FORM EQP 5111 ATTACHMENT MODULE A2
CHEMICAL AND PHYSICAL ANALYSES

This document is an attachment to the Michigan Department of Environment, Great Lakes, and Energy's *Instructions for Completing Form EQP 5111, Operating License Application Form for Hazardous Waste Treatment, Storage, and Disposal Facilities*. See Form EQP 5111 for details on how to use this attachment.

The administrative rules promulgated pursuant to Part 111, Hazardous Waste Management, of Michigan's Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (Act 451), being R 299.9504, R 299.9508, and R 299.9605, and Title 40 of the Code of Federal Regulations (CFR) §§264.13(a) and 270.14(b)(2), establish requirements for chemical and physical analyses at hazardous waste management facilities. All references to the 40 CFR citations specified herein are adopted by reference in R 299.11003

This license application module addresses requirements for chemical and physical analyses at the hazardous waste management facility for the *Dow Silicones Corporation* in *Midland*, Michigan. The information included in the module demonstrates how the facility meets the chemical and physical analyses requirements for hazardous waste management facilities.

Type of applicant: *(Check as appropriate)*

- ☒ Operating License applicant (R 299.9508 and R 299.9605)
- ☐ Construction Permit applicant (R 299.9504 and R 299.9605)

Type of Facility: *(Check as appropriate)*

- ☒ On-site Facility (generates hazardous waste)
- ☒ Off-site Facility (accepts hazardous waste from other generators)

Type of Units to be Constructed or Operated at the Facility: *(Check as appropriate)*

- ☒ Containers
- ☒ Tank(s)
- ☐ Waste Pile(s)
- ☒ Landfilled Waste
- ☐ Waste Incineration
- ☐ Land Treatment
- ☐ Miscellaneous Unit(s)

☐ Boilers and Industrial Furnaces

This module is organized as follows:

List of Tables

A2.A WASTE DESCRIPTION

[R 299.9504(1)(c) and 40 CFR §270.14(b)(2)]

Before a waste is accepted for treatment (off-site only), storage or disposal at the Dow Silicones 800 Block Facility, the generator of the waste must prepare and submit a detailed chemical and physical evaluation of the waste. In addition, generators are required to evaluate the regulatory status of their waste. In the event that a waste is determined to be subject to restrictions, the generator is required to notify the treatment, storage, or disposal facility that such waste is subject to restrictions. The information obtained from these evaluations is used to assure proper treatment, storage, or disposal of the waste consistent with all applicable state and federal regulations. The generator may use process knowledge or analytical data to determine the characteristics of the waste.

A2.A.1 Waste Description (generate on-site wastes)

[R 299.9504(1)(c) and 40 CFR §270.14(b)(2)]

Due to the complexity of the activities carried out at the Dow Silicones facility, a wide variety of waste materials in various forms may be generated on-site and managed at the regulated units. The waste characterization process is dynamic; the information is updated frequently as new data is obtained, regulations change, wastes are evaluated for approval or renewal, and when existing wastes are no longer generated.

The primary tool used to aid generators with the proper characterization of their wastes is the Generator Waste Characterization Form (GWCF).

To ensure that each waste stream is managed in an appropriate manner, every waste accepted must be characterized.

Characterization of a waste stream is three-fold. It includes:

- Identifying components that make up the waste;
- Classifying the waste by use of RCRA characteristics and listings; and
- Identifying the appropriate handling and operational considerations associated with managing the waste.

Generators are provided with the form in an electronic database or an equivalent system that requires entry of all pertinent information to completely characterize their waste. A copy of the GWCF can be found in Module A3, Waste Analysis Plan, of this operating license reapplication. The GWCF is updated as necessary.

The GWCF requires that the generator of the waste completely identify the chemical composition of their waste. The generator is required to determine if the waste exhibits any of the characteristics of a hazardous waste (i.e., ignitability, corrosivity, reactivity, or toxicity as described in the form). The generator is also required to review all hazardous waste listings to determine if the waste is a regulated, listed hazardous waste. Generators are provided with a guidance document which contains definitions of all RCRA and Act 451 Part 111 listings and characteristics for reference. This information is obtained from the generator in a

question/answer format based directly on the RCRA regulations (40 CFR 261 Subpart C).

