MICHIGAN DEPARTMENT OF ENVIRONMENT, GREAT LAKES, AND ENERGY
AIR QUALITY DIVISION

June 17, 2024

PERMIT TO INSTALL
68-24

ISSUED TO
Western Michigan University

LOCATED AT
1801 Stadium Drive, Robert M Beam Power Plant
Kalamazoo, Michigan 49008

IN THE COUNTY OF
Kalamazoo

STATE REGISTRATION NUMBER
K2131

The Air Quality Division has approved this Permit to Install, pursuant to the delegation of authority from the Michigan Department of Environment, Great Lakes, and Energy. This permit is hereby issued in accordance with and subject to Section 5505(1) of Article II, Chapter I, Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. Pursuant to Air Pollution Control Rule 336.1201(1), this permit constitutes the permittee's authority to install the identified emission unit(s) in accordance with all administrative rules of the Department and the attached conditions. Operation of the emission unit(s) identified in this Permit to Install is allowed pursuant to Rule 336.1201(6).

DATE OF RECEIPT OF ALL INFORMATION REQUIRED BY RULE 203: **May 28, 2024**	
DATE PERMIT TO INSTALL APPROVED: **June 17, 2024**	SIGNATURE:
DATE PERMIT VOIDED:	SIGNATURE:
DATE PERMIT REVOKED:	SIGNATURE:

PERMIT TO INSTALL

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COMMON ACRONYMS

AQD	Air Quality Division
BACT	Best Available Control Technology
CAA	Clean Air Act
CAM	Compliance Assurance Monitoring
CEMS	Continuous Emission Monitoring System
CFR	Code of Federal Regulations
COMS	Continuous Opacity Monitoring System
Department/department/EGLE	Michigan Department of Environment, Great Lakes, and Energy
EU	Emission Unit
FG	Flexible Group
GACS	Gallons of Applied Coating Solids
GC	General Condition
GHGs	Greenhouse Gases
HVLP	High Volume Low Pressure*
ID	Identification
IRSL	Initial Risk Screening Level
ITSL	Initial Threshold Screening Level
LAER	Lowest Achievable Emission Rate
MACT	Maximum Achievable Control Technology
MAERS	Michigan Air Emissions Reporting System
MAP	Malfunction Abatement Plan
MSDS	Material Safety Data Sheet
NA	Not Applicable
NAAQS	National Ambient Air Quality Standards
NESHAP	National Emission Standard for Hazardous Air Pollutants
NSPS	New Source Performance Standards
NSR	New Source Review
PS	Performance Specification
PSD	Prevention of Significant Deterioration
PTE	Permanent Total Enclosure
PTI	Permit to Install
RACT	Reasonable Available Control Technology
ROP	Renewable Operating Permit
SC	Special Condition
SCR	Selective Catalytic Reduction
SNCR	Selective Non-Catalytic Reduction
SRN	State Registration Number
TBD	To Be Determined
TEQ	Toxicity Equivalence Quotient
USEPA/EPA	United States Environmental Protection Agency
VE	Visible Emissions

*For HVLP applicators, the pressure measured at the gun air cap shall not exceed 10 psig.

POLLUTANT / MEASUREMENT ABBREVIATIONS

acfm	Actual cubic feet per minute
BTU	British Thermal Unit
°C	Degrees Celsius
CO	Carbon Monoxide
CO_2e	Carbon Dioxide Equivalent
dscf	Dry standard cubic foot
dscm	Dry standard cubic meter
°F	Degrees Fahrenheit
gr	Grains
HAP	Hazardous Air Pollutant
Hg	Mercury
hr	Hour
HP	Horsepower
H_2S	Hydrogen Sulfide
kW	Kilowatt
lb	Pound
m	Meter
mg	Milligram
mm	Millimeter
MM	Million
MW	Megawatts
NMOC	Non-Methane Organic Compounds
NO_x	Oxides of Nitrogen
ng	Nanogram
PM	Particulate Matter
PM10	Particulate Matter equal to or less than 10 microns in diameter
PM2.5	Particulate Matter equal to or less than 2.5 microns in diameter
pph	Pounds per hour
ppm	Parts per million
ppmv	Parts per million by volume
ppmw	Parts per million by weight
psia	Pounds per square inch absolute
psig	Pounds per square inch gauge
scf	Standard cubic feet
sec	Seconds
SO_2	Sulfur Dioxide
TAC	Toxic Air Contaminant
Temp	Temperature
THC	Total Hydrocarbons
tpy	Tons per year
µg	Microgram
µm	Micrometer or Micron
VOC	Volatile Organic Compounds
yr	Year

