

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

N3143  
FY 2018 Sched Insp.  
SM CMS

N314343317

FACILITY: CARROLL PRODUCTS, INC.		SRN / ID: N3143
LOCATION: 44056 Phoenix Drive, STERLING HTS		DISTRICT: Southeast Michigan
CITY: STERLING HTS		COUNTY: MACOMB
CONTACT: Mike Murphy , Plant Manager		ACTIVITY DATE: 01/10/2018
STAFF: Iranna Konanahalli	COMPLIANCE STATUS: Compliance	SOURCE CLASS: SM OPT OUT
SUBJECT: FY 2018 scheduled SM CMS inspection of Carroll Products, Inc.		
RESOLVED COMPLAINTS:		

**Carroll Products, Inc. (N3143)**  
44056 Phoenix Drive  
Sterling Heights, Michigan 48314-1463

**BACT:** Rule 702 BACT is based upon 2001 BACT determination because the PTI modification PTI No. 78-01 → PTI No. 78-01A does not involve change in emissions. Existing combination of CE > 70% and RTO DE > 95% is valid Rule 702 BACT. One new printing press replaced two existing presses.

**RACT:** Rule 336.1624 for existing graphic arts lines. Maximum 25% Volatile Organic Compounds (VOC) content or specified emissions reduction (Rule 624(3)).

**PTI:** Permit-to-Install Number 78-01A (ROP and MACT Synthetic Minor) dated August 17, 2016 (FG-FLEXO, I.1&2 limits: 28.9 tpy and 15.4 pph VOC; FG-FLEXO, IV.1&2 limits: CE > 70% [CE = 76.4% > 70% based upon February 28, 2017, Stack Tests], RTO DE > 95% [DE = 98.9 > 95% based upon February 28, 2017, Stack Tests] and RTO T > 1590 °F [RTO operating T = 1597 °F during the February 28, 2017, Stack Tests]; FG-FACILITY, I.1&2 limits: 8.9 tpy Single HAP and 22.49 tpy Aggregate HAPs). The PTI modification (PTI No. 78-01 → PTI No. 78-01A) did not change VOC and HAP limits and deemed PTI No. 78-01 Rule 702 BACT as valid BACT to be continued for PTI No. 78-01A.

**PTI void:** Permit-to-Install Number 78-01 (ROP Opt-out) dated May 14, 2001, voided on August 17, 2016.

**PTI Application void:** Permit-to-Install Number 973-92.

**PTI Mod:** PTI No. 78-01 → PTI No. 78-01A. The modification removed old and inefficient printing presses, known as Carraro and FMC, and incorporated new printing press known as UTECO808, which is much more efficient and runs at substantially higher speed (UTECO808 1,000-1,300 feet per minute Vs old units ≈250 feet per minute). The PTI modification did not change VOC and HAP limits. In addition, the modification removed clean up tank (EU-CLEANUPTANK).

**VNs:** AQD issued violation notices (VNs) dated August 8, 2000 (for failure to keep VOC records per Rule 290(c)), October 27, 2000 (for failure to obtain permit per Rule 201, failure to comply with Rule 624 limits for graphic arts line, failure to register per 208a or obtain ROP opt-out permit), April 24, 2001 (for failure to obtain either ROP or Synthetic Minor Permit) and February 5, 2009 (for failure to maintain properly VOC capture

devices per PTI No. 78-01, SC No. 4 and determine VOC content using US EPA RM 24 per PTI No. 78-01, SC No. 7).

**CO: Consent Order AQD No. 42-2001 dated November 13, 2001: Terminated on March 24, 2005. Consent Order was for violations of Rule 624 RACT, 702 BACT, 208a, Rule 290 (August 8 and October 27, 2000, VNs). Settlement = \$90,000.00 and installation of RTO.**

On December 19, 2017, and January 10, 2018 (on Jan 10<sup>th</sup> new AQD engineers Bogнар & Magirl accompanied for the inspection), I conducted a level-2 FY 2018 scheduled SM CMS inspection of Carroll Products, Inc. ("Carroll" or "the company") located at 44056 Phoenix Drive, Sterling Heights, Michigan 48314-1463. The inspection was conducted to determine compliance with the Federal Clean Air Act; Article II, Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994, PA 451; Michigan Department of Environmental Quality, Air Quality Division (MDEQ-AQD) administrative rules; and Permit-to-Install Number 78-01A (ROP and MACT Synthetic Minor) dated August 17, 2016

