U-004-306.4

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OPERABLE UNIT (OU) 2 TREATABILITY STUDY WORK PLAN COMMENTS RESOLUTION/REVISED TREATABILITY STUDY WORK PLAN

10-22-91

DOE-164-92
DOE-FSO/EPA
2
LETTER

Department of E[redacted]
Fernald Environmental Management Project
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2306

OCT 2 2 1991

DOE-164-92

Mr. James A. Saric, Remedial Project Director
U. S. Environmental Protection Agency
Region V - 5HR-12
230 South Dearborn Street
Chicago, Illinois 60604

Mr. Graham E. Mitchell, DOE Coordinator
Ohio Environmental Protection Agency
40 South Main Street
Dayton, Ohio 45402

Dear Mr. Saric and Mr. Mitchell:

OPERABLE UNIT (OU) 2 TREATABILITY STUDY WORK PLAN COMMENT RESOLUTION/REVISED TREATABILITY STUDY WORK PLAN

Reference:
2124 1. Letter, G. E. Mitchell to J. R. Craig, "Comments on the Treatability Study Work Plan for OU 2," dated September 24, 1991

2118 2. Letter, J. A. Saric to J. R. Craig, "Disapproval of Treatability Study Work Plan for OU 2," dated September 23, 1991

Enclosed for your review and approval are responses to comments received in the referenced letters and a revised Treatability Study Work Plan for OU 2.

Your expedited review, comments and/or approval are respectfully requested to assure that the accelerated OU 2 RI/FS remains on track. DOE has directed ASI/IT to proceed with the Treatability Study, at risk, to assure that the Amended Consent Agreement milestones will be met. As a result, analytical testing was initiated on October 21, 1991.

If you or your staff have any questions or comments, please contact Johnny Reising at FTS 774-9083 or (513) 738-9083.

Sincerely,

Jack R. Craig
Fernald Remedial Action
Project Manager

FO:Reising

Recycled and Recyclable

cc w/encl.:

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K. A. Hayes, EM-424, GTN
M. Butler, USEPA-V, 5CS-TUB-3
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AR Coordinator, WEMCO

RESPONSE TO COMMENTS

RECEIVED ON THE OPERABLE UNIT 2

DRAFT TREATABILITY STUDY WORK PLAN

DOCUMENT DATE - AUGUST 22, 1991

OHIO EPA COMMENTS - SEPTEMBER 23, 1991

U.S.EPA COMMENTS - SEPTEMBER 23, 1991

OCTOBER 1991

U.S. EPA COMMENTS

General Comments

The major comment regarding the Operable Unit #2 treatability study workplan is basically the same as that for Operable Unit #4. The scope of the treatment is only with hazardous materials. However, the major contaminants are uranium, thorium, and decay products. The study omits consideration for stabilization of radiological components, particularly radon. The study should add investigation of radionuclides/radon or else justify omitting it. The study could also be suitably modified to include leachability and stabilization of radioactive contaminants, radon will be particularly essential to validation of a particular treatment technology. Therefore, the study in its current form cannot be used to make definitive selection of treatment technology which would be best for comprehensive treatment of the residues preparatory to disposal.

Response: The intended scope of the work plan includes all constituents of potential concern. The constituents of concern were listed in Table 1-1 of the August draft of the Work Plan. Radon will be added to those lists of constituents that already include radium. Gaseous radon emissions from a treated material's final form will be measured if the source concentration exceeds the 40CFR192.12(a)(2) combined radium-226 and radium-228 soil concentration limit of 15 pCi/g. The short half-lives of radon isotopes limit their transport in groundwater systems to inches from their sources. Beyond this point, radon will be in equilibrium with its radium precursors in the surrounding soil and water. Thus, DOE feels that efforts should be directed towards improving the precision of other test parameters instead. However, EPA has specifically requested that radon concentrations in leachate from materials containing significant levels of radium be analyzed. This will be done in the optional advanced phase of the treatability study if the combined radium-226 and radium-228 concentrations in the material exceed 15pCi/g.

Action: Radon has been added to the constituents of potential concern (Table 1-1), as indicated in the response. Methodology to evaluate gaseous radon emissions and radon concentrations in leachate from the final waste form has been added to the treatability study work plan (see Section 4.2.1).

Commenting Organization: U.S. EPA Commentor:
Pg. # Section # Paragraph # Sent./Line #
Original Comment # 1

Comment: The work plan document is well organized and in general contains the types of information that will result in successful treatability testing. However, the logic of the test methodology is an area of concern. Specifically, the design of the treatability study work plan and in particular, the selection and use of the stabilization/solidification (S/S) screening criteria, are not related to the remedial action objectives (RAO) presented in the document. As noted in the work plan (Subsection 1.0, page 1, lines 8 through 11), the primary use of treatability test results is to select a remedial action technology that will result in attainment of RAOs, it is recommended that the design of the test methodology and the relevant sections of the work plan text be modified in accordance with the following comments and testing considerations.

Response: DOE agrees that the goals of the treatability study should be linked with, but clearly distinguished from, the RAOs. DOE believes that the purpose of the treatability study is to gather data and, if possible, to identify stabilization formulations that will be acceptable from the health risk point of view. TCLP is recognized as an acceptable method for determining if the health risk associated with exposure from the leachate of a stabilized, landfilled waste is acceptable. Because RAOs have not been finalized, we believe it is prudent to attempt to meet standards (TCLP) that are based on acceptable groundwater concentrations. The UCS of 500 psi was chosen and included because of an NRC technical position on waste form for low-level radioactive waste.

A UCS of 500 psi will not be considered a criterion but will be considered a target. UCS and TCLP data are not the only performance data being collected. Leachate from the TCLP will also be analyzed for radionuclides. These data will be factored into a groundwater model. The results and the model will be used in the evaluation of the method of disposal (i.e., on-site or off-site disposal). If on-site disposal is chosen, the engineered waste management facility will be designed to meet RAOs.

Action: The objectives of the treatability study has been developed more clearly in the performance objectives section (Section 3.1) of the document. This section has been revised to include the risk-based PRGs for the constituents of concern in OU2, as well as other information that will aid in the experimental design and quantitative performance evaluation of the treatment technologies.

Commenting Organization: U.S. EPA Commentor:
Pg. # Section # Paragraph # Sent./Line #
Original Comment # 2

Comment: The test plan proposes using the measurement of unconfined compressive strength as the primary screening criterium for the initial (preliminary) screening criteria. The toxicity characteristic leaching procedure (TCLP) test is the primary criteria used during the advanced testing. In both cases, specific measurement values are proposed to determine successful treatment; however, the justification for selecting these values (500 psi unconfined compressive strength and TCLP listing standards) is not related to RAOs. Because negotiations and discussions regarding the specificity of the proposed RAOs are still ongoing, it may be difficult to choose measurements and values that would definitely identify the ability of a treatment or individual formulation to meet RAOs. However, the testing should be designed to provide the best possible conclusions regarding (1) the feasibility of the technology (2) specific cost information to facilitate alternative screening in the FS.

