

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

N254740924

FACILITY: Woodward FST		SRN / ID: N2547
LOCATION: 700 N. CENTENNIAL AVE, ZEELAND		DISTRICT: Grand Rapids
CITY: ZEELAND		COUNTY: OTTAWA
CONTACT: Jonathan Eslick, EHS Specialist		ACTIVITY DATE: 07/19/2017
STAFF: Tyler Salamasick	COMPLIANCE STATUS: Compliance	SOURCE CLASS: SM OPT OUT
SUBJECT: Scheduled inspection of Synthetic Minor Opt Out		
RESOLVED COMPLAINTS:		

Background

Woodward FST (Woodward) SRN: N2547 is an aerospace manufacturer that specializes in manufacturing and testing of fuel nozzles. The facility is located at 700 N. Centennial Road, Zeeland, Michigan. Woodward is located in a primarily industrial area with the nearest residential structures approximately 1500 feet both north and south of the facility. The facility was inspected on 7/18/2017 by Tyler Salamasick, Environmental Quality Analyst of the Michigan Department of Environmental Quality, Air Quality Division. The intent of the inspection was to determine the facility's compliance with the Federal Clean Air Act Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act of 1994, PA 451, as amended, Michigan's Air Pollution Control Rules and PTI No.279-99. Woodward is a synthetic minor opt out source for volatile organic compounds (VOCs) and hazardous air pollutants (HAPs). The company is limited to 98.0 tons per year (tpy) of VOC emissions, based upon a 12 month rolling time period. The company is also limited to 9 tpy of any individual HAP and 22 tpy aggregate HAPs emissions, based upon a 12 month rolling time period. The process with the highest amount of emissions is the spray pattern testing areas. This process involves spraying calibration fluid through the nozzles and observing the pattern. The calibration fluid is similar in chemical and physical properties to jet fuel. Most of the spray is recaptured, but what is not captured is emitted as VOCs.

Inspection

Site arrival was at 9:05am on 7/18/17. I met with Jon Eslick the Environmental Health and Safety Manager for Woodward. I presented my State of Michigan identification card, informed Jon of the intent of my inspection and was permitted onto the site. Jon and I had an introductory meeting, during which Jon explained the facility's background and its processes.

Woodward manufactures fuel nozzles for aircrafts. The nozzle components are shipped in and assembled at the facility. Woodward does not do a significant amount of modifications or fabrication of the actual parts. Each part is process slightly differently but undergoes similar general steps. The first step is parts assembly. Woodward receives the parts in cases as individual kits. These kits have most or all of the parts required to fully assemble the fuel nozzle. Some of the parts may require some light machining. These parts might be drilled/cut/ground before or after some assembly. Once assembled, the parts are then brazed or TIG welded. These parts go to a pressure testing station where a worker uses nitrogen and a pressure gauge to check for small leaks. There are approximately 12 pressure testing stations at the facility. After pressure testing is completed, the part is tested in a test chamber. Woodward has approximately 40 testing chambers. The test chamber is a quality control test used to assure proper fuel spray patterns are achieved. Woodward has multiple types of testing chambers that allow them to analyze different aspects of the fuel spray pattern. This process can run for a significant amount of time while the tests are being conducted. The emissions from this process are primarily caused by the venting of volatilized droplets generated during the spraying of the fuel.

After the parts are tested with calibration fluid they are dried in a parts dryer. The parts dryer blows indoor air (shop air) across the part which evaporates the left over calibration liquid. Combined, these processes are the major contributors to the facility's VOC emissions. Woodward tracks its VOC emissions with a mass based system. In order to calculate their emissions, the facility uses how much fuel is purchased, accounts for the reclaimed waste from their capture system and assumes what is not recaptured is emitted as a VOC. The facility had emitted 63.61 tpy of VOC based upon a 12 month rolling total as determined for June.