The form also requests operational information required for the treatment, storage, or disposal facility to properly manage the waste. Unique sections of the GWCF pertain to wastes sent to the appropriate waste receiving facility(e.g., WWTP, Kiln, Landfill, etc). The final pages of the form identify the required Land Disposal Notification and Certification information for restricted wastes and also address Toxic Substances and Control Act (TSCA) considerations.

The completed GWCF is submitted to the Waste Classification department for review and approval. Qualified waste approvers review the information to ensure that the waste is an acceptable waste type and is managed properly.

A2.A.2 Waste Description (receive wastes from off-site generators)

[R 299.9504(1)(c) and 40 CFR §270.14(b)(2)]

A2.A.2(a) Procedures for Obtaining Chemical and Physical Analyses from Off-Site Generators

Dow Silicones Corporation facilities are captive facilities that generate and manage the majority of wastes on-site, but also can receive certain wastes generated off-site from other Michigan based sites owned by The Dow Chemical Company and Dow subsidiaries (e.g., Dow Silicones Corporation). Any waste received from off-site will follow the same waste characterization process outlined in section A2.A.1, Waste Description (generate on-site wastes), above.

See Table A2-1 for descriptions of hazardous wastes, hazard characteristics, and the basis for hazard designation for hazardous wastes.

A2.B CONTAINERIZED WASTE

[R 299.9504(1)(c) and 40 CFR §264.172]

A2.B.1 Wastes Compatible with Container

Compatibility of wastes and containers are provided in Module C1.

A2.B.2 Containers without Secondary Containment System

All containers of waste with free liquids are stored in container storage areas with secondary containment systems that are of sufficient capacity to contain either ten percent of the volume of the maximum number of containers of free liquid that could be stored in the area or the entire volume of the largest container of free liquid stored in the area.

A2.C WASTE IN TANK SYSTEMS

[R 299.9504(1)(c) and 40 CFR §§264.190(a), 264.191(b)(2), 264.192(a)(2)]

A2.C.1 Wastes Compatible with Tanks

A2.C.2 Tanks without Secondary Containment System

This section is not applicable as all tank systems at the Dow Michigan Operations facility are in compliance with the secondary containment requirements of 40 CFR 264.193.

A2.D WASTE IN PILES

[R 299.9504(1)(c) and 40 CFR §264.250(c)(1) and (4)]

There are no waste piles located at the facility.

A2.E LANDFILLED WASTES

[R 99.9504(1)(c) and 40 CFR §§264.13(c)(3) and 264.314]

A2.E.1 Containerized or Bulk Wastes

No hazardous waste will be disposed of in the landfill. Only the following examples of non-RCRA regulated materials are disposed of in the landfill: RCRA-empty containers; containers of non regulated gloves, rags, pieces of metal and glass and other debris; column packing; cleaned process equipment; asbestos; construction debris; solidified silicone sealants, rubber and gums; solidified polysiloxane gels; nonhazardous contaminated dirt; nonhazardous sandblast media and used office furniture.

No wastes containing free liquids are disposed in the landfill and no lead contaminated (D008) hazardous wastes have been placed in the landfill since 1985.

General criteria for accepting Dow Silicones Landfill as an appropriate disposal facility are:

1. The waste has a flash point greater than 140 degrees F or the waste does not ignite;
2. The waste does not exhibit properties of reactivity as defined in 40 CFR 261.23;
3. The waste passes the paint filter test and is not a free liquid;
4. The waste does not exhibit the characteristic of corrosivity as defined in 40 CFR 261.22;
5. The waste, if it is hazardous, meets Land Disposal Restrictions;
6. The waste is compatible with the landfill liner and other disposed wastes; and
7. The waste complies with the special requirements contained in 40 CFR 264.312 and 40 CFR 264.17.

