

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL
DIVISION OF AIR AND WASTE MANAGEMENT
HAZARDOUS WASTE MANAGEMENT BRANCH

GUIDANCE DOCUMENT
FOR
POST-CLOSURE CARE PLAN

June 15, 1992

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1.0 INTRODUCTION

The State of Delaware Department of Natural Resources and Environmental Control (DNREC) has developed this guidance document to assist owners and operators in performing hazardous waste post-closure care planning under the DRGHW Parts 264 (permitted status) and 265 (interim status) Subpart G. This document was developed as a supplement to the Delaware Regulations Governing Hazardous Waste (DRGHW). These guidelines do not replace any portion of the Delaware or Federal regulations governing hazardous waste.

Post-closure care must begin as soon as the unit is closed and continue for a period of thirty (30) years, unless the DNREC Secretary shortens or extends the care time in accordance with DRGHW Parts 122 & 124. Post closure care is a permitted activity pursuant to DRGHW Parts 264 & 265 Subpart C and Part 122. The post-closure permit application must be accompanied by several attachments. The post-closure care plan is one such supplement to the permit. Others may include, but shall not be limited to, the groundwater management plan, corrective action measures and provisions for permit modifications. This document should be used as a guide for developing the post-closure care plan.

Section 2.0 outlines a suggested format for a post-closure plan. This section also details the information which should be included in a complete post-closure plan. Submitting post-closure plans in the suggested format will aid in expediting DNREC review.

Section 3.0 outlines the required deliverables. The deliverables which must accompany the Certification of Post-Closure are detailed.

Adherence to the recommendations within does not exempt facilities performing post-closure from compliance with all applicable Regulations. It is anticipated that this document will be updated as needed when rules, regulations, or policies change. Facilities planning to perform post-closure care of a unit are urged to follow the guidelines entailed within.

Any questions regarding this document or the post-closure process should be directed to:

State of Delaware
Department of Natural Resources and Environmental Control
Division of Air and Waste Management
Hazardous Waste Management Branch

89 Kings Highway
Dover, DE 19903
302/739-3689

2.0 CLOSURE PLAN FORMAT

This section outlines a sample format for a post-closure plan. Under each title is a brief description of the contents which should be detailed. Adherence to this format will greatly expedite the closure review process.

Sample Cover Page

Post-Closure Care Plan

For

(List Units Covered by Plan)

At

(Facility Name)

(& Address)

Prepared by

(Company Name)

(& Address)

(Date of Plan)

Submitted to:

State of Delaware
Department of Natural Resources and Environmental Control
Division of Air & Waste Management
Hazardous Waste Management Branch
P.O. Box 1401, 89 Kings Highway
Dover, DE 19903

RE: Facility DED #, Code 15

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1. Introduction

State the general intent of the post-closure plan and the number of years of care. Applicable regulations and regulatory agencies should be referenced. The post-closure plan must conform to the regulations set forth in DRGHW Section 264 or 265 Subpart C.

- A. Scope - Briefly summarize the scope of activities pertinent to post- closure care.
- B. Background - Briefly detail the history of the area, including the closure activities.

II. Facility Description

A. General Description - A general description of the facility. This description should be sufficient for the reviewer to obtain a general understanding of the processes performed at the facility. The description must also accurately state general site conditions and the location of the facility. Location of the facility on a topographic map is required. A USGS 7 1/2 Minute Series (topographic quadrangle) map is suggested as a base.

B. Solid Waste Management Units (SWMU) - A list of all SWMU(s), past and present, the wastes handled at each, and their present status.

C. Hydrogeologic Conditions - Outline any and all pertinent information regarding the ground water and soil conditions at the site. Tables and maps would be useful. List dates of any ground water and soil sample collection programs, and the analytical results obtained. If any corrective action activities were/are being performed in regard to the hydrogeologic conditions, they must be detailed here.

D. Surface Waters - Outline all information regarding surface waters and potential impacts at the site.

III. Post-Closure Unit Description

Describe the specific unit(s) for which post-closure care will be conducted. Include as a minimum:

- Design and dimensions;
- List of waste managed at the unit(s) by waste numbers and quantities throughout the history of operation;
- The units hazardous waste capacity; and
- Known releases of hazardous substances and/or waste.

