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DEPARTMENT OF THE ARMY
ST. LOUIS DISTRICT, CORPS OF ENGINEERS
8945 LATTY AVENUE
BERKELEY, MISSOURI 63134

September 26, 2012

REPLY TO
ATTENTION OF

Formerly Utilized Sites Remedial Action Program (FUSRAP)

SUBJECT: Remedial Investigation and Baseline Risk Assessment Report for the Inaccessible Soil Operable Unit at the St. Louis Downtown Site
Final dated September 20, 2012

Mr. Matthew Jefferson
U.S. Environmental Protection Agency
Region VII, Superfund Branch
901 North Fifth Street
Kansas City, Kansas 66101-2907

Dear Mr. Jefferson:

Enclosed is a copy of the subject final document, one CD containing the document and the responses to comments. Copies of this document are also being provided to Mr. Branden Doster and Mr. Eric Gilstrap (Missouri Department of Natural Resources), Ms. Karen Burke (Covidien) and Dr. Robin Rodriguez (Chamberlain Group Ltd).

This Final document supersedes any prior version. Earlier versions should be destroyed. If you have any questions regarding this document, please contact Ms. Jo Anne Wade at (314) 260-3912 or josephine.a.wade@usace.army.mil.

Sincerely,

Sharon R. Cotner
FUSRAP Program Manager

Enclosure

USEPA Comments on the SLDS Remedial Investigation and Baseline Risk Assessment, Draft Final, dated July 26, 2012

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1.	General	a) Even though sections in the text and appendices have been revised to include new language on the ecological risk assessment, the Draft Final Remedial Investigation still does not follow EPA's 1998 ecological risk guidance and, therefore, the document does not comply with the requirement under the NCP in section 300.430(d)(4) and Section IX Paragraph A(1) of the St Louis FUSRAP Federal Facilities Agreement (Docket VII-F-0005). Please refer to the specific comments in the EPA memorandum from Catherine Wooster-Brown to Matthew Jefferson dated July 16, 2012 which is enclosed in this letter. These sections of the document must be revised to be consistent with the 1998 EPA ecological risk guidance, the NCP, and the Federal Facilities Agreement.	USEPA	a) In response to this comment, as well as to the "General Comments" and the first comment (bullet) under the "Recommendations" section of the USEPA memorandum from Catherine Wooster-Brown to Matthew Jefferson dated July 16, 2012, the Ecological Assessment section (Sections 6.2 and K3.0) previously presented in the Draft Final RI/BRA Report (dated July 26, 2012) has been revised to follow the applicable SLERA steps presented in USEPA's (1997) *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments, Interim Final.* This revision was discussed and agreed upon between USACE and the USEPA during a teleconference on August 28, 2012. The new SLERA has been prepared as part of the Final RI/BRA document and meets the requirements under the NCP in section 300.430(d)(4) and Section IX Paragraph A(1) of the St Louis FUSRAP Federal Facilities Agreement (Docket VII-F-0005). The following responses address other comments posed by Ms. Wooster Brown in the USEPA memorandum: **<u>USACE Response to USEPA Memorandum General Comments Regarding the Issue of Coldwater Creek:</u>** As explained by USACE during the August 28th teleconference, Coldwater Creek (CWC) is not physically part of the ISOU, nor is it part of the SLDS. All past and current work by the USACE at CWC is being conducted under the 2005 *Record of Decision for the North St. Louis*