GENERAL CONDITIONS

1. The process or process equipment covered by this permit shall not be reconstructed, relocated, or modified, unless a Permit to Install authorizing such action is issued by the Department, except to the extent such action is exempt from the Permit to Install requirements by any applicable rule. **(R 336.1201(1))**

2. If the installation, construction, reconstruction, relocation, or modification of the equipment for which this permit has been approved has not commenced within 18 months, or has been interrupted for 18 months, this permit shall become void unless otherwise authorized by the Department. Furthermore, the permittee or the designated authorized agent shall notify the Department via the Supervisor, Permit Section, Air Quality Division, Michigan Department of Environment, Great Lakes, and Energy, P.O. Box 30260, Lansing, Michigan 48909-7760, if it is decided not to pursue the installation, construction, reconstruction, relocation, or modification of the equipment allowed by this Permit to Install. **(R 336.1201(4))**

3. If this Permit to Install is issued for a process or process equipment located at a stationary source that is not subject to the Renewable Operating Permit program requirements pursuant to Rule 210 (R 336.1210), operation of the process or process equipment is allowed by this permit if the equipment performs in accordance with the terms and conditions of this Permit to Install. **(R 336.1201(6)(b))**

4. The Department may, after notice and opportunity for a hearing, revoke this Permit to Install if evidence indicates the process or process equipment is not performing in accordance with the terms and conditions of this permit or is violating the Department's rules or the Clean Air Act. **(R 336.1201(8), Section 5510 of Act 451, PA 1994)**

5. The terms and conditions of this Permit to Install shall apply to any person or legal entity that now or hereafter owns or operates the process or process equipment at the location authorized by this Permit to Install. If the new owner or operator submits a written request to the Department pursuant to Rule 219 and the Department approves the request, this permit will be amended to reflect the change of ownership or operational control. The request must include all of the information required by subrules (1)(a), (b), and (c) of Rule 219 and shall be sent to the District Supervisor, Air Quality Division, Michigan Department of Environment, Great Lakes, and Energy. **(R 336.1219)**

6. Operation of this equipment shall not result in the emission of an air contaminant which causes injurious effects to human health or safety, animal life, plant life of significant economic value, or property, or which causes unreasonable interference with the comfortable enjoyment of life and property. **(R 336.1901)**

7. The permittee shall provide notice of an abnormal condition, start-up, shutdown, or malfunction that results in emissions of a hazardous or toxic air pollutant which continue for more than one hour in excess of any applicable standard or limitation, or emissions of any air contaminant continuing for more than two hours in excess of an applicable standard or limitation, as required in Rule 912, to the Department. The notice shall be provided not later than two business days after start-up, shutdown, or discovery of the abnormal condition or malfunction. Written reports, if required, must be filed with the Department within 10 days after the start-up or shutdown occurred, within 10 days after the abnormal condition or malfunction has been corrected, or within 30 days of discovery of the abnormal condition or malfunction, whichever is first. The written reports shall include all of the information required in Rule 912(5). **(R 336.1912)**

8. Approval of this permit does not exempt the permittee from complying with any future applicable requirements which may be promulgated under Part 55 of 1994 PA 451, as amended or the Federal Clean Air Act.

9. Approval of this permit does not obviate the necessity of obtaining such permits or approvals from other units of government as required by law.

10. Operation of this equipment may be subject to other requirements of Part 55 of 1994 PA 451, as amended and the rules promulgated thereunder.

11. Except as provided in subrules (2) and (3) or unless the special conditions of the Permit to Install include an alternate opacity limit established pursuant to subrule (4) of Rule 301, the permittee shall not cause or permit to be discharged into the outer air from a process or process equipment a visible emission of density greater than the most stringent of the following. The grading of visible emissions shall be determined in accordance with Rule 303 (R 336.1303). **(R 336.1301)**
    a) A six-minute average of 20 percent opacity, except for one six-minute average per hour of not more than 27 percent opacity.
    b) A visible emission limit specified by an applicable federal new source performance standard.
    c) A visible emission limit specified as a condition of this Permit to Install.

