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Responses to Missouri Department of Natural Resources (MDNR) Comments
on the Draft Final Engineering Evaluation/Cost Analysis
for the Proposed Removal Action at the Southeast Drainage
(March 1996)

1. Comment: *As noted in the MDNR's comment letter of December 29, 1995, and discussed with DOE/PMC staff on March 29,1996, the soils characterization data collected by the PMC during the December 1995 sampling effort needs to be included in the EE/CA to provide a more thorough understanding of the situation in the drainage and the remediation measures proposed.*

Response: A comprehensive set of data, including the results of the data collected in December 1995, are provided as an attachment to this comment response package. These data will be published in a separate document which will be referenced in the EE/CA. The risk analyses for the hunter and child scenarios in the EE/CA have been revised to incorporate these new additional data. These updated analyses, in addition to the requested calculations for the residential scenario, are summarized as follows:

| | Hunter | Child | Resident |
|---|---|---|---|
| Segment A | $1 \times 10^{-5}$ | $5 \times 10^{-5}$ | $5 \times 10^{-3}$ |
| Segment B | $2 \times 10^{-5}$ | $1 \times 10^{-4}$ | $7 \times 10^{-3}$ |
| Segment C | $2 \times 10^{-5}$ | $1 \times 10^{-4}$ | $9 \times 10^{-3}$ |
| Segment D | $1 \times 10^{-5}$ | $6 \times 10^{-5}$ | $4 \times 10^{-3}$ |

The radiological risks to the Hunter and Child are based on the scenarios as described in the draft EE/CA. For the resident scenario (which is not included in the draft EE/CA), it is assumed that an individual lives in the drainage 350 days per year, 24 hours per day (20 hours indoors and 4 hours outdoors), over a 30-year period. It was assumed that the residence would be built directly on top of a contaminated location in the drainage. The pathways addressed in this resident scenario included external gamma irradiation and ingestion of contaminated sediment. The ingestion rate of sediment was taken to be 100 mg/event (with one event occurring per day) consistent with guidance of the U.S. Environmental Protection Agency. For the gamma irradiation pathway, it was assumed that the individual would spend 25% of the time outdoors in a contaminated area in the drainage, and while indoors, the gamma radiation is reduced to 70% of the outdoor rate due to shielding afforded by the structure. Inhalation of contaminated particulates and radon gas and dermal exposure to contaminated sediment in the drainage were not included for the same reasons as presented in the EE/CA, and ingestion of food grown in contaminated soil was not addressed since it is not reasonable to plant a garden in the drainage.

Comment: *The data currently included in the EE/CA does not address if contamination exists on the ballast of the KATY Trail State Park or if the ENTIRE length of the Drainage was characterized (i.e. the portion of the drainage between the KATY Trail and its confluence with the Missouri River does not appear to have been characterized). As requested by the Division of State Parks staff during the January 23, 1996, meeting between the DOE, MDNR, MDOC, and the St. Charles Citizens Commission regarding the draft of the EE/CA, characterization of the ballast is needed to determine if Trail visitors are being exposed and to insure that all materials in the Drainage which pose an unacceptable risk are removed in one efficient removal action. (Refer to comments 1b and 13 of the MDNR December comment letter.)*

Response: A comprehensive gamma walkover survey was performed for the KATY Trail in the vicinity of the Southeast Drainage and areas south of the KATY Trail, including the ballast, from April 23-25, 1996. This survey did not did not show elevated gamma radiation levels, so samples were not collected for laboratory analysis.

2. Comment: *The EE/CA states that, "calculated risk-based concentrations" were derived. Clarification is needed as to how these concentrations will "guide" cleanup activities. What is the difference between concentrations that guide clean-up activities and "soil clean-up concentrations"? Will these concentrations be utilized for both surface and subsurface soils? (Refer to comment 23c of the MDNR December comment letter.)*

Response: The phrase "calculated risk-based concentrations" refers to the derivation of residual concentrations of contaminants in environmental media that would result in a specified level of risk. As used in the EE/CA, these concentrations are synonymous with cleanup criteria. The EE/CA will be revised to refer to these concentrations as cleanup criteria. Although these criteria were derived for surface soils, they will also be utilized for subsurface soils.

