

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

B494247702

FACILITY: DOW AGROSCIENCES LLC		SRN / ID: B4942
LOCATION: 305 N HURON AVE, HARBOR BEACH		DISTRICT: Saginaw Bay
CITY: HARBOR BEACH		COUNTY: HURON
CONTACT: James W. McGee , EH&S Leader		ACTIVITY DATE: 01/08/2019
STAFF: Matthew Karl	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MAJOR
SUBJECT: Scheduled inspection to determine compliance with MI-ROP-B4942-2015a.		
RESOLVED COMPLAINTS:		

On Tuesday (1/8/19), I (Matt Karl) conducted a compliance inspection at Dow AgroSciences LLC located at 305 North Huron Avenue, Harbor Beach, Michigan. The purpose of the inspection was to determine compliance with the Federal Clean Air Act; Article II, Part 55, Air Pollution Control of Natural Resources and Environmental Protection Act, 1994 Public Act 451; Michigan Department of Environmental Quality, Air Quality Division (MDEQ-AQD) Administrative Rules; Renewable Operating Permit (ROP) No. MI-ROP-B4942-2015a. Mr. Jim McGee, EH&S Specialist, and Mr. Matt Klaska, EH&S Tech assisted me during my inspection and provided requested records.

Facility Description:

Dow AgroSciences LLC is an insect pesticide production facility. A 20,000-gallon capacity anhydrous ammonia tank is used at the start of the production process. The manufacturing process consists of fermentation, extraction, crystallization, evaporation, filtration, centrifuge, vacuum and drying process equipment. Emissions from the production process are vented to the thermal treatment units (TTUs) to control VOC, HAPs, ammonia (NH₃) and particulate matter (PM) emissions. Emissions from the bioreactor are controlled by an enclosed flare.

Compressed air, steam, and chilled water required by the production process are supplied by an on-site power generation facility that was constructed by Solar Turbines, Inc. in 1999. The power generation facility consists of two air compressors powered by natural gas-fired turbines, two heat recovery steam generators (HRSG) and supplemental burners (duct burners) in the turbine exhaust duct and two chiller units. NO_x emissions are controlled by dry ultra-low NO_x burners (SoLoNoX) for the turbines.

Solids handling processes used for packaging dry product are controlled by filters of the sock and cage style that use pulsed nitrogen to knock down accumulated dust prior to venting to the TTUs. Dust collector #3 exhausts to the in-plant environment; is a Nilfisk A15 EXP air driven venturi style device.

Site Inspection:

I arrived on site on Tuesday (1/8/19) at approximately 10:00. I met with Matt Klaska, EH&S Tech and Jim McGee, EH&S Specialist. First, we reviewed the electronic recordkeeping systems for the facility. Currently, the facility uses two electronic recordkeeping systems, IP21 for the production process and Delta V for the utility generation component. The company will be implementing a transition to the Delta V system for the entire facility within the next year. If the electronic recordkeeping systems go down for any reason, an alarm is set to sound in the operator control room and the procedure is to then conduct manual readings every 15 minutes.

Jim McGee informed me of a recent deviation that occurred at the facility on 12/18/18, which consisted of a valve being left open resulting in the venting of 26 lbs. of ammonia (NH₃) to the atmosphere. Jim informed me that the details of the deviation would be submitted in the upcoming Semi-Annual Deviation report.

Jim McGee informed me that the latest audit and certification performed on the TTUs was conducted on 10/25/17. Jim and Matt were able to display and provide copies of the monthly TTU testing records for April, July and October 2018 (see records review below). They were also able to display and provide copies of the TTU temperature records for February and October 2018 (see records review below). Jim also informed me that the facility's third-party consultant, AECOM, was on site today performing the monthly Total Hydrocarbon testing on the TTUs. We discussed how preventative maintenance (PM) inspections are conducted yearly by staff on the TTUs. There is a checklist that involves checking pressure switches and thermocouples. If an issue is found, the procedure is to replace the equipment, recalibrate the equipment, retest and record actions taken. The checklist is stored both electronically and physically on site.