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				County Sites, which governs an operable unit that is separate from the ISOU. The USACE understands how the activities at SLDS can be confused with activities being conducted within the much larger context of all of the St. Louis Sites (SLS). During the August 28th teleconference, USEPA requested clarifying text in the RI/BRA that better defines the framework of all of the St. Louis Sites (SLS) and OUs relative to each other. Therefore, in response to these requests, the following changes have been made to alleviate confusion associated with SLS framework: The second paragraph of Section 1.0 changed to *"The SLDS is one of two separate geographical areas collectively referred to as the St. Louis Sites (SLS). These two areas are comprised of multiple properties and are located in two distinct areas: downtown St. Louis City and North St. Louis County (NC) (Figure 1-1). These two areas are designated as the SLDS and the NC sites, respectively. The SLDS is divided into two operable units (OUs), one for accessible soil and ground water and another for inaccessible soil. This RI/BRA applies only to the SLDS ISOU."* The third paragraph of Section 1.1 changed to *"In accordance with 40 Code of Federal Regulations (CFR) 300.430(a)(ii)(A), the CERCLA process may be completed in OUs when phased analysis and response is*

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				necessary or appropriate given the size or complexity of the site or to expedite site cleanup. The Record of Decision for the St. Louis Downtown Site (USACE 1998a) (hereafter referred to as the 1998 ROD), addressed accessible soil and ground-water contamination as one OU. The other OU (i.e., the ISOU), which this RI/BRA covers, includes soil and sediment at SLDS not addressed by the 1998 ROD that have the potential for MED/AEC contamination, as further described in Section 1.1.2." The first paragraph of Section 1.1.2 changed to *"The scope of the ISOU includes all media at the SLDS not covered by the 1998 ROD that may have become contaminated as a result of the deposition or migration of MED/AEC-related contaminated media. A conceptual view of the inaccessible areas is shown on Figure 1-2."* In addition the location of Coldwater Creek is now labeled on Figure 1-1 to clarify its location in relationship to the SLDS and the NC sites and a conceptual view of the inaccessible areas was added to Figure 1-2. **USACE Responses to USEPA Memorandum Recommendations:** • *USEPA Recommendation (first bullet)*: A Screening Level Ecological Risk Assessment needs to be performed according to the EPA (1998) guidance. *USACE Response:* Please refer to the first

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				paragraph of this response to USEPA comment 1a above regarding revisions made to the Ecological Assessment in Final RI/BRA. • *EPA Recommendation (second bullet)*: Surface water is a data gap for both the ditches on the property (surface water samples need to collected during a rain event) and Coldwater Creek. *USACE Response:* All ISOU surface water generally occurs as intermittent runoffs created as a result of precipitation events, and is captured by storm sewers. All storm sewers direct water flow to the Bissell Metropolitan Sewer District (MSD) plant for treatment. No creeks exist at the SLDS, though a ditch exists at DT-9 through which some water flow occurs, but only on an intermittent basis. There is no direct or open discharge of surface runoff or storm sewer flow into any offsite creeks or the Mississippi River. As discussed during the August 28th teleconference, surface water from CWC is not within the ISOU scope. • *EPA Recommendation (third bullet)*: The SLDS data is 20 years old and recent up to date data are needed including sediment from the Mississippi River (USACE, 1998). *USACE Response:* The main source of data used for the RI/BRA Report resulted from ISOU RI sampling during 2009 and 2010. Much of the 20-year old data referred to by

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				the reviewer is not applicable because the data were associated with the accessible soil operable unit and 1998 *Record of Decision for the St. Louis Downtown Site*. In a minimal number of cases though, older data from unremediated areas were used to show lateral extent of contamination. As discussed during the August 28th teleconference, the Mississippi River is not covered under the ISOU scope. The only sediment applicable to the ISOU is sediment collected from the sewers. • *EPA Recommendation (fourth bullet)*: Radionuclide sediment data from Coldwater Creek and the Mississippi River needs to be collected and analyzed. According to the Ecological Benchmarks for Radionuclides Thorium-230 is elevated (EPA, 2008) as well as sediment that was collected in storm water systems (USACE, 1998). *USACE Response:* The Mississippi River and CWC are not covered under the ISOU scope (please see the responses to the General Comments and second Recommendation bullet above.) In addition, sediment from the Mississippi River adjacent to the SLDS was investigated under the Accessible Soils ROD and relevant data can be furnished under separate correspondence. The only sediment applicable to the ISOU is sediment collected from the sewers. No receptors of

