

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

P070954698

FACILITY: SUPERNAP GRAND RAPIDS, LLC		SRN / ID: P0709
LOCATION: 6100 E PARIS AVENUE, GRAND RAPIDS		DISTRICT: Grand Rapids
CITY: GRAND RAPIDS		COUNTY: KENT
CONTACT: John Kossitch , VP of Data Center Operations		ACTIVITY DATE: 08/04/2020
STAFF: April Lazzaro	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MINOR
SUBJECT: Announced, scheduled inspection.		
RESOLVED COMPLAINTS:		

Staff, April Lazzaro arrived at the facility on August 4, 2020 to conduct an announced, scheduled inspection and met with Jim Faunce, VP of Construction. The AQD Field Procedures have designated that inspections shall be announced during the COVID-19 pandemic. During the inspection proper PPE was utilized and social distancing was observed to the extent possible.

FACILITY DESCRIPTION

This facility is owned by Switch, a privately held company housed in Las Vegas, Nevada. Switch has invented and developed the SUPERNAP concept of data storage center facilities around the world. The Grand Rapids SUPERNAP is housed in the former Steelcase Pyramid which has undergone extensive repurposing for the company’s needs. Eventually, the property will house additional facilities as they continue to obtain clients and buildout additional capacity for data storage. Due to the fact that Switch ensures data reliability, which consists of 100% protection of data and systems, the power must also be reliable. A three tiered back up system exists for redundancy. First, power is supplied by the electrical grid. If there were power interruption, there is battery power back up on-site. Lastly, the company can also utilize the diesel fired generators. Six of the 59 permitted engines have been installed thus far. Three were installed in 2017, and three have been installed in 2020. As the facility grows, the plan is to install three units at a time, with six in a block.

The facility operates pursuant to two Air Quality Division (AQD) permits. These include Permit to Install (PTI) No. 91-16, which covers three existing 1,750 kilowatt diesel fueled emergency generators that were installed in 1989. An existing fire pump operates pursuant to Rule 285(2)(g). No changes to these generators or fire pump have been conducted by SUPERNAP. PTI No. 112-16 covers a total of 60, diesel fired emergency engines with a maximum rating of 3,010 kilowatts and associated belly tanks; and 36 cooling towers, equipped with drift eliminators to control particulate in the water droplets. The six (6) engines that have been installed have an engine rating of 2,740kW. Since the time of the permit application, the facility plans slightly changed and none of the cooling towers have been installed on the existing facility.

The potential to emit (PTE) allowed by PTI No. 112-16 for NOx is 163 tons per year. The PTE of NOx for all other equipment at the facility is reported at 11.95 tons. The other equipment includes a 150 HP fire pump installed in 1986 and three small boilers. This means that when enough emergency engines are installed, the facility will become a Category I major source of NOx. This appears to occur when installation for the 33rd emergency engine has commenced. At that point, the company will have 12-months to complete and submit a Title V permit application. The facility should calculate the PTE of NOx for existing equipment, and add that value to the allowable limit of 163 tons per year to determine exactly at what point during the continued growth of the facility the PTE exceeds the 100 ton major source threshold. Any changes at the facility that could impact the information presented in the permit application could affect the emissions and the timing identified above, and as such it is an estimate.

While this was a routine scheduled inspection, the date for the compliance inspection was chosen to align with the planned commissioning for three new engines. I wanted to observe them at start up and discuss with Supernap staff maintenance and observation activities associated with commissioning.

Upon start-up of an engine, a brief period of opacity was observed, however it did not appear to present a compliance issue. SUPERNAP had staff on site that have been Method 9 certified to ensure compliance.

COMPLIANCE EVALUATION

Facility staff had prepared records in a folder for me to review during the inspection. I also emailed an

information request to Mr. Faunce who shared it with his staff. I received a timely response sent by Mr. John Kossitch, VP of Data Center Operations and prepared by Heather Borgen.

PTI No. 91-16

This permit includes three existing 1,750 kilowatt diesel-fueled emergency engines that are not subject to federal standards.

Flexible Group: FGEG1-3

The permittee is limited to burn only ultra-low sulfur diesel fuel in any engine. Ultra-low sulfur diesel fuel is defined as having a maximum sulfur content of 15 ppm (0.0015 percent) by weight. The Safety Data Sheet viewed indicates that the sulfur content of the fuel at this facility is <0.0015%. All currently available diesel fuel in the United States is certified at less than 0.0015% sulfur content.

These engines are limited to a total of 105 hours per year on a 12-month rolling time period as determined at the end of each calendar month. Data provided by the company indicated that the 12-month rolling hours of operation through July 2020 for EUEG1 are 7.80 hours, EUEG2 are 7.0 hours and EUEG3 are 7.3 hours. Each unit is equipped with a non-resettable hours meter as required. The engine hours taken from the meter on EUEG1 was 844.1 hours, EUEG2 was 814.9 hours and EUEG3 was 806.7 hours. Due to the fact that the engine design capacity is the maximum rated power output, that value cannot be exceeded.

