M4777
MANILA

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

M477751011

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| **FACILITY:** BASF CORP | | **SRN / ID:** M4777 |
| **LOCATION:** 1609 BIDDLE AVE, WYANDOTTE | | **DISTRICT:** Detroit |
| **CITY:** WYANDOTTE | | **COUNTY:** WAYNE |
| **CONTACT:** Tom Wharton , EHS Specialist | | **ACTIVITY DATE:** 10/16/2019 |
| **STAFF:** Todd Zynda | **COMPLIANCE STATUS:** Compliance | **SOURCE CLASS:** MAJOR |
| **SUBJECT:** October 16, 2019 Inspection and ETPU RTO Stack Test Observation | | |
| **RESOLVED COMPLAINTS:** | | |

REASON FOR INSPECTION: Scheduled Inspection
INSPECTED BY: Todd Zynda, AQD
PERSONNEL PRESENT: Tom Wharton, EHS Specialist; Mariana Runho, EHS Specialist; Nick Martin, EPC EHS; George Rinke, Cellasto Plant EHS; Neal York, ETPU Plant Manager; Volkner Zahn, ETPU Process Engineer; Mark Knowles, ETPU Production Manager
FACILITY PHONE NUMBER: (734) 324-5042
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 Plastics Plants stationary source, M4777, the subject of this report, comprises the Engineering Plastics Compounding (EPC) Operations, the Cellasto Plant, and Expanded Thermoplastic Urethane (ETPU) Operations.

## PROCESS OVERVIEW

The EPC Operations produces plastic pellets from seven extruder lines. Solid raw materials (filler, fiberglass, nylon, pigment) are poured from supersacs into mixing vessels which are then fed into the extruder hoppers. The solids are melted into semi-solids under heat and extruded into thin wires which are cooled to harden, cut into pellets, and packaged. Material handling and hopper charging operations are controlled by dust collectors. Vapors from the extruders are controlled by water scrubbers. EPC is divided into two sub-plants, EPC II and EPC III, each operating with its own extruders, dust collectors, and scrubber.

The Cellasto plant manufactures automobile suspension parts by curing a mixture of polyol and diisocyanate with catalysts/inhibitors. Polyol and diisocyanate are initially reacted under heat into a prepolymer in one of five reactors. The prepolymer is dosed with an initiator into a heated mold and a urethane plastic is produced. The plastics are cured in ovens and shaken ("deburred") to remove imperfections. Storage vessels and reactor vessels are controlled by carbon adsorption units. Curing oven emissions are controlled by demisters (called scrubbers by the plant). Deburring machines either vent to the general in-plant environment or vent to outside ambient air through the control of knock out boxes and mesh filters (filter socks).

The ETPU operations is comprised of two ETPU plants; the operations at the two plants, ETPUI and ETPUII, are nearly identical. Water and the thermoplastic urethane beads are charged to an impregnation vessel, followed by a nitrogen purge and an addition of butane gas. After agitation under heat and pressure, the butane gas is expanded across an orifice into the rundown vessel, thus expanding the thermoplastic urethane beads to a desired density.

Butane and nitrogen in the rundown vessel flash off into an off-gas recovery tank (TK-780 for ETPUI and TK-880

for ETPUII). The aqueous solution is pumped out to a settlement tank. After washing, the beads are dried through a spin dryer, a flash dryer, and then stored in batch silos; this equipment vents to a fabric filter control device (i.e., F-780 for ETPUI and F-880 for ETPUII). After remaining in the batch silos for a sufficient time to allow for the majority of residual butane to off-gas to atmosphere, the beads are transferred to bulk storage silos in the bulk loading facility and thereafter shipped to customers.

The butane from the off-gas recovery tanks passes through a nitrogen condensation system for recovery and reuse in the impregnation vessels; one condensation system serves both ETPUI and ETPUII. Residual butane lost to off-gassing during the remainder of the process is replaced with fresh butane from storage as needed. Butane emissions from the degassing silos are controlled by a regenerative thermal oxidizer (RTO).

## COMPLAINT/COMPLIANCE HISTORY

There have been no recent complaints for this facility.

On June 17, 2014 a violation notice was issued to BASF Plastics for failure to submit a renewal application to MI-ROP-M4777-2009 by the June 10, 2014 deadline. As a result, Consent Order No. 47-2014 (effective date October 2, 2014) was issued.

## INSPECTION NARRATIVE

On October 16, 2019 the Michigan Department of Environment, Great Lakes, and Energy (EGLE) Air Quality Division (AQD) inspector, Mr. Todd Zynda, conducted an inspection of BASF Plastics Plants at 1609 Biddle Avenue, Wyandotte, Michigan. The inspection was conducted in conjunction with the ETPU RTO stack test. During the inspection, Mr. Tom Wharton, EHS Specialist, Mariana Runho, EHS Specialist, Nick Martin, EPC EHS, George Rinke, Cellasto Plant EHS, Neal York, ETPU Plant Manager, Volkner Zahn, ETPU Process Engineer, and Mark Knowles, ETPU Production Manager, provided information and a tour of facility operations relating to air quality permits. The inspection was conducted to determine the facility's compliance with the Natural Resources and Environmental Protection Act (NREPA), Act 451, Part 55, ROP No. MI-ROP-M4777-2015a, and PTI 88-17.

At 9:00 AM, Mr. Todd Zynda (AQD) arrived onsite and was greeted by Mr. Wharton. Prior to the inspection a visitor pass was obtained at the administration building.

During the opening meeting the BASF operations, MI-ROP-M4777-2015a and PTI 88-17 conditions, and ETPU RTO stack testing were discussed. A records request was sent to BASF via email on October 8, 2019. Records were provided via email on October 17 and 24, 2019.

Following the opening meeting, inspections of the EPC Plant, Cellasto Plant, and ETPU Operations was conducted, along with observation of the ETPU RTO stack test.

EPC Plant

The EPC Plant was visited from approximately 3:00 PM to 4:00 PM. During the inspection, Mr. Nick Marth and Ms. Mariana Ruhno provided information and a tour of the EPC Plant. The inspection began with observation of EPC II. According to previous inspections, EPC II was installed in 1992, while EPC III was installed in 1999. EPC II operates extruder lines 4, 5, and 6, while EPC III operates extruder lines 7, 8, 9, and 10.

