

DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION

ACTIVITY REPORT: Scheduled Inspection

A403337997

FACILITY: The Dow Chemical Company U.S.A., Midland		SRN / ID: A4033
LOCATION: 1790 Building, MIDLAND		DISTRICT: Saginaw Bay
CITY: MIDLAND		COUNTY: MIDLAND
CONTACT: Kayla Peacock, Environmental Specialist		ACTIVITY DATE: 10/12/2016
STAFF: Kathy Brewer	COMPLIANCE STATUS: Compliance	
SUBJECT: EUB2 Methocel; IR camera		SOURCE CLASS: MEGASITE
RESOLVED COMPLAINTS:		

EUB2-S1

10-12-2016

Environmental contact: Kayla Peacock.

EUB2-S1 is the cellulose derivative production plant (METHOCEL™ methylcellulose and hydroxypropyl methylcellulose process in the METHOCEL™ manufacturing block) with reactors, separators, dryers, storage tanks/silos and related equipment. The cellulose derivative production plant includes finishing and vent recovery.

This emission unit is subject to the requirements of 40 CFR Part 63, Subparts A, and UUUU and the equipment leak provisions of the HON (i.e., 40 CFR Part 63, Subpart H). Tank T-1045 is subject to 40 CFR Part 60, Subpart Kb.

EUB2-S1 is a CAM subject emission unit subject to the requirements of 40 CFR Part 64. The CAM subject pollutants for this emission unit are VOC and PM-10.

This emission unit was most recently permitted in PTI 7-04A. Packaging line emissions are controlled by several Rule 284(k) exempt baghouses.

The FLIR camera was used to observe the rail car recovery compressor (VGR) and a methanol tank.

Based on the inspection and records review the facility is in compliance with the ROP requirements for EUB2-S1.

Attachments

Process overview diagram

Nov 2015, Feb 2016, July 2016, and Oct 12, 2016 operating and required monitoring records for:

Scrubber flow T-1975, T-1002

Exit gas temp for condensers E-902, E-913, E-105

12 Month VOC, MeCl, PO, PG DME

PM emissions for all required vents

dP SVB2026, SVB202044

Quarterly VE records 4th 2015, 1st, 3rd and 4th Q 2016 for SVB2014, SVB2058, SVB2004, SVB2005A, SVB2005B, SVB2007, SVB2009, SVB2010, SVB2029, SVB2055, SVB2059, SVB2060

Baghouse maintenance completed 3/15/2016 SVB2016

File review:

Environmental audits January 2015 to December 2016

Annual and semi annual deviation reports 2015 and 2016

DESCRIPTION

The process requires several steps to go from wood pulp to the final product. The product is used in food, pharmaceutical, and commercial applications. Wood pulp is ground and stored. Multiple reactors and intermediate processes run except for periods of maintenance or if demand reduces. The process uses MeCl & Propylene Oxide (PO) plus other items in the reactors. A slurry is made followed by filter wash, vacuum table, and dryers.

From the grinder to slurry tanks, the process is considered "closed looped" as most vents capture and recycle vapors back into the process or tanks. A steam stripper from one of the slurry tanks vent to VC recovery, then to VGRS. The steam stripper and associated equipment (tanks, pumps, heat exchanger piping, cooling tower cell) are used to process waste water from the METHOCEL™ process in order to comply with 40 CFR Part 63, Subparts A and UUUU. Volatiles recovered from the process are compressed and nearly 100% condensed. Concentrated vapors from the steam stripper are condensed and collected in a storage tank and reused in process or loaded onto a rail car for value recovery. On occasion, condensed volatiles may be burned at the site incinerator. Uncondensed volatiles are exhausted to the 963 THROX (afterburner). In the event the 963 THROX is unavailable, the uncondensed volatiles will vent to the 954 THROX (afterburner). VGRS can be used to feed 963Throx (vapor) or load rail cars (liquid) to go to the Incinerator.

