

**FORM EQP 5111 ATTACHMENT XIV.A11
CLOSURE AND POSTCLOSURE CARE PLANS**

This document is an attachment to the Michigan Department of Environmental Quality's (DEQ) *Instructions for Completing Form EQP 5111, Operating License Application Form for Hazardous Waste Treatment, Storage, and Disposal Facilities.*

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), R 299.9613 and Title 40 of the Code of Federal Regulations (CFR), Part 264, Subpart G, establishes requirements for the closure and, if necessary, postclosure care of hazardous waste management facilities. All references to 40 CFR citations specified herein are adopted by reference in R 299.11003.

This license application module addresses requirements for the proper closure and, if necessary, postclosure care of the hazardous waste management units and the hazardous waste management facility for the Dow Salzburg Landfill in Midland, Michigan. The information provided in this module was used to prepare the closure and postclosure care cost estimate provided in Attachment XIV.A12, "Closure and Postclosure Care Cost Estimates."

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A11.A CLOSURE PLAN

A11.A.1 Closure Performance Standard
[R 299.9613 and 40 CFR §264.111]

This Closure Plan is designed to ensure that the facility will be closed in a manner that achieves the following:

- a. Minimizes the need for further maintenance; and
- b. Controls, minimizes, or eliminates, to the extent necessary to protect human health and the environment, postclosure escape of hazardous wastes, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition byproducts to the groundwater, surface water, or atmosphere; and, as applicable
- c. Complies with the unit-specific closure requirements for each of the following units:

(Check as appropriate)

- | | |
|---|---------------------------------------|
| <input type="checkbox"/> Use and management of containers | R 299.9614 and 40 CFR §264.178 |
| <input type="checkbox"/> Tank systems | R 299.9615 and 40 CFR §264.197 |
| <input type="checkbox"/> Surface impoundments | R 299.9616 and 40 CFR §264.228 |
| <input type="checkbox"/> Waste piles | R 299.9617 and 40 CFR §264.258 |
| <input type="checkbox"/> Land treatment ^a | R 299.9618 and 40 CFR §264.280 |
| <input checked="" type="checkbox"/> Landfill | R 299.9619 and 40 CFR §264.310 |
| <input type="checkbox"/> Incinerators | R 299.9623 and 40 CFR §264.351 |
| <input type="checkbox"/> Drip pads ^b | R 299.9632 and 40 CFR §264.575 |
| <input type="checkbox"/> Miscellaneous units | R 299.9628 and 40 CFR §§264.601-603 |
| <input type="checkbox"/> Hazardous waste munitions and explosive storage ^b | R 299.9637 and 40 CFR §264.1202 |
| <input type="checkbox"/> Boilers and industrial furnances | R 299.9808 and 40 CFR §266.102(e)(11) |

^a Not included in the template

^b Not yet included in 40 CFR §264.111; therefore not considered

This Closure and Postclosure Care Plan is for the Dow Salzburg Landfill licensed hazardous waste management facility. This plan identifies all steps necessary to close each hazardous waste management unit at this facility at the end of its active life and manage the unit during the postclosure care period. Unit-specific closure procedures are discussed in Section A11.A.5 of this Attachment for each applicable unit type indicated above.

A11.A.2 Unit-Specific Information
 [R 299.9613 and 40 CFR §§264.112(b)(3) and (6)]

Table A11.A.1 Hazardous Waste Management Units Information

The following table identifies each hazardous waste management unit at the Dow Salzburg Landfill facility subject to the closure requirements of this hazardous waste management facility operating license. The table also includes: each unit's maximum licensed hazardous waste inventory, a list of the waste codes managed in the unit, the anticipated date of closure (if known), and the estimated duration of closure activities once closure begins. Unit-specific methods for closure and detailed schedules are discussed in Section A11.A.5 of this Attachment.

