

State Registration Number
B2814

**RENEWABLE OPERATING PERMIT
STAFF REPORT**

ROP Number
MI-ROP-B2814-20XX

Detroit Thermal Beacon Heating Plant

State Registration Number (SRN): B2814

Located at

541 Madison Avenue, Detroit, Wayne County, Michigan 48226

Permit Number: MI-ROP-B2814-20XX

Staff Report Date: March 18, 2024

This Staff Report is published in accordance with Sections 5506 and 5511 of Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451). Specifically, Rule 214(1) of the administrative rules promulgated under Act 451, requires that the Michigan Department of Environment, Great Lakes, and Energy (EGLE), Air Quality Division (AQD), prepare a report that sets forth the factual basis for the terms and conditions of the Renewable Operating Permit (ROP).

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Purpose

Major stationary sources of air pollutants, and some non-major sources, are required to obtain and operate in compliance with an ROP pursuant to Title V of the federal Clean Air Act; and Michigan’s Administrative Rules for Air Pollution Control promulgated under Section 5506(1) of Act 451. Sources subject to the ROP program are defined by criteria in Rule 211(1). The ROP is intended to simplify and clarify a stationary source’s applicable requirements and compliance with them by consolidating all state and federal air quality requirements into one document.

This Staff Report, as required by Rule 214(1), sets forth the applicable requirements and factual basis for the draft ROP terms and conditions including citations of the underlying applicable requirements, an explanation of any equivalent requirements included in the draft ROP pursuant to Rule 212(5), and any determination made pursuant to Rule 213(6)(a)(ii) regarding requirements that are not applicable to the stationary source.

General Information

Stationary Source Mailing Address:	Detroit Thermal Beacon Heating Plant 541 Madison Avenue Detroit, Michigan 48226
Source Registration Number (SRN):	B2814
North American Industry Classification System (NAICS) Code:	221330
Number of Stationary Source Sections:	1
Is Application for a Renewal or Initial Issuance?	Renewal
Application Number:	201800115
Responsible Official:	Phil Malara, Plant Manager 313-972-4335
AQD Contact:	Sam Liveson, Senior Environmental Engineer 313-405-1357
Date Application Received:	September 12, 2018
Date Application Was Administratively Complete:	September 12, 2018
Is Application Shield in Effect?	Yes
Date Public Comment Begins:	March 18, 2024
Deadline for Public Comment:	April 17, 2024

Source Description

Detroit Thermal Beacon Heating Plant (Detroit Thermal) is a subsidiary of Detroit Renewable Energy. Detroit Thermal is located at 541 Madison Avenue in downtown Detroit. Directly west of the facility is the 36th District Court; north is the Ford Field Stadium; south are the Wayne County Jail and Wayne County Third Circuit Court; and east is the Chrysler Freeway (Interstate 375). The facility currently operates 24 hours a day, 7 days a week.

At this time, Detroit Thermal operates four boilers (numbered 1, 2, 6, and 7) that are used to generate/supply steam to various commercial, industrial, and residential customers in the downtown Detroit area. Currently, the four boilers fire natural gas and have the ability to fire No. 2 fuel oil as backup. Boilers 1 and 2 were installed in the 1920's and have a rated heat input capacity of 570 million British thermal units per hour (MMBtu/hr). In 2007, Boiler 5 was permanently shut down, removed from the facility, and replaced by Boilers 6 and 7. Boilers 6 and 7 are each rated at 180.2 MMBtu/hr. Both boilers 6 and 7 are equipped with low nitrogen oxides burners and with flue gas recirculation.

Boilers 3 and 4 have not operated since before 2012, and they are currently inoperable because their burner guide tubes have been removed. Detroit Thermal does not consider boilers 3 and 4 to be permanently shut down. Therefore, boilers 3 and 4 remain in the ROP.

The following table lists stationary source emission information as reported to the Michigan Air Emissions Reporting System (MAERS) for the year **2022**.

TOTAL STATIONARY SOURCE EMISSIONS

Pollutant	Tons per Year
Carbon Monoxide (CO)	68.9
Lead (Pb)	0.00072
Nitrogen Oxides (NO _x)	177.4
PM10*	8.73
Sulfur Dioxide (SO ₂)	0.86
Volatile Organic Compounds (VOCs)	7.91
Ammonia	0.71

* Particulate matter (PM) that has an aerodynamic diameter less than or equal to a nominal 10 micrometers.

The following table lists Hazardous Air Pollutant emissions as calculated for the year 2022 by Detroit Thermal:

Individual Hazardous Air Pollutants (HAPs) **	Tons per Year
Hexane	2.59
Total Hazardous Air Pollutants (HAPs)	2.72

**As listed pursuant to Section 112(b) of the federal Clean Air Act.

See Parts C and D in the ROP for summary tables of all processes at the stationary source that are subject to process-specific emission limits or standards.