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		b) As specified in the attached EPA memorandum, the forth recommendation states that a Screening Level Risk Assessment per the 1998 ecological risk assessment guidance be performed at the Mississippi River and Coldwater Creek. EPA acknowledges that this request is outside the scope of the inaccessible soils remedial investigation work plan. If the accessible soil operable unit of the St. Louis Downtown sites and the entire North County sites do not adhere to the 1998 EPA ecological risk guidance, then ecological risk will need to be revisited. EPA suggests the screenings be included as a part of the 2013 Five Year Review.		concern inhabit the sewers, so there are no complete ecological exposure pathways for the sewers. b) As discussed in the response to comment 1a (above), ecological risk issues associated with the Mississippi River, CWC, the North County sites, and the SLDS accessible soil OU are separate from the ISOU and are being evaluated relative to the existing North County and SLDS RODs. The potential for changes to existing ecological risk assessments conducted under those RODs will be addressed as needed during the respective Five-Year Reviews. Also, as discussed during the August 28, 2012 teleconference, a copy of the North County Ecological Risk Assessment was recently provided to USEPA.
2.	Section 1.2.1, fourth paragraph:	This paragraph has been revised, but there was no request for a revision from EPA and the revised text was not presented in the redline document. The revision added text describing a fertilizer company (DT-37) and that this company handled "potash, fertilizer, and bauxite, that are known to contain naturally occurring radioactive material (NORM) and exhibit radiation levels above background soil." This revised text should also be accompanied by a citation of a published reference showing concurrence with the statement regarding the presence of NORM in these materials.	USEPA	The following references were cited at the end of the paragraph and included in the reference section. "USEPA 1999d, *Background Report on Fertilizer Use, Contaminants and Regulations*, United States Environmental Protection Agency, January. NCRP 1995, *Radiation Exposure of the U.S. Population from Consumer Products and Miscellaneous Sources*. NCRP Report No. 95. Bethesda, MD: National Council on Radiation Protection and Measurements, June."

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		Please revise the text as appropriate.		
3.	Section 1.2.1, sixth paragraph:	This paragraph has been revised, but there was no request for a revision from EPA and the revised text was not presented in the redline document. The revision added text to describe materials that comprise a typical section of RR track as consisting of a ballast of "crushed stone, including materials such as granite that contain NORM." Further, these NORM constituents "are similar to the radiological PCOCs at the SLDS, so railroads can contain radioactive materials irrespective of historical MED/AEC activities." There is also an addition of text regarding arsenic, saying that "RR ties constructed of lumber treated with arsenic could act as a potential source of arsenic contamination." The addition of this information should be accompanied by citation of a published reference(s) showing concurrence with all of the statements. Please also provide a citation that describes arsenicals as the chemical typically used for preservatives of RR ties – a cursory internet search on RR tie preservatives seems to indicate that most are preserved with creosote, not arsenicals. A citation of a published reference stating that most ties are preserved with arsenicals	USEPA	The following reference was cited at the end of the paragraph and included in reference section. "NCRP 1995, *Radiation Exposure of the U.S. Population from Consumer Products and Miscellaneous Sources*. NCRP Report No. 95. Bethesda, MD: National Council on Radiation Protection and Measurements, June." The fact that some, not necessarily all or even most, of the RR ties could have been treated with arsenic leads to the fact that the RR ties could be a potential source of arsenic contamination. The following reference was cited at the end of the paragraph and included reference section. "MassDEP 2003. Massachusetts Department of Environmental Protection. "*Best Management Practices for Controlling Exposure to Soil during the Development of Rail Trails.*" Massachusetts Department of Environmental Protection, Commonwealth of Massachusetts Executive Office of Environmental Affairs. Found on the World Wide Web at:

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		should also be provided here.		http://www.mass.gov/dep/cleanup/laws/railtrai.pdf"
4.	Section 1.2.1, ninth paragraph:	This is a new paragraph, not found in the red-lined version, and not requested in EPA's comments on the November 2011 draft RI. It discusses buildings constructed on the Mallinckrodt property in the early 1900's that may be sources of non-MED/AEC contamination as a result of past building practices. It cites lead paint and lead pipes in buildings; arsenic used as a wood preservative on building exterior structures; and the uses of granite and building stone that may be sources of NORM. As in comments 5 and 6 above, please provide citations of published references to support the theory of historical building components that may be sources of site contamination.	USEPA	Paragraph changed to *"Many of the buildings on the Mallinckrodt property were constructed in the early 1900s, prior to MED/AEC operations. The buildings at the SLDS are constructed of a variety of materials, including wood, concrete, brick, granite, and other types of building stone. Portions of some of the buildings were constructed with materials such as granite, brick, ceramics, and some types of concrete, which exhibit naturally occurring elevated radioactivity (NCRP 1995)."*
5.	Section 1.2.2, twelfth paragraph:	This is a new paragraph, not found in the red-lined version, and not requested in EPA's comments on the November 2011 draft RI. It discusses the sewer system, prior to Dec. 1970. That Mallinckrodt property sewers were constructed of vitrified clay pipe and vitrified brick, which was sealed with bituminous tar or cementitious materials; but, that is was possible that some portions of the sewer system "could have had lead as a component." Further, that the "bedding material commonly used during this era was granulated rock material, but some	USEPA	The statement has been revised as follows: *"Sewers at the Mallinckrodt property were predominantly constructed from vitrified clay pipe (VCP) and vitrified brick sealed with bituminous tar or cementitious materials, but portions of the plumbing system (i.e., smaller diameter pipes within buildings that drain to the sewer) could have had lead as a component. Lead pipes and/or lead-based solder at piping connections are often found in older buildings (MDNR 2010).* The following reference has been added to the reference list: MDNR, 2010. *Lead in Drinking Water: Important Information on How to Protect Your Health,* Water

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		sewers may have been constructed without any bedding material." Please revise to include citations of published references supporting the clay pipe brick as containing NORM and lead components.		Protection Program, PUB2409, December. No statement was made that the clay pipe brick contained NORM.
6.	Table 1-2, second row:	The new version removes the following bullet item from the second column: "installed one additional groundwater monitoring well." Please explain why this bullet was deleted.	USEPA	The number of ground-water wells in bullet #4 was changed from "eight" to "nine" and the referenced bullet was deleted.
7.	Section 2.2.2, a missing paragraph:	The paragraph following the equation (paragraph six) has been omitted from the redline version. The missing text had stated that "structures exhibiting fixed-point measurements exceeding the gross alpha screening level of 3,900 dpm/100 cm^2 was subjected to additional evaluation to determine the extent of contamination." Please verify if removal of this paragraph was appropriate, or, if as indicated in the USACE response to Comment 36, has this information been moved to Appendix S?	USEPA	The paragraph was removed as the screening level for structural surfaces was revised from 3,900 dpm/100cm^2 in the RI WP and the November 2011 version of the RI Report to 130 dpm/100cm^2 for internal surfaces and 3,200 dpm/100cm^2 for external surfaces in the July 26th revision of the RI Report. The derivation of the revised structural surface PRGs is detailed in Appendix S.
8.	Section 2.2.3.1, a missing paragraph:	There is a paragraph missing from between paragraphs 2 and 3. In the red-lined version, this paragraph stated that "All samples were field-screened for organics using a photoionization detector (PID) or similar device and for external radiation using a gamma/beta detector." Does removal of this statement mean that field-screening with said equipment was not	USEPA	The paragraph was moved to be the last sentence of the second paragraph of Section 2.2.3.1 (page 24): *"All samples were field-screened for organics using a photoionization detector (PID) or similar device and for external radiation using a NaI gamma radiation detector or instrument of equal or greater sensitivity."*