IV. Post-Closure Care Activities

A detailed description of the activities which will be performed. Most post-closure plans will need to address the following:

A. Monitoring Activities - Provide details of the proposed groundwater monitoring activities for the post-closure care period. These activities should be consistent with the current conditions at the unit or facility. The plan should include:

- Number, location, and depth of wells;
- Frequency and procedures for sampling;
- Types of sample analyses and methods;
- Party responsible for monitoring activities;
- Soil monitoring activities, if applicable;
- Leak detection monitoring activities, if applicable; and
- Gas monitoring activities, if applicable.

B. Leachate Collection and Removal - Provide details of the procedures for operating the leachate collection and removal system for the post-closure care period. The description should include:

- Estimated quantity of leachate;
- Procedures for collecting and pumping leachate;
- Procedures for disposing/discharging of the leachate; and
- Party responsible for monitoring activities.

C. Maintenance Activities - A description of the planned activities necessary to maintain the integrity of the containment system(s) and the function of the monitoring equipment and security systems, where applicable. The plan should include a description and schedule for the following maintenance activities:

1. Routine inspections - Describe the procedures and schedule for inspecting the facility systems that must be maintained during the care period. The closed areas can be integrated into the routine inspection schedule of the facility, but the plan should address explicitly the procedures for inspections after the entire facility has been closed. Components that should be inspected include:

- Final cover;
- Run-on and run-off control systems;
- Surveyed benchmarks;
- Ground water monitoring system(s);
- Leachate collection and removal system, if applicable;
- Leak detection system, if applicable;
- Gas monitoring system, if applicable;
- Soil monitoring system, if applicable; and
- Security system, if required.

The party responsible for conducting these inspections must be indicated, as well.

2. Maintenance of the Waste Containment Systems - The majority of the routine maintenance operations should be directed at maintaining the integrity of the waste containment systems (e.g. final cap or vegetation) and controlling erosion. A description of the types and frequencies of activities required to maintain the integrity of the final cover and/or vegetation must be detailed. These activities should include:

- Inspections;
- Mowing;
- Fertilizing;
- Reseeding and mulching bald spots and eroded areas;
- Sprinkling;
- Replacing soil lost to erosion;
- Maintaining surface water run-off and run-on control mechanisms;
- Controlling rodents as necessary; and
- If vegetation has not been established, stabilization and damage repair procedures must be detailed. This may be especially important in the early years before the cover is well established.

The type of activity and site-specific conditions will affect the frequency for each of the activities to be conducted. The plan must also describe contingency plans for damages caused by severe storms or other periodic natural events that may occur during the post-closure care period. The plan should be revised as new information becomes available.

3. Processes Necessary for the Continuation of Waste Degradation at Land Treatment Facilities - Post-closure care for land treatment facilities/units is an extension of the operating life of the facility/unit. The activities necessary to enhance degradation and transformation and sustain immobilization of hazardous constituents in the treatment zone must be continued. The plan should describe the following procedures if appropriate and frequencies at a minimum:

- Disking;
- Fertilizing;
- Liming to ensure proper pH balance;
- Controlling moisture content;
- Controlling oxygen levels;
- Controlling run-on and run-off from the treatment fields;
- Repairing erosion damage;
- Regrading and replanting as needed; and
- Controlling wind dispersal of particulates.

The plan should also:

- Include a description and schedule of how the proposed activities will achieve the continued degradation, transformation and immobilization;
 - Indicate the party responsible for conducting the activities; •
- Comply with all the food chain crop prohibitions specified in the permit; and
- Indicate procedures for demonstrating that hazardous constituents

are no longer present at the facility/unit. The following should

- Constituents requiring re-establishment of background values;
- Number of soil increments to be analyzed; and
- Procedures for conducting analyses to test the level of hazardous constituents in the treatment zone.

Post-closure care must be conducted until the level of constituents no longer exceed the background value of the constituents by a statistically significant amount.

If an owner or operator expects that the constituents will degrade prior to the end of the 30-year period, a demonstration of such may be submitted to DNREC in accordance with DRGHW Section 264.280 (d).