3. Comment: *As discussed during meetings held between the MDNR and DOE staffs on January 23, February 16, and March 15, 1996, a mass balance of water into and out of the watershed is needed. This mass balance would further define the connection between the groundwater and surface water and the influence of the contaminated sediments on the surface water. The characteristics of the watershed and the factors controlling erosion in this drainage is also needed to be able to determine the fate and transport of remaining contaminants and to determine erosion control devices to be utilized during remediation. (Refer to comments 1d, 3b, 7a, 7c, and 13 of the MDNR December comment letter.)*

Response: This calculation will be performed following additional input from the MDNR.

4. Comment: *The EE/CA does not address current or future (if the proposed removal action is instituted) risks to the environment. Section 2.3.4 of the report addresses ecological risks however this assessment is based solely on aquatic organisms and did not include an assessment of the risks to other animal life (such as mammals). An assessment to determine the risks to other animals is needed to provide a complete and thorough understanding of the proposed removal action and its affects. (Refer to comment 1g of the MDNR December comment letter.)*

Response: Because of the nature of the contaminated media in the drainage (sediment and surface water), aquatic biota were identified as the ecological receptors most likely to be exposed to contaminants and thus most at risk from current conditions in the drainage. In response to this comment, risks to terrestrial biota will be evaluated and incorporated into the EE/CA. Specifically, contaminant exposure and uptake will be evaluated for three terrestrial wildlife species: the white-tailed deer, the deer mouse, and the barred owl. The former two are herbivorous species that are likely to occur in or otherwise utilize the drainage. Contaminant uptake by these receptors will occur primarily through the ingestion of drinking water and vegetation. The barred owl is a top level predator that may forage in the drainage, and contaminant uptake by this species would occur primarily through the ingestion of contaminated smaller mammals.

5. *Comment: In a letter dated February 13, 1996, the DOE responded to the MDNR December comment letter regarding the EE/CA. Several of these responses need to be included in the EE/CA document and/or need to be revised in order to specifically address the MDNR comment or to provide further detail. These include the responses to the following comments from the MDNR December comment letter: 1c, 1h, 1i, 5a, 7c, 8, 11, 12, and 16.*

Comment 1c: *Clarification is needed regarding the term "natural uranium". Are there other than naturally occurring, i.e., synthetic or man-made? Is this statement implying that levels of uranium in the surface waters of the drainage are naturally occurring or "background"? What are the other contaminants of concern found within this drainage and addressed by this EE/CA?*

Response: As noted previously, the phrase "natural uranium" was used to describe the relative abundance of the three uranium isotopes present in uranium as found in nature. Uranium also can be enriched (having an increased amount of uranium-235) or depleted (having a reduced concentration of uranium-235). The radiological risk for all three uranium isotopes is comparable. To avoid any confusion associated with this phrase (such as implying that the concentrations of uranium in the surface waters of the drainage are at background levels, which they are not), this phrase will not be used in the EE/CA.

As noted previously, the contaminants of concern in the drainage are presented in Chapter 2 of the EE/CA. The risk calculations presented in the EE/CA addressed all of these contaminants.

Comment 1h: *Have the contaminated sediments been evaluated to determine if any treatment for stability is needed prior to disposal in the cell? If so, what factors were utilized to determine if treatment is necessary, and what type of treatment will be utilized? If the evaluation has not been made, we strongly suggest that it be performed.*

Response: No treatment for stability is expected to be necessary prior to disposal in the cell based on the very small volume that these sediments will occupy in the cell and their physical similarity to other materials that have been determined to not need stabilization (such as contaminated soil). If necessary, these sediments can be mixed with other materials (such as soil) to provide a more homogeneous material as it is placed in the cell. Evaluations on the physical form of these materials as it effects waste emplacement will be made after the sediment has been removed from the drainage and placed in temporary storage on-site.

Comment 1i: *A proposed schedule outlining the components of the remediation of the SE Drainage and tentative milestone dates is needed in this document.*

Response: A tentative start date (summer of 1997) was added to Chapter 6 of the EE/CA. It is not possible to identify more details at this time (such as tentative milestone dates) given the very preliminary nature of planning activities for remediation of this drainage at this time. The state of Missouri will be kept informed of all activities associated with planning and implementing this removal action.

Comment 5a: *Include the background concentrations of the radiological constituents for the drainage.*

Response: Background soil concentrations for the radioactive contaminants in the drainage will be added to Chapter 2 of the EE/CA.

