UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 7
11201 Renner Boulevard
Lenexa, Kansas 66219

MEMORANDUM

SUBJECT: Region 7 Response to CSTAG Recommendations for Big River Watershed – Combined Site Project for Big River Mine Tailings OU2 and SW Jefferson County OU4 Mining Sites, CSTAG Milestone Meeting 2 and 3 - Dated January 22, 2021

FROM: Dan Kellerman, Team Lead RPM on behalf of the Big River Watershed Site Team
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TO: Karl Gustavson, Chair
Contaminated Sediment Team Advisory Group
Superfund Remediation and Technology Innovation, U.S. EPA

This response is provided on behalf of the Big River Watershed Project Site Team (site team) to the recommendations provided in the Contaminated Sediment Team Advisory Group (CSTAG) memorandum dated January 22, 2021 for the subject sites. The CSTAG memo provides a background, brief description of the site and recommendations associated with the Milestone 2 meetings between the Superfund and Emergency Management Division of the U.S. Environmental Protection Agency Region 7 (SEMD) and the CSTAG on October 28, 2020. The CSTAG memorandum also includes recommendations related to the Milestone 3 meeting between the SEMD and the stakeholders held concurrently on October 29th. The SEMD's site team response is provided per the directive establishing the CSTAG Charter and the relevant guidance and processes under which the charter functions as it relates to complex sediment sites.

The CSTAG is aware the SEMD is pursuing an interim ROD to initiate remediation primarily as a secondary source control remedy. The site team's responses below include the CSTAG's recommendations which are referenced prior to each response. The site team generally agrees with all recommendations made by the CSTAG for the Big River Watershed Project and is willing to discuss any concerns you may have. On behalf of the site team, the CSTAG's assistance, support and guidance continues to be greatly appreciated.

CSTAG RECOMMENDATIONS

CSTAG's understanding is that an interim remedy (IR) will be proposed for the Big River Watershed, a combined project that includes the Big River Mine Tailings Site Operable Unit (OU2) and the SW Jefferson County Lead Mining Site OU4. Like other mining impacted waterways, the site is geographically large with site related COCs (primarily lead [Pb]) present throughout the river's sediments, banks, and floodplains. According to the SEMD, the primary Pb source areas (mine sites and waste piles) have been controlled, but there are multitudes of secondary Pb sources in the sediment bed and banks that pose potential risk to human and ecologic receptors and continue to migrate downstream, and distribute to banks and floodplains, especially during flood events. The SEMD discussed the challenges in developing remedial goals for a system so large, when the national

Pb policy, potentially necessary for final RAO/PRG development, is not finalized. That issue combined with the extent of contaminated areas and the uncertainty in actions needed to achieve a final, protective remedy suggests that it is premature, at this time, to develop a final ROD to address mining-waste related exposures in the combined OUs. The SEMD has sought to address these challenges by proposing an IR approach, supported by adaptive management to chart progress and support later decisions and a final remedy.

At the time of the meeting, a draft feasibility study (FS) for the combined IR was not available to review, nor were the IR's RAOs or remedial alternatives. RAOs, PRGs, and alternatives from the separate OUs that had been considered for final actions were provided or discussed. It was expressed that these materials were similar to those being considered for the IR and could be used to inform CSTAG on the SEMD's plans and basis for decisions. However, CSTAG's review cannot comment on most of the elements described in its operating procedures for the combined IR because they were not available or presented. CSTAG's discussion and recommendations are therefore more cursory and focus on recommendations for the SEMD to consider when developing a combined IR framework.

1. Cleanup Strategy

The SEMD's proposal to combine OUs in an IR appears reasonable considering that the OUs represent the upper and lower portions of the same watershed and river, impacted by the same, or similar sources. CSTAG agrees with the overall approach to use an IR that targets high COC concentration, high mobility sediments, and eroding banks representing sources of Pb to the river. CSTAG also agrees that an adaptive management strategy of actions, monitoring, learning, and adaptation is a critical remedy component that will help inform the need for future actions and selection of a final, protective remedy.