A vapor balance system is used during rail car loading activities. Storage tank breathing and filling losses are routed to the 963Throx (or the 954 THROX as backup control). Tank T-1045 is subject to 40 CFR Part 63 Subpart Kb. Under Subpart Kb, the tank is required to vent to a THROX.

Emissions from material transferred to the Filter/Wash from the slurry and from the filter/wash are sent to the T1001 scrubber (SVB008). VOCs are in these emissions.

Dried material is sent to silos. The material next undergoes size reduction to a fine powder using ball mill, then to storage silo until sent to homogenization or blender/LV (low viscosity). In LV HCL is used as a catalyst to produce lower viscosity liquid. The material is screened and rare earth magnets remove any metal impurities. The product is packaged in drums and super sacks.

MeCl offloaded to a liquid to storage tank using a compressor to rail car & rail car to tank. Pressure test railcar before unloading, LEL & high pressure alarms are installed to monitor vapor balance system.

Emissions from the dryer south train are vented to the wet scrubber (SVB2009) &/or wet scrubber SVB2010. Emissions from the North train dryer are vented to a wet scrubber (SVB2007). Emissions from dryers and subsequent process points do not have VOC emissions (not included in any VOC calculations)

Several baghouses are used to control emissions.

Dried material is sent Storage silos. Emission controlled by baghouses (exempt under 284(k)); Size reduction emissions controlled by baghouses (SVB2014, 2015, 2016). After size reduction the material sent to storage tanks with baghouses that are exempt (284(k)).

Homogenizing emissions are controlled by baghouses SVB2020, 2021, and 2014. Differential pressure recorded in lieu of VEs. Emissions from the low viscosity (LV) portion of the process are vented to baghouse (SVB2026) & water scrubber (SVB2029).

EMISSION LIMITS

The following emission limits apply to EUB2-S1

Pollutant	Limit	Time Period/ Operating Scenario	Equipment	Monitoring/ Testing Method	Associated stacks/vents
1. VOC	1.2 pph	Test Method	SV963THROX (or 954 THROX as backup control) emissions resulting from METHOCEL process equipment vents**	SC V.1 (Scrubber T-1975 & dryer scrubbers gpm)	SV963THROX SV954THROX SVB2029; SVB2007, SVB2009, SVB2010
2. VOC	12 pph	Test Method	Equipment venting to SVB2005a**	SC V.1 (Scrubber T-1975 & dryer scrubbers gpm)	Blowdown tanks to atmosphere,
3. VOC	12 pph	Test Method	Equipment venting to SVB2005b**	SC V.1 (Scrubber T-1975 & dryer scrubbers gpm)	Blowdown tanks to atmosphere
4. VOC	7.0 pph	Test Method	Equipment venting to	SC VI.2 (Scrubber T-	SVB2008

			SVB2008**	1001 flow & condenser exit gas temperature), ROP reference incorrect SC V.1 (Scrubber T-1975 & dryer scrubbers gpm)	
5. Methyl Chloride (MeCl)	10 tpy	12-month rolling time period+	EUB2-S1**	SC VI.1 (Scrubber T-1975 & dryer scrubbers gpm) SC VI.2 (Scrubber T-1001 flow & condenser exit gas temperature), SC. VI.3 (maintain T-1001 liquid flow indicator) & SC VI. 4. (record T-1975 & dryer scrubbers liquid flow rate) ALSO SC. VI. 6 (calculate & record each month)	SVB2029; SVB2007, SVB2009, SVB2010; SVB2008
6. Propylene Oxide (PO)	2 tpy	12-month rolling time period+	EUB2-S1**	SC VI.1 (Scrubber T-1975 & dryer scrubbers gpm) SC VI.2 (Scrubber T-1001 flow & condenser exit gas temperature), 3 (maintain T-1001 liquid flow indicator) and 4 (record T-1975 & dryer scrubbers liquid flow rate) ALSO SC. VI. 6 (calculate & record each month)	SVB2029; SVB2007, SVB2009, SVB2010; SVB2008
7. Propylene Glycol Dimethyl Ether (PG DME)	1.7 tpy	12-month rolling time period+	EUB2-S1**	SC VI.1 (Scrubber T-1975 & dryer scrubbers gpm) SC VI.2 (Scrubber T-1001 flow & condenser exit gas temperature), 3 (maintain T-1001 liquid flow indicator) and 4 (record T-1975 & dryer scrubbers liquid flow rate) ALSO SC. VI. 6 (calculate & record each month)	SVB2029; SVB2007, SVB2009, SVB2010; SVB2008