If a waste meets these criteria, other permit conditions, and applicable regulations, then it may be approved for disposal at Dow Silicones Landfill. Otherwise an alternative management method would be selected.

A2.E.2 Procedures to Determine Addition of Biodegradable Sorbent

The qualified waste approvers from the Waste Classification department review the GWCF to ensure that there are no biodegradable sorbents in the waste to be disposed of at the Dow Silicones Landfill. If there is, it will be rejected and an alternative management method would be selected.

A2.F WASTES INCINERATED AND WASTES USED IN PERFORMANCE TESTS

[R 299.9504(1)(c) and 40 CFR §246.341]

Wastes are not incinerated and/or used in performance tests at the facility, therefore, this section does not apply.

A2.G WASTES TO BE LAND TREATED

[R 299.9504(1)(c) and 40 CFR §§264. 271(a)(1) and (2), 264.272, and 264.276]

Wastes are not land treated at the facility.

A2.H WASTE IN MISCELLANEOUS UNITS

[R 299.9504(1)(c) and 40 CFR §270.13(d)]

There are no miscellaneous treatment units at the facility.

A2.I WASTE IN BOILERS AND INDUSTRIAL FURNACES

There are no wastes from boilers and/or industrial furnaces at the facility.

TABLE A2-1
HAZARDOUS WASTE GENERATED AND ACCEPTED AT THE FACILITY
DOW SILICONES CORPORATION, MIDLAND, MICHIGAN

Hazardous Waste Code	Waste Description	Hazardous Waste Characteristics	Basis for Hazardous Designation	Hazardous Waste Management Unit
D001	Ignitable and reactive liquids and solids; lab packs; solvent wastes; ignitable, acidic and corrosive wastes; discarded virgin raw materials	Ignitable	Flashpoint < 140°F	809 Container Storage Area & 806 Tank Storage Area
D002	Ignitable and reactive liquids; lab packs; ignitable, acidic and corrosive wastes; discarded virgin raw materials	Corrosive	pH </= 2.0	809 Container Storage Area & 806 Tank Storage Area
D003	Ignitable and reactive liquids and solids; lab packs; discarded virgin raw materials	Reactive	Reacts with water	809 Container Storage Area & 806 Tank Storage Area
D004	Ignitable and reactive liquids and solids; lab packs; discarded virgin raw materials	Toxic	Toxic by TCLP test	809 Container Storage Area & 806 Tank Storage Area
D005	Ignitable and reactive liquids and solids; lab packs; discarded virgin raw materials	Toxic	Toxic by TCLP test	809 Container Storage Area & 806 Tank Storage Area
D006	Ignitable and reactive liquids; lab packs; discarded virgin raw materials	Toxic	Toxic by TCLP test	809 Container Storage Area & 806 Tank Storage Area

TABLE A2-1
HAZARDOUS WASTE GENERATED AND ACCEPTED AT THE FACILITY
DOW SILICONES CORPORATION, MIDLAND, MICHIGAN

Hazardous Waste Code	Waste Description	Hazardous Waste Characteristics	Basis for Hazardous Designation	Hazardous Waste Management Unit
D007	Ignitable and reactive liquids and solids; lab packs; discarded virgin raw materials	Toxic	Toxic by TCLP test	809 Container Storage Area & 806 Tank Storage Area
D008	Ignitable and reactive liquids and solids; lab packs; discarded virgin raw materials	Toxic	Toxic by TCLP test	809 Container Storage Area & 806 Tank Storage Area
D009	Ignitable and reactive liquids; lab packs; discarded virgin raw materials	Toxic	Toxic by TCLP test	809 Container Storage Area & 806 Tank Storage Area
D010	Ignitable and reactive liquids; lab packs; discarded virgin raw materials	Toxic	Toxic by TCLP test	809 Container Storage Area & 806 Tank Storage Area
D011	Ignitable and reactive liquids and solids; lab packs; discarded virgin raw materials	Toxic	Toxic by TCLP test	809 Container Storage Area & 806 Tank Storage Area
D018	Ignitable and reactive liquids and solids; lab packs; solvent wastes; discarded virgin raw materials that contain Benzene	Toxic	Toxic by TCLP test	809 Container Storage Area & 806 Tank Storage Area