Recommendation

CSTAG recommends that the SEMD clarify that the IR is intended to be consistent with a final action (NCP 40 CFR 300.430(a)(ii)(B)). In its discussion of the scope and role of the IR, the SEMD should identify the uncertainties and challenges present at the site, the rationale and purpose of the IR, how the IR will be supported by adaptive management, and how the IR and adaptive management will be used to inform a final remedy (see also recommendation 5).[5]

<u>SEMD Response</u>

The SEMD will follow the NCP and understands the importance of consistency between the IR and final action for the site. The overall intent of the IR is to stabilize the river system by reducing the volume of contaminated sediment and stabilize contaminated banks that are or have the potential of continued secondary source contribution to the channel migration zone of the Big River.

The proposed IR actions will:

- Reduce the volume of contaminated sediment through removal,
- Reduce the concentration of contaminated sediment through removal,
- Stabilize secondary sources that potentially increase the net volume of contamination,
- Prevent or reduce dispersion and re-deposition of contaminated sediment within the channel migration zone and floodplain through removal and stabilization,

[5]For example, see Section 4 of the 2012 Interim ROD at the Bunker Hill Mining and Metallurgical Complex (available at: https://semspub.epa.gov/work/10/664107.pdf).

- Decrease the volume of contaminated sediment exiting in the project areas, and
- Prevent re-contamination through upper river actions above secondary source locations.

Considering the multitude of uncertainties and challenges of remediation activities in a large, dynamic river system, the IR remediation strategies, remedy components, and techniques will incorporate monitoring to:

- Identify ideal project locations,
- Pair remedial techniques with select locations,
- Identify failures by monitoring structures and effects on river features and morphology,
- Identify improvements to the remedial applications, and
- Measure the success of reducing contamination volume and concentration.

Parameters to monitor in the Adaptive Management approach may include, but are not limited to:

- Physical Parameters
  - Contaminated sediment/bank soil volume
  - Contaminant concentration at remediation locations and downstream of these locations
  - Deposition locations
  - Secondary source attribution
  - Engineering structure and component integrity
  - Effect of engineering components (feature/morphology damage or changes)
- Logistic Parameters
  - Rate of hydraulic transport/stream flow relationship (suspended sediment, bedload)
  - Rate of deposition
  - Suspended sediment loading volume and rate
  - Bedload movement rate and volume
  - Grain size distribution

All data collection will be considered in determining the final remedy. The site team contends that any IR actions completed at the site resulting in the capture and removal of contaminated sediment and soil, in addition to secondary source stabilization of banks throughout the system, will assist in stabilizing the channel migration zone and progressively lower the net volume and concentration of contamination throughout the system.

2. Remedial Action Objectives

The RAOs presented to CSTAG were final RAOs for the lower watershed (OU4) based on achieving protective COC levels. These are not the objectives of the conceptual IR for the combined OUs.

Recommendations

a. CSTAG recommends that the SEMD develop RAOs for the IR. The IR RAOs should focus on the objectives of secondary source control (e.g., Pb in bed and banks), Pb migration reduction, and COC exposure reduction to human and ecological receptors (e.g., sediment and fish tissue Pb concentrations).

<u>SEMD Response</u>

The following RAOs have been developed for the Big River Watershed:

Human Health Receptors	
Fish	Reduce the risk to human health from ingestion of fish with lead above the State of Missouri fish advisory level of 0.3 mg/kg.
Floodplain Soil	Lessen the exposure of humans to lead in soil via direct contact through the reduction of lead concentrations in sediment. Sediment is deposited in the floodplain during high flow events.
Sediment [1]	Reduce direct human contact to sediment with lead concentrations greater than 600 mg/kg.
Ecological Receptors	
All	Avoid or minimize damage to natural habitats (for example: wetlands, riparian forests, rivers, and streams) that support a functional ecosystem for aquatic and terrestrial plant and animal populations during construction and operation of the RAs.
Floodplain Soil	Reduce the exposure of mammals and birds to lead in soil via uptake in food through the reduction of lead concentrations in sediment. Sediment is deposited in the floodplain during high flow events.
Sediment [1]	Lower the concentration of lead in sediments below 600 mg/kg to reduce the exposure of macroinvertebrates, aquatic prey species, and the subsequent bioaccumulation in the food chain.

Notes:
[1] The reduction of system-wide sediment lead concentrations below 600 mg/kg is expected to be achieved by implementing a series of secondary source control measures including bank stabilization and sediment excavation and dredging. The measures will limit the re-introduction and migration of lead-contaminated sediments to stabilize the system by decreasing the net volume and concentration. The natural introduction of clean sediment upstream of the mining areas will further enhance recovery of the system.