8. VOC	78 tpy	12-month rolling time period ⁺	EUB2-S1**	SC VI.1 (Scrubber T-1975 & dryer scrubbers gpm) SC VI.2 (Scrubber T-1001 flow & condenser exit gas temperature), 3 (maintain T-1001 liquid flow indicator) and 4 (record T-1975 & dryer scrubbers liquid flow rate) ALSO SC. VI. 6 (calculate & record each month)	SVB2029; SVB2007, SVB2009, SVB2010; SVB2008
9. PM-10	0.10 lbs per 1000 lbs of exhaust gas ⁺⁺	Test Method	All particulate emitting vents (listed in SC V.2)	Test method (SC V.2) ALSO SC.III.8 [^] (dP inches W.C.)	SVB2014; SVB2015; SVB2016; SVB2020 [^] ; SVB2021 [^] ; SVB2026 [^] SVB2044 [^] SVB2057; SVB2058 SVB2061; SVB2063 [^]

⁺ 12-month rolling time period as determined at the end of each calendar month.

⁺⁺ Calculated on a dry gas basis.

^{**} This limit does not include fugitive emissions (i.e., emissions from leaking valves, flanges, etc.) from the process.

Individual TPY 12 month rolling averages are based on process wide emissions and any applicable destruction or removal efficiency rates. Most emissions are from byproducts. For emission calculation VOCs/pollutants are calculated based on emissions established by evaluating emissions from each emission generating step. A vent rate efficiency is applied to the amount of pollutant generated. For the 1001 scrubber the worst case testing emission results are used. For process steps generating VOCs that vent to the 963Throx, 963Throx emissions generated values have an appropriate destruction rate applied.

The site tracks pounds of Methocel produced and the pounds of the following raw materials: Pulp, NaO MeCl, Propylene Oxide. During the inspection I reviewed the November 2015, February 2016, and July 2016 monthly material use and product generated sheets including the number of batches of each methocel type, pounds of methocel generated, and pounds of raw products used. The November 2015, February 2016, July, and September 2016 12 month rolling average for MeCl, PO, PG DME, and VOCs are below.

Pollutant	12 month rolling emission limit(TPY)	September 2016	July 2016	February 2016	November 2015
MeCl	10	3.72	0.21	0.31	0.31
PO	2	0.69	0.04	0.06	0.06
PG DME	1.7	0.25	0.02	0.02	0.04
VOC	78	44	3	3	3

On site record review of VOC pound per hour (pph) emissions for November 2015, February 2016, and July 2016 peak VOC pph emissions were below ROP allowed limits.

Pollutant	Limit pph	July 2016	February 2016	November 2015
SC I.1 VOC	1.2 pph	0.5	0.8	0.8
SC I.2 VOC	12 pph	2.4	4.1	3.8
SC I.3 VOC	12 pph	2.4	4.1	3.8

SC I.4 VOC	7.0	1.5*		
------------	-----	------	--	--

*1.5 was peak VOC pph emission recorded for 12 month period Sept 2015 – Sept 2016

The PM emissions limit for several vents is 0.1 lbs/1000 lbs exhaust gas. PM emissions from February 2016, July 2016 and November 2015 for numerous vents (36) were reviewed. Peak emissions and average lbs/1000 lbs of solids over the months reviewed were below 0.06 lb/1000 lbs exhaust gas.

