**Facility Name:** Click here to enter text.

**EPA ID:**Click here to enter text.

**Agency Interest ID:**Click here to enter text.

**Instructions:** In order to help expedite the review process, please submit the following with the permit application:

Part E – Groundwater Monitoring Checklist. Columns “Submitted” and “Location in Application” must be completed by the applicant. Failure to do so may result in an Administrative Notice of Deficiency by the Division. The “Technically Adequate” Column is for use by KDWM staff.

*\*Notes: Y for Yes. N for No. NA for Not Applicable.*

| ***Section and Requirement*** | ***Regulation******(Federal or State)*** | ***Submitted****(Y/N/NA)\** | ***Location in Application*** | ***Technically Adequate****(Y/N)\** | ***Comments*** |
| --- | --- | --- | --- | --- | --- |
| **E.1** | **Exemption from Groundwater Protection Requirements** All land based units must have a groundwater monitoring program. A surface impoundment, waste pile, drip pad and land treatment unit or landfill that receives hazardous waste may qualify for this exemption.  | 270.14(c); 270.26(b); 264.90(2);270.14(c)(1) |  |  |  | *In order to qualify for the exemption, the applicant must satisfy applicable Checklist E.1.1 through E.1.3 below. If applicant does not qualify for the exemption, proceed from Checklist E.2 below.* *A surface impoundment, waste pile, and land treatment unit or landfill that receives hazardous waste after July 26, 1982 are referred to as a “regulated unit” in this checklist.*  |
|  | **E.1.1 Exemption criteria for Landfill, Surface Impoundment and Drip Pads** The applicant must demonstrate the following for each unit: | 264.90(b)(2); 270.14(c); 264.90(b)(2); 270.26(b) |  |  |  | *The applicant may have optional or additional requirements for unit specific exemption criteria. Please check the applicable unit specific checklist below.*  |
|  | 1. Is an engineered structure.
 | 264.90(b)(2)(i) | Click here to enter text. | Click here to enter text. |  | *Provide the design of the unit.*  |
|  | 1. Does not receive or contain liquid waste or waste containing free liquids.
 | 264.90(b)(2)(ii);  | Click here to enter text. | Click here to enter text. |  | *To demonstrate the absence or presence of free liquids in the waste, the following test must be used: Method 9095B (Paint Filter Liquids Test) as described in “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,” EPA Publication SW-846, as incorporated by reference in 40 CFR Part 260.11.* |
|  | 1. Is designed and operated to exclude liquid, precipitation, and other run-on and run-off.
 | 264.90(b)(2)(iii);  | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | 1. Has both inner and outer layers of containment enclosing the waste.
 | 264.90(b)(2)(iv) | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | 1. Has a leak detection system built into each containment layer.
 | 264.90(b)(2)(v) | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | 1. The applicant will provide continuing operation and maintenance of these leak detection systems during the active life of the unit and the closure and post-closure care periods.
 | 264.90(b)(2)(vi) | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | 1. To a reasonable degree of certainty, will not allow hazardous constituents to migrate beyond the outer containment layer prior to the end of the post-closure care period.
 | 264.90(b)(2)(vii) | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | **E.1.2 Exemption Criteria for Waste Piles**To qualify for the optional exemption criteria, the applicant shall operate a waste pile that is inside or under a structure, and shall demonstrate the following *(See Comments)*:  | 270.18(b); 264.90(b)(5); 264.250(c) |  |  |  | *The applicant has the option to comply with either the requirements in Checklist E.1.1 above or comply with Checklist E.1.2.*  |
|  | 1. Liquids or materials containing free liquids are not placed in the pile.
 | 264.250(c)(1) | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | 1. The pile is protected from surface water run-on by the structure or in some other manner.
 | 264.250(c)(2) | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | 1. The waste pile is designed and operated to control dispersal of the waste by wind, where necessary, by means other than wetting.
 | 264.250(c)(3) | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | 1. The waste pile will not generate leachate through decomposition or other reactions.
 | 264.250(c)(4) | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | **E.1.3 Exemption Criteria for No Migration** Demonstrate that there is no potential for migration of liquid from a regulated unit to the uppermost aquifer during the active life of the regulated unit (including the closure period) and the post-closure care period specified under 40 CFR Part 264.117.  | 264.90(b)(4) | Click here to enter text. | Click here to enter text. |  | *This demonstration must be certified by a qualified geologist or geotechnical engineer. In order to provide an adequate margin of safety in the prediction of potential migration of liquid, the applicant must base any predictions made under this requirement on assumptions that maximize the rate of liquid migration.* |
| **E.2**  | **Interim Status** Provide a summary of groundwater monitoring data obtained during the Interim Status period. | 270.14(c)(1); 265.90 – 265.94 | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
| **E.3** | **General Hydrogeologic Information**Provide the following information and to the extent possible, a topographic map that clearly shows: | 270.14(c)(2); 270.14(c)(3) |  |  |  | *See comments in Checklist E.4 below for the topographic map.*  |
|  | i. A description of the regional and site-specific geologic and hydrogeological setting. |  | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | ii. Identification of the uppermost aquifer and aquifers hydraulically interconnected beneath the facility property. |  | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | iii. Groundwater flow direction and rate. Include the basis for such identification (*i.e.,* the information obtained from hydrogeologic investigations of the facility area) |  | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | iv. Provide a discussion on subsidence (sinkhole collapse) and how the subsidence will be monitored. |  | Click here to enter text. | Click here to enter text. |  | *For facility that is underlain by limestone (i.e., is in a karst terrane).* |
|  | v. Propose a spring survey and a dye trace and discuss karst drainage, if applicable. |  | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
| **E.4** | **Topographic Map Requirements**Provide a topographic map(s) that clearly shows the following: | 270.14(c)(2), (3), (4)(i) |  |  |  | *Topographic map shall show a distance of 1,000 feet around the facility at a scale of 2.5 centimeters (1 inch) equal to not more than 61.0 meters (200 feet)* |
|  | 1. A delineation of the waste management area.