During the inspection, Mr. Mike Murphy (Phone: 586-254-6300; Fax: 586-254-9458; E-mail: m.Murphy@CarrollProducts.com), Plant Manager, and Mr. Joseph Wolf (Phone: 586-254-6300; Fax: 586-254-9458; Cell: 248-930-0385; E-mail: j.Wolf@CarrollProducts.com), President, one of three owners, and Mr. Ken Kaptur (Phone: 586-254-6300; Fax: 586-254-9458; Cell: 586-630-7542; E-mail: k@CBkgr13@gmail.com), Print Supervisor, assisted me.

Mr. Don Logan, Maintenance Tech., was not present.

Mr. Eugene H. Stys (Phone: 586-254-6300), President & Owner, retired from the company in CY2008 and discontinued consulting since Feb 2012. Mr. Eugene H. Stys and Mr. Gary Dehaun sold their interests in the company to Messrs. Mike Murphy, Joel Manardo and Joseph Wolf.

The company operates three (3 = 4-2+1: about September 2016, of four original and inefficient presses that operated for decades, two presses Carraro and FMC were removed and one brand new and efficient press UTECO808 was installed resulting in three presses in all) flexographic (packaging and specialty flexography) printing units / presses identified as:

1. Carraro (EU-CARRARO, removed): About September 2016, 830 Stack Press, equipped with four-color capability and configured with single common exhaust point for both between-colors dryers and overhead dryers, was removed to make room for brand new press UTECO808.
2. Wolverine (FG-FLEXO, EU-WOLVERINE, installed January 1, 1986): Flexographic Printing Line. Web Width = 38 inches. Control Equipment: Regenerative Thermal Oxidizer (RTO). The Wolverine 384 4-color Stack Press is equipped with four-color capability. Unlike Carraro, it is not equipped with heat source and uses ambient air for between-colors and overhead dryers. Line speed = 200 feet per minute.
3. FMC (EU-FMC, removed): About September 2016, FMC (Hudson Sharp (HS)) 586 6-color CI press central impression (CI) cylinder type press with six-color capability and an overhead dryer, was removed to make room for brand new press UTECO808.

4. Comexi (FG-FLEXO, EU-COMEXI, installed January 1, 1999): Flexographic Printing Line. Web Width = 48 inches. Control Equipment: RTO. The Comexi FS 1500 six-color central impression (CI) press was installed in 1999. The press has six-color capability. The Comexi press is equipped with chambered doctor blades that help reduce fugitive emissions. Both between-color and overhead dryer supply and exhaust systems are independent of each other and located at opposite ends of the press. Line speed = 250-300 feet per minute.
5. UTECO808 (FG-FLEXO, EU-UTECO808, installed September 15, 2016): Flexographic Printing Line. Web Width = 49 inches. Control Equipment: RTO. Line speed = 500-1,000 and possible 1,300 feet per minute. Hence, production rate is much higher than other units. UTECO808 saves energy as well as it has highly efficient DC motors. Unlike other presses, which have plastic sheets as enclosures to capture VOC, UTECO808 press is completely enclosed by sheet metal. UTECO808 press is equipped with see-through glass and its doors cannot be opened when printing due to an interlock mechanism. Hence, UTECO808 achieves nearly 100% capture of VOC. UTECO808 is equipped with 8 print stations; four on each side. UTECO808 is equipped two ducts for VOC capture and delivery to RTO.

Printing of inks on polyethylene, polypropylene rolls of packaging materials is accomplished using these three printing presses. The three flexographic printing press lines have VOC capture systems (one for each press) that vent VOC laden air to MegTech Regenerative Thermal Oxidizer (RTO) via common exhaust manifold that is located at the roof-top. The capture systems for older presses were replaced in CY2009 as result of the February 5, 2009, Violation Notice. All ducts connect to one 36-foot exhaust manifold, which delivers VOC laden exhaust to the RTO, on the roof.