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		performed? Please provide verification that removal of this paragraph was appropriate.		
9.	Section 4.1, second paragraph:	The use of PRGs is presented here as a means to evaluate the nature and extent of contamination. However, comparing site contaminant data to PRGs is also the method by which COPCs are selected for quantification in the risk assessment. Please revise to include this information.	USEPA	The third paragraph of Section 4.1 addresses the fact that the risk-based PRGs are used for identifying COPCs for quantitative evaluations in the BRA as follows: *"PCOCs detected in an ISOU medium with at least one concentration exceeding the corresponding PRGs are being retained for further quantitative evaluations in the BRA as COPCs. One set of sitewide COPCs is being identified for each ISOU medium that will be applied to all sitewide and property-specific evaluations being conducted in the BRA except for metals COPCs in inaccessible soil. The metals COPCs in inaccessible soil will be applied to the uranium-ore processing area and the individual properties in the uranium-ore processing area."* No change was made.
10.	Section 4.2, fourth paragraph, last sentence:	The last portion of this sentence states that Appendix E contains "figures identifying sample locations". Are these the same soil samples "shown on figures provided in Appendices C and E" described in the second sentence of this paragraph? Please revise for clarity and to remove redundancy.	USEPA	Second sentence deleted, paragraph changed to *"The results of the RI sampling for inaccessible soil are discussed sitewide on a PCOC basis. The distribution of samples exceeding the PRG by PCOC is presented in Appendix C. The GWS data collected for each inaccessible soil area are presented in Appendix D. The analytical results for soil sampling are presented in Appendix E, along with figures identifying sample locations on a property-by-property basis."*
11.	Section 4.2 (Inaccessib	The presentation of results for the Nature and Extent of Contamination is	USEPA	In the previous revision (November 2011), the areas/buildings at each property having sample

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	le Soil), 4.3 (Buildings and Structures), and 4.4 (Sewers):	significantly different from what was presented in the previous version of this report. In the previous version of the RI, each site/VP was discussed in its own section, with all accompanying figures and tables. This new presentation is more representative of a "data dump", rather than a thorough discussion of the nature and extent of contamination at each area. EPA did not request that this new approach be utilized; hence, it is baffling as to why the entire previous approach was scrapped in favor of this summarized approach. The previous approach was comprehensive to provide a link between site activities and history to the current RI results, and, importantly, also was consistent with EPA's *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (EPA, 1988). The previous approach also nicely tied in the exterior soil sample results at each site with analytical results related to site buildings/structures, as well as to the site sewers and associated soil. Unfortunately, with this new approach, all of this perspective is now lost.		results that exceeded the screening levels were discussed. In the July 26, 2012 revision, the radiological screening levels had been replaced with USEPA's risk-based generic preliminary remediation goals (PRGs) for outdoor worker exposures to soil (dated August 2010), targeting a cancer risk of 1E-06 as suggested by the USEPA. This resulted in every sample location having an exceedance of the PRGs. Therefore the written description in the November 2011 was replaced by a high level summary and new Appendix C figures that show the distribution of the sample locations exceeding the PRG by PCOC in the July 26, 2012 version.
		Is it anticipated that this new approach will somehow better facilitate the Feasibility Study (FS) efforts and any decision document after that?		The revised RI Report provides a thorough discussion of the nature and extent of contamination. The nature and extent section was rewritten to increase the readability of the RI Report in light of the fact that use of the more conservative PRGs results in every area being

