M41808
MAWILS

DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
ACTIVITY REPORT: Scheduled Inspection

M480838419

FACILITY: BASF Corporation		**SRN / ID:** M4808
LOCATION: 1609 BIDDLE AVE., WYANDOTTE		**DISTRICT:** Detroit
CITY: WYANDOTTE		**COUNTY:** WAYNE
CONTACT: Jordan Thompson , Senior EHS Specialist		**ACTIVITY DATE:** 12/07/2016
STAFF: Todd Zynda	**COMPLIANCE STATUS:** Compliance	**SOURCE CLASS:** MAJOR
SUBJECT: Scheduled Inspection		
RESOLVED COMPLAINTS:		

REASON FOR INSPECTION: Scheduled Inspection
INSPECTED BY: Todd Zynda, AQD
PERSONNEL PRESENT: Bryan Hughes, EHS Team Leader; Jordan Thompson, Senior EHS Specialist
FACILITY PHONE NUMBER: (734) 324-6523
FACILITY WEBSITE: www.basf.com

FACILITY BACKGROUND

BASF Corporation (BASF) is located in Wyandotte, Michigan on the east side of Biddle Avenue, along the Detroit River, between Goddard Road and Ford Road in a primarily industrial setting. A mixture of commercial and residential areas is located immediately to the west across Biddle Avenue.

BASF's Wyandotte operations comprise three separate stationary sources: (1) chemical production plants with a Standard Industrial Classification (SIC) major grouping of 28 and identified as State Registration Number (SRN) B4359; (2) plastics production plants with an SIC major grouping of 30 and identified as SRN M4777; (3) laboratory and research operations with an SIC major grouping of 87 and identified as SRN M4808.

The Labs and Applications Centers stationary source, M4808, provides a variety of services to customers internal to the BASF Wyandotte site, to customers at BASF Corporation sites outside Wyandotte, and to customers outside of the BASF Corporation. These services include research and development, chemical and physical analyses, process development, and testing.

BASF research and development operations, termed the Labs and Application Centers, comprise various operations at the site: the wet chemical and physical analysis laboratories at the main R&D building and at the various quality assurance/quality control (QA/QC) labs appended to each process (Polyol Plant, Cellasto Plant, Engineering Plastics Compounding [EPC] Plant, Thermoplastic Urethane [TPU] Plant, Wyandotte Resins Plant [WYR]), urethane application laboratory (UAL), the urethane application center (PAC), the woodbinder laboratory, and the non-production operations at Chemical Engineering Research (CER) - formerly Analytical Chemistry and Chemical Engineering (ACCE). BASF's Labs and Application Centers is operating under Renewable Operating Permit No. MI-ROP-M4808-2014 issued May 13, 2014.

INSPECTION NARRATIVE

On December 7, 2016 and January 17, 2017 the Michigan Department of Environmental Quality (MDEQ) Air Quality Division (AQD) inspector, Mr. Todd Zynda, conducted an inspection of BASF Labs and Application Centers at 1609 Biddle Avenue, Wyandotte, Michigan. During the inspection, Mr. Bryan Hughes, EHS Team Leader and Mr. Jordan Thompson, Senior EHS Specialist provided information and a tour of facility operations relating to air quality permits. Additional BASF personnel provided information and tours of their respective assigned work area. The inspection was conducted to determine the facility's compliance with the Natural Resources and Environmental Protection Act (NREPA), Act 451, Part 55, and ROP No. MI-ROP-M4808-2014.

Prior to the inspection a visitor pass was obtained at the administration building. In addition, a safety and orientation video was viewed at the administration building. The inspection of Labs and Applications Centers (M4808) was conducted in conjunction with the inspection of BASF Plastic Plants (M4777) and BASF Chemical Plants (B4359).

During the inspection on December 7, 2016, the BASF operations and MI-ROP-M4808-2014 conditions were discussed. An inspection checklist outlining ROP requirements and emission unit permit to install (PTI) exemption applicability were discussed.

