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

K324929284

FACILITY: Michigan State University		**SRN / ID:** K3249
LOCATION: 426 Auditorium Rd., EAST LANSING		**DISTRICT:** Lansing
CITY: EAST LANSING		**COUNTY:** INGHAM
CONTACT: Robert Ellerhorst , Director of Utilities		**ACTIVITY DATE:** 04/22/2015
STAFF: Brian Culham	**COMPLIANCE STATUS:** Compliance	**SOURCE CLASS:** MAJOR
SUBJECT: This was a scheduled inspection. Its purpose was to complete a Full Compliance Evaluation (FCE) of processes covered under section 2 of the ROP MI-ROP-K3249-2009. I announced my inspection the week before so that I could be certain that Robert Ellerhorst was available. Issues involving a Working Draft ROP were discussed.		
RESOLVED COMPLAINTS:		

Contact - Amanda Groll, Environmental Analyst – algroll@ipf.msu.edu
Robert Ellerhorst, Director of Utilities - Rlellerh@ipf.msu.edu

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Location –The T.B. Simon Power Plant is located on the south side of the Michigan State University (MSU) main campus. To the north are primarily classrooms and dormitories. To the west is Spartan Village and to the east is Baker Woodlot. Student parking, a golf course, and the University Farms are to the south. A rail line runs east to west, angling slightly to the southeast immediately south of the power plant.

Description – Michigan State University (MSU) is a learning institution with a campus that covers several square miles. Several sources of air emissions are scattered about the campus including a coal fired power plant, multiple incinerators, and many reciprocating internal combustion engines. Although in separate locations, the AQD determined that all process on the campus made up one stationary major source. The source was issued Renewable Operating Permit (ROP) MI-ROP-K3249-2009. The ROP is in two sections. The TB Simon Power Plant is managed as a separate section from the rest of campus.

T.B. Simon is primarily a steam generating and electric utility for the campus. The electricity is for campus use and is not produced for sale. Traditionally bituminous coal has been the main fuel, but natural gas and bio-fuels have become more common. Recently, MSU declared its intentions to switch to all Natural Gas as fuel

Regulatory Applicability – The potential to emit (PTE) for both Oxides of Nitrogen and Oxides of Sulfur is greater than 250 tons per year; therefore certain changes at the power plant have been evaluated for Prevention of Significant Deterioration (PSD). Michigan State University is a Major Source of the criteria pollutants NOx, SOx, and CO as defined by Title V of the Clean Air Act. Potential emissions of hydrochloric acid (HCL) from coal combustion exceed 10 tons annually and also make the source a Title V Major Source of Hazardous Air Pollutants.

Because Michigan State University is a Title V Major Source they are required to report annual emissions to MAERs and pay air use fees. A MAERs report was submitted on March 13, 2015 and has been reviewed.

Several NSPS and MACT subject processes exist at Michigan State University and are identified in this report. On January 25, 2005 an Initial Notification was received for the Industrial Boiler MACT subpart DDDDD. Boiler Units 1 through 4 were identified as being subject to the regulation. On November 16, 2012 an Initial Notification was received identifying several Reciprocating Internal Combustion Engines scattered across the MSU Campus as subject to MACT subpart ZZZZ.

Units 1 through 4 at T.B. Simon are subject to a CAIR Ozone Nitrogen Oxide Budget Permit.

History - On January 25, 2005 the AQD received an Initial Notification Report for the ICI Boiler MACT 40 CFR 63 subpart DDDDD. The ICI Boiler MACT was subsequently stayed and remanded. A second Initial Notification was received on May 24, 2013. On February 4, 2014 a request for a one year extension to the Boiler MACT compliance date was received by the

AQD. MSU was investigating control technologies and was looking into various dry or wet sorbent injection systems to control HCl. An approval letter for the extension was signed by G. Vinson Hellwig. In July, 2014 a revision to the extension request was submitted by MSU identifying that the repurposing of Unit #4 combined with conversion to Natural Gas may also be a possible compliance approach to the Boiler MACT. On February 9, 2015 a second revision was received identifying that if an upgrade to the gas delivery system could be completed to accommodate the higher gas flow need, the entire plant could be converted to Natural Gas.

