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

D806526581

FACILITY: Dart Container Corporation of Michigan		**SRN / ID:** D8065
LOCATION: 432 Hogsback Rd, MASON		**DISTRICT:** Lansing
CITY: MASON		**COUNTY:** INGHAM
CONTACT: Donald Wiltse , Regulatory Engineer		**ACTIVITY DATE:** 08/13/2014
STAFF: Brian Culham	**COMPLIANCE STATUS:** Compliance	**SOURCE CLASS:** MAJOR
SUBJECT:		
RESOLVED COMPLAINTS:		

Donald Wiltse, Regulatory Engineer - Donald.Wiltse@dart.biz

This was a scheduled inspection for the purpose of determining compliance and assuring that monitoring for a newly issued ROP is being implemented. Compliance was evaluated and an FCE will be completed. An inspection brochure was left during the inspection.

Dart Container of Michigan is located northwest of Mason, Michigan just west of the US-127. The Dart campus straddles Howell Road and continues northwest along Cedar Street. Dart is expanding their campus in this direction. Commercial developments are located to the south and southeast. Immediately west is a residential subdivision. Agriculture and recreational land ranges to the north and northeast. Farther to the south is more agricultural land.

Dart manufactures polystyrene (foam) containers (cups). Pentane emissions released from the polystyrene beads during manufacturing are controlled by exhausting the pentane into three natural gas fired boilers. The boilers are also used to generate steam for the cup molding processes and for comfort heating. Molds used to shape the containers are periodically plated or re-plated with chrome.

Dart is a "major stationary source" in regards to Title V of the Clean Air Act (ROP), as defined by Title 40 CFR Part 70.2, because the potential to emit volatile organic compounds (VOC) is greater than 100 tons per year.

Dart is an "area source" in regards to Title I of the Clean Air Act (HAP)), as defined by Title 40 CFR Part 70.2, because the potential to emit hazardous air pollutants (HAP) is less than 10 tons per year of any single HAP, and less than 25 tons per year of any combination of HAPs.

Dart is located in Ingham County, which is currently designated as attainment/ unclassified for all criteria pollutants. The stationary source is considered a "synthetic minor source" in regards to Prevention of Significant Deterioration (PSD), Title 40 CFR Part 52.21, since the stationary source has accepted legally enforceable permit conditions limiting the potential to emit VOC to less than 250 tons per year.

In 1990, Ingham County was designated non-attainment for ozone (VOC). At one time the stationary source was subject to Michigan Air Pollution Control (APC) Rule R336.1220 for Major Offset Sources (LAER). APC Rule 220 has been rescinded and replaced by APC Part 19 Rules.

A two section MI-ROP-D8065-2008 was renewed on July 15th of this year. Darts east campus is section 1 and is considered the Cup Plant where the foam cups are manufactured. The west campus is section 2 and is the Machine Manufacturing Plant that assembles machines used in cup manufacturing. Dart has a NAICS code of 326140 - Polystyrene Foam Product Mfg. for the "stationary source".

Dart is subject to the Maximum Achievable Control Technology (MACT) Standards for Chromium Emissions from Hard Chromium Electroplating promulgated in Title 40 of the Code of Federal Regulations, Part 63, Subpart N. Dart is not subject to MACT Standards for Nine Metal Fabrication and Finishing Area Source Categories ; 40 CFR Part 63 Subpart XXXXXX(6X) because 326140 is not one of the listed NAICS codes. Reciprocating internal combustion engines (RICE) at Dart are subject to Standards of Performance (NSPS) for Stationary Compression Ignition Internal Combustion Engines 40 CFR Part 60 Subpart IIII and the "Area Source" requirements of the National Emissions Standards for Hazardous Air Pollutants (MACT) for Stationary Reciprocating Internal Combustion Engines 40 CFR Part 63 Subpart ZZZZ.

The emission unit EU-CUPS-S1 is subject to the federal Compliance Assurance Monitoring (CAM) rule under Title 40 of the Code of Federal Regulations, Part 64, because EU-CUPS-S1 has both a control device and potential pre-control emissions of VOC greater than the major source threshold level. In addition, post-control emissions of VOC from EU-CUPS-S1 are over the major source threshold level.

