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**SUMMARY OF COMMENTS/RESPONSES  
RCRA/CERCLA BACKGROUND SOIL STUDY  
SAMPLING AND ANALYSIS PLAN APRIL, 1992**

**04/28/92**

**9  
ENCLOSURE**

SUMMARY OF COMMENTS/RESPONSES

RCRA/CERCLA Background Soil Study Sampling and Analysis Plan  
April, 1992

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Date Document Issued February 6, 1992

Date Comments Due \_\_\_\_\_ / Received OEPA - March 18; U.S. EPA - April 13, 1992

Date Responses Due April 21, 1992

Date Report Due April 21, 1992

1. Commenting Organization: U.S. EPA Commentor: James A. Saric  
Original Comment # 1

Comment: The statistical approach is generally sound, but it is not particularly conservative. A more conservative and possibly more appropriate approach would require comparing on-site concentrations to the lower tolerance limits of background, rather than to the upper tolerance limits of background as proposed in the sampling plan.

Response: DOE disagrees that it would be more appropriate to compare site-related concentrations to the lower tolerance limits of background, rather than the upper tolerance limits.

Use of the upper tolerance limit (UTL) provides a standard statistical methodology by which site-related measurement results (sample concentrations) can be compared to background levels (concentrations) (U.S. EPA, "Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities," April 1989). Use of the UTL, defined as the "upper 95% confidence limit on the 95th quantile" or the "upper 95% coverage tolerance limit with tolerance coefficient of 95%," provides a reasonable demarcation between site-related sample concentrations and "true" background concentrations. In this way, the "false positive" identification of sample concentrations as being "above background" is held to a level of approximately one in 20 (1/20). Use of the "lower confidence (tolerance) limit" is a nonstandard approach that would unnecessarily lead to inclusion of more constituents that are present only at background levels.

Action: No action is required.

2. Commenting Organization: U.S. EPA Commentor: James A. Saric  
Original Comment # 2

Comment: The proposed use of literature values for some background parameters in the Operable Unit (OU) 2 and 4 Remedial Investigation (RI) Reports may be acceptable. However, U.S. DOE must provide U.S. EPA with a list of proposed literature values for each parameter, the rationale for their use, and the applicability to the site. U.S. DOE should also provide information on how the actual data will be incorporated into the RI reports for OU 2 and 4.



Response: DOE agrees to incorporate any background sampling results into the OU 2 and 4 RI reports, as soon as the results are available prior to submission of the reports to EPA.

Action: No text change is required. See comment/response Number 9.

5. Commenting Organization: U.S. EPA  
Original Comment # 5

Commentor: James A. Saric

Comment: Add histograms to the list of descriptive statistics for on-site and off-site concentration data.

Response: We agree that graphic statistics should be used to present the background concentration data. However, before we have performed statistical analyses, we cannot state that histograms are the best graphic technique for data presentation.

Action: The sampling and analysis plan has been modified to state that statistical data will be presented graphically in the final report. See Action for Response No. 6.

6. Commenting Organization: U.S. EPA  
Original Comment # 6

Commentor: James A. Saric

Comment: The Upper Tolerance Limit (UTL) approach is generally based on the assumption that background data are normally distributed, and such calculations will be sensitive to any deviation from normality. This matter should be discussed. Of particular concern are the potential impact of outliers in the background data on such a procedure. Consequently, a stringent approach to evaluating outliers is required. Specifically, it must be shown that an outlier was not the result of laboratory or field sampling error, and that a careful examination of the location of the outlying sample did not suggest any potential for a localized source of contamination. Regardless, the UTL calculations should be done with and without the outlying data point.

Response: DOE agrees with the comment.

Action: The following paragraph will be added to Section 4.1, after the first paragraph: "The background data set for each contaminant at each of the sampling depths will be evaluated to determine the probability distribution (normal, lognormal, or other) that best describes the data. Two methods will be used to determine the distribution type. In the first method, a histogram will be constructed from each data set and will be visually inspected to see if the distribution appears to be normal, lognormal, or other. Although this determination is subjective, the method complements inspection of data in tabular form or data that are summarized by descriptive statistics. The second method consists of a quantitative evaluation of the linearity of probability plots of the data (or of log transformed data). A more complete description of the methodology for determining the distribution type for background data is given in the Risk Assessment Work Plan Addendum.

The following paragraph will be added to Section 4.1 after the last paragraph:

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"Outliers will be evaluated to determine whether the results are a consequence of laboratory error or field sampling errors. The location from which an outlier result is collected will be examined to determine if the result is due to a localized source of contamination. UTL calculations will be made and presented with and without outliers."