While it is recognized the protective measures to be accomplished under the IR will not accomplish final risk reduction goals throughout the entire watershed, some project locations such as stabilized banks and upper-river sediment removal could accomplish what is currently perceived as final risk protection measures based on the current risk studies.

A description of how the IR RAOs will be consistent with the anticipated, final RAOs will be included in the IR RAO discussion.

3. Remedial Goals

The SEMD shared a conceptual IR PRG for Pb concentration in soil and sediment, but CSTAG was not able to determine its basis or the factors driving its selection over other values. The PRGs were not described in the context of IR objectives or their role in making progress toward potential final objectives. Specifics regarding the application of the PRG (e.g., area size and location) were not explained.

Recommendations

a. CSTAG recommends that the derivation and selection of proposed IR PRGs be explained and linked to the attainment of the IR RAOs.

SEMD Response

This recommendation will be explained in the FFS and will be included or referenced in the proposed decision documents. This will include:

- The 600 ppm Pb IR PRG will be used to screen out project locations where such locations at or below the PRG will be monitored for natural recovery and addressed under final actions as deemed necessary.
- For locations difficult or cost prohibitive to access such as extremely steep channels, heavily forested terrain, or access restrictions due to unwilling property owners, upstream section/subsection(s) may require actions to reduce concentrations enough to enable natural processes (e.g. hydraulic transport) to eventually achieve the PRG; these would be subject to monitoring under adaptive management and Monitored Natural Recovery or, MNR.
- Remedial actions at stream sections/subsections that are not subject to recontamination (i.e. uppermost river contamination locations) may be able to achieve the final risk protection PRGs since recontamination should not occur, comparable to stabilized banks that would achieve protection with the placement of clean material to protect a bank.
- Trap locations would be strategically placed to enable continuous sediment collection and removal throughout the IR RA; these will not likely achieve the IR RAOs or PRGs but will result in decreased volume and concentrations of contaminated sediment downstream.

CSTAG recommends the SEMD describe the remedial goals associated with the achievement of the IR RAOs, in a manner consistent with Recommendation 5 of the 2017 contaminated sediments directive:

> *"RAOs should be supported by statements that quantitatively describe the condition to be achieved by the remedy (e.g., expected concentrations in sediments or fish or expected levels of sediment toxicity) and the estimated timeframe for achieving the objective….The monitoring endpoints used to measure progress towards or achievement of RAOs… are site-specific, and should directly indicate the RAO and be linked to the remediation...*
>
> *A remedy's risk reduction expectations should answer several fundamental questions:*
>
> *• What condition (e.g., contaminant concentration or level of toxicity) is expected to be achieved?*
> *• In what media (e.g., sediment, fish tissue, surface water, porewater)?*
> *• In what area?"*

The SEMD should specify the media (soils vs sediment), application area (bank, sediment bed), and geographic area (basin, sub-basin, river mile, river reach, etc) associated with the PRG, and how the PRG will be measured (e.g., a point "not-to exceed" level or the SWAC of a decision unit/exposure area) when describing PRGs.

SEMD Response

The site team agrees to quantify the RAOs for the purpose of identifying the targeted remedy achievements in the phased cleanup approach.

b. CSTAG recommends the application and evaluation of these PRGs using smaller geographic site subunits[6] at a spatial scale that will facilitate the identification of prioritized actions and the evaluation of the effectiveness of those actions.

[6] The current application area has not been established but it appears that a basin-wide average is being considered.

SEMD Response

This site team recognizes the need to break this mega-site into numerous smaller units, stream sections/subsections, for the IR remedy. This will assist to define the monitoring units and identify the efforts and criteria necessary to effectively evaluate the IR remedial action.

c. CSTAG recommends that the SEMD document how managing sediments and bank soils at the specified PRGs will influence or be influenced by remediation in upland OUs and support the success of those final remedies. For example, riverine transport of bank and sediment bed materials will likely dominate floodplain exposure, impacting wildlife, and can impact humans where they recreate or reside.