In addition to the main product line, Woodward also conducts various forms of jet engine testing in its two test cells. Woodward demonstrated the processes are exempt from permitting pursuant to Rule 283. The test cells are used to test various conditions and operating parameters of components of jet engines. These engines can be tested while burning the fuel, and while spraying fuel but not burning it. The fumes are vented to the outside air, but must first pass through a baffle system. The baffle system knocks down the fuel spray and allows some of it to be recaptured. Woodward estimates that the baffle system limits the fuel emissions to 30%. As a condition of the permit, Woodward tracks the material throughput of the exempt processes. This assures the facility still maintains a limit on the potential to emit through the entire facility. On 8/2/2017 I had a phone conference with Jon Eslick and the combustion lab engineers at Woodward and with Matt Kwiatkowski from ERM. We further discussed the combustion lab and the research conducted at the facility. During the conversation Woodward was able to indicate that the testing done was in-fact researched based. The products being tested were not later sold, meaning the equipment tested was not a quality control test. Instead, the testing covers a range of fuel ignition testing. Some processes are tested as a design conformation where others test client's experimental equipment alongside Woodward's parts. The facility is also limited by compressor air input. The air injected roughly accounts for 70% of the flow rate. This is one of the conditions that limits fuel throughput. In addition Woodward explained that some of the tests might only spray fuel in 20 second bursts during a run. The engineers estimated that during the month of April they used approximately 6 gallons of fuel after accounting for the reclaimed waste. This process appears to meet the requirements to fall under the exemption Rule 283(2)(a). In combination with the facility wide limit on fuel usage the process does not appear to exceed limits set by Rule 278 that would exclude Woodward from using the exemption.

The third process at the facility was the chrome plasma coating operation. This process is used to apply a very thin coating (microns thick) on the wearing portion of moving aircraft parts. Woodward achieves this by heating gases to a greatly elevated temperature and then they spray powdered chrome through the heated air. The heating equipment looks much like an average size blowtorch. When the chrome passes through the heat it temporarily liquefies the chrome powder. This molten chrome is then deposited on the part where it solidifies. This process is used, as opposed to chrome plating because it allows for a significantly more precise coating. The thickness of the coating is very important in aerospace technology, and Woodward is restricted to tight tolerances. This chrome substance is applied as a sacrificial coating on a small section of the part. The coating is applied to the area that is exposed to regular wear during equipment operation. Woodward is limited to an emission rate of 3.9 pounds per year. The facility uses the manufacturer data that suggests the dust collector has 99% control efficiency. Woodward calculated their emissions to be 0.37 lbs of chrome for the past 12 months for month of June. This is approximately 9.5% of the facility's permit limit. Some parts are sent to Woodward for repair. The repair process requires that the old chrome coating be removed prior to the addition of the new coating. During the conference call on 8/2/2017 Jon described the removal process. The removal process involves using a CNC machine with oil to remove the chrome component. I did not observe the

process but it does not appear that the removal of the old chrome would generate air contaminants that emit to the outside ambient air.

After inspecting the facility's processes Jon and I had a post inspection meeting. During the meeting I requested documentation of records as required by PTI No. 279-99. Jon provided me with electronic copies as well as some hard copies. I also review some of the electronic records prior to Jon submitting them.

PTI No. 279-99 Requirements Special Conditions- EUFUELTEST

EUFUELTEST includes all process equipment related to quality control testing of the jet fuel nozzles. This involves the spraying and recapturing of fuels, as well as the drying of fuel laden parts.

Woodward's permit limits the total volatile organic compound (VOC) emission rate from EUFUELTEST to 95.0 tons per year, based on a twelve month rolling time period. The highest emission rate per 12 month time period in the last 3 years was 63.61 tons during the month of June 2017. This is below the 95 ton limit and complies with the permit limit. This also equates to 67% of the limit set by the permit.

Woodward also has test fuel limit of 29,818 gallons based on a twelve month rolling time period. The facility is allowed to include captured waste and its removal in their fuel usage calculation. Woodward's highest fuel usage was 19,798 gallons after corrected for waste removal. This is below the permit limit of 29,818 gallons. This also equates to 66.4% of the limit set by the permit.