7. Commenting Organization: U.S. EPA Commentor: James A. Saric  
Original Comment # 7

**Comment:** While not mentioned in the Plan, U.S. EPA assumes the nonparametric test (Wilcoxon and Quantile) discussed by U.S. DOE in the RI/FS Risk Assessment Workplan dated February 4, 1992 are still to be conducted. They are needed for the planned data collection, particularly if all 90 background samples can be used in the calculations. If 30 or fewer samples can be used, the power of these tests will suffer appreciably. The draft statistical methods document by Gilbert and Simpson from which the nonparametric tests are drawn stresses the need to estimate the statistical power of the tests to detect excess contamination. This appears not to have been done. Power calculations must be included in the Plan. Also U.S. DOE should consider the assumptions of normality and common variance in making these calculations.

**Response:** It is not the intent of this plan to describe all uses of the data that are to be acquired under the background sampling program. But rather, it is the intent of the plan to demonstrate that the sampling program is adequate and sufficient for background data needs for RCRA compliance programs and in the CERCLA RI/FS, including baseline risk assessments. As noted in the Risk Assessment Work Plan Addendum, there are three tests to be performed on site-related data for comparison with background data in the RI/FS. Construction of the upper tolerance limit (UTL) for each contaminant and a comparison of each site-related measurement with the UTL is the first method. The UTL will be calculated for each data set, according to whether the distribution of the data is normal or lognormal. Two additional tests are to be made on the data set for each constituent and medium. These tests are the Wilcoxon Rank Sum test and the Quantile test. The statistical power of these tests will be estimated based on the size of the data sets (background and site-related). Power calculations will be presented in the reports which incorporate the nonparametric test methods and results, since the power will be dependent on the size of the data sets actually used.

**Action:** No text change required.

8. Commenting Organization: U.S. EPA Commentor: James A. Saric  
Original Comment # 8

**Comment:** When a compound exceeds a risk-based level of concern but statistical tests fail to demonstrate exceedance of background, a second step in the statistical analysis is required. Specifically, tests are needed to indicate the amount of excess above background that is

compatible with the data. Of most value are estimates of a confidence interval for the site mean concentration minus the background mean concentration for appropriate exposure averaging areas of the site. If the upper end of this range is large it means that the data, while not definitive, are consistent with an important increase above background. This information will increase the ability of the assessors to understand the uncertainties involved with background comparisons, which may be large. Therefore, confidence intervals should be added to the Work Plan.

**Response:** DOE does not completely understand the comment. If the comment refers to risks from background levels that are "of concern," we need only look at the risks associated with naturally-occurring radionuclides (using the EPA risk assessment methodology). Such risks from background radionuclides often exceed  $10^{-4}$  if standard exposure parameters are assumed. Additionally, in many cases the risk due to concentrations equal the standard deviation of the background concentrations exceed  $10^{-5}$  or higher. The confidence interval for the site mean concentration minus the background mean concentration can be calculated and can be used to understand the uncertainties associated with background comparisons. Also noted in the Risk Assessment Work Plan Addendum, risks will be calculated for concentrations including background concentrations, for concentrations with background subtracted, and for background concentrations only. Confidence intervals will be presented as part of the reports in which comparisons of site-related concentrations are compared with background concentrations (e.g., RI reports).

**Action:** No text change is required.

9. **Commenting Organization:** Ohio EPA **Commentor:** Graham E. Mitchell  
**Original Comment #** 1

(Cover Letter)

**Comment:** The literature values and other site data to be used for determining background for the OU 2 RI should be included in the revision of this sampling plan.

**Response:** DOE agrees with the comment. The best and most up-to-date data will be used for the OU 2 RI.

**Action:** Because the subject study feeds into a number of other projects with tight schedules, the analyses and review of data for this project have been prioritized. If background soil data from the subject study are available, then they will be used in the OU 2 RI. Section 1.0 will be revised to include the following: "Regional data for radionuclides and inorganic compounds in surface soil from Ohio and Indiana will be used for the Operable Unit 2 Remedial Investigation Report in the absence of the results of the background sampling program. The regional data are given in Attachment I. If data from the background sampling program are available prior to delivery of the Operable Unit 2 Remedial Investigation Report to EPA, the data will be reviewed to determine what, if any, impacts the data have on the Report."