Comment 7c: *Since the sources of contamination in the surface water of the drainage were removed in 1994, have samples collected in 1995 indicated an improvement in water quality? Why was data collected prior to 1990 considered not representative of current conditions?*

Response: Although certain sources of surface water contamination were removed in 1994 (principally the Imhoff tank and contaminated soil at the chemical plant within the watershed of the Southeast Drainage), the limited amount of spring water collected and analyzed since that time do not indicate an improvement in water quality. The major source of surface water contamination is likely the contaminated sediment within this drainage, and removal of this sediment as proposed in the EE/CA is expected to improve water quality in the long term. The risk calculations presented in the EE/CA have been redone to include all data, including that collected prior to 1990. It should be noted that these calculations indicate that drinking water from the drainage at its current concentrations would not result in an unacceptable risk.

Comment 8: *What is meant by the term, "consistently found" in reference to nitroaromatic compounds?*

Response: The term was meant to describe the high frequency (albeit low concentrations) with which nitroaromatic compounds were found during sampling events. The document has been revised to more accurately reflect the contamination conditions in the drainage in regards to nitroaromatic compounds. This term is no longer used in the EE/CA.

Comment 11: *Does the average area of contamination of about 100 sq. Ft. refer to the area within each segment, each "hot spot", or the entire drainage?*

Response: This area is considered to be representative of each single area of contamination in the drainage and was used in the external gamma irradiation dose calculation. As used in this comment, this area refers to each "hot spot" in the drainage.

Comment 12: *What sampling event is being referred to in the statement, "Any additional risks from dermal absorption of TNT would likely be small because of the very low concentrations of this substance in isolated drainage locations".*

Response: This statement does not reflect any individual sampling event but is an interpretation of contamination conditions (based on current data) with regards to the risks posed by dermal absorption of trinitrotoluene in the drainage.

Comment 16: *The MDNR does not agree with complying with ARARs only if it is "practicable", and dependent upon the "urgency of the situation". What is the urgency of the situation regarding the SE Drainage. This statement is at odds with the concept of ARARs.*

Response: This discussion in the EE/CA is meant to be a general description on the use of ARARs as applied to a removal action (as excerpted from the National Contingency Plan [40 CFR 300.415]). The "practicability" refers to the ability to conduct this action in accordance with preset conditions, such as removing contaminants to prescribed levels (given the environmental setting of the drainage) and the "urgency of the situation" refers to the timing of the proposed removal action (it must be conducted before the cell is closed). There is no urgency in regards to protecting human health.

6. Comment: *How will trees, root balls, and vegetation from contaminated areas be managed?*

Response: The above-ground portion of removed vegetation will be used for wildlife habitat, and will be located away from the stream channel to prevent stream blockage. The below-ground portion of removed vegetation will be transported in covered trucks to the contaminated wood storage area at the chemical plant. Based on similar activities previously conducted at the chemical plant and quarry areas, above-ground portions of vegetation are not expected to contain detectable concentrations of radionuclides. Below-ground portions are retained because of the difficulty in separating contaminated soils from vegetation debris.

Comment: *The DOE needs to be aware of the KATY Trail during remediation. This is of special concern as the existing schedule indicates that the removal action will take place during the early summer months, a time when the trail is heavily utilized.*

Response: The DOE appreciates this concern and will coordinate activities with the appropriate state and local agencies to minimize any disruption that remediation activities could present. There are currently no plans to use the KATY Trail as an access or haul road. If a decision is made to use the KATY Trail, the timing will be adjusted to conduct remedial activities in accordance with the seasonal requirements of MDNR Parks. In addition, recreational visitors will be informed of remedial activities and safety issues.

7. Comment: *A definition is needed of elevated levels of contaminants. How will areas which cannot be reached or removed by track vehicles be managed?*

Response: Elevated areas of contamination are those that exceed a risk of $1 \times 10^{-5}$ for the child scenario. These are the areas targeted for remediation. The text in Chapters 5 and 6 will be revised to clarify the meaning of this phrase. All locations exceeding a $1 \times 10^{-5}$ risk level are targeted under the proposed action; preliminary design surveys conducted in the drainage indicate that track vehicles will be able to reach all targeted areas.

8. Comment: *The statement "would involve removal of all sediment locations" needs to be revised to read, "removal of all contaminated sediment/soil locations".*

Response: The text will be revised to note that all contaminated soil and sediment will be removed from locations targeted for remediation.