During the inspection, the EPC material staging area, extruder lines, and pollution control equipment were observed. The EPC II water scrubber, which controls vapors from the extruding lines, was operating at 231 liters per minute. The extruders within EPC II use material that is mixed prior to entering the extruder. EPC II's dust collectors filter particulate emissions when raw materials are blown into the mixers from the hopper (filler) and storage silos (nylon). Mixed material also includes copper, fiberglass, talcum powder, and coloring. EPC II dust collectors are located on the roof of the building and were observed during the inspection from the rooftop door. Dust collector F-1040Z-3 services line 4, F-1040Z-4 services line 5, and F-1040Z-2 services line 6. The fourth dust collector (F-405Z-1) draws on the mixers to filter a combined flue. In addition, the four dust collectors are also equipped with a secondary filter after the exhaust from the primary dust collector. This secondary filter provides a backup control in case of a dust collector malfunction. During the inspection there were no visible emissions observed from dust collector exhaust. Pressure drop readings were not obtained as the roof access requires double ear protection (plugs and muffs). At the time of inspection, earmuffs were not available.

Following observation of the EPC II, EPC III was observed. In EPC III, dust collectors are housed in a single room on the ground floor. These pulse-jet baghouses with circular filters are not equipped with pressure drop gauges; the casings are opened and the filters cleaned and inspected according to a schedule. The filter room was not observed during the inspection as the room requires double ear protection. The stacks for the filters, are directed into a rectangular structure equipped with baffles. The structure is designed to reduce the noise generated from the exhaust; emissions are now exhausted at the bottom of the rectangular structure near to ground level. The exhaust point was observed from the outside during inspection. No visible emissions were observed.

The venturi water scrubber servicing EPC III is located in a room on the ground floor. The scrubber continually runs at a set flow and there are not any gauges observable measuring the flowrate. The EPC III stack vents out the east wall of the EPC building. No odors were observed from the EPC III venturi scrubber area during the inspection. According to past inspection reports, the EPC III scrubber was the cause of a confirmed odor event in 2002.

Storage silos are located outside along the southern end of the plant. Fabric filters are installed on the top of each silo to filter particulate entrained in air displaced when filling. The filters on top of these silos were not inspected during the site visit. According to previous inspections, the filters on each silo are inspected once a year.

The EPC oven was also observed during the inspection. The natural gas oven, which operates at 1600 degrees Fahrenheit (°F) and is equipped with an afterburner, is operated approximately once a week. The oven is used to clean die plates for extruders and other equipment associated with the extruders. The oven was not in use during the inspection.

According to the facility records request response the EPC cold cleaner was removed during April 2019.

Cellasto Plant

The Cellasto Plant was visited from approximately 1:30 PM to 2:30 PM. During the inspection, George Rinke, Cellasto Plant EHS provided information and a tour of the Cellasto Plant.

The inspection of the Cellasto Plant began in the north and south reactor rooms. The north reactor room contains three reactors (EUELAREACTOR210, 220, and 230), while the south reactor room contains two reactors (EUELAREACTOR240 and 250). The plant operates the five reactors for the combination of polyol, diisocyanate, and catalysts/inhibitors. Each reactor is operated with a vacuum pump and a carbon adsorption unit for volatile organic compound (VOC) control.

During the inspection on February 25, 2015 (see MACES report CA_M477728626), there was an issue with naphthalene diisocyanate (NDI) levels being greater than the permissible exposure limit (PEL) in the reactor rooms. As a result, the facility installed a glove box for NDI transfer and also installed a ventilation system to control the addition of NDI to the reactors. Any potential dust created during NDI transfer or addition to the reactors is vented to two dust collectors located on the north side of the Cellasto building. Previously any dust generated during NDI transfer/addition activities were released to the general in-plant environment. The facility claims the dry material handling of NDI which is controlled by the new dust collectors is exempt from permit to install (PTI) requirements per Rule 290.

During the inspection the carbon adsorption units in the reactor rooms were inspected. Transparent carbon-filled sleeves are installed on the top of each adsorption unit as a color gauge. The carbon is initially purple in color and turns brown as the carbon in the drum is exhausted. These sleeves were inspected and were approximately 75% purple, indicating that the carbon was approximately 25% exhausted.

During the inspection, Mr. Rinke explained the transfer of the reacted material to the mold lines. Liquid product is drawn from the bottom of the reactor and piped to transport vessels; air displaced during filling is vented uncontrolled to atmosphere through a flexible hood. The transport vessels are wheeled across the room and fitted to the metering machine, programmed to mix the proper amounts of prepolymer with component B, the catalyst/inhibitor mixture received in drums and also fitted to the machine. The metered dose of prepolymer/component B is poured into the dose machine feeding each individual mold at a line. According to BASF from a previous inspection, no blowing agent is used; when in the mixhead of the dosing machine the prepolymer/component B mix foams, creating the pressure necessary to push it out of the mixhead and into the

mold.

During the inspection the eleven mold lines were observed. Each line contains space for approximately 250 of the numerous molds employed for the various automobile suspension parts produced. At the time of inspection most mold lines were producing "joynce bumpers". The heated mold cures the part approximately 70%. The part is ejected from the mold and the mold is ready to be refilled.

Parts released from the molds are cured to completion in one of twelve ovens (101 through 112), which were observed during the inspection. Oven exhaust gas is approximately 108°C and vents to one of two mist eliminators ("de-mister") which drops out particulates and condensable VOCs; one demister controls ovens 101 through 106 and the second ovens 107 through 112. Both de-misters are located on the upper "mezzanine" level. The demisters servicing ovens 101 through 106 was observed during the inspection and the pressure drop ranged from at 0.25 inch to 0.5 inch of water; the demister require servicing at 2 inches of water. The demister servicing ovens 107 through 112 was also observed during the inspection, but the pressure drop gauge is no longer in use. According to correspondence from Mr. Wharton manual readings are recorded from the switch by plant personnel to confirm that the set point has not been changed. "Currently, if the air flow is out of range (less than 0.5 or above 0.62 inches of water), the system will automatically shut down the curing ovens and send a visual alarm to a HMI (Human Machine Interface) screen with an audible alarm, which is located adjacent to the applicable bank of ovens."