Regenerative thermal oxidizers (RTO) offer superior heat recovery characteristics versus any other oxidation system. RTOs use recovered energy to pre-heat incoming process air to oxidation temperatures. This significantly lowers overall operating costs. RTOs are particularly effective for process streams with low solvent loading. Carroll installed MEGTEC MILLENNIUM RTO.

The MEGTEC MILLENNIUM 8000 RTO (Design inlet flow rate 8,200 acfm @ 120 °F, Design exhaust flow rate 10,200 acfm @ 215 °F, Maximum burner heat input 1.4 MMBTU / Hour, Typical burner heat input 0.3 MMBTU / Hour) uses an inexpensive ceramic heat exchange media that is virtually indestructible. The media's exceptionally low resistance minimizes pressure drop. Typical pressure drop is 14 inches of water across the media pad. That means smooth operations and reduced electrical operating costs. The system delivers thermal efficiencies of 95%. Even at relatively low solvent (VOC) concentrations, the system can sustain thermal conditions (about 1600 °F) with the heat released during VOC oxidation — requiring no additional fuel for VOC destruction. At Carroll, **January 10, 2018**, temperature profile reflects high thermal efficiency: incoming VOC laden process air from four presses was at **110 °F**, outgoing exhaust air to ambient atmosphere, after thermal oxidation of VOC and heat recovery was at **220 °F** (varies: 170-250 °F) and the combustion chamber temperature was at **1604°F** (PTI No. 78-01A, FG-FLEXO, IV.2 limit). The Millennium RTO unit has two combustion chambers: one in oxidation mode and the other in heat recovery mode. Every 180 seconds (3 minutes), the chambers switch from oxidation mode to heat recovery mode and visa versa. According to  $Q = m c_p \Delta T$ , where  $m$  = mass of media,  $c_p$  = heat capacity of media and  $\Delta T$  = temperature change, heat released and absorbed by the media. There are two

ceramic packing media to exchange heat; while one media pad is in heat absorption mode and the other in heat release mode. 1590°F). The temperature data are logged on to strip charts (paper), which were replaced on **December 08, 2017** (PTI No. 78-01A, FG-FLEXO, IV.3 limit: record the temperature)

### **RTO maintenance**

Once a year, Babcock & Wilcox MEGTEC, LLC ("MegTec") of De Pere, WI 54115-5030 (Phone: 800-558-5535 or 920-337-1410), conducts preventive maintenance. It also fine-tunes performance of the Millennium RTO unit. The thermocouples are changed every year. In CY 2007, additional ceramic packing was added.

CY 2014: MegTec conducted annual maintenance during May 14-16, 2014. Invoice No. 123521 dated June 12, 2014, for \$3,637.36 for parts and service shows that maintenance activities were done. Many parts were replaced: Igniter-spark, Thermocouple, Bushing, Oxygen monitor, etc.

CY 2015: MegTec conducted annual maintenance during February 2015. Invoice No. 1105842 dated March 03, 2015, for \$1,411.98 for parts and service shows that maintenance activities were done. Many parts were replaced: Igniter-spark, Thermocouple, Bushing, Oxygen monitor, Gasket, etc.

CY 2016: MegTec conducted annual maintenance during March 2016. Invoice No. 1114318 dated March 30, 2016, for \$2,066.93 for parts and service shows that maintenance activities were done. Many parts were replaced: Igniter-spark, Thermocouple, Bushing, Oxygen monitor, Battery, etc.

CY 2017: MegTec conducted annual maintenance during March 2017. Invoice No. 130841 dated March 24, 2017, for \$2,575.65 for parts and service shows that maintenance activities were done. Many parts were replaced: Igniter-spark, Thermocouple, Bushing, Oxygen monitor, etc.

A common manifold that carries VOC laden air from the presses to the RTO is located on the roof-top.

