LTSM005572

Department of Energy
Oak Ridge Operations
Weldon Spring Site
Remedial Action Project Office
7295 Highway 94 South
St. Charles, Missouri 63304

January 21, 2000

Mr. Dan Wall
Project Manager
Superfund Division
U.S. EPA
Region VII
726 Minnesota Avenue
Kansas City, Kansas 66101

Dear Mr. Wall:

FINAL: REMEDIAL DESIGN/REMEDIAL ACTION (RD/RA) WORK PLAN FOR THE QUARRY RESIDUALS OPERABLE UNIT (QROU) (JANUARY, 2000); RESPONSES TO COMMENTS ON THE DRAFT FINAL RD/RA

Two copies of the subject document are provided. This final document reflects the agreements made with EPA and MDNR in discussions of the issues raised during the comment period and in subsequent meetings. At this time we are also transmitting written responses to those comments.

By copy of this letter with the enclosures, we also are sending this final document and comment responses to the MDNR. If you have any questions, please contact Tom Pauling at (636) 926-7051.

Sincerely,

Stephen H. McCracken
Project Manager
Weldon Spring Site
Remedial Action Project

Enclosure:
As stated

cc w/ enclosure:
Larry Erickson, MDNR
Branden Doster, MDNR
MDNR Field Office
Myrna Rueff, MDNR/DGLS
Mike Schroer, MDC
Gene Valett, PMC
Steve Warren, PMC
Becky Cato, PMC
Yvonne Deyo, PAI
Weldon Spring Citizens Commission
Joe Nichols, St. Charles County
Bob Boettner, EM-424
Mary Picel, ANL

cc w/o enclosure:
Terri Uhlmeyer, PMC

LWSH 2.2

RESPONSES TO MDNR COMMENTS ON THE REMEDIAL DESIGN/REMEDIAL ACTION WORK PLAN FOR THE QUARRY RESIDUALS OPERABLE UNIT, DRAFT FINAL (OCTOBER 1999)

	COMMENT	RESPONSE
2.1 Monitoring Strategy	**Comment 1:** The document references that a metric of 10%, equal to 300 pCi/l uranium, is equivalent to a 10^{-4} risk under a residential risk scenario. This risk is reference as the upper bound of the Environmental Protection Agency's (EPA) acceptable range. This concentration of uranium, according to the response to comments from the Department of Energy (DOE), equates to a 4×10^{-4} risk under the residential scenario. This risk falls outside EPA's acceptable risk range of 1×10^{-4} to 1×10^{-6}. Referencing the Feasibility Study for the Groundwater operable Unit, a 10^{-4} risk for the residential scenario calculates to approximately 90 pCi/l uranium. Text should be revised to explain the discrepancy.	Reference to the 300 pCi/l target level as being within the EPA's acceptable risk range has been deleted from the text. Consistent with the remediation goals outlined in the *Record of Decision*, the goal of the long-term monitoring being performed for groundwater north of the slough is to observe reduction in the uranium concentrations so that the amount of uranium that could potentially migrate to the St. Charles County well field is likewise reduced. Therefore, a target concentration equivalent to 10% of the maximum concentration (approximately 2700 pCi/l) would represent a 90% reduction of the amount that could potentially migrate. This approach is considered to provide further protectiveness to the St. Charles County well field in addition to the already protective condition that currently and will continue to exist.
	Comment 2: The long-term monitoring for the QROU does not monitor uranium-contaminated groundwater until concentrations reach a protective level. Monitoring of uranium south of the slough must continue until the concentration of the contaminant plume decreases to a protective level of 1×10^{-6} risk, based on a residential scenario. It is understood that the concentration equivalent to this level of protection is less than the action level established for the groundwater south of the slough. MDNR find this action level of 30 pCi/l uranium an	The criteria for the long-term monitoring program to be implemented for the quarry area groundwater are similar to those listed in this comment with the exception of item 3. As stated in the response to comment #1, the goal of the monitoring effort for groundwater north of the slough is to observe a reasonable level of reduction in uranium concentration so that the potential for contaminant migration to the well field could be that much further reduced. As such, the end-point need not necessarily be established on a risk-based concentration as