Next, Jim and Matt were able to display and provide copies of the records for the utility generation component of the facility, consisting of information about the operating mode, natural gas usage and emissions for the burners

and turbines for February and July 2018 (see records review below).

Jim McGee informed me that there had been no changes to the chemical inventory list of the materials used and emitted from EUPROCESS since the 2004 permit application. Jim informed me the chemical inventory list provided with the 2004 permit application was still the most recent and up to date.

Next, we discussed the recordkeeping requirements for FG-COLD CLEANERS. Jim and Matt informed me that there was only one cold cleaner, a Safety Kleen Model 81 with a surface-air interface of <10 square feet. Jim and Matt informed me that a monthly compliance inspection is conducted on the cold cleaner. I reviewed the "Parts Washer Procedure Checklist" dated 12/13/18. The checklist contained items such as reviewing the status of the mechanical cover, the status of a part draining device and operating procedure; how waste is stored and checking that the operating instructions were present.

We then proceeded with the site walkthrough. First, we checked the cold cleaner. I confirmed that the cold cleaner mechanical cover worked, that the operating instructions were present, and that there was a waste rag bin present near the cold cleaner.

Next, we went to the utility generation building. Jim McGee summarized the utility generation process. The two natural gas turbines power the air compressors. The turbine exhaust gas (TEG) is routed to the heat exchanger which provides heat to the boiler (these two pieces of equipment together are the "heat recovery steam generator"), which produces steam. This is defined as "TEG Mode." When the production process requires more steam, two natural gas duct burners can provide more heat to the system. When the turbines, heat recovery steam generator and duct burners are all operating, this is defined as "Supplemental Mode." When the turbines are not operating and not providing TEG, and the heat is being provided by only the duct burners to the heat recovery steam generator, this is defined as "Fresh Air Mode." We then visited the utility generation building operator control room. I reviewed the control screens and recorded the natural gas flow to the turbines at 550 SCFM and 76 SCFM. The inlet temperature of air to the turbines was approximately 41°F and the average temperature from the end of the combustion chamber was approximately 1159.3°F. Jim McGee explained that the TEG is normally approximately 800°F when it reaches the heat exchanger, and the exhaust to atmosphere that leaves the stack is approximately 400°F.

We then walked through and viewed the bioreactor tanks. Jim McGee explained that PTI No. 116-17 was to add two additional bioreactor tanks to the original permitted tanks. He explained that the facility will possibly apply for a permit to add three additional bioreactor tanks in the near future. He explained that the bioreactor tanks operate on a staggered batch schedule which takes between 12-14 days to complete the fermentation process. We then stopped in the facility lab, and lab staff explained how they step up a straw sample to a full batch, as well as their QA/QC process.

Our next stop was the process operator control room. I reviewed the control screens and recorded the following information at approximately 11:47 for the TTUs:

TTU ID#	Inlet Temp (°F)	Air Flow (SCFH)
850	674	25,000
855	675	14,211
860	674	11,870
865	676	11,473

I discussed with the process operator control room staff what they could adjust in terms of the TTUs. They informed me that the main thing they could adjust was the blower speed, which controls the air flow to the TTUs. The blower controls are displayed in three ways: the present value (PV), the set point (SP) and the output; all represented as % capacity of the blower.

We then proceeded to the extraction and packaging operator control room. The staff in this room explained how they extract the dry product from the batch solution. I reviewed the control screens and recorded a differential pressure of 0.64" W.C. at approximately 12:15 for the sock and cage style filter associated with the dryer. I departed the facility at approximately 13:00.