### **US EPA RM24 analysis (PTI No. 78-01A, FG-FLEXO, V.2 & VI.4 limit: US EPA RM 24 and VOC content)**

Prior to Feb 2009, Carroll failed to determine VOC content according to US EPA Reference Method 24 (or 24A), SC No. 7 (PTI No. 78-01) and the October 25, 2007, letter to Eugene H. Stys, President, describes an alternative method. Please refer to the February 5th NOV for additional details.

Based upon FY2010 inspection, RM24 analysis (PTI No. 78-01SC 7 and Oct 25, 2007, letter) was conducted. On 11/13/2009, SF Analytical Laboratories (262-754-5300) of New Berlin, WI 53151, conducted RM24 analysis for VOC content, water content, density, etc. Again, in CY 2010 and CY 2011, Carroll failed to perform US EPA RM 24 analysis. Upon request during the FY 2012 inspection (May 30, 2012), Carroll conducted RM 24 analysis during June 7-8, 2012, using SF Analytical Laboratories. AQD received the analytical report via e-mail (Joseph Wolf <[j.wolf@carrollproducts.com](mailto:j.wolf@carrollproducts.com)> Wed 6/6/2012 9:05 AM). Notice of Violation was not sent for failure to conduct RM24 test considering the fact that RTO together with associated capture systems provides 76 percent capture and 99 percent destruction (PTI No. 78-01SC 3

& 4). I informed Mr. Wolf that June 7-8, 2012, report counts towards CY 2011 analysis and that Carroll is required to perform RM24 test by Dec 2012 for CY 2012.

Mr. Wolf could not produce CY 2013 RM24 test report by August 4, 2014; the report was due by Dec 2013. I asked him to conduct US EPA RM24 analyses immediately. This CY 2014 RM24 analytical report would be good for both CY 2013 & 2014.

Carroll conducted US EPA RM24 analyses on January 18, 2018 using Eurofins S-F Analytical Laboratories (262-754-5300) of New Berlin, WI 53151. This report is deemed to be for CY 2017.

### **Consent Order and RTO**

The inks are purchased from Toyo (which replaced in 2010 Flint Ink Company); Sun Chemical Company does not supply inks any more based upon FY 2014 inspection. The company uses solvent-based inks due to quality problems associated with water-based inks (adhesion and gloss). The Permit-to-Install Number 78-01, which is now 78-01A (ROP Opt-out), requires VOC control to satisfy Rule 336.1624 and Rule 336.1702 BACT. The permit and consent order are a result of an enforcement action initiated in order to ensure compliance with Rule 336.1624. Carroll installed 8,000 SCFM (12,600 Nm<sup>3</sup> per hour) Millennium Regenerative Thermal Oxidizer (RTO) to control VOC emissions from the printing presses. On or about July 13, 2002, Carroll started operating this RTO, which delivers thermal efficiencies up to 95 percent.

While solvent based inks give better quality with shorter dryer, water-based inks give poor quality and need higher capacity dryer. Carroll does not use water-based inks.

### **Solvent cleaning (EU-CLEANUPTANK) - removed**

Cleaning method had been changed to cleaning inside an enclosed tank (EU-CLEANUPTANK) until the tank was removed about 2006. Miscellaneous solvent (n-propanol) usage has been substantially reduced in recent years and finally to zero. Since CY2006, clean-up occurred at the press while RTO is still running. During the PTI mod (PTI No. 78-01 → PTI No. 78-01A) the emissions unit (EU-CLEANUPTANK) was removed from the permit.

### **RTO**

The company has chosen the set point of 1590 degrees Fahrenheit (PTI No. 78-01A, FG-FLEXO, IV.2 limit: 1590°F). When the RTO operating temperature falls below the set-point, the presses shutdown automatically (PTI No. 78-01A, FG-FLEXO, IV.2 limit: 1590°F).

Temperature charts are present to record temperature continuously (PTI No. 78-01A, FG-FLEXO, IV.3 limit: temperature records). The charts are replaced every two months. At Carroll, January 10, 2018, temperature profile reflects high thermal efficiency: incoming VOC laden process air from four presses is at ≈110 °F, outgoing exhaust air to ambient atmosphere, after thermal oxidation of VOC and heat recovery is at 220 °F (varies: 170-250 °F) and the combustion chamber temperature is at 1604°F (PTI No. 78-01A, FG-FLEXO, IV.2 limit: 1590°F).

