M4808
MANILA

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

M480828627

FACILITY: BASF Corporation		**SRN / ID:** M4808
LOCATION: 1609 BIDDLE AVE., WYANDOTTE		**DISTRICT:** Detroit
CITY: WYANDOTTE		**COUNTY:** WAYNE
CONTACT: Bryan Hughes , EHS Team Leader		**ACTIVITY DATE:** 04/01/2015
STAFF: Todd Zynda	**COMPLIANCE STATUS:** Compliance	**SOURCE CLASS:** MAJOR
SUBJECT: FY 2015 Targeted Inspection		
RESOLVED COMPLAINTS:		

REASON FOR INSPECTION: Targeted Inspection
INSPECTED BY: Todd Zynda, AQD
PERSONNEL PRESENT: Bryan Hughes, EHS Team Leader; Jordan Thompson, Senior EHS Specialist; Tom Wharton, 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 February 25, March 31, and April 1, 2015 the Michigan Department of Environmental Quality (MDEQ) Air Quality Division (AQD) inspector, Mr. Todd Zynda, conducted a level 2 unannounced inspection of BASF Labs and Application Centers at 1609 Biddle Avenue, Wyandotte, Michigan. During the inspection, Mr. Bryan Hughes, EHS Team Leader, Mr. Jordan Thompson, Senior EHS Specialist, and Mr. Tom Wharton, 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 opening meeting on February 25, 2015, the BASF operations and MI-ROP-M4808-2014 conditions were discussed. During the opening meeting an inspection checklist outlining ROP requirements and emission unit permit to install (PTI) exemption applicability (Attachment A), was discussed. Additionally, the BASF operations site layout was discussed.

On April 13, 2015, Mr. Hughes requested additional time to compile the information requested. Mr. Hughes indicated that additional time was needed for an intern to compile the information regarding the emissions at M4808. Additional time was granted. On April 20, 2015 information requested regarding best available control technology for toxics (T-BACT) was provided via email. The remaining requested information regarding Rule 283 applicability was provided on July 28, July 30 and August 21, 2015.

During the February 25, 2015 inspection, the following areas were inspected: Cellasto Lab (associated with SRN M4777), UAL, PAC and machining areas, and Central Research and Development (R & D) Labs.

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 Mr. Hughes, the research conducted in the Central R & D building is for the transportation, construction, industrial industries and varies by specific laboratory room.

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.

During the inspection, the EPC laboratory appeared dark and was not in use. According to previous inspection reports, the EPC laboratory houses a "mini extruder".

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 analyzied chemically and microscopically to determine the extent of reaction and structure. During the inspection one laboratory was visited. Emissions are vented uncontrolled through laboratory hoods and stacks at roof level.

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. During the inspection the foam producing machines were not in operation. Several molds produced were observed.

During the inspection on March 31 and April 1, 2015, the following areas were inspected. CER and TPU QA laboratory,

BASF asserts the operations at M4808 are exempt from the requirement to obtain a permit to install through Rule 283(1)(a) and Rule 283(1)(b) because they are utilized for the purposes of research and development only. Those operations exempt under Rule 283(1)(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 pure research. Emissions are controlled by vacuum pumps with dry ice traps. Additionally, CER contains three reactors for polyol production or 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 1.03 bar. An alarm sounds at 2 bar and the pH is sampled monthly. The operations log entry for April 1, 2015 showed a scrubber water concentration of 56.8% and a pH of 2.1. The north/south vacuum jet was in operation at the time of the inspection and registered a temperature of 16.8°C (or 62.2°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

During the inspection, the TPU QA laboratory was observed (associated with B4359). The lab is used for physical testing of thermoplastic polyurethane elastomer that is producred 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 Mr. Thompson, 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.

Within the July 28, 2015 email submittal, BASF provided a 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 September 27, 2013, with the last full compliance evaluation covering compliance activities reviewed through approximately September 30, 2013. In general, this report covers compliance activities that have occurred since October 1, 2013 through approximately April 1, 2015. A request for information from BASF was received on April 20, July 28, July 30 and August 21, 2015.

BASF asserts the operations at M4808 are exempt from the requirement to obtain a permit to install through Rule 283(1)(a) and Rule 283(1)(b) because they are utilized for the purposes of research and development only.

R 336.1283(1) 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(2) provides restrictions on the exemption at (1)(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 August 21, 2015 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 9.9 tons and total HAP emissions are reported at 2.3 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(1)(b) and the record keeping requirements of Rule 278a.

The April 17, 2015 submittal identifies units exempt under Rule 283(1)(a). A complete evaluation of the T-BACT analyses was not conducted. Based on review of the material at this time, M4808 is considered in compliance with the exemption Rule 283(1)(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 2015 inspection. Based on the observations of the March 31, 2015, the production logs for April 2013 through March 2015 (May 1, 2015 submittal for SRN B4359), and the monitoring data for March 25, 26, and April 22, 2015 (May 1, 2015 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 March 31, 2015 inspection;

(2) the scrubber pump outlet pressure was continuously monitored and registered less than 2.0 bar, as seen by the 1.03 bar reading observed during the March 31, 2015 inspection, the continual readings of 1.0 bar in the daily records for March 25, March 26, and April 22, 2015;

(3) the monthly pH monitoring has been conducted and the pH has been less than 3.0, as seen by the 2.1 pH reading as noted in log entries dated April 1, 2015;

(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 59.7% on December 4, 2014, after which the scrubber solution was changed prior to the next batch;

(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 March 31, 2015 inspection when the north/south vacuum jet temperature was in operation and observed to measure a temperature of 16.8°C (or 62.2°F), and in the March 25, March 26, and April 22, 2015 daily records where all vacuum jet temperatures continually registered less than 40°C (104°F).

Please also see report B435929024. 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(1)(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 – **IN 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 – **IN 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 – **IN 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) – **IN COMPLIANCE** – Certification of reports and prompt reporting of deviations – Annual certifications and semiannual deviation reports were received or postmarked March 4, 2015, September 11, 2014, and March 17, 2014.

GC 24 – Compliance – Submissions to the Emissions Inventory – The AQD received this facility's 2014 and 2013 MAERS databases on (or postmarked) March 16, 2015 and March 13, 2013. Please see reports M480828891and M480821086.

Source-Wide Conditions

SC I.1 and 2, VI.1 through 3 – **IN 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 February 2013 through February 2015 in the March 27, 2015 submittal. Monthly total HAP emissions range between 0.936 and 0.998 tons. Acrylic acid registered the highest total of any single HAP for a 12-month rolling period at 2.64 tons. BASF reported that the highest 12-month rolling total HAPs occurred during March 2013 at 11.9 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. 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. It is recommended that during the next inspection cycle that a more detailed evaluation of BASF's T-BACT analyses is conducted. In addition it is recommended that the chemical inventory and calculated emissions be evaluated in greater detail.

NAME _____ DATE 8/26/15 SUPERVISOR JK