

PART IV: GROUND WATER MONITORING

IV.A SUMMARY OF GROUND WATER MONITORING PROGRAMS

Pursuant to 6 CCR 1007-3, Section 264.91(b), the Permittee shall perform corrective action monitoring at Station B and detection monitoring at Station E. Corrective action monitoring at Station B will be performed to demonstrate the effectiveness and determine the success of the implemented closure action and to confirm that levels of constituents in the groundwater continue to decrease to complete corrective action on the former releases. Detection monitoring will be performed at Station E to monitor for the occurrence of any releases at Station E.

Supplemental Appendix IX analyses will be required as part of the Corrective Action Monitoring Program for Station B. Once the contaminant plume has been shown to be remediated at Station B based on a demonstration that the concentrations are below CDPHE "Basic Standards for Groundwater" in all compliance point wells for a period of three consecutive years, the monitoring program will then change into a detection monitoring program.

Ground water monitoring at these units will be conducted in accordance with the facility's Ground Water Monitoring, Sampling and Analysis, and Statistical Analysis Plan and any CDPHE-approved updates ([Attachment 12](#)).

IV.B STATION B CORRECTIVE ACTION MONITORING PROGRAM

The current groundwater data for Station B shows detections of Trichloroethene, 1,1-Dichloroethene, 1,1-Dichloroethane, Cis 1,2-Dichloroethene, 1,1,1 Trichloroethane, Toluene, Chloromethane, Benzene, Ethyl Benzene and 1,4-Dioxane. Selenium has also been detected, but has been addressed as SWMU 82. The components of the plume and its behavior seem to be well characterized by the available data. The trends for all the organic constituents are downward, or the concentrations are below the CDPHE "Basic Standards for Groundwater" (5 CCR 1002, Regulation 41). Further attenuation and dilution of the residual contamination in the groundwater should drop the concentrations for all the constituents below the State groundwater protection standard.

The source of groundwater contamination has already been controlled through a closure action. Station B was closed by stabilizing the waste and enclosing it in an engineered vault consisting of a clay liner, synthetic liners with leak and leachate detection systems and a composite cap of clay and synthetic membrane. No contaminants have been detected leaching from the reconstructed Station B. There is residual low level contamination in the groundwater from prior operations, however, no releases have been detected from the reconstructed unit.

IV.B.1 Corrective Action Monitoring Requirements

Corrective action monitoring shall be conducted at Station B to demonstrate the effectiveness and determine the success of the implemented closure action and to confirm that levels of constituents in the groundwater continue to decrease to complete corrective action on the former releases in accordance with the requirements of 6 CCR 1007-3, Section 264.100(d). Under this program, specific elements of both detection monitoring and compliance monitoring will be incorporated to fulfill the objectives of the corrective action program.

- IV.B.1.a The following wells shall be the compliance point wells used to monitor Station B: MW 3, MW 87-5, MW 2A, MW 87-7, MW 87-3, and MW 87-8. The wells are shown in Attachment 1, Well Location Map.
- IV.B.1.b Wells shall be sampled and analyzed semi-annually. [6 CCR 1007-3, 264.98(d)]
- IV.B.1.c The wells shall be monitored for the following parameters and constituents at each sampling event: Trichloroethene, 1,1-Dichloroethene, Cis 1,2-Dichloroethene, 1,1-Dichloroethane, 1,1,1 Trichloroethane, Toluene, Chloromethane, Benzene, Ethyl Benzene, 1,4-Dioxane, pH, temperature, and conductivity. [6 CCR 1007-3, Section 264.98(a)]
- IV.B.1.d Because there is contamination in the ground water from past activities, intra-well comparisons shall be made to determine if statistically significant increases in contaminants are occurring over time.
- IV.B.1.e Statistical methods used to determine if changes in constituents are significant shall be submitted to the Director according to the schedule specified in Permit Condition I.I.1. The Permittee shall compare data collected to fulfill the requirements of Permit Condition IV.B.1 to data that has been collected during post-closure interim status monitoring. The Permittee must demonstrate that the interim status data used for the comparison do not reflect anomalous effects of closure activities on ground water quality.
- IV.B.1.f If the Permittee determines that there have been statistically significant increases in the constituents specified in Permit Condition IV.B.1.c, the Permittee must:

- IV.B.1.f.1 Notify the Director of this finding in writing within seven days as specified in 6 CCR 1007-3, Section 264.98(g)(1).
- IV.B.1.f.2 Sample the ground water in all Station B monitoring wells to determine if Appendix IX constituents are present, and if so in what concentration, as specified in 6 CCR 1007-3, Section 264.98(g)(2) and (3).
- IV.B.1.f.3 Within 90 days submit to the Director an application for a permit modification to establish a compliance monitoring program meeting the requirements of Section 264.99 as specified in 6 CCR 1007-3, Section 264.98(g)(4).
- IV.B.1.f.4 Within 180 days, the Permittee must submit to the Director data necessary to justify an alternate concentration limit. [6 CCR 1007-3, Section 264.98(g)(5)]
- IV.B.1.f.5 Within 180 days the Permitted must submit to the Director an engineering feasibility plan for a corrective action program unless: [6 CCR 1007-3, Section 264.98(g)(5)]
 - IV.B.1.f.5.a The concentrations of all hazardous constituents identified under Permit Condition IV.b.1.f.2, that are listed in Table 1 of Section 264.94, do not exceed the respective values given in that Table; or the Permittee has sought an alternate concentration limit under 264.94(b) for every hazardous constituent identified under Permit Condition IV.B.1.f.2. [6 CCR 1007-3, Section 264.98(g)(5)]