On January 9, 2017, Mr. Thompson requested additional time to compile the information requested. On February 27, 2017 information was provided regarding the 2016 actual usage for VOCs and HAPs at M4808. Information regarding best available control technology for toxics (T-BACT) was not provided. According to Mr. Thompson, the T-BACT information has not changed since the April 17, 2015 submittal provided as part of the last inspection.

During the December 7, 2016 inspection, the following areas were inspected: Central Research and Development (R & D) Labs, and Chemical Engineering Research. BASF asserts the operations at M4808 are exempt from the requirement to obtain a permit to install through Rule 283(2)(a) and Rule 283(2)(b) because they are utilized for the purposes of research and development only. Those operations exempt under Rule 283 (2)(a) are required to operate under T-BACT. BASF's CER Plant, formerly ACCE, is the most prominent operation of this type at M4808. CER has several smaller size reactors ranging from 10 to 160 gallons that are used for research. Emissions are controlled by vacuum pumps with dry ice traps. Additionally, CER contains three reactors for polyol production and for research. The smaller 60 gallon R-20 and 250 gallon R-100 reactors are more often utilized for research and development while the larger 2,000 gallon R-30 reactor is more often utilized for commercial manufacture. A wet scrubber and vacuum jet condenser controls are applied for emissions control under either scenario. The wet scrubber located in Building 55R and controls emissions from reactor vents and raw material tank air displacements. The north/south (N/S) vacuum jet condensers located in Building 55R or the east/west (E/W) vacuum jet condensers located in Building 53Z, control emissions from oxide stripping. During the inspection, the oxide scrubber control panel in Building 55R showed a T-110 wet scrubber pump outlet pressure of 0.96 bar. According to previous inspections, an alarm sounds at 2 bar and the pH is sampled monthly. The operations log entry for December 4, 2016 showed a scrubber water concentration of 86.8% and a pH of 1.82. The north/south vacuum jet was in operation at the time of the inspection and registered a temperature of 20.9°C (or 69.6°F). An alarm will sound if temperature reaches 45 °C.

Building 55R also contains support laboratories for the WYR Plant (SRN B4359), which includes bench scale autoclave reactors.

The Central R & D building is the red brick building along Biddle Road, just north of the Administration Building. The Central R & D building has approximately 40 to 50 vertical stacks that are used to exhaust laboratory hood vents. Emissions are released uncontrolled to the atmosphere. Wet chemical and physical laboratories occupy all three floors (two above ground and one basement level). At the time of inspection approximately one half of the building appeared occupied. Most of the laboratories are used for R & D of new and existing BASF products. Equipment in laboratories may consist of mixers, titration equipment, gas chromatography (GC), mass spectrometry, flame ionization detection (FID), etc. According to the previous inspection, the research conducted in the Central R & D building is for the transportation, construction, industrial industries and varies by specific laboratory room. According to Mr. Thompson, the expansion of the Central R & D building is currently on hold.

During the inspection on January 17, 2017, the Cellasto Lab (associated with SRN M4777) and Packaging Application Laboratory (PAL) were observed.

The Cellasto Lab is used for dimension analyses, chemical analyses, and "mini batch" reactivity tests. The Cellasto Lab houses a wet chemistry and physical chemistry equipment.

The PAL, which opened in June 2016, contains an extruder, printers, paper coaters, thermoformer, and associated ovens. The PAL is used for research and development of packaging application. Potential emissions are vented and exhausted outside to ambient air. The PAL is not used for production or commercial sale of products, and is strictly used for research and development of the packaging coatings and printing.

During the inspection, the TPU QA laboratory was not observed (associated with B4359). The previous inspection indicates that the lab is used for physical testing of thermoplastic polyurethane elastomer that is produced from diols, methylene diisocyanate (MDI), and solid materials. The lab includes a melt-flow machine that conducts viscosity testing on the product produced.

