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REVISED RESPONSE TO UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (U.S. EPA) COMMENTS FOR WASTE PITS 3 AND 5 AND CLEARWELL DIKE STABILITY ANALYSIS

04/21/92

Department of Energy
Fernald Environmental Management Project
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APR 2 1 1992

DOE-1414-92

Mr. James A. Saric, Remedial Project Director
United States Environmental Protection Agency
Region V - HRE-8J
77 West Jackson Street
Chicago, Illinois 60604-3590

Mr. Graham E. Mitchell, Project Manager
Ohio Environmental Protection Agency
40 South Main Street
Dayton, Ohio 45402-2086

Mr. Paul D. Pardi, Hazardous Waste Group Leader
Ohio Environmental Protection Agency
40 South Main Street
Dayton, Ohio 45402-2086

Dear Mr. Saric and Mr. Mitchell and Mr. Pardi:

REVISED RESPONSE TO UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (U.S. EPA) COMMENTS FOR WASTE PITS 3 AND 5, AND CLEARWELL DIKE STABILITY ANALYSIS

Enclosed for your information is the revised response to comments submitted by the U.S. EPA for the Waste Pits 3 and 5, and Clearwell Dike Stability Analysis. The Department of Energy, Fernald Field Office (DOE-FN) feels that the nature of the comments is such that clarifications as provided in the enclosed responses will be adequate to provide complete understanding of the original stability analysis report without document revisions.

If you or your staff have any questions, please contact Rod Warner at FTS 774-8916 or (513) 738-8916.

Sincerely,

for Jack R. Craig
Fernald Remedial Action
Project Manager

FN:Warner

Enclosure: As Stated

cc w/enc.:

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REVISED RESPONSE TO COMMENTS FROM U.S. EPA

for

3194

WASTE PITS 3 AND 5, AND CLEARWELL DIKE STABILITY ANALYSIS

General Comment 1

Comment The report is a good summary of the field investigation, geotechnical laboratory testing, and slope stability analysis for Waste Pits 3 and 5 and Clearwell Dikes at Operable Unit 1, at the FEMP in Fernald, Ohio. The geotechnical investigation is thorough, and the method of analysis is appropriate. However, the high ground-water table with earthquake loading should be analyzed by DOE in addition to the three cases analyzed in the Stability Analysis Report to ensure that the dikes will remain stable even under low probability natural hazards.

Response Engineering analysis of forces induced by the simultaneous occurrence of 100 year and 500 year return period events is inappropriate. The estimated return period of such an event is in excess of 500 years. Due to this extraordinarily long period of return, a Factor of Safety of less than the recommended value would not warrant preventive or corrective actions.

Additionally, the U.S. Department of Energy's current design criteria guidance (DOE 6430.1A) does not require analysis of simultaneous occurrence of the earthquake and storm events. The design criteria states that "A design basis earthquake (500-year in the case of the dike stability analysis) shall be assumed capable of occurring at any time, except that the simultaneous occurrence with any other limiting site related event need not be considered for design purposes, except where the joint occurrence is causally related." In the case of the stability analysis, the 100-year rain storm and the 500-year earthquake are not causally related. Though the stability analysis was not a design activity, per se, it is in line with current design criteria.

General Comment 2

Comment Sand lenses were encountered during the geotechnical field investigation. These lenses do not appear in the typical cross-sections analyzed in the report. Saturation of these sand lenses will increase pore pressure within the embankment, and adversely affect embankment stability. Therefore, all cases should be reanalyzed to properly account for the sand lenses within the embankment.

Response These sand lenses do appear in the cross-sections analyzed. Please see Appendix C, Figures C13, C14 and C15.

Specific Comment 1

Comment Section 2.3.5, Page 2-6: The low ground-water table case (Case 1) assumes seepage through the dike with a steep hydraulic gradient to a ground-water elevation near the top of the aquifer. This

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assumption is not justified, because the geotechnical field investigation indicated the presence of silty sands within the dike at depths of (1) 10 to 17 feet and 22 to 20 feet below ground surface in Waste Pit 5; (2) 3.5 to 6 feet and 12 to 14 feet below ground surface in Waste Pit 3; and (3) 11.5 to 13.5 feet below ground surface in the Clearwell Dikes. U.S. EPA recommends that the phreatic surface in the dikes reflect the presence of these silty sands.

Response The assumption is justified. The sand lenses cited in Item 1 of this comment were monitored using piezometers. These piezometers identified no ground water migration which would invalidate the assumptions associated with Case 1.

The sand lens cited in Item 2 of this comment as ranging from 3.5 to 6 feet is in error. The subject strata was described as clay in the boring log description, but the lithologic symbol for sand was mistakenly used in the symbolic boring profile. The sand lens identified as starting at approximately 12 feet in this boring is not a sand lens, but is the top of the sand and gravel strata containing the aquifer.

The sand lens identified in Item 3 of this comment is also the upper limit of the sand and gravel strata containing the aquifer.

Specific Comment 2

Comment Section 3.1.3, Page 3-1: The text states that ground water encountered at Waste Pit 5 is perched, typical of ground water encountered in the glacial till through out the site. However, the presence of perched ground water is not reflected in the low ground-water and earthquake loading cases analyzed in the report. These should be reanalyzed with consideration to the presence of perched ground water.

Response Disagree. Perched ground water does not invalidate the assumptions in Cases 1 and 3. Please see Specific Comment 1.

Specific Comment 3

Comment Section 4.2, Page 4-4: The effect on safety of a flatter Waste Pit 3 exterior slope is presented in Table 4-1. Considering the critical nature of Waste Pits, U.S. EPA recommends that the flatter 2.5:1 exterior slope be adopted for Waste Pit 3 to ensure stability in the event of a long duration, high intensity rain storm or an earthquake.

Response Disagree. Factor of Safety is below that recommended by the Naval Facilities Engineering Command, however, calculation of the decrease in estimated frequency of return based upon the margin to failure yields a large and acceptable event return period. Furthermore, it is not likely that even a 100-year rainfall event would create the conditions modeled in Case 2. A 1000-year earthquake is estimated to be necessary to cause failure of the berm.

Specific Comment 4

Comment Section 5.0, Page 5-1: Recommendation 7 states, "If in-place remediation is selected as the final remedial action for Waste Pit 3, employ an engineering design measure to increase the dike's long-term stability in the event of an earthquake." This sentence is vague. U.S. EPA recommends that the engineering design measure should be specified, and the exterior slope of Waste Pit 3 should be flattened to 2.5:1 if in-place remediation is selected as the final remedial action.

Response Disagree. If in-situ remediation is chosen, dike improvements will be specified as part of the final remedial action. The type of in-situ remediation planned may impact the method and extent of dike improvements.

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