

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

B284046378

FACILITY: Consumers Energy D.E. Karn Facility		SRN / ID: B2840
LOCATION: 2742 N. Weadock Hwy., ESSEXVILLE		DISTRICT: Saginaw Bay
CITY: ESSEXVILLE		COUNTY: BAY
CONTACT: George Eurich , Environmental Lead -Air		ACTIVITY DATE: 08/21/2018
STAFF: Benjamin Witkopp	COMPLIANCE STATUS: Compliance	SOURCE CLASS: MAJOR
SUBJECT: Facility inspection and records review		
RESOLVED COMPLAINTS:		

Ben Witkopp of the Michigan Department of Environmental Quality met with George Eurich of Consumers Energy. George is the environmental contact for the electrical power generating complex. The complex at one time consisted of Weadock 7 & 8 as well as Karn units 1-4. Weadock was coal fired as is Karn 1 & 2. Karn 3 & 4 runs on fuel oil or natural gas. Weadock 7 & 8 have been decommissioned, leaving only the Karn units active. The complex is covered by renewable operating permit (ROP) MI-ROP-B2840 - 2014b and consists of five sections. It is a major source of NOx, SO2, PM, and Hazardous air pollutants (HAPs).

Karn 1 and 2 are coal fired boilers with fuel oil capability for use during startup. Each unit has it's own stack. Pollution control consists of a number of different devices. To control particulate emissions, pulse jet fabric filters (PJFF) are used, one per unit. Each PJFF has 10 compartments with 1,016 bags per compartment for a total of 10,160 bags. The resulting total cloth area is 320,950 square ft. Selective catalytic reduction (SCR) is the technology used to control NOx emissions. Exhaust from a boiler is injected with ammonia to act as a reducing agent. The SCR reactor contains porous ceramic catalyst containing vanadium pentoxide. The result is that water and nitrogen are formed. Spray dry adsorbers (SDAs) are used for controlling SO2 with the added benefit of also controlling mercury through injection of activated carbon. Lime is prepped and then sprayed into exhaust gasses using an atomizer. The heat from the exhaust gases evaporates leaving only dry particulate. An additional benefit of the SDAs is that they use the fly ash / particulate collected by the PJFF. This allows the SDA to utilize any potential unspent lime. This eliminated the need for dry ash handling. The control strategies employed at Karn 1 & 2 help the complex to comply with 40 CFR part 63 subpart UUUUU as well as the cross-state air pollution rule (CSAPR). The units burn primarily low sulfur western coal along with some eastern coal. The eastern coal typically has a higher heating value but also higher sulfur content. Coal is delivered by ship or rail with the coal pile being on the north end of the site near the Saginaw River.

Karn 3 & 4 are dual fuel fired units capable of burning fuel oil and natural gas. Several years ago, the situation was a basic mothballing but the units are now capable of production as peaking units once again. However, the units are typically operated only during relative accuracy test audit (RATA). Exhaust from both units is sent out a single combined stack. Four fuel oil storage tanks can supply oil. The tanks are equipped with internal floating roofs and vapor seals. Low NOx burners are employed and SO2 is minimized by fuel blending. The units also have two auxiliary boilers that are natural gas fired and equipped with low NOx burners. The units can heat up Karn boilers 3 & 4 or can also provide steam to Karn 1 & 2 in the event one of the units goes down or is in a planned outage.

The complex also has some ancillary operations such as emergency generators, subject to 40 CFR Part 63 subpart ZZZZ, and some cold cleaners.

George provided full access to electronic records right in his office. We started with Karn 1 and proceeded through the ROP requirements. Karn 1 has a SO2 limit of 0.090 pounds per mmBTU heat input on a 30 day rolling average. The highest found was 0.058 on May 22, 2018. Another SO2 limit is for a 365 day rolling average. The highest amount found was 0.046 in comparison to a limit of 0.075. Overall, the SO2 controls in place provide about 76% reduction in SO2. Karn 1 emitted 361 tons of SO2 in 2017. PM had a limit of 0.015 pounds per mmBTU on an hourly basis. The highest found was 0.002 back in mid June. The lowest pressure drop on the PJFF was 5.55 inches. The highest NOx level found was 0.050 pounds per mmBTU based on a 30 day rolling average and it too occurred in mid June. The internal target for NOx is 0.05 and the actual average was 0.043. The NOx limit is 0.08. On a per year basis Karn 1 emitted 211 tons. Opacity had some difficulties for short time periods. On August 16, 2018 there was a reading of 100%. However, it was an incorrect reading due to a monitor malfunction. The

monitor was pulled and sent in for repairs. In the interim periodic Method 9 observations were made and the particulate control parameters were monitored until a back up monitor could be installed. On September 7, 2018 the original monitor was received and reinstalled. On January 11, 2018 there were readings of 69% and 78% at 20:18 and 20:24 respectively. The cause was an electrician mistakenly tripping the wrong breaker providing electricity to the unit.