During the inspection, the Care Chemical Lab and Woodbinder Lab were not visited. According to the previous inspection, the Care Chemical Lab consists of laboratory benches and hoods used for the research and

development of soaps and surfactants. According to Mr. Thompson the Woodbinder Lab is used for the research and development of resins and adhesives.

During the inspection, the EPC laboratory was not observed. According to previous inspection reports, the EPC laboratory houses a "mini extruder".

During the inspection the UAL and PAC were not observed. The UAL and PAC are located adjacent to the Central R & D building to the north. Within the UAL bench scale experiments form urethane from polyol resin and isocyanates to test for foam rise and other properties during reaction. Foams are tested for physical properties and are analyzed chemically and microscopically to determine the extent of reaction and structure.

The PAC contains several areas were urethane application is "scaled up". The area contains spray booths and foam producing machines. Polyol and isocyanates are stored in separate drums (55 gallons). The additives and blowing agent are mixed with polyol. When using a foam producing machine, a mixer draws the raw materials together, meters them to a mixhead at a prescribed rate, and blows them out under pressure, usually into a mold.

Within the July 28, 2015 email submittal provided for the previous inspection, BASF provided site maps of Rule 283 activities and processes.

Compliance Status:
Stationary source M4808 is currently covered under MI-ROP-M4808-2014, issued on May 13, 2014. Prior to the current inspection described in this report, the last site inspection was conducted on April 1, 2015, with the last full compliance evaluation covering compliance activities reviewed through approximately April 1, 2015. In general, this report covers compliance activities that have occurred since April 1, 2015 through approximately December 7, 2016. A request for information from BASF was received on February 27, 2017.

BASF asserts the operations at M4808 are exempt from the requirement to obtain a permit to install through Rule 283(2)(a) and Rule 283(2)(b) because they are utilized for the purposes of research and development only.

R 336.1283(2) exempts from the requirement of R 336.1201(1) to obtain a permit to install the following:

(a) pilot processes or process equipment utilizing T-BACT used for any of the following: (i) chemical analysis; (ii) physical analysis; (iii) empirical research; (iv) theoretical research; (v) the development of process or process equipment design and operating parameters; (vi) the production of a product for field testing; (vii) the production of a product for clinical testing of pharmaceuticals; (viii) the production of a product for use as a raw material in the research and development of a different product.

(b) laboratory equipment.

R 336.1283(3) provides restrictions on the exemption at (2)(a), noting the rule does not include pilot processes or process equipment used for: (a) the production of a product for sale, unless such sale is only incidental to the use of the pilot process or process equipment; (b) the repetitive production of a product using the same process or process equipment design and operating parameters; (c) the production of a product for market testing or market development; (d) the treatment or disposal of waste which is designed, by listing or specified characteristic, as hazardous under federal regulations or state rules.

R 336.1278 precludes the exemptions from applying to any of the following:
(1)(a) any activity subject to major New Source Review (Part 18 or Part 19 of the AQD rules);
(1)(b) any activity resulting in an increase in actual emissions greater than the Rule 119 significance levels;
(2) construction or reconstruction of a major source of HAPs (40 CFR 63.2 and 63.5(b)(3));
(3) construction or modification of a HAP source at 40 CFR 61.