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	acceptable target value for the groundwater north of the slough. The following criteria must be met before monitoring activities south of the slough can be concluded: 1. The target level of 0.11 ppb for 2,4-DNT is achieved with confidence and trending shows decreasing concentrations for the groundwater north of the slough. 2. 2,4-DNT levels remain below the target level of 0.11 ppb and trending does not show increasing concentrations for the groundwater south of the slough. 3. The target level of 30 pCi/l for uranium is achieved with confidence and trending shows decreasing concentrations for the groundwater north of the slough. 4. Uranium levels remain below the target level of 30 pCi/l and trending does not show increasing concentrations for the groundwater south of the slough. The geological uncertainties associated with the slough area, the reliance on natural processes to attenuate contamination, unknowns from future developments such as construction of wetlands, and the possibility of changing geochemical conditions combined with the close proximity of the public drinking water supply, dictate the need for monitoring until these criteria can be met.	suggested in the comment. The vulnerability of the St. Charles County well field to impact from groundwater originating from the quarry has been the focus of several studies performed. It was determined from these studies that recharge from the area of impact accounts for less than 1% of the total flow through the St. Charles County well field. Under current conditions, the groundwater north of he slough poses no imminent risk to human health from water obtained from the well filed. If after attainment of the target level of 300 pCi/l, attenuation mechanisms were to become ineffective, the increase to the well field would be 3 pCi/l. Future conditions are expected to be similar to current conditions, if not better, because the source of contamination has been removed. The hydrogeological and geochemical field studies stipulated in the *Record of Decision* are intended to provide additional data to support the premise that the natural system that exists is adequately attenuating uranium concentrations north of the slough, thereby limiting or eliminating the potential for exposure to the contamination. It is expected that the data collected from the field studies would support and further increase confidence in the contaminant fate and transport model for the quarry area.

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2.2 Monitoring Locations	**Comment 3:** Please add MW-1017 and MW-1021 to Figure 2-2, as per Appendix A.	Monitoring wells 1017 and 1021 will be added to Figure 2-2.
	Comment 4: It appears that MW-1045 would be a valuable addition to the long-term monitoring network. This would extend Line 1 or 2 to provide data upgradient from MW-1-21 and MW-1050. This well is constructed in 4 foot of sand and silty gravel and would monitor changes and establish trends in contaminant levels and monitor migration pathways from north of the slough to south of the slough.	Monitoring well MW-1045 will be added as a long-term monitoring location.
2.3 Monitoring Parameters	**Comment 5:** Monitoring parameters to evaluate the performance of the interceptor trench that were discussed at the Modified Value Engineering Meeting in April 1998 included dissolved oxygen. Please explain the exclusion of this parameter from the monitoring parameters found in this plan.	Dissolved oxygen was not included in the list of parameters to be determined from the interceptor trench samples due to expected agitation of the water during pumping from the trench and the mixing of groundwater from a large area. Erroneous dissolved oxygen values could result from the introduction of air during pumping and sampling activities. It is expected that the groundwater samples obtained from the nearby monitoring wells would establish the dissolved oxygen levels in the aquifer in the vicinity of the trench.
2.4.1 Groundwater Monitoring North of the Slough	**Comment 6:** See comments 1 and 2.	See responses to Comments 1 and 2.
2.4.2 Groundwater Monitoring South of the Slough	**Comment 7:** See comments 1 and 2.	See responses to Comments 1 and 2.

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COMMENT		RESPONSE
3.1.1 Groundwater North of the Slough	**Comment 8:** Restrictions on groundwater usage will be lifted once groundwater concentrations reach a target level. This contradicts the third paragraph that states that a risk assessment would be used to determine the need for future institutional controls. Lifting institutional controls prior to assessing the risk and attaining unrestricted use of the groundwater is unacceptable. Please revise the second paragraph for consistency.	The last two sentences of the second paragraph in this section have been deleted.
	Comment 9: The 500-foot buffer zone should also have the ability to adapt if conditions (contaminant migration) change after the initial evaluation. The collection of data after the initial evaluation and definition of the buffer zone should be periodically analyzed and this zone modified if needed.	The discussion regarding the establishment of a buffer zone is not appropriate in this document. The components of institutional controls will be developed in a subsequent documents as part of the operations and maintenance plan for this operable unit.
	Comment 10: It is understood that this Work Plan will not address all components of institutional controls, including procedures for establishing and enforcing them. It is also understood that DOE has committed to producing a Stewardship Plan, with concurrence from the State of Missouri, that will address all components of institutional controls and long-term care of the site including the purpose for the institutional controls, types of control, associated costs, long-term monitoring of compliance, and mechanisms for funding long-term oversight and necessary future remedial actions.	Operations and maintenance will be outlined in a series of three documents: *Weldon Spring Stewardship Document for Operations and Maintenance*, *Long-Term Monitoring Plan for the Weldon Spring Site*, and *Institutional Controls Plan for the Weldon Spring Site*. The *Weldon Spring Stewardship Document for Operations and Maintenance* will outline the framework for the *Long-Term Monitoring Plan* and the *Institutional Controls Plan*, as well as the basis for the roles and responsibilities of stakeholders regarding stewardship and long-term care of Weldon Spring Site. Each operable unit will be