12. Collected air contaminants shall be removed as necessary to maintain the equipment at the required operating efficiency. The collection and disposal of air contaminants shall be performed in a manner so as to minimize the introduction of contaminants to the outer air. Transport of collected air contaminants in Priority I and II areas requires the use of material handling methods specified in Rule 370(2). **(R 336.1370)**

13. The Department may require the permittee to conduct acceptable performance tests, at the permittee's expense, in accordance with Rule 1001 and Rule 1003, under any of the conditions listed in Rule 1001. **(R 336.2001)**

EMISSION UNIT SPECIAL CONDITIONS

EMISSION UNIT SUMMARY TABLE

The descriptions provided below are for informational purposes and do not constitute enforceable conditions.

Emission Unit ID	Emission Unit Description (Including Process Equipment & Control Device(s))	Installation Date / Modification Date	Flexible Group ID
EUPBTURBIN-7	Natural gas fired turbine, rated at 60 MMBTU/hr heat input.	07-01-1997 01-01-1998 TBD	FGPBTUHR-78
EUPBTURBIN-8	Natural gas fired turbine, rated at 60 MMBTU/hr heat input.	07-01-1997 01-01-1998 06-28-2022	FGPBTUHR-78
EUPBHRSGEN-7	Natural gas fired heat recovery steam generator with duct burner rated at 85 MMBTU/hr heat input in fresh air firing mode and 50 MMBTU/hr heat input while supplementary firing with the turbine exhaust.	07-01-1997	FGPBTUHR-78
EUPBHRSGEN-8	Natural gas fired heat recovery steam generator with duct burner rated at 85 MMBTU/hr heat input in fresh air firing mode and 50 MMBTU/hr heat input while supplementary firing with the turbine exhaust.	07-01-1997	FGPBTUHR-78

Changes to the equipment described in this table are subject to the requirements of R 336.1201, except as allowed by R 336.1278 to R 336.1291.

FLEXIBLE GROUP SPECIAL CONDITIONS

FLEXIBLE GROUP SUMMARY TABLE

The descriptions provided below are for informational purposes and do not constitute enforceable conditions.

Flexible Group ID	Flexible Group Description	Associated Emission Unit IDs
FGPBTUHR-78	A grouping of turbine/heat recovery steam generator trains #7 and #8 that share applicable requirements.	EUPBTURBIN-7 EUPBTURBIN-8 EUPBHRSGEN-7 EUPBHRSGEN-8

FGPBTUHR-78
FLEXIBLE GROUP CONDITIONS

DESCRIPTION

A grouping of turbine/heat recovery steam generator trains #7 and #8 that share applicable requirements.

Emission Unit: EUPBTURBIN-7, EUPBTURBIN-8, EUPBHRSGEN-7, EUPBHRSGEN-8

POLLUTION CONTROL EQUIPMENT

The duct burners are controlled with a low NO_x burner design as constructed for their respective installation dates.

I. EMISSION LIMIT(S)

Pollutant	Limit	Time Period / Operating Scenario	Equipment	Monitoring / Testing Method	Underlying Applicable Requirements
1. NO_x	42 ppmv, corrected to 15% O_2 on a dry gas basis at ISO conditions	Hourly[a]	EUPBTURBIN-7	SC V.1, SC V.2	40 CFR 52.21(j)
2. NO_x	25 ppmv, corrected to 15% O_2 on a dry gas basis at ISO conditions	Hourly[a]	EUPBTURBIN-7 EUPBTURBIN-8	SC V.1, SC V.2	40 CFR 52.21(c) & (d)
3. NO_x	12.0 pph	Hourly[a]	EUPBTURBIN-7 EUPBTURBIN-8	SC V.1, SC V.2	R 336.2810
4. NO_x	192 ppmv, corrected to 15% O_2 on a dry gas basis at ISO conditions	Hourly[a]	EUPBTURBIN-7 EUPBTURBIN-8	SC V.4	40 CFR 60.332(a)(2)
5. NO_x	15.3 pph	Hourly[b]	EUPBHRSGEN-7 EUPBHRSGEN-8	SC V.3	40 CFR 52.21(c) & (d)
6. NO_x	25 tpy	12-month rolling time period as determined at the end of each calendar month[c]	EUPBTURBIN-7 EUPBTURBIN-8	SC VI.6	R 336.1205, 40 CFR 52.21(c) & (d)

