

PART VII: GROUNDWATER PROTECTION PROGRAM

The Permittee shall perform groundwater monitoring following the requirements of 6 CCR 1007-3 Part 264 Subpart F, following the requirements of this Permit Part, and following the requirements of the Groundwater Sampling and Analysis Plan, Attachment 8 of this Permit.

VII.A. WELL LOCATION AND CONSTRUCTION

- VII.A.1. The Permittee shall maintain groundwater monitoring wells at the Compliance Point and other designated locations in accordance with: 6 CCR 1007-3 §264.15, §264.91, §264.95, and §264.97, and the schedules, maps, and specifications in this Permit. The Permittee shall use the document, USEPA OSWER Directive 9950.1, titled *RCRA Groundwater Monitoring Technical Enforcement Guidance Document* as guidance for constructing and maintaining the groundwater monitoring wells.
- VII.A.1.a. The groundwater monitoring well system must consist of a sufficient number of wells, installed at appropriate locations and depths to yield groundwater samples from the uppermost aquifer below the facility where saturated conditions exist or may be likely to occur in the future.
- VII.A.1.b. Relatively more permeable strata must be monitored with a significantly greater number of wells than less permeable strata.
- VII.A.1.c. Multiple saturated strata below the same point(s) shall be monitored with well clusters which allow sampling of each separate saturated stratum above unweathered bedrock.
- VII.A.2. Compliance Point and Compliance Boundary are equivalent terms, defined as the continuous surface extending down into the upper most saturated strata within unweathered Pierre Shale bedrock, from a line at the ground surface at the outer perimeter of: the seven secure cells which can be constructed under this Permit, the Treatment Building, Segregated Stormwater Retention Basin, including the perimeter berm around the waste processing area, and Lift Station A.
- VII.A.2.a. If sand zones are removed at the Compliance Boundary as required in Permit Condition VI.D.4., the Compliance Boundary shall be adjusted (if necessary) to include the outer limit of all removed sand.
- VII.A.2.b. At the beginning of the Facility post-closure period, after Department acceptance of closure certifications for all waste

management structures and areas, the Compliance Boundary will be moved to the outer perimeter of the completed Secure Cell Area.

VII.A.2.c. During a Corrective Action Compliance Period, which may begin before Closure, and which involves or may involve areas outside the completed Secure Cell Area, the Department may maintain all or part of the Compliance Boundary at its original location.

VII.A.3. The locations of the monitoring wells and monitoring points are shown in Figure VII-1. The points are defined by and the wells are screened in different and distinct hydro-stratigraphic units (called “zones”), as described below:

VII.A.3.a. The Level 1 (L1) Zone is defined as the Leachate Collection System in each individual Secure Cell. Each Leachate Collection System shall be constructed according to the Plans and Specifications in Permit Attachment 10, construction of each Leachate Collection System shall be inspected according to the Construction Quality Assurance/Quality Control Procedures contained in Permit Attachment 10, and the each system shall be operated and maintained according to Permit Conditions VI.C.4.

VII.A.3.b. The Level 2 (L2) Zone is defined as the Leak Detection System in each individual Secure Cell. The Leak Detection System consists of a geocomposite drainage layer between the primary and secondary liners and the Permanent Sump which is a drainage layer underlying the secondary liner sump area. Each Leak Detection System and Permanent Sump shall be constructed according to the Plans and Specifications contained in Permit Attachment 10, construction of each Leak Detection System shall be inspected according to the Construction Quality Assurance/Quality Control Procedures contained in Permit Attachment 10 and each system shall be operated and maintained according to Permit Conditions VI.C.5.

VII.A.3.c. The Level 3 (L3) Zone is defined as the discrete lenticular sand body that occurs within the surficial Silty Clay Unit. Level 3 Wells located along the compliance boundary have been and will be installed at 50-foot intervals. The Permittee has and shall install Level 3 - Sand Zone Monitoring Wells adjacent to secure cells

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- along potential fluid migration pathways in the Sand Unit. The number and location of all new Level 3 wells shall be approved by the Department, in writing, prior to installation.
- VII.A.3.d. The Level 4A (L4A) Zone is defined as the interface between the Surficial Silty Clay Unit and the underlying weathered Pierre Shale. Level 4A Monitoring Wells have been and will be installed at 100-foot intervals in those areas where the L4A Zone is saturated.
- VII.A.3.e. The Level 4 (L4) Zone is defined as the interface between the weathered Pierre Shale and the underlying unweathered Pierre Shale. Level 4 Zone Monitoring Wells have been and will be installed at 300-foot intervals along the compliance boundary in unsaturated conditions, at 100-foot intervals in saturated conditions, and around each secure cell. The number and location of L4 Monitoring Wells around each secure cell shall be approved by the Department, in writing, prior to installation. Additional L4 Monitoring Wells shall be installed on a schedule to allow collection of complete (four quarters) background sample data from the wells, prior to receipt of wastes in any secure cell.
- VII.A.3.f. The Level 5 (L5) Zone is defined as the uppermost saturated, water producing, portion of the unweathered Pierre Shale. The Level 5 Monitoring Wells are eight approximately equally spaced around the Compliance Boundary.
- VII.A.3.g. The Level 6 (L6) Zone is defined as the first occurrence of saturated conditions in the alluvial drainages outside the Compliance Boundary.
- VII.A.4. Additional saturated zone or sand zone monitoring wells shall be installed to maintain compliance with Section VII.A.1. above if subsurface conditions or the Department's or Permittee's knowledge of those conditions significantly change after Permit issuance. Such changes may include, but are not limited to, water level elevation or apparent flow direction changes, detection of water in previously dry observation wells, detection of saturated conditions below a leak detection system sump, detection of solvents or other potentially sorbing or leaching organic compounds in a well or nearby well, or discovery of previously unknown

sand or silt strata during cell excavation or other exploration. [6 CCR 1007-3 §264.15, §264.91(b), §264.92, §264.97]

- VII.A.5. The Department may require the Permittee to install and sample additional wells at any time during active life, Closure, Post-Closure or compliance periods if new information or unforeseen circumstances reveal a need for them. [6 CCR 1007-3 §264.15, §264.31, §264.91, §264.94, §264.95, §264.97, §264.98, §264.99, §264.100]
- VII.A.6. The Permittee shall construct additional or replacement monitoring wells in accordance with 6 CCR 1007-3 Part 264, Subpart F; USEPA OSWER Directive 9950.1, titled *RCRA Groundwater Monitoring Technical Enforcement Guidance Document*; USEPA Publication 600/4-89/034, titled *Handbook of Suggested Practices for the Design and Installation of Ground-Water Monitoring Wells*; and the following requirements.
- VII.A.6.a. An experienced professional geologist or engineer shall supervise all work and report preparation.
- VII.A.6.b. All cores shall be sealed, boxed and stored, available for Department inspection, for the operating life of the Facility.
- VII.A.6.c. Groundwater samples must not be adversely affected by well construction materials.
- VII.A.6.c.i) The Department must be notified and an evaluation must be performed, if the detection of contaminants, as defined by Permit Condition VII.C.3., in any monitoring well, may have been introduced by, adsorbed to, or leached from the construction materials used in the well.
- VII.A.6.c.ii) The notification procedures of Permit Condition VII.D.3. shall be followed.