The waste management area is the limit projected in the horizontal plane of the area on which waste will be placed during the active life of a regulated unit. | 270.14(c)(3); 264.95(b) | Click here to enter text. | Click here to enter text. |  | *The waste management area includes horizontal space taken up by any liner, dike, or other barrier designed to contain waste in a regulated unit. If the facility contains more than one regulated unit, the waste management area is described by an imaginary line circumscribing the several regulated units.* |
|  | 1. Property boundary.
 | 270.14(c)(3) | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | 1. Proposed “point of compliance”.
 | 270.14(c)(3); 264.95(a) | Click here to enter text. | Click here to enter text. |  | *The point of compliance is a vertical surface located at the hydraulically downgradient limit of the waste management area that extends down into the uppermost aquifer underlying the regulated units.* |
|  | 1. Proposed location of groundwater monitoring wells as required by 40 CFR Part 264.97.
 | 270.14(c)(3)  | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
| **E.5** | **Contaminant Plume Description**Provide the following information: | 270.14(c)(2), (4), (7) |  |  |  | *If the presence of hazardous constituents has been detected in the groundwater at the point of compliance at the time of the permit application, the applicant must establish a compliance monitoring program. See Checklist E.8 below.*  |
|  | 1. A description of any plume of contamination that has entered the ground water from a regulated unit.
 |  | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | 1. A delineation the extent of the plume on a topographic map.
 |  | Click here to enter text. | Click here to enter text. |  | *See comments in Checklist E.4 above for the topographic map.* |
|  | 1. Identify the concentration of each constituent in 40 CFR Part 264 Appendix IX throughout the plume or identify the maximum concentrations of each constituent in Appendix IX in the plume.
 |  | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
| **E.6** | **General Monitoring Program Requirements** | 270.14(c)(5); 264.90(b)(4); 264.97 |  |  |  | *The program shall consists of detailed plans and an engineering report, to be implemented to meet the requirements of 40 CFR Part 264.97.* |
|  | **E.6.1 Description of Wells**Demonstrate the following: | 264.97(a),(b),(c) |  |  |  | *The groundwater monitoring system must consist of a sufficient number of wells, installed at appropriate locations and depths to yield groundwater samples from the uppermost aquifer.* |
|  | 1. The quality of the groundwater samples from background groundwater has not been affected by leakage from a regulated unit.