A permit to install 75-14 issued last November was amended and re-issued March 3, 2015 as 75-14A. The permit covered Boiler Units 1-4.

RATAs were completed in February of this year on the continuous monitoring systems.

MAERs/Fees – Because MSU is a Major Source it is required to submit an annual emissions report and pay fees. The MAERS report of 2014 emissions data has been submitted, was certified, and has been reviewed.

#	Emission Unit or Flexible Group	Description	Permit Number or Exemption	Comp. Status
1	EU-2-UNIT1	Dry bottom, wall fired boiler generating steam for CHP. Capable of combusting pulverized bituminous coal and/or natural gas	MI-ROP-K3249-2009	C
2	EU-2-UNIT2	Dry bottom, wall fired boiler generating steam for CHP. Capable of combusting pulverized bituminous coal and/or natural gas	MI-ROP-K3249-2009	C
3	EU-2-UNIT3	Dry bottom, wall fired boiler generating steam for CHP. Capable of combusting pulverized bituminous coal and/or natural gas	MI-ROP-K3249-2009	C
4	EU-2-UNIT4	Circulating fluidized bed boiler generating steam for CHP. Capable of combusting bio fuels, bituminous coal and/or natural gas.	MI-ROP-K3249-2009	C
5	FG-2-UNITS5/6	Unit #6 is a natural gas fired turbine with low NOx burner followed by a Heat Recover Steam Generator (HRSG). Unit #5 is an additional inline duct burner.	MI-ROP-K3249-2009	C
6	FG-2-123MATVENTS FG-2-4MATVENTS	Various materials handling equipment.	MI-ROP-K3249-2009	C
7	FG-2-COLDCLEANERS		MI-ROP-K3249-2009	C
8	EU-2-MHFUGITIVE	Fugitive emissions from material handling and traffic:	MI-ROP-K3249-2009	C

Activity - I arrived at 8:30 a.m. as was scheduled the week prior. It was overcast and 33° F. Wind was from the northwest at 20 mph. No odors were experienced upon arrival. No significant opacity was noted from the area of the power plant.

I met with Amanda Groll, Ron Rushing, and Robert Ellerhorst. I discussed the importance of submitting the M-001 forms required when changes are made that affect the Renewable Operating Permit. I explained that APC Rules 215 and 216 contain information about the submittals. I also stated that a permit approval cover letter reminds the recipient that the forms are required. MSU has not been submitting the forms.

Prior to the plant walk through I met with A. Groll who showed me the data collection systems and provided me printouts of some of the data used in the report below. All required recordkeeping was in place and appeared to be adequate.

1. & 2. EU-2-Unit1 & EU-2-Unit2 – Dry Bottom, Wall Fired Solid Fuel and Gas Boilers.

Boiler ID	Rated Steam #/hr.	Act. Steam #/hr.	% Load	% Opacity	Fuel	Gas Flow SCFH
EU-2-Unit1	250,000	189,200	75.7	2.1	Nat. Gas	2181.2

EU-2-Unit2	250,000	172,300	68.9	0.7	Nat. Gas	2013.5

I entered the control room with Ron Rushing and collected the data above. Both units were burning only Natural Gas. Solid fuels have not been used for some time. The boilers are identical and share the eastern most exhaust stack. I looked at the stacks before, during, and after the inspection, but did not identify any opacity.

The boilers are equipped with low NOx burners and utilize bag house control for particulate. I identified the two bag houses. I saw the opacity transmisometer installations at the individual exhaust stack breechings. Liquid urea can also be injected into the boilers for Selective Non-Catalytic Reduction (SNCR). It is my understanding that SNCR control is used only during the Ozone Season to control NO_X as needed.

