

# FINAL

SUBJECT: Ground Water Monitoring Program  
Plan Requirements for Wastewater  
Facilities

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PURPOSE: To establish consistent recommendations from DDAGW staff to Division of Surface Water (DSW) staff regarding ground water monitoring program plans for facilities regulated by DSW.

BACKGROUND: After completion of Phases I, II, and III of the hydrogeologic site investigation process, as outlined in DSW Policy #4.16, a ground water monitoring system may be required. Possible exceptions include: lime sludge surface impoundments, storm runoff ponds, coal pile runoff ponds, surface impoundments that utilize a double synthetic liner system with a leak detection layer between the liners, concrete lined disposal areas that are considered tanks and surface impoundments that are only used for a very short period of time. The ground water monitoring system should be designed based on monitoring the first continuous significant zone of saturation underlying the facility and all significant zones of saturation above the first continuous significant zone of saturation underlying the facility. The ground water monitoring system shall be able to immediately detect ground water quality degradation from the facility.

GUIDANCE: Any wastewater facility required to install a ground water monitoring system should submit an approvable ground water monitoring program plan after completion of the hydrogeologic site investigation process.

The ground water monitoring system specified in the plan should be based on site-specific information acquired during the hydrogeologic site investigation process and should be capable of immediately detecting a release from the facility being monitored to the first continuous significant zone of saturation underlying the facility and all significant zones of saturation above the first continuous significant zone of saturation underlying the facility.

The facilities ground water monitoring program (GWMP) should be based on the Attachments included with this guidance document. The Attachments, and citation, which address a specific section of the GWMP are summarized below.

Definitions of Key Terms: The definitions for key terms are contained in Attachment A of this document. These definitions are consistent with those used in Ohio's solid waste regulations.

Hydrogeologic Site Investigation Report: The information listed in Attachment B should be within the hydrogeologic site investigation report. This information should be submitted in narrative form with all supporting data sheets and well logs attached in appendices. This information is necessary in order to determine if the engineering design and the proposed ground water monitoring program of the facility will be sufficient to protect the ground water beneath the facility. Additional information on hydrogeologic site investigation reports may be found in the Division of Drinking and Ground Waters (DDAGW) procedural document (DDAGW-03-02-300) on hydrogeologic site investigation reports.

Siting Criteria: The siting conditions listed in Attachment C of this document represent areas and conditions where normal engineering design may not adequately protect the ground water resource beneath the site. If the wastewater facility is not located in any of the sites described in Attachment C and is underlain by at least 15 feet of geologic material of low permeability and/or if no significant ground water resource is present and a liner is used, then less stringent requirements or the waiver of ground water monitoring requirements should be considered.

If the facility is to be located in any of the areas listed in Attachment C, then ground water monitoring and additional engineering features should be incorporated into the design to protect the ground water resource. The siting conditions are consistent with those listed in DSW Policy #2.05.

**Ground Water Monitoring Program:** The ground water monitoring program (GWMP) plan should be described within the permit application. The ground water monitoring program should be designed so that any impact on ground water quality from the facility to the first continuous zone of saturation underlying the facility and all significant zones of saturation above the first continuous significant zone of saturation underlying the facility can be determined. The GWMP plan should be consistent with the requirements described in Attachment D through G. The siting of the ground water monitoring well system shall be based on information contained in the hydrogeologic site investigation report.

**Double Synthetic Liner System:** Groundwater monitoring is waived for wastewater facilities utilizing a double synthetic liner system. The special conditions recommended to be attached to the permit upon approval by DSW are described in Attachment H.

Attachment A  
Definitions of Select Terms  
Used in This Guidance

1. "Aquifer System" means one or more geologic units(s) or formations(s) that is/are wholly or partly saturated with water and is/are able to store, transmit, and yield significant amounts of water to wells or springs.
2. "Developed Spring" means any spring which has been permanently modified by the addition of pipes or a collection basin to facilitate the collection and use of spring water.
3. "Ground Water" means any water below the surface of the earth in a zone of saturation.
4. "Public water supply well" means any well connected to a public water system as defined by paragraph (J) of rule 3745-81-01 of the Administrative Code.
5. "Public well field" means any system of wells which are connected to a public water system as defined by paragraph (J) of rule 3745-81-01 of the Administrative Code.
6. "Significant zone of saturation" means a zone of saturation that may act as a preferential pathway of migration away from the limits of waste placement.
7. "Zone of saturation" means that part of the earth's crust excluding the capillary zone, in which all voids are filled with water.