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				carried forward to the Baseline Risk Assessment.
		EPA requests that the ISOU RI Report be revised to include the more comprehensive approach of the Nature and Extent of Contamination sections, as presented in the November 2011 document.		No changes made.
12.	Section 5.2.1.2:	This section is new to the report. The point of this section, that there are only two buildings in which the concentration of Ra-222 could be of concern, is well taken. There is active radon monitoring in these two buildings to answer this question. However, the sentence describing radon 222 as a radioactive decay product of U 238 is confusingly written. Please revise for clarity.	USEPA	The third sentence of the second paragraph changed to *"Additionally, Th-230 (which decays to Ra-226) is not considered significant unless average Th-230 concentrations above background exceed 14 pCi/g in surface soil and/or 43 pCi/g in subsurface soil, which would result in a buildup of Ra-226 to levels exceeding 40 CFR 192.12(a) levels (i.e., 5 pCi/g in surface soil and/or 15 pCi/g in subsurface soil) over a 1,000 year period."*
13.	Regarding EPA Comment #47:	Table 5-3 and text have been added as a result of this comment. Please revise the text accompanying this table to further explain the values presented in column three, "Predicted Site-Specific Kc Values". Specifically, it appears as though a range of Kd values is presented (from USEPA lookup tables); however, there is no explanation defining the numerical value presented just below this range. Is this some mean or median value? Please explain what this value represents and how it was derived. Also, please revise the text to indicate what information was derived	USEPA	The basis for the predicted K_d value is explained in column 4, and depends on the available data for the particular COC. For cadmium, thorium, and radium, the single numerical value presented below the range in column 3 is the geometric mean of the range of values presented in Sheppard and Thibault for clay-rich soil. For arsenic, it is the geometric mean of the values provided in an EPA guidance document. (The EPA guidance document was used because Sheppard and Thibault did not have any arsenic values.) For uranium, a site-specific uranium Kd value for SLDS was used as the predicted value. Text has been added to Table 5-3 to clarify the basis of each predicted K_d value and to

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		from the Sheppard and Thibault, 1990 paper.		add more data from Sheppard and Thibault (i.e., a Pb value, and ranges of K_d values for clay-rich soil for Cd and Th). Text has been added to column 5 (references) to specify which values were obtained from the Sheppard and Thibault 1990 paper. As noted above, this reference (mainly Tables 1 and A-3, which list clay soil Kd values) provides the basis for the majority of the predicted K_d values listed in Table 5-3.
14.	Section 6.1.2, second paragraph, second-to-last sentence:	For consistency, please revise the text to insert the target CR range, 1E-06 to 1E-04, into this sentence. Also, please insert "the target HI of" before "1.0".	USEPA	The cited sentence has been revised to read as follows: *"As stated previously, the resulting doses, CRs, and HIs were compared to the target criteria of 25 mrem/yr, the USEPA's target CR range of 1.0E-06 to 1.0E-04, and USEPA's target HI of 1.0."*
15.	Section 6.1.2, sixth paragraph, first sentence:	For consistency, please revise the text to insert the target CR range into this sentence.	USEPA	The cited sentence has been revised to read as follows: *"During characterization discussions, comparisons are made versus the target dose of 25 mrem/yr, USEPA's target CR range of 1.0E-06 to 1.0E-04, and USEPA's target HI of 1.0;..."*
16.	Section 6.1.2, sixth paragraph and rad risk results tables:	In the previous version of this report, rad risk results greater than the target dose and the CR risk range were highlighted by grey-shading the cells. In this new version, these results are not highlighted, and the accompanying text of the sixth paragraph explicitly states that exceedances are only discussed in the text. It is a benefit to the reader to keep the grey-shading of cells in	USEPA	Clarification, while the tables show all of the results, only those dose and CR values that exceed the target dose and the USEPA's target CR range are presented in text. No changes made to document.