Records Review:

On Friday (1/4/19) I sent an email with a document containing the requested records to Jim McGee. I collected the following records during my inspection on Tuesday (1/8/19):

- B4942 TTU Data – for February and October 2018
- Utilities Emissions 2018 – For February, July and October 2018

- Harbor Beach Monthly TTU Testing – For April, July and October 2018
- SDS for SAFETY-KLEEN PREMIUM SOLVENT (VIRGIN AND RECYCLED) dated 9/2/14

On Monday (1/14/19) Jim McGee notified me that the B4942 TTU Data October 2018 graphs still had links referencing data on the Dow AgroSciences LLC server. The data in the spreadsheet was still correct, but the summary graphs were not functioning correctly. On Tuesday (1/15/19) Jim McGee sent me a corrected version with functioning graphs "B4942 TTU Data2."

On Wednesday (1/30/19) Jim McGee sent me an email with information on the ammonia emission rate from EUPROCESS in an excel table titled "Worst Case Ammonia Emissions."

EUPROCESS: Compliant

SC VI.1. The permittee shall install, calibrate, maintain and operate in a satisfactory manner a device to monitor and record the temperature of each TTU on a continuous basis.

Based on my review of the "B4942 TTU Data – for February and October 2018" it appears that the facility is in compliance with this condition. During October 2018 there was approximately 11 hours on 10/7 and 10/8 where the IP21 electronic recordkeeping system was down. During this period of time the facility manually recorded data. Additionally, TTU 855 was shut down from approximately 6 am on 10/22/18 to 3 pm on 10/25/18 totaling 81 hours down time as part of the facility's preventative maintenance plan.

SC VI.3. The permittee shall monitor and record, in a satisfactory manner, the daily average temperature in each catalytic TTU (850, 855, 860, and 865) each day that the TTU operates.

Based on my review of the "B4942 TTU Data – for February and October 2018" it appears that the facility is in compliance with this condition.

SC VI.4. The permittee shall monitor and record, in a satisfactory manner, the inlet and outlet catalyst temperature for each catalytic TTU (850, 855, 860, and 865).

I've included tables below summarizing the average catalyst inlet and outlet temperatures for each TTU for February and October 2018. SC IV.2. requires the facility maintain a minimum daily average temperature of 650 °F. It appears that all of the TTUs were in compliance with this condition, except for TTU-855 in Oct 2018, which had a <650 °F average temperature, due to the 81 hours it was shut down between 10/22 to 10/25 for preventative maintenance.

February 28, 2018 Monthly Summary Table

TTU No.	Avg. Catalyst Inlet Temperature (°F)	Avg. Catalyst Outlet Temperature (°F)	Temperature Delta
TTU-850	674.2	675.5	1.3
TTU-855	676.0	678.4	2.4
TTU-860	660.9	671.4	10.5
TTU-865	749.1	752.6	3.5

October 31, 2018 Monthly Summary Table

TTU No.	Avg. Catalyst Inlet Temperature (°F)	Avg. Catalyst Outlet Temperature (°F)	Temperature Delta
TTU-850	672.4	672.2	-0.2
TTU-855	607.9*	604.1*	-3.9
TTU-860	679.6	686.5	6.9
TTU-865	683.4	690.3	7.0

*Note, TTU-855 was shut down for 81 hours between 10/22 and 10/25 for preventative maintenance

SC VI.5. The permittee shall keep, in a satisfactory manner, records of catalyst regeneration hours and temperature.

Based on my review of the "B4942 TTU Data – for February and October 2018" it appears that the facility is in compliance with this condition.

In February 2018, TTU 860 was regenerated on 2/12/18 from approximately 9:30 am to 6:30 pm for ~9 hours at ~1020°F.

In October 2018, TTU 860 and 865 were regenerated together on three occasions. These included:

- 10/8 from 6 am to 3 pm for ~9 hours at ~900°F;
- 10/18 to 10/19 from 6:30 am to 7:30 am for ~25 hours at ~900°F;
- 10/26 from 4 am to 1 pm for ~9 hours at ~900°F.

SC VI.6. The permittee shall calculate the ammonia emission rates from EUPROCESS monthly, for the preceding 12-month rolling time period, using a method acceptable to the AQD District Supervisor.

