

State Registration Number
B2798

**RENEWABLE OPERATING PERMIT
STAFF REPORT**

ROP Number
MI-ROP-B2798-2022

DTE Electric Company - Delray Peaking Facility

State Registration Number (SRN): B2798

Located at

6603 West Jefferson Avenue, Detroit, Wayne County, Michigan 48209

Permit Number: MI-ROP-B2798-2022

Staff Report Date: August 1, 2022

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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RENEWABLE OPERATING PERMIT

August 1, 2022 - STAFF REPORT

ROP Number

MI-ROP-B2798-2022

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:	DTE Electric Company - Delray Peaking Facility 6603 West Jefferson Avenue Detroit, Michigan 48209
Source Registration Number (SRN):	B2798
North American Industry Classification System (NAICS) Code:	221112
Number of Stationary Source Sections:	1
Is Application for a Renewal or Initial Issuance?	Renewal
Application Number:	202100222
Responsible Official:	Biljana Pecov, Plant Manager, Energy Supply – Peakers 313-897-0170
AQD Contact: District Inspector	Jorge Acevedo, Senior Environmental Engineer 313-456-4679
AQD Contact: ROP Writer	Michael Conklin, Senior Environmental Engineer 906-202-0013
Date Application Received:	November 5, 2021
Date Application Was Administratively Complete:	November 5, 2021
Is Application Shield in Effect?	Yes
Date Public Comment Begins:	August 1, 2022
Deadline for Public Comment:	August 31, 2022

Source Description

DTE Electric Company – Delray Peaking Facility (DTE Delray) is an electric generating station located in Detroit, Michigan. The facility is owned and operated by DTE Electric, an electrical utility company that generates, transmits, and distributes power to customers in southeastern Michigan. DTE Delray is considered a “peaking station”, meaning the facility is used during a high demand for electricity and power outages.

DTE Delray is located at 6603 West Jefferson Avenue in the City of Detroit. The location is considered an industrial, urban area with flat topography. The facility was originally a power plant that was shut down in 1988 and then functioned as a substation prior to the installation of two stationary gas combustion turbine generators (CTG). Units EU-CTG11-1 and EU-CTG12-1 are General Electric Frame 7 stationary gas turbines with a load rating of 71.1 MW at ISO conditions. Both units were installed in 1999 under Permit to Install (PTI) No. 373-98. The units are natural gas-fired only and are equipped with dry, low-NOx combustors for NOx control. The two turbines are housed in separate buildings, with flue gases from each unit exhausting through separate vertical stacks at an exit height of 70 feet above ground. The turbines are not equipped with any add-on air pollution control equipment.

Each unit is composed of a simple cycle turbine connected to an electric generator. In a simple cycle turbine, ambient air is drawn in and compressed. The hot high-pressure air is then ignited with fuel in the combustors and routed to the power section of the turbine. The hot exhaust gases expand through the power section providing rotational force to the power shaft. The power shaft is connected to a generator. In a simple cycle system, the combustion emissions are exhausted to the atmosphere.

The primary pollutants emitted from the natural gas-fired turbines include nitrogen oxides (NOx) and carbon monoxide (CO). Other pollutants emitted in lesser amounts include volatile organic compounds (VOCs), particulate matter (PM), hazardous air pollutants (HAPs) and sulfur dioxide (SO₂). Emissions from natural gas-fired turbines vary at different operating loads, inlet temperature, ambient pressure, and humidity. A turbine can operate at higher loads than ISO ratings during ambient conditions with cooler temperatures, higher pressure, and low humidity. NOx and CO emissions are a function of the combustion temperatures, pressure, and mass flows. The formation of NOx is strongly related to the combustion temperature. At higher operating loads, the firing temperature increases resulting in higher NOx emissions. NOx is formed and emitted primarily through one of three mechanisms: thermal, fuel, and prompt. Thermal NOx formation occurs in the high temperature zone by the reaction of nitrogen (N₂) and oxygen (O₂) molecules in the combustion air. This is the predominant NOx formation mechanism for natural gas-fired turbines. Higher combustion temperatures, longer residence times, and well mixing of fuel and combustion air results in greater combustion efficiency and lower emissions of CO, VOCs, and HAPs, but higher emissions of NOx. Lower ambient temperatures can decrease the firing temperature thereby lowering NOx emissions.