- VII.A.6.c.iii) The evaluation shall include, but not be limited to, a demonstration and assessment that the well produces samples that are representative of the groundwater in the geologic formation surrounding the well and a determination as to whether the well should be replaced. The evaluation must be submitted within 30 days of the notification of the detection of the contaminants.
- VII.A.6.d. Replacement wells must be located within ten feet from an original well.
- VII.A.6.e. A minimum of one sample from each source of water introduced into wells to complete drilling work, logging, cleaning, or for any other reason, shall be analyzed for the parameters in Table VII-3.
- VII.A.6.f. All equipment and materials (except filter pack and sealants) introduced into a well bore must be steam cleaned, or washed with hot water and laboratory detergent (e.g. Alconox or equivalent) and thoroughly rinsed with distilled water, prior to introduction.
- VII.A.6.g Well intakes must be designed and constructed to allow sufficient groundwater flow to the well for sampling; minimize the passage of formation, filter pack, or other materials into the well; and ensure sufficient structural integrity to prevent collapse of the well.
- VII.A.6.g.i) All screen material must be factory slotted.
- VII.A.6.g.ii) Filter pack material shall be installed between the formation and screen.
- VII.A.6.g.ii)a) Filter material shall be clean quartz sand or chemically inert beads (e.g. silica or glass).
- VII.A.6.g.ii)b) Filter pack should not extend more than two feet above the screen.
- VII.A.6.g.ii)c) Filter pack grain size and screen slot size shall be chosen to optimize the performance of the well as specified above.

VII.A.6.g.iii) Each well completed in a saturated zone must be developed to restore the natural hydraulic conductivity of the formation adjacent to the screen and to remove turbidity.

VII.A.6.g.iii)a) Surge blocks, bailers or pumps may be used for development. Compressed air surging shall not be used.

VII.A.6.g.iii)b) Wells shall be repeatedly developed as specified in the TEGD, to remove turbidity to a maximum of five Nephelometric Turbidity Units. The Permittee shall document in the operating record wells which have not achieved a maximum of five Nephelometric Turbidity Units after repeated development. The Permittee shall also evaluate the validity of the data obtained from the wells, during each sampling event, following the Decision Chart for Turbid Ground-water Samples, Figure 3-4 in the TEGD. Documentation of this evaluation shall be contained in the Semi-annual Monitoring Reports.

VII.A.6.g.iv) Monitoring wells completed in zones which do not produce water shall not be developed at the time of installation.

VII.A.6.g.iv)a) Upon discovery of water in a previously dry well at an elevation above the bottom of the screen in the course of monitoring or inspection, the well shall be developed as specified in section VII.A.6.g.iii) above.

VII.A.6.g.iv)b) If the previously dry well cannot be adequately developed solely due to lack of available ground water, the well shall be sampled as specified in Attachment 8, Groundwater Sampling and Analysis Plan and the well shall be inspected monthly for the next two months to determine if the water surface elevation has changed. If the water surface elevation

has then risen above the bottom of the screen, further development shall be attempted.

- VII.A.6.g.iv)c) If a previously dry well has not been successfully developed after three attempts (conducted after quarterly or interim monthly inspections as specified in VII.A.6.f.iv)a) and b) above), the well shall either be replaced with a well screened at an elevation two feet or more below the original well screen, or a technical justification report shall be submitted to the Department within 180 days.
- VII.A.6.h. At least two feet of bentonite pellets followed by bentonite-Portland cement mixtures of anti-shrink cement mixtures must be used as sealants in the annular space above the screen and filter pack, to within ten feet from the surface.
- VII.A.6.h.i) A tremie pipe shall be used to place cement or other slurry in the annular space.
- VII.A.6.h.ii) The upper ten feet (approximately) of the annular space shall be sealed with cement, blending into a concrete apron extending at least three feet around the surface casing.
- VII.A.6.i. Steel surface casing with locking security caps shall be provided for all wells, whether dry or water producing.
- VII.A.6.j. Completion and development reports for each well must include at least the following information.
- Date(s) of drilling, completion and development.
 - Drilling method and fluid(s) used; Reference to source and analysis of any introduced water.
 - Well location, referenced to site within grid 0.5 foot.
 - Bore and casing(s) diameter(s).
 - Total depth, within 0.1 foot.
 - Drilling and lithologic logs.
 - Casing and sump material specification and size; Reference material certification.

- Screen material, slot size and type, installed depth to top of screen and length.
- Casing and screen joint type.
- Filter pack material source, complete grain size analysis and D10 grain size estimated from specifications provided by sand supplier.
- Filter pack volume.
- Filter pack placement method.
- Sealant material source(s), type(s), mix design.
- Sealant volume.
- Sealant placement method.
- Surface seal design.
- Well development procedures, including equipment and methods used, total daily amounts of water removed, recovery rates, and turbidity and water surface elevation measurements during development.
- Description of protective cap.
- Surveyed ground and well reference elevations (concrete apron, top of surface and well casings).
- Detailed drawing of well, with dimensions.
- Information required in Permit Condition VII.a.6.e.

VII.A.6.k. The Permittee shall conduct in-situ permeability tests in each separate saturated zone found during well installation.

VII.A.6.l. Abandoned wells and borings shall be plugged to avoid providing a potential preferential flow conduit.

VII.A.6.l.i) Abandoned wells shall be either auger-reamed to remove the casing, screen and filter pack, or pressure grouted across the screened interval with expanding neat cement.

VII.A.6.l.ii) Boreholes not used to construct monitoring wells, and reamed or grouted wells, shall be filled within five feet or less from the surface with tamped bentonite pellets or bentonite-cement slurry.

- VII.A.6.m. Level 5 Wells: Air rotary technique shall be employed to drill Level 5 boreholes.
 - VII.A.6.m.i) Temporary surface casing may be installed in auger borings not to exceed 30 feet in depth.
 - VII.A.6.m.ii) Air supply shall be filtered or provided with an efficient separator to minimize water or compressor oil introduced into the well bore.
 - VII.A.6.l.m.iii) Auger and air cutting shall be continuously inspected and logged. Cuttings shall be observed carefully to detect and quantify sand content.
 - VII.A.6.m.iv) Cores shall be taken at each lithologic change and through anticipated water producing strata.
 - VII.A.6.m.v) Potable water may be used to complete drilling, cleaning and geophysical logging of boreholes after the first water producing zone is penetrated.
 - VII.A.6.m.vi) Schedule 80 polyvinyl chloride casing and screen with flush threaded couplings may be used in the monitoring program, as long as performance standards (for representative samples of groundwater) are met.
 - VII.A.6.m.vii) PVC material shall meet National Sanitation Foundation and/or ASTM material specifications.
 - VII.A.6.m.viii) Construction material shall be at a minimum four inch nominal diameter.
 - VII.A.6.m.ix) Screens shall be a maximum of 20 feet in length, centered at the first water producing zone penetrated during drilling.