9. Comment: *A definition is needed of "administrative feasibility".*

Response: As given in guidance for conducting remedial investigations and feasibility studies under CERCLA (EPA/540/G-89/004), administrative feasibility is identified as those activities needed to coordinate with other offices and agencies, such as obtaining permits for off-site activities or rights-of-way for construction.

10. Comment: *This alternative does not address removing contaminated sediments in all segments of the drainage as it does not include those contaminated soils/sediments in the upper reaches of segment A.*

Response: The text will be revised to clarify that this alternative does not involve removing contaminated materials in the upper reaches of Segment A.

Comment: *Clarify in the text as to which quarry haul road will be utilized for this subalternative. Will repairs need to be made to the Hamburg Quarry haul road prior to its use during the Drainage's remediation? Do the costs included for each subalternative include activities to repair the drainage to natural conditions following removal actions?*

Response: For subalternative 2.1, material would be transported along the KATY Trail to the Hamburg Quarry haul road to the haul road built to transport the quarry bulk wastes to the chemical plant; this will be clarified to the text. If the Hamburg Quarry haul road were to be used, it is likely that some minor repairs would need to be made. These would be made as part of this removal action. The costs identified for each subalternative includes all activities associated with implementing the action, including those associated with repairing the drainage following the removal of contaminated soil and sediment.

11. Comment: *A residential scenario is possible in Segment A of the Drainage. How does the post-remedial risk listed for Subalternative 2.3 compare with the risk that would be associated with an unrestricted, residential use scenario?*

Response: Post-remedial risks for a residential scenario, assuming that the drainage was cleaned up to the levels proposed in the EE/CA (i.e., 13 pCi/g for radium isotopes, 290 pCi/g for uranium-238, and 350 pCi/g for thorium-230) are calculated to be $3 \times 10^{-3}$. (A description of this scenario and the parameters used to estimate this risk are provided in the response to Comment 1.) For comparison, the risk associated with remediating the drainage to the same levels as given in the record of decision for the chemical plant area is estimated to be $9 \times 10^{-4}$.

12. *A definition is needed to the stability testing previously performed for related wastes. A definition is needed of the existing materials which will be utilized to construct the two haul routes. Will contamination which is present under areas slated to be used for road construction be removed prior to building or after haul roads have been utilized? Will the ramp into the north end of Segment B remain following remediation of the Drainage?*

Response: Waste material is required to be tested for stability based upon two considerations; whether treatment is required to prevent leaching of contaminants in excess of those allowed by RCRA for land disposal and whether treatment is needed to provide a structurally stable material. The waste materials from the Southeast Drainage will not require treatment to prevent leaching of contaminants since the major contaminants are radionuclides which are not regulated by RCRA and similar materials from the process sewer lines and tank have been characterized and determined to be nonhazardous materials within the meaning of RCRA. Treatment of these materials to provide a structurally stable material is also not expected to be necessary (see related discussion in the response to Comment 1h).

The haul roads can largely be constructed with materials present in the vicinity of the Southeast Drainage. For example, materials currently in the drainage such as sand, silt, gravel, and cobbles are generally capable of supporting traffic without an engineered aggregate surface, and use of these materials will allow for implementation of this action without bringing similar materials into the drainage area for construction purposes Any contamination which is present beneath or along the haul route will be removed prior to use. Any ramp or other access route will be restored consistent with reasonable requests made by the Missouri Department. of Conservation. Current plans include the use of soil/rock berms along any haul route to assist with erosion controls and discourage routine use of the cleared access routes by recreational visitors.

13. Comment: *What would determine if the light grey aggregate is reused, disposed or used as backfill grading in the excavated areas? Will more than one crossing be utilized at the intersection of HWY 94 and the haul road? Has the MHTD consented to providing traffic control?*

Response: The light colored aggregate will be used sparingly and will be surveyed with field instruments to determine if the material has become contaminated. If the gamma exposure rate is less than 1.5 times background, the material will be either left in place or utilized in grading/shaping excavation areas. If the measurement is equal to or greater than 1.5 times background, the material will be removed for disposal with the contaminated sediment.

Current plans call for a single crossing the state highway 94. Activities impacting this state highway will be coordinated with the MHTD prior to implementation.