Attachment B  
Hydrogeologic Site Investigation Report

A hydrogeologic site investigation report shall be presented in narrative form in a report to be included with the permit-to-install. This report shall at a minimum include:

1. Sufficient hydrogeologic information to allow the Director to:
  - a. identify and characterize the hydrogeology of the first continuous significant zone of saturation underlying the facility and all geologic strata that exists above that zone; and
  - b. sufficiently characterize the site geology to allow for the evaluation of the proposed design of the facility and to ensure that it will comply with the requirements of Ohio Revised Code (ORC) 6111.
2. A description, based on publicly available information, of the hydrogeology within 2000 feet of the proposed facility. This shall include, but may not be limited to:
  - a. the identification of all aquifer systems used as water supplies within 2000 feet of the facility; and
  - b. the well logs of public and private water supply wells within 2000 feet of the proposed facility; and
  - c. the average yield of water supply wells within 2000 feet of the facility; and
  - d. the direction of ground water flow in the aquifer system(s) used as water supply sources within 2000 feet of the facility; and
  - e. the identification of recharge and discharge areas of the aquifer system(s) used as water supply sources within 2000 feet of the facility; and
  - f. the identification of any public water supply wells within 2000 feet of the facility; and
  - g. regional stratigraphy, geomorphology and structural geology.
3. A detailed description, including the presentation of cross sections, of the hydrogeology under the proposed facility. This description shall be based on data collected from boreholes, piezometers, and test pits. The description shall include but may not be limited to:
  - a. A description of the consolidated and unconsolidated deposits forming stratigraphic units from the ground surface down to the base of the first continuous significant zone of saturation underlying the facility including:
    - i. Sedimentary composition for unconsolidated formations including:
      - a. Textural classification: ASTM version of Unified Soil Classification System - USCS; and
      - b. Atterberg limits; and
      - c. Grain size distribution (sieve and hydrometer curves for representative samples of each group of borings of similar soil composition); and

- d. Hydraulic conductivity; and
- ii. thickness; and
- iii. lateral extent; and
- b. A description of the geomorphology at the proposed facility; and
- c. A description of the first continuous significant zone of saturation underlying the facility and all significant zones of saturation above the first continuous significant zone of saturation underlying the facility. This description shall include the depth to, and lateral and vertical extent of the first continuous significant zone of saturation to extend completely beneath the facility. This description shall include but not be limited to:
  - i. Temporal fluctuations in ground water levels and the effects on ground water flow directions;
  - ii. An interpretation of the ground water flow system, including rate of flow, direction of flow, vertical and lateral components of flow, and interconnections between and within significant zones of saturation to extend completely beneath the facility. This interpretation shall be described in both narrative and map form;
  - iii. Identification and characterization of recharge and discharge areas within the boundaries of the proposed facility. This shall include any relationships of ground water with seeps, springs, streams and other surface water features; and
  - iv. A quantification of the vertical and horizontal hydraulic conductivity of the first continuous significant zone of saturation underlying the facility and all significant zones of saturation above the first continuous significant zone of saturation underlying the facility.
- 4. A detailed description of:
  - a. The drilling and soil sampling methods used in characterizing the soil and hydrogeologic properties of any unconsolidated and consolidated rock material underlying the proposed facility; and
  - b. The analytical procedures and methodology used to characterize the soil and rock materials obtained from test pits and borings;
  - c. The methodology, equipment, and procedures used to define the uppermost aquifer system and all significant zones of saturation above the uppermost aquifer system including:
    - i. Well and piezometer construction specifications; and
    - ii. Water level measurement procedures.
  - d. The methodology, equipment, and procedures used to determine the groundwater quality (if determined) in any significant zone of saturation including:
    - i. Detection of immiscible layers; and
    - ii. Collection of ground water samples, including:

- a. Well evacuation;
  - b. Sample withdrawal;
  - c. Sample containers and handling; and
  - d. Sample preservation.
- iii. Performance of field analysis, including:
- a. Procedures and forms for recording data and the exact location, time, and facility-specific considerations associated with the data acquisition; and
  - b. Calibration of field devices; and
- iv. Decontamination of equipment; and
- v. Analysis of ground water samples; and
- vi. Chain of custody control, including:
- a. Standardized field tracking reporting forms to record sample custody in the field prior to and during shipment; and
  - b. Prepared sample labels containing all information necessary for effective sample tracking; and
- vii. Field and laboratory quality assurance and quality control including:
- a. collection of replicate samples; and
  - b. Submission of field-bias blanks; and
  - c. Potential interferences.
5. All boring logs, test pit logs, ground water quality data, soil analytical data, and any other data generated while preparing this report.

Attachment C  
Geologic Conditions and Sites that Require  
Additional Engineering Protection

1. Within one thousand feet of a public water supply well that is part of a public water supply well field supplying less than 75,000 gallons per day to a public water supply system or within fifteen hundred feet of a water supply well that is part of a public water supply well field supplying more than 75,000 gallons per day to a public water supply system or within an established and Ohio EPA approved well head protection area.
2. An aquifer system declared by the Federal Government under the "Safe Drinking Water Act" to be a sole source aquifer.
3. An area of potential subsidence due to an underground mine in existence on the date of receipt of the permit to install; and
4. Above an unconsolidated aquifer system capable of sustaining a yield of one hundred gallons per minute for a twenty-four hour period to an existing or future water supply well located within one thousand feet of the limits of waste placement; and
5. Within one thousand feet of a water supply well or a developed spring in existence on the date of permit-to-install application was received by Ohio EPA; and
6. Where the isolation distance between the uppermost aquifer system and the bottom of the disposal unit is less than five feet of insitu geologic material.

Attachment D  
Ground Water Monitoring Program

All wastewater storage, treatment or disposal facilities shall install a ground water monitoring system and should submit an appropriate ground water monitoring program plan after completion of the hydrogeologic site investigation.

The ground water monitoring system specified in the plan should be based on site-specific information acquired during the hydrogeologic site investigation process and should be capable of immediately detecting a release of contaminants from the regulated unit to the first continuous significant zone of saturation underlying the facility and all significant zones of saturation above the first significant zone of saturation underlying the facility.

This plan should consist of the following elements:

1. The number and location of monitoring well and rationale for such placement. Numerous water-bearing zones may need to be monitored. The ground water monitoring well system should be designed based on the following considerations:
  - a. The ground water monitoring system should consist of a sufficient number of wells, installed at appropriate locations and depths to yield ground water samples from the monitored significant zone of saturation that:
    - i. Represent the quality of ground water that has not been affected by past or present operations at the waste treatment or disposal area; and
    - ii. Represent the quality of ground water passing directly downgradient of the perimeter of the waste treatment or disposal area.
    - iii. The casing should be screened or perforated and packed with sand or gravel in such a way that allows:
      - a. For the minimization of the passage of formation materials into the well; and
      - b. For the monitoring of discrete portions of the geologic unit being monitored;
    - iv. The design, installation, development and abandonment of any monitoring wells, piezometers, and other measurement, sampling, and analytical devices should be documented in the operating record; and
    - v. The monitoring wells, piezometers and other measurement, sampling, and analytical devices should be operated and maintained to perform to design specifications throughout the life of the monitoring program;
  - b. The number, spacing and depths of ground water monitoring wells should be:
    - i. Based on site specific hydrogeologic information obtained during the hydrogeologic site investigation process and;
    - ii. Capable of immediately detecting a release from the waste disposal area to the geologic unit being monitored at the closest practical distance from the limits of waste treatment or disposal.

c. At least annually, the ground water surface elevations that are obtained under Section 4 of this Attachment should be evaluated to determine whether the requirements of Section 1(a) and (b), for locating the monitoring wells, continues to be satisfied. If the evaluation shows that Section 1(a) and (b) is no longer satisfied, the facility should immediately modify the number, location, or depth of the monitoring wells to bring the ground water monitoring system into compliance with this requirement.