If a determination of background groundwater quality includes sampling of wells that are not hydraulically upgradient of the waste management area, demonstrate that:* Hydrogeologic conditions do not allow the applicant to determine what wells are hydraulically upgradient; and
* Sampling at other wells will provide an indication of background ground-water quality that is representative or more representative than that provided by the upgradient wells.
 | 264.97 (a)(1)401 KAR 39:090 Sec 9 (24) | Click here to enter text. | Click here to enter text. |  | *The citations to the Safe Drinking Water Act shall also include any applicable Kentucky requirements as established in 401 KAR Chapters 6, 8, 9 and 10, and 805 KAR Chapter 1.* |
|  | 1. The groundwater samples represent the quality of groundwater passing the point of compliance.
 | 264.97(a)(2) | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | 1. The well(s) is capable of detecting contamination when hazardous waste or hazardous constituents have migrated from the waste management area to the uppermost aquifer.
 | 264.97(a)(3) | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | 1. For a facility that contains more than one regulated units, sampling of the groundwater conducted at the uppermost aquifer will enable detection and measurement at the point of compliance for the hazardous constituents released from the regulated units.
 | 264.97(b) | Click here to enter text. | Click here to enter text. |  | *If a facility contains more than one regulated unit, separate groundwater monitoring systems are not required for each regulated unit provided Checklist E.6.1.iv is satisfied.*  |
|  | 1. Monitoring well(s) has casing and the casing must be screened or perforated and packed with gravel or sand, where necessary, to enable collection of ground-water samples.
 | 264.97(c); 401 KAR 6:350 | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | 1. The annular space (i.e., the space between the bore hole and well casing) above the sampling depth is sealed to prevent contamination of samples and the ground water.
 | 264.97(c); 401 KAR 6:350 | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | **E.6.2 Sampling and Analysis Procedures**Provide the procedures and techniques for:  | 270.14(c)(5); 264.97(d),(e),(f),(g) |  |  |  | *Consistent sampling and analysis procedures shall be designed to ensure monitoring results that provide a reliable indication of groundwater quality below the waste management area.* |
|  | 1. Sample collection from background well(s) and/or at the point of compliance. In addition, provide:
* A description of a procedure that takes a sequence of at least four samples at each well per sampling event, or propose an alternate procedure.
 | 264.97(d)(1); 264.97(g) | Click here to enter text. | Click here to enter text. |  | *The number and kinds of samples collected to establish background shall be appropriate for the form of statistical test to be used, following generally accepted statistical principles.*  |
|  | 1. Sample preservation and shipment.
 | 264.97(d)(2) | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | 1. Analytical procedures. Identify the parameters to be monitored and test methods to be used. Provide an explanation on why the test methods used are the most appropriate and accurate.
 | 264.97(d)(3) | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | 1. Chain of custody control.
 | 264.97(d)(4) | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | 1. The determination of the groundwater surface elevation each time groundwater is sampled.
 | 264.97(f) | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | **E.6.3 Statistical Procedures** Provide the details on any statistical methods listed below that will be used: | 270.14(c)(5); 264.97(h),(i)(1), (5),(6) |  |  |  | *Use of any of listed statistical methods must be protective of human health and the environment and must comply with the performance standards outlined in 40 CFR Part 264.97(i).* |
|  | 1. A parametric analysis of variance (ANOVA) followed by multiple comparisons procedures to identify statistically significant evidence of contamination. Demonstrate that the statistical method used complies with 40 CFR Part 264.97(i)(2).
 | 264.97(h)(1), (i)(2) | Click here to enter text. | Click here to enter text. |  | *The method must include estimation and testing of the contrasts between each compliance well's mean and the background mean levels for each constituent.* |
|  | 1. A nonparametric analysis of variance (ANOVA) that is based on ranks, followed by multiple comparisons procedures to identify statistically significant evidence of contamination. Demonstrate that the statistical method used complies with 40 CFR Part 264.97(i)(2).
 | 264.97(h)(2), (i)(2) | Click here to enter text. | Click here to enter text. |  | *The method must include estimation and testing of the contrasts between each compliance well's median and the background median levels for each constituent.* |
|  | 1. 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 compliance well is compared to the upper tolerance or prediction limit. Demonstrate that the statistical method used complies with 40 CFR Part 264.97(i)(4).
 | 264.97(h)(3), (i)(4) | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | 1. A control chart approach that gives control limits for each constituent. Demonstrate that the statistical method used complies with 40 CFR Part 264.97(i)(3).
 | 264.97(h)(4), (i)(3) | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | 1. Alternative statistical methods. Demonstrate that the statistical method used complies with applicable 40 CFR Part 264.97(i).
 | 264.97(h)(5), (i) | Click here to enter text. | Click here to enter text. |  | *Alternative statistical method must be approved by the Division.*  |
| **E.7** | **Detection Monitoring Program** | 270.14(c)(6); 264.91(a)(4), 264.98 |  |  |  | *If the presence of hazardous constituents has not been detected in the groundwater at the time of permit application, the applicant must establish a detection monitoring program.* |
|  | **E.7.1 Indicator Parameters, Waste Constituents, or Reaction Products** Provide the following information: | 270.14(c)(6)(i); 264.98(a)  |  |  |  | *The applicant must monitor for indicator parameters (e.g., specific conductance, total organic carbon, or total organic halogen), waste constituents, or reaction products that provide a reliable indication of the presence of hazardous constituents in groundwater.* |
|  | 1. The types, quantities, and concentrations of constituents in wastes managed at the regulated unit.
 | 264.98(a)(1) | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | 1. The mobility, stability, and persistence of waste constituents or their reaction products in the unsaturated zone beneath the waste management area.
 | 264.98.(a)(2) | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | 1. The detectability of indicator parameters, waste constituents, and reaction products in ground water.
 | 264.98(a)(3) | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | 1. The concentrations or values and coefficients of variation of proposed monitoring parameters or constituents in the ground-water background.
 | 264.98(a)(4) | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | **E.7.2 Groundwater Monitoring System**Provide the following information: | 270.14(c)(6)(ii); 264.97(a)(2), (b), (c); 264.98(b) |  |  |  | *The groundwater monitoring system must consist of a sufficient number of wells, installed at appropriate locations and depths to yield groundwater samples from the uppermost aquifer.* |
|  | 1. Identify the number, location, depth of each well, and describe the well construction material.
 |  | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | 1. Information requested in *Checklist E.6.1.ii, iv, v*, and *vi* above.
 | 264.97(a)(2), (b), (c); 264.98(b) | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | **E.7.3 Background Groundwater Concentration Values for Proposed Parameters**Provide the information requested in *Checklist E.6.2.i* above. | 270.14(c)(6)(iii); 264.97(g); 264.98(c), (d) | Click here to enter text. | Click here to enter text. |  | *The applicant shall provide background values for each proposed monitoring parameter or constituent, or procedures to calculate such values.* |
|  | **E.7.4 Proposed Sampling and Analysis Procedures**Provide the following information: | 270.14(c)(6)(iv); 264.97(d), (e), (f); 264.98(d), (e), (f) |  |  |  | *A description of proposed sampling, analysis and statistical comparison procedures to be utilized in evaluating ground-water monitoring data.* |
|  | 1. The procedures and techniques for sample collection.
 | 264.97(d)(1) | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | 1. The information requested in *Checklist E.6.2.ii*, *iii*, *iv,* and *v* above.
 | 264.97(d)(2) to (4), (f) | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | 1. Demonstrate that the applicant will determine the ground-water flow rate and direction in the uppermost aquifer at least annually.
 | 264.98(e) | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | **E.7.5 Contamination**Demonstrate that if the applicant determines there is statistically significant evidence of contamination for chemical parameters or hazardous constituents at any monitoring well at the compliance point, the applicant shall comply with 40 CFR Part 264.98(g).  | 270.14(c)(6); 264.98(g); Part 264 Appendix IX | Click here to enter text. | Click here to enter text. |  |  |
| **E.8** | **Compliance Monitoring Program** Provide the following information:  | 270.14(c)(7); 264.99 |  |  |  | *If the presence of hazardous constituents has been detected in the groundwater at the point of compliance at the time of the permit application, the applicant must establish a compliance monitoring program.* |
|  | 1. A description of the waste. The description must include historical records of volumes, types, and chemical composition of waste placed in units in waste management areas.
 | 270.14(c)(7)(i) | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | 1. A characterization of the contaminated ground water, including concentrations of hazardous constituents.
 | 270.14(c)(7)(ii) | Click here to enter text. | Click here to enter text. |  | *For each well at point of compliance and for each background well, provide concentrations of each constituent in Part 261 Appendix VII, major cations and anions, and constituents listed in Table 1 of Part 264.94, if not already mentioned above.*  |
|  | 1. A list of hazardous constituents to be monitored in the Compliance Program.
 | 270.14(c)(7)(iii); 264.98(g)(3); 264.99(a)(1) | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | 1. Proposed concentration limits for each hazardous constituent, based on the criteria set forth in 40 CFR Part 264.94(a).