VII.A.6.n. Level 4 Wells: Air rotary or hollow stem auger techniques shall be employed to drill Level 4 wells. If air rotary technique is utilized the procedure specified in Permit Condition VII.A.6.l. shall be utilized.

VII.A.6.n.i) PVC casing and screen may be used, as specified for Level 5 wells in Permit Condition VII.A.6.l., except Level 4 screens shall be 10 feet or less in length, centered at the weathered/unweathered bedrock interface.

VII.A.6.n.ii) Upon discovery of water in a previously dry Level 4 well above the base of the well screen the Permittee shall:

VII.A.6.n.ii)a) Except as provided for in “b” below, drill step-out borings at 100 foot spacings along the compliance boundary or adjacent to a secure cell on either side of the well. The step-out borings shall be left open for a minimum of 24 hours and backfilled according to VII.A.6.l. if dry. If groundwater is present then the boring(s) shall be completed as Level 4 monitoring wells. Step-out borings and/or Level 4 wells shall be completed in each of the four directions until dry conditions are verified in the step-out borings.

VII.A.6.n.ii)b) If the Permittee believes that a condition other than groundwater flow caused the previously dry well to begin producing water, the Permittee may submit a technical justification report for not performing the step-out borings and/or well completions required by “a” above. The technical justification report shall be submitted within 90 days of finding water in the previously dry well.

VII.A.6.n.ii)c) If the Department does not accept the technical justification, the Department will notify the Permittee of such in writing. Within 45 days of receipt of such notification the Permittee shall begin the installation of step-out borings and/or monitor wells as described in “a” above.

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- VII.A.6.o. Level 3 Wells: Level 3 well bores shall be continuous core drilled, sampled by split spoon or equivalent, then augured to complete the boring.
- VII.A.6.o.i) PVC casing and screen material may be used, as specified in Permit Condition VII.A.6.m. as long as performance standards are met.
 - VII.A.6.o.ii) Screened intervals for dry sand zone wells shall not extend above the sand, and not exceed ten feet in length, beginning one to two feet below the bottom of the sand lens and extending upward to penetrate into the sand.
 - VII.A.6.o.iii) Screened intervals for shallow saturated zone wells shall not exceed ten feet in length, centered at the stable water table elevation determined immediately after drilling of the wells.
 - VII.A.6.o.iv) Upon discovery of water in a previously dry Level 3 Well, the Permittee shall follow the procedures in Permit Condition VII.A.6.n.ii).
- VII.A.7. The Permittee shall determine the horizontal and vertical extent of the sand zones or buried sand and gravel deposits with Unified Soil Classification System gradation of SM (Silty Sand) or coarser, which are found at or within the Compliance Boundary. [6 CCR 1007-3 §264.15, §264.31, §264.91, §264.97]
- VII.A.7.a. The lenses or deposits shall be defined by exploratory core drilling at a maximum spacing of fifty feet, extending to the edges of the deposit or to one half mile outside the Compliance Boundary, whichever comes first. Cores shall be stored and maintained available for Department inspection. Core holes shall be filled with bentonite or equivalent sealant if not completed as monitoring wells.
 - VII.A.7.b. The Permittee shall install monitoring wells outside the Compliance Boundary in sand or sand and gravel deposits at the point(s) nearest the boundary where saturated conditions are found, according to the specifications in Section VII.A.1.a.

VII.A.7.c. Sand zone exploration reports (if required by discovery of more deposits) shall be submitted to the Department within 90 days after the initial identification of a previously unknown sand deposit. Sand zone exploration reports shall include well completion logs, core logs, grain size analyses of sand zone and confining layer samples, maps, cross sections, permeability determinations, and other information necessary to define a preferential migration pathway, as recommended in Chapter One of the US EPA publication *RCRA Groundwater Monitoring Technical Enforcement Guidance Document*.

VII.A.8. The Permittee shall submit monitoring well completion reports to the Department within 60 days after completion.

VII.B. MONITORING PROGRAMS

VII.B.1. The Groundwater Protection Program shall consist of three monitoring programs: 1) the Secure Cell and Surface Impoundment Performance Monitoring Program, 2) the Inspection Well Monitoring Program, and 3) the Detection Well Monitoring Program.

VII.B.2. The Permittee shall perform data collection and data evaluation for each of the three programs at the frequencies outlined in Table VII-1.

VII.B.3. The Permittee shall establish the background data pool for all new or replacement wells and previously dry wells which contain water by collecting at least four consecutive quarterly samples. If water is found in a well at least once, but less than four times during a background sample collection period, the data obtained during that period will be considered the background data.

VII.B.4. Prior to taking water level elevation measurements, purging, or sampling each well, the well will be inspected. The condition of each well will be noted on the inspection log.

VII.B.5. Water level measurements will be performed on all wells and sumps, including wells and sumps which have been historically dry.

VII.B.5.a. Upon discovery of water in a previously dry well, the well will be purged and the well and sump shall be sampled

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- according to the requirements of this Part of the Permit and according to the Groundwater Sampling and Analysis Plan, Permit Attachment 8.
- VII.B.5.b. Upon discovery of water in a previously dry well or sump, or the discovery of a significant increase in water level elevation as defined by Permit Condition VII.C.1., the Permittee shall conduct an evaluation to determine the source of the water. This evaluation must be submitted to the Department as part of the Quarterly or Semi-annual Groundwater Monitoring Report.
- VII.B.5.c. Wells for which the water level elevation is below the screened interval will not be sampled.
- VII.B.6. Monitoring wells will be purged prior to sample collection.
- VII.B.6.a. A high yield well is defined as a well which recovers at least 90% of its initial water level within 12 hours, per Attachment 8, Condition III.A.1. High yield wells will be purged a minimum of three casing volumes, or until field parameters (pH and specific conductance) have stabilized, which ever is later.
- VII.B.6.b. A low yield well is defined as a well which takes longer than 12 hours to recover, per Attachment 8, Condition III.A.2. Low yield wells will be purged by removing the standing volume of water from the well.
- VII.B.7. Sampling will be performed according to the procedures in the Groundwater Sampling and Analysis Plan, Permit Attachment 8.
- VII.B.7.a. Sampling of high yield wells will be completed within 24 hours from the time the last well volume was purged.
- VII.B.7.b. Sampling of low yield wells will be following the *Ground Water Sampling Procedure for Low Stress (Low Flow) Purging and Sampling*, contained in Permit Attachment 8, Ground Water Sampling Plan

VII.B.7.c. If a sufficient amount of water is unobtainable for any analysis the well will be considered dry for that sampling event.