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		the results tables for perspective on which sites are showing exceedances. Please revise the tables to provide the shading.		
17.	Section 6.1, first paragraph:	The scope of the HHRA, as described in the second and third sentences of this section, mirrors the objectives presented in Section 1.1.2, Operable Unit Scope, as being limited to "inaccessible soil, soil on interior and exterior building / structural surfaces, sewer sediment, and soil adjacent to sewer lines". However, the bullets listed with paragraph one of Section 6.1 include industrial workers and recreational users exposed to "combined inaccessible and accessible soil", in addition to inaccessible soil. While combining inaccessible and accessible soil was shown in the November 2011 version of this RI report, it does appear that providing this additional evaluation is not within the scope or objectives of this specific RI effort. Accessible soils have been evaluated in previous efforts and this RI report should be limited to a presentation of the inaccessible soils investigation and evaluation.	USEPA	While the scope of the HHRA is the inaccessible soil, the combined evaluation shows the actual risk for the receptors at the property for informational purposes. All decisions on the COPCs that will become COCs for the FS evaluations, along with areas requiring remedial action in the FS, will be based on the inaccessible soil results.
18.	Section 7.3.1, third paragraph, fourth sentence:	For consistency, please revise the text to insert the target CR range into this sentence.	USEPA	The cited sentence has been revised to read as follows: *"The doses and CRs presented in the aforementioned tables are those above background that are greater than the target dose of 25 mrem/yr and that are within or exceed the USEPA's target CR range of 1.0E-06 to 1.0E-04."*

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19.	Section 7.4, first paragraph:	Please revise the text to also provide a summary list of specific radionuclides and specific metals deemed to be COCs driving the risks, thereby warranting further evaluation in the FS.	USEPA	The following information was added to the cited paragraph: *"The COCs driving risk in inaccessible soil include: Ac-227, Pa-231, Ra-226, Ra-228, Th-230, Th-232, U-235, U-238, and arsenic. There are no COCs for soil on building/structural surfaces or for sewer sediment. The following radiological COCs were identified for soil adjacent to sewer line at Plant7/DT-12 (per sewer excavation data at locations SLD93275 and SLD93277): Ac-227, Pa-231, Ra-226, Ra-228, Th-230, and U-238. There no metal COCs identified for soil adjacent to sewer lines."*
20.	Section K2.1, second paragraph:	The text on page K-4 sets forth the end use of the data, i.e., to define the items to be addressed in the FS. It is very helpful to have an occasional overview statement which points beyond the torrent of data to the end use of that data.	USEPA	Acknowledged.
21.	Section K2.3.1.1, first sentence:	Please review this sentence. It appears to be a very long, run-on sentence, which includes a duplicate line. The duplicate line should be removed and the paragraph rewritten by splitting the first sentence in two. Please revise for clarity.	USEPA	For clarity, the text in Section K2.3.1.1 has been replaced with the following text: *"For all sitewide and property-specific inaccessible soil and combined inaccessible/accessible soil dose and risk evaluations, EPCs were first calculated separately for inaccessible soil and accessible soil, each of which are based on the lesser of the 95 percent UCL or maximum detection. Rather, as described in Section K2.5.3, the resulting EPCs are used to determine risks and doses for inaccessible and accessible soil areas separately for each sitewide and property-specific scenario. Afterward, for any given property, or for SLDS (sitewide), the combined inaccessible/accessible soil doses and*

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				risks are finally determined as the area-weighted average of the doses and risks determined separately for the inaccessible and accessible soil areas. Therefore, combined inaccessible/accessible soil EPCs are never actually calculated. For metals, sitewide and property-specific EPCs for inaccessible and accessible soil areas are determined using data from only those properties within the boundary of the former uranium ore processing area. For properties through which the levee and St. Louis Riverfront Trail runs, only radiological data from DT-2, DT-9 Levee and DT-15 are used for calculating EPCs for inaccessible and accessible soil areas."
22.	Section K2.3.1.2, first paragraph, last sentence:	This sentence contains a comparison of "...the lesser of a measurement and the maximum gross alpha value...". The conjunction "and" should be replaced by the disjunction "or". The rule set forth is to use the lesser of one value or another value. Please revise for clarity.	USEPA	The recommended change has been applied globally.
23.	Section K2.3.1.3, first paragraph, second sentence:	The same mistake noted in comment #23 [22] above is found here. Please revise for clarity.	USEPA	The recommended change has been applied globally.
24.	Section K2.3.2, second	This bullet asserts that the Riverfront Trail users are primarily adolescents. How was this information ascertained? It is	USEPA	All references to recreational users of the Riverfront Trail as being adolescents have been removed. Recreational users were evaluated for