It is recommended that the preliminary screening be based on the ability of formulations to chemically fix constituents of concern. Furthermore, it is recommended that the screening be based on qualitative analysis. The stabilization formulations should be screened by choosing those which demonstrate the highest reduction in constituent leachability on a percentage basis (when corrected for additive dilution). This will assure that the final formulation(s) will result in minimal volume increases, because the primary

focus will be on the stabilization chemistry and not on the physical attributes. Once the formulation chemistry has been optimized, formulations can be fine tuned to produce desirable physical characteristics. Secondary screening of formulations should include physical properties or selection of formulations that require the least costly and least amount of chemical additives.

Response: These tests were designed to range find the reagent levels necessary to meet the UCS requirements of approximately 500psi. The MTCLP test will be added to this stage to augment the UCS results, providing additional information on the fixation and the solidification of the waste matrices.

Action: The text (Section 4) has been revised.

Commenting Organization: U.S. EPA Commentor:
Pg. # Section # Paragraph # Sent./Line #
Original Comment # 3

Comment: The methodology for conducting stabilization treatability studies should recognize several other issues related to the feasibility and optimization of treatment by S/S technology.

As mentioned in general comment 1, the S/S treatability test methodology should consider that while the physical properties of the final waste form can be varied to limit the exposed surface area and enhance the treatment effectiveness, understanding and controlling the stabilization chemistry is crucial to successful and optimum treatment. The following observations outline recommended actions to design test methodology that will not only enhance the treatability test results outcome for feasibility study screening, but that will improve the test results' usefulness for remedial design.

a) The work plan does not propose pH measurements of stabilization mixtures. The pH of the leaching solution strongly influences the solubility of heavy metals. For each metal the optimum pH for minimum solubility is unique. Most metals, particularly lead, exhibit amphotericity, which means they have high solubility at both high and low pH. Because each metal has a different solubility curve, the combination of metals to be stabilized is critical for (1) selecting the optimum pH of a stabilization mixture and (2) minimizing the leachability of the metals of concern.

Furthermore, during the leaching procedure (as proposed in the work plan using TCLP), chemical changes continue to occur in the stabilized matrix. For example, an acidic leach will neutralize some of the basicity common in cementations materials. If a metal is soluble at a high pH, the acidic leach may offset its solubility. However, if a stabilized material is exposed on site to fairly

neutral leaching (such as nonacidic rainwater), no neutralization will occur as the leaching occurs, and the metal in question will in fact leach out of the matrix at a much higher rate than observed in a bench-scale demonstration with an acidic leach.

b) Advanced screening of the stabilization formulations should address site-specific aspects of the alternatives proposed in the feasibility study. Consideration should be given to testing with a prepared leach that simulates the carbon dioxide concentration (carbonic acid content) and pH of leachate filtering through on-site soils, a cap, or local ambient air. Site-specific testing should include modification of the TCLP test protocol to address realistic waste-to-leaching solution ratios and exposed surface areas for the various remedial alternatives.

c) The appendices prove a justification for the use of the 500 psi UCS measurement as a screening criteria. However, the test plan methodology should recognize that (1) the UCS measurement has different relevance to each of the proposed remedial alternatives and (2) the directive should be applied to site-specific aspects of Operable Unit (OU) 2 and the remedial alternatives being considered.

d) Leachability analysis is proposed for treated waste mixtures only and is not proposed for the untreated samples. The efficiency and quantifiable effectiveness of a mixture to fix heavy metal constituents cannot be exactly determined without measuring TCLP (or other leaching procedures) before and after treatment. After treatment leaching results must be corrected for the dilution of additives in order to perform the qualitative analysis.

Response: a) It is well understood that the solubility of metals is a function of pH. However, the critical pH is the final pH of the extraction fluid at the end of the extraction method's prescribed contact time. These values will be measured and the formulas adjusted to minimize the leachability of the metal constituents of concern. The TCLP procedure was selected because it is a regulatory accepted standard test method as identified in SW 846, third edition.

b. EPA, in formulating the TCLP, performed 34 laboratory leaching tests on four different wastes to assess accuracy of the method to be selected as TCLP. These tests involved four leaching media: sodium acetate buffer, carbonic acid, water, actual municipal waste leachate. As a result of this testing, two leaching procedures were found to be acceptable and subjected to further testing along with the original EP Tox method. These two leaching procedures involved the sodium acetate buffer solution and the carbonic acid solution.

During the second round of testing, it was found that the carbonic acid leaching medium was less aggressive towards inorganics than the sodium acetate buffer system and that it did not produce results that correlated with actual field generated data.

Based on this, use of the TCLP sodium acetate buffer solution, which was selected over the carbonic acid solution for TCLP, will provide more accurate and

conservative numbers than using a carbonic acid leaching medium. **See page 21676-7, Fed Reg., June 13, 1986.** The TCLP was selected because it presents a worst-case situation, based on reduced particle size and surface area to volume ratios. This procedure results in conservative contaminant concentrations for input into the risk calculations.

c. DOE agrees that the UCS measurement has different relevance for the various proposed alternatives. It should be noted that the UCS measurement has relevance only to those alternatives (Alternatives 5 and 6 for the Sanitary Landfill and Fly Ash/Southfield Area and Alternatives 3 and 4 for the Lime Sludge Ponds) that propose to remove and treat the wastes. The UCS directive does not apply to Alternatives 1 and 2.

d. Noted. The TCLP will be conducted on similar untreated waste samples as part of the 1991 sampling program (summarized in Section 6.0). The data gathered from this sampling program will be used in comparison with data obtained during the treatability study.

The current regulatory position of the EPA RCRA permitting division, Washington, D.C., is that stabilization is a recognized (legal) form of treatment that only requires that the levels be met, and as such, the stabilization media cannot be considered as a dilutant. Because of the way the regulations are set up, EPA has recognized the dilution factor as part of treatment by stabilization. Rule making is underway to address this situation but proposed rules have not been published. Consequently, TCLP results will be reported with and without correction for dilution.

Action: The text has been revised to include reporting TCLP results in three ways: (1) actual analysis of extract, (2) results adjusted for spike recovery, and (3) results adjusted for spike recovery and dilution by stabilization reagents.

Commenting Organization: U.S. EPA Commentor:
Pg. # Section # Paragraph # Sent./Line #
Original Comment # 4

Comment: The test plan does not clearly identify which constituents of concern will be used to measure the success of the leachability tests. For example, if a particular test mixture shows the best fixation for lead but the worst for thorium, what criteria will be used to rank the success of this formulation?

Response: The contaminants of concern were listed in Table 1-1. Also refer to response to U.S.EPA General comment #1.