4. Maintenance of the Monitoring System(s) - Describe the provisions for maintaining the groundwater, soil, and gas monitoring systems, and the leachate collection and leak detection systems, as applicable. A maintenance schedule must be included. Maintenance may include:

- Replacing or redrilling monitoring wells;
- Replacing seals, piping, and caps;
- Repairing or replacing pumps; and
- Other routine maintenance.

May need to update the post-closure plan as more data becomes available.

5. Maintenance of the Security System - Outline the security system and maintenance program to be employed during post-closure activities. Also estimate the frequency of the proposed activities. These activities must ensure that the system remains reliably functional throughout the care period.

If intend not to provide security during the post-closure care period, explain why such provisions are not needed to protect human health and the environment.

V. Contact Person or Office

The name, address, and phone number of the person or office to contact about the facility or unit during post-closure care. This person or office must maintain a copy of the post-closure plan.

VI. Post-Closure Care Notices

Owners or operators of disposal units must submit to the DNREC Secretary and to the local land authority, or authority with jurisdiction over land use, a record of the type, location, and quantity of hazardous wastes disposed within each disposal unit. The record must be filed no later than sixty (60) days after certification of closure of each disposal unit.

Within sixty (60) days of closure certification of the first and last disposal unit a notation on the deed to the facility property must be made. The notation must state that the property was used to manage hazardous waste, that the land use is restricted, and that a survey plat and a record of the wastes has been filed with the appropriate local land authority and the DNPEG Secretary. A copy of these notations to the deed and a certification signed by the owner or operator that states these notations were filed must be submitted.

VII. Post-Closure Certification

Certification of post-closure must be performed by an independent, professional engineer, registered in the State of Delaware. The post-closure plan shall identify the professional engineer and include the following information:

- A. Inspections - The post-closure plan shall outline the inspection activities. All field procedures shall be observed and documented in a facility/unit post-closure care log.
- B. Criteria for Evaluating Adequacy - Land treatment facilities must indicate the procedures for demonstrating that hazardous constituents are no longer present at the end of the care period. The proposed sample collection and analysis plan must demonstrate achievement of this.

A statistical model can be used to determine adequacy of the sample collection and analysis plan as well as to demonstrate the adequacy of the degradation. The facility shall detail statistical methods of comparison of post-closure unit analytical data to background analytical data.

The proposed statistical model shall:

- Provide at least a 95% confidence level;
- Propose a method for determining outliers and a plan of action if outliers are found; and
- Propose a method to determine appropriate number of sample points.

C. Deliverables - The post-closure plan must identify the information which will be provided with the Post-Closure Final Report. See section 3.0 for an outline of the required deliverables. Samples of field reports and logs which will be utilized should be attached.

The report must document all field activities and present documentation that the post-closure was performed in accordance with the approved post-closure plan. Certification must be based on (1) review of internal documents (e.g. owner or operator inspection reports, ground water monitoring results, . . .) ; (2) observation of post-closure activities; and (3) evaluation of the adequacy of land treatment's effectiveness. The plan should indicate the types of documents that will be maintained for the post-closure care period. Section 3.0 of this guideline outlines the documentation required for post-closure certification approval by DNREC.

VIII. Closure Cost Estimate

A detailed post-closure cost estimate shall be provided by the facility. The estimate must include all costs associated with post-closure, to include but not limited to:

- Ground Water Monitoring;
 - Number and depth of wells;
 - Frequency of sampling; and
 - Types of analyses.
- Soil Monitoring, if applicable;
 - Number and frequency of sampling; and
 - Types of analyses.
- Leachate Monitoring and Removal;
 - Procedures and frequency of sampling; and
 - Estimated quantity of leachate to be collected and removed.
- Inspections;
 - Types and frequency.
- Maintenance Activities;
 - Final cover and/or vegetation;
 - Monitoring systems; and
 - Security systems.
- Continuation of Land Treatment Processes, if applicable;
 - Continuation of degradation;
 - Controlling run-on and run-off (e.g. drainage system repairs and handling of run-off);
 - Controlling wind dispersal; and
 - Determining level of constituents:
 - sampling and analyses for identification of constituents;
 - number of samples and frequency; and
 - statistical methods.
- Post-Closure Notices;
 - Record of Wastes; and
 - Notation on deed.
- Post-Closure Certification.

