

DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
ACTIVITY REPORT: Self Initiated Inspection

M402335001

FACILITY: THE DETROIT ZOO		SRN / ID: M4023
LOCATION: 8450 W 10 MILE RD, ROYAL OAK		DISTRICT: Southeast Michigan
CITY: ROYAL OAK		COUNTY: OAKLAND
CONTACT: Lynn Cox , Health and Safety Coordinator		ACTIVITY DATE: 06/03/2016
STAFF: Rebecca Loftus	COMPLIANCE STATUS: Non Compliance	SOURCE CLASS: MINOR
SUBJECT:		
RESOLVED COMPLAINTS:		

On June 3, 2016, Tyler Salamasick and I, Rebecca Loftus, from the Department of Environmental Quality (DEQ), Air Quality Division (AQD), conducted an inspection at the Zoological Park (Zoo), State Registration Number (SRN): M4023, located at 8450 West Ten Mile Road, in Royal Oak, Michigan. The purpose of this inspection was to determine the Zoo'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 to verify the incinerator permitted under Permit to Install (PTI) No. 37-83I has been removed.

We arrived at the Zoo at 9:00am and met with Ms. Lynn Cox, Health and Safety Coordinator, and Ms. Rachel Handbury, Manager of Sustainability.

On July 25, 2016, I conducted a follow-up inspection to verify the number of stationary emergency generators, as well as the specifications of each generator. Ms. Cox escorted me through the Zoo during my inspection. See addition information in the Emergency Generator section below.

Contacts

Ms. Lynn Cox, Health and Safety Coordinator, 248-336-5863, lcox@dzs.org

Ms. Rachel Handbury, Manager of Sustainability, 248-336-5838, rhandbury@dzs.org

Facility Overview

The Zoo opened in 1928 and currently has approximately 125 acres of land dedicated to the habitats of over 2000 different animals.

In regards to Air Regulations, the Zoo previously operated an incinerator under PTI No. 37-83I, and currently operates the following emission units: 22 small boilers, 22+ stationary emergency generators, seven portable emergency generators, one bio-digester with associated stationary emergency generator, two underground storage tanks (USTs) for fueling, one grain silo, four small space heaters, and one cold cleaner/parts washer. Additional information for each emission unit is discussed in each section below.

PTI No. 37-83I and Incineration

PTI No. 37-83i is a modification to the original incinerator permit issued on September 26, 1972 and was issued to the Zoo for operation of an incinerator burning Type 4 Waste.

Since my last inspection, Ms. Cox and other zoo staff have been working with the AQD to remove the incinerator, and in its place, construct the new bio-digester project. On July 8, 2015, Ms. Cox sent an email with pictures of the removed incinerator.

During my inspection, I confirmed the incinerator was removed from the property and recommend the AQD void PTI No. 37-83i.

Boilers

The Zoo currently has 22 natural gas boilers ranging in heat input size from 43,000 to 4,185,000 Btu/hr. The boilers are mainly used in the winter to heat various animal habitats. Previously, The Zoo had 26 boilers; they have replaced 4 of the boilers with HVAC systems.

Ms. Cox provided a spread sheet for the boilers with the following information: location, boiler plate Btu rating, and installation dates (see attached). Using this information, I was able to calculate the PTE for CO and NOx. Assuming the boilers are operated 24/7, the PTE from all boilers is approximately 12.5 tons NOx and 10.5 tons CO (see attached).

Each boiler appears to be exempt from obtaining a Michigan Air Permit to Install (PTI) pursuant to Rule 282(b)(i). In addition, the boilers do not appear to be subject to the following federal regulations: 40 CFR, Part 60, Subpart Dc, the New Source Performance Standards for small industrial/commercial/institutional steam generating units, and 40 CFR, Part 60, Subpart JJJJJ, the National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources.

Emergency Generators

During my inspection on June 6, 2016, noted a few emergency generators being used to power the maintenance garage. Ms. Cox informed me that the zoo has multiple emergency generators; like the boilers, they are located at each of the main animal habitats. I requested that Ms. Cox provided a list of the emergency generators, including the location, engine specifications, manufacture date, install date, fuel type, and run hours for each unit.

On July 12, 2016, Ms. Cox provided me a spread sheet with information for 21 stationary emergency generators and seven portable generators.

Based on the information provided, I decided to conduct a follow-up inspection to help the zoo determine the applicability of the following federal regulations:

- 40 CFR, Part 63, Subpart ZZZZ, the National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines.
- 40 CFR, Part 60, Subpart JJJJ, the Standards of Performance for Stationary Spark Ignition Internal Combustion Engines.
- 40 CFR, Part 60, Subpart IIII, the Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

During my inspection on July 25, 2016, I noted an additional emergency generator located at the Polk Penguin Conservation Center (PPCC), for a total of 22 stationary emergency

generators. Upon returning to the office, I received an email from Ms. Cox which stated that another emergency generator was installed at the Zoo, for a total of 23 stationary emergency generators. The emergency generator associated with the bio-digester will increase the total to 24; more information on this generator is discussed in the Bio-Digester section of this report.