The emission unit EU-CHROMEPLATING-S2 is not subject to the federal CAM rule, because the emission limitations or standards for EU-CHROMEPLATING-S2 are covered by the National Emission Standards for Chromium Emissions from Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks, 40 CFR 63 Subpart N. Compliance with the subpart satisfies CAM requirements.

Certification and deviation reports are being submitted as required. Dart is also considered a Category I Fee subject facility and are reporting to MAERs annually (see the FCE report).

I arrived at the facility at 1:00 pm. There were no odors associated with the plant as I entered the property. I did not identify any opacity. I met with Donald Wiltse who escorted me to a conference room that contained the following additional Dart staff:

Kelly Winland, Cup Plant Manager
Dennis Archer, Cup Plant Services Manager
Jo Anna Stenzel, Environmental Services Director
Gary Brewer, Machine Manufacturing Plant Manager
Jerry Kramer, Machine Manufacturing Assembly Superintendent
Charlie Hills, Facilities Infrastructure Manager

A short conference was held on updates, and question and answers, on the ROP, recordkeeping, and the draft cup storage permit PTI 349-06A.

#	Emission Unit or Flexible Group	Description	Permit Number or Exemption	Comp. Status
1	EU-CUPS-S1	EPS pre-expanders, pentane collection system, bead screens, and steam chest molding	MI-ROP-D8065-2008, CAM 40 CFR 64	C
2	FG-BOILERS-S1	Three natural gas fired boilers also used for pentane destruction	MI-ROP-D8065-2008	C
3	EU-RECYCEXTRUDER-S1	Extrude scrap and recycled foam into polystyrene beads	MI-ROP-D8065-2008	C
4	FG-COLDCLENERS-S1 FG-COLDCLENERS-S2	Aqueous based units.	MI-ROP-D8065-2008, Rule 281(h) Rule 285(r)(iv)	C
5	FG-RULE290-S1	UV Print and Cleanup	MI-ROP-D8065-2008, Rule 290	C
6	EU-CHROMEPLATING-S2	One hard chrome plating and one chrome strip tank	MI-ROP-D8065-2008, 40 CFR 63 subpart A &N	C
7	EU-PAINTBOOTH	Machine parts coating line booth	MI-ROP-D8065-2008	C
8	EU-LASERCUTTER1	Laser cutter	MI-ROP-D8065-2008	C
9	EU-FOAMPKG	Polyurethane Foam-in- place packaging.	Rule 286(e)	C
10	EU-DIEOVEN	Extruder die burn-off oven	Rule 290(a)	C
11	FG-METALWORK	Welding, blasting, grinding, cutting metal	Rule 285(i), Rule 285(l)(vi)	C
12	FG-POLYMERLAB	Inspection of plastic or metal products or parts.	Rule 283(1)	C
13	FG-R&D	Pilot testing prototypes or experimental designs prior to developing.	Rule 283(1)	C
14	FG-RICE (S-1 and S-2)	Fire pump and generator	Rule 285(g)	C

		engines.		
15	EU-CUPSTORAGE	Finished containers are packaged into plastic film sleeves, boxed, stacked and stored. On average, containers remain in storage for 30-days .		

Section 1 is considered the Foam Container Division

1. EU-CUPS-S1 EPS pre-expanders, pentane collection system, bead screens, and steam chest molding.

The process was originally installed in 1960. Dart produces foam containers made from expandable polystyrene (EPS) beads. Records of the manufactures specification certificates are being maintained as required by the permit. I saw manufacture specifications for recently purchased EPS beads. The beads typically range between 5.2% and 5.4% pentane as a blowing agent. The permit limits the EPS material to a pentane concentration of less than 6.5% by weight.

Beads are purchased in barrier lined thousand pound bags and boxes. Dumpers transport the beads to blenders, which load holding tanks. Beads are inspected before being dumped.

The pre-expander uses steam and air to heat the EPS beads. The heat vaporizes the blowing agent (pentane) causing expansion within the bead cells. Pentane is released as the bead is expanded to a desired density. The expanded bead is called "pre-puff". A pentane collection system captures the pentane from the pre-expansion system and routes it to any two of three boilers for destruction. The "pre-puff" beads are screened to remove clumped beads, oversized beads, and undersize beads before being sent to the cup molding machines.

