North Carolina Hazardous Waste Section Guidelines for Groundwater Monitoring Reports

Groundwater Monitoring Reports submitted to the Hazardous Waste Section (HWS) should, at a minimum, include the following information:

1. Transmittal cover letter, including facility name, contact, address, and EPA ID number.

2. Title and Certification Page, including facility name, EPA ID number, and appropriate certification by a North Carolina-licensed Professional Engineer or Professional Geologist.

3. Table of contents.

4. Acronym List.

5. Executive Summary that includes key observations and conclusions.

6. Introduction containing general information about:

    a. the site location
    b. regional and site-specific geology/hydrogeology
    c. surrounding area
    d. buildings
    e. fences/boundaries
    f. surface water bodies
    g. elevation/topography
    h. other significant site-specific features
    i. operating history, including past and present waste management activities
    j. contamination history, including any identified releases and contaminants of concern (COCs) involved
    k. regulatory history
    l. location and extent of regulated units (Hazardous Waste Management Units [HUMUs], Solid Waste Management Units [SWMUs], and/or Areas of Concern [AOCs]).

    The Introduction section may include a map or maps for clarification, but must also present a narrative description of the items listed above.

7. Description and history of the Remediation System, if the site has one.

8. History of sampling, frequency, and current Sampling and Analysis Plan (SAP).

9. Tabulated groundwater water-levels grouped by hydrogeologic unit/aquifer. Measurements should include:

    a. top of casing
    b. ground surface
    c. screened interval and geologic unit in which the screen is set
    d. depth to water
    e. water elevation (current & historical)
    f. the presence of free-phase contaminants
    g. any newly added or abandoned wells, including temporary wells
    h. appropriate boring & well construction logs

10. Current potentiometric maps for each hydrogeologic unit/aquifer illustrating groundwater flow directions and gradients, and supporting horizontal and vertical velocity computations. Maps should include a directional reference (North arrow) and the location of horizontal and vertical

control points used to establish location and elevation. Historical potentiometric maps should also be presented when necessary to support conclusions or to illustrate changed conditions.

11. Location, significance, and history of the Point(s) of Compliance (POC).

12. Tabulated analytical results (including applicable regulatory standards) and highlighted exceedence(s) of the standards (if any). The table[s] must also include historical analytical results for all constituents detected in each well.

13. Summary of the recent sampling activities and comparisons to past events.

14. Conclusions:
    The report must present a discussion of conclusions and inferences drawn from the collected data by the reporting entity. {Note: It is not the responsibility of the HWS to interpret the collected data for the reporting entity.} Conclusions must:

    a. be internally consistent, fully supported, and defensible;
    b. discuss appropriate regulatory standards and any exceedence(s);
    c. identify and discuss observed changes in site conditions and any anomalous or problematic observations, and justify the exclusion of any data from the interpretation/conclusions determined in the report;
    d. evaluate the progress of corrective measures;
    e. verify the validity of, or identify necessary modifications to, the current Conceptual Site Model (CSM); and,
    f. propose a continuing course of action.

15. Figures and maps are intended to clarify or support conclusions. They should include:

    a. site location with regulatory units and key features;
    b. monitoring well locations;
    c. potentiometric maps with groundwater flow directions clearly illustrated;
    d. plume maps (for appropriate COCs) illustrating contaminant distribution in plan-view;
    e. longitudinal and transverse cross-sections illustrating subsurface structure/conditions and vertical distribution of contaminants;
    f. flow nets illustrating groundwater flow in both vertical and horizontal domains;
    g. graphical representation(s) of decline in concentration and/or transformation of contaminants of concern through time; and,
    h. any other illustrations that may be deemed useful to provide support and/or verification of information/conclusions contained in the report

    All maps and figures must be presented at a scale that renders them readily legible and contain a directional reference and graphical scale. Cross-sections must include horizontal and vertical scales, vertical exaggeration, and index maps clearly showing the line(s) of section represented. {Note: The effect[s] of vertical exaggeration must be considered in construction of flow nets.}

16. Analytical reports and chain(s)-of-custody.

17. Data QA/QC, validation methods, and an explanation of any data qualifiers.

18. References.