLENE	127-18-4	10		N	N
METHOXYCHLOR	72-43-5	10	V	Y	Y	TITANIUM TETRACHLORIDE	7550-45-0	0.1		N	N
METHOXYETHANOL, [2-]	109-86-4	10	P	Y	N	TOLUENE	108-88-3	10		Y	N
METHYL CHLORIDE	74-87-3	10		Y	N	TOLUENE DIISOCYANATE, [2,4-]	584-84-9	0.1		Y	N
METHYL ETHYL KETONE (Delisted)	78-93-3					TOLUIDINE, [ORTHO-]	95-53-4	4		Y	N
METHYL HYDRAZINE	60-34-4	0.06		Y	N	TOXAPHENE	8001-35-2	0.01		Y	N
METHYL IODIDE	74-88-4	1		Y	N	TRICHLOROBENZENE, [1,2,4-]	120-82-1	10		Y	N
METHYL ISOBUTYL KETONE	108-10-1	10		Y	N	TRICHLOROETHANE, [1,1,1-]	71-55-6	10		N	N
METHYL ISOCYANATE	624-83-9	0.1		Y	N	TRICHLOROETHANE, [1,1,2-]	79-00-5	1		Y	N
METHYL METHACRYLATE	80-62-6	10		Y	N	TRICHLOROETHYLENE	79-01-6	10		Y	N
METHYL TERT-BUTYL ETHER	1634-04-4	10		Y	N	TRICHLOROPHENOL, [2,4,5-]	95-95-4	1		Y	N
METHYLCYCLCOPENTADIENYL MANGANESE	12108-13-3	0.1	R	N	Y	TRICHLOROPHENOL, [2,4,6-]	88-06-2	6		Y	N
METHYLENE BIS(2-CHLOROANILINE), [4,4-]	101-14-4	0.2	V	Y	Y	TRIETHYLAMINE	121-44-8	10		Y	N
METHYLENEDIANILINE, [4,4-]	101-77-9	1	V	Y	N	TRIFLURALIN	1582-09-8	9		Y	Y
METHYLNAPHTHALENE, [2-]	91-57-6	0.01	V	Y	N	TRIMETHYLPENTANE, [2,2,4-]	540-84-1	5		Y	N
MINERAL FIBERS		0	T	N	Y	URETHANE [ETHYL CARBAMATE]	51-79-6	0.8		Y	N
NAPHTHALENE	91-20-3	10	V	Y	N	VINYL ACETATE	108-05-4	1		Y	N
NAPHTHYLAMINE, [ALPHA-]	134-32-7	0.01	V	Y	N	VINYL BROMIDE	593-60-2	0.6		Y	N
NAPHTHYLAMINE, [BETA-]	91-59-8	0.01	V	Y	N	VINYL CHLORIDE	75-01-4	0.2		Y	N
NICKEL CARBONYL	13463-39-3	0.1	U	N	Y	XYLENE, [META-]	108-38-3	10	G	Y	N
NICKEL COMPOUNDS		1	U	N	Y	XYLENES (MIXED ISOMERS)	1330-20-7	10	G	Y	N
NICKEL REFINERY DUST		0.08	U	N	Y						
NICKEL SUBSULFIDE	12035-72-2	0.04	U	N	Y						

Legend	
Group ID	
A	Asbestos
B	Cresols/Cresylic Acid (isomers and mixtures)
C	2,4 - D, Salts and Esters
D	Dibenzofurans, Dibenzodioxins
E	4, 6 Dinitro-o-cresol, and Salts
F	Lindane (all isomers)
G	Xylenes (all isomers and mixtures)
H	Antimony Compounds
I	Arsenic Compounds
J	Beryllium Compounds
K	Cadmium Compounds
L	Chromium Compounds
M	Cobalt Compounds
N	Coke Oven Emissions
O	Cyanide Compounds
P	Glycol Ethers
Q	Lead Compounds (except elemental Lead)
R	Manganese Compounds
S	Mercury Compounds
T	Fine Mineral Fibers
U	Nickel Compounds
V	Polycyclic Organic Matter
W	Selenium Compounds
X	Polychlorinated Biphenyls (Aroclors)
Y	Radionuclides
Notes	The SMAL for radionuclides is defined as the effective dose equivalent to 0.3 millirems per year for 7 years exposure associated with a cancer risk of 1 in 1 million