Regulatory Analysis

The following is a general description and history of the source. Any determinations of regulatory non-applicability for this source are explained below in the Non-Applicable Requirement part of the Staff Report and identified in Part E of the ROP.

The stationary source is located in Wayne County which is currently designated by the U.S. Environmental Protection Agency (USEPA) as attainment/maintenance with respect to the 8-hour ozone standard and attainment/unclassified for all other criteria pollutants except for a portion of Wayne County designated as a non-attainment area with respect to the sulfur dioxide standard (SO₂). This stationary source is not located in this portion of Wayne County.

The stationary source is subject to Title 40 of the Code of Federal Regulations (CFR) Part 70, because the potential to emit of nitrogen oxides and carbon monoxide exceeds 100 tons per year.

The stationary source is a "synthetic minor" source regarding HAP emissions because the stationary source accepted a legally enforceable permit condition limiting the potential to emit of any single HAP regulated by Section 112 of the federal Clean Air Act, to less than 10 tons per year and the potential to emit of all HAPs combined to less than 25 tons per year.

EU-BOILER1 EU-BOILER2, EU-BOILER3, and EU-BOILER4 were installed prior to August 15, 1967. As a result, this equipment is considered "grandfathered" and is not subject to New Source Review (NSR) permitting requirements. However, future modifications of this equipment may be subject to NSR.

EU-BOILER6 and EU-BOILER7 at the stationary source were subject to review under the Prevention of Significant Deterioration regulations of 40 CFR 52.21, because at the time of New Source Review permitting the potential to emit of nitrogen oxides was greater than 100 tons per year, and potential emissions from this project exceeded the significance levels for carbon monoxide (CO) and particulate matter less than 10 microns in size (PM₁₀). The application for PTI No. 63-05 was for three boilers (EU-BOILER6, EU-BOILER7, EU-BOILER8); EU-BOILER8 was never installed. At the time, Wayne County was non-attainment for one-hour ozone and PM_{2.5}. The potential emissions from this project exceeded the NSR significant levels for NO_x, CO, and PM₁₀. Detroit Thermal accepted restrictions on Boiler 3 and used those restrictions and netting to limit the PTE of NO_x for this project below the significance level. With this action, NO_x was no longer subject to major source permitting/review. CO and PM₁₀ did undergo major source permitting/review as a major PSD modification for both pollutants. With the issuance of PTI No. 62-21, the Underlying Applicable Requirements for CO, NO_x, PM₁₀, and SO₂ emission limits have been updated to cite 40 CFR 52.21(c) and (d) for pollutants that did not go through PSD review, and to cite the equivalent state rules for pollutants that did go through PSD: Rule 1803 (R 336.2803) for PSD Increments, and Rule 1804 (R 336.2804) for NAAQS. The state PSD rules are cited for the PM₁₀ and CO emission limits, and 40 CFR 52.21(c) and (d) is cited for NO_x and SO₂.

In 1973 and 1974, EU-BOILER1, EU-BOILER2, EU-BOILER3, and EU-BOILER4 were converted from coal-fired boilers to natural gas/No. 2 fuel oil-fired boilers. The change from coal fired boilers to natural gas/No.2 fuel oil fired boilers does not constitute a modification as defined in 40 CFR 60.2. Therefore, EU-BOILER1, EU-BOILER2, EU-BOILER3, and EU-BOILER4 retain the pre-1967 install date as it applies to 40 CFR Part 60, Subpart D. EU-BOILER1, EU-BOILER2, EU-BOILER3, and EU-BOILER4 are not currently subject to Subpart D because Subpart D only applies to boilers constructed, modified, or reconstructed after August 17, 1971.

EU-BOILER6 and EU-BOILER7 at the stationary source are subject to the Standards of Performance for Industrial, Commercial, Institutional Steam Generating Units promulgated in 40 CFR Part 60, Subparts A and Db. According to the Alternate Monitoring Protocol submitted to AQD in November 2016, these boilers were constructed in 2006.

Although boilers 1, 2, 3, 4, 6, and 7 at the facility have the capacity to fire No. 2 fuel oil as a backup fuel, the boilers are currently operated/categorized as "gas-fired boilers" as defined in 40 CFR 63.11237. Pursuant to 40 CFR 63.11195(e), gas-fired boilers are not subject to applicable provisions under 40 CFR Part 63, Subpart JJJJJ, the National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers at Area Sources. If at any time the boilers are reclassified to another subcategory, the facility must comply with all applicable requirements under 40 CFR Part 63, Subparts A

and JJJJJ. Conditions pertaining to 40 CFR Part 63, Subpart JJJJJ, can be found in the ROP under the flexible group FG-BOILER_6,7.

