

HAZARDOUS CONSTITUENT SAMPLING LIST  
and  
RISK BASED CONCENTRATION SCREENING - ATTACHMENT B

1. The Permittee shall analyze media for hazardous constituents listed in 40 C.F.R. Part 264, Appendix IX. Based on site-specific considerations (e.g., the contaminated media, sampling and analysis of waste from the unit, or facility-specific information), the Permittee may propose to EPA for approval a reduced list of constituents for analyses. Likewise, the above list shall not preclude the Permittee from analyzing constituents, chemical parameters or physical parameters not otherwise specified.
  
2. The Permittee shall either screen analytical data against Risk-Based Screening Levels (RBSLs) or, in lieu of screening, carry forward a SWMU/AOC, constituent, media and/or exposure pathway through the RFI. By use of a risk-based concentration screen, the corrective action process (including any risk assessment) can be made more efficient by focusing on media, significant units, dominant contaminants and routes of exposure at the earliest feasible stage. The levels specified below represent **screening levels** which are intended to guide the Permittee in recommending further action (e.g., conducting a RFI/CMS). These values are not intended to be remedial cleanup levels.
  - A. The RBSLs will be developed from the following sources as appropriate:
    - i. U.S. EPA Region III Technical Guidance Manual, Risk Assessment, "Selecting Exposure Routes and Contaminants of Concern by Risk-Based Screening," U.S. EPA/903/r-93-001, January 1993.
    - ii. U.S. EPA Region III Risk-Based Concentration (RBC) Table (most recent update)
    - iii. Current Federal Primary Drinking Water Standards
    - iv. Soil Screening Guidance, U.S. EPA/540/R-95/128, May 1996.
    - v. Ambient Water Quality Criteria (AWQC).

- vi. Other guidance documents as appropriate and approved by EPA.
- B. For a given medium containing a constituent with more than one risk-based concentration (i.e., one based on carcinogenic risk, one based on noncarcinogenic effects), the lower concentration shall be used. RBSLs for noncarcinogenic constituents will be based on a hazard quotient of 0.1. RBSLs for carcinogenic constituents will be based on a risk level of  $1 \times 10^{-6}$ .
  - C. If health-based criteria are not available for a constituent detected at the site, EPA may require that provisional RBSLs be proposed based conservatively on toxicity data reported in literature and/or health-based criteria for similar constituents. As additional toxicological data of adequate quality becomes available, the Permittee may incorporate such data into the RBSLs, subject to EPA approval.
- 3. The Permittee may use existing data (i.e. data collected prior to the effective date of the permit) or data collected during the RFI to characterize the nature and extent of contamination for a SWMU/AOC, constituent, media and/or exposure pathway. Data collected prior to EPA approval of a Quality Assurance Project Plan must have documentation supporting its quality. For either existing data or data collected during the RFI, the detection limits for the analytical methods used must meet the various screening criteria outlined below. Standard SW-846 method detection limits will not meet the various screening criteria outlined below for all constituents. For those constituents, the Permittee may choose to carry them forward through the RFI at one-half the detection limit, or use a more sensitive method which can meet the screening criteria.
  - 4. The requirement to implement Corrective Measures at the Facility is not contingent upon exceedances of these screening levels. That is, if EPA determines that a constituent(s) present in a concentration below screening levels may pose a threat to human health or the environment, given site-specific exposure conditions, and there is reason to believe that the constituent(s) has been released from the facility, EPA may require a Corrective Measures. Likewise, EPA may deem no further action is necessary despite exceedances of these screening levels, with appropriate rationale.

5. The Permittee shall screen each pathway described below. A SWMU/AOC, constituent, and/or medium with sufficient quantity and quality of data, that does not exceed screening concentrations for any of the pathways may generally be eliminated from further investigation. A SWMU/AOC, constituent or medium for which analytical data exceeds screening levels for a given pathway shall require further investigation or evaluation under the RFI. Based upon all the available information (e.g. number of samples, nature of contamination, location of SWMU/AOC), the Permittee shall recommend a course of action.
  - A. Soil screening concentrations shall be developed for each of the following exposure pathways; direct contact, inhalation, migration to groundwater, and ecological receptors.
    - i. For direct contact, RBSLs shall be developed so that contaminants remaining in soil would be safe for incidental ingestion assuming residential exposure. If the Permittee has submitted documentation supporting industrial (or other non-residential) future land use scenarios (see Condition 6 of this Attachment), the Permittee may also develop RBSLs for soils in accordance with the scenario under EPA consideration. The Permittee may conduct the industrial screening prior to the residential screening so that, if contaminant concentrations at the unit exceed the industrial RBSLs, further investigation or evaluation is required, and the residential screening is not required. If a unit does not exceed the industrial RBSLs, then the residential screening must be conducted, so that soils at the site can be classified for direct contact exposure as follows:
      - a. Below Residential - A SWMU/AOC or constituent for which analytical data is below residential RBSLs can generally be eliminated from further investigation for the direct contact pathway.
      - b. Above Industrial - A SWMU/AOC or constituent for which analytical data is above industrial RBSLs shall be carried forward for additional investigation or evaluation under the RFI or CMS.