The treated waste should achieve a UCS value of approximately 500 psi, meet TCLP standards, and provide the best formulation evaluation from a risk perspective. The professional judgement of the investigator will be used to determine a reasonable

compromise between leaching and minimization of the bulking factor and reagent loadings. The investigator will consider the fact that the data will be used to develop risk assessment models and will take this into account when determining which formulations provide the "best mixture." Formulations that provide this reasonable compromise between leaching and minimization of the bulking factor, reagent loadings, and future worth from a risk perspective, will be considered for the advanced phase.

Action: Contaminants of concern will be clearly presented as such in the next version of the work plan.

Commenting Organization: U.S. EPA Commentor:
Pg. # Section # Paragraph # Sent./Line #
Original Comment # 5

Comment: The work plan does not recognize that fly ash materials contain heavy metals and possibly trace amounts of organic materials. The work plan should include analysis to quantify the metals in the fly ash additives and the data analysis should address their presence.

Response: A metals TCLP analysis of a blank consisting of cement/flyash/sodium silicate reagents with sand will be conducted.

Action: The text (Section 4.1.5) has been revised.

Commenting Organization: U.S. EPA Commentor:
Pg. # Section # Paragraph # Sent./Line #
Original Comment # 6

Comment: The test plan does not recognize the importance of particle size distribution in the evaluation of implementability of stabilization treatment. No mention is made in the text of the known size distribution of the wastes. Waste characterization performed as part of the treatability studies should address particle size distribution, and the screening of remedial alternatives should consider particle size distribution of the wastes.

Response: The untreated particle size distribution for fly ash is being determined in the companion geophysical analysis. (See information in Section 6.) The waste is being ground to pass through a 0.2-inch sieve before treatment. (See procedures in Appendix D.) Particle size tests, ASTM, are being conducted in this treatability study for the Sanitary Landfill, Lime Sludge Ponds, and Southfield.

Action: Geotechnical testing is discussed in Section 6.

Commenting Organization: U.S. EPA Commentor:
Pg. # Section # Paragraph # Sent./Line #
Original Comment # 7

Comment: Additional leaching tests, such as American Nuclear Society (ANS) 16.1 and a test that simulates long-term stability, such as a multiple extraction, should be considered.

Response: The TCLP extraction procedure was selected because it presents a worst case situation based on reduced particle size and surface area to volume ratios. This procedure results in conservative contaminant concentration for input into the risk calculations.

Action: None required

Specific Comments

Commenting Organization: U.S. EPA Commentor:
Pg. # 6 Section # 1.2.3 Paragraph # Sent./Line # 26 and 27
Original Comment # 1

Comment: This sentence does not mention that active fly ash was analyzed for semi-volatile organic compounds (SVOC). It is highly unlikely that volatile organic compound (VOC) will be present in fly ash from the combustion of coal; however, SVOCs are a much more likely to be present. Further characterization of all fly ash wastes (from both the inactive and active disposal areas) should concentrate on the quantification of SVOCS. The treatability test methodologies should also reflect this concern.

Response: Analysis for SVOCs in the Active Fly Ash Pile are provided for in the additional sampling plan (DCR41 of the RI/FS Work Plan).

Action: The paragraph has been revised to include reference to Section 6 of the Treatability Study Work Plan which summarizes sampling activities for Operable Unit 2.

Commenting Organization: U.S. EPA Commentor:
Pg. # 17 Section # 1.3.3 Paragraph # Sent./Line # 30 through 33
Original Comment # 2

Comment: The test methodology and selection criteria should be reconsidered in accordance with general comments 1, 2 and 3.

Response: See responses to general comments 1, 2, and 3.

Action: The selection criteria has been revised and added to the Treatability Study Work Plan.

Commenting Organization: U.S. EPA Commentor:
Pg. # 18 Section # 1.3.3 Paragraph # Sent./Line # 7 through 9
Original Comment # 3

Comment: This paragraph should be rewritten to clarify specific ARARs and should take into consideration changes suggested in the general comments regarding test methology and objectives.

Response: Noted.

Action: The paragraph has been revised to read, "Data generated from UCS and leachability testing under this work plan will be used for evaluating compliance with ARARs in the FS."

Commenting Organization: U.S. EPA Commentor:
Pg. # 1 Section # 3.1 Paragraph # Sent./Line #
Original Comment # 4

Comment: The performance objectives should be revised in accordance with the changes made in response to the general comments above.

Response: DOE agrees.

Action: Section 3.1 has been revised in accordance with the above general comments.

Commenting Organization: U.S. EPA Commentor:
Pg. # 1 Section # 3.1 Paragraph # Sent./Line # 24 through 27
Original Comment # 5

Comment: The potential evolution of gases and vapors during stabilization should be identified as a phenomenon to be observed and recorded during testing. Such occurrences can affect remedy selection, influence the testing protocol in future studies, and require specific address in the remedy design.

Response: During the stabilization of the waste, the molds are observed for physical changes (swelling) as well as temperature changes in the mixture and for any bubbling of mixture during stabilization. These observations will be recorded. Measurements of gas concentrations will not be recorded.

Action: The text (Section 3.1) has been revised to include the potential evolution of gases.

Commenting Organization: U.S. EPA Commentor:
Pg. # 2 Section # 3.1 Paragraph # Sent./Line #
Original Comment # 6

Comment: Table 3-1. The information in Table 3-1 is not clearly presented. The table title implies that these are the suite of analyses to be performed on treated waste samples; however, the table reference in the text is inadequate, and the qualifiers listed as notes on the table are confusing and unacceptable. For example, what characterization study is being referenced in note b? How will note d be resolved within the scope of the treatability studies? The test plan must provide a definite plan for analysis of all parameters and reference test methods where appropriate.

Response: DOE agrees.

Action: The text has been revised to make proper reference to Table 3-1. Note that in the revised text Table 3-1 is now Table 3-4. The qualifiers (notes) have been revised for clarification.

Commenting Organization: U.S. EPA Commentor:
Pg. # 1 Section # 4.1 Paragraph # Sent./Line # 5
Original Comment # 7

Comment: The text states herein that the purpose of the treatability testing is to define the stabilization mixtures that will provide optimal performance. The text should clarify that the remedial design phase and associated studies to be performed as part of remedial design are more appropriate for "optimal formula" investigation. The purpose of attempting to narrow down the formulations is so that fairly accurate cost information can be provided for feasibility study screening.

Response: DOE agrees. The treatability study will provide a range of formulations for the stabilization technology, which will be evaluated during the remedial design phase. The formulations are narrowed down based on their effectiveness of treating the waste. The more effective formulation will be used to estimate the cost of technology being evaluated for the treatability study.

Action: The text in Section 4.1 has been revised to indicate that the treatability study will provide a formulation that is effective in treating the waste. Section 1.2.7 has been revised to state that the feasibility study will contain a cost estimate based on the formulation.