SEMD Response

A detailed description of the anticipated future use and the upland areas will be included and discussed in the final ROD. Upland areas will be addressed as part of the final ROD remedy due to high re-contamination potential during the IR actions. The highest risk human exposure locations in the upland areas such as recreational areas and residences are being addressed under the individual site operable unit residential cleanups currently underway. Exposure to wildlife in the upland areas will not be addressed as part of the IR. The data suggests that the river migration channel has and continues to be the major source of fine sediment deposition to the upland area. High flow and associated velocities generate the suspension of sediment and deposit it in low velocity locations such as backwater and upland areas. The reduced volume of contaminated sediment through removal and the stabilization of highly contaminated bank soil will reduce the volume of transport and deposition. Conversely, reduced concentrations through this same process will result in surface soils with reduced exposure potential to wildlife. Farming improvement practices such as terracing to prevent agriculture soil runoff that is contaminated could serve as a major protection to the cleanup in the channel migration zone. Since agricultural use is much more prevalent in the lower reaches of the river where the floodplain widens, the strategy to remediate upstream to downstream compliments preventing impacts from upland areas to the channel migration zone. As part of the adaptive management process, the relationship between upland and channel migration zone contamination should be established, and if monitoring determines that upland contamination is re-contaminating remediated locations, then terracing could be included as a remedy component to prevent this from occurring.

d. CSTAG recommends that the IR FS clarify Pb background concentrations, particularly in sediment and bank soils. The [2005] Sediment Remediation Guidance states, "*Generally, under CERCLA, cleanup levels are not set at concentrations below natural or anthropogenic background levels."* PRGs should be developed consistent with an understanding of background concentrations and inputs.

SEMD Response

The RI/FS includes information relative to background determination and concentration. The site team is cognizant of its authority under the NCP and CERCLA related to addressing Pb concentrations that are not directly related to impacts from mining and anthropogenic sources. The investigation data supports that any action taken under the IR will address only concentrations above what is determined to be background Pb concentrations.

4. Alternatives

CSTAG appreciated the range of technologies that were presented for reducing bank erosion and for capturing migrating coarse and fine Pb-contaminated materials. These approaches have generally already been piloted in the Big River watershed and are undergoing evaluation for effectiveness and optimization. CSTAG also appreciated the SEMD's focus on bioengineering and natural channel design. The SEMD has already collaborated with the trustees on projects using these concepts and, based on presentations from the State, trustees, and non-governmental organizations, there is significant support for these "soft-engineering" approaches to bank stabilization.

The SEMD developed mass balance approach for identifying the effect of bank and sediment bed source control actions on mass transport and Pb exposure reductions in the watershed. CSTAG considered the use of this sediment mass budget model to be reasonable for its purpose of prioritizing areas, particularly in conjunction with additional design data and sampling to verify reductions in Pb transport and exposure.

IR alternatives were not presented and specific high-priority areas for remediation were not identified based on bed or bank stability and potential for Pb exposure, contribution, or migration. Based on materials that were provided, CSTAG had concerns that the IR lacked specificity regarding the inclusion or prioritization of areas for remediation or the characteristics of areas that would drive selection of remedial technologies in those areas. This appeared to result in an open-ended remedy where actions and areas are added in the future under "adaptive management".[7] It was also not clear if various IR PRGs would be used to develop the IR alternatives.

Recommendations

a. CSTAG recommends that the metrics and measures (e.g., bank or channel stability, or reductions in Pb transport or concentration) used to evaluate effectiveness and/or optimize the piloted approaches for reducing bank erosion and capturing migrating Pb-contaminated materials should be clearly described to support future decisions that incorporate these approaches.

<u>SEMD Response</u>

The site team agrees that these will be developed to evaluate the effectiveness of the proposed IR remedial actions. The pilot projects are general examples of monitoring which has been employed since completion. The sediment trap location is monitored for volume and concentration of sediment trapped. Sampling of sediment is conducted to determine concentration reduction over time at and downstream of the subsection where sediment recovery is accomplished. These monitoring components are also incorporated for bank stabilization. The sediment trap and bank stabilization projects also include monitoring to determine any adverse effects due to the change made to channel and banks. Monitoring includes up- and downstream effects to the adjacent bank locations, upstream and downstream banks, channel headcutting, side channel erosion, and any resulting changes to river features or morphology.

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[7] E.g., in the site information package, the SEMD states: "*Bank stabilization could be implemented as a source control measure at any location along the Big River in Jefferson County, and at any time during the cleanup, where the river is eroding contaminated bank material.*" [p.8] and "*[t]he locations of future sediment traps would be selected and prioritized, in accordance with the adaptive management strategy…*"[p. 9]

CSTAG recommends that if an IR FS is to be developed, then the SEMD should consider using PRGs to differentiate alternatives and present a broader range of remedial actions. Even if PRGs other than the SEMD's tentative PRG are screened out, the process would help to communicate the analyses and comparisons used to establish the selected IR PRG.