IX. Financial Assurance Statement

A Financial Assurance Statement shall be provided by the facility as required by DRGHW Sections 264 and/or 265 Subpart H, Financial Requirements.

Within sixty (60) days of completing the determination of the level of hazardous constituents, the certifying engineer shall submit the Post-Closure Final Report. The report shall include, but not be limited to the following:

A. The Certification of Post-Closure

An independent professional engineer shall certify that post-closure activities were performed in accordance with the approved post-closure plan and that the levels of hazardous constituents in land treatment units are not statistically different from background levels. The certification shall include the basis justifying achievement of the post-closure objectives. In the event contamination remains, the certifying engineer shall identify the associated risks, and justify whether or not further corrective action should be pursued.

B. Document Review and Field Data

The owner or operator should maintain and submit, at a minimum, copies of the inspection and maintenance reports and results of the sampling and analyses. The following information should be included in these reports:

1. Activities during inspections and maintenance;
2. Summarized facility/unit post-closure care logs; and
3. Field forms used during post-closure activities, including but not limited to:
 - Field reports for each on-site visit;
 - Sample collection logs;
 - Calibration logs;
 - Manifests for removed hazardous waste; and
 - Health and safety forms.
4. List of in-house records to be reviewed by the certifying engineer (e.g. owner/operator logs of inspections, laboratory results, chain of custody forms; contractors' logs of activities).

C. Analytical Data

The results of sample analysis and the following listed QA/QC information must be provided:

1. The results summary must include:
 - Specific Compound Results;
 - Results of Tentatively Identified Compound Analysis;
 - Method Detection Limits; and
 - Sample Analysis Dates.

2. The quality control summary must include:

- Methods Summary;
 - Surrogate Recoveries;
 - Matrix Spike/Matrix Spike Duplicate Recoveries;
 - Method/Trip/Field Blank Results; and
 - Storage Times.
3. The quality assurance shall provide for data validation of the analyses done as described in the Quality Assurance Project Plan. The data validation shall determine data acceptability and shall be performed in accordance with EPA's Functional Guidelines for Data Review for data derived by Contact Laboratory Procedure Methods, (Laboratory Data Validation - Functional Guidelines for Evaluating Organic Analyses, Hazardous Site Evaluation Division, US EPA, February 1, 1988 and' Laboratory Data Validation - Functional Guidelines for Evaluating Inorganic Analyses, Hazardous Site Evaluation Division, US EPA, June 13, 1988). If another method is used, the data validation shall be performed in accordance with the QA/QC data validation criteria set forth in that method. For methods lacking QA/QC data validation protocols, the Facility . must establish validation criteria such as those in Section 8 of the EPA Series Methods in 40 CFR Part 136. The appropriate quality assurance data validation summary reports shall be submitted to DNREC, along with sample data and summary sheets and final sample results.

The facility shall ensure that DNREC personnel and/or DNREG authorized representatives are allowed reasonable access to the laboratory(ies), records and personnel utilized by the facility for analysis of samples collected pursuant to post-closure.

4.0 REFERENCES

40 Codified Federal Register. U. S. Government Printing Office. Washington, D.C. July 1990.

Delaware Regulations Governing Hazardous Waste. DNREC, Dover, DE. 40-09- 189-101-101. 1990.

Federal Register The. U.S. Government Printing Office. Washington, D. C. (as updated).

Laboratory Data Validation - Functional Guidelines for Evaluating Organic Analyses, Hazardous Site Evaluation Division, US EPA, February 1, 1988.

Laboratory Data Validation - Functional Guidelines for Evaluating Inorganic Analyses, Hazardous Site Evaluation Division, US EPA, June 13, 1988.

Model RCRA Permit for Hazardous Waste Management Facilities (Draft), Office of Solid Waste, US EPA, September 1988.

RCRA Guidance Manual for Subpart G Closure and Post-Closure Standards and Subpart H Cost Estimating Requirements. ICF Incorporated for U.S.EPA. OSWER Directive #9476.00-5. January 1987.

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