VII.B.8. Monitoring Parameters

- VII.B.8.a. The Permittee shall analyze groundwater samples in accordance with the methods specified in the Groundwater Sampling and Analysis Plan, Permit Attachment 8 and the USEPA publication SW-846.
- VII.B.8.b. The Permittee shall analyze groundwater samples taken for the purpose of establishing background for the parameters listed in Table VII-2.
- VII.B.8.c. The Permittee shall analyze groundwater samples taken from the inspection and detection monitoring wells, Secure Cell Leak Detection Systems, Permanent Sumps, and the Treatment Building Leak Detection System for the parameters listed in Table VII-3.
- VII.B.8.D. In addition, the Permittee shall analyze samples from the Level 4 wells for the parameters listed in 6 CCR 1007-3 Part 264, Appendix IX once every three years.
- VII.B.8.e. The Permittee shall analyze samples from the Secure Cell Leachate Collection Systems for the parameters listed in 6 CCR 1007-3 §268.40 for waste code F039.
- VII.B.8.f. The Permittee shall annually evaluate the results of the analysis from the Leachate Collection System to determine if new parameters must be added to Table VII-3. This evaluation shall be submitted to the Department 30 days prior to the first sampling event of each calendar year. The Department will approve the evaluation prior to the sampling event.
- VII.B.8.g. The Permittee will annually review the constituents, methods and PQLs in Table 2 to determine if the Table needs to be updated. The review will be documented in the Operating Record and the updates will be incorporated into the Permit following the procedures in 6 CCR 1007-3, Section 100.63.

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- VII.B.9. The Permittee shall determine the groundwater flow rate and direction in the uppermost aquifer at least annually. The determination shall include an evaluation of the groundwater flow patterns in any perched zones. If there is no definable hydraulic gradient, this must be demonstrated by, at a minimum, mapping the water level elevations. This map must be included in the Annual Monitoring Report.

VII.C. DATA EVALUATION

- VII.C.1. Quarterly, the Permittee shall perform a statistical evaluation of the water level elevations for all wells and sumps containing water.
 - VII.C.1.a. This analysis will be used to determine the mean plus two standard deviations for water levels. This number shall define a significant increase in water level elevation.
 - VII.C.1.b. The Quarterly and Semiannual Monitoring Reports shall include hydrographs illustrating water level elevations.
- VII.C.2. This data validation checklist shall be used to evaluate the validity of all data prior to performing a statistical analysis of the data.
- VII.C.3. Data evaluation shall be performed using the procedures and at the frequencies indicated in Table VII-1.
 - VII.C.3.a. The Permittee must determine if there is a statistically significant increase over the background value or applicable tolerance level for each of the inorganic Detection Monitoring Parameters contained in Table VII-3.
 - VII.C.3.b. For the Organic Parameters listed in Table VII-3, any detectable quantity beyond the reportable detection limit (as defined in Table 2 of the Groundwater Sampling and Analysis Plan) in any detection monitoring well or leak detection system is considered significant and subject to the requirements of Permit Condition VII.D.3.
 - VII.C.3.c. The Permittee must determine if there is a significant trend variation over the background value for each of the General Groundwater Quality Parameters contained in Table VII-4

VII.C.4. Statistical Procedures

- VII.C.4.a. Descriptive statistics shall be generated to characterize the various data sets and to select appropriate statistical methods.
- VII.C.4.b. Trend analysis shall be performed to identify temporal changes in the data sets that may result from natural changes in the composition of the secure cell fluids and groundwater in the hydrostratigraphic units at the Facility and to evaluate the suitability of the current indicator parameters for making evaluation regarding potential, releases from the secure cells.
- VII.C.4.c. Comparative statistical analyses will be performed to identify significant changes in water quality that may indicate a release.
- VII.C.5. All statistical tests will be performed at the 95 per cent and 99 percent level of significance.
- VII.C.6. Data for each parameter in Table VII-3 will be used for each individual well and sump for trend analyses.
- VII.C.7. Data for each parameter in Table VII-3 will be pooled by well group for descriptive and comparative statistical analyses. The Permittee shall annually evaluate the data to confirm or modify the grouping, based on distinctive geochemical characteristics of the groundwater.
- VII.C.8. Data handling procedures for statistical analyses:
 - VII.C.8.a. When parameter concentrations are not quantified below the detection levels presented in Tables VII-3, simple substitution of one half the parameter-specific detection level will be used to modify the data set for graphical presentation and, where necessary, to perform the statistical analyses.
 - VII.C.8.b. Plots of logarithmic data, such as pH and log-transformed data, may be shown on semi-log plots to facilitate linear trend analysis.
 - VII.C.8.c. Parameter values for duplicate samples will not be averaged for statistical analyses; the original value will be used, unless rejected as a result of poor quality.

VII.C.8.d. Trend analyses are not required for monitoring parameters that have less than 10 detections in the background database.

VII.C.9. Background data base:

VII.C.9.a. The background data base for each secure cell leachate collection system and leak detection system, and the Treatment Building leak detection system, will consist of all data obtained from the system that meet the criteria listed in Permit Condition VII.C.9.c.

VII.C.9.b. The background data base for each monitoring well will consist of data obtained prior to waste acceptance at the Facility (or waste acceptance into each individual secure cell) and data obtained after waste acceptance that meets the criteria in Permit Condition VII.C.9.c.

VII.C.9.c. The following procedures will be used to evaluate new data for incorporation into the background database.

VII.C.9.c.i) The data validation checklist will be completed. In the event that data of questionable quality are identified, samples will either be reanalyzed or resampling will be recommended. The Quality Control (QC) and other data will be evaluated to reach decisions regarding the useability of the original data. Errors, corrections, or deletions will be reported and discussed in the quarterly and semiannual reports.

VII.C.9.c.ii) Descriptive statistics and trend analyses will also be used to identify data that may be of questionable quality. Notable changes in descriptive statistics and trend analyses will prompt a review of the QC data and supporting documentation to determine what may have caused the change. When changes in descriptive statistics or trend analyses occur, QC data will be reviewed to determine whether poor data quality may have been a contributing factor.