BASF provided emissions information in the February 27, 2017 submittal. BASF claims this data as "Confidential Business Information". Within the submittal, BASF details emissions for the stationary source by CAS number. The inventory of chemical usage and emissions are broken down by laboratory and room number. The majority of emissions are assumed equivalent to half the chemical usage (emission factor of 0.5) for ease of calculation. Chemicals are used as raw materials in R&D processes and in chemical standard preparation; therefore this assumption is likely a conservative estimate. Similar to the October 10, 2005 submittal, lower emission factors were used for MDI, TDI, styrene, acrylonitrile, ethylene oxide, propylene oxide, etc, based on the volatility of the chemical. Total VOC emissions are reported at 8.24 tons and total HAP emissions are

reported at approximately 1.1 tons. Based on the reported emissions, the source is beneath major source thresholds for prevention of significant deterioration (PSD), nonattainment area (NAA), and maximum achievement control technology (MACT) [threshold required to define a project as constructing a new source], as well as below all Rule 119(e) significance levels (i.e. 40 tons VOC, 15 tons PM-10). A detailed review of the inventory and calculated emission was not conducted. Based on review of the information at this time, M4808 is considered in compliance with the exemption Rule 283(2)(b) and the record keeping requirements of Rule 278a.

During the previous inspection, the April 17, 2015 submittal identifies units exempt under Rule 283(2)(a). A complete evaluation of the T-BACT analyses was not conducted at that time. Based on review of the material at that time, M4808 is considered in compliance with the exemption Rule 283(2)(a) and the record keeping requirements of Rule 278a.

CER equipment that share production and R&D activities was in operation at CER during the 2016 inspection. Based on the observations of the December 7, 2016 and the monitoring data for November 4 and December 4, 2016 (submittal for SRN B4359), the CER operations appear to be in compliance with the requirements within the B4359 ROP:

(1) the T-110 scrubber and the vacuum jets were installed and operating during the December 7, 2016 inspection;

(2) the scrubber pump outlet pressure was continuously monitored and registered less than 2.0 bar, as seen by the 0.96 bar reading observed during the December 7, 2016 inspection, the continual readings of less than 1.0 bar in the daily records for November 4, 2016 and December 4, 2016;

(3) the monthly pH monitoring has been conducted and the pH has been less than 3.0, as seen by the 1.82 pH reading as noted in log entry dated December 4, 2016;

(4) the monthly water content monitoring has been conducted and measured greater than 60%, as noted in the log entries where the minimum water concentration in the scrubber solution of 86.8% on December 4, 2016;

(5) the monthly logs indicate the number of theoretical batches have been calculated;

(6) the vacuum jets have been in operation and have measured consistently less than 113°F (N/S jets) and 140° F (E/W jets), as noted during the December 7, 2016 inspection when the north/south vacuum jet temperature was in operation and observed to measure a temperature of 20.9°C (or 69.62°F), and in the daily records for December 7 where all vacuum jet temperatures continually registered less than 40°C (104°F).

Because CER operations have met the emissions control, monitoring, and recordkeeping requirements of the B4359 ROP when under commercial operations, it is presumed the R&D operations have met the T-BACT requirements under Rule 283(2)(a).

ROP No. MI-ROP-M4808-2014

MI-ROP-M4808-2014 general conditions (GC) and special conditions (SC) are listed as appropriate. For brevity, permit conditions and the language of federal and state rules have been paraphrased.

General Conditions

GC 9, 10 – **COMPLIANCE** – Collected air contaminants shall be removed to maintain controls at required collection efficiency; air cleaning devices installed and operated in a satisfactory manner – Controls were installed and operating in accordance with T-BACT during the inspection.

GC 11 – **COMPLIANCE** – Visible emissions limited to 20% over a six-minute average, with the exception of one 27% opacity per hour unless otherwise specified in the ROP or in a federal new source performance standard. This limit applies to point source (non-fugitive) emission units at the plant. Visible emissions were not observed exceeding 20% opacity during the inspection.

GC 12 – **COMPLIANCE** – Nuisance emissions prohibited – No citizen complaints have been received by the AQD's Detroit Office for the BASF Wyandotte operations in the period since the last inspection.

GC 19 through 23, 25 (and under individual EU/FG tables at SCs VII.1 through 3) –**COMPLIANCE** – Certification of reports and prompt reporting of deviations – Annual certifications and semiannual deviation reports were received or postmarked August 20, 2016, March 9, 2016, and August 29, 2015.