| Unit Designation | Maximum Inventory* (Include Units) | Waste Codes of Hazardous Wastes Managed | Scheduled Closure Date | Estimated Duration of Closure |
|----------------------------|---|--|--|--------------------------------------|
| Cells 1-2 | 1.9 acres | Closed hazardous / solid waste cells | 1984 | Capped |
| Cells 3-5 | 2.2. acres | Closed hazardous waste cells | 1984 | Capped |
| Cells 6-8 | 1.7 acres | Closed hazardous waste cells | 1986 | Capped |
| Cells 9-10 | 1.7 acres | Closed hazardous waste cells | 1986 | Capped |
| Cells 11-12 | 2.5 acres | Closed hazardous waste cells | 1986 | Capped |
| Cells 13-14 | 3.2 acres | Closed hazardous waste cells | 1988 | Capped |
| Cells 15-16 | 3.5 acres | Closed hazardous waste cells | 1991 | Capped |
| Cells 17-19 | 6.1 acres | Closed hazardous waste cells | 2005 | Capped |
| Cells 38-39 | 4 acres | Closed solid waste cells | 1988 | Capped |
| Cells 40-43 | 9.4 acres | Closed solid waste cells | 2005 | Capped |
| Cells 20-22 | 7.2 acres | Attachment XIV.A2, Appendix A | 2016 | 180 Days |
| Cells 23-26 (Active cells) | 8.4 acres | Attachment XIV.A2, Appendix A | Not anticipated prior to expiration of operating license | 180 Days |

* The Salzburg Landfill facility has a design capacity of 3,090,000 cubic yards.

A11.A.3 Schedule of Final Facility Closure
[R 299.9613 and 40 CFR §264.112(b)(6)]

The Dow Salzburg Landfill facility:

(Check as appropriate)

- Anticipates completing final closure of the entire facility by [insert estimated date]
- Has not determined when the facility will close and does not anticipate completing final closure of the entire facility prior to expiration of the facility's hazardous waste operating license.

The final Salzburg Landfill facility closure activities will be completed in accordance with a formal Closure Plan, consistent with R 299.9613 and §264.111 through 264.115, that will be submitted to the MDEQ for approval not less than 60 days before the date on which Dow expects to begin final closure of the facility.

Closure activities and the anticipated time of completion of each activity for a typical cell closure are shown below.

| Closure Activity | Time Completed |
|--------------------------------------|----------------|
| Mobilization | 10 days |
| Site Grading & Gas Vent Installation | 20 days |
| Subbase Preparation | 30 days |
| Clay Liner Component (GCL) | 70 days |
| Synthetic Liner Component | 80 days |
| Drainage Collection Layer (GDM) | 90 days |
| Erosion – Freeze Protection Layer | 120 days |
| Closure Certification | 160 days |

A11.A.4 Notification and Time Allowed for Closure
[R 299.9613 and 40 CFR §§264.112(d)(2) and 264.113(a) and (b)]

Final closure activities will be initiated within 90 days of receipt of the final volume of hazardous wastes and completed within 180 days of receipt of the final volume of waste. The tasks and estimated time required for closure shall follow the schedule specified in Section A11.A.3. The Director will be notified by Salzburg Landfill facility 60 days before final closure begins. Final closure will be certified by both The Dow Chemical Company and an independent, qualified, registered professional engineer of the state of Michigan.

A11.A.4(a) Extensions for Closure Time
[R 299.9613 and 40 CFR §264.113(a) and (b)]

In the event that an extension for closure for the facility or any unit is necessary, the Salzburg Landfill facility will request an extension in accordance with the requirements of 40 CFR §264.113(a).

A11.A.5 Unit-Specific Closure Procedures

Unit-specific closure procedures are provided for each unit identified in Section A11.A.2 of this Attachment.

A11.A.5(a) Closure of Container Storage Areas [R 299.9614 and 40 CFR §264.178]

This section does not apply, as there are no Container Storage Areas at the Salzburg Landfill facility.

A11.A.5(b) Closure of Tank Systems [R 299.9615 and 40 CFR §264.197]

This section does not apply, as there are no Tank Systems at the Salzburg Landfill facility.

A11.A.5(c) Closure of Surface Impoundments [R 299.9616 and 40 CFR §264.228(a)(1) and (2)]

This section does not apply, as there are no Surface Impoundments at the Salzburg Landfill facility.

A11.A.5(d) Closure of Waste Piles [R 299.9617 and 40 CFR §264.258]

This section does not apply, as there are no Waste Piles at the Salzburg Landfill facility.

A11.A.5(e) Closure of Landfills [R 299.9619 and 40 CFR §264.310(a)]

This section describes the procedures for closure of Salzburg Landfill. The general closure requirement and specific closure procedures are discussed below.