IV.B.2 Appendix IX Requirements

In addition to including specific elements of a detection monitoring program, Appendix IX analyses under a compliance monitoring program is required at Station B under 6 CCR 1007-3, Section 264.99(g). Appendix IX analyses shall be performed at all compliance point wells once every five years. Two purposes will be served by analysis of Appendix IX constituents at the detection monitoring wells: (1) All contaminants of concern shall be identified; and (2) Appendix IX analyses will provide additional information that may help in detection of leaks from the closed unit. Detection of leaks is more difficult because of the existing contamination from Station B. Detections of Selenium have been addressed as SWMU 82.

- IV.B.2.a If Appendix IX constituents (except selenium) are detected in the compliance point wells, the wells must be resampled to confirm if the constituents are present. If the presence of additional Appendix IX constituents is confirmed in the compliance point wells, the Permittee must modify this Permit to include the additional constituents in the list of analytes that are required by Permit Condition IV.B.1.c.

IV.C STATION E DETECTION MONITORING PROGRAM

No constituents except selenium and 1,4-Dioxane have been detected in the ground water at Station E in nineteen years of groundwater monitoring. Electric Arc Furnace Dust (K061) and a characteristic lead waste (D008) were disposed of in Station E. The basis for listing K061 are the hazardous constituents hexavalent chromium, lead, and cadmium. Selenium has been addressed as SWMU 82.

IV.C.1 Detection Monitoring Requirements

The Permittee shall conduct detection monitoring at Station E. Detection Monitoring at Station E shall meet the requirements of 6 CCR 1007-3, Section 264.98.

- IV.C.1.a Wells shall be sampled and analyzed semi-annually. [6 CCR 1007-3, Section 264.98(d)]
- IV.C.1.b The following wells shall be the compliance point wells used to monitor Station E: Well MW-3A, Well 87-2, and Well MW 96-1 Attachment 1, Well Location Map. [6 CCR 1007-3, 264.98(b)] .
- IV.C.1.c Well MW-1 shall be used as the background well for Station E. [6 CCR 1007-3, 264.98(b)]
- IV.C.1.d The Permittee must monitor the ground water monitoring wells identified in Permit Conditions IV.C.1.b and IV.C.1.d for the following constituents and parameters: dissolved lead, dissolved cadmium, dissolved chromium (total), dissolved mercury, dissolved nickel, dissolved silver, dissolved zinc, pH, temperature, conductivity. [6 CCR 1007-3, Section 264.98(a)] After the first four semi-annual sampling events a determination was made by CDPHE that there are no releases to the ground water of chromium, mercury, nickel, silver, or zinc based on the statistical decision criteria included in [Appendix 12](#), therefore, these constituents have been dropped from the monitoring program.

- IV.C.1.e The Permittee must compare the analytical results of the compliance point wells to the analytical results of the background well. The method used for the comparison is specified in [Attachment 12](#).
- IV.C.1.f If the constituents specified in Permit Condition IV.C.1.d exceed background the Permittee must:
 - IV.C.1.f.1 Notify the Director of this finding in writing within seven days as specified in 264.98(g)(1).
 - IV.C.1.f.2 Sample the ground water in all Station E monitoring wells to determine if Appendix IX constituents are present and if so, in what concentration. [6 CCR 1007-3, Section 264.98(g)(2)]
 - IV.C.1.f.3 Within 90 days submit to the Director an application for a permit modification to establish a compliance monitoring program meeting the requirements of Section 264.99.
 - IV.C.1.f.4 Within 180 days, the Permittee must submit to the Director data necessary to justify an alternate concentration limit. [1007-3, 264.98(g)(5)]
 - IV.C.1.f.5 Within 180 days the Permittee must submit to the Director an engineering feasibility plan for a corrective action program unless: [1007-3, 264.98(g)(5)]
 - IV.C.1.f.5.a The concentrations of all hazardous constituents identified under Permit Condition IV.C.1.d, that are listed in Table 1 of Section 264.94, do not exceed the respective values given in that Table; or the Permittee has sought an alternate concentration limit under 264.94(b) for every hazardous constituent identified under Permit Condition IV.B.1.f.2. [6 CCR 1007-3, 264.98(g)(5)]

IV.D SAMPLING AND ANALYSIS PROCEDURES

The Permittee must use the following techniques and procedures when obtaining and analyzing samples from the ground water monitoring wells described in Permit Condition IV.B. and IV.C.: [6 CCR 1007-3, Sections 264.97(d) and (e), 264.98(g) and 100.42 (c)(6)]

IV.D.1 Samples must be collected using the techniques described in Attachment 12 described in Post-Closure Permit #95-09-29-01.