OrIf applicant proposes any alternate concentration limits, provide the justification. The justification must at the very least address the following two factors:* Adverse effects on groundwater quality.
* Potential adverse effects.
 | 270.14(c)(7)(iv); 264.94(b); 264.99(a)(2); 270.14(c)(7)(iv) | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | 1. Detailed plans and an engineering report describing the proposed ground-water monitoring system. Include details supporting representative nature of groundwater quality at background monitoring wells and point of compliance well.
 | 270.14(c)(7)(v); 264.95; 264.97(a)(2), (b), (c); 264.99(b) | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | 1. A description of proposed sampling, analysis and statistical comparison procedures to be utilized in evaluating ground-water monitoring data.
 | 270.14(c)(7)(vi); 264.97(d), (e), (f); 264.99(c) – (g) | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | 1. If applicant determines that groundwater protection standard has been exceeded at compliance point monitoring well, demonstrate that the applicant will notify the Division in writing within seven days.
 | 270.14(c)(8); 264.99(h)(i) | Click here to enter text. | Click here to enter text. |  | *The notification must indicate what concentration limits have been exceeded.* |
| **E.9** | **Corrective Action Program** Provide the following information: | 270.14(c)(8); 264.99(j); 264.100 |  |  |  |  |
|  | 1. A characterization of the contaminated ground water, including concentrations of hazardous constituents.
 | 270.14(c)(8)(i) | Click here to enter text. | Click here to enter text. |  | *For each well at point of compliance and for each background well, provide concentrations of each constituent in Part 261 Appendix VII, major cations and anions, and constituents listed in Table 1 of Part 264.94, if not already mentioned above.* |
|  | 1. The concentration limit for each hazardous constituent found in the ground water.