### **RTO stack tests**

#### **June 2003 RTO stack test**

The permit and the consent order (which was terminated in March 2005) require capture and destruction of VOC in a regenerative thermal oxidizer. Minimum capture efficiency (CE) of 65 percent by weight and minimum destruction efficiency (DE) of 95 percent by weight are required. Carroll installed 8,000 SCFM (12,600 Nm<sup>3</sup> per hour) Millennium Regenerative Thermal Oxidizer (RTO) to control VOC emissions. On or about July 13, 2002, Carroll started operating this RTO. Based upon the June 2003 stack tests, CE = 76.3% > 65% (PTI No. 78-01SC 3) and DE = 98.7% > 95% (PTI No. 78-01SC 4)

The company's Consent Order No. 42-2001, paragraph 11 (terminated in March 2005) and Permit-to-Install No. 78-01 dated May 14, 2001 required that Carroll Products test for capture efficiency and destruction efficiency within 180 days of commencement of operation of the Regenerative Thermal Oxidizer (RTO); RTO commenced operation on July 13, 2002 (SC 6). Because AQD required the company to test the oxidizer when the roof vent is operating and, according to the company, it was not technically feasible to operate the printing processes when the roof vent is open & operating during winter months, AQD allowed an extension of time for Carroll Products to carry out the oxidizer performance tests by August 30, 2003.

Pursuant to PTI No. 78-01(SC 6), Carroll conducted performance tests on June 17 & 18, 2003. On July 22, 2003, AQD received the test reports. The capture efficiency (CE) and destruction efficiency (DE) reported in the July 2003 stack test report are 76.3 percent and 98.7 percent, respectively (SC 3 & 4 limits: CE > 65 % and DE > 95%). Resulting overall control efficiency (CE \* DE) is 75 percent. MACTEC (513-489-6611) of Cincinnati, Ohio, conducted the sampling and analysis.

### **February 2017 RTO stack test**

**Permit-to-Install (PTI): PTI No. 78-01A (FG-FLEXO, I.1 & 2 limits:28.9 tpy &15.4 pph VOC; FG-FLEXO, IV.1 & 2 limits: CE > 70%, DE > 95%, RTO T > 1590°F and RTO ε > 0.5 seconds; FG-FLEXO, V.1: testing for VOC emission rates, VOC capture efficiency (CE), and VOC destruction efficiency(DE); FG-FACILITY, I.1 & 2 limits: 8.9 tpy Single HAP and 22.49Aggregate HAPs) dated August 17, 2016**

**Contact: Mr. Joseph Wolf (Phone: 586-254-6300; Fax: 586-254-9458; Cell: 248-930-0385; E-mail: j.wolf@carrollproducts.com), President, one of three owners.**

On February 28, 2017, BT Environmental Consulting, Inc. (BTEC, Inc. – Messrs. Randy Tysar, Barry Boulianne, Mr. Steve Smith, Paul Molenda, David Trahan; Project No. 16-4967.00; April 3, 2017) of Royal Oak, Michigan, conducted the tests using CEM methods. BTEC conducted volatile organic compound (VOC) Destruction Efficiency (DE) test by measuring VOC at inlet and outlet to one recuperative thermal oxidizer (RTO). BTEC also conducted a Capture Efficiency (CE) test by measuring VOC emission rates at the RTO inlet sampling location as well as at one uncontrolled (north wall room air) exhaust sampling location. The building is deemed Total and Permanent Enclosure (TPE) with one ventilation fan at one location, where uncontrolled emissions were measured by constructing temporary horizontal stack (in the north wall) to comply with US EPA Reference emissions measurement methods. AQD Permit-to-Install No. 78-01A requires a minimum VOC CE of 70% (by weight) and a minimum DE of 95% (by weight).

AQD received the CE and DE test protocol (Project No. 16-4967.00; December 8, 2016). Mr. Thomas Maza of AQD-TPU approved the test plan on February 15, 2017, via the letter to Mr.