A. General Closure Requirement

At the final closure of the landfill or upon closure of any cell, the Salzburg Landfill will cover the landfill or cell with a final cover designed and constructed to:

1. Provide long-term minimization of migration of liquids through the closed landfill;
2. Function with minimum maintenance;
3. Promote drainage and minimize erosion or abrasion of the cover;
4. Accommodate settling and subsidence so that the cover's integrity is maintained; and
5. Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoil present.

After final closure, the Salzburg Landfill will comply with all postclosure requirements contained in R 299.9613 and 40 CFR §264.117, including maintenance and monitoring throughout the postclosure care period.

B. Specific Closure Procedures

The final landfill cover design, the construction quality assurance program for installing the final landfill cover, and plat of survey are discussed below.

1. Landfill Cover Design

The final landfill cover conceptual design is presented in Part II of Section VI, Facility Design, Engineering, and Operating Standards Cell and Cap Construction, of this license application.

2. Construction Quality Assurance (CQA) Program

The detailed specifications and construction quality assurance requirements for each component of the cap will be addressed in the design documents submitted to the MDEQ for approval prior to construction.

3. Plat of Survey

A notation in the deed has been completed informing potential purchasers that the land has been used to manage hazardous wastes and its use is restricted under 40 CFR Part 264, Subpart G.

In accordance with 40 CFR 264.117(c), post-closure use may never be allowed to disturb the integrity of the final cover, liners, or any other components of the containment system, or the functions of the facility's monitoring system unless the MDEQ Director finds that either the disturbance is necessary to reduce a threat to human health or the environment, or it is necessary for the proposed use of the property and will not increase the potential hazard to human health or the environment.

A11.A.5(f) Closure of Incinerators
[R 299.9620 and 40 CFR §264.351]

This section does not apply, as there are no Incinerators at the Salzburg Landfill facility.

A11.A.5(g) Closure of Miscellaneous Units
[R 299.9623 and 40 CFR §§264.601 through 264. 603]

This section does not apply, as there are no Miscellaneous Units at the Salzburg Landfill facility.

A11.A.5(h) Closure of Boilers and Industrial Furnaces (BIF)
[R 299.9808 and 40 CFR §266.102(e)(11)]

This section does not apply, as there are no Boilers and Industrial Furnaces at the Salzburg Landfill facility.

A11.A.5(i) Other Closure Activities

[R 299.9504(1)(c), R 299.9508(1)(b), and R 299.9613(1) and 40 CFR §§270.14(b)(13) and 264.112(b)(5)}

The Salzburg Landfill Closure Plan is designed to ensure that the facility is closed in a manner that minimizes the need for further maintenance; and controls, minimizes or eliminates, to the extent necessary to protect human health or the environment, postclosure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products to the ground, surface water, or atmosphere.

If evidence of leaks or spills is detected, in the landfill or related appurtenances, specified in Condition VIII.B of the License, or in the vehicle wash facility specified in Conditions VIII.D.11 and 12 of the License, samples will be taken and analyzed to determine the extent, if any, of contamination in the soil, groundwater, surface water or air. If contamination that can be attributed to the operation or closure of the facility is determined to be present; and the contamination is at concentrations sufficient to pose a threat to human health or the environment; then the most suitable alternative to remedy the contamination will be implemented to ensure protection of public health and the environment.

All equipment used for cap construction that contacts waste material will be thoroughly cleaned before being used on another project task or leaving the work site. The cleaning will be conducted at the facility vehicle wash building (3601 Building) using pressurized water. All equipment will be washed until visibly clean.

The wash water is transferred via pipeline to The Dow Chemical Company, Michigan Operations, NPDES permitted Waste Water Treatment Plant.

Once waste disposal activities cease at the facility, the areas outside the cells and the access roads will be sampled, if necessary, to determine if any surface contamination exists. Samples will be analyzed for the primary detection parameters commonly detected in the leachate. Any soil found to have significant levels of contamination above background will be removed and properly disposed of in the remaining active cell. At final facility closure, the facility building and vehicle wash building will be demolished and removed. Any operating equipment leaving the site will be washed before removal.