IV.D.2 Samples must be preserved and shipped, in accordance with the procedures specified in the Permit and the "Ground-Water Monitoring, Sampling and Analysis, and Statistical Analysis Plan," Attachment 12.

IV.D.3 Samples must be analyzed in accordance with the procedures specified in the Permit and the "Ground-Water Monitoring, Sampling and Analysis, and Statistical Analysis Plan," Attachment 12.

IV.D.4 Samples must be tracked and controlled using the chain-of-custody procedures specified in the Permit and the "Ground-Water Monitoring, Sampling and Analysis, and Statistical Analysis Plan," Attachment 12.

IV.E ELEVATION OF THE GROUND WATER SURFACE

IV.E.1 The Permittee must determine the elevation of the ground water surface at each well each time the ground water is sampled. [6 CCR 1007-3, Section 264.97(f)]

IV.E.2 The Permittee must record the surveyed elevation of the monitoring well(s) including the top of casing, ground surface, well pad, protective casing and total depth when installed.

IV.F STATISTICAL PROCEDURES

When evaluating the monitoring results in accordance with Permit Condition IV.F., the Permittee must use the **statistical procedures as presented in Permit Attachment 12** and described in Permit Condition IV.G.

IV.G MONITORING PROGRAM AND DATA EVALUATION

IV.G.1 The Permittee must collect ground water samples for the analytes listed in Permit Conditions IV.B.1.c, IV.C.1.e, and IV.B.2 from the ground water monitoring program monitoring wells at the required frequencies pursuant to Permit Conditions IV.B.1.b, IV.C.1.a, and IV.B.2.

IV.G.2 The Permittee must determine ground water quality at each monitoring well during the post-closure care period of the regulated units. The Permittee must express the ground water quality at each monitoring well

in a form necessary for the determination of statistically significant increases. [6 CCR 1007-3, Section 264.97(h)]

- IV.G.3 The Permittee must determine the ground water flow rate and direction in the uppermost aquifer at least annually. [6 CCR 1007-3, Section 264.98(e)]
- IV.G.4 The Permittee must determine whether there is a statistically significant increase over the background value for each analyte identified in Permit Conditions IV.B.1.c and IV.C.1.e each time ground water quality is determined at the compliance points in accordance with the following Permit Conditions.
 - IV.G.4.a In determining whether such an increase has occurred for analytes, the Permittee must compare the ground water quality at each monitoring well specified in Permit Conditions IV.B.1.a to the specified background values specified in Permit Condition IV.B.1.d (for Station B), and the ground water quality at each monitoring well specified in Permit Condition IV.C.1.b and c to the background values specified in Permit Condition IV.C.1.d (for Station E). [6 CCR 1007-3, Section 264.98(g)]
 - IV.G.4.b For analytes whose background concentrations are below detection: any detectable quantity above the detection limit in any monitoring well is considered significant and subject to the requirements of Permit Condition IV.H.
- IV.G.5 The Permittee must perform the evaluations described in Permit Condition IV.G.4. within 60 days after completion of sampling. [6 CCR 1007-3, Section 264.98(f)(2)]

IV.H RECORD KEEPING AND REPORTING

- IV.H.1 The Permittee must enter all monitoring, testing, and analytical data obtained in accordance with Permit Condition IV.G. in the post-closure care operating record. [6 CCR 1007-3, Section 264.73(b)(6)] The data must include all computations, calculated means, variances, t-statistic values, and t-test results (or results of statistical tests that the Director has determined to be equivalent).

- IV.H.2 The Permittee must submit the analytical results required by Permit Conditions IV.G.2. and IV.G.3. and the results of the initial statistical analyses required by Permit Condition IV.G.4., 90 days after the sampling event has occurred.
- IV.H.3 If the Permittee determines, pursuant to Permit Condition IV.F., there is a statistically significant increase above the background values for the indicator constituents specified in Permit Conditions IV.B.1.c and IV.C.1.e, the Permittee must fulfill Permit Conditions IV.B.1.f and IV.C.1.g.
- IV.H.4 If the Permittee determines pursuant to Permit Condition IV.F., there is a statistically significant increase above the background values for the parameters specified in Permit Conditions IV.B.1.c and IV.C.1.e, he or she 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:
- IV.H.4.a Notify the Director in writing within seven (7) days that he or she intends to make a demonstration. [6 CCR 1007-3, Section 264.98(g)(6)(i)]
 - IV.H.4.b Within 90 days, submit a report to the Director that 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, Section 264.98(g)(6)(ii)]
 - IV.H.4.c Within 90 days, submit to the Director an application for a permit modification to make any appropriate changes to the monitoring program at the facility. [6 CFR 264.98(g)(6)(iii)]
 - IV.H.4.d Continue to monitor in accordance with the monitoring program at the facility. [6 CCR 1007-3, Section 264.98(g)(6)(iv)]