Joseph Wolf, dated February 15, 2017. According to the approval, VOC would be measured simultaneously at RTO inlet and at uncontrolled exhaust according to US EPA Reference Method 25A to determine Capture Efficiency (CE). Also, Destruction Efficiency (DE) would be determined by measuring simultaneously VOC at the RTO inlet and the RTO outlet at the exhaust stack. All VOC measurements during the February 28, 2017, tests were according to US EPA Reference Method 25A.

BTEC staff measured the gas flow rate and sampled emissions of volatile organic compounds (VOC) according to USEPA Methods 1-4 and 25A. The building formed a permanent total enclosure for the capture efficiency test. Sampling followed the procedures in USEPA Methods 204B, Volatile Organic Compounds Emissions in Captured Stream, and 204E, Volatile Organic Compounds Emissions in Uncaptured Stream from Building Enclosure. The test runs were performed while the printing lines (EU-WOLVERINE, EU-COMEXI, EU-UTECO808) were in operation.

AQD received the test report (Project No. 16-4967.00; April 3, 2017) on April 04, 2017. Per the report, Capture Efficiency is 76.4% (CE > 70%) and Destruction Efficiency is 98.9 (DE > 95%) (FG-FLEXO, IV.1 & 2 limits: CE > 70%, DE > 95%, RTO T > 1590°F and RTO  $\epsilon$  > 0.5 seconds). In addition, RTO controlled and uncontrolled building fugitive emissions were 0.30 and 6.6 pounds of VOC per hour, respectively; 6.6 plus 0.3 = 6.9 pph VOC (FG-FLEXO, I.1 & 2 limits: 28.9 tpy & 15.4 pph VOC). During the tests, RTO operating temperatures were 1597 (Run 1: UTECO808 and Wolverine), 1584 (Run 2: COMEXI and Wolverine) and 1586 (Run 3: UTECO808 and Wolverine) degrees Fahrenheit. Per the AQD (Tom Maza) calculations, Capture Efficiency is 75.6% (CE > 70%) and Destruction Efficiency 98.7. As both (BTEC and AQD) calculations are close, BTEC reported results (CE = 76.4% > 70% and DE = 98.9 > 95%) may be accepted for compliance calculations and determinations.

During RTO DE (DE = 98.9 > 95%) tests, flow rates were: Inlet = 4,521 and Outlet = 4,176 scfm.

During the building permanent total enclosure CE (CE = 76.4% > 70%) tests, flow rates were: RTO Inlet = 4,396 and North Wall Room Air exhaust = 8,043 scfm.

The reported results are in compliance with the permit.

#### **PTI No. 78-01A compliance**

#### **PTI No. 78-01A, FG-FLEXO**

#### **PTI No. 78-01A, FG-FLEXO, I. EMISSION LIMITS**

CY 2017: After combustion control at the Millennium RTO, while VOC emissions due to inks and diluent solvents are 1,358 pounds per month (December 2017), VOC emissions due to clean-up solvents are 446 pounds per month (December 2017). For the entire printing facility, VOC emissions are 11.75 tons (23,500 lbs.) per 12-month rolling period (PTI No. 78-01A, FG-FLEXO, I.1&2 limits: 28.9 tpy and 15.4 pph VOC)

#### **PTI No. 78-01A, FG-FLEXO, II. MATERIAL LIMITS**

NA

#### **PTI No. 78-01A, FG-FLEXO, III. PROCESS/OPERATIONAL RESTRICTIONS**

All materials (e.g., inks, solvents, rags) are handled properly (PTI No. 78-01A, FG-FLEXO, III.1&2 limits: handle all materials properly such that fugitive emissions are minimized)

#### **PTI No. 78-01A, FG-FLEXO, IV. DESIGN/EQUIPMENT PARAMETERS**

Capture systems are installed and operating properly for EU-WOLVERINE & EU-COMEXI and curtains are inspected every day (PTI No. 78-01A, FG-FLEXO, IV.1 limit: curtain-type enclosures for EU-WOLVERINE or EU-COMEXI).