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- VII.C.9.c.iii) Data that show no statistically significant difference (i.e., 95 percent level of significance) from previous background data will be included in the background database. Data that show a statistically significant difference from the background will not be included unless those data are shown to be truly valid and representative based on an evaluation of the next sampling event data.
- VII.C.10. Within 30 days of the effective date of this Permit, the Permittee shall submit to the Department the specific statistical methods to be used to perform the statistical evaluations required by this section of the Permit. The methods selected must comply with Permit Condition VII.C. and 6 CCR 1007-3 §264.97.
- VII.C.11. The Permittee shall perform the data evaluations and statistical procedures within 45 days after the Permittee receives the final laboratory results for the sampling event. The data must be received with sufficient time to allow its incorporation into the required reports. [6 CCR 1007-3 §264.98(f)(2)]

VII.D. RECORD KEEPING AND REPORTING

- VII.D.1. The Permittee must record, as it becomes available, all monitoring, sampling, testing, and analytical data obtained in accordance with this Permit Part in the operating record. The data must include a summary of all computations (including example calculations, data for each calculation, each measured, known, or estimated value so that each calculation can be verified) required by this Permit.
- VII.D.2. The Permittee must submit all analytical results and the results of the statistical analyses obtained for the Secure Cell and Surface Impoundment Performance Monitoring Program, Inspection Well Monitoring Program, and Detection Well Monitoring Program, within 90 days after the samples are collected.
- VII.D.2.a. The complete Quarterly Monitoring Reports for the Secure Cell and Surface Impoundment Performance Monitoring Systems shall include all data, field reports, descriptions of anomalous or

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- unexplained data, new or increased concentrations, quality control, and any other problems.
- VII.D.2.b. The complete Semi-Annual Monitoring Reports for the Secure Cell and Surface Impoundment Performance Monitoring Program, Inspection Well Monitoring Program, and Detection Well Monitoring Program shall include all data, field reports, descriptions of anomalous or unexplained data, new or increased concentrations, quality control, and any other problems.
- VII.D.2.c. A complete Annual Data Evaluation Report, including all data, field reports, descriptions of anomalous or unexplained data, new or increased concentrations, quality control, and any other problems, the annual evaluation of the detection monitoring parameters, the annual determination of groundwater flow and directions, and the annual evaluation of the validity of the well grouping, shall be submitted within 30 days after the submission of the first semi-annual report.
- VII.D.3. If the Permittee determines, pursuant to Permit Condition VII.C.3., there is a statistically significant increase for any of the detection monitoring parameters (Table VII-3), the Permittee must:
- VII.D.3.a. Notify the Department in writing within seven days. [6 CCR 1007-3 §264.98(g)(1)]
- VII.D.3.b. When the well or sump has recovered sufficiently to produce a complete set of aliquots, the Permittee shall immediately resample the well or sump from which the exceedance data was obtained and analyze for the parameters in Table VII-2. The results of the sample analysis shall be submitted to the Department as soon as possible, but in no case more than 45 days after collection.
- VII.D.3.b.i) If the Department determines that laboratory error or other causes may have produced a false positive indication of the occurrence of a statistically significant concentration increase for an inorganic constituent or a detection of an organic constituent, the Permittee may delay implementation of Compliance Monitoring requirements until receipt of the resample analysis.

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- VII.D.3.b.ii) The Permittee shall determine whether the resampling data confirms the initial exceedance or excursion indication, and submit a written Resampling Evaluation Report to the Department within seven days after receipt of the analyses. The Resampling Evaluation Report must include determination of the joint probability of occurrence of concentrations of organic hazardous waste constituents found in the initial excursion data set and resampling data.
- VII.D.3.b.iii) The Permittee shall implement the Contingency Plan if the resampling confirms a significant increase in an Inspection Well, a Secure Cell leak detection system, or the Treatment Building leak detection system.
- VII.D.3.b.iv) The Permittee shall follow the procedures contained in Permit Sections V.D.4. through V.D.7. if the resampling confirms a significant increase in a Detection Monitoring Well.
- VII.D.4. If the resampling confirms a significant increase in a Detection Monitoring Well, the Permittee shall immediately sample the groundwater in all wells in which the significant increase occurred and all wells adjacent to the wells in which significant increases have been found. The samples shall be analyzed for all constituents in 6 CCR 1007-3 §264, Appendix IX.
- VII.D.5. The Permittee shall establish the compliance monitoring constituent list using the Appendix IX groundwater analytical results. [6 CCR 1007-3 §264.98(g)(3)]
- VII.D.6. Within 90 days of the resampling confirmation of a detection monitoring parameter, submit to the Department a permit modification request to establish a compliance monitoring program meeting the requirements of 6 CCR 1007-3 §264.99. The modification request must include the following information: [6 CCR 1007-3 §264.98(g)(4)]
- VII.D.6.a. An identification of the concentration of each Appendix IX constituent found in the groundwater at the each monitoring

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- well at the compliance point. [6 CCR 1007-3 §264.98(g)(4)(I)]
- VII.D.6.b. Any proposed changes to the groundwater monitoring system at the Facility necessary to meet the requirements of compliance monitoring as described in 6 CCR 1007-3 §264.99. [6 CCR 1007-3 §264.98(g)(4)(ii)]
- VII.D.6.c. Any proposed changes to the monitoring frequency, sampling and analysis procedures, or methods or statistical procedures at the Facility necessary to meet the requirements of compliance monitoring as described in 6 CCR 1007-3 §264.99. [6 CCR 1007-3 §264.98(g)(4)(iii)]
- VII.D.6.d. For each hazardous constituent found at the compliance point, a proposed concentration limit, or a notice of intent to seek an alternate concentration limit for a hazardous constituent. [6 CCR 1007-3 §264.98(g)(4)(iv)]
- VII.D.7. Submit a corrective action feasibility plan to the Department within 180 days. [6 CCR 1007-3 §264.98(g)(5)]
- VII.D.8. If the Permittee determines pursuant to Permit Condition VII.D.3.b.ii., there is a statistically significant increase above the background values for the parameters specified in Permit Condition VII.B.8.b., he may demonstrate that a source other than a regulated unit caused the increase or that the increase resulted from error in sampling, analysis, or evaluation. In such cases, the Permittee must:
- VII.D.8.a. Notify the Department in writing within seven (7) days that he intends to make a demonstration. [6 CCR 1007-3, §264.98(g)(6)(i)]
- VII.D.8.b. Within 90 days, submit a report to the Department which demonstrates that a source other than a regulated unit caused the increase, or that the increase resulted from error in sampling, analysis, or evaluation. [6 CCR 1007-3, §264.98(g)(6)(ii)]
- VII.D.8.c. Within 90 days, submit to the Department an application for a permit modification to make any appropriate changes to the

detection monitoring program at the facility. [6 CCR 1007-3 §264.98(g)(6)(iii)]

- VII.D.8.d. Continue to monitor in accordance with the compliance and corrective action monitoring program at the facility. [6 CCR 1007-3, §264.98(g)(6)(iv)]

VII.E. COMPLIANCE SCHEDULE

Within thirty days of the effective date of this Permit, the Permittee shall submit, for the Department's review and approval, Analytical Methods to be used for Radioactivity Analysis. Approved methods must be in place prior to the first sampling event following the effective date of this Permit.

