STATE OF MISSOURI
Jeremiah W. (Jay) Nixon, Governor Sara Parker Pauley, Director
DEPARTMENT OF NATURAL RESOURCES
dnr.mo.gov

January 10, 2012

Ms. Sharon Cotner
FUSRAP Program Manager
U.S. Army Corps of Engineers
8945 Latty Avenue
Berkeley, MO 63134

RE: Remedial Investigation and Baseline Risk Assessment Report for the Inaccessible Soil Operable Unit at the St. Louis Downtown Site, Revision B, dated November 10, 2011.

Dear Ms. Cotner:

The Missouri Department of Natural Resources (MDNR) has finished its review of the above referenced document received November 14, 2011. Comments are included as an enclosure to this letter. MDNR staff has not received comments from the Missouri Department of Health and Senior Services' comments as they are still in internal review. MDNR staff will forward the comments on as soon as we receive them.

If you or your staff have any questions or need further clarification, then please contact me at (314) 877-3251. Written correspondence can be directed to my attention at Missouri Department of Natural Resources, 917 N HWY 67, Suite 104, Florissant, MO 63031.

Sincerely,

HAZARDOUS WASTE PROGRAM

Tiffany D Burgess

Tiffany D. Burgess
Radiological and Remediation Assessment Unit
Federal Facilities Section

TB:ls

Enclosure

c: Mr. Brenton Barkley, U.S. Army Corps of Engineers (e-mail only)
Mr. Daniel Carey, Department of Natural Resources (e-mail only)
Mr. Branden Doster, Department of Natural Resources (e-mail only)
Mr. Eric Gilstrap, Department of Natural Resources (e-mail only)
Mr. Matt Jefferson, U.S. Environmental Protection Agency (e-mail only)
Ms. Robin Rodriguez, Chamberlain Group (e-mail only)

MDNR Comments on the SLDS Remedial Investigation and Baseline Risk Assessment, Revision B, dated November 10, 2011

Comment #	Page/Paragraph	Quote	Comment
1	General	*N/A*	The RI/BRA references the RI Work Plan quite often throughout the document. This makes it difficult for the reader to understand methodology decided upon in the work plan. The RI/BRA should be a standalone document with minimum referencing to the work plan. Instead, the reader often has to refer back to the work plan in order to understand what methodology was used. The Department does not expect the entire work plan to be restated in the RI. However, the Department expects that a brief explanation on the methodology used be restated in the RI for the reader.
2	General	*N/A*	Please add a section within the document discussing the applicable or relevant and appropriate requirements (ARARs, e.g., Mo Universal Environmental Covenant Act, UMTRCA), and to be considered (TBCs, e.g., EPA guidance on LTS) that will be investigated as part of this operable unit.
3	General	*N/A*	In preparation for the upcoming Feasibility Study, the Department would like the USACE to discuss within the text regarding institutional control mechanisms the USACE will investigate for this operable unit.
4	Page 3, paragraph 1	*The 1998 ROD was published by USACE in consultation with USEPA...*	Please change to "The 1998 ROD was published by USACE in consultation with and approval from the USEPA" or similar verbiage.
5	Page 5, last bullet	*Plant 7W was used previously by MED/AEC and by*	The Department understands that the USACE and

		Mallinckrodt for processing radioactive feed materials. Plant 7W is currently excluded from the ISOU because historic sources of contamination have not been determined.	Mallinckrodt have yet to determine the source of contamination (MED/AEC or Mallinckrodt). If it is determined that historic sources of contamination on 7W are the responsibility of the USACE and are inaccessible, how will that information be added to this report and subsequent documents?
6	Page 15, paragraph 3	*The 1993 BRA concluded that the primary radioactive contaminants in soil and sediment at the SLDS were Ra-226, Th-232, Th-230, U-238, and U-235 and its decay products (including Ac-227 and Pa-231).*	This should also include Ra-228. The 1998a ROD states, "Soils at SLDS were characterized in the BRA as posing potentially unacceptable risks to human health and the environment due to the following MED/AEC related radiological COCs: Th-230, Th-232, Ra-226, Ra-228, U-235, U-238, and their respective decay products" (p. 38).
7	Page 19, paragraph 3	*Systematic or random sampling for metal PCOCs was not completed because it was expected that areas slated for biased sampling would best characterize any metal contaminants as metals have predominately been found commingled with radiological PCOCs in the accessible portions of SLDS.*	Page 43 of the RI Work Plan for the ISOU states that, "If the number of biased soil sampling locations is not adequate for risk assessment purposes (section 3.7.4.3), then locations proposed for systematic sampling will be also used." Please verify in the text that the biased sampling for metals was adequate for the risk assessment evaluation.
8	Page 27, paragraph 4	*The SLDS properties are currently zoned industrial, which does not allow new residential land use. The long-term plans by the city of St. Louis for the SLDS area are to retain the industrial uses, encourage the wholesale produce district, and phase out the remaining residential land uses located west of the SLDS.*	Please cite within the text where this information was obtained. Additionally please include the zoning excerpt in the appendices for regulators to review. The Department wants to ensure that residential areas are not allowed within this area since not all industrial zonings preclude residences.

