GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

Richard E. Dunn, Director

Land Protection Branch
4244 International Parkway
Suite 104
Atlanta, Georgia 30354
404-362-2537

MONITORING OF SURFACE WATER AND UNDERDRAIN SYSTEMS AT SOLID WASTE FACILITIES GUIDANCE DOCUMENT

February 2021

PURPOSE

This document clarifies monitoring and reporting requirements for surface water and underdrain systems at Municipal Solid Waste Landfills (MSWL), Construction & Demolition (C&D) Landfills, Commercial Industrial Landfills, and Private Industry Solid Waste Disposal Facilities in Georgia where groundwater monitoring is required, as detailed in the Rules for Solid Waste Management. The requirements outlined in this guidance are separate to any requirements regulated under the National Pollution Discharge and Elimination System (NPDES) General Permit GAR050000 for Storm Water Discharges Associated with Industrial Activity, or NPDES permit for Industrial Discharges that may apply to these permitted Solid Waste Facilities.

To align with the provisions of this guidance, updated surface water monitoring plans should be submitted as part of the facility's next 5-year permit review.

Coal Combustion Residuals (CCR) Units detailed in 391-3-4-.10 are not covered by this guidance.

LEGAL AUTHORITY:

391-3-4-.01 Definitions (64) "Release" means the discharge, deposit, injection, dumping, spilling, emitting, releasing, leaking, or placing of any substance into or on any land or water of the state.

391-3-4-.07(1)(l) Groundwater and Surface Water Monitoring Plan: "The design must provide for a groundwater monitoring plan in accordance with the requirements for Groundwater Monitoring and Corrective Action as provided in Rule 391-3-4-.14. A surface water monitoring plan, which will determine the impact of the facility on all adjacent surface waters, must also be included."

391-3-4-.07(3)(j) Surface water requirements; All landfill units shall not:

1. Cause a discharge of pollutants into waters of the state or the United States, including wetlands, that violates any requirements of the Clean Water Act, including, but not limited to, the National Pollutant Discharge Elimination system (NPDES) requirements pursuant to section 402:

2. Cause the discharge of a nonpoint source of pollution to waters of the state or the United States, including wetlands, that violates any requirement of an area-wide or State-wide water quality management plan that has been approved under section 208 or 319 of the Clean Water Act, as amended.

391-3-4-.07(3)(v) Groundwater, Underdrain Discharge, and Surface Water Monitoring: "all water monitoring points shall be sampled in accordance with the approved plans or with any directive issues by the Division. Analytical results must be submitted to the Division in accordance with the approved time schedules. It shall be the responsibility of the facility owner or operator to promptly report any exceedance of established standards. All monitoring reports must be accompanied by a certified statement by a qualified groundwater scientist, for those constituents which have established standards, that established standards have been complied with or certifying noncompliance. Underdrain discharge shall comply with surface water monitoring standards."

BACKGROUND

Surface Water Monitoring:

In Georgia, surface water monitoring to address non-point source run-off is required as part of environmental monitoring requirements at permitted landfills that are accepting waste, in closure, or undergoing post-closure care. Revisions to the Rules in recent years has clarified the regulatory compliance standards of underdrain systems. Consequently, EPD is unifying surface water and underdrain monitoring requirements under one guidance document. For the purpose of this guidance EPD considers surface water as defined by Rule 391-3-7-.01(aa): "State Waters" means any and all rivers, streams, creeks, branches, lakes, reservoirs, ponds, drainage systems, springs, wells, and other bodies of surface or subsurface water, natural and artificial, lying within or forming a part of the boundaries of the State which are not entirely confined and retained completely upon the property of a single individual, partnership, or corporation, except as may be defined in O.C.G.A. 12-7-17(8) (O.C.G.A. 12-7-3(16).

Underdrain Systems: Rule 391-3-4-.07(1)(d)1.b. and EPD's Circular 14 specify the minimum vertical distance between the landfill's liner system and the seasonal high groundwater elevation of at least 5 feet. In order to maintain the required separation, the design of some landfills includes an underdrain system. In general terms, an underdrain system is a subsurface drainage system that consists of a network of perforated pipes in gravel installed to intercept the local groundwater table. Once the groundwater is intercepted by the underdrain system, it is conveyed to a collection pond or discharged at the ground surface via one or more outlets or outfalls. In addition, intermittent or

perennial streams that originate on the property of a permitted waste facility have historically been piped below the waste disposal areas at the facility. EPD considers these piped streams as also being an underdrain.

APPLICABILITY

The following facilities defined in Rule 391-3-4-.01 that are active, in closure, or in post-closure care are subject to the requirements of this guidance:

- Municipal Solid Waste Landfills (MSWLF),
- Construction/Demolition Waste (C&D) Landfills;
- Other landfill facilities permitted under the Rules for Solid Waste Management in Georgia where groundwater monitoring is required by the Division.