Cured parts are tumbled together in one of three "deburring" machines to remove chaff (extraneous folds and ridges on the parts). Two of the machines have been replaced with newer units. The units no longer use the filter socks associated with the older unit. Each unit is equipped with a knockout box and vented externally to outside ambient air. The deburring machines were in operation during inspection and no visible emissions were observed.

In addition to the deburring machines, an automated "cutting" machine used to cut molds in half was observed. Emissions from the cutting machines are released uncontrolled to the general in-plant environment.

Storage tanks 111 and 112 for NMP (N-methyl-2-pyrrolidone) are located outside the north face of the Cellasto building. NMP is used to clean miscellaneous equipment (there is a 200-gallon tank in the plant filled from the east tank as needed) and for the cleaning of reactors and pumps (NMP in the west tank recirculates to the reactors and back and the solvent is periodically changed). Emissions from each tank are controlled by a carbon adsorption unit. The carbon cannisters are used to capture VOCs due to tank breathing losses. Indicator "sleeves" on top of each carbon bed change color from purple to brown as carbon saturates. Viewed during the inspection, the indicators showed 90% purple for both tanks indicating the carbon was approximately 10% exhausted. Working losses during the filling of tanks 111 and 112 are controlled by vapor balance.

The Cellasto Plant cold cleaner was not observed during the inspection. According to previous inspections, the cold cleaner is equipped with an agitator and the lid is motorized.

ETPU Operations

On October 16, 2019, a stack test was conducted on the RTO. An inspection of ETPU operations (also known as Infinergy®) was conducted in conjunction with stack test observation. During the inspection and stack test, Mr. Volkner Zahn, Process Engineer, Mr. Neal York, Plant Manager, and Mr. Mark Knowles, Production Manager provided information and a tour of ETPU Operations.

Mr. Todd Zynda and Mr. Mark Dziadosz of the AQD arrived at approximately 9:00 AM on October 16, 2019 for observation stack testing of the RTO. Testing was conducted to verify the volatile organic compounds (VOC) destruction efficiency. PTI 88-17 includes a VOC destruction efficiency of 98% by weight.

During the test the EPUII was in operation. According to Mr. Neal York, ETPUI is not likely to operate until 2023 or 2024. At approximately 10:20 AM the RTO firebox measured 1549°F. The VOC destruction efficiency was measured as approximately 99% during Run 1 and 98.8% during Run 2.

On December 2, 2019, the AQD received BASF's test report via email. BASF reports the average VOC destruction efficiency was 98.8%.

The inspection began with observation of the volatile organic compound (VOC) recovery system (referred to as the Polaris by the facility), the ETPU Building, and the control room. Production equipment is housed within the

ETPU building and around its perimeter. BASF monitors production and pollution control equipment on computer consoles displaying valve position, temperature/pressure controls, tank levels, pressure drops, etc. on ETPUI, ETPUII, and raw material equipment in the plant. These parameters were viewed in the control room. At the time of the inspection, ETPUI was not in operation. According to Mr. York, ETPUI is likely to not run until 2023 or 2024. The facility no longer uses tricalcium phosphate (TCP) powder or nitric acid. The ETPU process uses a "soap" product Disponil followed by a City water rinse. The fabric filter formerly used for the TCP bag dump station is currently still in place but no long in use. Similarly, the nitric acid tank (emptied) and associated scrubber are still in place but no longer in use.

Emissions of butane, a VOC, are the predominant air emission at the plant. At 3,800 cubic feet for TK-780 in ETPUI (not in use) and 5,500 cubic feet for TK-880 in ETPUII, each of the two waste gas tanks has the capacity to accommodate an entire waste gas vent from its respective process vessel. A computer interlock prevents the pressure/temperature from rising above specified levels in a process vessel until the respective waste tank registers sufficient capacity to accept the volume of waste gas to be released after a completed batch.

The condensation system consists of a non-contact water chiller, two (alternating) dehydrators, a nitrogen-coolant condenser, and a butane collection tank. The chiller and a dehydrator condense out the water vapor and the nitrogen condenser liquefies the butane for collection. The remaining waste gas, composed almost entirely of nitrogen, is vented to the RTO duct that also controls emissions from the degassing silos (described below). The liquid butane is collected in the in-process butane collection tank and reused in the process. The liquid nitrogen coolant is stored in a vertical storage tank. An interlock prevents the release of butane from a waste gas tank if one or more indicators reflect a malfunction in the condensation system, such as a gas temperature exiting the condenser in excess of -50°F. Taken with the interlock linked to the waste gas tanks, this system is designed to prevent an emergency release of butane to atmosphere due to a breakdown in either a waste gas tank or the condensation system; upon detection of an irregularity operations are halted at points where the butane gas may be contained until the problem is corrected.

The condensation system recovers approximately 99% of the butane entering the system if the top of the condensation column maintains a temperature of -186°F or lower. From the computer display in the control room, the temperature gauge at the top of the column registered -86°F at the time of the inspection (process in regeneration). Overall, the condensation recovers approximately 55% to 66% of the butane used in a given batch; the remainder is lost as fugitive emissions or captured via degassing silos to the RTO. Butane is replaced with fresh butane from a 16,000 gallon storage tank. At the time of the inspection, the tank contained 32,000 pounds butane, approximately 42.3% of capacity.

The condensation unit is a part of the ambient butane monitoring system installed at the plant wherein 32 butane detectors are placed at locations of known possible butane release points. All sensors are set to alarm and shutdown that section of the process should the sensor read a butane concentration of 1100 ppm or greater, 10% of butane's lower explosive limit. Four of the butane sensors are installed at the condensation system – one near the waste gas vent and three near ground level (because butane is heavier than air at ambient conditions). None of the sensors were displaying an alarm in the control room when observed during the inspection.