TABLES

**FREQUENCY OF DATA COLLECTION AND EVALUATION
(TABLE VII-1)**

Monitoring Location	Monitoring Program	Data Collection Frequency		Data Evaluation Frequency		
		Hydraulic Measurements	Sampling and Lab Analysis (if appropriate)	Descriptive Statistics	Comparative Statistics	Trend Analyses
Closed Secure Cell LCS	Secure Cell Performance Monitoring	Weekly	Annually	NA	NA	NA
Active Secure Cell LCS	Secure Cell Performance Monitoring	Weekly	Quarterly	NA	NA	NA.
Secure Cell LDS	Secure Cell Performance Monitoring	Weekly	Semiannually	NA	NA	NA
Secure Cell Permanent Sump	Secure Cell Performance Monitoring	Weekly	Semiannually	NA	NA	NA
Treatment Building LDS	Surface Impoundment Performance Monitoring	Weekly	Semiannually	NA	NA	NA
Level 3 Wells	Inspection Monitoring	Quarterly	Semiannually	Semiannually	Semiannually	Semiannually
Level 4A Wells	Detection Monitoring	Quarterly	Semiannually	Semiannually	Semiannually	Semiannually
Level 4 Wells	Detection Monitoring	Quarterly	Semiannually	Semiannually	Semiannually	Semiannually
Level 5 Wells	Detection Monitoring	Quarterly	Semiannually	Semiannually	Semiannually	Semiannually
Level 6 Wells	Inspection Monitoring	Quarterly	Semiannually	Semiannually	Semiannually	Semiannually

**BACKGROUND MONITORING PARAMETERS
(TABLE VII-2)**

ANALYTE	CAS Number	Minimum Detection Limit	Units	Analysis Method *
PHYSICAL PROPERTIES				
pH	N/A	N/A	N/A	Field
Specific Conductance	N/A	1	umhos/cm	Field
Turbidity	N/A	1.0	NTU	Field
Total Dissolved Solids	n/a	21	mg/l	EPA 160.1
INORGANIC, NON-METALLICS				
Total alkalinity	71-52-3	5	mg/l	EPA 310.1
Chloride	16887-00-6	3	mg/l	EPA 325.2
Fluoride, Free	16984-48-8	0.1	mg/l	EPA 340.2
Nitrogen, Ammonia	N/A	0.1	mg/l	EPA 350.1
Nitrogen, Nitrate-Nitrite	N/A	1.0	mg/l	EPA 353.2
Sulfate	14808-79-8	5.0	mg/l	EPA 375.4
Radium	7440-14-4	3	pCi/l	EPA 903 or SW-846 9320
Gross Alpha, Gross Beta	N/A	3	pCi/l	EPA 900 or SW-846 9310
ORGANICS				
Total Organic Carbon (TOC)	N/A	1.0	mg/l	EPA 415.1
Total Organic Halides (TOX)	N/A	10	ug/l	SW846 9020

ANALYTE	CAS Number	App. IX PQL (ug/L)	Minimum Detection Limit** (ug/L)	Analysis Method *
METALS				
Antimony	7440-36-0	300	10	SW846 6010
Arsenic	7440-38-2	500	15	SW846 6010
Barium	7440-39-3	20	50	SW846 6010
Beryllium	7440-41-7	3	50	SW846 6010
Cadmium	7440-43-9	40	10	SW846 6010
Chromium	7440-47-3	70	50	SW846 6010
Copper	7440-50-8	60	50	SW846 6010
Iron	7439-89-6	N/A	100	SW846 6010
Lead	7439-92-1	40	20	SW846 6010
Manganese	7439-96-5	N/A	50	SW846 6010
Mercury	7439-97-6	2	0.5	SW846 7470
Nickel	7440-02-0	50	50	SW846 6010
Selenium	7782-49-2	750	15	SW846 6010
Silver	7440-22-4	70	50	SW846 6010
Sodium	7440-23-5	N/A	1,000	SW846 6010
Thallium	7440-28-0	400	50	SW846 6010
Zinc	7440-66-6	20	50	SW846 6010
VOLATILE ORGANICS				
Benzene	71-43-2	5	5	SW-846 8260
Bromodichloromethane	75-27-4	5	5	SW-846 8260
Bromoform (Tribromomethane)	75-25-2	5	5	SW-846 8260
Bromomethane	74-83-9	10	10	SW-846 8260
Carbon tetrachloride	56-23-5	5	5	SW-846 8260
Chlorobenzene	108-90-7	5	5	SW-846 8260
Chloroethane	75-00-3	10	10	SW-846 8260

**BACKGROUND MONITORING PARAMETERS
(TABLE VII-2)**

ANALYTE	CAS Number	App. IX PQL (ug/L)	Minimum Detection Limit** (ug/L)	Analysis Method *
2-Chloroethyl vinyl ether	110-75-3	n/a	10	SW-846 8260
Chloroform	67-66-3	5	5	SW-846 8260
Chloromethane	74-87-3	10	10	SW-846 8260
Dibromochloromethane	124-48-1	5	5	SW-846 8260
1,1-Dichloroethane	75-34-3	5	5	SW-846 8260
1,2-Dichloroethane	107-06-2	5	5	SW-846 8260
trans-1,2-Dichloroethene	156-60-5	5	5	SW-846 8260
1,1-Dichloroethene	75-35-4	5	5	SW-846 8260
1,2-Dichloropropane	78-87-5	5	5	SW-846 8260
cis-1,3-Dichloropropene	10061-01-5	5	5	SW-846 8260
trans-1,3-Dichloropropene	10061-02-6	5	5	SW-846 8260
Ethylbenzene	100-41-4	5	5	SW-846 8260
Methylene chloride (Dichloromethane)	75-09-2	5	10	SW-846 8260
1,1,2,2-Tetrachloroethane	79-34-5	5	5	SW-846 8260
Tetrachloroethene	127-18-4	5	5	SW-846 8260
Toluene	108-88-3	5	5	SW-846 8260
1,1,1-Trichloroethane	71-55-6	5	5	SW-846 8260
1,1,2-Trichloroethane	79-00-5	5	5	SW-846 8260
Trichloroethene	79-01-6	5	5	SW-846 8260
Trichlorofluoromethane	75-69-4	5	10	SW-846 8260
Vinyl chloride	75-01-4	10	10	SW-846 8260
SEMIVOLATILE COMPOUNDS (ACID/BASE/NEUTRAL EXTRACTABLES)				
Acenaphthene	83-32-9	10	10	SW-846 8270
Acenaphthylene	208-96-8	10	10	SW-846 8270
Anthracene	120-12-7	10	10	SW-846 8270
Benzidine	92-87-5	n/a	100	SW-846 8270
Benzo(a)anthracene	56-55-3	10	10	SW-846 8270
Benzo(a)pyrene	50-32-8	10	10	SW-846 8270
Benzo(b)fluoranthene	205-99-2	10	10	SW-846 8270
Benzo(g,h,i)perylene	191-24-2	10	10	SW-846 8270
Benzo(k)fluoranthene	207-08-9	10	10	SW-846 8270
bis(2-Chloroethoxy)methane	111-91-1	10	10	SW-846 8270
bis(2-Chloroethyl) ether	111-44-4	10	10	SW-846 8270
bis(2-Chloroisopropyl) ether (2,2'-oxybis(1-Chloropropane))	108-60-1	10	10	SW-846 8270
bis(2-Ethylhexyl) phthalate	117-81-7	10	10	SW-846 8270
4-Bromophenyl phenyl ether	101-55-3	10	10	SW-846 8270
Butyl benzyl phthalate	85-68-7	10	10	SW-846 8270
4-Chloro-3-methylphenol (p-Chloro-m-cresol)	59-50-7	20	20	SW-846 8270
2-Chloronaphthalene	91-58-7	10	10	SW-846 8270
2-Chlorophenol	95-57-8	10	10	SW-846 8270
4-Chlorophenyl phenyl ether	7005-72-3	10	10	SW-846 8270
Chrysene	218-01-9	10	10	SW-846 8270
Dibenz(a,h)anthracene	53-70-3	10	10	SW-846 8270
Di-n-butyl phthalate	84-74-2	10	10	SW-846 8270
1,2-Dichlorobenzene (o-Dichlorobenzene)	95-50-1	10	10	SW-846 8270
1,3-Dichlorobenzene (m-Dichlorobenzene)	541-73-1	10	10	SW-846 8270