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	bullet:	suspected that the overwhelming number of users of this trail are adults. There might be a demographic breakdown of users available from www.Trailnet.org. Please verify for accuracy.		only radiological exposures and RESRAD does not differentiate among age groupings.
25.	Section K2.4.1, first paragraph, second sentence:	This is a seriously incorrect statement: "Because radiological exposures result in cancer....." This statement is both pejorative and factually wrong. The vast majority of radiological exposures result in no effect at all. The qualifier "may" should be added before "result" and the statement will be correct. As a side note, the three bullet items in this section are very well written.	USEPA	The cited sentence has been revised to read: "*Because radiological exposures may result in cancer...*"
26.	Section K2.4.2.5, second paragraph, last sentence:	This sentence contains a duplication error in the sentence ".....assuming that PbBs in women of child-bearing age reflect the geometric mean of a lognormal distribution of PbBs of women of child-bearing age." The sentence should be truncated after ".....lognormal distribution".....	USEPA	The cited sentence has been revised to read: *"The ALM describes the estimated relationship between the PbB in adult women and the corresponding 95th percentile fetal PbB, assuming that PbBs in women of child-bearing age reflect the geometric mean of a lognormal distribution."*
27.	Section S.2.2.1:	This section makes a very important point: the maximum dose for the thousand year period under consideration occurs in year zero. Despite daughter radioisotope ingrowth, which increases the dose from some radioisotopes, the total dose from all radioisotopes combined declines from year zero through the entire thousand years. This is an important fact and it is good to	USEPA	Acknowledged.

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		see it placed up front in the discussion.		
28.	Table S-5:	The text following Table S-5 sets forth both the methodology and the logic behind it. The process is transparent to the reader, which is excellent, and stands in sharp contrast to the preceding draft of the RI reviewed in December of 2011.	USEPA	Acknowledged.
29.	Editorial	Nowhere in the text are there definitions of the following terms: COPC, and COC. A definition, not merely an acronym description, is needed for each to ensure that the reader understands the concepts, and which term is appropriate given the steps of the RI / FS / HHRA process.	USEPA	The following definition of COPC has been added to Section 1.3 *"one or more contaminants found on, in or under a property that exceeds the initial site condition standards for the property".* The following definition of COC has been added to Section 1.1.1 *"one or more contaminants found on, in or under a property at a concentration that exceeds the applicable site condition standards for the property."*
30.	Editorial	Please do a global check throughout the document to search for "ground water", "ground-water", and "groundwater". This term appears all three ways throughout the document. Please revise to "groundwater" for consistency.	USEPA	Following past practice in FUSRAP documents, "ground water" (two words) is used when ground water is used as a noun. "Ground-water" (hyphenated) is used when ground water is used as an adjective. Groundwater (one word) is only used when it was the form used in the title of a reference document.
31.	Editorial	Acronym List: SLAPS has not yet been added to the Acronym List.	USEPA	"SLAPS" has been added to the acronym list.

Comment #	Page/Section /Paragraph	Comment	Reviewer	Response
32.	Section 1.3, Section 5.0: Executive Summary, page ES-3	The acronym PCOC appears in the text here for the first time. Please revise the report to provide the acronym definition. PCOC actually appears first in the Executive Summary, page ES-3, also without definition.	USEPA	PCOC is now defined on page 2 in Section 1.1. PCOC is defined on page ES-1 in second paragraph. Acronyms are redefined in the main text if they are used in the Executive Summary.
33.	Section 4.2, fourth paragraph, last sentence:	Please replace "sampling" with "samples".	USEPA	"Sampling" has been replaced with "samples."

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