2. A Sampling and Analysis Plan (SAP). The SAP should ensure the ground water samples are representative of ground water quality. (Refer to Attachment F for the components of a Sampling and Analysis Plan); and

3. An assessment plan outline (see Attachment G) that describes a program capable of determining the concentration of any pollutants released to the ground water as well as the extent and the rate of movement of these contaminants in the ground water.

4. The ground water surface elevation shall be measured in each well prior to purging and sampling. The direction of ground water flow shall be determined for each zone monitored every time ground water elevations are determined.

5. Sampling of the noted different types of facilities for the constituents listed below and determining their concentrations in the ground water beneath the facility.

a. DSW regulated facilities which only accept for disposal non-toxic flyash, bottom ash or foundry sand should sample for the following parameters:

i. Parameters establishing ground water quality:

Barium	Lead
Calcium	Magnesium
Chloride	Manganese
Gross Alpha	pH
Gross Beta	Selenium
Iron	Sodium

ii. Parameters used as indicators of ground water contamination:

Alkalinity	Sulfate
Specific Conductivity	Total Dissolved Solids (TDS)

b. Small municipalities as defined by the DSW should sample for the following parameters:

i. Sampling for parameters establishing ground water quality may place an unreasonable financial burden on the budget of small municipalities. As such, the Ohio EPA is not requiring these entities to sample for parameters establishing ground water quality.

ii. Parameters used as indicators of ground water contamination:

Ammonia, as N	pH
Chloride	Sodium
Nitrate, as N	Specific Conductivity

c. Large municipalities as defined by the DSW should sample for the following parameters:

i. Parameters establishing ground water quality:

Barium	Manganese	Phosphorus, total
Calcium	Magnesium	Potassium
Chloride	Nitrate, as N	Selenium
Iron	Nitrite, as N	Sodium
		Sulfate

ii. Parameters used as indicators of ground water contamination:

Ammonia, as N	Total Organic Carbon (TOC)
Chemical Oxygen Demand (COD)	Total Organic Halogens (TOX)
Specific Conductivity	

d. Industrial facilities as defined by the DSW should sample for the following parameters.

i. Parameters establishing ground water quality:

Calcium	Potassium
Chloride	Sodium
Magnesium	Specific Conductivity
pH	Sulfate
	Total Alkalinity

ii. Parameters used as indicators of ground water contamination will be based on site-specific waste characterization.

Note: This list may be modified based on site-specific waste characterization.

6. For all monitoring wells, the facility should establish initial background concentrations for all pertinent parameters listed in Section 5. The permittee should do this quarterly for one year. The action should be initiated prior to waste placement in any new facilities.
7. After the first year of establishing background concentrations all ground water monitoring wells should be sampled and the samples analyzed at the following time intervals:
  - a. Samples collected to establish ground water quality should be obtained and analyzed for all parameters specified in the appropriate 5 (i) Section at least annually.
  - b. Samples collected to indicate ground water contamination should be obtained and analyzed for the parameters in the appropriate 5 (ii) Section at least semi-annually.
8. The minimum frequency of sampling used to establish background and downgradient (after the initial year) ground water quality for parameters used to indicate ground water contamination, listed in the appropriate 5 (ii) Section of this attachment, should be consistent with the statistical procedure utilized pursuant to Attachment E. The minimum frequency of sampling should be as often as necessary to ensure, with reasonable confidence, that a contaminant release to the ground water from the facility will be detected.
9. The permittee should determine whether or not there is a significant increase (and/or decrease in the case of

pH), over background values for each indicator parameter listed in the appropriate 5 (ii) Section using the approved statistical/data evaluation method chosen from Attachment E. The permittee should make these determinations semi-annually. In determining whether a significant change has occurred, the permittee should compare the ground water quality of each indicator parameter at each downgradient ground water monitoring well to the background value of that indicator parameter according to the approved evaluation procedures specified in Attachment E.