Within the control room, the pressure drop for the bag house F-880 was observed. According to Mr. Knowles, F-780 and F841 are not in use as ETPUI and the TCP station are not in operation. The measured pressured drop for baghouse F880 was 0.05 inches water.

The stacks for the three baghouses were observed. All three baghouses vent vertically unobstructed to the ambient air. There were no visible emissions present at the time of inspection.

The inspection concluded with observation of the degassing silos and Infinergy Warehouse (formerly the Bulk Loading Facility [BLF]). The expanded pellets are stored in the degassing silos where butane emissions are captured and vented to the RTO for VOC control. Within the Infinergy Warehouse, a physical testing laboratory was observed. Within the laboratory, ETPU is tested for tensile, compression and density. The packaging area and storage area of the final product was observed in the Infinergy Warehouse.

No spillage was noted in the ETPU Building, in the Infinergy Warehouse, or on the surrounding grounds. No odors were noted and no opacity emissions were observed from the process equipment viewed.

## APPLICABLE RULES/PERMIT CONDITIONS

**ROP No. MI-ROP-M4777-2015a**
MI-ROP-M4777-2015a 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**

These general conditions (GC) are repeated at the beginning of each ROP section and are addressed here in total.

GC 9, GC 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 as directed by the ROP during the October 16, 2019 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 exceeding 20% opacity were not observed during the October 16, 2019 inspection.

GC 12 – **COMPLIANCE** – Nuisance emissions prohibited – There have been no Rule 901 violations for the BASF Wyandotte operations in the period since the last inspection.

GC 19 through GC 23, GC 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 September 13, 2019, March 15, 2019, September 13, 2018, and March 15, 2018.

GC 24 – **COMPLIANCE** – Submissions to the Emissions Inventory – The AQD received this facility's 2018 MAERS submittal on March 15, 2019.

**Source-Wide Conditions**

These general conditions are repeated at the beginning of each ROP section and are addressed here in total.

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 April 2018 through September 2019 in the October 17, 2019 submittal. Monthly total HAP emissions range between 1.133 and 1.209 tons. Acrylic acid registered the highest total of any single HAP for a 12-month rolling period at 2.817 tons. BASF reported that the highest 12-month rolling total HAPs occurred at the end of April 2018 at 14.771 tons.

Section 1 - FGEPCCOLDCLEANERS and Section 2 - FGELACOLDCLEANERS

According to the October 17, 2019 response the EPC cold cleaner was removed during April 2019. The Cellasto Plant cold cleaner was removed during August 2019. Prior to removal of the both cold cleaners the product used (Extreme Simple Green Aircraft & Precision Cleaner) was less than 5% VOC, meeting the definition of an aqueous based part washer (R 336.1101(q)).

SC II.1 – **COMPLIANCE** – Less than 5% of any combination of methylene chloride, perchloroethylene, trichloroethylene, 1,1,1-trichloroethane, carbon tetrachloride, and chloroform – The safety data sheet (SDS) for the cleaning solvent, "Extreme Simple Green Aircraft & Precision Cleaner", was provided in the October 17, 2019 submittal and indicates the solvent is water based and contains triethanolamine (<10%), ethoxylated alcohol (<5%), propylene glycol butyl ether (<5%), tetrapotassium pyrophosphate (<1%), and potassium silicate (<1%).

SC III.1 and 2, SC IV.1 through 5, SC VI.1 through 4 – **COMPLIANCE** – Cold cleaner operational requirements, including draining parts, closing cover when not in use, posting operating procedures near the cleaner, and storing waste solvents in closed containers; cold cleaner operational requirements are based on the type of cleaner and the vapor pressure of the solvent; information on each cold cleaner to be maintained on file.

In the October 17, 2019 submittal, BASF provided cold cleaner information, SDS, cold cleaner dimensions, locations, and air/vapor interface area. The vapor pressure of the solvent used in cold cleaners located at EPC and Cellasto is reported at 20.7 mmHg (0.400 psia). During previous inspections, the cover on the cold cleaners were observed to be closed and signs posted near or on the cleaner with proper procedures (keep cover closed when not in use, etc.). Therefore, the cold cleaners were judged in compliance with SCs IV.3 and VI.3. The air/vapor interfaces appeared to be less than 10 square feet, which demonstrated compliance with SC IV.1.a. During previous inspections, the cold cleaner in the Cellasto Plant was observed with the capability of solvent agitation and motorized lid, in compliance with SC IV.4.

Section 1 - FGEPCRULE290

EPC contains two emission units (EUEPCFILLERHNDLG, EUEPCOVEN) relating to Rule 290 subject equipment. R 336.1290 exempts from R 336.1201 those sources with limited emissions. The rule is divided into three general sections and further divided into subsections, depending on the type of emission (VOC, particulate, etc.), the carcinogenicity of the emissions, and the health-based screening level(s) of the emissions. Only those rules applicable to the Rule 290 emission units at the stationary source will be addressed. Rule 290 was recently revised on December 20, 2016. The citations listed below coincide with the existing ROP conditions and the former Rule 290 (prior to Rule revision). Each of emission units were installed prior to the rule revision and have not been modified.

R 336.1290(a) through (d) – **COMPLIANCE** – Emissions less than 1000 lbs. uncontrolled and 500 lbs. controlled with more restrictive limits for certain initial threshold screening levels (ITSL) and initial risk screening levels (IRSL); particulates limited to emissions of 0.01 lbs. particulate per 1000 lbs. gas, controlled by dust collector or equivalent installed and maintained, 5% opacity limit and monthly visible emission observation; description on file and records maintained. Required records are as follows for each emission unit: written description of the emission unit and control device, including the design control efficiency and exhaust gas flowrate; identify air contaminants emitted, carcinogenicity, screening level, and level of control; monthly emissions calculations; record of monthly visible emission readings.