The two turbines combined are restricted to firing 2,747 million standard cubic feet (MMscf) of natural gas per 12-month rolling time period and shall not exceed 89 tons for NOx and 87.9 tons for CO per 12-month rolling time period. Compliance is demonstrated through performance testing and continuous monitoring of operating parameters. The operating parameters indicative of NOx formation and proper turbine operation are inlet guide vane position, compressor discharge temperature, compressor discharge pressure, and exhaust temperature. These four operating parameters are continuously monitored to ensure the NOx formation characteristics of the turbines remain consistent with those experienced during the performance test.

Additional emission units designated EU-EDG21-1, EU-EDG21-2, and EU-EDG21-3 at the source include three compression ignition (CI) emergency engines. All three emergency engines have a nameplate capacity of 1490 HP and are 4-cycle, 12-cylinder diesel-fired. The three engines are certified to comply with the Tier 2 emission limits of the USEPA New Source Performance Standards. The emergency

engines are an addition to the source since the issuance of MI-ROP-B2798-2017 and did not go through New Source Review (NSR).

The following table lists stationary source emission information as reported to the Michigan Air Emissions Reporting System (MAERS) for the year **2020**.

TOTAL STATIONARY SOURCE EMISSIONS

Pollutant	Tons per Year
Carbon Monoxide (CO)	5.1
Lead (Pb)	<1
Nitrogen Oxides (NOx)	8.6
PM10*	1.3
Sulfur Dioxide (SO ₂)	<1
Volatile Organic Compounds (VOCs)	<1

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

This source is a true minor source of HAPs, thus no HAP emissions data is listed.

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 in Wayne County, which is currently designated by the United States Environmental Protection Agency (USEPA) as a non-attainment area with respect to the 8-hour ozone standard.

A portion of Wayne County is currently designated by the United States Environmental Protection Agency (USEPA) as a non-attainment area with respect to the SO₂ standard.

The stationary source is subject to Title 40 of the Code of Federal Regulations (CFR) Part 70, because the source is subject to the federal Acid Rain program promulgated in Title 40 of the Code of Federal Regulations, Part 72.

The stationary source is a minor source of HAP emissions because the potential to emit of any single HAP regulated by Section 112 of the federal Clean Air Act, is less than 10 tons per year and the potential to emit of all HAPs combined are less than 25 tons per year.

Emission units at the stationary source have not been subject to the Prevention of Significant Deterioration regulations of Part 18, Prevention of Significant Deterioration of Air Quality of Act 451 or 40 CFR Part 52.21 because at the time of New Source Review (NSR) permitting, the potential to emit of each criteria pollutant was less than 250 tons per year. In 1999, a "synthetic minor" permit limiting the potential to emit of nitrogen oxides and carbon monoxide to less than 100 tons per year, Permit to Install (PTI) No. 373-98, was issued for two combustion turbine generators. In the ROP, these emission units are identified as EU-CTG11-1 and EU-CTG12-1 or flexible group, FG-CTG.

EU-CTG11-1 and EU-CTG12-1 at the stationary source are subject to the Standards of Performance for Stationary Gas Turbines promulgated in 40 CFR Part 60, Subparts A and GG. These emission units are subject because they are stationary gas turbines with a heat input at peak load equal to or greater than 10 million BTU per hour and were constructed after October 3, 1977. The NSPS GG applicable NO_x emission limit, under 40 CFR 60.332(a)(1), was added in this ROP renewal. This limit was added so the source is aware of all applicable requirements. Footnote “a” was added so the source and AQD are aware of how the limit was derived based on the rated capacity of the turbines. The emission limit was calculated from 40 CFR 60.332(a)(1) based on the following:

$$STD = 0.0075 \frac{(14.4)}{Y} + F$$

STD = allowable ISO corrected NO_x emission concentration (percent by volume at 15 percent oxygen and on a dry basis),

Y = manufacturer's rated heat rate at manufacturer's rated load (kilojoules per watt hour) or, actual measured heat rate based on lower heating value of fuel as measured at actual peak load for the facility.

The value of Y shall not exceed 14.4 kilojoules per watt hour, and

F = NO_x emission allowance for fuel-bound nitrogen as defined in 40 CFR 60.332(a)(4).

At ISO (59 degrees Fahrenheit), the turbines have a manufactured rated heat input of 11,170 BTU/KW-hr. This equates to 11.78 kj/KW-hr as the “Y” value in the equation above. DTE is choosing not to apply NO_x allowance for fuel-bound nitrogen. The STD equates to 92 ppmv on a dry gas basis at 15% oxygen. DTE is also electing to comply with the standards for sulfur dioxide outlined in 40 CFR 60.333(b). The source has the option to demonstrate compliance with either 40 CFR 60.333(a) or (b). As a result, the sulfur dioxide emission limit outlined in 40 CFR 60.333(a) was removed from the emission limit table in FG-CTG.