A permit to install 75-14 issued last November was amended and re-issued March 3, 2015 as 75-14A. The two permits affected both units. Combustion of biomass fuel was allowed in both boilers at up to 5% by weight of the total solid fuel combusted.

At present, Units 1&2 are operated primarily on Natural Gas. They have not been operated on solid fuel for some time. Coal analytical is used to determine coal sulfur content (see Unit #4 for analytical details). The following values have been reported to MAERs and show compliance with the coal sulfur limit.

Average Coal Analytical for 2014 as Reported to MAERs			
Analytical Parameter	mmBTU	%S	Ash
Value	12,105	1.04	12.49
Adjusted	12,000	1.03	12.38
Limit	none	1.5	none

A stack test to determine particulate matter emissions in accordance with Method 5 was last preformed on Units #1 and #2 on March 31, 2010. A report was received on March 10, 2011.

Particulate Matter Stack Gas Analysis March 2010 pounds PM per 1000 pounds exhaust @ 50% ea		
Unit	Results	Limit
EU-2-Unit1	0.01	0.25
EU-2-Unit2	0.01	0.25

I inspected the COM shack and saw the analyzers. A 41C analyzer was being used for Opacity and a 42C for NOx. This matched RATA data. Although Units 1 and 2 do not have a NOx limit in the ROP, they are regulated by CAIR. Therefore, both Units 1 and 2 are required to have NOx analyzers.

Recordkeeping as required by permit is being maintained. Quarterly excess emissions and summary reports are being submitted. The quarter report ending December 2014 was received on February 13, 2015. No excess opacity (20%/27% limit by Rule) was reported for either Unit #1 or Unit #2. The percent of operating time in excess of the opacity limit averaged out to be 0.0% for both units.

A Malfunction Abatement Plan has been submitted for the baghouse and boiler operation. A Fuel Procurement Monitoring Plan has also been submitted.

A CAM Plan for particulate was requested and recently submitted. CAM allows continuous compliance determination methods (CCDM) to be exempt from the CAM requirement. Past ROP evaluations have assumed that Opacity was reasonable monitoring for particulate emissions and allowed the exemption. However; the CAM exemption requires a direct correlation between the monitored value and the standard. All though there is some correlation, opacity values cannot be converted to pounds particulate per 1000 pounds of exhaust with any certainty. The additional parametric monitoring submitted by MSU in their CAM plan is not new and has been in place for some time. Rather than make an issue of what is, or isn't CCDM, the AQD chose to document the other additional parametric monitoring that, with the COMs, collectively satisfy CAM.

3. EU-2-Unit3 – Dry Bottom, Wall Fired Natural Gas Boiler.

Boiler ID	Rated Steam #/hr.	Act. Steam #/hr.	% Load	% Opacity	Fuel
EU-2-Unit3	350,000	offline	0.0		

Unit #3 went down for outage on March 12, 2015. During the inspection Unit #3 was still off-line.

The new permit 175-14A restricts Unit #3 to burning only natural gas. Solid fuels are no longer allowed. The only control that is required now is low NOx burners. Unit #3 was equipped with an ESP. That control is no longer required.

Unit #3 is subject to NSPS subpart D and the CAIR NO_X Ozone Trading Program.

This unit exhausts through the tall west stack shared with Unit #4. A stack test to determine particulate matter emissions in accordance with Method 5 was last preformed on Unit #3 on March 31, 2010. A report was received on March 10, 2011. The particulate limit has been removed from the permit.

Particulate Matter Stack Gas Analysis March 2010 pounds PM per 1000 pounds exhaust @ 50% ea		
Unit	Results	Limit
EU-2-Unit3	0.01	0.10

A CEMS for SO_2 was installed. It is not required.

Unit #3 is also equipped with monitoring for NO_X. NOx monitoring is required for The CAIR Ozone Season and NSPS subpart D. I was given records of the NOx monitoring on March 12, 2015 prior to the outage. No hourly values exceeded the permit limit of 0.20 #/mmbtu.