The facility is not subject to the Cross-State Air Pollution Rule NO_x Ozone Season Group 2 Trading Program pursuant to 40 CFR Part 97, Subpart EEEEE. However, EU-BOILER1, EU-BOILER2, EU-BOILER3, and EU-BOILER4 are required to comply with the requirements of Part 8 of Michigan's Air Pollution Control Rules. Special conditions can be found in the ROP under FG-BOILER_1-4_Rule801.

The monitoring conditions contained in the ROP are necessary to demonstrate compliance with all applicable requirements and are consistent with the "Procedure for Evaluating Periodic Monitoring Submittals."

The following table provides a summary of the emission units subject to CAM.

Emission Unit/Flexible group ID	Pollutant/Emission Limit	UAR(s)	Control Equipment	Monitoring	Emission Unit/Flexible Group for CAM	PAM? *
FG-BOILER_6,7 (EU-BOILER6 and EU-BOILER7)	0.140 lb/MMBtu NO _x , when burning 100% No 2 fuel oil	R 336.1205, 40 CFR 52.21(c) and (d); 40 CFR Part 60 Section 60.44b(a)	Flue gas recirculation	NO _x predictive emission monitoring system (PEMS)= 0.140 MMBtu/hr on an hourly average	FG-BOILERS_6, 7	No
	76.4 lb/hour NO _x	R 336.1205; 40 CFR 52.21(c) and (d)				
	155.3 tons/yr NO _x	R 336.1205; 40 CFR 52.21(c) and (d)				

*Presumptively Acceptable Monitoring (PAM)

The flexible group FG-BOILER_6,7 contains four emission limits for NO_x. Special Conditions (SCs) I.4 (while burning natural gas) and I.5 (while burning No. 2 fuel oil) apply to each boiler and SCs I.6 (lb/hr) and I.7 (TPY) apply collectively to both boilers. The emission limit of 0.140 pounds NO_x per MMBtu (SC I.5) while firing No. 2 fuel oil results in a potential to emit NO_x at a rate of 110 tons per year for each boiler, after controls. And collectively, annual NO_x emissions are limited to 155.3 tons per year, after controls (SC I.7). Therefore, whether considering a PSEU that encompasses an individual boiler or a PSEU encompassing both boilers, that PSEU has a potential to emit of NO_x greater than the major source threshold of 100 tons per year and CAM applies to the NO_x emission limitations while burning No. 2 fuel oil. The pre-control NO_x emissions while burning natural gas (SC I.4) are below the major source threshold.

Boilers 6 and 7, each having a heat input capacity less than 250 MMBtu/hr, are subject to 40 CFR 60 Subpart Db-Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units. Under NSPS Db, the permittee is required to install, certify, maintain, and operate continuous emissions monitoring systems (CEMS) to determine hourly NO_x emission rates in parts per million (PPM) or pounds per million British thermal units (Lb./MMBtu). Per 40 CFR 60.49b(c), the permittee has elected to install, certify, maintain and operate Predictive Emissions Monitoring Systems (PEMS) in lieu of CEMS and submitted "Alternative Monitoring Protocol Predictive Emissions Monitoring Systems for Natural Gas-Fired Boiler No. 6 (EU-BOILER6) Natural Gas-Fired Boiler No. 7 (EU-BOILER7)". A PEMS is installed on each boiler. Each PEMS was commissioned and certified following the procedures in 40 CFR 60, Appendix B,

Performance Specification 16, Specifications and Test Procedures for Predictive Emission Monitoring Systems in Stationary Sources. The Alternative Monitoring Protocol PEMS for Boilers 6 and 7 (AMP Cherokee, 2016) provides additional details with regard to the PEMS.

PEMS that are required pursuant to other authority under the Clean Air Act, such as the NSPS Db, satisfy CAM (40 CFR 64.3(d)(1)) and PEMS that are required to meet applicable provisions within 40 CFR 60.13 are deemed to satisfy the general design criteria and performance criteria of 40 CFR 64.3(a) and (b). Pursuant to 40 CFR 64.3(b)(4)(ii) monitoring is required four times within an hour, matching the frequency stipulated within 40 CFR 60.13(e)(2).

As detailed in the approved Alternative Monitoring Protocol, the PEMS emissions model was developed for the entire design range of each boiler. CEMS data was collected over a four-day period for the boilers covering 35 operating ranges (from 0% to 100% load) including periods of startup and shutdown. The sensor indicator ranges reflect the sensor readings over that load range.

Please refer to Parts B, C and D in the draft ROP for detailed regulatory citations for the stationary source. Part A contains regulatory citations for general conditions.