GC 24 – Compliance – Submissions to the Emissions Inventory – The AQD received this facility's 2015 and 2014 MAERS databases on (or postmarked) March 16, 2016 and March 16, 2015. Please see reports M480833784 and M480828891.

Source-Wide Conditions

SC I.1 and 2, VI.1 through 3 – **COMPLIANCE** – Hazardous Air Pollutant (HAP) emissions limited to less than 9.0 tons per 12-month rolling time period for each individual HAP and 22.5 tons per 12-month time period for combined HAPs; records; these requirements apply to the three stationary sources B4359, M4777, and M4808 combined.

BASF provided site-wide HAP emissions totals for the period December 2014 through December 2016 in the January 26, 2017 submittal. Monthly total HAP emissions range between 0.857 and 0.991 tons. Acrylic acid registered the highest total of any single HAP for a 12-month rolling period at 2.641 tons. BASF reported that the highest 12-month rolling total HAPs occurred at the end of December 2016 at 11.58 tons.

R 336.1707
This rule applies to all new cold cleaners. M4808 currently does not have any cold cleaners.

NESHAP for Chemical Manufacturing Area Sources, 40 CFR Subparts A and VVVVVV
On March 9, 2010, the AQD received from BASF Corporation, dated February 26, 2010, a "declaration of non-applicability regarding the Chemical Manufacturing Area Source Rule 40 CFR 63 Subpart VVVVVV as it relates to the manufacturing operations at the BASF Corporation facility located at 1609 Biddle Avenue Wyandotte, MI." No further information is provided.

Published in the October 29, 2009 Federal Register beginning page 56008, the Subpart VVVVVV contains the Area Source MACT for nine source categories in the chemical manufacturing sector. At 40 CFR 63.11494(a), the standard applies to chemical manufacturing process units (CMPUs) that uses as feedstocks, generates as byproducts, or produces as products any of the following HAPs: 1,3-butadiene, 1,3-dichloropropene, acetaldehyde, chloroform, ethylene dichloride, hexachlorobenzene, methylene chloride, quinoline, arsenic compounds, cadmium compounds, chromium compounds, lead compounds, manganese compounds, nickel compounds hydrazine. At 40 CFR 63.11494(c)(3) and (4), the standard does not apply to research and development facilities (as defined in Section 112(c)(7 of the Clean Air Act) or to quality assurance and quality control operations. Section 112(c)(7) of the Clean Air Act defines a research or laboratory facility as "any stationary source whose primary purpose is to conduct research and development into new processes and products, where such source is operated under the close supervision of technically trained personnel and is not engaged in the manufacture of products for commercial sale in commerce, except in a de minimis manner."

The Labs and Applications Centers (M4808) uses methylene chloride but appears to be classified as a research and development facility and therefore does not appear to be subject to 40 CFR 63 Subpart VVVVVV. However, the AQD has not received delegation from the U.S. EPA to administer MACT VVVVVV. Please see report M480809750.

On May 28, 2013, the AQD received from BASF Corporation, dated May 21, 2013, an Initial Notice of Compliance Status report for Chemical Manufacturing Area Source MACT at 40 CFR 63 Subpart VVVVVV. Please see B435923198. According to BASF, MACT VVVVVV applies to certain equipment at the CER plant associated with the EUCHEHARDELEN and EUCHEORGACT emission units (both included under stationary source B4359 – Chemical Plants). This appears to not change the status of MACT VVVVVV as it relates to M4808.

Conclusion:
At the time of completion of the investigation, the M4808 stationary source at BASF's Wyandotte facility appears to in compliance with its applicable requirements. As time allows a more detailed evaluation of BASF's T-BACT analyses should be conducted. In addition, if time allows, it is recommended that the chemical inventory and calculated emissions be evaluated in greater detail.

NAME _____ DATE 3/2/17 SUPERVISOR JK