DTE Energy

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December 12, 2017

Mr. Jonathan Lamb, Sr. Environmental Quality Analyst
Air Quality Division
Michigan Department of Environmental Quality
3058 Est Grand Blvd, Suite 2-300
Detroit, MI 48202-6058

Re: DTE Electric Response to the MDEQ-AQD Violation Notice of November 21, 2017, Trenton Channel Power Plant, Aux Boiler Initial Testing

Dear Mr. Lamb:

This letter is in response to the Michigan Department of Environmental Quality (MDEQ) Air Quality Division's (AQD) Violation Notice dated November 21, 2017 issued to Trenton Channel Power Plant. The MDEQ's Notice of Violation cited the following deviation:

Process Description	Rule/Permit Condition Violated	Comments
EU-TCHAux1-S1, EU-TCHAux1-S2, EU-TCHAux1-S3, of FG-AuxBoilers-S1	*PTI #227-15A, SC V.5*	*Facility did not perform testing to determine the maximum heat release capacity of each boiler within 180 days of startup of that boiler.*

Background

On April 29, 2016, DTE Electric-Trenton Channel Power Plant obtained permit to install (PTI) 227-15 to install up to five natural gas-fired boilers. Condition V.1 requires testing each boiler's maximum heat release capacity no later than 180 days after initial operation of each boiler. Boiler #22 had an initial startup date of Dec 7, 2016. On July 14, 2017, Trenton Channel contacted MDEQ-AQD's Detroit office to request an extension on the testing requirement due to operational issues with the boilers. At that time, MDEQ-AQD noted that an extension could not be provided since a test deadline had passed. Further, MDEQ-AQD advised Trenton to renotify MDEQ-AQD when the units could be tested. On November 14, 2017, MDEQ was notified in writing through the required 7-day test notice that a test for one of the aux boilers was scheduled for November 21, 2017. Further, Trenton notified MDEQ in writing on November 21, 2017 that the two remaining aux boilers were scheduled to be tested between November 28 and 30, 2017. The next sections in the response letter present information requested by MDEQ-AQD.

Dates and Duration of Occurrence

As mentioned earlier, maximum heat release testing was due within 180 days after initial operation of each boiler. The table below outlines each boiler's initial startup date, 180-day test due date, and testing completion date.

Boiler	Initial Startup Date	Date 180-day testing due	Date Testing done	Run Hours
Aux Boiler 21	12/29/2016	6/27/2017	11/29/2017	44 hours or 1% of time between 6/27 and 11/29
Aux Boiler 22	12/7/2016	6/5/2017	11/29/2017	184 hours or 4% of time between 6/5 and 11/29
Aux Boiler 23	12/29/2016	6/27/2017	11/22/2017	754 hours or 21% of time between 6/27 and 11/22

While the period between the testing due dates and test completion dates span five (5) months, practically November was the earliest that the required maximum design heat input capacity could be reached to conduct the maximum heat release testing. The table above shows the number of run hours and the percent run time (ratio to total clock hours available in that period) in between the period the test was due and the completion of the testing.

The testing was delayed until November because the boilers could not achieve maximum design heat input capacity. The boilers couldn't be operated at the maximum level for several reasons: 1) operational issues from startup through summer, 2) boiler work on controls during summer; 2) minimal steam production demand during summer; 3) unit outages during fall, with no downstream point to supply the steam (explained below). Therefore, November was the earliest that the required maximum design heat input capacity could be reached due to these factors.

Explanation of the Cause

DTE Electric reviewed circumstances leading to not completing the maximum heat release testing within the 180 days of initial startup. Several issues contributed to the testing not being completed by the due date. Due to operational issues and other complicating factors, the boilers were not able to be operated in a manner to reach the required design heat input capacity on a steady state basis for a suitable length of time by the testing due dates. These issues included boiler control problems, lack of boiler manufacturer support, contract issues, and tracking permit requirements in context to the operational schedule of plant, boilers, and plant's external customer.

While Trenton Channel Power Plant did submit start up notification letters indicating the startup of dates for each boiler, all boilers experienced multiple operational issues once in operation. As is commonly the case with new equipment, the boilers should have gone through more extensive "shakedown" testing before commissioning. Next, steam production needs from the boilers dropped in the summer. With decreased demand, troubleshooting the boiler controls was limited to operating times of the equipment which minimized the timeframe to identify and correct operational issues. Operation of the boilers was also curtailed during September and October because both Trenton Channel Unit 9 and the plant's external customer were in outages.

