Solid Waste Permitting Sampling and Analysis Plan Guidance

For solid waste facilities that have water quality monitoring, the facility owner or operator must develop a written monitoring plan. The following guidance includes the topics that should be covered in the sampling and analysis plan (SAP) for compliance monitoring. Furthermore, this guidance will provide information on groundwater environmental well sampling, EDD data submittals, and the EQuIS online portal (see Appendix A, Appendix B, and Appendix C, respectively for further information).

This document (Guidance) outlines the standard of care and best practices intended to guide professionals in delivering high quality groundwater data and ensuring optimal outcomes. SAPs, sampling, analysis and reporting must adhere to all requirements in Minn. R. 7001.0150 and 7035.2815, subp. 10 and 14. This guidance is meant to assist in fulfilling the rule requirements to yield representative data to determine compliance with the terms and conditions of the facility permit and Minnesota and federal pollution control statutes and rules. This guidance is consistent with other Minnesota Pollution Control (MPCA) program guidance and Environmental Protection Agency (EPA) requirements.

1. General SAP requirements and use

1. The MPCA-approved SAP must be included in a section of the facility operations manual.[1]
2. A hardcopy of the SAP must be kept at the facility and followed during sampling and sample analysis.
3. The SAP must be reviewed at least annually by the owner or operator, sampling personnel, and analytical laboratory and revised as needed.
4. Sampling personnel must receive copies of sampling plans prior to the commencement of each sampling event. Pre-sampling briefings will be held by the site/project manager to apprise participants of the objectives, sample locations, and chain-of-custody procedures to be followed.
5. Revisions of the SAP must be submitted to the MPCA upon written request or as specified in the facility permit, order, or stipulation agreement. The SAP must be revised immediately when there are any changes in the monitoring system, field or analytical procedures, sampling personnel, or analytical laboratory.
6. Past SAP language with effective dates must be retained throughout the operating life of the facility and the post closure care period.
7. All wells must be sampled according to permit requirements and the approved SAP. If a well frequently and persistently yields insufficient volume to collect appropriate samples via the methods described in this document, the well should be replaced by a well with a deeper screened interval in a more connected position within aquifer materials that can be consistently sampled under all groundwater conditions.

2. SAP required sampling information

This section is an overview of sampling requirements. More information and recommendations are detailed in Appendix A.

[1] Minn. R. 7035.2815, subp. 14(G)

The following reference and procedural information must be included in the SAP or support alternative approaches that achieve these conditions:

1. Background information:
    - The purpose of the SAP;
    - names and contact information of project personnel, including roles and responsibilities;
    - brief site description and operational history; and
    - site geology and hydrogeology as it relates to sampling. Include:
        - a description of the major hydrogeologic units at the site and cross-sectional drawing(s) showing the hydrogeologic units relative to the landfill monitoring wells (if available); and
        - hydrogeological information for the well including, but not limited to, the hydrogeologic unit that the well is completed in and whether the aquifer that the well is completed in is unconfined or confined (if available).
2. Data quality objectives.
3. General information should be included that documents:
    - Sample collection timeframes, frequency, and analytes to be evaluated;
    - quality control acceptance criteria (may include reference to lab table(s) included in the document);
    - specific analyte limits that data will be compared to; and
    - steps that will be taken to resample monitoring point(s) or otherwise assess results if data are found to exceed the specified limits.
4. Clear and legible map showing location of sampling points, the compliance boundary, and key-site features.
5. Table(s) of monitoring locations must be included with the following at a minimum:
    - Unique identification number;
    - common well name;
    - coordinates (UTM 15 North);
    - elevation data including:
        - surveying method;
        - the vertical datum used;
        - survey reference point (i.e., benchmark, control point, monument) information;
        - the elevation of the top of well casing/riser at the water level measuring point;
        - ground surface elevation at the well location;
    - date of well installation;
    - date of well sealing (if applicable);
    - screened interval (below top of casing);
    - total well depth (below top of casing); and
    - citation for location of well construction log.
6. Sampling parameters and frequency (annual sampling periods), including the following:
    - Current analyte limits for each sampling location;
    - the order in which the monitoring points will be sampled;[2]
    - all tests and measurements needed at each monitoring point, and the order in which they will be carried out;[2] and
    - equipment and containers to be used, with procedures and precautions for their use.[2]

[2] Minn. R. 7035.2815, subp. 14(H)