Pollutant	Limit	Time Period / Operating Scenario	Equipment	Monitoring / Testing Method	Underlying Applicable Requirements
7. NO_x	44.7 tpy	12-month rolling time period as determined at the end of each calendar month[b]	EUPBHRSGEN-7 EUPBHRSGEN-8	SC VI.2	R 336.2810
8. CO	50 ppmv corrected to 15% O_2 on a dry gas basis at ISO conditions	Hourly[a]	EUPBTURBIN-7 EUPBTURBIN-8	SC V.1, SC V.2	40 CFR 52.21(j)
9. CO	8.8 pph	Hourly[a]	EUPBTURBIN-7 EUPBTURBIN-8	SC V.1, SC V.2	R 336.2810
10. CO	6.8 pph	Hourly[b]	EUPBHRSGEN-7 EUPBHRSGEN-8	SC V.3	40 CFR 52.21

[a] From each individual turbine either operating alone or in conjunction with its respective duct burner
[b] From each individual duct burner, respectively, while operating in fresh air firing mode.
[c] From each individual turbine, not including the respective duct burner.

II. MATERIAL LIMIT(S)

Material	Limit	Time Period / Operating Scenario	Equipment	Monitoring / Testing Method	Underlying Applicable Requirements
1. Sulfur content in natural gas	0.8% by weight	At all times	EUPBTURBIN-7, EUPBTURBIN-8	SC VI.3, SC VI.4	**40 CFR 60.333(b)**

2. The permittee shall only burn natural gas in FGPBTUHR-78. **(40 CFR 60.331(u), 40 CFR 60.333(b), 40 CFR 60.334(h), 40 CFR Part 60, Subpart GG)**

III. PROCESS/OPERATIONAL RESTRICTION(S)

NA

IV. DESIGN/EQUIPMENT PARAMETER(S)

1. The permittee shall not operate any duct burner in FGPBTUHR-78 unless the low NO_x burner design of each duct burner is installed, maintained, and operated in a satisfactory manner. **(R 336.2810)**

2. The design heat input capacity for EUPBTURBIN-7 and EUPBTURBIN-8 shall not exceed, on a fuel heat input basis, 54 MMBTU per hour (LHV) at ISO site installed conditions, as described in the manufacturer's product documentation. **(R 336.1205(1)(a), 40 CFR 52.21(c) & (d))**

V. TESTING/SAMPLING

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

1. Within 180 days after restart, and thereafter every five years the permittee shall verify NO_x and CO emission rates from EUPBTURBIN-7, while either operating alone or in conjunction with the respective duct burner, EUPBHRSGEN-7, by testing at owner's expense, in accordance with Department requirements. Testing shall be performed using an approved EPA Method listed in:

Pollutant	Test Method Reference
NO_x	40 CFR Part 60, Appendix A
CO	40 CFR Part 60, Appendix A

The emission rate during testing shall be determined by the average of the acceptable test runs performed in accordance with the method requirements. An alternate method, or a modification to the approved EPA Method, may be specified in an AQD approved Test Protocol and must meet the requirements of the federal Clean Air Act, all applicable state and federal rules and regulations, and be within the authority of the AQD to make the change. No less than 30 days prior to testing, the permittee shall submit a complete test plan to the AQD Technical Programs Unit and District Office. The AQD must approve the final plan prior to testing. Verification of emission rates includes the submittal of a complete report of the test results to the AQD Technical Programs Unit and District Office within 60 days following the last date of the test. **(R 336.2001, R 336.2003, R 336.2004, 40 CFR 52.21(c) & (d), 40 CFR 52.21(j))**