10. All ground water and statistical analysis/data analysis results generated in accordance with sections 4, 5, 6, 7, 8, and 9 above should be submitted to the appropriate Ohio EPA districts, Division of Surface Water within 75 days after sampling the well. All ground water data, with the accompanying text, should be submitted to the appropriate Ohio EPA district office's Division of Surface Water for evaluation by the Division of Drinking and Ground Waters.
11. If, at any monitoring well, the permittee determines that there has been a statistically significant increase (or decrease in the case of pH) from background values according to the statistical method specified by the permittee pursuant to Attachment E for the indicator parameters specified in the appropriate 5 (ii) Section, the permittee shall notify the Director not later than fifteen (15) days after receiving the statistical results which indicate a statistically significant change. The notification must also indicate which parameters have shown a statistically significant change from background levels.
12. The permittee may demonstrate that a source other than the regulated unit cause the contamination or that the statistically significant increase resulted from an error in sampling, analysis, statistical evaluation, or natural variation in ground water quality. A report documenting this demonstration must be approved by the appropriate Ohio EPA district office's Division of Drinking and Ground Waters through the Division of Surface Water. If a successful demonstration is made and documented, the permittee may continue detection monitoring as specified in this attachment. If after 90 days after notification to the Director of the significant change, a successful demonstration is not made, the permittee must submit and implement a ground water quality assessment plan. The ground water quality assessment plan should be consistent with DDAGW policy #PP303.300 (Appendix E) and Attachment G concerning ground water quality assessments. This plan should be able to determine the concentrations, rate and extent of all contaminants in the ground water from the regulated unit.
13. Any monitoring wells, or borings drilled at the proposed or permitted facility must be abandoned per OAC Rule 3745-09-10 and per any other applicable requirements.

Attachment E  
Statistical Procedures To Be Used In  
Analyzing Ground Water Quality Data

1. The permittee should, within 90 days of obtaining the final sample which completes the initial year of ground water monitoring, specify one of the following statistical procedures to the appropriate Ohio EPA district office's Division of Drinking and Ground Waters through the Division of Surface Water. The statistical method chosen should be conducted separately for each of the appropriate indicator parameters specified in section 5 of Attachment D. The statistical method specified should be protective of human health and the environment and should comply with performance standards outlined below in section 2. The statistical method specified should be selected from the following methods:
  - a. A parametric ANalysis Of VAriance (ANOVA) followed by multiple comparisons procedures to identify statistically significant evidence of contamination. The method shall include estimation and testing of the contrasts between each monitoring wells median and the background median levels for each constituent.
  - b. An ANalysis Of VAriance (ANOVA) based on ranks followed by multiple comparisons procedures to identify statistically significant evidence of contamination. The method shall include estimation and testing of the contrasts between each monitoring wells median and the background median levels for each constituent.
  - c. A Tolerance or Prediction Interval procedure in which an interval for each constituent is established from the distribution of the background data, and the level of each constituent in each monitoring well is compared to the upper tolerance or prediction limit.
  - d. A Control Chart approach that gives control limits for each constituent.
  - e. Another statistical test method submitted by the permittee and approved by the appropriate Ohio EPA district office's Division of Drinking and Ground Waters through the Division of Surface Water.
2. Any statistical method chosen under section 1 should comply with the following performance standards as appropriate:
  - a. The statistical method used to evaluate ground water monitoring data shall be appropriate for the distribution of chemical parameters or contaminants. If the distribution is shown by the permittee to be inappropriate for a normal theory test then the data should be transformed or a distribution free theory test should be used. If the distributions for the constituents differ, more than one statistical method may be needed.
  - b. If an individual well comparison procedure is used to compare an individual monitoring well constituent concentration with background constituent concentrations, or a ground water concentration level, the test shall be conducted at a Type I error level no less than 0.01 for each testing period. If a multiple comparisons procedure is used, the type I experiment-wide error rate for each testing period shall be no less than 0.05. However, the type I error rate of no less than 0.01 for individual monitoring well comparisons shall be maintained. This performance standard does not apply to tolerance intervals, prediction intervals or control charts.
  - c. If a control chart approach is used to evaluate ground water monitoring data, the specific type of control chart, and its associated parameter values, should be proposed by the permittee and approved by the appropriate Ohio EPA district office's Division of Drinking and Ground Waters through the Division of Surface Water.