The pentane collection system on the pre-expanders is equipped with analyzers that continuously monitor and record gas flow rate and pentane concentration. The analyzer is calibrated every week. The calibration gas used was identified as pentane.

The Pentane Control System uses a strip chart to continuously log the air flow rate and pentane concentration as well as several other parameters. Operators are required to record values every two hours. Using the analyzed data the system calculates the pounds per hour of pentane entering the pentane destruction system (boilers). I witnessed a pentane value of 24.47 pounds/hour during my inspection. The strip chart for the day logged a maximum rate of 35 pounds/hour. Emissions are restricted to 75.33 pounds/hour by the ROP.

The permit requires a 30% minimum capture of pentane from the pre expansion system. On January 16, 2013 testing was completed and tests resulted in average capture efficiencies of 35.8% and 35.6%. The records below exhibit 36.4% efficiency.

Additional records maintained by Dart include bead usage rate, pentane content, and hours of operation. Mass emission rates can be calculated and recorded from these values as required by permit.

Emission rates are determined using the 95% minimum destruction value required by the permit. A stack test is required every 5 years coinciding with the ROP renewal cycle. Destruction efficiency determined from the required stack testing completed January 17, 2013 was reported as an average of 99.1%, exceeding the 95% minimum.

Total pentane captured for 2013 (including recycle) was reported at 137,536 pounds. Total EPS bead usage for 2013 was reported as 13,444,000 pounds. The following equation is from Appendix 7-1 of the ROP.

See Image at end of report

Where:
Pentane=emissions from EU-CUPS-S1 in tons
EPS=expandable polystyrene in pounds
y=collected pentane emissions in pounds (less recycle)
x=boiler destruction efficiency (0.95)

Steam is again used to heat the pre-puff at the steam chest molding machines, and causes it to expand into the shape of the container mold. Cooling sets the foam container's shape to that of the mold. Pentane that is

released from this part of the process goes to atmosphere. The steam chest molding is expected to release an additional 0.0023 pounds of pentane per pound of EPS beads processed, or 15.46 tons for 2013.

All EPS waste from EU-CUPS-S1 processes is collected and delivered to EU-RECYCEXTRUDER-S1.

The permit limits pentane emissions from EU-CUPS-S1to 219.95 tons per year I calculated about 135.29 tons in 2013.

The continuous monitoring of boiler temperature, pentane concentration, and gas flow to the three boilers by the Pentane Control System is the accepted Compliance Assurance Monitoring (CAM) plan for this Emission Unit. Boilers 7 and 8 were operating satisfactorily. A minimum temperature of 300°F is required by the permit for operation of the pentane collection system. Unit 7 was at 348°F and Unit 8 was at 333°F during the inspection. Boiler 5 was down and had just completed an annual boiler inspection.

2. FG-BOILERS-S1 Three natural gas fired boilers also used for pentane destruction

Boiler #5 is a 600 hp boiler, Boiler #7 is a 700 hp boiler, and Boiler #8 is an 800 hp boiler. All boilers are used to produce steam for foam container production and for comfort heat. The boilers also mix pentane exhaust in the combustion air and combust the pentane. The primary fuel is natural gas. A backup supply of No.2 fuel oil is maintained. Natural gas was being combusted during the inspection.

The boilers were installed in 1970. They are not subject to 40 CFR Part 60 Subpart Dc - Standards of Performance (NSPS) for Small Industrial-Commercial-Institutional Steam Generating Units because they were constructed before June 9, 1989.

Boiler stack temperatures are monitored continuously and recorded on a strip logger. Written records are also maintained on a daily basis. Boiler operational status is identified in the written record. Non-operational boilers can exhibit high temperatures on the data logger implying an erroneous excursion.

3. EU-RECYCEXTRUDER Extrude scrap and recycled foam into polystyrene beads

An extruder is used in the recycle center to recycle polystyrene foam. Waste beads and scrap containers from container manufacturing, as well as collected post-consumer products are recycled through the extruder. Supporting processes consist of cleaning and sorting the recycled foam. The extruded polystyrene beads are sold to an external source for further manufacturing. No additional VOCs are added by Dart in this process. The recycle process was installed in 1990.