Karn 2 was checked next. It has a SO₂ limit of 0.090 pounds per mmBTU heat input on a 30 day rolling average. The highest found was 0.068 on May 30, 2018. Another SO₂ limit is on a 365 day rolling average basis. It is 0.075. The highest value found was 0.052. Karn 2 emitted 348.4 tons of SO₂ in 2017. PM had a limit of 0.015 pounds per mmBTU on an hourly basis. The highest found was 0.001 back on the last few days of June. The highest NO_x level found was 0.054 pounds per mmBTU based on a 30 day rolling average and it typically was about 0.047. The internal target for NO_x is 0.05. The NO_x limit is 0.08. On a per year basis Karn 2 emitted 124.2 tons. Opacity was typically about 3%.

Lime prep consists of storage, slaker, and lime slurry transfer and storage tanks for use in the SDA systems mentioned above. Control equipment consists of bin vent filters, spray scrubbers etc. The reuse of ash collected by the PJFF allows less use of lime. Testing has not been requested due to the nature of the emissions. Opacity is read once per shift. The malfunction abatement plan (MAP) information is included in the MAP for the SDA.

BP (byproduct) recycle is set up to handle ash, spent lime, and sorbent to minimize the amount of fresh lime needed in the SDA system. Testing has not been requested due to the nature of the emissions. Opacity is checked once per shift.

BP disposal consists of vacuum transport blowers with filter separators and storage silos with bin vent filters. Testing has not been requested due to the nature of the emissions. Opacity is checked.

Sorbent (activated carbon) for the SDA system is stored in two silos controlled by bin vent filters. No testing has been required. Opacity is checked.

Flexible groups (FGs) have been established for Karn 1 & 2, parts cleaners, and emergency generators. The FG for Karn 1 & 2 concerns the use of boiler cleaning solutions. George said neither unit has burned boiler cleaning solutions in quite some time. A parts cleaner was checked in the maintenance area. Operating instructions were posted. The solvent being used was Pennsol L10055 which is 100% volatile organic compounds (VOCs). Two diesel fired emergency generators are found in Karn 1 & 2, one for AC and one for DC. Both are less than 500 HP. There are a total of three 40 HP propane fired generators. Two are located at the guard house and one at the fish barrier control room. The hours were checked on the AC and DC units. AC had 1,052 in 2013 and ended at 1121 in 2017. The DC unit had 1206 in 2013 and ended at 1295 in 2017. The highest run total was 25 hrs for the AC unit. The company does not use the option of oil analysis but instead changes the oil and filters and performs other required maintenance.

Lastly, the permit contains sulfur dioxide allowance allocations and nitrogen oxides requirements for Karn 1 & 2. However, averaging is no longer used as the Company's consent decree basically threw it out as the SCR control equipment was mandated.

Karn 3 & 4 are natural gas and fuel oil fired boilers. Sulfur dioxide is controlled via fuel blending and NO_x emissions are controlled through the use of low NO_x burner technology. The units are basically operated as standby peaking units but are barely run. In fact, previously they were basically in mothballed status. The units were last run for a few hours on Aug 15 and 16, 2018. Since the units share a common exhaust stack only one needs to be run during testing to confirm pollution monitor accuracy.

There are also two auxiliary boilers A & B both of which are natural gas fired and equipped with low NO_x burner technology. These boilers can warm up Karn 3 or 4 or provide steam to Karn 1 or 2 in the event of a unit going down or during a planned outage. The boilers are subject 40 CFR part 63 subpart DDDDD which basically requires boiler tune up. Records were checked and the units were tuned up in late 2017.

There are monthly average limits on SO2 in terms of pounds per mmbtu heat input for Karn 3 & 4 and the auxiliary boilers. George provided the records at a later date. Records were checked from Jan 2017 through August 2018. SO2 emissions were well below the 1.11 pounds per mmbtu heat input. The highest value was 0.293. Nox has a limit of 0.45 pounds per mmbtu on a daily average. The highest hourly value was 0.031. Therefore, the units were well below the limit on any given day.

There is a limit on the amount of fully reclaimed on-spec fuel oil however, such oil has not been received for years.

There is also an emergency diesel fired generator for Karn 3 & 4 which is greater than 500 HP. The only requirement for 40 CFR Part 63 subpart ZZZZ is initial notification. Records indicated the diesel was less than the 1.0 % sulfur limit.

Karn 3 & 4 has a paint room which is restricted to 200 gallons of coating per month. It really isn't a traditional paint booth but basically is a room where very occasional painting is conducted using aerosol spray cans.

A parts cleaner was checked. Operating instructions were posted. The solvent being used was Pennsolv L10055 which is 100% volatile organic compounds (VOCs).

NAME TS. Zuckhoff

DATE 11-20-18

SUPERVISOR C. Kane