**BACKGROUND MONITORING PARAMETERS
(TABLE VII-2)**

ANALYTE	CAS Number	App. IX PQL (ug/L)	Minimum Detection Limit** (ug/L)	Analysis Method *
1,4-Dichlorobenzene (p-Dichlorobenzene)	106-46-7	10	10	SW-846 8270
3,3'-Dichlorobenzidine	91-94-1	20	50	SW-846 8270
2,4-Dichlorophenol	120-83-2	10	10	SW-846 8270
Diethyl phthalate	84-66-2	10	10	SW-846 8270
2,4-Dimethylphenol	105-67-9	10	10	SW-846 8270
Dimethyl phthalate	131-11-3	10	10	SW-846 8270
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o-cresol) (2-methyl-4,6-dinitrophenol)	534-52-1	50	50	SW-846 8270
2,4-Dinitrophenol	51-28-5	50	50	SW-846 8270
2,4-Dinitrotoluene	121-14-2	10	10	SW-846 8270
2,6-Dinitrotoluene	606-20-2	10	10	SW-846 8270
Di-n-octyl phthalate	117-84-0	10	10	SW-846 8270
1,2-Diphenylhydrazine	122-66-7	N/A	10	SW-846 8270
Fluoranthene	206-44-0	10	10	SW-846 8270
Fluorene	86-73-7	10	10	SW-846 8270
Hexachlorobenzene	118-74-1	10	10	SW-846 8270
Hexachlorobutadiene	87-68-3	10	10	SW-846 8270
Hexachlorocyclopentadiene	77-47-4	10	50	SW-846 8270
Hexachloroethane	67-72-1	10	10	SW-846 8270
Indeno(1,2,3-cd)pyrene	193-39-5	10	10	SW-846 8270
Isophorone	78-59-1	10	10	SW-846 8270
Naphthalene	91-20-3	10	10	SW-846 8270
Nitrobenzene	98-95-3	10	10	SW-846 8270
4-Nitrophenol (p-Nitrophenol) 50	100-02-7	10	50	SW-846 8270
N-Nitroso-di-n-propylamine	621-64-7	10	10	SW-846 8270
N-Nitrosodimethylamine	62-75-9	10	10	SW-846 8270
N-Nitrosodiphenylamine	86-30-6	10	10	SW-846 8270
Pentachlorophenol	87-86-5	50	50	SW-846 8270
Phenanthrene	85-01-8	10	10	SW-846 8270
Phenol	108-95-2	10	10	SW-846 8270
Pyrene	129-00-0	10	10	SW-846 8270
1,2,4-Trichlorobenzene	120-82-1	10	10	SW-846 8270
2,4,6-Trichlorophenol	88-06-2	10	10	SW-846 8270
ORGANOCHLORINE PESTICIDES				
Aldrin	309-00-2	0.05	0.05	SW-846 8081
Hexachlorocyclohexane alpha-BHC	319-84-6	0.05	0.05	SW-846 8081
Hexachlorocyclohexane beta-BHC	319-85-7	0.05	0.05	SW-846 8081
Hexachlorocyclohexane delta-BHC	319-86-8	0.1	0.05	SW-846 8081
Hexachlorocyclohexane gamma-BHC (Lindane)	58-89-9	0.05	0.05	SW-846 8081
Chlordane	57-74-9	0.1	0.50	SW-846 8081
4,4'-DDD	72-54-8	0.1	0.10	SW-846 8081
4,4'-DDE	72-55-9	0.1	0.10	SW-846 8081
4,4'-DDT	50-29-3	0.1	0.20	SW-846 8081
Dieldrin	60-57-1	0.05	0.10	SW-846 8081
Endosulfan I	959-98-8	0.1	0.05	SW-846 8081
Endosulfan II	33213-65-9	0.05	0.10	SW-846 8081
Endosulfan Sulfate	1031-07-8	0.5	0.10	SW-846 8081
Endrin	72-20-8	0.1	0.1	SW-846 8081

**BACKGROUND MONITORING PARAMETERS
(TABLE VII-2)**

ANALYTE	CAS Number	App. IX PQL (ug/L)	Minimum Detection Limit** (ug/L)	Analysis Method *
Endrin Aldehyde	7421-93-4	0.02	0.10	SW-846 8081
Heptachlor	76-44-8	0.05	0.05	SW-846 8081
Heptachlor epoxide	1024-57-3	1	0.05	SW-846 8081
Methoxychlor	72-43-5	2	0.50	SW-846 8081
Toxaphene	8001-35-2	2	5.0	SW-846 8081
PCBs				
PCB-1016	12674-11-2	50	1.0	SW-846 8082
PCB-1221	11104-28-2	50	1.0	SW-846 8082
PCB-1232	11141-16-5	50	1.0	SW-846 8082
PCB-1242	53469-21-9	50	1.0	SW-846 8082
PCB-1248	12672-29-6	50	1.0	SW-846 8082
PCB-1254	11097-69-1	50	1.0	SW-846 8082
PCB-1260	11096-82-5	50	1.0	SW-846 8082
PCB-1262 0.5	37324-23-5	N/A	1.0	SW-846 8082
PCB- 1268 0.5	11100-14-4	N/A	1.0	SW-846 8082
CHLORINATED HERBICIDES				
2,4-Dichlorophenoxy acetic acid (2,4-D)	94-75-7	10	4	SW-846 8151
2,4,5-T	93-76-5	2	1	SW-846 8151
2,4,5-TP (Silvex)	93-72-1	2	1	SW-846 8151
ORGANOPHOSPHORUS PESTICIDES				
Bolstar (Sulprofos)	35400432	N/A	0.5	SW-846 8141
Chloropyrifos methyl (Methyl Dursban, Reldan) 2921882	5598130	N/A	1.0	SW-846 8141
Diazinon	33-41-5	N/A	0.5	SW-846 8141
Disulfoton	298-04-4	2	0.5	SW-846 8141
Ethoprop (Mocap)	13194484	N/A	0.5	SW-846 8141
Fenthion (Baytex, Tiguvon)	55-38-9	N/A	0.5	SW-846 8141
Malathion (Cythion)	121-75-5	N/A	1.2	SW-846 8141
Methyl parathion	298-00-0	0.5	0.5	SW-846 8141
Phorate	298-02-2	2	0.5	SW-846 8141
Ronnel 0.3	299843	N/A	10	SW-846 8141
Sulfotepp	3689-24-5	10	0.5	SW-846 8141
Parathion (Ethyl parathion)	56-38-2	10	0.5	SW-846 8141
EPN (o-ethyl-o,p-nitrophenyl phenylphosphorothioate)	2104-64-5	N/A	0.5	SW-846 8141
RADIOACTIVITY				
Total Uranium				
Total Thorium				
Total Radium				
Gamma Spectrum				
Gross Alpha				
Gross Beta				

* Typical Analytical Method. Any EPA or ASTM method may be used if necessary to achieve the minimum detection limit.