10. Commenting Organization: Ohio EPA  
Original Comment # 2

Commentor: Graham E. Mitchell

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(Cover letter)

Comment: The data from this background sampling should be available for inclusion in the OU4 RI. The sampling results should be available in at most seven months and the OU4 RI is not due to the EPAs for twelve months (3/19/93). Five months should be sufficient for inclusion of the background data into the OU4 RI. The inclusion of this data will be critical if results are significantly different from reference source background values used.

Response: DOE agrees with the comment.

Action: No text change is required.

11. Commenting Organization: Ohio EPA  
Pg. # 2 Section # 2.1  
Original Comment # 1

Commentor: Graham E. Mitchell  
Paragraph # Sent./Line #

(Sampling Plan)

Comment: In order to provide better background information as well as information which may be useful during statistical analysis, a SCS soil survey map should be included to define the soil type for background locations chosen. Each sampling location should be defined as a specific soil type. This information will be useful in evaluating statistical outliers and the variability in the surface soil sampling results.

Response: We agree that soil classification information may be helpful in evaluating the results of the program; however, the sampling locations were chosen randomly. Since the field locations have not been field checked, some locations may have to be relocated in the field in accordance with criteria listed in the sampling and analysis plan (SAP). As locations are not final in the SAP, it is premature to identify each sampling location in the SAP with respect to soil type classification.

Action: The final report for the background sampling will contain qualitative and quantitative comparisons of soil types and analytical results as suggested by the commentor.

12. Commenting Organization: Ohio EPA  
Pg. # 12 Section # 3.4 Table # 1  
Original Comment # 2

Commentor: Graham E. Mitchell  
Paragraph # Sent./Line #

Comment: Analytical test methods for the parameters listed in Table 1 are not specified within the revised plan. Are selected test methods the same as those listed in the original plan?

Response: Because this study is establishing background data that will be compared to site data, every attempt is being made to ensure that the data are comparable. Consequently, all



15. Commenting Organization: Ohio EPA Commentor: Graham Mitchell  
Pg. # 13 Section # 3.4 Table # 1 Paragraph # Sent./Line #  
Original comment # 5a

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Comment: DOE should add Bismuth-214 to the analytical parameters. Bi-214 has been detected in both the active flyash pile and the K-65 residues..

Response: Bismuth-214 has a half-life of approximately 20 minutes and is assumed to be in equilibrium with its parent (Ra-226). Since it has such a short half-life it is unlikely that differential leaching of the two materials is occurring. When the laboratory analyzes for Ra-226, it identifies the activity of Bi-214 through gamma spectroscopy. As the activity of Bi-214 is in equilibrium with the activity of Ra-226, the Bi-214 photo peak is used to calculate the Ra-226 activity.

Action: None required.

Commenting Organization: Ohio EPA Commentor: Graham Mitchell  
Pg. # 13 Section # 3.4 Table 1 Paragraph # Sent./Line #  
Original Comment # 5b

Comment: Why are no potential levels of concern provided for selenium, copper and cobalt?

Response: Appropriate values have been added for selenium and cobalt. No ingestion hazard index is currently available for copper since insufficient data is available to establish its toxic effects, if any.

Action: Potential levels of concern for selenium and cobalt have been added to Table 1 of the Sampling and Analysis Plan.

16. Commenting Organization: Ohio EPA Commentor: Graham Mitchell  
Pg. # 15 Section # 4.1 Paragraph # Sent./Line #  
Original Comment # 6

Comment: What guidance is DOE using to justify the use of a 95 percent confidence limit for background concentrations? DOE should provide a reference for the use of a 95th percentile upper tolerance limit.

Response: Section 4.4.4. of EPA's Risk Assessment Guidance for Superfund Volume 1, Human Health Evaluation Manual (Part A) (December 1989) refers to EPA's Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities (April 1989) for guidance for designing sampling plans for comparing site-related contamination to background data. The latter reference describes acceptable statistical methods for detecting contamination in groundwater. One of the methods calls for the construction of an upper tolerance limit (UTL) for each constituent from the background data, to which the level of each site-related constituent is compared. Section 5.3 of the report (April 1989) describes the construction of the UTL and recommends a coverage of 95 percent. The UTL (upper

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95% coverage tolerance limit with tolerance coefficient of 95%) will therefore be constructed from the background data as the adaptation of this guidance.

Action: Section 4.1, 3rd paragraph, last sentence will indicate the reference citation: "EPA 1989." The "Reference" section will be revised to include: "U.S. Environmental Protection Agency, 1989, 'Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities,' EPA/530-SW-89-026, EPA, Office of Solid Waste, Washington, DC."