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		included as a separate section in these plans. Specifics regarding monitoring locations, parameters, and frequencies, as well as data interpretation and documentation will be presented in the *Long-Term Monitoring Plan*. Also, specifics regarding establishing and enforcing institutional controls on groundwater usage in the area north of the slough, as well as controls in other areas, will be outlined n the *Institutional Controls Plan*.
4.1.3 Data Evaluation	**Comment 11:** It is stated that the removal rate of uranium will be largest at the beginning of trench operations and then is expected to decrease and approach a constant value with time (asymptotic). Many factors will determine how much uranium will be removed from the groundwater during trench operations. The study itself was designed to observe how much uranium will be removed from the system over an operation period of two years. Geochemical factors may change after a period of time and thus release more uranium into solution than could be predicted by extrapolating a removal curve or graph prior to project completion. This type of anomaly can not be predicted by extrapolation. Caution should be taken when predicting the removal rate of uranium, especially in the early stages of the project. The termination of the field study prior to the operation period to two years would be	It is discussed in this section that decreasing and asymptotic removal rates are the anticipated behaviors based on the performance of typical extraction treatment systems. At some period during operations, concentrations of contaminants are expected to increase and then decrease to a constant or asymptotic value due to the effects of retardation and attenuation in the aquifer. The test will determine if the removal rate is sufficient to provide additional protection over the natural processes or if the rate is at a level to low to provide benefit. Monitoring of the geochemistry of the aquifer during the testing period will be used to evaluate the stability of this system during operations of an extraction system. As water levels are drawn down it is expected that the effects, if any, on the geochemistry of the aquifer will be observed.

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	premature.	Also, it is expected at the completion of these studies (including hydrogeological/geochemical field study), a more definitive understanding of this system can be attained, reducing the uncertainties associated with the contaminant fate and transport model for the area north of the slough.
	Comment 12: Geochemical data will also be collected from the trench and nearby monitoring wells. Please revise the text.	Geochemical data will not be determined from trench samples. The monitoring wells will be used to determine the if any impacts to the geochemistry of the aquifer from trench operations occur during this study.
6.2.1 Backfilling of the Quarry Proper	**Comment 13:** The RD/RA states that: "The quarry proper will be restored through backfilling with soil to meet the following criteria: • Minimize long-term physical hazards associated with the quarry high walls. • Eliminate ponded water in the quarry. • Reduce recharge to the groundwater within the quarry. • Restore the quarry to a natural state. It should also be noted in these bullets that the backfill would reduce the potential for mobilization of any potential residual contaminants into the groundwater (ROD for QROU).	The four bullets presented in Section 6.2.1 are the design criteria for determining how the backfill should be placed in the quarry and the types of materials that should be selected in order to fulfill the objectives of quarry restoration, as outlined in Section 1.3.2. Reduction of potential mobilization into the groundwater is not appropriate in Section 6.2.1, since the section focused on presenting the objectives for the restoration of the quarry. Essentially, by reducing recharge to the groundwater within the quarry as presented n the third bullet, the potential for mobilization into groundwater of residual contaminants, if any would be reduced.

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COMMENT		RESPONSE
7.1.1 Quarry Restoration Contaminated Materials Removal	**Comment 14:** Construction activities associated with the removal of contaminated materials at the quarry staging areas and contaminated soil in the quarry proper will include the treatment of fractures in the quarry bench and highwall. Please add a bullet summarizing this activity.	Text will be included.