2. The permittee shall verify NO_x and CO emission rates every five years from the previous test, from each individual turbine unit, EUPBTURBIN-7 and EUPBTURBIN-8 of FGPBTUHR-78, while either operating alone or in conjunction with its respective duct burner, EUPBHRSGEN-7 or EUPBHRSGEN-8, by testing at owner's expense, in accordance with Department requirements. Testing shall be performed using an approved EPA Method listed in:

Pollutant	Test Method Reference
NO_x	40 CFR Part 60, Appendix A
CO	40 CFR Part 60, Appendix A

The emission rate during testing shall be determined by the average of the acceptable test runs performed in accordance with the method requirements. An alternate method, or a modification to the approved EPA Method, may be specified in an AQD approved Test Protocol and must meet the requirements of the federal Clean Air Act, all applicable state and federal rules and regulations, and be within the authority of the AQD to make the change. No less than 30 days prior to testing, the permittee shall submit a complete test plan to the AQD Technical Programs Unit and District Office. The AQD must approve the final plan prior to testing. Verification of emission rates includes the submittal of a complete report of the test results to the AQD Technical Programs Unit and District Office within 60 days following the last date of the test. **(R 336.2001, R 336.2003, R 336.2004, R 336.2810, 40 CFR 52.21(j)))**

3. Upon the request of the AQD District Supervisor, the permittee will be required to verify NO_x and CO emission rates from each individual duct burner, EUPBHRSGEN-7 or EUPBHRSGEN-8, while operating in fresh air firing mode, in FGPBTUHR-78 by testing at owner's expense, in accordance with Department requirements. Testing shall be performed using an approved EPA Method listed in:

Pollutant	Test Method Reference
NO_x	40 CFR Part 60, Appendix A
CO	40 CFR Part 60, Appendix A

The emission rate during testing shall be determined by the average of the acceptable test runs performed in accordance with the method requirements. An alternate method, or a modification to the approved EPA Method, may be specified in an AQD approved Test Protocol and must meet the requirements of the federal Clean Air Act, all applicable state and federal rules and regulations, and be within the authority of the AQD to make the change. No less than 30 days prior to testing, the permittee shall submit a complete test plan to the AQD Technical Programs Unit and District Office. The AQD must approve the final plan prior to testing. Verification of emission rates includes the submittal of a complete report of the test results to the AQD

Technical Programs Unit and District Office within 60 days following the last date of the test. **(R 336.2001, R 336.2003, R 336.2004, R 336.2810)**

4. Upon request of the AQD District Supervisor, the permittee shall verify the NO_x emission rate from EUPBTURBIN-7 and EUPBTURBIN-8, alone or in conjunction with duct burners, at a minimum of four evenly-spaced load points, 30%, 50%, 75%, and 90-100% of peak load or at four evenly-spaced load points in the normal operating range of the gas turbine, including the minimum point in the operating range and 90-100% of peak load. Testing shall be performed in accordance with the applicable federal Reference Methods, 40 CFR Part 60, Appendix A, Method 7E or an alternate method approved in advance by the AQD. The emission rate during testing shall be determined by the average of the acceptable test runs performed in accordance with the method requirements. An alternate method, or a modification to the approved USEPA Method, may be specified in an AQD-approved Test Protocol. No less than 30 days prior to testing, the permittee shall submit a complete test plan to the AQD Technical Programs Unit and District Office. The AQD must approve the final plan prior to testing, including any modifications to the method in the test protocol that are proposed after initial submittal. The permittee must submit a complete report of the test results to the AQD Technical Programs Unit and District Office within 60 days following the last date of the test. **(R 336.2001, R 336.2003, R 336.2004, 40 CFR 60.335(b)(2))**

VI. MONITORING/RECORDKEEPING

Records shall be maintained on file for a period of five years. **(R 336.1201(3))**

1. The permittee shall complete all required calculations in a format acceptable to the AQD District Supervisor by the last day of the calendar month, for the previous calendar month, unless otherwise specified in any monitoring/recordkeeping special condition. **(R 336.2810)**

2. The permittee shall keep the following information on a monthly basis for FGPBTUHR-78:

   a) A record of the hours of operation of the duct burners while operating in fresh air firing mode.

   b) Records of the amount of natural gas used per month and 12-month rolling time period in the turbines and the duct burners, separated out by mode of operation.

   c) NO_x emission calculations from the duct burners, while operating in fresh air firing mode, determining the monthly emission rate in tons per calendar month.

   d) NO_x emission calculations from the duct burners, while operating in fresh air firing mode, determining the annual emission rate in tons per 12-month rolling time period as determined at the end of each calendar month.