The site team is agreeable and such comparisons will be made. The IR remedial alternatives will compare a relevant range for this mega-site project. For the purpose of additional comparisons, the Mass Sediment Budget Model can be used to illustrate other associated cleanup target values and available options for use of optional or improved remedial technologies. The model can incorporate costs and variations of the technologies and sequencing for comparison.

CSTAG recommends that in the development of alternatives, the SEMD should specify the areas being considered for remediation and how they were selected. The criteria for selection of these areas should be explicit so that reasons for inclusion/exclusion of areas are transparent.[8] CSTAG recommends that the alternatives provide a decision tree for how specific areas will be prioritized and the factors that inform prioritization.

SEMD Response

The site team agrees. This is in progress, building on what is already included in the FS. The site team will utilize a formal process, such as a decision tree, to assist in location selection. The preliminary locations initially selected are based on accessibility, Pb concentrations, and bank conditions (as recommended in e. below).

b. Because of the importance of the mass budget model in targeting areas for remediation, CSTAG recommends that the SEMD ensure appropriate model review and "buy-in" from stakeholders.

SEMD Response

The Mass Sediment Budget Model has been evaluated by multiple, qualified stakeholders who were provided the model for trial use. The stakeholders met with the model developer on two occasions who shared the background data used to construct the model, in addition to providing a detailed demonstration of the model's applications.

The meetings resulted in a positive critique of the model, in addition to useful background data and information sharing that resulted in some improvement to the model's accuracy and proficiency. No objections have been expressed by any stakeholder involved with the evaluation related to the model inputs, outputs, or its anticipated use. The model will continue to be refined as data is collected over time during the IR remedy which should improve both predictability and accuracy. The SEMD will continue to get stakeholder input on the use of the model.

[8] While it is anticipated that the prioritization process will be based on RAOs (e.g., Pb source control, Pb migration reduction, and Pb exposure reduction), the SEMD emphasized that access to privately-owned river bank areas was a primary uncertainty of whether an area could be remediated. As such, the prospect for obtaining long-term access is an important criterion in the prioritization process.

c. When assembling the alternatives and cost estimates, CSTAG recommends that the SEMD consider applying remedial technologies based on the type of area (banks or beds) and characteristics of the area selected for remediation (e.g., bank characteristics such as slope, lack of vegetation, active river head cutting or a model that incorporates all of these factors, like BANCS).

SEMD Response

The site team agrees to incorporate pairing remedial technologies with project remedy and monitoring location selection, which will include characterization using available guidance such BANCS in order to evaluate stream features and geomorphic properties. Considerations will be incorporated from other guidance such as the Natural Channel Design Review Checklist (EPA 843-K-12-006), that will supplement the remedial approach in a manner consistent with natural river and riparian conditions to the extent possible.

d. To permit updates to the selected areas and technologies based on newly collected data or information, CSTAG recommends that the SEMD discuss the process for refining specific technologies or approaches during the design and construction process based on new or updated information.

SEMD Response

The site team intends to use a design/construct, phased approach and agrees to include this concept.

e. CSTAG recommends that additional specificity or design principles for the soft-engineering approaches be provided, e.g. an ideal slope factor (5:1, 4:1, etc.) for softened bank design.

SEMD Response

The site team has these resources available and will incorporate references to this information in decision documents.

5. Adaptive Management

The extent of contamination and the potential degree and duration of remediation in the Big River watershed suggest that a long-term, adaptive management approach may be needed. Generally, adaptive management is a process to implement actions, collect information on the effect of the actions, and inform future decisions by comparing those data to decision criteria. Although the premise of adaptive managment is to learn and adapt, adaptive management is not an open-ended "remedy" where actions and areas are added as opportunity arises.

Adaptive management facilitates decisions in complex environments with high uncertainty between management actions and outcomes. At complex contaminated sediment sites like the Big River Watershed, the fundamental uncertainty informed and addressed by adaptive management is the degree, location, and timing of remediation required to achieve final, protective remedial goals (for example, following a significant initial action). In this context, adaptive management is a long-term management approach, under which interim actions, system response monitoring, and final actions are conducted. The process permits a significant remedial action, a period of learning, and subsequent decisions informed by the learning to occur within the Superfund framework.