Commenting Organization: U.S. EPA Commentor:
Pg. # 1 Section # 4.1 Paragraph # Sent./Line # 11-12
Original Comment # 8

Comment: Although Appendix A provides a good background on S/S techniques, the work plan should justify or explain the selection of potential stabilizing additives such as Type I and Type II Portland cement (instead of Types III or IV), attapulgite, or clinoptilotile. How do each of the additives relate to the known chemical makeup of the wastes? For example, do any of the wastes from OU 2 contain high levels of sulfate (especially the active fly ash from the electrostatic precipitators), which would necessitate the use of Type IV cement?

Response: From the available data, the Sanitary Landfill, and the Southfield have low sulfate concentrations. The sulfate content in the fly ash is being diluted by at least a factor of two by the other waste being added to the fly ash. It is assumed that the potential sulfate problem for the fly ash will be minimized by using this waste and reagent combination. In addition, fly ash has been added to cement in order to minimize the effects of sulfate on the cement. Therefore, the readily available and least expensive cement, Portland Type I, was chosen. This type of cement is normally used in most cement-based stabilization work. The lime sludge should have moderate sulfate content; therefore, Type II cement, which has moderate sulfate resistance was selected. Attapulgite and clinoptiltite were selected to decrease the metal leachability of the treated waste.

Action: None required.

Commenting Organization: U.S. EPA Commentor:
Pg. # 1 Section # 4.1.6 Paragraph # Sent./Line # 22
Original Comment # 9

Comment: A justification should be provided for the use and selection of a 3/8-inch screen in the test procedures. How will this be representative of remedial field methods? Screening prior to treatability testing could distort the results of the treatment (especially the physical measurements) if the waste samples contain significant amounts of large particles.

Response: The 3/8-inch mesh screen size was selected due to its use in the standard TCLP. The screen size was not meant to be representative of remedial field methods, but was meant to follow standard EPA-approved procedures (SW-846, Method 1311).

Action: The data-required (Section 4.1.5) have been changed to include a record of the maximum particle size treated, if the material was crushed/ground before use, and the weight/percentage of material sieved out from the raw waste before treatment. The text has been revised to include:

- The maximum particle size treated, weight, and percentage of material sieved out from the raw waste before treatment, and
- A general description of the waste form before and after reagents are mixed, including a description of any grinding of the sample to meet particle size requirements for UCS.

Commenting Organization: U.S. EPA Commentor:
Pg. # 1 Section # 4.1 Paragraph # Sent./Line # 27
Original Comment # 10

Comment: While the use of a plastic container is common for bench scale testing, caution should be exercised due to the potential for rapid heat release during the mixing of additives, waste, and water.

Response: Caution advisory is noted. However, indications are that there is a temperature rise of only 10- 15°C.

Action: None required.

Commenting Organization: U.S. EPA Commentor:
Pg. # 5 Section # 4.1 Paragraph # Sent./Line # 1
Original Comment # 11

Comment: The work plan text should clearly qualify the limited value of measuring temperature increase during the experiments. The text should recognize that in practice the actual temperature increase will be affected by the rate of chemical addition; by the size of the stabilized block; by the adequacy of mixing; by the ambient conditions in the laboratory or field; by physical occurrences such as wind, air conditioning, temperature of the containment vessel; and by such factors such as thermometer (thermocouple) placement in the mixture. The work plan does not adequately address these potential influences on the measurement and therefore such measurements will be of nonquantitative value.

Response: The measured temperature rise is a qualitative test. It is conducted as a screening test as an alert to potential problems and hazards during scale-up. Further investigations of the actual temperature rise may be made during the remedy design phase, when larger equipment (which has a design similar to the full-scale equipment) will be used.

Action: The text (Section 4.1.5) has been revised.

Commenting Organization: U.S. EPA Commentor:
Pg. # 5 Section # 4.1.1 Paragraph # Sent./Line # 7 and 8
Original Comment # 12

Comment: Provide justification for the procedures proposed to ash the Sanitary Landfill waste. What is the relevance of the 200°C and 500°C temperatures? Will the samples be subject to crushing and screening prior to ashing, or will the ashed samples be screened? If so, explain the relevance to field treatment processes.

Response: The sample will be first heated at a moderate temperature (200°C) to remove most of the volatile material under more controlled conditions. After the sample has heated for 2 hours or more at 200°C, the temperature will be raised to 550 C which is in the typical temperature range (500°- 600°C) a solid material would be exposed to an incinerator. The sample will be inspected for obvious debris such as wood chips before ashing, and any wood chips will be removed. The sample will not be sieved or crushed before ashing. Ashing of the landfill material in the laboratory is not intended to directly simulate the incineration of the material in a full scale incineration facility. The ashing of the material in the laboratory is conducted following the standard procedure for ashing a sample (ASTM 2974-87).

Ashing the samples is intended to provide a feed stock for the stabilization testing that would be similar in refractory constituents to the material produced in the full-scale incineration.

Action: The text in Section 4.1.1 was revised.

Commenting Organization: U.S. EPA Commentor:
Pg. # Section # 6.0 Paragraph # Sent./Line #
Original Comment # 13

Comment: The sampling and analysis methods for all of the proposed testing should be specifically provided within Section 6.0. This section should address all sampling and analytical methods for raw waste characterization, treated sample analysis, and additive characterization. The suite of analysis for each type of measurement should be provided.

Response: DOE agrees.

Action: Section 6.0 has been revised to discuss the method of sampling used. The types of analyses are also included in this discussion.

Commenting Organization: U.S. EPA Commentor:
Pg. # Section # 8.0 Paragraph # Sent./Line #
Original Comment # 14

Comment: The exact quantities of raw waste, liquid, and dry additives should be recorded. Interpretation of leachability test results should include the evaluation of the sample leachability before and after treatment. Interpretation of leachability test results should also evaluate the results against treated sample results corrected for dilution, in order to separate the dilution effects of stabilization treatment from chemical fixation.

Response: DOE agrees. The measured quantities of waste and reagents will be recorded. TCLP analyses of the raw waste are being conducted as part of the sampling and analysis plan. See Section 6. The TCLP results of the treated samples will be reported with and without consideration of dilution.

Action: Section 8.0 has been revised in accordance with the response to the comment.

Commenting Organization: U.S. EPA Commentor:
Pg. # Section # 13 Paragraph # Sent./Line #
Original Comment # 15

Comment: The responsibilities of individuals in the management and staffing of the treatability testing project should be briefly described.

Response: Noted.

Action: Existing Section 13.0 text is now Section 14 and has been replaced with the following: An organizational chart for the management of Operable Unit 2 Treatability Study is provided in Figure 14-1. The principal parties include DOE Fernald, WEMCO, ASI/IT, TDL, and Parsons.