The following emission units are listed as Rule 290 subject in the 2018 MAERS with their reported annual emissions in pounds:

2018 MAERS emissions reported (in pounds)

| Section | Emission Unit | VOC | PM10 | NOx | SO2 |
|---|---|---|---|---|---|
| 1 | EUEPCFillerHndlg | ------ | 238 | ------ | ------ |
| 1 | EUEPCOven | 22 | 43.00 | 914 | 5.5 |

According the MAERS submittal, the above reported emission units operate 12 months of the year. Fabric filters control particulate emissions from EUEPCFillerHndlg. Reported emissions for EUEPCFillerHndlg total to less than 500 pounds per year and therefore meet the monthly limit. Reported emissions for EUEPCOven are less than 500 pounds per year for both VOCs and PM10 combined. NOx emissions for EUEPCOven are 914 lbs for the year (estimated to be 76.16 lbs per month based on a 12 month operating year).

In the October 17, 2019 submittal, the facility also submitted EPC monthly emission calculations. BASF reports PM emissions from EPC for 2018 and 2019. The reported emissions are significantly less than 500 pounds per month. In addition, BASF provided the visible emission records for EPC (April 2018 through September 2019).

Exemptions are not applicable to emission units that represent a PSD major source or major modification nor an ROP significant or minor modification. None of the emission units cited as Rule 290 sources in Section 1 of the ROP are excluded from the classification. As reported in the 2018 MAERS, the annual emission from each Rule 290 source is less than the significance levels in Rule 119(e).

R 336.1286(2)(a)

R 336.1286(2)(a) excludes from the requirement to obtain a Permit to Install "[p]lastic extrusion . . . and associated plastic resin handling, storage, and drying equipment." This exemption applies to the EPC extruding lines and plastic storage silos. This equipment is still required to comply with R 336.1301, R 336.1331, R 336.1901, and R 336.1910. Observations during the inspection on October 16, 2019 suggest compliance with these requirements, as visible emissions and off-site odors were not noted during the site visit. There is also no evidence suggesting this equipment is excluded from exemption under R 336.1278. In MAERS 2018, BASF reports VOC emissions at approximately 3.9 tons for all emission units within EUEPCEXTRUSION combined.

Section 2 - EUELAREACTOR
This emission unit covers the reactors used to generate the prepolymer for polyurethane molding operations.

SC I.1, SC III.1, SC VI.1 – **COMPLIANCE** – VOC emissions from the reactors, thinning tanks, and blending tanks, requires a maximum emission rate of 0.5 pounds per 1000 pounds of completed organic resin; requires records be kept to demonstrate compliance.

In the October 17, 2019 submittal, BASF calculates monthly emissions per reactor for each month in the period. The monthly VOC emissions from each reactor, and the combined monthly VOC emissions from all reactors, calculate to less than 0.5 pounds per 1,000 pounds of product.

SC IV.1 – **COMPLIANCE** – Carbon units on each reactor to be installed and operating properly.
During the inspection the carbon units on each reactor appear to be installed and operating properly.

Section 2 - EUELAMACTS
The equipment constituting EUELAMACTS at the stationary source is subject to the National Emission Standards for Hazardous Air Pollutants for Flexible Polyurethane Foam Production promulgated in Title 40 of the Code of Federal Regulations (CFR), Part 63, Subparts A and III. On October 8, 2001, the first compliance date of the standard for an existing source, the stationary source M4777 was a part of a group of stationary sources (B4359, M4777, and M4808) that met the definition of a "major source" as defined at paragraph (a)(1), section 112, title I, of the Clean Air Act.

SC III.1, SC VI.1 –**COMPLIANCE** – Under MACT III at 63.1300(a), HAPs and HAP-based materials cannot be used to flush the mixhead or clean other equipment, with the exception of diisocyanate, which may be used to flush the mixhead and piping during startup or maintenance as long as the diisocyanates are used in a closed-loop system and re-used in production.

According to the October 17, 2019 submittal, the material used to flush the mixhead and lines is "CHEVRON Superla White Oil". The MSDS lists the chemical component as 100% white mineral oil with a CAS #8042-47-5. No HAPs are listed on the SDS.

SC III.2, SC VI.2 – **COMPLIANCE** – Under 63.1300(b), a HAP cannot be used as a mold release agent.

According to the October 17, 2019 submittal, the mold release agent is "münch chemie international Release Agent 621/E7 special". The Technical Data Sheet indicates this is an aqueous emulsion and does not contain organic solvents.

SC VII.1 through 4 – **COMPLIANCE** – Semiannual deviation reports, Rule 912 reports, compliance certifications and report certifications, including certifications for compliance with MACT III - There have not been deviations reported for this flexible group in the semiannual reports.

SC IX.1 – **COMPLIANCE** – Comply with all applicable provisions of 40 CFR 63, Subparts A, III – Applicable requirements are included in the flexible group table.

Section 2 - FGELARULE290
The Cellasto Plant contains the following emission units relating to Rule 290 subject equipment listed in MI-ROP-M4777-2015a: EUELAREACTOR210, EUELAREACTOR220, EUELAREACTOR230, EUELAREACTOR240, EUELAREACTOR250, EUELAOVEN101, EUELAOVEN102, EUELAOVEN103, EUELAOVEN104, EUELAOVEN105, EUELAOVEN106, EUELAOVEN107, EUELAOVEN108, EUELAOVEN109, EUELADEBURRING, and EUELAMOLDING. The facility is also claiming the dry material handling of NDI which is controlled by two dust collectors is exempt from PTI requirements per Rule 290.

As described above in FGEPCRULE290, R 336.1290 exempts from R 336.1201 those sources with limited emissions.

R 336.1290(a) through (d) – **COMPLIANCE** – Emissions less than 1000 lbs. uncontrolled and 500 lbs. controlled with more restrictive limits for certain ITSL/IRSLs; particulates limited to emissions of 0.01 lbs. particulate per 1000 lbs. gas, controlled by dust collector or equivalent installed and maintained, 5% opacity limit and monthly visible emission observation; description on file and records maintained. Required records are as follows for each emission unit: written description of the emission unit and control device, including the design control efficiency and exhaust gas flowrate; identify air contaminants emitted, carcinogenicity, screening level, and level

of control; monthly emissions calculations; record of monthly visible emission readings.