I reviewed the "Worst Case Ammonia Emissions" to determine compliance with this condition. It appears the calculation is based on assuming the four TTUs operate 24 hours/day, for every day of each month. The testing determined emission factor is multiplied by the total monthly hours, and then multiplied by 4 for the four TTUs (850, 855, 860, 865) to determine the total monthly pounds of ammonia. This is then summed with the preceding 11-months to determine the 12-month rolling sum. I've included a summary table for 2018 below. The total monthly ammonia emissions are normally <4 lbs, and the 12-month rolling sum is normally <50 lbs, which are well below the emission limits.

There was one recent deviation noted in the record. As stated during the on-site inspection, on 12/18/18 there was an unplanned event where a valve to unit 320P was not completely closed. This allowed ~26 lbs of ammonia to vent to the atmosphere. This deviation is expected to be reported in the next ROP Semiannual Deviation Report. Reviewing the emission limits SC I.7 and I.8, the ammonia emissions from EUPROCESS are not to exceed 31 lbs/hr or 2 tons/year. Based on this information, the unplanned event on 12/18/18 would not have exceeded the 31 lbs/hr emission limit. No violation notice will be sent at this time.

Worst Case Ammonia Emissions - 2018

Month	Days	Hours	Emission Factor (lbs/hr)	4 TTU (lbs/month)	Rolling Sum (lbs)
December	31	744	0.00125	29.72*	69.8
November	30	720	0.00125	3.6	47.4
October	31	744	0.00125	3.72	47.5
September	30	720	0.00125	3.6	47.4
August	31	744	0.00125	3.72	47.5
July	31	744	0.00125	3.72	47.5
June	30	720	0.00125	3.6	47.4
May	31	744	0.00125	3.72	47.5
April	30	720	0.00125	3.6	47.4
March	31	744	0.00125	3.72	43.8
February	28	672	0.00125	3.36	43.8
January	31	744	0.00125	3.72	43.8

*12/18/18 unplanned event deviation

SC VI.7. The permittee shall monitor and record, in a satisfactory manner, monthly Total Hydrocarbon on each catalytic TTU outlet stack (SV00003, SV00004, SV00005 and SV00006) pursuant to the approved AMR.

I reviewed the "Harbor Beach Monthly TTU testing" records to determine compliance with this condition. I reviewed the monthly testing records for April, July and October 2018 and included the summaries in the tables below. The emission limits in SC I.1-4 limit the emissions to 20 ppmv from the TTUs. Based on the information in the tables below, the facility appears to be complying with this condition.

April 2018 Monthly TTU Testing (Test Date 4/18/18)

Stack No. Run No.	Stack Temperature (°F)	Average Concentration (ppm hydrocarbon (HC) as propane)
850 Stack Run 1	675	8.7
850 Stack Run 2	675	8.8
850 Stack Run 3	675	8.8
855 Stack Run 1	675	6.7
855 Stack Run 2	675	7.1
855 Stack Run 3	675	7.2
860 Stack Run 1	675	13.5
860 Stack Run 2	675	6.5
860 Stack Run 3	675	6.4

865 Stack Run 1	750	10.7
865 Stack Run 2	750	3.2
865 Stack Run 3	750	2.7

July 2018 Monthly TTU Testing (Test Date 7/31/18 for 850 & 855 and 8/2/18 for 860 & 865)

Stack No. Run No.	Stack Temperature (°F)	Average Concentration (ppm hydrocarbon (HC) as propane)
850 Stack Run 1	675	16.2
850 Stack Run 2	675	18.3
850 Stack Run 3	675	16.4
855 Stack Run 1	675	9.4
855 Stack Run 2	675	9.4
855 Stack Run 3	675	9.7
860 Stack Run 1	675	4.4
860 Stack Run 2	675	4.6
860 Stack Run 3	675	4.5
865 Stack Run 1	675	7.6
865 Stack Run 2	675	5.1
865 Stack Run 3	675	5.6

October 2018 Monthly TTU Testing (Test Date 10/2/18 for 850 & 855 and 10/3/18 for 860 & 865)