The following text has been incorporated into Section 14.0:

> Personnel involved in the management of the entire RI/FS include Jack Craig, DOE Project Director, who is responsible for the RI/FS; John Wood, ASI/IT's Project Director for the RI/FS consultant; and ASI/IT's John Razor, who serves as Deputy Project Director and is responsible for the technical content of all of the RI/FS consultant's documents.
>
> Additional personnel involved in the management of RI/FS treatability programs for all operable units include Briand Wu, ASI/IT's Technical Integration Manager, who is responsible for specific major RI/FS consultant's work tasks as follows: RI, NEPA, and treatability. Also, Sam Wolinsky serves as Treatability Coordinator for all operable unit treatability studies performed by the RI/FS consultant.
>
> Those personnel specifically involved in Operable Unit 2 include Johnny Reising, DOE Operable Unit manager, Bob Skalka, the integration contractor WEMCO's Operable Unit manager; and Kathie Riedel, Operable Unit manager for Parsons, the remedy design contractor. Briand Wu of ASI/IT also serves as the RI/FS consultant, Operable Unit 2 manager and as the focal point for supervision of the laboratory performing the treatability study.
>
> The IT Technology Development Laboratory personnel will perform the actual treatability testing. Those personnel include Jack Hill, laboratory director, and Ed Alperin, laboratory manager, who is responsible for all of the treatability testing programs within the treatability laboratory. Darrell Drouhard, Project Manager/Engineer, coordinates all treatability laboratory work between the laboratories and the site. Ernie Stine, Operations Supervisor, is responsible for the technical aspects of the treatability programs at the laboratory. Prasad Subbanna will perform most of the experiments. Patti Carswell is responsible for all QA activities and reports directly to Jack Hall.

OHIO EPA COMMENTS

General Comments

Commenting Organization: OEPA Commentor:
Pg. # Section # Paragraph # Sent./Line #
Original Comment # 1

Comment: The work plan should indicate that the treatability study will be conducted to comply with 40 CFR 261.4(e) and (f) and Ohio Administrative Code 3745-51-04(E) and (F).

Response: DOE agrees.

Action: The text has been revised (Section 1.4.1).

Commenting Organization: OEPA Commentor:
Pg. # Section # Paragraph # Sent./Line #
Original Comment # 2

Comment: Following the EPA's "Guide for Conducting Treatability Studies under CERCLA", the following section is missing or omitted: Schedule - Since schedules were recently negotiated with U.S. EPA, a detailed schedule for the treatability study should be available and incorporated into the document.

Response: DOE agrees.

Action: Section 13 has been revised to discuss schedule, and Section 14 has been added to discuss management and staffing.

Commenting Organization: OEPA Commentor:
Pg. # Section # Paragraph # Sent./Line #
Original Comment # 3

Comment: This treatability study addresses solidification, but does not address other alternatives such as separation and thermal treatment. Separation and thermal treatment should also be addressed, so that the best alternative can be selected.

Response: DOE disagrees. Alternatives such as separation and thermal treatment were addressed and evaluated for the waste areas in the Initial Screening of Alternatives (ISA) Report for OU2. In-situ thermal treatment (vitrification) was eliminated as a technology for each waste area. Ex-situ thermal treatment (vitrification, incineration) was considered a viable process option. During the process option evaluation, incineration was chosen as a representative process because of its effectiveness and implementability. Please note that the only wastes being incinerated are the Sanitary Landfill wastes, due to the high diversity of organic contaminants.

Treatability testing for incineration may not be necessary for this application since incineration is a well proven technology for destroying organics in waste.

The CERCLA guidance (pg. 5-5) states that treatability testing may not be required when:

- A developed technology is well proven on similar applications and
- Substantial experience exists with a technology employing treatment of well-documented waste materials.

Also, the bench-scale treatability study would not provide sufficient information to simulate full-scale performance. A pilot-scale study would probably be required for incineration.

Action: None required.

Commenting Organization: OEPA Commentor:
Pg. # Section # Paragraph # Sent./Line #
Original Comment # 4

Comment: Using the term solidification seems to limit this treatability study just to cementation. Considering that vitrification is being tested in the other operable unit's treatability study, examining vitrification as an alternative should be possible for this treatability study.

Response: DOE disagrees. The Initial Screening of Alternatives Report for Operable Unit 2 (April 1991) selected incineration and ash solidification for the Sanitary Landfill as a representative process option. Cement-based solidification was chosen as a representative process option for the remaining waste units. Cement solidification was chosen because fly ash lends itself to this process in that it can be utilized, along with cement, to solidify Operable Unit 2 wastes (including ash from the incineration of Sanitary Landfill Wastes). Based on the results of the alternative development and screening process for Operable Unit 2, solidification was chosen as the preferred technology for the treatability study.

Another consideration is schedule. The schedule cannot be met if additional technologies are added to the Treatability Study at this time. If the results of the study show solidification to be unsatisfactory, additional technologies will be considered in accordance with the RI/FS process.

Action: None required

Specific Comments

Commenting Organization: OEPA Commentor:
Pg. # 1 Section # 1 Paragraph # Sent./Line # 28
Original Comment # 1

Comment: This sentence implies that radionuclides will be eliminated by incineration. Please clarify this sentence.

Response: Noted.

Action: The statement has been clarified to indicate that incineration would not destroy radionuclides.

Commenting Organization: OEPA Commentor:
Pg. # 2 Section # 1.1 Paragraph # Sent./Line # 3
Original Comment # 2

Comment: An additional objective should be to determine the leachability of the metals and radionuclides present in the final waste forms. To stay consistent throughout the document, please address the specific levels that this study will try to achieve.

Response: DOE believes that the purpose of the treatability study is to gather data and, if possible, to identify stabilization formulations that will be acceptable from the health risk point of view. TCLP is recognized as an acceptable method of determining whether the health risk associated with exposure from the leachate of a stabilized, landfilled waste is acceptable. Because remedial action objectives (RAOs) have not been finalized, we believe it is prudent to attempt to meet standards (TCLP) that are based on acceptable groundwater concentrations.

Leachate from the TCLP will also be analyzed for radionuclides. The data from these analyses will be used in groundwater modeling. The results, and the model, will be used in the evaluation of the method of disposal (i.e., on-site or off-site). If on-site disposal is chosen, the engineered waste management facility will be designed to meet RAOs.

Action: The objective to determine the leachability of metals and radionuclides has been included in Section 3.0.

Commenting Organization: OEPA Commentor:
Pg. # 2 Section # 1.1 Paragraph # Sent./Line # 28-31
Original Comment # 3

Comment: Solidification and stabilization should not be used interchangeably. As stated in EPA's Handbook for Stabilization/Solidification of Hazardous Wastes: "Solidification implies that the beneficial results of treatment are obtained primarily, but not necessarily exclusively, through the production of a solid block of waste material which has high structural integrity--a product often referred to as a "monolith." Stabilization techniques are generally those whose beneficial action is primarily through limiting the solubility or mobility of the contaminants with or without change or improvement in the physical characteristics of the waste. Both stabilization and solidification refer to treatment processes that are designed to accomplish one or more of the following results: (1) improve the handling and physical characteristics of the waste, as in the sorption of the free liquids; (2) decrease the surface area of the waste mass across which transfer or loss of contaminants can occur; and/or (3) limit the solubility of any hazardous constituents of the waste such as pH adjustment or sorption phenomena."