Based on the current list of emergency generators, some of the generators have heat inputs below 10,000,000 Btu/hour and appear to be exempt from obtaining a PTI pursuant to Rule 285(g). The PPCC, and potentially the additional unknown engine(s), are subject to Act 451, Rule 201, Michigan's Air Pollution Control Rules - Permit to Install Regulations.

Based on the information provided, the following page contains a list of the stationary emergency generators and the applicable Federal Regulations.

No.	Generator Location	Manufacturer	Type of generator	Mfg or Install Date	40 CFR Part 63 Subpart ZZZZ	40 CFR Part 60 Subpart JJJJ	41 CFR Part 60 Subpart IIII
1	GREAT APES	MQ POWER	Diesel generator less than 600 HP	1980	Yes	---	---
2	GIRAFFES	MQ POWER	Diesel generator less than 600 HP	1980s?	Yes	---	---
3	REPTILES	MQ POWER	Diesel generator less than 600 HP	1980s?	Yes	---	---
4	AMPHIBIANS	DETROIT DIESEL	Diesel generator less than 600 HP	2000	Yes	---	---
5	FEC	KOHLER	Diesel generator less than 600 HP	2004/2006	Yes	---	---
6	RHINOS	CUMMINS	Diesel generator less than 600 HP	2009	---	---	Yes
7	PPCC	KOHLER	Diesel generator greater than 600 HP	2016	---	---	Yes
8	HOSPITAL	CUMMINS	4-cycle, lean burn	2007	---	Yes, HP great than 130	---
9	ADMIN	KOHLER	4-cycle, lean burn	2009	---	Yes, HP great than 130	---
10	GUEST SERVICES	KOHLER	4-cycle, lean burn	2009/2011	---	Yes, HP great than 130	---
11	PENGUINS	CUMMINS/ ONAN	4-cycle, lean burn	2009/2016	---	Yes, HP great than 130	---
12	MAINTENANCE	GENERAC	4-cycle, lean burn	2013/2013	---	Yes, HP great than 130	---
13	LIONS	GENERAC	4-cycle, lean burn	2014/2015	---	Yes, between 25 -100HP	---
14	PUDU	GENERAC	4-cycle, lean burn	2013/2014	---	Yes, between 25 -100HP	---
15	TIGERS	GENERAC	4-cycle, lean burn	2013/2016	---	Yes, between 25 -100HP	---
16	BARN	GENERAC	4-cycle, lean burn	2014	---	No, b/c less than 25 HP	---
17	OUTBACK NORTH	GENERAC	4-cycle, lean burn	2014	---	No, b/c less than 25 HP	---
18	OUTBACK SOUTH	GENERAC	4-cycle, lean burn	2014	---	No, b/c less than 25 HP	---
19	WOLVERINE	GENERAC	4-cycle, lean burn	2014	---	No, b/c less than 25 HP	---
20	CAMELS	GENERAC	4-cycle, lean burn	2014	---	No, b/c less than 25 HP	---
21	VELDT	GENERAC	4-cycle, lean burn	2014	---	No, b/c less than 25 HP	---
22	SAFARI GRILL	GENERAC	4-cycle, lean burn	2016	---	No, b/c less than 25 HP	---
23	UNKNOWN	unknown	unknown	unknown	unknown	unknown	unknown
24	BIODIGESTER	CAT	bio-gas/methane	TBD	---	---	Yes

*Note the seven portable generators are not currently subject to federal regulations.

For most of these generators, the Federal Regulations do not require an initial notification; however, there are requirements for performance testing, maintenance plans/records, non-resettable hour meters, and hour usage records (See attached Summaries from the EPA's Engine Regulation Online Tool).

The GREAT APES, GIRAFFES, REPTILES, AMPHIBIANS, and FEC generators are subject to 40 CFR, Part 63, Subpart ZZZZ, and have maintenance requirements (see attached EPA Summary).

The RHINOS, PPCC, HOSPITAL, ADMIN, GUEST SERVICES, PENGUINS, MAINTENANCE, LIONS, PUDU, and TIGERS generators have the following requirements:

- A non-resettable hours meter to track operating hours
- Subject to Emission Standards/Initial Performance Testing
- Maintenance plans and maintenance conducted records
- Records documenting the hours operated in emergency mode, test mode, and non-emergency mode.

During my inspection, I noted that these generators did have non-resettable hour meters.

The LIONS, PUDU, MAINTENANCE, and TIGERS are labeled as certified engines (see photos). If operated per the manufacturer's specifications, including required maintenance, these emergency generators do not require performance testing.

The PPCC, HOSPITAL, ADMIN, GUEST SERVICES, PENGUINS generators are subject to emission standards and require initial performance testing; no testing has occurred.

The RHINOS generator has a displacement of 3.9L and therefore does not have emission standards nor does it require performance testing.

During my inspection, and on July 27, 2016, I told Ms. Cox that the PPCC required an Air Permit before it was installed. I also discussed the federal requirements for the generators and told her I will be issuing a violation notice to the Zoo outlining the violations.