- c. Between Residential and Industrial - For a SWMU/AOC or constituent for which analytical data is below industrial and above residential RBSLs, the Permittee shall recommend whether further investigation or evaluation is warranted under the RFI or CMS for the direct contact pathway, based upon all available information (e.g., data quality, number of samples, nature of contamination, location of the SWMU/AOC, location and nature of actual/potential pathways and receptors, and potential for exposure).
- ii. For inhalation, RBSLs shall be developed so that contaminants remaining in soil would be safe for inhalation of volatilized constituents or of soil-bound contaminants suspended in the air.
- iii. For migration to groundwater, RBSLs shall be developed so that contaminants remaining in soil would not; (1) increase contamination in groundwater to concentrations that exceed RBSLs (see Condition 5.B. below); and (2) increase contamination in surface water to concentrations that exceed RBSLs (see Condition 5.C. below).
- iv. For ecological receptors, if ecological exposure has occurred or is potentially occurring, the permittee shall quantitatively screen analytical data against the appropriate ecological screening criteria below. If it is not known if ecological exposure has occurred or is potentially occurring, the Permittee must collect sufficient biotic survey data to make such a determination.
  - a. Toxicological Benchmarks for Wildlife: 1996 Revision. Sample, B.E., D.M. Opresko, and G.W. Suter II, Oak Ridge National Laboratory, Oak Ridge, TN, 1996.
  - b. Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision. Efroymsen, R.A., M.E. Will, G.W. Suter II, and A.C. Wooten, Oak Ridge National Laboratory, Oak Ridge, TN, 1997.

- c. Toxicological Benchmarks for Potential Contaminants of Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Processes. Will, M.E. and G.W. Suter II, Oak Ridge National Laboratory, Oak Ridge, TN, 1995.
- B. Groundwater screening shall be conducted both for potential human health exposure and for protection of surface water considering the nature of the groundwater/surface water interaction.
  - i. For the protection of human health, groundwater samples shall be screened based on the current or potential use of the aquifer as follows:
    - a. If the aquifer is a current or potential source of drinking water, or is hydraulically connected to an aquifer which could be a drinking water supply, then the Permittee shall screen groundwater against the lower of the Maximum Contaminant Levels (MCLs) established under the Safe Drinking Water Act, Region III RBCs or similarly derived RBSLs.
    - b. If the aquifer is not a current or potential future source of drinking water, as designated by EPA or through an EPA-endorsed CSGWPP<sup>1</sup>, and the aquifer is not hydraulically connected to an aquifer which could be a drinking water supply, then RBSLs appropriate for the groundwater use that could apply (e.g., agricultural) shall be developed for

---

<sup>1</sup> In interpreting whether the aquifer is a current or potential source of drinking water, EPA will generally use the approach outlined in the Ground-Water Protection Strategy (August 1984) and/or a site specific decision making rationale included in an EPA endorsed Comprehensive State Ground Water Protection Program (CSGWPP). Currently there are no states in Region III with an EPA endorsed CSGWPP, consequently the RCRA Program must rely on the Federal classification. It is Region III RCRA Program experience that most RCRA facilities in Region III will probably be either a current or potential drinking water supply and will not meet the requirements to be classified as a non-potable (i.e., Class III) aquifer.

EPA approval by the Permittee.

ii. For the protection of surface water, groundwater which discharges to surface water shall also be screened against the surface water criteria listed below in Condition 5.C.

C. Surface water screening shall be conducted both for human health exposure and for protection of aquatic life. Surface water screening for human health will be based on the surface water body use, as designated by the applicable state. For drainage systems (e.g. storm water channels), the designation shall be based on the designation of the surface water body which ultimately receives the discharge. Screening for the protection of aquatic life shall also include screening of sediment.

i. For the protection of human health, surface water samples will be screened based on the state designation as follows:

a. If the state surface water designation includes use as drinking water, the Permittee shall use the available human health Ambient Water Quality Criteria (AWQC) for ingestion of water and organisms. Where AWQC are not available, the Permittee shall screen against the lower of MCLs, Region III RBCs or similarly derived RBSLs.

b. If the state surface water designation does not include use as drinking water, the Permittee shall use the available human health AWQC for ingestion of organisms. Where AWQC are not available, the Permittee may develop similarly derived RBSLs.

ii. For protection of aquatic life, surface water and sediment shall be screened as follows:

a. Surface water samples shall be screened against Chronic AWQC for the protection of aquatic organisms, or, if not available, the screening values in Toxicological Benchmarks for Screening of Potential Contaminants of Concern for Effects on Aquatic Biota on Oak Ridge Reservation: 1996 Revision (Suter, G.W.

II and C.L. Tsao, Oak Ridge National Laboratory, Oak Ridge, TN, 1996).

- b. Sediment samples shall be screened against the screening values in Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Sediment-Associated Biota: 1997 Revision (Jones, D.S., G.W. Suter II, and R.N. Hull, Oak Ridge National Laboratory, Oak Ridge, TN, 1997).
6. If the Permittee believes that a future industrial land use scenario is applicable to the Facility, the Permittee must submit the land use information specified in the OSWER Directive No. 9355.7-04 "Land Use in the CERCLA Remedy Selection Process." EPA will make a final land use determination after review of the Permittee's submittal and consultation with state and local land use planning authorities, elected officials, and the public. This determination will be independent of the screening procedures specified above.