TABLE A2-1
HAZARDOUS WASTE GENERATED AND ACCEPTED AT THE FACILITY
DOW SILICONES CORPORATION, MIDLAND, MICHIGAN

Hazardous Waste Code	Waste Description	Hazardous Waste Characteristics	Basis for Hazardous Designation	Hazardous Waste Management Unit
D019	Ignitable and reactive liquids and solids; lab packs; solvent wastes; discarded virgin raw materials that contain Carbon tetrachloride	Toxic	Toxic by TCLP test	809 Container Storage Area & 806 Tank Storage Area
D021	Ignitable and reactive liquids and solids; lab packs; solvent wastes; discarded virgin raw materials that contain Chlorobenzene	Toxic	Toxic by TCLP test	809 Container Storage Area & 806 Tank Storage Area
D022	Ignitable and reactive liquids and solids; lab packs; solvent wastes; discarded virgin raw materials that contain Chloroform	Toxic	Toxic by TCLP test	809 Container Storage Area & 806 Tank Storage Area
D027	Ignitable and reactive liquids; lab packs; discarded virgin raw materials that contain 1,4-dichlorobenzene	Toxic	Toxic by TCLP test	809 Container Storage Area & 806 Tank Storage Area
D035	Ignitable and reactive liquids and solids; lab packs; solvent wastes; discarded virgin raw materials that contain Methyl ethyl ketone	Toxic	Toxic by TCLP test	809 Container Storage Area & 806 Tank Storage Area

TABLE A2-1
HAZARDOUS WASTE GENERATED AND ACCEPTED AT THE FACILITY
DOW SILICONES CORPORATION, MIDLAND, MICHIGAN

Hazardous Waste Code	Waste Description	Hazardous Waste Characteristics	Basis for Hazardous Designation	Hazardous Waste Management Unit
D038	Ignitable and reactive liquids; lab packs; discarded virgin raw materials that contain Pyridine	Toxic	Toxic by TCLP test	809 Container Storage Area & 806 Tank Storage Area
D039	Ignitable and reactive liquids and solids; lab packs; solvent wastes; discarded virgin raw materials that contain Tetrachloro-ethylene	Toxic	Toxic by TCLP test	809 Container Storage Area & 806 Tank Storage Area
D040	Ignitable and reactive solids; lab packs; solvent wastes; discarded virgin raw materials that contain Trichloroethylene	Toxic	Toxic by TCLP test	809 Container Storage Area & 806 Tank Storage Area
D041	Ignitable and reactive liquids; lab packs; discarded virgin raw materials that contain 2,4,5-tri-chlorophenol	Toxic	Toxic by TCLP test	809 Container Storage Area & 806 Tank Storage Area
D042	Ignitable and reactive liquids; lab packs; discarded virgin raw materials that contain 2,4,6-trichlorophenol	Toxic	Toxic by TCLP test	809 Container Storage Area & 806 Tank Storage Area
F001	Ignitable lab packs; acidic corrosive lab packs; solvent wastes that contain spent halogenated solvents	Toxic	Listed Waste	809 Container Storage Area & 806 Tank Storage Area