To show compliance with the NO_x emission limit from 40 CFR 60.332(a)(1), DTE is electing to use the testing methodology specified in Appendix E to Part 75 and through continuous parametric monitoring. Under 40 CFR 60.334(c), NSPS GG allows for alternative procedures for monitoring compliance with the NO_x emission limit if approval is provided from EPA, State, or local permitting authority. DTE has submitted a “Continuous Compliance Protocol” that specifies Appendix E to Part 75 is utilized to determine NO_x emission rates from each unit. The underlying applicable requirements of “40 CFR 60.334(c) and 40 CFR Part 75, Appendix E” were added to the testing condition for the NSPS GG NO_x emission limit. Also, the testing frequency requirement from 40 CFR Part 75, Appendix E was added as a special condition under “Testing/Sampling.”

EU-EDG21-1, EU-EDG21-2, and EU-EDG21-3 at the stationary source are subject to the Standards of Performance for Stationary Compression Ignition Internal Combustion Engines promulgated in 40 CFR Part 60, Subparts A and IIII because the emission units are stationary compression ignition (CI) internal combustion engines (ICE) that were constructed in 2016 and have a displacement of less than 30 liters per cylinder.

EU-EDG21-1, EU-EDG21-2, and EU-EDG21-3 at the stationary source are subject to the National Emission Standard for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE) promulgated in 40 CFR Part 63, Subparts A and ZZZZ. EU-EDG21-1, EU-EDG21-2, and EU-EDG21-3 are new stationary RICE located at an area source meeting the requirement in 40 CFR 63.6590(c)(1). An affected source that meets any of the criteria in 40 CFR 63.6590(c)(1) through (7) meets the requirements of 40 CFR Part 63, Subpart ZZZZ by meeting the requirements of 40 CFR Part 60, Subpart IIII.

EU-CTG11-1 and EU-CTG12-1 at the stationary source are subject to the federal Acid Rain program promulgated in 40 CFR Part 72.

EU-CTG11-1 and EU-CTG12-1 at the stationary source are subject to the Cross-State Air Pollution Rule NOx Annual Trading Program pursuant to 40 CFR Part 97, Subpart AAAAA.

EU-CTG11-1 and EU-CTG12-1 at the stationary source are subject to the Cross-State Air Pollution Rule NOx Ozone Season Group 3 Trading Program pursuant to 40 CFR Part 97, Subpart GGGGG.

EU-CTG11-1 and EU-CTG12-1 at the stationary source are subject to the Cross-State Air Pollution Rule SO₂ Group 1 Trading Program pursuant to 40 CFR Part 97, Subpart CCCCC.

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."

No emission units have emission limitations or standards that are subject to the federal Compliance Assurance Monitoring rule pursuant to 40 CFR Part 64, because all emission units at the stationary source either do not have a control device or those with a control device do not have potential pre-control emissions over the major source thresholds.

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-B2798-2017 are identified in Appendix 6 of the ROP.

PTI Number			
373-98			

Streamlined/Subsumed Requirements

This ROP does not include any streamlined/subsumed requirements pursuant to Rules 213(2) and 213(6).

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

There were no processes listed in the ROP Application as exempt devices under Rule 212(4). Exempt devices are not subject to any process-specific emission limits or standards in any applicable requirement.

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 Christopher Ethridge, Assistant Division Director. 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.

State Registration Number
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RENEWABLE OPERATING PERMIT
September 6, 2022 - STAFF REPORT ADDENDUM

ROP Number
MI-ROP-B2798-2022

Purpose

A Staff Report dated August 1, 2022, was developed to set forth the applicable requirements and factual basis for the draft Renewable Operating Permit (ROP) terms and conditions as required by Rule 214(1) of the administrative rules promulgated under Act 451. The purpose of this Staff Report Addendum is to summarize any significant comments received on the draft ROP during the 30-day public comment period as described in Rule 214(3). In addition, this addendum describes any changes to the draft ROP resulting from these pertinent comments.

General Information

Responsible Official:	Biljana Pecov, Plant Manager, Energy Supply – Peakers 313-897-0170
AQD Contact: District Inspector	Jorge Acevedo, Senior Environmental Engineer 313-456-4679
AQD Contact: ROP Writer	Michael Conklin, Senior Environmental Engineer 906-202-0013

Summary of Pertinent Comments

No pertinent comments were received during the 30-day public comment period.

Changes to the August 1, 2022 Draft ROP

No changes were made to the draft ROP.