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*RESPONSES TO USEPA AND OEPA COMMENTS ON
THE RI/FS WORK PLAN ADDENDUM ADDITIONAL
CHARACTERIZATION OF VADOSE AND PERCHED
WATER IN THE K-65 AREA MAY 1993*

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*DOE-FN/EPA
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RESPONSES*

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ON THE
RI/FS WORK PLAN ADDENDUM
ADDITIONAL CHARACTERIZATION OF VADOSE
AND PERCHED WATER IN THE K-65 AREA
MAY 1993

US EPA GENERAL TECHNICAL COMMENTS AND RESPONSES

1) **Commenting Organization:** U.S. EPA **Commentor:**

Section #: **Page #:** **Line #:**

Original Comment #: 1

Comment: Assuming that the primary objective of the proposed study is to characterize the nature and extent of K-65-related ground-water contamination, the proposed investigation is not adequate. Additional hydropunch borings or piezometers, particularly in the areas west and south of monitoring well 1032, should be located along the downgradient areas of Operable Unit 4 to fully characterize the lateral and vertical extent of contaminated, perched groundwater.

Response: Please reference Figure 1 of the Work Plan for the following response. Paddys Run Creek is approximately 75 feet west of 1032. The three lysimeters (1894, 1895, 1896) west and south of Monitoring Well 1032 will determine if contaminated perched or vadose water is reaching Paddys Run Creek.

As discussed in the April 1 OU5 TIE meeting, DOE will install a piezometer adjacent to each of the lysimeters. The purpose of the piezometers is to determine if a perched water condition exists in the Glacial Overburden adjacent to Paddys Run Creek.

Also discussed in the April 1 TIE was the need to provide a contingency in the Work Plan to install a piezometer southwest of Piezometer 1891. The contingency piezometer would be installed based on total uranium results from Piezometer 1891.

Piezometer 1891 is being installed as part of this Work Plan. It is located south of well 1032, and southwest of the silos. Based on currently available analytical data, and the hydrogeologic conditions in the silo area, it appears that the perched water contamination is isolated to a relatively thin zone immediately west of the silos.

Action: DOE will modify the Work Plan to provide for:

- The installation of piezometers adjacent to Lysimeters 1894, 1895, and 1896
- A contingency piezometer southwest of Piezometer 1891. The additional piezometer will be installed if total uranium values exceed 20 ug/L in Piezometer 1891.

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2) **Commenting Organization: U.S. EPA** **Commentor:**
Section #: Page #: Line #:
Original Comment #: 2

Comment: If monitor well 1033 is not immediately upgradient of the silos background contamination emanating from other sources cannot be adequately evaluated in context with contamination downgradient of the silos, and additional hydropunch borings or piezometers should be installed.

Response: Monitoring Well 1033 is immediately upgradient of Silos 1 and 2. This is based on water levels collected from 1000 Series wells in vicinity of the silos, as well as water levels determined during the slant boring project in 1991. Further discussion of the hydrogeology of the OU4 area is presented in Chapter 3 of the OU4 RI report.

Action: A map depicting typical perched water table contours will be included and discussed in the Work Plan.

3) **Commenting Organization: U.S. EPA** **Commentor:**
Section #: Page #: Line #:
Original Comment #: 3

Comment: The remedial investigation/feasibility study (RI/FS) Work Plan addendum should include a section summarizing the hydrogeological characteristics of the K-65 silo areas. The sections should include brief discussions of perched water flow directions, rates, continuity, thicknesses, and depth.

Response: A complete summary of perched water flow directions, rates, continuity, thickness, and depth is included in the OU4 RI Chapter 3. The DOE agrees that a brief description of hydrogeologic characteristics such as known perched water zones and flow directions is necessary information for discussion of proposed well locations, etc.

Action: A brief discussion of hydrogeology in the silo area will be added to the Work Plan.

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| US EPA SPECIFIC COMMENTS AND RESPONSES |
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- 4) **Commenting Organization:** U.S. EPA **Commentor:**
Section #: 2.1.2 **Page #:** 2 **Paragraph #:** **Sentence #:** 2
Original Comment #: 1

Comment: This sentence states that radiological analytical results from the previous investigations are shown in Table 4-33; however, the total uranium and Pb-210 results are not included in the table. This information should be included in the table.

Response: If available, total uranium concentrations will be added to Table 4-33. Pb-210 was not analyzed in subsurface soil samples taken during the installation of these wells; therefore it cannot be added to Table 4-33. Pb-210 was added to the list of OU4 radiological analytes in the summer of 1991 during the silo content sampling and slant boring programs. All of the wells listed in Table 4-33 were installed prior to the summer of 1991.

Action: Total U data will be added to Table 4-33, if it is available. (Reference Table 2 in the revised Work Plan.)