The SEMD's current vision of adaptive management appears to focus on using collected information to modify elements of a remedial action.[9] While CSTAG supports the use of monitoring to modify design and construction processes to improve remedy performance, the type of evaluation-response actions described by the SEMD can readily be accommodated using operations and maintenance protocols, remedy optimization approaches, contingent actions, or the five-year review process and remedy modification procedures. Instead, adaptive management should be positioned as a sitewide long-term site management strategy to implement actions, collect information on the effect of the actions, and inform future decisions by comparing those data to decision criteria to ultimately result in a final, protective remedy.

Integral to this approach are monitoring plans and programs that evaluate the objectives of the remediation and support the next decision iteration. It is anticipated that the primary focus of the monitoring will be the IR objectives (reductions in Pb release, exposure, and migration) but other metrics such as bank stability, erosion/deposition, and restoration metrics will also be collected to support decisions on the approaches used to achieve the remediation objectives and goals.

Recommendations

a. CSTAG recommends that, if an adaptive management strategy is used, it be positioned as a sitewide long-term management strategy to guide iterative remedial actions that ultimately result in a final, protective remedy. The SEMD should consult the 2017 contaminated sediments directive (recommendation 8) that describes adaptive management steps focused on establishing goals, implementing actions, and evaluating progress against criteria to make decisions about subsequent actions.

b. CSTAG recommends the SEMD consider developing the following components of an adaptive management plan. The goals, indicators, areas, and timeframes, that will be used to demonstrate progress toward and attainment of the IR remedial goals and RAOs.

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[9] One example provided by the SEMD was to compare the amount of plant mortality and erosion on a stabilized bank to plant growth and bank stability criteria and then have contingencies if the bank does not meet those criteria at 3 years. Those contingencies included actions such as changing plant species or planting density, modifying bank design, modifying bank selection criteria, or using other remedial technologies described by the SEMD can readily be accommodated using operations and maintenance protocols, remedy optimization approaches, contingent actions, or the five-year review process and remedy modification procedures. Instead, adaptive management should be positioned as a sitewide long-term site management strategy to implement actions, collect information on the effect of the actions, and inform future decisions by comparing those data to decision criteria to ultimately result in a final, protective remedy. Integral to this approach are monitoring plans and programs that evaluate the objectives of the remediation and support the next decision iteration. It is anticipated that the primary focus of the monitoring will be the IR objectives (reductions in Pb release, exposure, and migration) but other metrics such as bank stability, erosion/deposition, and restoration metrics will also be collected to support decisions on the approaches used to achieve the remediation objectives and goals.

- Performance criteria that will be used to evaluate effectiveness of the IR and adapt the IR remedy as necessary (see also recommendation 3).
- The sitewide monitoring indicators, areas, and timeframes that will be used to demonstrate progress toward and attainment of the final remedial goals and RAOs.
- The criteria and timing for evaluating sitewide monitoring to evaluate the need for additional actions that achieve the final RGs and RAOs for the site.
- A process for revisiting and updating the AM plan, as necessary, based on new information or developments in site understanding.

SEMD Response:

The site team agrees and recognizes the components mentioned above are necessary to identify and otherwise incorporate into the watershed project adaptive management approach. This will be included as part of the AR or attachment to the IR, but likely in draft form. The initial adaptive management plan will include the framework to inform the need for IR remedy improvement or adjustments in meeting the targeted cleanup objectives. This will include what is monitored and measured, the known or suggested adjustments or refinements that are necessary to implement for remedy optimization, and the associated monitoring/measurement timelines and targets the process is anticipated to follow in order to continue and improve the future success of the IR remedy. Please refer to SEMD's response to Section 3 – Remedial Goals for additional reference.