Recordkeeping as required by permit is being maintained. Quarterly excess emissions and summary reports are being submitted. The quarter report ending December 2014 was received on February 13, 2015. On 10/08/2014, Unit #3 had an 18 minute exceedance with a high value over 40% opacity. The percent of operating time in excess of the opacity limit averaged out to be 0.1% for unit #3.

4. EU-2-Unit4 – Coal/Biomass Fuel Fired Circulating Fluidized Bed Boiler.

Boiler ID	Rated Steam #/hr.	Act. Steam #/hr.	% Load	% Opacity	Fuel	Coal Flow KLB/H
EU-2-Unit4	350,000	279,400	79.8	2.5	Biofuel & Coal	26.9

This unit is subject to NSPS subpart Db and CAIR NO_X Ozone Trading Program.
Many of the Subpart Db requirements have been subsumed by stricter PSD requirements

This boiler unit shares the western tall stack with unit #3. Boiler 4 is controlled by a bag house for particulate control, a selective non-catalytic reduction (SCNR) system for nitrogen oxide control, and limestone injection for sulfur dioxide control.

The bituminous coal that is being combusted as fuel in this boiler is delivered by rail. A shipment was being unloaded during the inspection. I asked A. Groll about the coal sulfur analytical. A. Groll stated that MSU collects a composite sample which is analyzed for %S by SGS analytical. Record of shipping analysis provided by their supplier is also maintained. The data used for compliance purposes is the daily analytical.

COM and CEM records are being maintained and quarterly excess emissions and summary reports are being submitted. The quarterly report ending December 2014 indicated no minutes of excess opacity on Unit #4. The percent of operating time in excess of the opacity limit averaged out to be 0.0%.

Compliance with the SO_2 limit when firing coal is determined by CEMs. The limit is 0.74 lbs/mmbtu averaged over 24-hours. During the inspection an instantaneous value of 0.389 was reported from the CEM. The addition of biofuel in the boiler reduces SO_2 emissions.

MSU is determining a daily 30-day sulfur reduction rate. The value is determined based on fuel (coal) sulfur content and CEMs emission data. Reduction was reported at 91.6%, or an emission of 8.4% of the total sulfur in fuel. The limit is 10%. I was shown analytical data for coal sampling. The data was for an April 16, 2015 sample. Dry coal sulfur content was 2.71%. The lab doing the analytical is SGS. Values for the last 30 completed samples range from 2.2 to 2.9 % Sulfur.

The present coal is too high in sulfur content to be combusted in Unit 1 or Unit 2.

Cumulative CEMs data was reported to MAERS for the 12-month period ending December 2014 as follows.

MAERs 2014	
Emission Unit	SO_2 Tons
EU-2-UNIT4	235.2
Limit	1208.9

Carbon monoxide (CO) is being monitored by CEMs and was instantaneously at 0.05 #/mmbtu during the inspection. CO is limited to 0.20 pounds/mmbtu over a 24-hour rolling time period to be determined every hour.

A report of abnormal conditions was received on April 27, 2015 for exceedance of the carbon monoxide (CO) 0.20 pounds/mmbtu 24-hour rolling time period limit. The exceedance occurred on April 25, 2015 as part of a fuel switch event at the Simon Plant Unit 4. The upset condition was resolved after 19 hours and exceeded the limit by no more than then 20% of the limit at its greatest one hour value.

NO_X is also being monitored. A CEM instantaneous value of 0.09 #/mmbtu was noted during the inspection MAERs reports indicated 90.1 tons for 2014. NOx is limited to 0.16 pounds/mmbtu over a 24-hour rolling time period when firing solid fuel.

A stack test to determine particulate matter emissions in accordance with Method 5 was last preformed on Units #4 on March 31, 2010. A report was received on March 10, 2011.