Exceptions

Permitted solid waste facilities that have completed the removal of waste from all waste units as part of an EPD approved closure plan, are not required to perform surface water monitoring, unless EPD determines the potential for surface waters to be affected.

DESIGN OF SURFACE WATER AND UNDERDRAIN MONITORING SYSTEM

A significant origin of non-point source impacts from a permitted solid waste facility is from surface run-off contaminated with leachate. Leachate is a liquid that has passed through or emerged from solid waste and contains soluble, suspended, or miscible materials removed from such waste. Run-off contaminated with leachate can occur at the working face of an active landfill, from erosion of slopes of the waste units, or from a leachate seep from a waste unit. In addition, a release of landfill gas condensate in run-off could also potentially cause impacts.

Surface Water Monitoring Locations

Surface Water Monitoring should be located at the following as applicable:

- At the upstream location where a perennial or intermittent surface water enters a permitted solid waste facility boundary, and at the downstream location where a perennial or intermittent surface water leaves the solid waste facility boundary;
- At the downstream location where a perennial or intermittent surface water leaves the solid waste facility boundary, where the perennial or intermittent surface water originates on the permitted solid waste facility;
- At the upstream location where an adjacent perennial or intermittent surface water first abuts a permitted solid waste facility boundary, and at the downstream location where the adjacent perennial or intermittent surface water abuts the solid waste facility boundary;
- Where no on-site or adjacent perennial or intermittent surface waters exist: where a stormwater detention pond or temporary stormwater impoundment is located at

the permitted facility boundary, the retained water in the pond itself should be sampled, but not the discharge from the outfall.

Underdrain Monitoring Locations

Underdrain Monitoring Locations should be located:

- Where an underdrain channels a perennial or intermittent stream below the disposal areas, monitoring locations should be established immediately upstream of where the underdrain first channels the surface water, and downstream where the underdrain discharges at the surface.

- Where an underdrain discharges a concentrated flow from the sub-surface only, the monitoring location should be established at the discharge point where the flow reaches the surface.

Establishing Monitoring Locations, Designations and Markers

All monitoring locations (surface water and underdrain sampling locations) need to be surveyed (location and elevation). An as-built site monitoring location map that includes all monitoring locations needs to be developed and incorporated into the Groundwater and Surface Water Monitoring Plan. Permanent markers need to be established adjacent to all monitoring locations with signs identifying each monitoring location designation. The groundwater and surface water monitoring plan will include a description of the type of markers to be used. Surface monitoring locations are usually designated in the following manner: SWA-1, SWA-2 for upgradient locations, SWC-1, SWC-2 for downgradient locations. The underdrain sampling location will usually be designated as UDA-1, UDA-2 for sampling points immediately upstream of an underdrain, and UDC-1, UDC-2 for sampling points at the discharge point of the underdrain.

SURFACE WATER/UNDERDRAIN MONITORING PROCEDURES

The quality of the water discharged from the surface water or underdrain system must be monitored as part of the groundwater and surface water monitoring plan. Samples from flowing surface waters should be collected ideally from mid-depth of the water column within the main flow, in an appropriate decontaminated container. Sampling methodologies in accordance with EPA Region IV Science and Ecosystem Support Division (SESD), Operating Procedure for Surface Water Sampling (SESDPROC-201-R4) as amended, should be employed. Once the sample has been collected into laboratory supplied containers, they should be submitted to a National Environmental Laboratory Accreditation Program (NELAP) certified laboratory using chain-of-custody protocols.

Surface water monitoring points that are outfalls or underdrain monitoring locations must be visually inspected during the scheduled groundwater sampling events. Specifically, the objectives of this inspection are:

1) To verify that the outlet/outfall is free of any obstruction or excessive silt accumulation, and functioning as designed;

2) To observe whether any visible discharge is associated with the surface water/underdrain monitoring point. If a flowing discharge is detected at any outlet/outfall, samples must be collected for analysis.

Analytical Requirements

Analytical methods approved by EPA for drinking water compliance should be used for analysis. The methods are specified in 40 CFR 141 Appendix A to Subpart C. For analysis of constituents where no standard method exists in 40 CFR 141 Appendix A to Subpart C, a method should be selected from the SW-846 Compendium per 40 CFR Parts 122 through 270, as amended.

Sampling parameter requirements and relevant compliance and comparison standards are shown in Table 1 below:

Table 1. Surface Water Sampling Parameters

Solid Waste Disposal Facility Type	**Surface Water Parameters**	**Surface Water Established Standard for Underdrains Only**	**Surface Water Comparison Standard for Non-underdrain sampling locations**
Construction and Demolition (C&D) Landfills and Municipal Solid Waste Landfills (MSWLs).	pH, chloride, Total Dissolved Solids (TDS), Appendix I Volatile Organic Compounds (VOCs).	Appropriate Instream Water Quality Standard per Rule 391-3-6-.03(5)(e)(iv) As Approved by US EPA Region 4 on 01/20/2021 (Specific parameter standards are shown in Table 2).	
MSWLs receiving Coal Combustion Residuals (CCRs).	Appendix I VOCs and Appendix III constituents (boron, calcium, chloride, fluoride, pH, sulfate, TDS.		
Private Industrial Landfills where groundwater monitoring is required (CCR units are excluded).	pH, chloride, TDS, other constituents depending on an individual facility's waste-stream.		