** If the Laboratory Quantitation Limit is higher than the Minimum Detection Limit or Reporting Limit, the Laboratory Quantitation limit may be used instead.

**DETECTION MONITORING AND GENERAL GROUNDWATER QUALITY PARAMETERS
(TABLES VII-3)**

ANALYTE	CAS Number	App. IX PQL (ug/L)	Reporting** Limit (ug/L)	Analysis Method *
VOLATILE ORGANICS				
Cyclohexanone (LDS Only)	108-94-1	N/A	20	SW-846 8260
4-Methyl-2-pentanone (LDS Only)	108-10-1	50	50	SW-846 8260
2-Butanone (MEK) (LDS only)	78-93-3	100	100	SW-846 8260
Toluene (LDS Only)	108-88-3	5	5	SW-846 8260
Xylenes, Total (LDS Only)	1330-20-7	5	5	SW-846 8260
SEMIVOLATILE COMPOUNDS (ACID/BASE/NEUTRAL EXTRACTABLES)				
4-Chloro-3-methylphenol (p- Chloro-m-cresol)	59-50-7	20	10	SW-846 8270
2-Chlorophenol	95-57-8	10	10	SW-846 8270
2,4-Dichlorophenol	120-83-2	10	10	SW-846 8270
2,6-Dichlorophenol (LDS ONLY)	87-65-0	10	10	SW-846 8270
2,4-Dimethylphenol	105-67-9	10	10	SW-846 8270
4,6-Dinitro-2-methylphenol (4,6-Dinitro-o- cresol) (2-methyl-4,6-dinitrophenol)	534-52-1	50	50	SW-846 8270
2,4-Dinitrophenol	51-28-5	50	50	SW-846 8270
4-Nitrophenol (p-Nitrophenol)	100-02-7	10	50	SW-846 8270
Pentachlorophenol	87-86-5	50	50	SW-846 8270
Phenol	108-95-2	10	10	SW-846 8270
2,4,6-Trichlorophenol	88-06-2	10	10	SW-846 8270
ORGANOCHLORINE PESTICIDES & PCBs				
Aldrin	309-00-2	0.05	0.05	SW-846 8081
Hexachlorocyclohexane alpha-BHC	319-84-6	0.05	0.05	SW-846 8081
Hexachlorocyclohexane beta-BHC	319-85-7	0.05	0.05	SW-846 8081
Hexachlorocyclohexane delta-BHC	319-86-8	0.1	0.05	SW-846 8081
Hexachlorocyclohexane gamma-BHC (Lindane)	58-89-9	0.05	0.05	SW-846 8081
Chlordane	57-74-9	0.1	0.50	SW-846 8081
4,4'-DDD	72-54-8	0.1	0.10	SW-846 8081
4,4'-DDE	72-55-9	0.1	0.10	SW-846 8081
4,4'-DDT	50-29-3	0.1	0.1	SW-846 8081
Dieldrin	60-57-1	0.05	0.1	SW-846 8081
Endosulfan I	959-98-8	0.1	0.05	SW-846 8081
Endosulfan II	33213-65-9	0.05	0.10	SW-846 8081
Endosulfan Sulfate	1031-07-8	0.5	0.10	SW-846 8081
Endrin	72-20-8	0.1	0.1	SW-846 8081
Endrin Aldehyde	7421-93-4	0.02	0.1	SW-846 8081
Heptachlor	76-44-8	0.05	0.05	SW-846 8081
Heptachlor epoxide	1024-57-3	1	0.05	SW-846 8081
Methoxychlor	72-43-5	2	0.50	SW-846 8081
Toxaphene	8001-35-2	2	5	SW-846 8081
CHLORINATED HERBICIDES				
2,4-Dichlorophenoxy acetic acid (2,4-D)	94-75-7	10	4	SW-846 8151
2,4,5-T	93-76-5	2	1.0	SW-846 8151
2,4,5-TP (Silvex)	93-72-1	2	1.0	SW-846 8151

**DETECTION MONITORING AND GENERAL GROUNDWATER QUALITY PARAMETERS
(TABLES VII-3)**

ANALYTE	CAS Number	Minimum Detection Limit**	Units	Analysis Method *
PHYSICAL PROPERTIES				
pH	N/A	N/A	N/A	Field
Specific Conductance	N/A	1	umhos/cm	Field
Turbidity	N/A	1.0	NTU	Field
Total Dissolved Solids	n/a	21	mg/l	EPA 160.1
INORGANIC, NON-METALLICS				
Total alkalinity	71-52-3	5	mg/l	EPA 310.1
Chloride	16887-00-6	3	mg/l	EPA 325.2
Nitrogen, Nitrate-Nitrite		0.1	mg/l	EPA 353.2
Sulfate	14808-79-8	5.0	mg/l	EPA 375.4
ORGANICS				
Total Organic Carbon (TOC)	N/A	1.0	mg/l	EPA 415.1

ANALYTE	CAS Number	App. IX PQL (ug/L)	Minimum Detection Limit** (ug/L)	Analysis Method *
METALS				
Arsenic	7440-38-2	500	15	SW846 6010
Iron	7439-89-6	N/A	100	SW846 6010
Manganese	7439-96-5	N/A	50	SW846 6010
Sodium	7440-23-5	N/A	1,000	SW-846 6010
Zinc	7440-66-6	20	20	SW846 6010

RADIOACTIVITY				
Uranium by Isotope				
Thorium by Isotope				
Radium by Isotope				
Gamma Spectrum				

* Typical Analytical Method. Any EPA or ASTM method may be used if necessary to achieve the minimum detection limit.

** If the Laboratory Quantitation Limit is higher than the Minimum Detection Limit or Reporting Limit, the Laboratory Quantitation limit may be used instead.

REFERENCES:

1. Methods for Chemical Analysis of Water and Wastes, March 1983, USEPA, 600/4-79-020 and additions thereto.
2. Test Methods for Evaluating Solid Waste, Physical/Chemical Method, September 1986, Third Edition, Update II, USEPA, SW-846 and additions thereto.
3. Prescribed Procedure for Measurement of Radioactivity in Drinking Water, USEPA, EPA-600/4-80-032, August 1980.