Particulate Matter Stack Gas Analysis March 2010 pounds PM per 1000 pounds exhaust @ 50% ea		
Unit	Results	Limit
EU-2-Unit4	0.01	0.10

A Fuel Procurement and Monitoring Plan was submitted as required by Permit to Install No. 25-11. The permit also restricts Boiler Unit #4 to not more than 30% biofuels combusted. Records of fuel combustion are being maintained. In March 5.68% of all solid fuel tonnage was biofuel. The limit is 30%. Engineered Pelleted Fuels are not presently being combusted.

I identified a pile of wood in the fuel storage yard. It is my understanding that a grinder comes in periodically to process the wood.

5. FG-2-UNITS5/6 Gas Turbine and HRSG with additional Duct Burner

This flexible group consists of a natural gas fired turbine, natural gas fired duct burner, and a Heat Recovery Steam Generator (HRSG). It is my understanding that this grouping is considered a Cogeneration Cycle Stationary Combustion Turbine for purposes of subpart YYYY. The turbine is rated at 14 MW and considered a "New Stationary Combustion Turbine" subject to 40 CFR 63 subpart YYYY, National Emission Standards for Hazardous Air Pollutants for Stationary Combustion Turbines, however; the subpart contains the following:

Stay of standards for gas-fired subcategories. *If you start up a new or reconstructed stationary combustion turbine that is a lean premix gas-fired stationary combustion turbine or diffusion flame gas-fired stationary combustion turbine as defined by this subpart, you must comply with the Initial Notification requirements set forth in § 63.6145 but need not* *comply with any other requirement of this subpart until EPA takes final action to require compliance and publishes a document in the Federal Register*. The EPA website indicated that the last document was dates as 08/18/04, so action has yet to be taken.

The gas turbine is also subject to certain parts of 40 CFR 60 Subpart GG, Standards of Performance for Stationary Gas Turbines.
The Duct Burner is subject to 40 CFR 63 subpart Dc, Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units.

The units were not operating during my inspection. Both the turbine and duct burner operate on pipeline quality gas. The monitoring of fuel nitrogen is not required when using pipeline quality gas. On April 5, 2015 24 hour gas flow to both units combined was 2,531,800 SCF.

The turbine is equipped with low NO_X burners.

I identified the CEM analyzers for both NO_X and CO. Data from the CEMS analyzers are used to report emissions to MAERS.

MAERs 2014		
Emission Unit	CO Tons	NO_X Ton
EU-2-UNIT5 – Duct Burner	0.0	0.0
EU-2-UNIT6 - Turbine	24.9	3.2
FG-2-UNITS5/6 - Total	24.9	3.2
Limit	89.9	34.9

6. FG-2-123MATVENTS and FG-2-4MATVENTS

These are groups of material handling equipment and associated control devices. The discharge points are inspected daily and recorded weekly. I was shown the copy of an inspection sheet.

Coal was being loaded into the bunkers during the inspection. I entered the coal bunker gallery above Unit 4. There was no dust in the area. I identified the baghouse control devices for EU-2-CONVEYOR4. The collected material from the baghouse is deposited down into the bunker.

There was no indication of opacity from the discharge points when I was on the roof.

7. FG-2-COLDCLEANERS

I did not identify any of these units. They are used in the maintenance areas for parts cleaning. I was told that they are managed by Zep, Inc. I was given an MSD sheet for the solvent. It is petroleum distillates.

8. EU-2-MHFUGITIVE Fugitive emissions from material handling and traffic

The fugitive dust plan is incorporated into the ROP.

I inspected the fuel storage yard from on top of the roof of the power plant. A unit train was parked on the siding and being unloaded by MSU. There was no indication of fugitive dust from any fuel yard processes, including the dozing of coal up onto the pile.

We have no current dust complaints on record.

Upon completion of my inspection I debriefed with Bob Ellerhorst and Amanda Groll. I stated that records of a visual observation of dust from the coal/wood storage yards and yard traffic will be required as part of the ROP. There were no deficiencies to report. I left at 12:00 noon.

NAME [signature] DATE 5-4-2015 SUPERVISOR ____________________