- d. If a tolerance interval, or a prediction interval, is used to evaluate ground water monitoring data, the levels of confidence and, for tolerance intervals, the percentage of the population that the interval must contain should be proposed by the permittee and approved by the appropriate Ohio EPA district office's Division of Drinking and Ground Waters through the Division of Surface Water. These parameters should be determined after considering the number of samples in the background data base, the data distribution, and the range of the concentration values for each constituent of concern.
- e. The statistical method should account for data below the limit of detection with one or more statistical procedures that are protective of human health and the environment. Any Practical Quantification Limit (PQL) approved by the appropriate Ohio EPA district office, Division of Drinking and Ground Waters through the Division of Surface Water, under section 1 that is used in the statistical method should be the lowest concentration level that can be reliably achieved within the specified limits of precision and accuracy during routine laboratory operating conditions that are available to the facility.
- f. If necessary, the statistical method should include procedures to control or correct for seasonal and spatial variability as well as temporal correlation in the data.

For further guidance on the statistical analysis of ground water data, the U.S. EPA Guidance Document on the Statistical Analysis of Ground Water Monitoring Data at RCRA Facilities should be consulted.

Attachment F

Ground Water Sampling and Analysis Plans

The Division of Drinking and Ground Waters requires that all ground water sampling and analysis plans, submitted as part of ground water monitoring program plans as governed by DDAGW and DSW policies, must describe methods and procedures involved in the collection of ground water samples, that, at a minimum, include the following information:

1. Measurement of ground water elevations;
2. Collection and handling of ground water samples including:
  - a. well evacuation;
  - b. sample withdrawal;
  - c. sampling equipment;
  - d. procedures for sample filtration;
  - e. sample containers; and
  - f. sample preservation;
3. Performance of field analysis, including:
  - a. Procedures and forms for recording data and the exact location, time and facility specific considerations associated with the data acquisitions; and
  - b. calibration of field equipment;
4. Decontamination of equipment;
5. Disposal of purge water;
6. Ground water sample analysis of all applicable constituents associated with the facility's monitoring program including:
  - a. constituents;
  - b. analytical methods;
  - c. detection limits; and
  - d. laboratory holding times;

7. Quality Assurance/Quality Control (QA/QC) information including:
  - a. samples for field, trip, equipment and laboratory blanks;
  - b. duplicate samples; and
  - c. potential laboratory interferences; and
8. Chain-of-Custody procedures including:
  - a. standardized tracking/reporting forms to establish field sample custody prior to and during shipment; and
  - b. sample labels containing all appropriate information necessary for effective sample tracking.

For further guidance on ground water sampling and analysis plans, see the DDAGW policy Review of Ground Water Sampling and Analysis Plans (PP0303.200).

Attachment G  
Ground Water Quality Assessment Plans

Guidance for the development of a Ground Water Quality Assessment Plan (GWQAP) for wastewater disposal, including but not limited to non-toxic flyash, bottom ash, foundry sand and coal storage pile facilities.