Stack No. Run No.	Stack Temperature (°F)	Average Concentration (ppm hydrocarbon (HC) as propane)
850 Stack Run 1	675	3.7
850 Stack Run 2	675	3.5
850 Stack Run 3	675	3.3
855 Stack Run 1	675	9.9
855 Stack Run 2	675	10.4
855 Stack Run 3	675	10.8
860 Stack Run 1	675	4.1
860 Stack Run 2	675	4.3
860 Stack Run 3	675	4.3
865 Stack Run 1	675	5.3
865 Stack Run 2	675	4.8
865 Stack Run 3	675	4.8

SC VI.8. The permittee shall maintain a current list of the materials emitted from EUPROCESS that are determined to be exempt from the health-based screening level requirement of Rule 225 pursuant to Rule 226(a). The list shall include the compound name and CAS number and a calculation demonstrating the emission rate of each material. The permittee shall keep all records on file and make them available to the Department upon request.

Jim McGee informed me that there had been no changes to the chemical inventory list of the materials used and emitted from EUPROCESS since the 2004 permit application. Jim informed me the chemical inventory list provided with the 2004 permit application was still the most recent and up to date.

FG-BURNERS: Compliant

SC VI.2. The permittee shall monitor and record, in a satisfactory manner, the total daily natural gas usage rate in standard cubic feet per calendar day for fresh air mode and all operating modes combined for each burner in FG-BURNERS (EU_N_BURNER and EU_S_BURNER).

I reviewed the "Utilities Emissions 2018" records to determine compliance with this condition. I reviewed the solar facility monthly emission summaries for February, July and October 2018 and included the summarized information in the tables below (see FG-UTILITES). Based on my review of the records, the facility appears to be tracking the gas use in mcf and the operating hours daily. From this information it would be possible to determine the total daily usage rate.

SC VI.3. The permittee shall monitor and record, in a satisfactory manner, the total operating hours for fresh air mode for each burner in FG-BURNERS (EU_N_BURNER and EU_S_BURNER) on a calendar day basis. Records shall also be maintained on a monthly and 12-month rolling time period as determined at the end of each calendar month.

I reviewed the "Utilities Emissions 2018" records to determine compliance with this condition. I reviewed the solar facility monthly emission summaries for February, July and October 2018 and included the summarized information in the tables below (see FG-UTILITIES). Based on my review of the records, the facility appears to be satisfactorily tracking the total operating hours in each mode.

SC VI.4. The permittee shall calculate and keep, in a satisfactory manner, records of hourly NOx and CO mass emissions for each burner in FG-BURNERS (EU_N_BURNER and EU_S_BURNER) on a calendar day averaging period basis, as required by SC I.1 and SC I.2. The calculations shall be performed using the method included in Appendix 7, unless a new method is approved by the District Supervisor.

I reviewed the "Utilities Emissions 2018" records to determine compliance with this condition. I reviewed the solar facility monthly emission summaries for February, July and October 2018 and included the summarized information in the tables below (see FG-UTILITIES). Based on my review of the records, the burners were not operated in "Fresh Air Mode" during any of the months reviewed. Therefore, the emission limits SC I.1 and I.2 do not apply and the emission limits in FG-UTILITIES are used instead.

FG-TURBINES: Compliant

SC VI.4. The permittee shall monitor and record, in a satisfactory manner, the total daily natural gas usage rate in standard cubic feet per day for all operating modes combined for FG-TURBINES and the hourly usage rate as required in SC II.1 based upon a calendar day averaging period.

I reviewed the "Utilities Emissions 2018" records to determine compliance with this condition. I reviewed the solar facility monthly emission summaries for February, July and October 2018 and included the summarized information in the tables below (see FG-UTILITIES). Based on my review of the records, the facility appears to be tracking the gas use in mcf and the operating hours daily. From this information it would be possible to determine the total daily usage rate.