Several vents require VE observations.

Based on the records reviewed the facility is in compliance with this requirement.

MATERIAL LIMITS

The ROP does not contain any material limits

PROCESS/OPERATIONAL RESTRICTIONS

The permit requires the 963THROX or a backup control be operating while portions of the process ducts to 963THROX are operating. If 963THROX is unavailable it alarms the process and shuts down flow. VG handles emissions until pressure or other operating conditions require venting to FG954THROX.

The permit requires that the liquid flow rate of the vent SVB2008 (scrubber T-1001) packed column scrubber not be less than 42 gpm for two trains or 22 gpm for one train on a daily average. The permit also requires that the liquid flow rate of the vent SVB2029 (scrubber T-1975) packed column scrubber not be less than 10 gpm. The scrubber flow records for T-1975 and T-1001 for November 2015, February 2016, July 2016, and the morning of October 12 are attached.

Scrubber	Limit minimum GPM	October 12, 2016 AM	July 2016	February 2016	November 2015
T-1975	10	>16 gpm	>16;<20 gpm	>12;<20 gpm	>12;<20 gpm
T-1001	42/22	>42; <48 gpm	>42;<54 gpm	>42;<54 gpm	>42;<54 gpm

The permit requires that the permittee implement and record corrective action if the exit gas temperature of the condensers (E-902, E-913, E-105) associated with the vent gas recovery system (VGRS) exceed daily average temperature of 40C. The exit gas temperature records for VGRS condensers for November 2015, February 2016, July 2016, and the morning of October 12, 2016 are attached.

Condenser	Limit Max exit gas temperature degree C	October 12, 2016 AM instantaneous	July 2016 daily average	February 2016 daily average	November 2015 daily average
E-902	40	<35 C	<40 C	<35 C	<35 C
E-913	40	<30 C	<40 C	<35 C	<35 C
E-105	40	<30 C	<40 C	<35 C	<35 C

The permit limits the differential pressure (dP) to be maintained below 200 inches W.C. across the secondary inline filter for vents SVB2020, SVB2012, SVB2026, SVB2044, and SVB2063. The dP records for baghouses venting from SVB2026 and SVB2044 for November 2015, February 2016, July 2016, and the morning of October 12, 2016 are attached.

Baghouse vent	Description	Limit maximum	October 12, 2016 AM	July 2016	February 2016	November 2015
SVB2026	Low viscosity baghouse	<200 dP inches WC	<100 dP inches WC	<100 dP inches WC	<150 dP inches WC	<50 dP inches WC

SVB2044	Homogenizing unit baghouse	<200 dP inches WC	<2.0 dP inches WC	<25 dP inches WC	<25 dP inches WC	<25 dP inches WC
---------	----------------------------	-------------------	-------------------	------------------	------------------	------------------

Based on the records reviewed the facility is in compliance with this requirement.

The permit requires that quarterly visible emissions (VEs) be checked during routine operating conditions at vents SVB2004, SVB2005, SVB2007, SVB2009, SVB2010, SVB2029, SVB2055, SVB2059, and SVB2061. The VE records for baghouses venting from SVB2004, SVB2005, SVB2007, SVB2009, SVB2010, SVB2029, SVB2055, SVB2059, and SVB2061 for November 2015, February 2016, and July 2016 are attached. All required quarterly VEs were performed.

The permit requires that daily visible emissions (VEs) be checked during routine operating conditions at vents SVB2014, SVB2015, SVB2016, SVB2057, SVB2058, and SVB2061. The VE records for baghouses venting from SVB2014 and SVB2058 for November 2015, February 2016, July 2016, and through October 1 2016 are attached. Based on the records reviewed the facility is in compliance with this requirement.