Source-Wide Permit to Install (PTI)

Rule 214a requires the issuance of a Source-Wide PTI within the ROP for conditions established pursuant to Rule 201. All terms and conditions that were initially established in a PTI are identified with a footnote designation in the integrated ROP/PTI document.

The following table lists all individual PTIs that were incorporated into previous ROPs. PTIs issued after the effective date of ROP No. MI-ROP-B2814-2014 are identified in Appendix 6 of the ROP.

PTI Number			
284-74	128-75	63-05A	

Streamlined/Subsumed Requirements

The following table lists explanations of any streamlined/subsumed requirements included in the ROP pursuant to Rules 213(2) and 213(6). All subsumed requirements are enforceable under the streamlined requirement that subsumes them.

In FG-BOILER_6,7 the NO_x standard at 40 CFR 60.44b(d), applicable for both natural gas and No. 2 oil, is subsumed by SC I.4 (natural gas) and by SC I.5 (No. 2 fuel oil). The emission limits at SCs I.4 and I.5 use the same emission units as the NSPS limit (lb NO_x/MMBtu), so they are comparable. The emission limits in SCs I.4 and I.5 are numerically lower than the NSPS emissions limit at 40 CFR 60.44b(d). The time period in SCs I.4 and I.5 is a shorter time frame (on a calendar day basis) than the NSPS limit (over a 30-day time period) at 40 CFR 60.44b(d). A shorter time period is more stringent.

Emission Unit/Flexible Group ID	Condition Number	Streamlined Limit/ Requirement	Subsumed Limit/ Requirement	Stringency Analysis
FG-BOILER_6,7	I.4	0.036 lb/MMBtu NO _x when burning 100% natural gas, evaluated on an calendar day basis.	0.20 pound of NO _x per MMBtu based on a 30-day rolling average calculated as the average of all of the hourly NO _x emission data for the preceding	The nitrogen oxides emission limit determined through NSR review and listed in condition I.4 (0.036 pounds NO _x per MMBtu based on a calendar day basis) is

Emission Unit/Flexible Group ID	Condition Number	Streamlined Limit/ Requirement	Subsumed Limit/ Requirement	Stringency Analysis
			30 steam generating unit operating days (40 CFR 60.44b(i) and 60.49b(g)).	more stringent in both the numerical value as well as averaging time than the nitrogen oxides limit in NSPS Subpart Db.
FG-BOILER_6,7	I.5	0.140 lb/MMBtu NO _x when burning 100% No. 2 fuel oil, evaluated on an calendar day basis.	0.40 pound of NO _x per MMBtu based on a 30-day rolling average calculated as the average of all of the hourly NO _x emission data for the preceding 30 steam generating unit operating days (40 CFR 60.44b(i) and 60.49b(g)).	The nitrogen oxides emission limit determined through NSR review and listed in condition I.5 (0.140 pounds NO _x per MMBtu based on an calendar day basis) is more stringent in both the numerical value as well as averaging time than the nitrogen oxides limit in NSPS Subpart Db.

Non-applicable Requirements

Part E of the ROP lists requirements that are not applicable to this source as determined by the AQD, if any were proposed in the ROP Application. These determinations are incorporated into the permit shield provision set forth in Part A (General Conditions 26 through 29) of the ROP pursuant to Rule 213(6)(a)(ii).

Processes in Application Not Identified in Draft ROP

The following table lists processes that were included in the ROP Application as exempt devices under Rule 212(4). These processes are not subject to any process-specific emission limits or standards in any applicable requirement.

PTI Exempt Emission Unit ID	Description of PTI Exempt Emission Unit	Rule 212(4) Citation	PTI Exemption Rule Citation
EU-MACHINING	Various machining equipment. Emissions are released to the general in-plant environment.	R336.1212(3)(f)	R336.1285(2)(l)(vi)(B)

Draft ROP Terms/Conditions Not Agreed to by Applicant

This draft ROP does not contain any terms and/or conditions that the AQD and the applicant did not agree upon pursuant to Rule 214(2).

Compliance Status

The AQD finds that the stationary source is expected to be in compliance with all applicable requirements as of the effective date of this ROP.

Action taken by EGLE, AQD

The AQD proposes to approve this ROP. A final decision on the ROP will not be made until the public and affected states have had an opportunity to comment on the AQD's proposed action and draft permit. In

addition, the USEPA is allowed up to 45 days to review the draft ROP and related material. The AQD is not required to accept recommendations that are not based on applicable requirements. The delegated decision maker for the AQD is Dr. April Wendling, Detroit District Supervisor. The final determination for ROP approval/disapproval will be based on the contents of the ROP Application, a judgment that the stationary source will be able to comply with applicable emission limits and other terms and conditions, and resolution of any objections by the USEPA.