Or | 270.14(c)(8)(ii); 264.94; 264.100(a)(2) | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | If applicant proposes any alternate concentration limits, provide the justification. The justification must at the very least address the following two factors:* Adverse effects on groundwater quality.
* Potential adverse effects.
 | 264.94(b); 264.100(a)(2)  | Click here to enter text. | Click here to enter text. |  | *Applicant is not required to submit information to establish a corrective action program if applicant demonstrates to the Division that alternate concentration limits will protect human health and the environment after considering the criteria listed in 40 CFR Part 264.94(b). Applicant must instead establish a Compliance Monitoring Program (See Checklist E.8 above)*  |
|  | 1. Detailed plans and an engineering report describing the corrective action to be taken. Include detailed plans and engineering report on corrective actions proposed for facility, including maps of engineered structures, construction details, plans for removing waste, description of treatment technologies, effectiveness of correction program, description of reinjection system, additional hydrogeologic data, operation and maintenance plans, and closure and post-closure plans.
 | 270.14(c)(8)(iii); 264.100(b) | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | 1. A description of how the groundwater monitoring program will demonstrate the adequacy of the corrective action. At a minimum, provide the information requested in *Checklist E.8.v* and *vi.*
 | 270.14(c)(7)(v) and (c)(8)(iv); 264.100(d) | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |
|  | 1. Demonstrate that the applicant will submit a report to the Division in writing on the effectiveness of the Corrective Action Program annually.
 | 264.100(g) | Click here to enter text. | Click here to enter text. |  | Click here to enter text. |