UTECO808 press is completely enclosed by sheet metal. UTECO808 press is equipped with see-through glass and its doors cannot be opened when printing due to an interlock mechanism. Hence, UTECO808 achieves nearly 100% capture of VOC (PTI No. 78-01A, FG-FLEXO, IV.1 limit: minimum overall capture efficiency of 70 percent from FG-FLEXO).

On February 28, 2017, BT Environmental Consulting, Inc. (BTEC, Inc. – Messrs. Randy Tysar, Barry Boulianne, Mr. Steve Smith, Paul Molenda, David Trahan; Project No. 16-4967.00; April 3, 2017) of Royal Oak, Michigan, conducted the tests using CEM methods. Per the stack test report, Capture Efficiency is 76.4% (CE > 70%) and Destruction Efficiency is 98.9 (DE >95%) (PTI No. 78-01A, FG-FLEXO, IV.1 & 2 limits: CE > 70%, DE > 95%, RTO T > 1590°F and RTO  $\epsilon$  > 0.5 seconds).

#### **PTI No. 78-01A, FG-FLEXO, V. TESTING/SAMPLING**

On February 28, 2017, BT Environmental Consulting, Inc. (BTEC, Inc. – Messrs. Randy Tysar, Barry Boulianne, Mr. Steve Smith, Paul Molenda, David Trahan; Project No. 16-4967.00; April 3, 2017) of Royal Oak, Michigan, conducted the tests using CEM methods (PTI No. 78-01A, FG-FLEXO, V.1 & 2 limit: verification of VOC emission rates, VOC capture efficiency, and VOC destruction efficiency from FG-FLEXO by testing, CE > 70% , RTO DE > 95%, RTO T > 1590). Per the stack test report, Capture Efficiency is 76.4% (CE > 70%) and Destruction Efficiency is 98.9 (DE >95%) (PTI No. 78-01A, FG-FLEXO, IV.1 & 2 limits: CE > 70%, DE > 95%, RTO T > 1590°F and RTO  $\epsilon$  > 0.5 seconds)

Carroll conducted US EPA RM24 analyses on January 18, 2018 using Eurofins S-F Analytical Laboratories (262-754-5300) of New Berlin, WI 53151. This report is deemed to be for CY 2017. (PTI No. 78-01A, FG-FLEXO, V.2 limit: US EPA RM 24).

#### **PTI No. 78-01A, FG-FLEXO, VI. MONITORING/RECORDKEEPING**

All VOC and HAP calculations are performed (PTI No. 78-01A, FG-FLEXO, VI.1 limit: calculations by 15th of the month). Temperature charts are present to record temperature continuously (PTI No. 78-01A, FG-FLEXO, IV.2 limit: temperature records). VOC and HAP content records are kept (PTI No. 78-01A, FG-FLEXO, IV.3&4 limit: VOC content records). VOC & HAP capture curtain enclosures and adjustable seals for EU-WOLVERINE and EU-COMEXI are inspected daily (PTI No. 78-01A, FG-FLEXO, IV.5 limit: visual inspection records)

#### **PTI No. 78-01A, FG-FLEXO, VIII. STACK/VENT RESTRICTIONS**

Stack height = 30 feet (PTI No. 78-01A, FG-FLEXO, VIII.1 limit: SV-RTO > 30 ft.)

#### **PTI No. 78-01A, FG-FLEXO, IX. OTHER REQUIREMENTS.**



EU-WOLVERINE, EU-COMEXI, and EU-UTECO808 are labeled (PTI No. 78-01A, FG-FLEXO, IX, limit: equipment labels)

**PTI No. 78-01A, FG-FACILITY**

CY2017 HAPs emissions are 0.2 pounds per year (PTI No. 78-01A, FG-FACILITY, I.1&2: < 8.9 tpy Single HAP and < 22.49 tpy Aggregate HAPs). Manufacturer's formulation data is used for HAP content (PTI No. 78-01A, FG-FACILITY, V.1 limit:HAP content). HAP containing materials usage records are kept and HAP emissions calculations are performed (PTI No. 78-01A, FG-FACILITY, VI.1&2 limit: HAP content and calculations)

**Conclusion:**

Carroll is in compliance with PTI 78-01A.

NAME S. Llenamahall DATE 03/19/2018 SUPERVISOR Joyce