Response: Noted. The term stabilization will be used throughout this document.

Action: The text has been revised.

Commenting Organization: OEPA Commentor:
Pg. # 5 Section # 1 Paragraph # Sent./Line #
Original Comment # 4

Comment: Table 1-1. Cadmium should be added to the list for the Inactive Fly Ash Disposal Area. Chlordane and PCBs should be added to the list for the Lime Sludge Ponds (See Appendix B, pg. 5).

Response: Noted.

Action: Table 1-1 has been revised to include all chemicals of concern.

Commenting Organization: OEPA Commentor:
Pg. # 6 Section # 1.2.2 Paragraph # Sent./Line #
Original Comment # 5

Comment: It should be noted in this section that both PCBs and Chlordane were detected within the north Lime Sludge Pond.

Response: Noted.

Action: A statement has been added to indicate detection of both PCBs and Chlordane in the North Lime Sludge Pond.

Commenting Organization: OEPA Commentor:
Pg. # 6 Section # 1.2.2 Paragraph # Sent./Line # 6
Original Comment # 6

Comment: Unless trip blanks had these contaminants detected during analysis, attribution to laboratory contamination should not occur. Conclusions concerning laboratory contamination should be reserved for the RI report unless DOE intends to provide more detailed information within this document.

Response: Noted.

Action: Conclusions concerning laboratory contamination has been deleted from the document.

Commenting Organization: OEPA Commentor:
Pg. # 6 Section # 1.2.2 Paragraph # Sent./Line # 12
Original Comment # 7

Comment: Provide a reference for determination of background levels for radionuclides in the lime sludge ponds. DOE has failed to adequately define background concentrations of radionuclides and other naturally occurring inorganics at the site. The concentrations DOE is considering background must be stated in the text.

Response: DOE agrees. That background concentrations used at the FEMP have been clearly documented.

Action: Estimates of local background concentrations have been referenced to Tables 3-1, 3-2 and 3-3.

Commenting Organization: OEPA Commentor:
Pg. # 6 Section # 1.2.2 Paragraph # Sent./Line # 19-21
Original Comment # 8

Comment: Conclusions such as this should be reserved for the RI report where sample locations, analysis and data are available to provided justification. If DOE insists on leaving the conclusion, additional data and information must be provided to support the conclusion.

Response: Noted.

Action: Conclusions concerning the containment of organics within the Lime Sludge Ponds or in the surrounding glacial overburden has been deleted from the text.

Commenting Organization: OEPA Commentor:
Pg. # 7 Section # 1.2.3 Paragraph # Sent./Line # 3
Original Comment # 9

Comment: Provide a reference for the stated inorganic background levels. As stated in previous Ohio EPA comments and letters, DOE has failed to adequately address site background levels for naturally occurring inorganics.

Response: DOE agrees. Background concentrations used at the FEMP have been clearly documented.

Action: References for the estimates of local background concentrations have been provided in Tables 3-1, 3-2, and 3-3.

Commenting Organization: OEPA Commentor:
Pg. # 8 Section # 1.2.5 Paragraph # Sent./Line # 7-9
Original Comment # 10

Comment: See Comment #8.

Response: Noted.

Action: This conclusion concerning the Southfield has been deleted from the text.

Commenting Organization: OEPA Commentor:
Pg. # 8 Section # 1.2.7 Paragraph # Sent./Line # 28
Original Comment # 11

Comment: There is a mention of "original interpretation" of the U.S. EPA "Guide for Conducting Treatability Studies Under CERCLA." There is no explanation for another interpretation.

Response: "Original interpretation" was intended to convey the idea that the EPA is changing its thinking somewhat, as reflected in "Designing Treatability Studies for CERCLA sites: Three Critical Issues," which appeared in the May 1991 Journal of Air Waste Management Association. The authors of the article are dePercin, Bates, and Smith of EPA's Risk Reduction Engineering Lab.

Action: The text in Section 1.2.7 has been revised for clarity.

Commenting Organization: OEPA Commentor:
Pg. # Section # 1.2.6 Paragraph # Sent./Line #
Original Comment # 12

Comment: Figure 1-2: a) The actual remedial action goals for non-carcinogens are to be based upon maintaining a Hazard Index of less than 1. Simply maintaining doses of non-carcinogens at less than the specific RfD will not necessarily achieve a Hazard Index of less than 1. b) The site-wide remedial action goal for carcinogens is to maintain lifetime cancer risks to between 10^{-4} and 10^{-6}. Simply meeting this goal for each pathway for each operable unit will not necessarily result in an additive site-wide cancer risk range of 10^{-4} and 10^{-6}. This section should reference the methodology recently negotiated in the Amended Consent Decree between U.S. EPA and DOE for ensuring the attainment of site-wide risk levels.

Response: DOE agrees. It was not the intent of the figure to imply that these RAOs were to be applied to constituents or pathways separately. These are site-wide RAOs and need to be clearly presented as such.

Action: Figure 1-2 has been revised.

Commenting Organization: OEPA Commentor:
Pg. # 13 Section # 1.2.7 Paragraph # Sent./Line # 1
Original Comment # 13

Comment: Please provide a reference for the revision of terminology in the treatability study guidance document.

Response: Noted. Reference: "Designing Treatability Studies for CERCLA Sites: Three Critical Issues," Journal of Waste Management Association, May 1991. The article was written by dePercin, Bates, and Smith of EPA's Risk Reduction Engineering Lab.

Action: The reference has been added to the text in Section 1.2.7.

Commenting Organization: OEPA Commentor:
Pg. # 15 Section # 1.3.1 Paragraph # Sent./Line #
Original Comment # 14

Comment: The Wet-dry test (ASTM D559-57) should be included as a test for durability of the monolith. This durability test is an important test to prove that the selected matrix has longevity.

Response: DOE disagrees. Tests relating to the long-term stability, e.g., free-thaw and wetting and drying tests, should be conducted during the remedy design phase. The choice of which

battery of tests to conduct will be determined later. As currently planned, the University of Cincinnati and Oak Ridge National Laboratory (on behalf of DOE) will conduct aging and durability studies.

Action: None required.

Commenting Organization: OEPA Commentor:
Pg. # 17 Section # 1.3.2.1 Paragraph # Sent./Line # 17
Original Comment # 15

Comment: Possible airborne emissions are not addressed. If the landfill contains radionuclides then emission for the lab furnace could cause the radionuclides to become an airborne contaminant. DOE should address, within the text, how this potential release will be mitigated.

Response: The lab furnace will be situated inside of a HEPA-filter equipped hood during ashing. In addition, a continuous air monitor (CAM) will be located next to the hood.

Action: None required.

Commenting Organization: OEPA Commentor:
Pg. # 17, 5 Section # 1.3.2.1, 4.1.1 Paragraph # Sent./Line # 3, 7
Original Comment # 16

Comment: Describe how the laboratory furnace adequately simulates full-scale incineration of the sanitary landfill waste.