The following emission units are listed as Rule 290 subject in the 2018 MAERS with their reported annual emissions in pounds:

2018 MAERS emissions reported (in pounds)

| Section | Emission Unit | VOC | PM10 |
|---|---|---|---|
| 2 | RGElaReacs&Molds | 3,994 | --------- |
| 2 | RGElaCuringOvens | 4,142 | 2,355 |
| 2 | EUELADEBURRING | ------ | 19 |

According the MAERS submittal, the above reported emission unit or reporting group operates 12 months of the year. Carbon adsorption units control volatile organic compound emissions from RGElaReacs&Molds. Demisters control particulate and volatile organic compound emissions from RGElaCuringOvens. Filter socks and/or knock out boxes control PM emissions from deburring lines prior to the installation of the new deburring lines.

The October 17, 2019 submittal contains records demonstrating that emissions are less than 500 pounds per month. According to Mr. Wharton, the emissions reported for EUElaCuringOvens are "worst case scenario" emissions for the ovens operating 24 hours a day, seven days a week. For EUElaCuringOvens the highest reported VOC emissions were 426 pounds per month (for all 12 months) and the highest reported PM emissions were 242 pounds. While the reported monthly emissions from all 12 ovens is greater than 500 lbs (combined VOC and PM = 668 lbs), the combined VOC and PM emissions from each individual oven in EUElaCuringOvens are less than 500 lbs (assume 668 pounds divided by 12). EUELADEBURRING emissions are significantly less than 500 pounds per month with reported emissions of 1.1 pounds per month during 2018 and 2019. The highest reported VOC emissions for EUELAMOLDS occurred in October 2018 at 228 pounds. The highest reported VOC emissions for FGELAREACTOR occurred in April, June, and July 2018 at 8 pounds during each month. In addition, the October 17, 2019 submittal included Cellasto Environmental Inspection Records for April 2018 through September 2019 which contains records of inspection of control equipment and visible emissions records.

The facility submitted Rule 290 records for the dry NDI material handling. Records indicate that monthly PM10 emissions vary between 0.25 to 0.46 lb/month and with 2018 annual emissions at 4.0 pounds per year.

Emissions include MDI (CAS #101-68-8, 24-hr ITSL of 0.6 micrograms per cubic meter), NDI (CAS #3173-72-6, no current screening level), DIPPI (CAS #28178-42-9, no current screening level), NMP (CAS #872-50-4, 24-hr ITSL of 700 micrograms per cubic meter), and DIPA (CAS #110-97-4, annual ITSL of 4 micrograms per cubic meter). NDI (1,5-naphthylene diisocyanate) and DIPPI (2,6-diisopropylphenyl isocyanate), do not have an associated screening level. During the inspection on September 27, 2013 (MACES report M477723230), the 12th Report on Carcinogens was consulted, published by the National Toxicity Program of the U.S. Department of Health and Human Services. Searching on-line under the two categories in the report, the "Known to be Human Carcinogens" and the "Reasonably Anticipated to be Human Carcinogens", the only chemical with the term "cyanate" found in its name is toluene diisocyanate (TDI). Therefore, it appears the current pollutant (aggregate of VOC, PM10, etc.) threshold for the emission units is 500 pounds per month controlled.

Exemptions are not applicable to emission units that represent a PSD major source or major modification nor an ROP significant or minor modification. None of the emission units cited as Rule 290 sources in Section 2 of the ROP are excluded from the classification. As reported in the 2018 MAERS, the annual emission from each Rule 290 source is less than the significance levels in Rule 119(e).

NSPS Subpart Kb

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) does not apply to storage tanks that have a capacity less than 75 cubic meters ($m^3$). The storage tanks at BASF Plastics Plants have a capacity less than 75 cubic meters ($m^3$), with the exception of EUELATK-103 which has a capacity of 25,000 gallons or 94.63 $m^3$. Subpart Kb (§60.110b(b)) also states that "the subpart does not apply to storage vessels...with a capacity greater than equal to 75 $m^3$ but less than 151 $m^3$ storing a liquid with a maximum true vapor pressure less than 15.0 kilopascals (kPa)." Currently, storage tanks located at BASF Plastics Plants store liquids having a true vapor pressure less than 1.5 pounds per square inch absolute (psia) or 10.34 kPa. Therefore, the BASF Plastics Plants storage tanks (including EUELATK-103) are not subject to 40 CFR Part 60, Subpart Kb.

SECTION 3 – FGETPURULE290

With the response provided on October 24, 2019, BASF states that both the nitric acid tank and scrubber were taken out of service when the plant stopped making EPO during March 2017. No Rule 290 units are currently associated with the ETPU plant.

SECTION 3 - FGETPU– through June 13, 2019

According to BASF, ETPU operations under PTI 88-17 began on June 14, 2019.

The conditions under MI-ROP-M4777-2015a are evaluated below through June 13, 2019. PTI 88-17 is evaluated below separately for June 14, 2019 through September 2019.

SC I.1, II.1, VI.3 – **COMPLIANCE** – VOC emissions limited to 129 tons per 12-month rolling time period; fresh butane usage limited to 129 tons per 12-month rolling time period; records of fresh butane usage.

In the information submittal received October 24, 2019, BASF reports fresh butane usage from May 2018 through June 2019. The highest 12-month rolling amount reported occurred at monthly from May 2018 through November 2018 with 58.5 tons butane.

SC III.1, IV.1, VI.1 and 2 – **COMPLIANCE** – ETPUI, ETPUII, or the raw material storage shall not be operated unless the baghouse operating procedures are installed and implemented; F-780, F-880, F-841 shall be installed and operating properly, including maintaining pressure drops within specified ranges; pressure drops shall be monitored and recorded daily.

An operating procedure is maintained for the three dust collectors and was provided in the October 24, 2019 submittal for the time period up to July 25, 2019. The proper ranges are quoted at 0.2 to 5 inches water column for F-780 (currently idled), 0.4 to 5 inches water column for F-880 (during bead transfer), and 0.1 to 5 inches water column for F-841 (when making a tricalcium phosphate batch – no longer applicable). Revised work instructions were provided on November 5, 2019 for the time period after July 25, 2019 following a recent calibration of pressure drop transmitter. According to BASF, the work instructions were updated to revise operating ranges of the F-880 dust collector to align with calibration of differential pressure transmitter. The revised operating range for F-880 is 0.05 to 5 inches during bead transfer. Pressure drop data provided for August 1, 2019 through September 30, 2019 was spot checked and the baghouses appear to be operating with pressure drop readings within specified operating ranges during periods of bead transfer on August 7, 8, 19, 20, 21, 28, and 29, and September 4, 5, and 18, 2019. Visible emissions or fallout from these dust collectors have not been identified during past plant visits in 2019, 2018, 2015, 2014, 2012, 2010, 2008, 2006, 2004, 2003, and 2002.