Once the effect of the operational issues on the boiler testing were identified, DEQ was contacted for an extension, however, the request was made past the testing due date.

Summary of Actions Taken

Through internal engineering support and external resources, operational issues associated with the boilers have been addressed and the adjustments have been completed. DTE Electric-Trenton Channel Power Plant engaged the boiler manufacturer to work out the support / contract issues and the appropriate service and adjustments to the boilers and controls are complete.

Regarding conducting the required maximum heat release testing, Trenton had initially contacted the MDEQ-AQD Detroit office in July. After the dual outages in September/October, Trenton determined that the boilers could meet the design heat input capacity on a steady state basis and provided written notification to MDEQ-AQD Detroit office of the November test dates.

Testing of aux boilers was completed per the dates above. The testing was conducted per the American Society of Mechanical Engineers (ASME) performance test codes as required by PTI 227-15. The objective of the test was to operate the aux boilers at their maximum design heat input capacity on a steady state basis as determined by each unit's physical design characteristics.

The heat release capacity is dependent upon two variables, the heat value of natural gas and the gas flow rate (driven by steam demand). For the test only, boiler operated to the maximum designed gas flow rate, based on the normal high heating value of 1020 Btu/scf, used during the permit process. At a normal heating value of 1020 Btu/scf, all boilers were within 99.9 mmBtu/hr, see Attachment 1. Testing of aux boiler 22 initially revealed the boiler could potentially exceed the maximum heat release capacity, solely due to the heat value of the natural gas sampled, reported at 1052 Btu/scf, see Attachment 2. At no point from boiler start up to present time, did the unit's natural gas flow rate reach maximum designed flow. The boiler's operational data indicates it operated well below the maximum heat release capacity. In fact, other than this test, the aux boiler 22 only reach 80% of its rated capacity.

Although normal unit operations would not have meant operating the boiler to its maximum designed fuel flowrate, aux boiler #22 has been taken out of service until the boiler manufacturer can adjust the natural gas hourly flow rate to account for a higher Btu value gas (up to 1100 Btu/scf to add plenty of safety margin). At that point, DTE Electric-Trenton Channel Power Plant will retest the unit and demonstrate the maximum heat release capacity is less than 99.9 mmBtu/hr.

Testing of aux boilers 21 and 23 demonstrated the unit's maximum heat release capacity were under 99.9 mmBtu/hr. Aux Boiler 23's hourly natural gas flow will also be adjusted to the new 1100 Btu/scf, high heating value since that unit's design heat input capacity is 99.9 mmBtu/hr. Aux boiler #21's hourly natural gas flow does not need adjusting because the unit's design heat input capacity is under 85 mmBtu/hr.

Steps being taken to prevent a reoccurrence of testing delay

As detailed above, several factors contributed to the heat release testing not being completed within 180 days of initial startup. These factors include commissioning new equipment without going through more thorough "shake-down" testing prior to actual startup, equipment and control issues, lack of steam demand downstream of the boilers to reach maximum heat release capacity, and plant outages. In the case of the aux boilers in question at Trenton Channel, the delayed testing on this equipment was a confluence of many factors resulting in a one-time event. However, since DTE Energy uses continuous improvement programs throughout the company, lessons learned from this event will be used to ensure a similar event does not occur elsewhere.

While the operational issues delayed the ability to test the boilers, the late testing deviation could potentially have been avoided with a timely request to the MDEQ-AQD for an extension. As part of DTE Electric's continuous improvement program, a corrective action database exists to track key commitments and automates communication to responsible personnel until the commitment is completed. The Company has assessed its permit review process to begin implementing changes to ensure permit requirements are appropriately assigned and tracked. Trenton Channel Power plant's remaining stack testing requirements will be entered in the corrective action database to assure timely completion.

We believe these actions will ensure compliance with testing requirements in the future. If you have any questions on the information contained herein or would like further information, please contact Mark Nederveld at (734) 362-2237 or Andrew Fadanelli at (313) 235-6384.