A11.A.6 Certification of Closure

[R 299.9613]

Within 60 days of completion of closure the Salzburg Landfill facility will submit to the Director, by registered mail, a certification that the hazardous waste management unit or facility, as applicable, has been closed in accordance with the specifications in the approved closure plan. The certification will be signed by The Dow Chemical Company and by an independent registered professional engineer. Documentation supporting the independent registered engineer's certification will be furnished to the Director in accordance with R 299.9613(3), including:

1. The results of all sampling and analysis;
2. Sampling and analysis procedures;
3. A map showing the location where samples were obtained;
4. Any statistical evaluations of sampling data;

5. A summary of waste types and quantities removed from the site and the destination of these wastes; and
6. If soil has been excavated, the final depth and elevation of the excavation and a description of the fill material used.

The Salzburg Landfill facility will maintain financial assurance for closure until the Director releases the Salzburg Landfill facility from the financial assurance requirements for closure under R 299.9703.

The certification must be worded as follows:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

A11.A.7 Postclosure Notices Filed

[R 299.9504(1)(c) and R 299.9508(1)(b) and 40 CFR §270.14(b)(14)]

The applicant must provide documentation that the postclosure notices required under 40 CFR §264.119 have been filed for hazardous waste disposal units that have been closed at the facility.

A11.B POSTCLOSURE PLAN

[R 299.9613 and 40 CFR §264.118]

A11.B.1 Applicability

(Check as appropriate)

Not applicable: Hazardous waste will not be left behind at closure. A survey plat, postclosure care, postclosure certifications, and other notices are not required.

Applicable:

Contingent plan

Landfill unit

A11.B.2 Postclosure Care Objectives

The Salzburg Landfill facility will complete the activities listed in Table A11.B.1 and the Salzburg Landfill Sampling and Analysis Plan (SAP) in order to achieve the following:

1. Maintain the integrity and effectiveness of the final cover, including making repairs to the cap as necessary to correct the effects of settling, subsidence, erosion, or other events;
2. Operate the leachate collection and removal system until leachate is no longer detected;

3. Maintain and monitor the leak detection system in accordance with R 299.9613 and 40 CFR §§264.301(c)(3)(iv) and (4) and 264.303(c), and comply with all other applicable leak detection system requirements of this part;
4. Maintain and monitor the groundwater monitoring system and comply with all other applicable requirements of R 299.9612 and 40 CFR, Part 264, Subpart F;
5. Prevent run-on and run-off from eroding or otherwise damaging the final cover; and
6. Protect and maintain surveyed benchmarks used in complying with R 299.9613 and 40 CFR §264.309.

A11.B.3 Postclosure Care Period Point of Contact

The planned monitoring and maintenance activities and the associated frequencies are designed to ensure the integrity of the cap and final cover system and the proper functioning of the monitoring system for each unit listed in Table A11.B.1. The point of contact for ensuring the performance of these activities is listed below.

| | |
|-------------------|--|
| Name and/or Title | <u>Responsible Care Leader, Michigan Operations</u> |
| Address | <u>1790 Building, Washington Street, Midland, MI 48674</u> |
| Telephone | <u>989-636-2646</u> |

A11.B.4 Postclosure Care Activities

Table A11.B.1 Postclosure Monitoring and maintenance

The following table identifies, for each unit requiring postclosure care, planned monitoring and maintenance activities and the frequency at which these activities will be performed.

| Unit | Planned Monitoring Activities** | Frequency | Planned Maintenance Activities | Frequency |
|-------------------|--|---|--|-----------|
| Salzburg Landfill | Security | Quarterly | Signs will be replaced as they become illegible. | As needed |
| | | | Fencing is maintained in good repair. | |
| | Erosion | Quarterly (try to avoid inspecting when ground is snow covered) | Washouts will be repaired | |
| | <ul style="list-style-type: none"> • Look for areas of erosion on side slopes of caps when ground is not frozen | | Restoration of vegetative cover will be performed. Repair/maintain slope stability. | |
| | Vegetative Cover | Spring and Fall | Vegetative cover maintenance will include mowing, reseeding, watering, and fertilizing. Note: Workers performing the mowing will make a visual inspection of the caps for erosion, settlement and washouts and will report any findings to Dow personnel. Dow will address such problems appropriately. | |
| | <ul style="list-style-type: none"> • Void of deep rooted plant species; areas of sparse vegetation. • Will be cut when deemed necessary. The rule of thumb will be that mowing will be performed when the vegetative cover reaches approximately twelve (12) inches in height. | | Tree or brush growth will be prevented over the actual cover areas. | |
| | Mowing will be performed when deemed necessary. Rule of thumb is approximately 12 inches. | | | |