6. USACE Collaboration

EPA and USACE appear to have closely aligned objectives, approaches, and areas of focus in the Big River watershed (e.g., bank stabilization to lessen bank erosion and transport). USACE described a restoration plan that identified several areas in the Big River for stabilization, grade control, and sediment collection. CSTAG understands that an EPA ROD and Pb PRG are desired by USACE to determine which areas can be restored without handling CERLCA waste and potentially incurring liability.[10] It appears that the Pb PRG would then differentiate EPA- and USACE-only work areas based on Pb-concentration. This requirement could be problematic for both USACE and EPA. For example, in a widely contaminated system, it will be challenging to design excavations and sediment collection systems that exclude contaminated sediment above a certain Pb concentration. System-wide Pb source control and migration reduction would also be lessened if restoration projects only target clean areas. While it is beyond CSTAG's scope to consider USACE's legal determinations, from a technical perspective, it is clear that restoration activities would be less encumbered and EPA objectives would be more readily achieved if USACE/EPA work areas weren't exclusive based on Pb content. The current paradigm also appears to potentially limit opportunities for collaboration and leveraging Federal resources despite work occurring in the same watershed with closely aligned objectives.

[10] It is unclear whether a final, protective PRG or an IR PRG would be needed for this purpose.

Recommendations

a. CSTAG recommends that the SEMD review the practices at other sites where USACE maintains navigation within contaminated sediment Superfund sites. Parties at these sites have in some cases collaborated for decades to ensure USACE mission completion while handling and disposing contaminated sediments in a manner consistent with Superfund decisions.

b. CSTAG recommends that EPA investigate avenues to work with USACE through written agreements (e.g., with a local waste repository sponsor) or to divide efforts (e.g. removal/disposal vs restoration) to facilitate USACE decisions on restoration priorities without regard to Pb-contamination, or even better, in a manner that can enhance reductions in Pb migration and exposure.

SEMD Response

SEMD agrees to these recommendations. The site team has a longstanding and strong collaboration history with the USACE and the Natural Resource Trustees (FWS and MoDNR) on common or related watershed projects over the past 10 years. Most, if not all pilot projects have involved collaboration and included written, interagency agreements with the USACE. EPA expects to continue these collaboration efforts and is hopeful to expand that relationship such that shared efforts in the same work locations under separate authorities will leverage the ability to complete more work than individual projects, at reduced costs. Ideally, EPA will address contamination, and the NRTs in their partnerships with the USACE will complete project locations with their NRD restoration efforts.

7. Waste Repositories

Managing waste at mining sites can be challenging due to volume considerations and the potential for mobilization of metals after disposal. Related to these challenges, the potential for groundwater and surface water impacts of unlined disposal was not presented. Disposal of materials on site is consistent with how similar sites manage waste from early actions and interim remedies, but the necessary areas, infrastructure, and monitoring needed for sediment disposal during the IR needs full consideration.

Recommendations

a. CSTAG recommends that the SEMD consider all likely final remedy ARARs in the design of such facilities to ensure that they are protective of groundwater and surface water in a manner consistent with the final remedy and in consideration of state standards.

b. In the long term, repositories and handling facilities may require moving large amounts of contaminated materials through communities. Therefore, CSTAG recommends developing best management practices from similar sites such that cleanup activities do not contribute negatively to community Pb dust movement in residential, recreational, or floodplain areas. Similarly, use of green remediation practices can be particularly impactful in moving such a large amount of material, as is avoiding to the extent possible emissions near sensitive populations, such as rerouting haul routes to avoid elementary schools and/or installing tailpipe controls where practicable. For more details, see: https://www.epa.gov/remedytech/green-remediation-incorporating-sustainable- environmental-practices-remediation.

SEMD Response

The SEMD agrees to this recommendation and will consider final ARARs that would otherwise be included in a final ROD. The site team is cognizant of federal and state ARARs from our extensive history of remediation conducted at SEMO Pb sites. One particularly noteworthy site characteristic is the pH buffering resulting from the dominantly calcareous sedimentary formations (limestone and dolomite) from which Pb was mined. Although Pb concentrations on average may be high across the project areas, historic pore- and surface water results reveal limited evidence of Pb leachability. The alkaline characteristic of the mine waste typically does not result in dissolved-phase lead in either ground- or surface water.

The site team is also cognizant of the need to handle and transport large volumes of waste. Again, reflecting on SEMD's vast experience remediating mine waste and meeting the final ARARs under multiple decision documents, the expectation for this project does not differ greatly. Adequate sampling to characterize waste and, as necessary, treating waste that exceeds the TCLP standards is always a consideration at sites where mine waste is consolidated and/or disposed. SEMD's experience has also involved nearly all aspects of handling and transporting waste through communities, large and small. Specific provisions, including green practices are either included in design and/or contract performance work statements.