Sincerely,

Michael Dunlap, II
Plant Manager – Trenton Channel Power Plant

Cc: W. McLemore – MDEQ-AQD, Detroit Office
J. Korniski, MDEQ-AQD, Detroit Office
B. Rice – DTE Electric
S. Boyd – DTE Energy
B. Marietta – DTE Energy
M. Solo – DTE Energy
A. Hayden – DTE Energy

TCHPP AUX Boiler #21 - EU-TCHAUX1-S1

Date	Time	Steam Pressure (psi)	Feedwater Flow (gal/min)	O2 Leaving Boiler (%)	Fuel Gas Totalizer (kscf)	Fuel Flow (Scf/hr)	Feedwater Temp (F)	Steam Flow (klbs/hr)	Vng (scf)	HHVF (Btu/scf)	Q (mmBTU/Hr)
28-Nov	2:04	344.9	53.7	2.4	15,559.4	79.4	250.4	56.5	79,100	1020	80.7
	2:19	327.2	54.6	2.4	15,579.1	79.3	251.8	62.1			
	2:34	319.8	57.1	2.4	15,598.9	79.2	250.4	63.6			
	2:49	325.6	57.1	2.5	15,619.0	78.7	250.1	62.5			
	3:04	232.8	57.5	2.5	15,638.5	78.8	249.9	64.2			
29-Nov	8:50	337.8	51.0	2.7	16,320.0	79.6	248.6	67.8	99,000	1020	80.8
	9:05	327.7	60.7	2.6	16,338.7	80.4	243.9	65.0			
	9:20	337.6	56.6	2.6	16,358.3	79.8	246.4	60.7			
	9:35	331.2	60.2	2.6	16,378.7	80.1	247.7	67.6			
	9:50	337.0	56.0	2.6	16,398.4	79.7	248.7	59.4			
	10:05	328.6	58.2	2.4	16,419.0	80.2	249.4	65.0			
									859,600		

Notes: HHV of 1020 used in the Heat Input calculation

Master Control set for 100% boiler output on DCS. Acutual Boiler output 95 to 96% of nameplate value.

TCHPP AUX Boiler #22 - EU-TCHAUX2-S1

Date	Time	Steam Pressure (psi)	Feedwater Flow (gal/min)	O2 Leaving Boiler (%)	Fuel Gas Totalizer (kscf)	Fuel Flow (Scf/hr)	Feedwater Temp (F)	Steam Flow (klbs/hr)	Vng (scf)	HHVF (Btu/scf)	Q (mmBTU/Hr)
28-Nov	11:36	338.4	71.0	3.0	7,662.9	97.2	224.1	72.3	97,200	1020	99.1
	11:51	353.3	69.0	3.0	7,687.9	96.8	235.4	70.6			
	12:06	340.6	68.9	3.0	7,711.4	97.0	241.7	70.8			
	12:21	338.2	71.8	3.0	7,736.0	97.0	247.8	72.2			
	12:36	340.3	70.7	3.0	7,760.1	96.9	249.0	69.8	96,900	1020	98.8
	12:51	349.6	71.1	3.0	7,784.3	97.1	249.9	75.6			
	1:06	346.9	72.5	3.0	7,808.9	96.9	249.7	74.9			
	1:21	342.2	70.6	3.0	7,832.5	97.1	249.9	72.5			
	1:36	331.2	72.8	3.0	7,857.0	96.9	249.7	75.3	194,100	1020	99.0
29-Nov	12:25	352.8	70.4	3.0	7,976.7	97.0	248.8	75.2	121,500	1020	99.1
	12:40	354.5	71.5	3.0	8,001.8	97.0	248.1	74.0			
	12:55	349.7	71.7	3.0	8,025.4	96.9	248.6	77.3			
	13:10	350.2	68.9	3.0	8,049.8	97.2	247.9	72.4			
	13:25	342.8	70.3	3.0	8,074.1	96.9	248.5	73.7			
	13:40	349.4	71.3	3.0	8,098.2	96.9	248.5	74.1			

Notes: HHVF of 1020 used in the Heat Input calculation

Master Control set for 100% boiler output on DCS.

TCHPP AUX Boiler #23 - EU-TCHAUX3-S1

Date	Time	Steam Pressure (psi)	Feedwater Flow (gal/min)	O2 Leaving Boiler (%)	Fuel Gas Totalizer (kscf)	Fuel Flow (Scf/hr)	Feedwater Temp (F)	Steam Flow (klbs/hr)	Vng (scf)	HHVF (Btu/scf)	Q (mmBTU/Hr)
21-Nov	14:00	342.5	66.5	3.0	10,770.7	92.2	245.2	68.6	92,500	1020	94.4
	14:15	350.4	72.2	2.9	10,793.7	93.0	246.7	68.5			
	14:30	347.4	63.1	3.1	10,816.8	92.9	247.8	69.8			
	14:46	343.9	71.6	3.0	10,841.6	91.8	248.4	71.2			
	15:00	354.4	59.9	3.1	10,863.2	91.5	248.8	68.8			
22-Nov	8:20	343.4	76.6	2.9	11,169.8	93.1	246.0	67.3	92,600	1020	94.5
	8:35	343.3	76.5	3.1	11,193.3	92.0	246.9	71.4			
	8:50	348.9	53.9	2.9	11,216.0	91.0	247.7	72.7			
	9:05	348.4	66.7	3.1	11,238.8	93.2	247.5	71.3			
	9:20	342.9	65.9	3.1	11,262.4	92.2	247.7	75.5			