SC VI.5. The permittee shall monitor and record, in a satisfactory manner, the total hours of uncontrolled operation for FG-TURBINES on a monthly and 12-month rolling time period as determined at the end of each calendar month.

I reviewed the "Utilities Emissions 2018" records to determine compliance with this condition. I reviewed the solar facility monthly emission summaries for February, July and October 2018 and included the summarized information in the tables below (see FG-UTILITIES). Based on my review of the records, the turbines were not operated "uncontrolled" during any of the months reviewed.

FG-UTILITIES: Compliant

SC VI.3. The permittee shall compile all information from FG-BURNERS and FG-TURBINES needed to calculate emissions for FG-UTILITIES on a monthly basis. The information shall include fuel usage specified by mode of operation and emission calculations. The permittee shall calculate and keep, in a satisfactory manner, records of monthly and 12-month rolling total NOx and CO mass emissions for FG-UTILITIES, as required by SC I.3 and SC I.6. The calculations shall be performed using the method included in Appendix 7, unless a new method is approved by the District Supervisor.

I reviewed the "Utilities Emissions 2018" records to determine compliance with this condition. I reviewed the solar facility monthly emission summaries for February, July and October 2018 and included the summarized information in the tables below. Based on my review of the records, FG-UTILITIES were operated in compliance with the emission rates in SC I.1 and I.4 of 13.6 lbs/hr of NOx and 14.1 lbs/hr of CO in the months reviewed. The maximum emissions over the records reviewed occurred in February 2018, and consisted of 10.78 lbs/hr NOx and 7.27 lbs/hr CO.

February 2018 Solar Facility Monthly Emissions Summary

Turbine	Mode	Hours	Nat. Gas Use (MCF)	NOx Emissions (lbs)	CO Emissions (lbs)
North	TEG	9	381	38	4
South	TEG	267.8	10948	1063	157
North	Supp	663	36994	3426	3893
South	Supp	326.3	17298	1735	388
North	Fresh Air	0	0	0	0
South	Fresh Air	0	0	0	0

July 2018 Solar Facility Monthly Emissions Summary

Turbine	Mode	Hours	Nat. Gas Use (MCF)	NOx Emissions (lbs)	CO Emissions (lbs)
North	TEG	11.5	440	44	4
South	TEG	609.8	22927	2226	328
North	Supp	732.5	35773	3313	3765
South	Supp	134.3	6498	652	146
North	Fresh Air	0	0	0	0
South	Fresh Air	0	0	0	0

October 2018 Solar Facility Monthly Emissions Summary

Turbine	Mode	Hours	Nat. Gas Use (MCF)	NOx Emissions (lbs)	CO Emissions (lbs)
North	TEG	8.8	360	36	3
South	TEG	544	21556	2093	308
North	Supp	735.3	38084	3527	4008
South	Supp	200	10123	1015	227
North	Fresh Air	0	0	0	0
South	Fresh Air	0	0	0	0

FG-COLD CLEANERS: Compliant

SC VI.2. The permittee shall maintain the following information on file for each cold cleaner:

- a) A serial number, model number, or other unique identifier for each cold cleaner.
- b) The date the unit was installed, manufactured or that it commenced operation.
- c) The air/vapor interface area for any unit claimed to be exempt under Rule 281(h).
- d) The applicable Rule 201 exemption.
- e) The Reid vapor pressure of each solvent used.
- f) If applicable, the option chosen to comply with Rule 707(2).

I reviewed the following information for FG-COLD CLEANERS:

- a) Safety Kleen Model 81
- b) -
- c) <10 square feet
- d) R 336.1281(h)
- e) SAFETY-KLEEN PREMIUM SOLVENT (VIRGIN AND RECYCLED) Vapor Pressure 0.2 mmHg at 68 F
- f) -

Summary:

Based on my site inspection and review of the records, it appears that Dow AgroSciences LLC was in compliance with ROP No. MI-ROP-B4942-2015a.

NAME Matthew R. Kord

DATE 2/1/19

SUPERVISOR C. Hare