7. Sampling parameters and/or monitoring frequencies must be updated in the SAP every time the monitoring plan is changed to ensure that the SAP reflects the most up-to-date sampling plan. Changes can be made to the SAP pending permit modification or reissuance.
8. Procedures and precautions to avoid introducing contaminants from outside sources into monitoring wells or samples, and when and how equipment must be cleaned between uses.[2]
9. Procedures for purging each monitoring well before each sampling.[2]
10. Procedures for well purging and stabilization, including criteria to determine stabilization.[3]
11. If required, procedures for sampling surface water monitoring points, including exact sampling locations and depths, and for sampling leachate.[2]
12. Quality control procedures to identify outside sources of contamination and sampling error, including types and numbers of quality control samples to be used in the field and during transport and associated handling procedures for these samples.[2]
13. Procedures and criteria for field filtration of samples, when appropriate, using in-line methods or other procedures that minimize loss of dissolved constituents from solution.[2][4]
14. Sample preservation, including preservatives and temperature control requirements.[2]
15. Procedures for sample labeling, sample handling and storage at the facility, and transport to the laboratory.[2]
16. Chain-of-custody procedures.[2]
17. Procedures for measuring water levels.[3]
18. Examples of all field records, logs, and forms; they must include places to record the names of the persons conducting the sampling, the time and date each monitoring point is sampled, water elevations and other required field measurements, and the purging procedures and test results before sampling. The owner or operator must retain the field records throughout the operating life of the facility and the postclosure period.[5]
19. Procedures for inspecting monitoring points for damage or obstructions. Damaged or obstructed monitoring points must be repaired, and the point must be resurveyed and incorporated into the SAP, as necessary.[6]
20. Management of investigative-derived waste (IDW).
21. All applicable standard operating procedures (SOPs) including calibration of field equipment.

3. Analysis information

This section is an overview of analysis requirements. Further explanation is available in the contracted laboratory's Quality Assurance Manual (QAMs) and/or SOPs. The SAP must include the following reference and procedural information from the contracted laboratory:

1. Documentation of analytical methods, quality control procedures, and laboratory equipment used; the documentation should support the selections for yielding accurate results within the range of concentration and composition of the samples analyzed. All appropriate actions must be taken to minimize error and to assure the reliability, precision, and accuracy of the analytical results.[7][8]
2. Responsibilities of laboratory personnel.[8]
3. Sample containers and preservatives and sample holding times.[8]

[3] Minn. R. 7035.2815, subp. 14(J)
[4] Minn. R. 7035.2815, subp. 14(K)
[5] Minn. R. 7035.2815, subp. 14(L)
[6] Minn. R. 7035.2815, subp. 10(T)
[7] Minn. R. 7035.2815, subp. 14(M)
[8] Minn. R. 7035.2815, subp. 14(N)

4. For each analytical constituent, the laboratory's measurements of precision and accuracy over a range of concentrations, limit of quantitation, and an explanation of how these quantities were measured.[8] Ensure the laboratory used to analyze the samples can meet the reporting limits required in the permit.
    - Where the limit of quantitation for a substance is higher than the concentration of concern, the MPCA hydrologist may investigate the feasibility of attaining lower analytical limits and must require lower limits if necessary and feasible.[8] An analytical method with a quantitation limit higher than the concentration of concern shall not be used unless otherwise approved.
5. Methods used to identify and prevent contamination of samples in the laboratory and during transport.[8]
6. Analytical quality control procedures.[8]
7. Methods of reviewing and assessing all data for completeness and accuracy.[8]
8. Sample retention times after analyses are completed.[8]
9. Inspection, testing, and preventive maintenance programs for all laboratory equipment.[8]
10. Chain-of-custody procedures.[8]
11. Procedures for documentation and retention of quality control results.[8]
12. Continuing education requirements for analytical personnel.[8]
13. Documentation of the quality assurance program including quality control procedures to assess the reliability, precision, and accuracy of the analytical results.[9]
14. Descriptions, criteria for, and frequencies of use of field and trip blanks, laboratory blanks, calibration standards, laboratory control samples, matrix spike/matrix spike duplicates, field duplicates, and other quality control procedures.[9]
15. Minnesota Department of Health accreditation certificate for the laboratory.

4. Reporting

The section is an overview of reporting requirements. In-depth explanations are detailed in Appendix A, Appendix B, and Appendix C.

1. The SAP should describe the information to be submitted with the monitoring results including:
    - A certification signed by the sampling personnel, analytical laboratory, and owner or operator stating whether all procedures, from obtaining the samples through completion of the analyses, were performed as described in the approved SAP, describing any departures from these procedures and explaining why these departures were necessary.[10]
    - A map showing locations of sampling points, fill areas with waste type identified, and the compliance boundary.
    - Water elevations, required field measurements and observations, dates and times when each sample was collected and received by the analytical laboratory, and the date each sample was analyzed.[10]
    - Analytical results from all blanks.[10]
    - Any additional information needed to establish the validity of the analytical results, including precision and accuracy data from the batch of samples in which each sample was analyzed, limits of quantitation, results from other quality control procedures, chain-of-custody records, and field records.[10]
        - Results that are not low enough to establish compliance with the reporting limit should be J flagged.
    - Field data sheets and complete laboratory reports.

[9] Minn. R. 7035.2815, subp. 14(O)
[10] Minn. R. 7035.2815, subp. 14(P)

2. All environmental monitoring data including groundwater, surface water, leachate, gas, and soil monitoring results should be submitted electronically through the Environmental Quality Information System (EQuIS) data environment using the LAB_MN format.
3. It is recommended that the MPCA Chain-of-Custody form be used. If another chain-of-custody form is used, ensure that all the required fields associated with data formats on the MPCA Chain-of-Custody form are included. The project code for compliance at solid waste facilities is PRJ07913. The Minnesota Location Identifiers, Minnesota Unique Well number, or Location Unique Identifier (LUI) must be used to ensure the data are associated with the correct sampling locations. If you have any questions about the location identifiers for your facility, contact MPCA program staff for assistance.
4. More information about report and data submittal can be found on the MPCA Solid Waste Permitting webpage.