			Additionally, if the USACE believes that the area will remain industrial, please state that the appropriate land use controls will be evaluated in the Feasibility Study.
9	Page 28, paragraph 4	*HU-B is one of the principal aquifers in the St. Louis area. It qualifies as a potential source of drinking water under the Guidelines for Ground-Water Classification under the EPA Ground-Water Protection Strategy (USEPA 1988b). However, expected future use of HU-B as a drinking water source at SLDS is highly unlikely for several reasons: the industrial setting, the site's proximity to the Mississippi and Missouri Rivers (i.e., major water supply sources), and the poor natural water quality of the HU-B.*	The USACE needs to state within the text that they are still evaluating the ground water under the 1998 ROD for the Accessible Soils and Ground Water Operable Units at the SLDS. Any conclusions regarding impacts to ground water are ongoing. Additionally, as stated in the 1998 ROD, the Department stated and reaffirms its statement that groundwater (in unit B) is a viable water source and must be protected to the extent that standard water treatment applications would be used to make the use acceptable as potable water.
10	Page 29, paragraph 3	*Overall, no potentially important habitats for biota occur either on-site or adjacent to the SLDS (DOE 1993).*	Please include a discussion on the information obtained from the ecological assessment of the site. Additionally, this statement may need modification depending on additional information requested in the ecological risk assessment (see comments 36-41).
11	Page 41, paragraph 4	*The preferential pathway investigation indicated that Ra-226, which decays to radon-222 (Rn-222), was at background concentrations. The systematic and biased samples collected beneath Building 25 during the RI have net Ra-226 concentrations less than 2 pCi/g. The Ra-226 results support the conclusion that elevated radon concentrations due to residual radium is not present at levels such that it could be of concern.*	Please explain within the text whether parent products (Th-230, U-238) of Ra-226 are at concentrations that could cause elevated concentrations of Ra-226 (and eventually Rn-222) in the future when they decay.
12	Page 42, paragraph 2	*Additional sampling adjacent to Building C and L*	Please explain why this additional sampling was

		may be required to vertically delineate contamination in this area for risk evaluation.	not performed during the RI process. If additional sampling is required, how will the sampling data and subsequent risk evaluation be presented to regulators for review?
13	Page 45, paragraph 1	*The RI WP- proposed sampling depth in this area was changed from 23 ft to approximately 6 ft, which is approximately the same depth below cover material of the accessible soil excavation near Building 510 (IT 2000).*	The RI WP specified that "all of the samples collected within the Building 510 footprint will be collected to a minimum depth of 6.9 m (23 ft) because the accessible soil within the 50-series excavation area was to this depth" (p. 64). The reason provided for not sampling to this depth is confusing. If the depth of accessible contamination in this area went to 23 ft, then inaccessible sampling in this area should also be to 23 ft.
14	Page 49, paragraph 5	*The analytical results and SOR_N values for each sample collected at Plant 2 during this RI are presented in Table E-7.*	Please change "Plant 2" to "Plant 3".
15	Page 65, paragraph 1	*Two biased soil sample locations proposed in the RI WP on the RR track at other areas adjacent to the accessible soil excavation areas were not collected but adequate samples exist along the RR track to evaluate the lateral extent to the west and east.*	Please provide a better description on which samples were not collected and the reason they were not collected per the RI WP.
16	Page 70, paragraph 4	*N/A*	Please put a space between "Figure" and "C-21".
17	Page 73, paragraph 2, Figure C-24	*Samples were also collected at several biased locations (SLD125237, SLD125241, SLD125245) in order to verify the radiological concentrations in three previous surface soil samples (SLD00963, SLD00975, and SLD00995) collected in 1999.*	Please explain the rationale for choosing resample locations for the samples collected in 1999. From Figure C-24, it appears that samples SLD125237 and SLD125245 were collected within approximately 12 feet of the 1999 sample. Sample SLD125241 appears to have been collected more than 25 ft from the 1999 sample. Please explain how sample SLD125241 is representative of the 1999 sample being 25 ft from it when the other two samples were taken