Some pentane still exists in the waste foam. A duct connects all emissions from the extruder to the pentane control system (see EU-CUPS-1). The duct is under negative pressure during operation of the extruder. It is expected that 100% of emissions from the extruder evacuated to the boilers.

Records of both Fresh and Post-Consumer foam material processing rates are being maintained. Pentane emissions are being calculated. Records indicated that 150 tons of Fresh and 226 tons of Post-Consumer foam were processed in 2013. The ROP limits production to a total of 2,190 tons per year. Potential VOC emissions generated by the process were calculated at 4.78 tons, but pentane recovery was measured (?) at 5.68 tons introduced to the boilers for 2013. At 95% destruction 0.3 tons of pentane was emitted for 2013, the limit is 3.4 tons of pentane/year.

4. FG-COLDCLENERS-S1 and FG-COLDCLENERS-S2

Most units have been switched to "green" aqueous based cleaners. Dart has only two cleaning stations left that are solvent based. The units are managed by an outside source Crystal(?). I asked what solvent was used. The product is a Petroleum Distillate blend. A total of 40.25 pounds of VOC was reported for 2013.

5. FG-RULE290-S1 UV Ink and cleanup solvents

An ultraviolet ink is used to print on foam containers. 17 printers are equipped with the UV ink. The inks are mostly solvent free and cured to the foam by exposure to ultraviolet light. Isopropyl alcohol is used for cleanup of the applicators. Records are being maintained and a 1.0% VOC content is calculated for the inks (worse case). Records stated that 7611 pounds of VOC was emitted for 2013.

Section 2 is considered the Machinery Manufacturing Division

6. EU-CHROMEPLATING-S2 One hard chrome plating tank and a chrome strip tank.

The plating process is used to plate molds used in the manufacturing of Styrofoam cups. The molds are of various shape and sizes and 4 to 6 can be plated on a rack at one time. A mold rack is cycled in and out of the plating bath every 35 minutes.

The plating line was installed in 1989. Under NESHAP standards the process is considered an existing small hard chrome plating operation. An HCL chrome strip tank is also part of this emission unit. The tanks are installed in a room isolated from the reset of the plant. The plating tanks are ventilated through a three pad Composite Mesh Pad (CMP) scrubber installed above the room before venting to atmosphere. The strip tank vents directly to atmosphere.

The last 40 CFR 63 subpart N amendment was Sept. 19, 2012. As of September 19, 2014, the new emission rate for the owner or operator of an existing affected source, such as Dart, will be 0.015 milligrams of total chromium per dry standard cubic meter. On June 25, 2013 a stack test was completed. The report received on August 13, 2013 indicated chromium in the exhaust at 0.002 mg/dscm less than both the existing and the new regulatory limit.

Emission tests were also completed on the plating line exhaust in June of 1999 and again in August of 2003.

Use of a CMP is Dart's chosen compliance method for Subpart N. Overall pressure drop must be maintained at ±2" H_2O of the value established during a valid compliance test. The 1999 test result indicated chromium at 0.0013 mg/dscm. The overall pressure drop during the 1999 test was reported at 3.3" H_2O gauge allowing for a range of 0.3" to 5.3". Although EU-CHROMEPLATING-S2 was not plating during my inspection, the system was on and the four gauges displayed pressure drop readings for the control device. From left to right the values read 0.6, 2.2, and 0.5 inches water gauge for each of the pads. A fourth gauge read the total system as 3.6" H_2O. Values from the gauges are being recorded by Dart employees daily as is required by the permit.

The manufacture approved usual operation of the three CMP scrubbers is :

Pad #1 – automatic, rinse every 60 minutes for 5 minutes

Pad #2 – automatic, rinse every 12 hours with 20 gallons

Pad #3 – manual, as needed

Records of hours of operation are also being maintained. The Subpart N Notification of Compliance Status reports are being submitted (see FCE Report). No deviations have been identified.

HCL concentrations and tank temperature are both being recorded for the strip tank.

7. EU-PAINTBOOTH Machine parts coating line booth

The paint booth was installed in 1997. It went through new source review and was issued a permit with 9.9 tpy and 2000 pounds/month VOC restrictions.