| Unit | Planned Monitoring Activities** | Frequency | Planned Maintenance Activities | Frequency |
|-------------------|--|--|---|-----------|
| Salzburg Landfill | Burrowing Animals | Quarterly | Eliminate burrowing animals and maintain/repair burrows to original specifications. | As needed |
| | Settlement; Visual [®] <ul style="list-style-type: none"> Low spots on cap where ponding may occur should not be present. | Quarterly (and after at least one rain event per year) | Unanticipated ponding will be repaired by adding fill and regrading to establish surface drainage. Vegetative cover will be restored. | |
| | Settlement; Postclosure Survey <ul style="list-style-type: none"> If the MDEQ and Dow agree that the results of the 3-year survey indicate that settlement is not an issue, any subsequent settlement monitoring will revert to visual. Note: This monitoring is based on the Cap Elevation Survey Plan – Rev. 1, attachment submitted with the previous license application. | First survey will be the determination of the as-built elevations when cap is constructed. Second survey will be 3 years after cap construction. | Repair. Significant* repair may need prior approval before repairs are implemented. | |
| | Gas Venting Systems <ul style="list-style-type: none"> Should be free of obstructions such as bird nests, etc. | Annually | Repair or replacement of defective equipment. | |
| | Run-on and Run-off <ul style="list-style-type: none"> Sumps and surface water ditches checked to ensure adequate drainage. | Quarterly | Cleaned and maintained. | |
| | Liner Failure Detection System <ul style="list-style-type: none"> Lift stations, pumps, visible piping, and instrumentation checked for proper operation. | Monthly | Repair or replacement of defective equipment. | |
| | Leachate Collection System <ul style="list-style-type: none"> Lift stations, pumps, visible piping, and instrumentation checked for proper operation. | Monthly. If leachate generation rates decline to 10% of active operation flow rates, frequency will be reduced to twice/year. | Repair or replacement of defective equipment. | |
| | Groundwater Monitoring Wells <ul style="list-style-type: none"> Condition of above-ground and visible elements of the well (e.g., protective barriers, well casings, caps, and pumps checked, etc.). | Semi-annually | Repair or replacement of defective equipment. | |
| | Benchmarks <ul style="list-style-type: none"> Moved or damaged. | Quarterly | Reset and re-established. Resurvey every 3 years. | |

[®] If, at any time, the quarterly visual inspection indicates that “significant” settlement may be an issue; the need for an additional cap elevation survey will be discussed with the MDEQ

* Indicators that “significant” settlement may have occurred include:

- The elevation of a survey point changes by more than 0.5 feet in elevation between surveys;
- A 30% flattening of the cap slopes, i.e., a 1% cap slope reduces to a 0.7% slope or a 2% slope reduces to a 1.4% slope;

- A localized subsidence or some cracks occurs on the surface of the cap due to differential settlement; or
- "Significant" ponding on the cap is noted during a post-rain event visual inspection.

** In addition to these requirements, the Sampling and Analysis Plan requirements in Attachment 15 to the License also need to be met.

A11.B.5 Postclosure Care Plan Amendment
[R 299.9613 and 40 CFR §264.118(d)]

The Postclosure Care Plan will be amended whenever:

1. Changes in the operations or facility design will affect closure and postclosure care; or
2. There is a change in the expected year of closure, if applicable; or
3. Unexpected events during closure require a modification to the plan.

A11.B.6 Certification of Postclosure
[R 299.9613]

Within 60 days of completion of postclosure care the Salzburg Landfill facility will submit to the Director, by registered mail, a certification that postclosure care for the hazardous waste management unit or facility, as applicable, has been completed in accordance with the specifications in the approved postclosure plan. The certification will be signed by the owner/operator of the Salzburg Landfill facility and by an independent registered professional engineer. Documentation supporting the independent registered engineer's certification will be furnished to the Director in accordance with R 299.9613(5). The Salzburg Landfill facility will maintain financial assurance for postclosure until the Director releases the Salzburg Landfill facility from the financial assurance requirements for postclosure under R 299.9703 and 40 CFR §264.143(i).

The certification must be worded as follows:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.