   An emission factor of 0.18 lb/MMBTU heat input shall be used in the calculation for NO_x unless an alternate emission factor is approved by the AQD District Supervisor. The permittee shall keep the records in a format acceptable to the AQD District Supervisor. The permittee shall keep all records on file and make them available to the Department upon request. **(R 336.2810, 40 CFR 60.48c(g)(2))**

3. The permittee shall monitor the total sulfur content of the natural gas used in the turbines following the methods and frequency described in 40 CFR 60.334(h), except as provided in SC VI.4. **(40 CFR 60.334(h))**

4. The permittee may elect not to monitor the total sulfur content of the gaseous fuel combusted in the turbines as required by 40 CFR 60.334(h), if the gaseous fuel is demonstrated to meet the definition of natural gas in 40 CFR 60.331(u), regardless of whether an existing custom schedule approved by the administrator for Subpart GG requires such monitoring. The permittee shall use one of the following sources of information to make the required demonstration: **(40 CFR 60.331(u), 40 CFR 60.334(h)(3))**

   a) The gas quality characteristics in a current, valid purchase contract, tariff sheet or transportation contract for the gaseous fuel, specifying that the maximum total sulfur content of the fuel is 20.0 grains/100 scf or less: or

   b) Representative fuel sampling data which show that the sulfur content of the gaseous fuel does not exceed 20 grains/100 scf. At a minimum, the amount of fuel sampling data specified in section 2.3.1.4 or 2.3.2.4 of Appendix D to Part 75 of this chapter is required.

5. The permittee shall monitor emissions and operating information for any portion of FGPBTUHR-78 in accordance with the federal Standards of Performance for New Stationary Sources as specified in 40 CFR Part 60, Subparts A, Dc, and GG. The permittee shall keep records of all source emissions data and operating information on file at the facility and make them available to the Department upon request. **(40 CFR Part 60, Subparts A, Dc, & GG)**

6. The permittee shall calculate and record, in a satisfactory manner, monthly and 12-month rolling time period NO_x emission calculations for EUPBTURBIN-7 and EUPBTURBIN-8, as required by SC I.6. The permittee shall keep all records on file and make them available to the Department upon request. **(R 336.1205, 40 CFR 52.21(c) & (d))**

VII. REPORTING

1. The permittee shall submit any performance test reports to the AQD Technical Programs Unit and District Office, in a format approved by the AQD. **(R 336.1213(3)(c), R 336.2001(5))**

2. Within 30 days after completion of the installation, construction, reconstruction, relocation, or modification of EUPBTURBIN-7, the permittee or the authorized agent pursuant to Rule 204, shall notify the AQD District Supervisor, in writing, of the completion of the activity. Completion of the installation, construction, reconstruction, relocation, or modification is considered to occur not later than commencement of trial operation of EUPBTURBIN-7. **(R 336.1201(7)(a))**

VIII. STACK/VENT RESTRICTION(S)

The exhaust gases from the stacks listed in the table below shall be discharged unobstructed vertically upwards to the ambient air unless otherwise noted:

Stack & Vent ID	Maximum Exhaust Diameter / Dimensions (inches)	Minimum Height Above Ground (feet)	Underlying Applicable Requirements
SVPBTURBIN7	54	136	R 336.2803, R 336.2804
SVPBTURBIN8	54	136	R 336.2803, R 336.2804
SVPBHRSGEN7	54	136	R 336.2803, R 336.2804
SVPBHRSGEN8	54	136	R 336.2803, R 336.2804

IX. OTHER REQUIREMENT(S)

1. The permittee shall comply with all provisions of the federal Standards of Performance for New Stationary Sources as specified in 40 CFR Part 60, Subparts A, Dc, and GG, as they apply to any unit in FGPBTUHR-78. **(40 CFR Part 60, Subparts A, Dc, & GG)**

Footnotes:
[1] This condition is state only enforceable and was established pursuant to Rule 201(1)(b).