Response: Ashing of the landfill material in the laboratory is not intended to directly simulate the incineration of the material in a full scale incineration facility. The ashing of the material in the laboratory is conducted following the standard procedure for ashing a sample (ASTM 2974-87).

The ashing of the samples is intended to provide a feed stock for the stabilization testing that would be similar in refractory constituents of the material produced in the full-scale incineration.

Action: None required.

Commenting Organization: OEPA Commentor:
Pg. # 17 Section # 1.3.2.4 Paragraph # Sent./Line #
Original Comment # 17

Comment: This section must discuss potential treatment options for the Inactive and Active Flyash Disposal Areas should reagent mixtures incorporating flyash prove to be ineffective. Treatment must be considered for the flyash which is not incorporated into other waste stream treatments.

Response: The workplan indicates that, for the fly ash not incorporated into wastes, the treatment technology of stabilization/solidification should be valid for the fly ash. The approved Final ISA report for OU2 lends itself only to stabilization/solidification as the treatment technology for flyash. Therefore, the treatability study workplan only discusses stabilization/solidification. In the unlikely event the reagent mixtures using fly ash prove to be ineffective they will be addressed in the advanced phase-optional.

Action: None required.

Commenting Organization: OEPA Commentor:
Pg. # 17 Section # 1.3.3 Paragraph # Sent./Line # 30
Original Comment # 18

Comment: Provide reasoning for the 28-day curing period.

Response: The 28-day laboratory curing period is based on standard concrete industry design and construction practices (see Troxell, Davis and Kelly, 1968, Composition and Properties of Concrete, 2nd Ed., p.4, McGraw-Hill, NY). This curing period is also specified in the NRC Technical Position Paper on Waste Form (Revision 1) which is included in Appendix A of this work plan.

Action: The reference to the 28-day curing period has been added to the text in Section 1.4.3.

Commenting Organization: OEPA Commentor:
Pg. # 17 Section # 1.3.3 Paragraph # Sent./Line # 31-32
Original Comment # 19

Comment: Specifically define relatively low permeability and minimal volume increase.

Response: The permeability and volume increase data will be used for the comparison between successful formulations. Formulations having lower permeability and a lower volume increase will be selected over (1) those that may have low permeability and higher volume or (2) those that may have higher permeability and lower volume increase. These terms should be interpreted to mean the lowest permeability per lowest volume. Samples with lower volume increase will result in a lower remediation cost because a smaller EWMF

would be necessary. Samples with lower permeabilities and similar leaching characteristics will be evaluated in the FS for reagent cost impacts, which will influence the selection of the final remedial alternative.

Action: None required.

Commenting Organization: OEPA Commentor:
Pg. # 18 Section # 1.3.3 Paragraph # Sent./Line # 7
Original Comment # 20

Comment: DOE should define to which discharge standards this sentence refers.

Response: The text associated with discharge standards has been deleted.

Action: The entire paragraph beginning on line 7 has been deleted and replaced with the following: "Data generated from UCS and leachability testing under this work plan will be used for evaluating compliance with ARARs in the feasibility study." This paragraph has been relocated to Section 1.4.3.

Commenting Organization: OEPA Commentor:
Pg. # 18 Section # 1.3.3 Paragraph # Sent./Line # 11-14
Original Comment # 21

Comment: This sentence mentions durability testing. Please explain what tests will be run for durability.

Response: Durability testing is not being performed.

Action: Text (Section 1.4.3) has been revised to indicate response.

Commenting Organization: OEPA Commentor:
Pg. # 18 Section # 1.3.3 Paragraph # Sent./Line # 18
Original Comment # 22

Comment: Another factor affecting short-term effectiveness is any potential off-gassing which may occur during treatment. DOE should discuss any potential for off-gassing and how this would be quantified.

Response: Observations for off-gassing will be made during the treatability studies. If there is significant off-gassing, it would be more appropriate to quantify it during remedial testing.

Action: None required.

Commenting Organization: OEPA Commentor:
Pg. # 1 Section # 2 Paragraph # Sent./Line # 13
Original Comment # 23

Comment: The treatability study includes procedures for studying the lime sludge pond wastes. Why does this sentence state that the ponds are not part of this treatability study?

Response: The intent of the statement was to indicate that in-situ solidification/stabilization demonstration for the Lime Sludge Ponds would not be a part of this study.

Action: The text has been clarified to indicate that in-situ solidification/stabilization is not part of this study.

Commenting Organization: OEPA Commentor:
Pg. # 1 Section # 3 Paragraph # Sent./Line # 7
Original Comment # 24

Comment: This section does not actually establish performance objectives for the treatment technologies, as stated. It does establish specific objectives for the treatment tests to be performed.

Response: DOE agrees.

Action: The text has been revised.

Commenting Organization: OEPA Commentor:
Pg. # 2 Section # 3 Paragraph # Sent./Line #
Original Comment # 25

Comment: Table 3-1: Why does this table have a secondary title, "TCLP Analysis List"?

Response: Noted.

Action: Table 3-1 is now Table 3-4, and the title has been changed.

Commenting Organization: OEPA Commentor:
Pg. # 2 Section # 3 Paragraph # Sent./Line #
Original Comment # 26

Comment: Table 3-1: Additional information which should be acquired is the total alpha and total beta concentrations in the leachate. This information is important in determining compliance with MCLs based upon these parameters.

Response: DOE agrees.

Action: The revised Table (3-4) includes alpha and beta concentrations.

Commenting Organization: OEPA Commentor:
Pg. # 2 Section # 3 Paragraph # Sent./Line #
Original Comment # 27

Comment: Table 3-1: In Table 3-1, footnote "b" refers to a "characterization study." What characterization study does this footnote refer to?

Response: Footnote in Table 3-1 refers to the characterization study, which is the work Plan Addendum for OU2, DCR41 to the Work Plan - additional sampling for OU2. Please note that Table 3-1 has been revised (now Table 3-4) in accordance with U.S.EPA specific comment #6. A radiological analysis on TCLP extract from raw waste samples also will be performed for radiological comparisons.

Action: Table 3-1 has been revised in accordance with U.S.EPA specific comment #6.

Commenting Organization: OEPA Commentor:
Pg. # 3 Section # 3.2 Paragraph # Second Sent./Line #
Original Comment # 28

Comment: It is stated that the establishment of DQOs is the part of the process that defines the data quality needs of the project. The process should work in the opposite fashion. The DQOs are determined by the intended uses of the data or data needs. For example, if the data needs are to support the design of the remedy, the DQOs would have a higher analytical levels than would be required for a technology screening analysis. Please revise.

Response: DOE agrees.

Action: Section 3.2 of the text has been revised.

Commenting Organization: OEPA Commentor:
Pg. # 7 Section # 3.2.1 Paragraph # Sent./Line # 2-4
Original Comment # 29

Comment: Provide a reference for the bulking factor formula.

Response: Noted.

Action: A bulking factor procedure, including the derivation of the formula, has been included in Appendix E.