Bio-digester

In 2014 and 2015, the Zoo contacted the AQD with a proposed a Bio-Digester Project. Based on the information provided, the collected gas from the bio-digester would be collected in a bladder tank and used in an emergency engine. The proposed engine had a maximum heat input of approximately 5,000,000 Btu/hr, which appears to be exempt from obtaining a PTI pursuant to Rule 285(g).

Federal Air Quality Regulations: Although this project appears to be exempt from obtaining a permit through the State of Michigan, there are Federal Engine Regulations that the zoo will have to comply with.

I provided this information to Ms. Wallace in 2015 and forwarded a copy of the information via email to Ms. Handbury on June 3, 2016 (see emails in file).

At the time of my inspection, the bio-digester walls were built (in the area of the old incinerator). The project is not currently complete and an emergency engine has not been installed.

On July 25, 2016, Ms. Cox and Ms. Handbury stated the emergency engine associated with the bio-digester has been ordered. Ms. Handbury will be emailing me the engine specifications.

Underground Storage Tanks – Diesel and Gasoline

The USTs are for gasoline (1500 gallons) and diesel (1000 gallons); the fuel is used in a variety of vehicles at the Zoo. In 2015, the Zoo used approximately 13,942 gallons of gasoline and 6,740 gallons of diesel.

The USTs and dispensing equipment appear to be exempt from obtaining a PTI pursuant to Rules 284(d) and 284(g)(i) and do not appear to be subject to 40 CFR, Part 60, Subpart Kb, the Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984.

The Zoo is subject to 40 CFR, Part 63, Subpart CCCCC, the National Emission Standards for Hazardous Air Pollutants for Source Category: Gasoline Dispensing Facilities.

Section 63.11116 lists the following requirements for facilities with monthly throughput of less than 10,000 gallons of gasoline:

(a) You must not allow gasoline to be handled in a manner that would result in vapor releases to the atmosphere for extended periods of time. Measures to be taken include, but are not limited to, the following:

- (1) Minimize gasoline spills;*
- (2) Clean up spills as expeditiously as practicable;*
- (3) Cover all open gasoline containers and all gasoline storage tank fill-pipes with a gasketed seal when not in use;*
- (4) Minimize gasoline sent to open waste collection systems that collect and transport gasoline to reclamation and recycling devices, such as oil/water separators.*

(b) You are not required to submit notifications or reports as specified in §63.11125, §63.11126, or subpart A of this part, but you must have records available within 24 hours of a request by the Administrator to document your gasoline throughput.

(c) You must comply with the requirements of this subpart by the applicable dates specified in §63.11113.

(d) Portable gasoline containers that meet the requirements of 40 CFR part 59, subpart F, are considered acceptable for compliance with paragraph (a)(3) of this section.

Based on the gasoline records provided and my observations during the inspection, the Zoo appears to be in compliance with Subpart CCCCC.

Miscellaneous Equipment

The Zoo has one grain silo, four small space heaters, and one cold cleaner/parts washer.

According to the Zoo, the grain silo's capacity is approximately 588 bushels. Ms. Cox explained the grain and/or pellets are fed directly to the animals and no milling of the grain occurs on-site. At the time of my inspection the silo was empty.

Based on the information gathered, the silo appears to be exempt from obtaining a PTI pursuant to 285(p) and is not subject to 40 CFR, Part 60, Subpart DD, the Standards of Performance for Grain Elevators.

The four small, natural gas fueled space heaters and the cold cleaner are located in the garage (see attached for the safety data sheet for the cold cleaner solvent). This equipment appears to be exempt from obtaining a PTI pursuant to Rule 282(b)(i) and Rule 281(h).

Greenhouse Gas Emissions

Based on the information provided, I calculated the potential Greenhouse Gas (GHG) emissions from the 26 boilers and 21 stationary emergency generators. The calculation did not include the PPCC, unknown, or bio digester generators, because the details of these generators were not available at the time. Also, the AQD does not anticipate significant GHG contributions from the remaining exempt emission units listed in the Miscellaneous Equipment Section.

The AQD calculations (attached), assume continuous operation of the boilers at 8,760 hours/year and 500 hours/year for the emergency generators. The total potential GHG emissions from boilers/generators are 19,137.55 tons/year and the CO2e emissions are 19,157.60 tons/year.

At this time, the Zoo is not consider a major source of GHGs and therefore is not subject to the Title V program for GHG emissions.

Note, the GHG PTE will have to be revised once a complete list of all stationary emergency generators is obtained.

Conclusions

Based on the information provided, the Zoo installed at least one emergency generator without obtaining appropriate permit coverage through the AQD. Also at a minimum, five of the emergency generators have not had initial performance testing; therefore four appear to be in violation of Subpart JJJJ and one in violation of Subpart IIII.

A violation notice, outlining the violations will be issued to the Zoo. This will include a request for a facility-wide PTE calculation.

In regards to the incinerator, since it has been removed from the site, a request will be sent to Lansing to void PTI No. 37-83i.

NAME Rebecca Joffe

DATE 7/28/16

SUPERVISOR CJE