Special Conditions-EUPLASMA

EUPLASMA permits the plasma coating of chrome on metal parts. This process utilizes high temperature gas to apply on an extremely thin protective chrome layer.

The permit limits VOC emission rate from EUPLASMA to 1,450 pounds per year based upon a twelve month rolling time period. At 20lbs per year of VOC emitted EUPLASMA appears to comply with the emission requirement.

Woodward is limited to a particulate emission rate of 3.9 pounds of chrome per year. Woodward calculates their emissions based on a control factor of 99%. This control efficiency was established by the Torit dust suppression manufacturer. With the control factor included in the calculation, Woodward was estimated to have emitted 0.37 lbs of particulate from EUPLASMA. This would likely include both Nickel and Chrome. This is below Woodward's permit limit of 3.9 lbs per year.

The facility is not permitted to operate EUPLASMA unless the Torit dust collector is installed and operating properly. The facility does regular filter changes every six months. Jon also informed me that they inspect the collection container and the baghouse regularly. I inspected the collection area and did not observe evidence of material spillage or leaking.

Woodward is not permitted to use more than 2,600 pounds per year of Chromium Carbide powder in EUPLASMA. At the time of my inspection the facility had used 30 lbs that month. The

previous 12 month totaled to 265 lbs. of material use which equates to approximately 10.19% of what Woodward is permitted. Woodward appears to comply with this condition.

Woodward's final material limit for EUPLASMA is for Anhydrol. Anhydrol is an alcohol based solvent. Woodward has primarily phased out the use of Anhydrol and Jon reported they are using less than 1 gallon of the material per month. I did not request documentation for the use of Anhydrol.

Facility wide conditions- FGFACILITY

Woodward has a facility wide limit of 9 tons per year for any individual HAP and 22 tons per year for any combination of HAPs. The annual limit is based upon a 12-month rolling time period as determined at the end of each calendar month. Woodward's records indicated that the highest single HAP emission in the past three years is 0.49 tons of xylene for June 2015.

Woodward's records indicate that the facility had zero emissions of nickel between June 2017 and January 2006. This conflicts with the SDS for the EUPLASMA. The SDS indicates that the chrome carbide compound contains between 50-75% chromium and 20-50% nickel. It would be expected that the nickel emissions are approximately half of the reported chromium emissions. Failing to report individual HAPs as required by the permit condition SC.XII is a violation of the permit, but the AQD will use regulatory discretion and not issue a violation if the facility corrects the issue in a timely manner and assures all HAPs are being properly calculated. During the conference call on 8/2/2017 Matt Kwiatkowski from ERM was able to ensure that this would be corrected. The emission rate for nickel is so low that it may not appear as any value in tons. The information is available in the facility's monitoring and record keeping software but will instead need to be converted to pounds in order to be a reportable value.

The volatile organic compound (VOC) emission rate from Woodward is limited to 98.0 tons per year, based on a twelve month rolling time period. As of June 2017 the facility had emitted 66.29 tons of VOCs. Woodward is complying with the 98 ton limit. Jon indicated that the facility has been considering the addition of air pollution control devices to lower their emissions.

The particulate matter less than 10 microns (PM10) emission rate from Woodward is limited to 14.9 tons per year. Woodward reported the facility wide 12 month rolling emission rate has been consistently 2.16 tons per 12 month rolling. The facility also reports a particulate material monthly usage of 0.18 tons per month, each month since January 2015. This appears to be a calculation error and Woodward has already been asked to correct the potential issue. AQD will use regulatory discretion and not issue a violation if the facility corrects the issue in a timely manner. During the conference call on 8/2/2017 Matt Kwiatkowski from ERM informed me that this might be a conservative value that is calculated based on an expected emission rate per shift. If this is correct it would appear to be an appropriate method of tracking PM emissions. Matt will follow up at a later date to address the emission rate.

Conclusion

It appears that Woodward FST is in compliance with the Federal Clean Air Act Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act of 1994, PA 451, as amended, Michigan's Air Pollution Control Rules and PTI No.279-99.

NAME 

DATE 8/2/17

SUPERVISOR 