SC III.2, III.3, IV.2, IV.3 – **COMPLIANCE** – ETPUI or ETPUII shall not be operated unless the butane collection system and condensation system are installed and operating properly and in accordance with operating procedures required to be developed and implemented; ETPUI or ETPUII shall not be operated unless the two systems are installed and operating properly and in accordance with operating procedures required to be developed and implemented.

Operating procedures have been developed (October 24, 2019 submittal). These procedures, and others concerning the rundown vessels, etc., are carried over with slight modifications from previous Polytech Molding procedures. The levels in hold tanks TK-780 and TK-880 are measured by dual monitors in each tank. The computer logic, operating the control of valves and blowers, etc., will not allow transfer to a hold tank unless the tank can accommodate the transfer, will abort a transfer from a hold tank to the condensation system if the hold tank is nearly empty, will abort a transfer if one of the area monitors detects a butane release, and will abort a transfer if the condensation system ("Polaris" system) alarms. The condensation system operates at its peak efficiency when the temperature at the top of the condensation column is less than -186°F; the monitored temperature at the top of the column was observed to be -86°F °F during the inspection (process of regeneration). According to Mr. Knowles the process was in regeneration and the temperature would drop closer to -186°F following the process cycle.

SC VI.4 – **COMPLIANCE** – Monthly records kept of all instances where butane collection and tank or condensation system fails to capture butane as designed, including amount failed to capture – BASF reports there were no instances from May 1, 2018 through June 13, 2019.

SECTION 3 - PTI 88-17 - June 14, 2019 through October 16, 2019

SC I.1 and 2, II.1, VI.1, 10, 11 – **COMPLIANCE** – VOC emissions limited to 70 tons per 12-month rolling time period (emissions from the warehouse super sacks, the drying lines, and fugitives from both ETPU lines combined); VOC emission limited to 82 tons per 12-month rolling time period (point source and fugitive emissions from both ETPU lines combined); fresh butane usage limited to 875 tons per 12-month rolling time period; records of fresh butane usage; records of number of batches.

In the information submittal received October 24, 2019 BASF reports VOC emissions (emissions from the warehouse super sacks, the drying lines, and fugitives from both ETPU lines combined) at 1.33 tons for 2019. BASF reports VOC emissions (point source and fugitive emissions from both ETPU lines combined) at 1.34 tons for 2019. BASF reports 1.87 tons of butane and a total of 45 batches for 2019.

SC III.1, IV.1, VI.6 and 8 – **COMPLIANCE** – ETPUI, ETPUII, or the raw material storage shall not be operated unless the baghouse operating procedures are installed and implemented; F-780, F-880, F-841 shall be installed and operating properly, including maintaining pressure drops within specified ranges; pressure drops shall be monitored and recorded daily.

An operating procedure is maintained for the three dust collectors and was provided in the October 24, 2019 submittal for the time period up to July 25, 2019. The proper ranges are quoted at 0.2 to 5 inches water column for F-780 (currently idled), 0.4 to 5 inches water column for F-880 (during bead transfer), and 0.1 to 5 inches water column for F-841 (when making a tricalcium phosphate batch – no longer applicable). Revised work instructions were provided on November 5, 2019 for the time period after July 25, 2019 following a recent calibration of pressure drop transmitter. According to BASF, the work instructions were updated to revise operating ranges of the F-880 dust collector to align with calibration of differential pressure transmitter. The revised operating range for F-880 is 0.05 to 5 inches during bead transfer. Pressure drop data provided for August 1, 2019 through September 30, 2019 was spot checked and the baghouses appear to be operating with pressure drop readings within specified operating ranges during periods of bead transfer on August 7, 8, 19, 20, 21, 28, and 29, and September 4, 5, and 18, 2019. Visible emissions or fallout from these dust collectors have not been identified during past plant visits in 2019, 2018, 2015, 2014, 2012, 2010, 2008, 2006, 2004, 2003, and 2002.

SC III.2, III.3, IV.2, IV.3 – **COMPLIANCE** – ETPUI or ETPUII shall not be operated unless the butane collection system and condensation system are installed and operating properly and in accordance with operating procedures required to be developed and implemented; ETPUI or ETPUII shall not be operated unless the two systems are installed and operating properly and in accordance with operating procedures required to be developed and implemented.

Operating procedures have been developed (October 24, 2019 submittal). These procedures, and others concerning the rundown vessels, etc., are carried over with slight modifications from previous Polytech Molding procedures. The levels in hold tanks TK-780 and TK-880 are measured by dual monitors in each tank. The computer logic, operating the control of valves and blowers, etc., will not allow transfer to a hold tank unless the tank can accommodate the transfer, will abort a transfer from a hold tank to the condensation system if the hold tank is nearly empty, will abort a transfer if one of the area monitors detects a butane release, and will abort a transfer if the condensation system ("Polaris" system) alarms. The condensation system operates at its peak efficiency when the temperature at the top of the condensation column is less than -186°F; the monitored temperature at the top of the column was observed to be -86°F °F during the inspection (process of regeneration). According to Mr. Knowles the process was in regeneration and the temperature would drop closer to -186°F following the process cycle.

SC III. 4 and 5. **COMPLIANCE**. Shall not operate EUETPUI or EUETPUII unless the RTO operating procedures are implemented and maintained. Shall not operate EUETPUI or EUETPUII unless a malfunction abatement plant (MAP) is submitted and approved. Within the October 24, 2019 submital, BASF provided the RTO operating procedures, work instruction SOP, and alarm and interlock table. The submital appears to satisfy the requirements of SCIII.4. The MAP was received on February 12, 2019 and satisfies the requirements of SC III.5 and Rule 911(2). The facility provided the MAP RTO preventitive maintainence program and maintanence work orders for June through September 2019.