TABLE A2-1
HAZARDOUS WASTE GENERATED AND ACCEPTED AT THE FACILITY
DOW SILICONES CORPORATION, MIDLAND, MICHIGAN

Hazardous Waste Code	Waste Description	Hazardous Waste Characteristics	Basis for Hazardous Designation	Hazardous Waste Management Unit
F002	Ignitable and reactive liquids and solids; lab packs; solvent wastes that contain spent halogenated solvents	Toxic	Listed Waste	809 Container Storage Area & 806 Tank Storage Area
F003	Ignitable and reactive liquids and solids; lab packs; solvent wastes that contain spent non-halogenated solvents	Ignitable	Listed Waste	809 Container Storage Area & 806 Tank Storage Area
F004	Ignitable and reactive liquids and solids; lab packs; solvent wastes that contain spent non-halogenated solvents	Toxic	Listed Waste	809 Container Storage Area & 806 Tank Storage Area
F005	Ignitable and reactive liquids and solids; lab packs; solvent wastes that contain spent non-halogenated solvents	Ignitable, Toxic	Listed Waste	809 Container Storage Area & 806 Tank Storage Area
P005	Ignitable and reactive solids; lab packs that contain Allyl alcohol	N/A	Listed Waste	809 Container Storage Area
P022	Ignitable and reactive solids; lab packs that contain Carbon disulfide	N/A	Listed Waste	809 Container Storage Area
P120	Ignitable and reactive solids; lab packs that contain Vanadium pentoxide	N/A	Listed Waste	809 Container Storage Area

TABLE A2-1
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DOW SILICONES CORPORATION, MIDLAND, MICHIGAN

Hazardous Waste Code	Waste Description	Hazardous Waste Characteristics	Basis for Hazardous Designation	Hazardous Waste Management Unit
U002	Ignitable and reactive solids; lab packs; discarded virgin raw materials that contain Acetone	Ignitable Waste	Listed Waste	809 Container Storage Area
U003	Ignitable and reactive solids; lab packs; discarded virgin raw materials that contain Acetonitrile	Ignitable and Toxic Waste	Listed Waste	809 Container Storage Area
U006	Acetyl chloride	Combustible, Reactive and Toxic Waste	Listed Waste	809 Container Storage Area
U008	Acrylic acid	Ignitable Waste	Listed Waste	809 Container Storage Area
U009	Acrylonitrile	NA	Listed Waste	809 Container Storage Area
U018	Benz[a]anthracene	NA	Listed Waste	809 Container Storage Area
U019	Benzene	Ignitable and Toxic Waste	Listed Waste	809 Container Storage Area
U031	1-Butanol	Ignitable Waste	Listed Waste	809 Container Storage Area
U035	Chlorambucil	NA	Listed Waste	809 Container Storage Area
U037	Chlorobenzene	NA	Listed Waste	809 Container Storage Area
U040	Chlorodibromomethane	NA	Listed Waste	809 Container Storage Area
U041	Epichlorhydrin	NA	Listed Waste	809 Container Storage Area

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DOW SILICONES CORPORATION, MIDLAND, MICHIGAN

Hazardous Waste Code	Waste Description	Hazardous Waste Characteristics	Basis for Hazardous Designation	Hazardous Waste Management Unit
U044	Chloroform	NA	Listed Waste	809 Container Storage Area
U045	Methyl chloride	Ignitable and Toxic Waste	Listed Waste	809 Container Storage Area
U055	Cumene	Ignitable Waste	Listed Waste	809 Container Storage Area
U056	Cyclohexane	Ignitable Waste	Listed Waste	809 Container Storage Area
U069	Dibutyl phthalate	NA	Listed Waste	809 Container Storage Area
U075	Dichlorodifluoromethane	NA	Listed Waste	809 Container Storage Area
U080	Methylene chloride	NA	Listed Waste	809 Container Storage Area
U092	Dimethylamine	Ignitable Waste	Listed Waste	809 Container Storage Area
U096	Hydroperoxide, 1-methyl-1-phenylethyl-	Reactive Waste	Listed Waste	809 Container Storage Area
U103	Dimethyl sulfate	NA	Listed Waste	809 Container Storage Area
U108	1,4-Dioxane	NA	Listed Waste	809 Container Storage Area
U112	Acetic acid, ethyl ester	Ignitable Waste	Listed Waste	809 Container Storage Area
U113	Ethyl acrylate	Ignitable Waste	Listed Waste	809 Container Storage Area
U115	Oxirane	Ignitable and Toxic Waste	Listed Waste	809 Container Storage Area
U117	Ethyl ether	Ignitable Waste	Listed Waste	809 Container Storage Area