The GWQAP to be submitted should include, at a minimum, detailed descriptions of the following:

1. Hydrogeologic conditions at the facility.
2. The detection monitoring program implemented by the facility, including:
  - a. The number, location (including latitude, longitude, and altitude), depth and construction of detection monitoring wells with documentation (boring and construction logs);
  - b. A summary of detection monitoring ground water analytical data with written documentation of the results (laboratory sheets); and
  - c. A summary of statistical analyses applied to the data.
3. The investigatory approach to be followed during the assessment, including but not limited to:
  - a. The proposed number, location (including latitude, longitude, and altitude), depth, installation method and construction of assessment monitoring wells;
  - b. The proposed method(s) for gathering additional hydrogeologic information; and
  - c. The planned use of indirect methodology (e.g., soil gas or geophysical surveys).
4. The techniques, procedures and analytical equipment to be used for ground water sampling during the assessment, including but not limited to:
  - a. Measurements of ground water elevations;
  - b. Collection of ground water samples, including:
    - i. well evacuation;
    - ii. sample withdrawal;
    - iii. sample containers and handling; and
    - iv. sample preservation;
  - c. Performance of field analysis, including:
    - i. Procedures and forms for recording data and the exact location, time, and facility-specific conditions associated with the data acquisition; and
    - ii. Calibration of field devices:

- d. Decontamination of equipment;
  - e. Methods for ground water sample analysis for all leachate or leachate-derived constituents;
  - f. Chain of custody control including:
    - i. Standardized field tracking reporting forms to record sample custody in the field prior to and during shipment; and
    - ii. Prepared sample labels containing all information necessary for effective sample tracking; and
  - g. Field and laboratory quality assurance and quality control including:
    - i. Collection of replicate samples
    - ii. Submission of field-bias blanks; and
    - iii. Potential interferences.
5. Data evaluation procedures, including but not limited to:
- a. Planned use of statistical data evaluation;
  - b. Planned use of computer models;
  - c. Planned use of previously gathered information; and
  - d. Criteria which will be utilized to determine if additional assessment activities are warranted.
6. A schedule of implementation.

For additional information concerning the developing of a ground water quality assessment plan, the U.S. EPA RCRA ground water monitoring technical enforcement guidance document (TEGD), the DDAGW policy Review of Ground Water Quality Assessment Plan, or the DDAGW Technical Guidance Manual for Hydrogeologic Investigations and Ground Water Monitoring (February 1995) should be consulted.

Attachment H  
Ground Water Monitoring Parameters and Sampling  
Frequencies for Municipal Wastewater Facilities  
Utilizing a Double Synthetic Liner System

1. Water levels within the leak collection system should be monitored and recorded daily, or in accordance with the frequency agreed upon by Ohio EPA and the permittee, for each impoundment or basin. Within 24 hours of detecting elevated water levels in the leak collection system, indicating possible leachate leakage, the permittee should notify the appropriate Ohio EPA district office, Division of Surface Water. In addition, a water sample should be collected from the leak collection system and analyzed for the following parameters:

Alkalinity, Total CaCO<sub>3</sub>  
Sulfate  
pH  
Specific Conductivity  
Total Dissolved Solids, TDS

Within five days of receiving the sample results, the permittee should submit the analytical results to the appropriate district office of the Ohio EPA, Division of Surface Water. Based on water level measurements and the water quality analysis of the samples taken, the permittee should determine if the liner system is leaking.

2. If the sampling results are conclusive that the liner is leaking, the permittee should notify the appropriate Ohio EPA district office, Division of Surface Water, in writing, within five days of receiving the sampling results. The permittee has fifteen days, from the date on which Ohio EPA has been notified, to implement the contingency plan as required in section 4 of this attachment. A report documenting location(s) of the liner failure should be submitted to the appropriate Ohio EPA district, Division of Surface Water within 15 days of completing repairs.
3. The entity should make a good faith effort to repair the liner system within a reasonable amount of time. After each effort to repair the liner system, the leak collection system should be sampled on a daily basis for pH, specific conductance and water levels measured in the collection point for no more than fifteen (15) days. If water levels, pH and specific conductivity values continue to indicate that the liner cannot be repaired, the permittee should implement their approved ground water monitoring program plan within sixty (60) days of notification to the Ohio EPA that the liner system appears to be irreparable.
4. The permittee should submit a contingency plan which outlines specific methods and procedures for determining the location(s) of the leak, and liner repair, in the event that a leak is suspected, based on section 1 of this attachment. The contingency plan should include a schedule of implementation. The plan should be submitted to the appropriate Ohio EPA district office, Division of Surface Water prior to the facility receiving their permit-to-install.