- 5) **Commenting Organization:** U.S. EPA **Commentor:**
Section #: 2.1.2 **Page #:** 2 **Paragraph #:** **Sentence #:** 5
Original Comment #: 2

Comment: This sentence states that concentrations of Ra-226, Pb-210, and total uranium decrease with depth. As indicated in Specific Comment No. 1, total uranium and Pb-210 results are not presented. Furthermore, the data presented in Table 4-33 do not support the conclusion that Ra-226 concentrations decrease with depth. These discrepancies should be addressed.

Response: DOE agrees that this sentence and sentence 4 of Section 2.1.2 (revised Work Plan (WP) Section 3.1.2) need to be clarified.

Action: Sentence 4 of Section 2.1.2 (Revised WP Section 3.1.2) will be modified as follows: Results from the slant borings and other subsurface soil samples indicate that soil contamination is confined principally to the area immediately under the silos or near the surface around the silos. Sentence 5 of Section 2.1.2 (Revised WP Section 3.1.2) will be modified as follows: Based on results from the slant borings there is a general decrease in concentrations of Ra-226, Pb-210, and total U with depth.

6) **Commenting Organization:** U.S. EPA **Commentor:**
Section #: 2.2.3 **Page #:** 3 **Paragraph #:** 3 **Sentence #:**
Original Comment #: 3

Comment: This section discusses the possibility that leaks have occurred based on Ra-226 data obtained from the slant borings. However, no other radiological data are discussed. All radiological data collected during the slant boring investigations should be included in this discussion.

Response: All radiological data from the slant boring program is discussed in the OU4 RI report. DOE does not agree that all the radiological results from the slant borings are pertinent to this investigation; therefore they have not been discussed in detail in this Work Plan.

Action: A reference to the specific section of the OU4 RI that discusses radiological results from the slant borings will be added to Section 2.2.3.(Revised WP Section 3.2.3)

7) **Commenting Organization:** U.S. EPA **Commentor:**
Section #: 3.1 **Page #:** 5 **Paragraph #:** 1 **Sentence #:** 4
Original Comment #: 4

Comment: This sentence indicates that, at a minimum, all water samples will be analyzed for Ra-226, U-238, and fluorescein dye tracer. The Site Wide Characterization Report (DOE, 1992) stated that uranium, thorium, and radium isotopes as well as Pb-210 were used as indicator parameters to determine if radiological contamination was emanating from the K-65 silos. DOE should explain why the list of proposed analyses has been reduced to only two radionuclides.

Response: As described in the sentence following the one commented on, additional parameters will be analyzed if sufficient water volume is available. The reduced list of analytes are the minimum to be collected if recharge in the well is not sufficient to collect the entire desired list.

Action: Add Pb-210 to TAL 40.03.05 B.

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8) **Commenting Organization:** U.S. EPA **Commentor:**
Section #: 3.1 **Page #:** 5 **Paragraph #:** 1 **Sentence #:** 5
Original Comment #: 5

Comment: The text states that additional analyses will be performed if sufficient water volume can be collected. DOE should make every effort to maximize sample volumes so that the TAL 50.03.13-B analyses can be performed. With the exception of lysimeter samples, volumes of water sufficient for TAL 50.03.13-B analysis should be obtainable. However, DOE should prioritize the list of analyses contained in TAL 50.03.13-B so field personnel will be able to make maximum use of the available water volumes in the event sufficient volumes for TAL 50.03.13-B analysis are not available.

Response: Priority of samples to be collected is clearly noted in Table 2 (Revised WP Table 6) of the Work Plan.

Action: The following sentence will be added after the sentence that is the subject of this comment: The prioritized order in which TAL 50.03.13 B (Revised WP TAL 40.03.05 B) samples are to be collected is noted in Table 2. (Revised WP Table 6)

9) **Commenting Organization:** U.S. EPA **Commentor:**
Section #: 3.2.1 **Page #:** 5 **Paragraph #:** 2 **Sentence #:** 2
Original Comment #: 6

Comment: This sentence provides details of the proposed piezometer installations. However, details regarding screen lengths are not included. This information should be provided.

Response: The DOE agrees that selection of screen length should be addressed in the text of this Work Plan.

Action: The following will be added to Section 3.2.1 (Revised WP Section 4.2.1) of the Work Plan to describe selection of screen length: Screen length will be determined by the onsite geologist based on the thickness of the upper perched zone at each location. The length of the screen will be such that the water table and at least 80% of the water bearing unit is screened.

- 10) **Commenting Organization:** U.S. EPA **Commentor:**
Section #: 3.2.4 **Page #:** 7 **Paragraph #:** 3 **Sentence #:**
Original Comment #: 7

Comment: This section discusses the installation of lysimeters along the east bank of Paddys Run. However, it is unclear why DOE proposes to conduct this investigation. Vadose zone waters emanating from the K-65 silos are expected to migrate vertically. It is very unlikely that contaminated vadose zone water will migrate 300 feet laterally into Paddys Run. This issue should be addressed.

Response: Current data shows that uranium contamination is present in Monitoring Well 1032. Perched water gradient, as discussed previously, is roughly east to west in the silo area. Based on Figure 1 of the work plan, Monitoring Well 1032 is approximately 150 feet west of the silos. Paddys Run is approximately 75 feet west of 1032. It is the DOE's opinion that in order to measure the western extent of contaminated perched or vadose water, the best method, in light of the hydrogeological conditions, is to install and sample lysimeters.