PTI No. 112-16

General Conditions

General Condition 2 states:

If the installation, construction, reconstruction, relocation, or modification of the equipment for which this permit has been approved has not commenced within 18 months, or has been interrupted for 18 months, this permit shall become void unless otherwise authorized by the Department. Furthermore, the permittee or the designated authorized agent shall notify the Department via the Supervisor, Permit Section, Air Quality Division, Michigan Department of Environmental Quality, P.O. Box 30260, Lansing, Michigan 48909-7760, if it is decided not to pursue the installation, construction, reconstruction, relocation, or modification of the equipment allowed by this Permit to Install. (R 336.1201(4))

SUPERNAP has already received the one allowable written extension to the 18-month construction commencement interruption condition from the AQD Permit Section. Installation commenced on the three new engines within the timeframe stipulated in the extension. The end of construction for the three new engines occurred on May 19, 2020 with start-up of the engines on May 20, 2020. As such, the 18-month clock restarted on May 20, 2020 and SUPERNAP will have until November 20, 2021 to commence construction on additional equipment pursuant to PTI No. 112-16.

Flexible Group: FGENGINES4-63

This flexible group includes sixty 3,010 kilowatt (kW) diesel-fueled emergency engines that are subject to 40 CFR Part 60 Subpart ZZZZ. The 3,010 kW value is the maximum rating that the engines may have, and the facility has currently installed six, 2,740 kW EPA certified engines and associated generator sets, manufactured by MTU America, Inc. The compliance requirements of Subpart ZZZZ states that you must be in compliance with 40 CFR Part 60 Subpart IIII.

EMISSION LIMITS

These engines are subject to emission limitations on a per engine basis. The emission limitations that are based on g/kW-hr and apply to certified engines. Engine certification is an EPA designation that ensures that the engines have been built to ensure emissions meet the limitations by design. The 2019 EPA Engine Conformity sheet was provided and is attached to this report. The previous EPA Engine Conformity sheet for the three older engines was evaluated during the last inspection. Per the federal requirements, the facility must operate the engines in accordance with the manufacturer's recommendations to ensure compliance. The mass emission limit for NOx is based on the emission factors as established through the permit review process. The number used in the application was 7.80

g/kW-hr which is higher than the NSPS limit. However, since the NSPS limit is for certified engines and the company is not required to install a certified engine, the calculations were based on the manufacturer's guarantee. Based on the Engine Model Number, I was able to determine that the new units are also EPA Certified Engines as shown below, therefore are considered in compliance with the emission limits established pursuant to the NSPS. Testing of the engines for compliance with the emission limits has not been required at this time.

The mass emission limit established in the permit for NOx is 163 tons per 12-month rolling time period as determined at the end of the month. The reported 12-month rolling NOx emissions through July 2020 are 1.11 tons.

MATERIAL LIMITS

As previously indicated, all current diesel fuel sold in the United States is compliant with the sulfur content limit of 15 ppm or <0.0015%.

PROCESS/OPERATIONAL RESTRICTIONS

The permittee is documenting the hours of operation, and the reason for operation using a computer system generated run time log. (attached) This information correlates with the non-resettable hours meter on the engine itself. Additionally, a spreadsheet is maintained with the 12-month rolling total hours of operation. Current hours of operation vary by engine and are as follows through July 2020: (note that EUEG5, EUEG7 and EUEG9 have not been installed for 12-months and the time below is total hours)

EUEG4- 16.4 hours
EUEG5- 1.65 hours
EUEG6- 13.05 hours
EUEG7- 0.25 hours
EUEG8- 10.10 hours
EUEG9- 1.50 hours

The highest reported 12-month rolling total hours since installation for the three engines that have 12-months of operation are as follows:

EUEG4- 81.85 hours for the 12-month time period ending October 2019
EUEG6- 81.30 hours for the 12-month time period ending April 2019
EUEG8- 86.00 hours for the 12-month time period ending May 2019

SUPERNAP understands the need to maintain the engines according to the manufacturer's emission-related written instructions and change only those emission-related settings that are permitted by the manufacturer.

The computer generated run time log identifies all run time where the engines operate. Each engine is limited to no more than 75% load averaged over a clock hour. According to information obtained in the permit application, the system is designed to operate at a maximum load of 66%, as to ensure adequate power supply to all customers. I requested data related to engine load for the timeframe of January-June 2019 and December 2019-February 2020. I received the engine load run log for each day operated from 2017-2020.

A review of that information found that all operating hour averages were less than 75% as required. The highest reported engine load % are as follows:

EUEG4- 42% on 8/27/18 during annual load bank testing
EUEG5- this engine has not operated under load yet
EUEG6- 26% on 1/30/19 during a monthly PM/Consumers Off Grid run time
EUEG7- this engine has not operated under load yet
EUEG8- 42% on 8/2/2019 during annual load bank testing
EUEG9- this engine has not operated under load yet

DESIGN/EQUIPMENT PARAMETERS

These engines are equipped with a non-resettable hours meter and were observed to be rated at 2,740 kW.