Baghouse vent	Days equipment operating through October 12, 2016	VEs through October 12, 2016 AM	Days equipment operating July 2016	VEs conducted in July 2016	Days equipment operating in February 2016	VEs conducted in February 2016	Days equipment operating in November 2015	VEs conducted in November 2015
SVB2014	10	10	28	28	29	29	23	23
SVB2058	6	6	17	17	24	24	24	24

Portions of plant do not continuously operate. The site previously reported deviations if the process ran for very short periods or near end of day (Midnight) and no VE had been conducted that day. To assure VEs are done for a period when operating, if the process is running and that portion is active, the operator is sent an alarm to perform a VE. The operator will acknowledge the alarm once the VE is done. If for some reason the equipment was operating but the operator was unable to perform the VE early, the alarm is sounded again near the end of the day. VE readings may be done at night. The vents are illuminated & any emissions are expected to be light in color.

DESIGN/EQUIPMENT PARAMETERS

The permit requires that the process only operate if the scrubbers, baghouses, rail car loading vapour balance system, and VGRS are installed and operating properly. All information evaluated during this inspection indicates that the control devices are installed and operated properly.

TESTING/SAMPLING

The ROP did not contain any emission testing or sampling requirements for the period evaluated. An initial test for PM emissions was required for SVB2014, SVB2015, SVB2016, SVB2020, SVB2021, SVB2022, SVB2034, SVB2035, SVB2043, SVB2044, SVB2057, SVB2058, SVB2061, and SVB20163. The test was completed on August 3, 2011.

MONITORING/RECORDKEEPING

All records requested were available. Records review indicates that all required monitoring and record keeping is performed.

MONITORING

Stack & Vent ID	Monitoring required	CAM Subject Pollutant	Special Condition
1. SVB2004	Quarterly VE		SC VI.7
2. SVB2005a	Quarterly VE		SC VI.7
3. SVB2005b	Quarterly VE		SC VI.7
4. SVB2006			
5. SVB2007	Quarterly VE		SC VI.7

4. SVB2008	Scrubber flow 44/22 GPM	VOC, PM	SC III.5
5. SVB2009	Quarterly VE		SC VI.7
6. SVB2010	Quarterly VE		SC VI.7
7. SVB2014	Daily VE/Stack Test	PM	SC I.9, SC VI.8, SC V.2
8. SVB2015	Daily VE/Stack Test	PM	SC I.9, SC VI.8, SC V.2
9. SVB2016	Daily VE/Stack Test	PM	SC I.9, SC VI.8, SC V.2
10. SVB2020	dP <200 in. W.C./Stack Test	PM	SC I.9, SC III.8., SC V.2, SC VI.9.
11. SVB2021	dP <200 in. W.C./Stack Test	PM	SC I.9, SC III.8., SC V.2, SC VI.9
12. SVB2026	dP <200 in. W.C./Stack Test	PM	SC I.9, SC III.8., SC V.2, SC VI.9, SC VI.9
13. SVB2029	Scrubber flow 10 GPM, Quarterly VE		SC III.6, SC VI.7
14. SVB2034	Stack Test		SC I.9, SC V.2
15. SVB2035	Stack Test		SC I.9, SC V.2
16. SVB2043	Stack Test		SC I.9, SC V.2
17. SVB2044	dP <200 in. W.C./Stack Test	PM	SC I.9, SC III.8., SC V.2, SC VI.9
18. SV963THROX	NOT EVALUATED		
19. SVB2055	Quarterly VE		SC VI.7
20. SVB2057	Daily VE/Stack Test	PM	SC I.9, SC VI.8, SC V.2
21. SVB2058	Daily VE/Stack Test	PM	SC I.9, SC VI.8, SC V.2
22. SVB2059	Quarterly VE		SC VI.7
23. SVB2060	Quarterly VE		SC VI.7
24. SVB2061	Daily VE/Stack Test	PM	SC I.9, SC VI.8, SC V.2
25. SVB2063	dP <200 in. W.C./Stack Test	PM	SC I.9, SC III.8., SC V.2, SC VI.9

REPORTING

A review of Annual and Semi Annual Deviation reports, and, Environmental Audit findings found the following reported items.