Notes: HHV of 1020 used in the Heat Input calculation

Master Control set for 100% boiler output on DCS.

TCHPP AUX Boiler #21 - EU-TCHAUX1-S1

Date	Time	Steam Pressure (psi)	Feedwater Flow (gal/min)	O2 Leaving Boiler (%)	Fuel Gas Totalizer (kscf)	Fuel Flow (Scf/hr)	Feedwater Temp (F)	Steam Flow (klbs/hr)	Vng (scf)	HHVF (Btu/scf)	Q (mmBTU/Hr)
28-Nov	2:04	344.9	53.7	2.4	15,559.4	79.4	250.4	56.5	79,100	1052	83.2
	2:19	327.2	54.6	2.4	15,579.1	79.3	251.8	62.1			
	2:34	319.8	57.1	2.4	15,598.9	79.2	250.4	63.6			
	2:49	325.6	57.1	2.5	15,619.0	78.7	250.1	62.5			
	3:04	232.8	57.5	2.5	15,638.5	78.8	249.9	64.2			
29-Nov	8:50	337.8	51.0	2.7	16,320.0	79.6	248.6	67.8	99,000	1052	83.3
	9:05	327.7	60.7	2.6	16,338.7	80.4	243.9	65.0			
	9:20	337.6	56.6	2.6	16,358.3	79.8	246.4	60.7			
	9:35	331.2	60.2	2.6	16,378.7	80.1	247.7	67.6			
	9:50	337.0	56.0	2.6	16,398.4	79.7	248.7	59.4			
	10:05	328.6	58.2	2.4	16,419.0	80.2	249.4	65.0			

Notes: HHV of 1052 used in the Heat Input calculation

Master Control set for 100% boiler output on DCS. Acutual Boiler output 95 to 96% of nameplate value.

TCHPP AUX Boiler #22 - EU-TCHAUX2-S1

Date	Time	Steam Pressure (psi)	Feedwater Flow (gal/min)	O2 Leaving Boiler (%)	Fuel Gas Totalizer (kscf)	Fuel Flow (Scf/hr)	Feedwater Temp (F)	Steam Flow (klbs/hr)	Vng (scf)	HHVF (Btu/scf)	Q (mmBTU/Hr)
28-Nov	11:36	338.4	71.0	3.0	7,662.9	97.2	224.1	72.3	97,200	1052	102.3
	11:51	353.3	69.0	3.0	7,687.9	96.8	235.4	70.6			
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	12:51	349.6	71.1	3.0	7,784.3	97.1	249.9	75.6			
	1:06	346.9	72.5	3.0	7,808.9	96.9	249.7	74.9			
	1:21	342.2	70.6	3.0	7,832.5	97.1	249.9	72.5			
	1:36	331.2	72.8	3.0	7,857.0	96.9	249.7	75.3	194,100	1052	102.1
Second Test period:											
29-Nov	12:25	352.8	70.4	3.0	7,976.7	97.0	248.8	75.2	121,500	1052	102.3
	12:40	354.5	71.5	3.0	8,001.8	97.0	248.1	74.0			
	12:55	349.7	71.7	3.0	8,025.4	96.9	248.6	77.3			
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	13:40	349.4	71.3	3.0	8,098.2	96.9	248.5	74.1			

Notes: HHV of 1052 used in the Heat Input calculation
Master Control set for 100% boiler output on DCS.

TCHPP AUX Boiler #23 - EU-TCHAUX3-S1

Date	Time	Steam Pressure (psi)	Feedwater Flow (gal/min)	O2 Leaving Boiler (%)	Fuel Gas Totalizer (kscf)	Fuel Flow (Scf/hr)	Feedwater Temp (F)	Steam Flow (klbs/hr)	Vng (scf)	HHVF (Btu/scf)	Q (mmBtu/Hr)
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	9:20	342.9	65.9	3.1	11,262.4	92.2	247.7	75.5			

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