		Due to an oversight in the field, metal samples from four locations along Mallinckrodt Street were not collected, per the RI WP.	closer to their respective samples. Please explain in the text the impact of not having these results, whether or not a data gap for metals exists in this area and whether metal sampling is needed.
18	Page 76, paragraph 5	*At two locations, SLD120223 and SLD120227 (Figure C-28), soil samples were only able to be collected to a depth of approximately 3 to 4 ft (as opposed to the planned 6 ft depth) because of auger refusal or because soil was saturated.*	Provide an explanation within the text on the impact of the missing samples and whether contamination is suspected at deeper depths.
19	Page 78-79, Table 4-4	*N/A*	Suggest adding a footnote for the values that exceed the screening level but where background has not yet been subtracted.
20	Page 81, paragraph 3	*Building 506 was proposed for a scoping survey but, upon field inspection, the building was determined to be new construction and is located approximately 25 ft to the south of the original location.*	Please provide additional information within the text on approximately when the building was constructed.
21	Page 96, paragraph 2	*This sewer line is located approximately 9 to 10 ft bgs, and the contamination extends from approximately 7 to 12 ft bgs.*	Page 93 of the text states, "Concentrations of radionuclides detected in samples from SLD124540 were highest in the deepest sample, thus indicating that the vertical extent of contamination in this boring is not fully defined." Please correct the text to clarify whether contamination may extend deeper than 12 ft bgs. Furthermore, does the USACE plan to fully characterize the vertical contamination in this area?
22	Page 103, paragraph 2	*Future soil sampling is planned adjacent to the 30-in sewer line during remediation activities that are currently being conducted under the 1998 ROD in an area immediately east of the RR tracks. Because the recent samples are in closer proximity to*	When this information is obtained, please share the results with both the USEPA and MDNR staff for review. If the results differ significantly from the 2006 data, how will it be included in the RI and risk assessment process?

		inaccessible portion of the sewer line underlying the tracks than the 2006 samples, they will replace the 2006 soil data when their analytical results become available. At that time, the portion of the 30-in sewer beneath the BNSF RR line will be re-evaluated by comparing the recent sampling results to the RI screening levels for radiological and metal PCOCs.	
23	Page 103, paragraph 3	*However, the concrete cradle may have limited or prevented the migration of radiological COCs from the sewer into the surrounding soil.*	This statement is assuming that the concrete cradle is intact and does not have any leaking cracks. If this is correct, please clarify the text to state such.
24	Page 116, Section 5.1.1 Inaccessible Soil Associated Buildings and Structures	*N/A*	Please explain why the areas listed in this section do not include all areas mentioned in Table 4-8. For example, inaccessible radiological contamination was located under building 25 on Plant 1, yet is not listed in this section.

25	Page 123, paragraph 2	*Aside from particulate emissions, gaseous emissions of Rn-222, a decay product of Ra-226, could occur from all inaccessible soil areas. However, given the relatively low levels of site-related Ra-226 concentrations measured in the soil, site-related Rn-222 is not considered to be significant, and therefore, was not investigated during the RI.*	Additional information is needed in this section in order to support the statement that Rn-222 is not considered significant and will not need further investigation under this RI. The USACE needs to have an in-depth discussion within the text, including: • An analysis of the current concentrations of Ra-226 in the soil. • What concentration of Ra-226 is considered significant vs. non-significant. • How the USACE determined the point where the concentration of Ra-226 becomes significant vs. non-significant. • If there is or isn't a significant migration pathway for Rn-222 in the soil. • Calculations showing whether Th-230 and U-238 will decay overtime to Ra-226 in concentrations that will result in elevated concentrations of Rn-222 that could pose a human health hazard.
26	Page 123, paragraph 4	*Elevated activities measured on exterior building/structure surfaces are essentially fixed and are not expected to be removable.*	What does "essentially fixed" mean? The text needs to be modified to clarify what is meant by this statement. If the contamination is not currently removable but can become airborne in the future through oxidation or weathering of material then please state that in the text.
27	Page 123, Section 5.2.2	*N/A*	This section discusses potential impacts if inaccessible contamination leached into ground water. Any inaccessible soil contamination that leaches into ground water would fall under the 1998 ROD for accessible soils and groundwater and would be evaluated accordingly.

28	Page 125, paragraph 2	*Surface water is this arec would run directly into the Mississippi River.*	Last sentence, change "Surface water is" to "Surface water in".
29	Page 130, paragraph 4	*N/A*	Change C03 to CO3
30	Page 138, last paragraph	*For consistency with the 1998a ROD....*	Please state within the text whether these values are also still relevant to the current and anticipated future site scenarios.
31	Page 143-144, Sections 6.1.2.4 Page K-15-K16, HHRA, Sections K2.3.2.4	*N/A*	From reviewing the CSM presented in Figure A-1 of the RI Work Plan, the maintenance worker appears to have potentially complete and significant exposure pathways from both inaccessible contaminated soil and contaminated drains/sewers. The Department understood this to mean that the maintenance worker would be exposed to contaminated soil adjacent to sewer lines and contaminated sediment inside sewer lines. The Department believes that the risk assessment for the Sewer Maintenance worker should have both exposure pathways evaluated together as presented in the CSM instead of only from contaminated sediments in sewer lines.
32	Page 158, Section 7.3.2	*N/A*	The Remedial Action Objectives (RAOs) assume that the contaminated soil and sediment within this operable unit does not become accessible in the future. The upcoming Feasibility Study should have a discussion on what actions will occur if inaccessible soils become accessible, including an evaluation of land use controls, soil management plans, institutional control layers, and information tools.
33	Figure C-7	*N/A*	The figure indicates that the administration building has contamination above screening level criteria. The text stated that when background

