

GROUND WATER PROTECTION/MONITORING PLAN

**DELINEATION AND VERIFICATION FOR
FRANK ROAD CLASS III-IV DEMOLITION
LANDFILL
SHELBY COUNTY, TENNESSEE**

**HBA Project Number
97- 09167**

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1. General Groundwater Protection Standard

The general flow of ground water at the site is northward toward the Wolf River. The site is located on the upland which bounds the flood plain of the Wolf River. In fact, the extreme northern end of the landfill is at the south boundary of the Wolf River flood plain. Sanders Creek lies immediately west of the landfill. Most of the western boundary of the site lies along the boundary of the 100 year flood plain of Sanders Creek.

The ground water beneath the site flows to the north into the underflow of the Wolf River and/or to the west into the underflow of Sanders Creek. When the water in the Wolf River is high, the site drains almost totally westward into the underflow of Sanders Creek. When the water is low in the Wolf River, the direction of flow of the groundwater beneath the fill flows northerly from beneath most of the site. That is, water still flows into the underflow of Sanders Creek, but at a direction trending north/northeast. The flow beneath the eastern half of the site is essentially northward.

The ground water at the facility will be tested for the constituents listed in Appendix F of this report as per 1200-1-7-.04 Appendix I.

2. Compliance Monitoring Boundary

The groundwater compliance monitoring boundary is the boundary of the fill area and is shown on Figure 16. The down gradient monitoring wells at the site are within 200 feet of the compliance monitoring boundary.

3. Monitoring System for Existing Facilities

(I) The monitoring system for the facility includes 4 wells, 1 up gradient and 3 down gradient which were installed in 1995 and 3 additional monitoring wells located down gradient of the intended fill area on the west which were installed in December, 1997. The location of the wells are shown on Figure 16. The depths of the wells range from 40 to 80 feet. All of the wells yield ground water from the uppermost aquifer. Logs of the monitoring wells and piezometers (hereafter referred to as wells) are included in Appendix B.

(ii) The monitoring wells are constructed of 2 inch diameter PVC. Each of the wells contain 0.020 slotted screen extending approximately 10 from the bottom of the well upward. The annular space around the screening interval is surrounded with 10-20 grain size sand pack. There is a bentonite seal (minimum 2 feet thick) around the casing above the screen in each of the wells to prevent contamination of the samples and the ground water and to prevent the release of volatile gases. The remainder of the annular space is filled with a high density bentonite. The construction of the wells can be seen on the logs in Appendix B.

4. Sampling, Analysis and Record keeping

(i) The ground water monitoring program includes sample collection, preservation and transport conducted in accordance with the Code of Federal Regulations, Protection of Environment, publication 40 CFR 136. The wells are purged and sampled using disposable Teflon bailers attached to unused nylon cord. Samples are placed in the appropriate containers which contain the appropriate preservatives, supplied by the analytical laboratory, in accordance with the approved test methods. The samples are placed in coolers chilled with ice and transported to the laboratory under chain-of-custody protocol.

The analytical procedures are conducted in accordance with 40 CFR 136 by an approved laboratory. Field blanks are submitted to the laboratory along with the monitoring well samples for quality assurance and control. No filtering methods are conducted prior to laboratory analysis.

(ii) The elevation of the ground water is measured in the wells prior to purging at each sampling event. The 1995 wells are currently being sampled semi-annually and the groundwater elevation in the wells is reported along with the analytical test results.

(iii) All sample collection, preservation, shipment, and analytical test methods are also conducted on the up gradient well using the same methods as noted above in 4-(I).

(iv) Samples are collected and analyzed semi-annually from each of the wells, including the up gradient well. The results of the analyses from these samples are compared (including all the results obtained since the installation of the wells in 1995) in a control chart format that gives control limits for each constituent, for statistical evaluation of the data.

(vii) Copies of the results for each sampling event are kept by the owner in his office and at the offices of HBA, both of which are in the State of Tennessee.

(viii) Five typed and bound copies of the analytical results, including ground water elevation readings from the wells, are submitted to the Memphis Division TDEC office within 30 days of each sampling event.

(ix) Based upon statistical comparison of the results from each sampling event, a determination is made concerning significant increases, if any, of the analytical results for each parameter or constituent in order to assure with a reasonable degree of confidence that the migration of waste constituents from the facility into or through the uppermost aquifer within the compliance boundary will be detected.

5. Detection Monitoring Program

(i) Samples are obtained and analyzed from the monitoring wells in accordance with the ground water monitoring program established in the 1200-1-7 solid waste regulation guidelines as required for solid waste landfill units. The analyses will include those constituents listed in Appendix I of the waste regulation guidelines and are included in this report in Appendix F.

(ii) In accordance with Rule 1200-1-7-.04(7)(a)5(l)(l), the frequency of monitoring will be at least semi-annual during the active life of the facility including the closure and post-closure care period.

(l) The number of samples collected to establish ground water quality data are consistent with an appropriate statistical procedure which will provide with a reasonable degree of confidence that the migration of waste constituents from the facility into or through the uppermost aquifer within the compliance boundary will be detected.