TABLE A2-1
HAZARDOUS WASTE GENERATED AND ACCEPTED AT THE FACILITY
DOW SILICONES CORPORATION, MIDLAND, MICHIGAN

Hazardous Waste Code	Waste Description	Hazardous Waste Characteristics	Basis for Hazardous Designation	Hazardous Waste Management Unit
U120	Fluoranthene	NA	Listed Waste	809 Container Storage Area
U121	Trichloromonofluoromethane	NA	Listed Waste	809 Container Storage Area
U122	Formaldehyde	NA	Listed Waste	809 Container Storage Area
U123	Formic Acid	NA	Listed Waste	809 Container Storage Area
U133	Hydrazine	Reactive and Toxic Waste	Listed Waste	809 Container Storage Area
U134	Hydrogen fluoride	Combustible and Toxic Waste	Listed Waste	809 Container Storage Area
U140	Isobutyl alcohol	Ignitable and Toxic Waste	Listed Waste	809 Container Storage Area
U144	Lead acetate	NA	Listed Waste	809 Container Storage Area
U151	Mercury	NA	Listed Waste	809 Container Storage Area
U154	Methanol	Ignitable Waste	Listed Waste	809 Container Storage Area
U159	Methyl ethyl ketone	Ignitable and Toxic Waste	Listed Waste	809 Container Storage Area
U161	Methyl isobutyl ketone	Ignitable Waste	Listed Waste	809 Container Storage Area
U162	Methyl methacrylate	Ignitable and Toxic Waste	Listed Waste	809 Container Storage Area
U165	Naphthalene	NA	Listed Waste	809 Container Storage Area
U188	Phenol	NA	Listed Waste	809 Container Storage Area

TABLE A2-1
HAZARDOUS WASTE GENERATED AND ACCEPTED AT THE FACILITY
DOW SILICONES CORPORATION, MIDLAND, MICHIGAN

Hazardous Waste Code	Waste Description	Hazardous Waste Characteristics	Basis for Hazardous Designation	Hazardous Waste Management Unit
U210	Tetrachloroethylene	NA	Listed Waste	809 Container Storage Area
U211	Carbon tetrachloride	NA	Listed Waste	809 Container Storage Area
U213	Tetrahydrofuran	Ignitable Waste	Listed Waste	809 Container Storage Area
U220	Toluene	NA	Listed Waste	809 Container Storage Area
U223	Toluene diisocyanate	Reactive and Toxic Waste	Listed Waste	809 Container Storage Area
U226	Methylchloroform	NA	Listed Waste	809 Container Storage Area
U228	Trichloroethylene	NA	Listed Waste	809 Container Storage Area
U239	Xylene	Ignitable Waste	Listed Waste	809 Container Storage Area
U328	o-Toluidine	NA	Listed Waste	809 Container Storage Area
U353	p-Toluidine	NA	Listed Waste	809 Container Storage Area
U359	Ethylene glycol monoethyl ether	NA	Listed Waste	809 Container Storage Area
001D	Copper	NA	Michigan Listed Waste	809 Container Storage Area & 806 Tank Storage Area
003D	Zinc	NA	Michigan Listed Waste	809 Container Storage Area & 806 Tank Storage Area

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DOW SILICONES CORPORATION, MIDLAND, MICHIGAN

Hazardous Waste Code	Waste Description	Hazardous Waste Characteristics	Basis for Hazardous Designation	Hazardous Waste Management Unit
002U	Allyl Chloride	NA	Michigan Listed Waste	809 Container Storage Area & 806 Tank Storage Area
032U	Chlorine gas	NA	Michigan Listed Waste	809 Container Storage Area
041U	Cobalt	NA	Michigan Listed Waste	809 Container Storage Area & 806 Tank Storage Area
070U	Hydroquinone	NA	Michigan Listed Waste	809 Container Storage Area
131U	Styrene	NA	Michigan Listed Waste	809 Container Storage Area & 806 Tank Storage Area
139U	o-Toluidine	NA	Michigan Listed Waste	809 Container Storage Area
140U	Triaryl phosphate esters	NA	Michigan Listed Waste	809 Container Storage Area