			was subtracted from the value, the concentration was less than the screening level. Please correct Figure C-7 or the text.
34	Figure C-23	*N/A*	From looking at Figure C-24, it appears that the eastern section of Former Salisbury Street Roadbed is not inaccessible. Please confirm that this is correct or if the map needs to be corrected. If the area is accessible, please explain why samples (SLD125279 and sLD125283) were taken in this location and the data used in the risk assessment. That is, if the area is accessible and contamination exists under it, then it should be remediated under the 1998a ROD and not be included in this RI.
35	Figure C-24	*N/A*	From looking at Figure C-24, it appears that the eastern section of Mallinckrodt Street by building 502 is not inaccessible. Please confirm that this is correct or if the map needs to be corrected. If the area is accessible, please explain why samples (SLD125241, SLD125245, SLD125249, and SLD125253) were taken in this location and the data used in the risk assessment. That is, if the area is accessible and contamination exists under it, then it should be remediated under the 1998a ROD and not be included in this RI.
36	Ecological Assessment Page K-41 through K-44 and Appendix R	*N/A*	The Department believes that the Ecological Assessment is not adequate and needs to be rewritten as a formal screening ecological risk assessment. More information needs to be included to explain why there are not complete pathways for receptors. For example, the assessment and checklist do not explain why deep-rooted trees such as sycamores and cottonwoods, which send roots into the water

			table, cannot uptake radionuclides from inaccessible areas. Additionally, the assessment and checklist do not discuss whether burrowing animals such as ground hogs, moles, etc. could come into contact with inaccessible soils.
37	Appendix R Page 3, Question 20 and	*The use of ground water for potable water is prohibited by the City of St. Louis.*	Please include within the text that the 1998 ROD for SLDS stated that ground water in unit B (HU-B) qualifies as a potential drinking water source under EPA guidelines.
38	Page 4, last paragraph	*Finally, there is no evidence of significant ground-water migration offsite to more sensitive aquatic habitats.*	Ground water does migrate offsite because it flows easterly towards the Mississippi River. HU-B, which flows through the site, flows easterly and is hydraulically connected to the Mississippi River. Therefore, this statement needs to be rewritten to clarify what is meant by this. If the USACE meant to state that there is no evidence of ground water contamination offsite, then this statement also needs to be modified. The ground water evaluation, which is a part of the 1998 ROD (accessible soils and groundwater), has not been completed for the site. The Department feels that such a statement should not be included until the ground water evaluation is completed per the 1998 ROD.
39	Appendix R, Page 11, Question 4	*The site could provide limited habitat to urban-adopted migratory bird species such as robins.*	Killdeer have been witnessed to nest on areas of DT-2 (City Property).
40	Appendix R, Page 11, Question 3	*Migration of contaminants from inaccessible soil is limited since most of these soils are covered by buildings, pavement or other impervious materials.*	The Department believes that migration of contaminants to ecological receptors needs to be evaluated in greater detail. The USACE needs to evaluate the potential exposure pathways from: • Uptake by tree roots (especially deep-rooted trees).

			• Burrowing animals (ground hogs, beavers). • Worms and insects that can be eaten by bird species.
41	Appendix R, Page 12, Question 8	*While it is possible that chemicals found on the site could leach or dissolve into ground water, there is no open pathway for ecological receptors due to the depth to ground water and the general lack of sensitive receptors.*	This does not evaluate the potential for tree roots to uptake contaminants from ground water and expose receptors if contaminants concentrate in the plants' leaves, bark, etc.

MDNR Division of Geology and Land Survey Comments on the SLDS RI/BRA for the Inaccessible Soils Operable Unit

Comment #	Page/Paragraph	Comment
1	General	There were some samples that were not collected according to the work plan. Some sample locations were moved based upon site conditions; however, some samples or surveys were not conducted. Samples and/or surveying was not completed at the following locations: curb containment west of Building 8 in Plant 1; containment pad southeast of Building 6 in Plant 1; Building 123 in Plant 6E; salt domes at DT-4; AT&T complex at DT-6; and Mallinckrodt Street. All sampling and surveying deviations from the work plan should have detailed evaluations and discussions in the report that include the reason for the deviation and any impacts upon the risk assessment or RI conclusion.

AR-012