(II) A minimum of 4 samples for each of the constituents in Appendix F of this report will be taken during the first semi-annual sampling event conducted on the 3 new down gradient wells on the western portion of the site. At least 1 sample from each of the wells will be collected and analyzed during subsequent sampling events as is the case in the wells currently being monitored.

(III) The elevation of the ground water surface is determined and recorded at each sampling event prior to bailing of the well.

(iii) If it is determined that there is a statistical increase over background for one or more of the constituents listed in Appendix F of this report at any well at the compliance monitoring boundary notice will be given to the Memphis Division field office within 14 days. In this case an assessment monitoring program meeting the requirements of Rule 1200-1-

7-.04 will be established within 90 days. If it can be demonstrated that the contamination is due to a source other than the SWLF or is the result of error in sampling, analysis, statistical evaluation or natural variation in ground water quality, a report documenting this demonstration and certified by a qualified ground water scientist will be issued to TDEC for consideration. If a demonstration is not made and approved within 90 days the following assessment monitoring program will be established.

6. Assessment Monitoring Program

(i) If a statistically significant increase over background is detected for one or more of the constituents listed in Appendix F of this report an assessment monitoring program will be established.

(ii) Within 90 days of activating the assessment monitoring program, a minimum of one sample will be collected and analyzed for the constituents listed in Appendix II of the solid waste regulations from each down gradient well. A list of these constituents is included in Appendix F of this report. For any constituent detected in the down gradient wells as a result of the complete constituent analysis found in Appendix II of the solid waste regulations, a minimum of 4 independent samples from both up gradient and down gradient wells will be collected and analyzed. The Appendix II constituents may be waved if it can be shown that the constituents are not reasonably expected to be in or derived from the waste contained in the SWLF.

(iii) After obtaining the results from the above mentioned sampling event, the results identifying the detected constituents will be supplied to TDEC within 14 days. Within 90 days and thereafter semi-annually, all wells will be resampled (minimum of one sample per well) for the constituents found in Appendix I of the solid waste regulations, and for any

constituents detected from Appendix II of the regulations. If the constituents from Appendix II are shown, based upon approved statistical procedures, to be at or below background values for two consecutive sampling events, TDEC will be notified and standard detection monitoring will resume upon approval. If the Appendix II constituents are above background values but below ground water protection standards, the assessment monitoring program will continue.

(iv) If any of the constituents from Appendix II of the solid waste regulations are detected at statistically significant levels above the ground water protection standard, TDEC will be notified of the detected constituents within 14 days.

(I) After giving notice, a specific groundwater quality assessment plan for the facility will be developed and submitted to TDEC in a timely manner. The ground water quality assessment plan will comply with the following requirements.

I. Be capable of determining whether solid waste or its constituents from the facility have entered the groundwater, the rate and extent of migration and the concentration of the waste and or its constituents in the ground water.

II. Specify the number, location, and depth of wells; the sampling and analytical methods to be used for detecting the solid wastes and solid waste constituents in the ground water; the evaluative procedures, including any use of previously gathered ground water quality information; and a schedule of implementation and reporting to TDEC; and

III. Be certified by a qualified ground water scientist.

IV. Include provisions for identifying all domestic or commercial water use within an area determined by TDEC.

(II) During the development of the assessment plan and taking of corrective action or until permission is received from TDEC, quarterly sampling of the detected constituents will be conducted.

(III) If necessary, additional monitoring wells will be installed to determine the character, nature and the vertical and horizontal extent of the release.

(IV) At least one additional well will be installed at the facility boundary in the direction of contaminant migration and will be sampled in accordance with part 6(iii)(II).

(V) If contaminants are found to have migrated off-site, all persons who own land or reside on land affected will be notified.

(VI) A report, certified by a qualified ground water scientist, may be submitted to document that a source other than the SWLF caused the contamination. If the report is approved, monitoring may continue in accordance with part 6.

(VII) If it is determined that no solid wastes or solid waste constituents from the facility have entered the ground water, the part 5 monitoring program may be reinstated.

(VIII) TDEC may determine at any time that a corrective action plan be undertaken.

7. Assessment of Corrective Measures

(i) If any of the constituents in Appendix II of the solid waste regulations are detected at a level exceeding the ground water protection standards, an assessment of corrective measures will be initiated within 90 days.

(ii) Monitoring will continue in accordance with the assessment monitoring program (see part 6).

(iii) The assessment will include analyses to assess and evaluate potential remedies and will address the following:

(I) Performance, reliability, ease of implementation, and potential impacts of appropriate remedies including safety impacts, cross-media impacts, and control of exposure to any residual impacts.

(II) Time required to begin and complete the remedy.

(III) Cost of remedy implementation.

(IV) Institutional requirements such as State or local permits or other environmental or public health requirements that may affect implementation of the remedy.

8. Selection of Remedy

Based upon the results of part 7, a remedy will be selected that meets the standards of the solid waste regulations Rule 8, pages .04-29 through .04-33.

9. Implementation of Corrective Action Program

Based upon part 8, a monitoring program will be selected and an appropriate corrective action remedy will be implemented in accordance with Rule 9 of the solid waste regulations, pages .04-33 through .04-36.