14. Comment: *What types of barriers would be erected on the drainage access routes? A definition of "minimal backfilling" in needed. The possibility of this action requiring a land disturbance permit still exists. Obtaining approval from the St. Charles County Highway engineer does not exempt the DOE from applying for and receiving a land disturbance permit. Approval from the local agencies is a prerequisite for submitting an application to the MDNR for a land disturbance permit. Please contact Richard Laux with the WPCP for additional language need in the EE/CA and Appendix B to clarify the ARARs needed for this action.*

Response: The barriers noted refer to berming that would be placed during restoration of the access routes. These berms would be constructed from soils present along the access routes and would serve to reduce potential erosion and also pose some deterrence to increased utilization of the access routes by the public following restoration. The term "minimal backfilling" simply means that the amount of fill used in restoration of excavated areas will be kept to a minimum. It is not possible to quantify the amount of backfilling necessary for proper restoration at this time. All restoration activities will be coordinated with the Missouri Department of Conservation.

The DOE agrees that a land disturbance permit action is likely to be required for this action, and these permits are typically obtained for off-site areas from the County Highway Engineer's Office. The DOE has contacted Richard Laux and plans to submit the land disturbance permit application to his office prior to remediation. The text will be revised to reflect these requirements..

Responses to MDNR Requests:

1. Request: *Submittal of all field and analytical data which has been generated from all characterizations and investigations of the drainage.*

Response: The data generated from all characterizations and investigations of the drainage are being compiled, and this comprehensive data set will be included in a revision to the report entitled *Southeast Drainage Soils Review Sampling Report, DOE/OR/21548-559,* which was originally issued in November of 1995. Because this revision is still in preparation, the data have been included as an attachment to this comment response document.

2. Request: *Determine if contaminated materials exist on the Katy Trail ballast; the extent of any contamination, and how these materials would be managed.*

Response: The KATY Trail ballast was recently surveyed for radioactive contamination and determined to be uncontaminated (see response to Comment 1).

3. Request: *Dates as to when the upgradient contaminated areas which drains to the Southeast Drainage will be remediated. A rationale or explanation by the DOE if these areas are scheduled to be remediated after the drainage, thereby causing the possibility of recontamination of the drainage.*

Response: The relatively small contaminated area (approximately five acres) which drains to the Southeast Drainage is scheduled for remediation in the fall of 1996, prior to any remediation activities planned for the drainage. Remediation of this area will include excavation of the foundations and contaminated soils, and any contaminated water would be contained within the excavations and managed on-site.

4. Request: *A comparison of the volume of contaminated soils, costs, and ecological damage of the limited use, risk-based scenario to a risk assessment based on remediating the drainage to unrestricted residential use.*

Response: The currently proposed action in the EE/CA (summarized in Chapter 6) would result in excavating approximately 2,200 cubic yards of contaminated sediment and soil at a cost of about $830,000. These contaminated materials would be transported to the chemical plant area for temporary storage prior to disposal in the on-site cell. A total of approximately five acres would requiring clearing, including that associated with excavating contaminated materials above the cleanup criteria proposed in the EE/CA, and all access routes and haul roads.

It is very difficult to provide a similar estimate for remediating the drainage to the soil cleanup levels identified in the record of decision for the chemical plant area. Identification of contaminated areas in the drainage was performed by first doing a walkover gamma radiation survey. Such a survey (using standard sodium iodide detectors) can identify areas having radionuclide concentrations at or above levels proposed as cleanup criteria in the EE/CA. However, the highly heterogeneous nature of contamination in the drainage, the variable thickness and areal extent of this contamination, and the physical characteristics of the drainage would make field detection of contamination at levels identified in the chemical plant record of decision nearly impossible. A much more thorough and expensive characterization effort would be needed to develop these estimates.

At a minimum, an additional 620 cubic yards would need to be excavated (resulting in a total volume of 2,820 cubic yards) for a cost of about $1,050,000; one additional acre is estimated to be disturbed. Cleanup to these levels would result in additional costs, including those associated with additional characterization to identify these additional areas (which would be very difficult to do with standard radiation detection equipment such as sodium iodide detectors). In addition, confirmation planning would require adjustments to insure removal to such low levels. This could result in increasing the cost of implementing this removal action significantly. The difficulty in measuring these isotopes with field detection equipment primarily stems from the differing material types/geometry presented by the various gradation and occurrence of contaminated materials in the drainage. The additional volume, cost, and impacted area estimated above are considered an absolute minimum.