Overspray filters were in place in the paint booth. I watched as the painter applied spray coating to parts. The painter had only been employed for two weeks but was able to show me his floor sheets for recording paint use. His raw data is reorganized into a spreadsheet for the required calculations and a summary record. Records indicated 378 gallons of coating were applied in 2013, generating less than 1 ton of VOC emissions.

8. EU-LASERCUTTER1 Laser cutter

The laser cutter is used to cut mild, stainless, and galvanized steels and aluminum. It was installed in 2007. The equipment was not operating during my inspection.

11. FG-METALWORK

Dart is considered an "area source" of HAP emissions. Chromium is a regulated metal HAP contained in stainless steel. Because stainless steel is periodically used for fabrications, Dart was concerned that several metal machining processes could be subject to the MACT Standards for Nine Metal Fabrication and Finishing Area Source Categories ; 40 CFR Part 63 Subpart XXXXXX(6X).

The Subpart 6X applies to "area sources" that machine, weld, dry grind, abrasive blast, or paint metals containing metal HAPs. Machining means dry metal turning, milling, drilling, boring, tapping, planing, broaching, sawing, cutting, shaving, shearing, threading, reaming, shaping, slotting, hobbing, and chamfering with machines.

EU-LASERCUTTER1 and EU-PAINTBOOTH as well as other exempt processes in the engineering building could have been affected by this regulation; however, the NAICS code for Foam Cup Manufacturing is not one of the categories that are listed as being subject to Subpart XXXXXX.

14. FG-RICE

Several Recipricating Internal Combustion Engines(RICE) are maintained at Dart for various emergency uses. Four units are subject to the New Source Performance Standard subpart IIII and two are subject to the NESHAP subpart ZZZZ.

- A 475 hp CI RICE emergency stationary generator. NSPS subpart IIII
- A 526 hp CI RICE stationary fire pump engine. NSPS subpart IIII
- A generator for supplying emergency light in the Cup Plant. . Area Source MACT subpart ZZZZ
- A second fire pump engine. Area Source MACT subpart ZZZZ
- A 2200 hp CI RICE emergency stationary generator. NSPS subpart IIII
- A 1200 hp CI RICE emergency stationary generator. NSPS subpart IIII

Charlie Hills, Facilities Infrastructure Manager, is responsible for compliance of these units. He is keeping records of the hours and reason for use of each unit. We also discussed maintenance and oil change records. It is my understanding that Dart will be using a manufacture approved independent company to twice annually inspect and maintain the larger units. Records of this service will be kept and should be adequate to assure the engine certification status.

15. EU-CUPSTORAGE

Finished containers are packaged into plastic film sleeves, boxed, and stacked. All of these containers are transported to a designated building for short-term storage. On average, the cup plant maintains a 30-day inventory of its products in short term storage.

About 40% of the total pentane is still in the cups after packaging. It was assumed during past inspections that, although some pentane was lost in storage, the majority was emitted after products left the Dart campus. At that time, emissions were treated as fugitive, and exempt from permitting by Rule 280(b).

Rule 280(b) allows for comfort ventilation of buildings. However, exemptions cannot be used when an emitted pollutant exceeds a significant amount. For VOC, significant is 40 tons annually. Dart had recently estimated emissions of VOC from all of their cup storage areas at over 40 tons. Dart contacted the Lansing District Office and explained their concern. Meetings were held between AQD and Dart and a decision to obtain a Rule 201 permit was made. The permit application has been submitted by Dart and draft conditions are presently being reviewed.

I left the facility at 3:45 pm.

I did not identify any non-compliance.

$$pentane = \frac{(EPS \times 0.0267) - (y \times x)}{2000\ lbs/ton}$$

$$pentane = \frac{(13{,}444{,}000 \times 0.0267) - (125579 \times 0.95)}{2000}$$

$$pentane = \frac{(358{,}955) - (119300)}{2000}$$

$$pentane = \frac{239655}{2000}$$

$$pentane = 119.83\ tons$$

Image 1(pentane calc) : Pentane emissions from Cup Plant

NAME _____ DATE 8.25.2014 SUPERVISOR _____