SC IV.4 and VI.5. **COMPLIANCE**. Shall not operate EUETPUI or EUETPUII unless the RTO is installed, maintained, and operated in a satisfactory manner (minimum VOC destruction efficiency of 98% [by weight],

minimum temperature of 1300°F and minimum retention time of 0.5 seconds. System to be in place to shut off flow of butane in RTO malfunctions. The stack test report received on December 2, 2019, via email indicates a VOC destruction efficiency of 98.8%. Temperature records provided for the day of inspection indicated the minimum temperature requirement is met with all temperature greater than 1500°F. The facility also provide RTO residence time calculations demonstrating compliance with 0.5 seconds.

SC IV.5, VI.2 and 7. **COMPLIANCE**. Shall install, calibrate, maintain and operate in a satisfactory manner a device to continiously monitor and record the combustion chamber. The facility has demonstrated that combustion chamber is continuously monitored. Temperature records were provided for the day of the inspection/stack test.

SC IV.6 and 7. **COMPLIANCE**. Shall not install by valves that could divert vent stream to the RTO except as allowed by SC IV.7. During periods of shutdown, bypass of the RTO for maintanence, offline inspections, or malfunctions, the permittee may vent the off-gassing silos to atmosphere by way of an RTO emergency vent stack. The permittee shall minimize uncontrolled emissions and shall not transfer any material into the off-gassing silos. As the RTO and production is just getting ramped up, the facility appears to be meeting these requirements.

SC V.1 and VI.4. **COMPLIANCE**. Shall verify the VOC destruction efficiency and VOC emission rates from the RTO. On October 16, 2019 a stack test was conducted to verify the VOC destruction efficiency and VOC emission rates. Shall keep up-to-date records of the following recorded during each performance test. A. Average combustion chamber temperature of the RTO. B. Percent reduction of VOC. C. A description of the location at which the vent stream is introduced into the RTO. D. All periods when the RTO is not operating.
The emission test report was received on December 2, 2019 (via email) with combustion zone temperature average (1,550.17 °F), percent reduction in VOCs (98.8%), and a description of the vent stream. The RTO was operating through the entirety of the test.

SC VI.3. **COMPLIANCE**. Shall conduct regular inspections of the RTO as below. A. Regular inspections of the RTO during outages or downtime, not less than every 12-month. B. Operational condition, and if necessary, reasons for the failure or malfunction of the different components of the RTO shall be determined. C. Any maintainence activities, repairs and corrective actions. As the RTO has not been in operation for 12 months, the facility appears to be in compliance with this special condition. Maintenance activities conducted to date were provided in the October 24, 2019 submittal.

SC VI.9. **COMPLIANCE**. Shall keep for at least 5 years, up-to-date, continuous records of periodsof operation during which the parameter boundaries established during the most recent performance test on the RTO are exceeded. Periods of operation during which the parameter boundaries established during the most recent performance test are exceeded is defined as all 3-hour periods of operation during which the average combustion temperature was more than 28°C (50°F) below the average combustion temperature during the most recent performance test. On December 2, 2019 the stack test report was provided via email. During the test the average combustion zone temperature was 1,550.17 °F indicating that going forward the minimum combustion zone temperature is now 1,500.17 °F.

SC VI.12. **COMPLIANCE**. Shall monitor and record, in a satisfactory manner, the condensation column temperature on a continuous basis. The facility contiously monitors the condesation column temperature as demostrated in the temperature trends provided for the day of inspection (October 16, 2019).

SC VI. 13. **COMPLIANCE**. Shall keep monthly records for FGETPU of all instances where the butane collection and hold tank or the condesation system fails to capture butane as designed. Within the October 24, 2019 submittal, BASF states that there have been no instances during the production activities from June 14, 2019 through present.

SC IX. **COMPLIANCE**. If the RTO is not installed and operating by December 31, 2018, PTI 88-17 will become void. BASF notified the AQD on December 14, 2018 that the RTO was installed and operating.

**R 336.1201, R 336.1278, R 336.1278a, R 336.1284(b) & (j)**

The following exemptions from the requirement to obtain a permit to install apply to the, butane storage tank and nitrogen storage tank provided the equipment is not excluded from exemption pursuant to R 336.1278 and provided records are maintained according to R 336.1278a. Previously the facility claimed exemptions for the nitric acid storage tank, acid neutralization tank, tricalcium phosphate tank, and plastic extrusion system. It was

verified that the nitric acid storage tank, acid neutralization tank, and tricalcium phosphate tank was either no longer in use and the plastic extrusion line has been removed.

R 336.1278 excludes from exemption any of the following activities: prevention of significant deterioration (PSD) and nonattainment new source review (NSR) activities, significant actual emissions increases, new or reconstructed major Hazardous Air Pollutants (HAPs) sources subject to case-by-case Maximum Achievable Control Technology (MACT) standards, National Emission Standards for Hazardous Air Pollutants (NESHAP) sources. R 336.1278a specifies that to be eligible for an exemption, the owner or operator must be able to provide the following within 30 days of a written request for information:

1. A description of the exempt process or process equipment, including the date of installation;
2. The specific exemption being used by the process or process equipment.
3. An analysis demonstrating that R 336.1278 does not apply to the process or process equipment.
4. Any other records required for a specific exemption.

R 336.1284(2)(b) – **COMPLIANCE** – Storage of butane, propane, or liquefied petroleum gas in a vessel with a capacity less than 40,000 gallons – This exemption applies to the 16,000 gallon capacity liquid butane storage tank and the small butane recovery tank within the condensation system.

R 336.1284(2)(j) – **COMPLIANCE** – Pressurized storage of gases, including nitrogen, with boiling points less than 0°C – The nitrogen storage tanks used in the condensation system are exempt by this rule.

**FINAL COMPLIANCE DETERMINATION**:

At this time, this facility appears to be in compliance with MI-ROP-M4777-2015a, PTI 88-17, and federal and state regulations.

NAME _____ DATE 1/7/2020 SUPERVISOR JK