8/6/2015 Seven compressors, classified as venting fugitive emissions to a closed vent system, were included in annual closed vent system inspection, and were added to the inspection procedure.

10/2/2015 Site Specific Monitoring Plan gaps were found for elements required by 40 CFR 63 Subpa UUUU. The Site Specific Monitoring Plan was updated to meet MACT UUUU requirements.

Discrepancies were found in reporting leak rates in 40 CFR 63 Subpart H. Dow updated steps to calculate leak rates reported for future Subpart H Periodic reports.

A July 6, 2015 leak of MeCl and PO discovered coming from a flange, reported, and repaired.

Emissions reported to MAERS for 2014 values were corrected after a review of emission models.

The reported items were not deviations or were corrected and procedures implemented to prevent recurrence.

STACK/VENT RESTRICTIONS

The following stacks/vents information was reviewed during the inspection.

Stack & Vent ID	Maximum Exhaust Dimensions (inches)	Minimum Height Above Ground Level (feet)	Description
1. SVB2004	4 ¹	95 ¹	
2. SVB2005a	16 ¹	80 ¹	Blowdown tanks to atmosphere, no control, residual VOCs
3. SVB2005b	16 ¹	80 ¹	Blowdown tanks to atmosphere, no control, residual VOCs
4. SVB2006	2 ¹	21 ¹	
5. SVB2007 ^a	14 ¹	38 ¹	North train dryer wet scrubber
26. SVB2008	12 ¹	80 ¹	T-1001 scrubber
27. SVB2009	97 ¹	87 ¹	South train flash dryer Wet scrubber
28. SVB2010 ^a	14 ¹	38 ¹	South train tumble dryer wet scrubber
29. SVB2014	10 ¹	65 ¹	Mill baghouse
30. SVB2015	10 ¹	65 ¹	Mill baghouse
31. SVB2016	10 ¹	65 ¹	Mill baghouse
32. SVB2020 ^a	8 ¹	9.5 ¹	Homogenizing unit baghouse
33. SVB2021 ^a	8 ¹	9.5 ¹	Homogenizing unit baghouse
34. SVB2026 ^a	8 ¹	9 ¹	Low viscosity baghouse
35. SVB2029	10 ¹	42 ¹	Low viscosity water scrubber
36. SVB2034	2 ¹	25 ¹	
37. SVB2035	2 ¹	25 ¹	
38. SVB2043 ^a	2 ¹	80 ¹	
39. SVB2044 ^a	8 ¹	60 ¹	Homogenizing unit baghouse
40. SV963THROX	18 ²	80 ²	
41. SVB2055 ^b	2 ¹	30 ¹	
42. SVB2057 ^b	20 ¹	95 ¹	

43. SVB2058 ^b	20 ¹	120 ¹	MILL
44. SVB2059 ^b	2 ¹	75 ¹	
45. SVB2060 ^b	2 ¹	20 ¹	
46. SVB2061 ^b	3 ¹	20 ¹	
47. SVB2063 ^b	3 ¹	20 ¹	
^a Stack discharge is horizontal. ^b Stack discharge is down or obstructed.			

MISCELLANEOUS
 The FLIR camera was used to observe portions of the process. A potential leak associated with the VGR compressor was observed. It was difficult to determine the definite presence of a VOC leak due to the large

temperature difference between the operating compressor and the other material handling components combined with the small potential VOC plume volume. Dow Chemical later confirmed the presence of a small VOC leak and repair of the leak.

A video report containing images is of the methanol tank and the rail car recovery compressor (VGR compressor- equipment ID C902) is available on S/AQD/FLIRCamera /Inspection video report .

NAME *[Signature]*

DATE 4/3/2017

SUPERVISOR *[Signature]*