Observations of the bank of Paddys Run Creek in the area where the lysimeters are to be installed indicate only minor amounts of vadose or perched water is reaching the creek bank, as evidenced by a few damp areas on the face of the bank. The bank is predominantly dry. Based on these observations, DOE does not expect a perched water condition to exist where the lysimeters are to be installed; therefore lysimeters were chosen over other monitoring methods such as piezometers or wells.

Action: As noted in the action for General Technical Comment 1.

- 12) **Commenting Organization:** Ohio EPA **Commentor:** M. Proffitt
Section #: 3.1 **Page #:** 4 **Line #:** **Paragraph #:** 1
Original Comment #: 2

Comment: The previous paragraph states that the lower perched zone was found in only boring 1616. However, this paragraph implies that it is also present at boring 1032. The paragraphs should be reworded to clarify the location of the lower perched zone.

Response: Agree.

Action: The word "only" will be deleted from the following sentence in Section 3.1: (Revised WP Section 4.1) Indications of a lower perched zone at approximately 552 feet MSL were found "only" in slant Boring 1616.

- 13) **Commenting Organization:** Ohio EPA **Commentor:** M. Proffitt
Section #: 3.1 **Page #:** 4 **Line #:** **Paragraph #:** 1
Original Comment #: 3

Comment: The DOE should clarify why "cross contamination" occurred in boring 1032. The DOE does not clearly indicate whether this cross contamination is the result of smearing while the sample was obtained, from inadequate decontamination, or if it has resulted from migration of contaminated groundwater from the upper perched zone to the lower perched zone.

Response: The first sentence on page 4 states: "contamination found in Boring 1616 could represent cross-contamination from the upper perched zone." DOE does not believe that cross-contamination has occurred in Monitoring Well 1032.

DOE does not know the exact mechanism for the potential cross-contamination in Boring 1616. The three mechanisms for cross-contamination stated in the comment are all possibilities. As stated in the last sentence of the first paragraph on page 4 the "proposed work is intended to further evaluate this suspected lower zone." DOE does not think that the exact cause of the cross-contamination can be determined with certainty.

Action: No modification of the Work Plan is required.

- 14) **Commenting Organization:** Ohio EPA **Commentor:** K. K.
Section #: 3.1 **Page #:** 4 **Line #:** Data Quality Objectives
Original Comment #: 4

Comment: The area to the south of the K-65 silos has an intermittent creek channel which discharges into Paddys Run. During a recent walk through by OEPA, DOE and FERMCO personnel, seepage of groundwater was observed coming from the embankments to the waterway. The possibility of this seepage being contaminated perched groundwater originating from under the K-65 silos and the creek being a transport vehicle to Paddys Run needs to be investigated.

Response: Due to the east to west perched water gradient beneath the silos, it is not believed that contaminated perched water from the silo area will have any effect on the drainage ditch in question. Additional evidence of this are Total U values of 3 to 4 ug/L from Well 1034, which is located immediately south of the silos. Further, as a result of the recent walk-through, a separate investigation is underway to evaluate the subject drainage ditch waters as well as the seeps that feed into the ditch from the north.

Action: No modification of the Work Plan is required.

- 15) **Commenting Organization:** Ohio EPA **Commentor:** M. Proffitt
Section #: 3.2.3 **Page #:** 5 **Line #:** Paragraph #: 2
Original Comment #: 5

Comment: The DOE should justify the use of a .02 inch slotted screen in a potentially fine grained formation.

Response: The DOE agrees that this explanation should be included in the Work Plan. A .02 slot screen was selected in order to allow for easier flow to occur from the perched zone into the well. In an effort to filter out unnecessary silt, a uniform sand pack (10/20) will be placed around the well screen.

Action: Justification of the .02 slot screen will be added to the Work Plan in Section 3.2. (Revised WP Section 4.2.1)

16) **Commenting Organization:** Ohio EPA
Section #: 3.2.3 **Page #:** 7 **Line #:**
Original Comment #: 6

Commentor: M. Proffitt
Paragraph #: 1

Comment: The Operating Principles for the lysimeter included in the Work Plan explain that the distilled water will separate from the flour and migrate into the soil. However, it would appear that the time necessary for the water to migrate into a silt or clay would be quite excessive. If the formation is fine grained, it may be necessary to use dry silica flour. Note: Special precautions will be necessary when handling dry silica flour to prevent the inhalation of dust particles.

Response: The lysimeter manufacturer was contacted regarding this comment and their recommendation was to use the slurry even in "tight" soil conditions. The manufacturer also suggested that excess water could be removed from the silica slurry via the lysimeter after installation.

The appropriate health and safety precautions will be observed when handling the dry silica flour.

Action: Continue to follow the lysimeter manufacturer's instructions. The field crew is to be instructed to observe appropriate health and safety precautions when handling the dry silica flour.