TESTING/SAMPLING

These engines were permitted as emergency engines, and testing is not required for certified emergency engines.

MONITORING/RECORDKEEPING

The permittee is maintaining all required records in a satisfactory manner, which were made available for review. See attached records.

REPORTING

The facility has installed six engines, which is one “organizational unit” as defined in the permit language. Notification of installation for these six engines has been received. Any future installations will come from a build out of new buildings at the stationary source.

STACK/VENT RESTRICTIONS

The engine stacks were not measured at the time of the inspection.

OTHER REQUIREMENTS

As part of the recordkeeping review, the hours of operation and designation of the reason for run time was evaluated to ensure that these engines are operating as Emergency Engines only as defined in 40 CFR Part 60 Subparts IIII.

As previously described, each time the engines operate, the facility representatives enter the reason for operation into the computer so that it is maintained in the generator run time log. Each engine has its own log, identified by the emission unit ID, as well as the engine serial number and generator set serial number. During each time the unit is operated a visible emissions check is made, if the run time is during daylight hours.

There are various reasons for run time, that are put into one of three categories. 1- maintenance, 2- other non-emergency, 3- emergency. NSPS IIII limits non-emergency (ie. other non-emergency) run time to 50 hours per calendar year. This limit is not specifically identified in the permit. The permit does include a catch-all condition that states the permittee shall comply with all requirements of NSPS IIII.

The reported calendar year non-emergency run time is as follows:

- EUEG4- 2017: 16.20 hours
 2018: 39.85 hours
 2019: 33.30 hours
 2020: 9.80 hours
- EUEG5- has not recorded non-emergency run time
- EUEG6- 2017: 11.65
 2018: 36.00
 2019: 30.65
 2020: 6.65 hours
- EUEG7- has not recorded non-emergency run time
- EUEG8- 2017: 6.65 hours
 2018: 45.95 hours
 2019: 38.35 hours
 2020: 1.85 hours
- EUEG9- has not recorded non-emergency run time

The NSPS also limits operations of the emergency engine to 100 hours per calendar year for maintenance and readiness testing, as well as non-emergency situations.

The reported runtime for maintenance and readiness testing as well as non-emergency situations is as follows:

- EUEG4- 2017: 38.31 hours

2018: 43.90 hours
2019: 50.45 hours
2020: 14.50 hours
EUEG5- 2020: 1.65
EUEG6- 2017: 36.64 hours
2018: 52.50 hours
2019: 43.10 hours
2020: 12.30 hours
EUEG7- 2020: 5.30 hours
EUEG8- 2017: 29.50 hours
2018: 58.00 hours
2019: 52.40 hours
2020: 8.25 hours
EUEG9- 2020: 2.20 hours

As I reviewed the data presented by the company, I encountered some NSPS III interpretation questions. As such, I contacted AQD engine expert, Missy Byrnes, as well as Cody Yarborough, EPA Region V engine contact and Melanie King, EPA Energy Strategies Group, Sector Policies and Programs Division of the Office of Air Quality Planning and Standards who worked on writing NSPS III. During my conversation with the experts, we discussed three of the main categories that are currently listed as “other non-emergency” run time. The first one discussed was the run time for testing of the Uninterrupted Power Supply (UPS) Annual testing. During these operations, the company runs the engine and generator set under load to ensure they can reliably provide power to self in an emergency. It was the opinion of EPA that this run time should be categorized as readiness testing, and not non-emergency run time. The second main operating scenario is categorized as Building Transfer. This run time occurs when a new data center system electrical connection is being installed, and there is a need to run on engine power. This run time is correctly categorized as “other non-emergency” run time. The third main operating scenario is categorized as load test or fuel cycling. This is when the engine and generator are operated together to ensure there is no “wet stacking” of fuel or to “polish” the fuel. This is because the engines can build up wet stack if they are operated at idle. Operating under load is critical to an engine’s performance and reliability. It was the opinion of EPA that this run time should be categorized as readiness testing, and not non-emergency run time.

The informal opinions I presented above mean that the way the company has been recording the run time can be changed, and the actual hours of non-emergency run time that count towards the 50 hour per year limit will be reduced.

Hours of operation for actual emergencies are not limited, and it appears as though those hours are correctly categorized.

The engines at the facility cannot supply power to the grid, they do not conduct peak shaving nor do they utilize power in non-emergency demand response situations.

The permittee appeared to be in compliance with 40 CFR Part 60 Subparts A and III, as well as 40 CFR Part 63 Subpart ZZZZ.

Flexible Group: FGCOOLTWRS6-41

36 cooling towers each equipped with drift eliminators to control particulate in water droplets. None of the permitted cooling towers have been installed because the build out plans have changed.

COMPLIANCE SUMMARY

At the time of the inspection, SUPERNAP Grand Rapids, LLC was in compliance.

NAME April Lazzaro DATE 09/17/2020 SUPERVISOR HH