Note: Appendix I refers to sampling parameters for 40 CFR 258 Appendix I.
Appendix III refers to parameters for 40 CFR 257 Appendix III

Additional monitoring parameters may be required by EPD based on monitoring results and site conditions.

DATA EVALUATION AND REPORTING

Surface water and underdrain sampling analytical results and field parameter measurements must be submitted with the facility's semi-annual groundwater monitoring report. Any surface water sampling points with insufficient flow to sample should be documented. The locations of surface water and underdrain sampling points should be shown on a figure. Analytical concentrations of constituents detected in monitoring data should be displayed in trend charts to determine general trends over time at each sampling point.

Comparison to Water Quality Standards

A comparison of constituent concentrations against the relevant water quality standards, must be shown in tabular format in the semi-annual sampling report for the facility. The table will show the sample identification number, the classification of the sampling point (upstream, downstream, or outfall) the name of the constituent, the concentration of the constituent, and the specific instream water quality standard to which the constituent is being compared. Concentrations above the relevant standard for that sampling event must be highlighted or bolded in the table. Please note that a comparison to the appropriate instream water quality standards is only a determination of compliance (to applicable standards) for underdrain sampling locations. Results from other surface water sampling points are for comparison purposes only. The results should also be discussed in the text of the report, together with a comparison of upstream and downstream sampling data, and any other qualifying information or data.

LEACHATE RELEASES

As defined in Rule 391-3-4-.01 Definitions (64) "Release" means the discharge, deposit, injection, dumping, spilling, emitting, releasing, leaking, or placing of any substance into or on any land or water of the state.

Within 48 hours of a release of leachate that was uncontained for more than 24 hours and/or has reached outside the lined area of the facility, the facility shall report the release to the Solid Waste Management Program and the local District Office of EPD. Within 7-days of reporting the leachate release to EPD, the facility will initiate the sampling and analysis of all surface water and/or underdrain monitoring points for the appropriate chemical constituents listed in this guidance, along with additional site-specific analyses that may be requested by EPD based on site conditions. In addition, any area where leachate is observed leaving the permitted facility boundary will also be sampled. This additional sampling may include, but not limited to, soil, sediment and surface water sampling. Sampling of these locations will be conducted every 7-days while a leachate

release continues at the facility. Sampling may stop when the release has been contained or when the results show no more impact from the release.

Within 60 days of reporting the release to EPD, a report will be submitted to the Solid Waste Management Program documenting the areal extent of both source(s) and impact of the release(s), mitigation measures to address the release(s), current status of the release, planned additional efforts, discussion of the results and laboratory analytical reports of all testing to date including comparison of constituents to appropriate Instream Water Quality Standards and any exceedances of established standards per Rule 391-3-4-.07 3(v). Where soil testing has been conducted to establish if there have been impacts to stormwater detention ponds or other areas impacted by the release, constituents should be compared to Type 3 or 4 Risk Reduction Standards for Soil in the Hazardous Site Response Rules 391-3-19-.07.

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William Cook, Manager Date
Solid Waste Management Program

Replaces and supersedes: Permit Conditions for Surface-Water Monitoring 7/95

Attachment: Table 2

Table 2, Appropriate Instream Water Quality Standards per Rule 391-3-6-.03(5)(e)(iv)

Constituent	Instream Concentration (mg/L)
Benzene	0.051
Benzo(a)pyrene (PAHs)	0.000018
Carbon tetrachloride	0.0016
Chlordane	0.00000081
Chlorobenzene	1.6
o-Dichlorobenzene	1.3
p-Dichlorobenzene	0.19
1,2-Dichloroethane	0.037
1,1-Dichloroethylene	7.1
trans-1,2-Dichloroethylene	10
Dichloromethane	0.59
1,2-Dichloropropane	0.015
Di(2-ethylhexyl) phthalate	0.0022
Endrin	0.00006
Ethylbenzene	2.1
Heptachlor	0.000000079
Heptachlor epoxide	0.000000039
Hexachlorobenzene	0.00000029
Hexachlorocyclopentadiene	1.1
Lindane	0.0018
Polychlorinated biphenyls (PCBs)	0.000000064
Pentachlorophenol	0.003
Tetrachloroethylene	0.0033
Toluene	5.98
Toxaphene	0.00000028
1,2,4-Trichlorobenzene	0.07
1,1,2-Trichloroethane	0.016
Trichloroethylene	0.03
Vinyl chloride	0.0024