Commenting Organization: OEPA Commentor:
Pg. # 7 Section # 3.2.1 Paragraph # Sent./Line # 13
Original Comment # 30

Comment: This sentence seems to indicate that each area's samples will be composited with other samples. Please reword.

Response: Noted.

Action: The text has been revised to clearly indicate that samples will be composited with samples from the same waste area. Section 6 has been revised (in response to other comments) and reference to Section 6 has been made in the text.

Commenting Organization: OEPA Commentor:
Pg. # 7 Section # 3.2.1.1 Paragraph # Sent./Line # 18-20
Original Comment # 31

Comment: These sentences are confusing. Please reword.

Response: Noted.

Action: The text has been revised for clarity.

Commenting Organization: OEPA Commentor:
Pg. # 7 Section # 3.2.2 Paragraph # Sent./Line # 22
Original Comment # 32

Comment: Define what makes additional work under stage II "necessary."

Response: Molds will be tested for UCS and MTCLP. If less than six formulations for each waste stream are judged to be successful, Stage II will be initiated with new formulations.

Action: The text has been revised.

Commenting Organization: OEPA Commentor:
Pg. # 7 Section # 3.2.3 Paragraph # Sent./Line # 29
Original Comment # 33

Comment: This sentence states that the EPA method for permeability "will be used as a guide." If the study does not intend to follow the method, a new method should be incorporated into the revised site-wide QAPP to be submitted in September, 1991.

Response: Noted.

Action: The procedure for permeability has been included in Appendix E.

Commenting Organization: OEPA Commentor:
Pg. # 1 Section # 4.1 Paragraph # Sent./Line # 21-23
Original Comment # 34

Comment: Explain the rationale for using a 3/8 inch mesh screen. Define "obvious debris."

Response: See response to U.S. EPA specific comment number 9. The 3/8-inch mesh screen size was selected because the TCLP testing uses 3/8 inch screens. Obvious debris would include chunks of wood, metal, or plastic.

Action: The data-required sections will be changed to include a record of the maximum particle size treated (if the material was crushed/ground before use) and the weight/percentage of material sieved out the raw waste before treatment. The text has been revised to include:

- The maximum particle size treated, weight and percentage of material sieved out from the raw waste before treatment, and
- The general description of the waste form before and after reagents are mixed including a description of any grinding of the sample to meet particle size requirements for UCS.

Commenting Organization: OEPA Commentor:
Pg. # 1 Section # 4.1 Paragraph # Sent./Line # 30
Original Comment # 35

Comment: Define how much bottom ash would be considered too much. What type of commercial fly ash might be substituted?

Response: The matrices in Section 4.0, which specify quantities of fly ash, will be followed.

Action: The statement has been deleted.

Commenting Organization: OEPA Commentor:
Pg. # 5 Section # 4.1.1 Paragraph # Sent./Line # 6-9
Original Comment # 36

Comment: Will the described incineration regiment for the landfill material be representative of actual remediation incineration? DOE should include a discussion laboratory conditions will relate to actual remedial actions.

Response: See response to OEPA specific comment #16.

Action: None required.

Commenting Organization: OEPA Commentor:
Pg. # 5 Section # 4.1.4 Paragraph # Sent./Line # 33
Original Comment # 37

Comment: DOE should provide a standard procedure/method which supports determining shear strength 10 minutes after mixture.

Response: DOE disagrees. The shear strength test is used to determine the early processability of the treated waste form. If the mixture exhibits an early high shear strength or sets rapidly, the implementability of the mixture should be evaluated.

Action: None required.

Commenting Organization: OEPA Commentor:
Pg. # 2 Section # 5 Paragraph # Sent./Line #
Original Comment # 38

Comment: Table 5-1: This table should include the manufacturer and manufacturing number.

Response: DOE disagrees. The manufacturer has already been listed where it is appropriate.

Action: None required.

Commenting Organization: OEPA Commentor:
Pg. # 1 Section # 6 Paragraph # Sent./Line # 2
Original Comment # 39

Comment: DOE should discuss the implications of using archived samples for testing. Is this action representative of what will occur during remediation? What affect will the use of archived samples have on the treatability work, if some of the organics have volatilized or degraded over time?

Response: DOE agrees that the implications of using archived samples should be considered in the text. The use of archived samples is representative of what will occur during remediation. This is because, for removal alternatives, waste material will require excavation over many months, which will expose Operable Unit 2 wastes to the atmosphere. The process of excavation/treatment will require that the waste material be excavated and hauled to a staging facility. There the material will be stockpiled along with reagent material. The waste will then be mixed with reagents in a batch mixer and cast into forms and allowed to harden. This process is, in essence, a scale-up of the bench-top experiments being conducted in the Treatability Study.

Action: Section 6 has been revised to include a discussion of the sampling methodology and the implications of using archived waste samples.

Commenting Organization: OEPA Commentor:
Pg. # 1-3 Section # 8.3 Paragraph # Sent./Line #
Original Comment # 40

Comment: Provide references for all formulas.

Response: Noted. The reference for these formulas is "Preparing Perfect Project Plans," EPA/600/9-89/087, October 1989.

Action: This reference has been added to the text.

Commenting Organization: OEPA Commentor:
Pg. # Section # 9 Paragraph # Sent./Line #
Original Comment # 41

Comment: It should be noted that when Ohio EPA approves this and any other work plans, approval is not given to the Health and Safety Plan. It is Ohio EPA policy not to approve Health and Safety Plans.

Response: Noted.

Action: None required.

Commenting Organization: OEPA Commentor:
Pg. # Section # Paragraph # Sent./Line #
Original Comment # 42

Comment: Appendix B, Table B-1, Item 7: Define "Volatile Inorganics."

Response: Volatile Inorganics as listed are volatile metals (Arsenic, Mercury, Lead, Tin, Selenium are examples).

Action: None required.

Commenting Organization: OEPA Commentor:
Pg. # Section # Paragraph # Sent./Line #
Original Comment # 43

Comment: Appendix B, Table B-1: DOE should provide the levels "assumed" to be background for both naturally occurring radionuclides and inorganics. Justification for these levels should also be discussed. As previously stated, Ohio EPA does not believe that DOE has adequately addressed background concentrations for naturally occurring radionuclides and other inorganics.

Response: DOE agrees that background concentrations used at the FEMP have been clearly documented.

Action: References for the estimates of local background concentrations have been provided in Tables 3-1, 3-2, and 3-3.

Commenting Organization: OEPA Commentor:
Pg. # Section # Paragraph # Sent./Line #
Original Comment # 44

Comment: Appendix B, Table B-3, Item 6: There is an obvious omission within the radionuclide data for the Active Flyash Pile. As printed it suggests the presence of enriched uranium within the pile. DOE should correct this error.

Response: The text contained a typographical error. Radium-228 was not detected and, therefore, should not have been listed.

Action: Radium-228 has been deleted from the list and the data is now listed correctly.