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

MEMORANDUM

SUBJECT: Region 6 and Region 7 Response to CSTAG Recommendations on the Tri-State Mining District Watershed. CSTAG Milestone Meeting 1 – Site Characterization

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TO: Karl Gustavson, Chair
Contaminated Sediment Technical Advisory Group
Office of Superfund Remediation and Technology Innovation

This point-by-point response is provided on behalf of the Tri-State Mining District (TSMD) Watershed project team to the 11 recommendations provided in the Contaminated Sediment Technical Advisory Group (CSTAG) memorandum dated October 21, 2022, for the subject project. The project includes the surface water and sediment in perennial (always flowing) water bodies of four Superfund sites: the Cherokee County site (Cherokee County, Kansas), the Oronogo-Duenweg Mining Belt site (Jasper and Newton Counties, Missouri), the Newton County Mine Tailings site (Newton and Lawrence Counties, Missouri), and the Tar Creek site (Ottawa County, Oklahoma). This area is a "Tier 2" CSTAG site, subject to review per CSTAG's policies and procedures.

The CSTAG memorandum provides a brief description of the project area and recommendations associated with the Milestone 1 meetings between the Superfund and Emergency Management Division (SEMD) of the U.S. Environmental Protection Agency Region 6 and Region 7 on July 12-14, 2022. The project team's response is provided per the directive establishing the CSTAG policies and procedures for complex sediment sites.

RESPONSE TO RECOMMENDATIONS

1. Source Control

The regions understand and agree with CSTAG's recommendations related to source control, and we anticipate incorporating these recommendations into decision documents moving forward. We appreciate CSTAG's support for the regions' continued identification and prioritization of upland source areas and media directly connected to the aquatic system. The recommendations related to source control focus on more highly resolved delineation of source areas. There is a need to look beyond primary source areas (i.e., mine waste piles) to include down-gradient secondary sources within the drainage network such as stream banks, floodplain soils, and contaminated sediment stored within sediment beds. The ongoing work to characterize source areas will continue to identify and target sources that release contamination directly to the aquatic systems such as eroding and erosion-prone streambanks with high metals concentrations, contaminated sediment beds subject to scour and transport, contaminated seeps, and surface water discharges from mine workings.

2. Site Characterization and Conceptual Site Model (CSM) Development

The regions understand and agree with CSTAG's recommendations related to site characterization and CSM development, and we anticipate incorporating these recommendations into decision documents moving forward. The specific CSM refinements recommended by CSTAG focus on improving the characterization of the relative contributions of source areas and the relative exposure risk posed by transport and exposure pathways. Those recommendations align with the regions' intended use of the CSM as both a framework for decision-making and a communication tool for engaging stakeholders. CSTAG recommendations also touch on evaluating the sufficiency of characterization data to prioritize management areas. The large scale of the study area and spatial resolution of data pose notable challenges. The regions expect that additional characterization data will be needed. The intended path forward will apply the existing data set with physical lines of evidence and the CSM to identify and prioritize focus areas that require greater detail to resolve.

3. Modeling

CSTAG recommends against using a watershed-wide model to simulate hydrology, hydraulics, and transport of sediment and contaminants. CSTAG advocates for empirical approaches would be more accurate and cost-effective in support of interim objectives targeting primary metals loading or exposure areas. The regions anticipate incorporating these recommendations into decision documents moving forward. The regions will evaluate an alternative empirical approach (in lieu of watershed-wide modeling) to develop an understanding of channel dynamics, estimated mass of contaminants in the drainage network, and transport of contaminants. We anticipate performing an analysis of channel and floodplain geomorphology to develop a map that defines channel segments according to erosion, transport, and deposition of sediments. Sediment and soil chemistry data will be superimposed on that map to identify secondary sources of metals contamination in riverbeds, depositional bars, riverbanks, and floodplain soils subject to channel migration and bank erosion. Sources of dissolved metals loading (e.g., contaminated seeps, discharge from mine works to surface waters) will also be mapped. Contaminant loading and transport rates (mass flux) will be estimated and used to develop a mass balance for contaminants.

These combined lines of empirical evidence will be used to map source areas and prioritize them according to the amount of contamination and the estimated loading rates attributable to each source. The mapped source areas will be further evaluated based on the potential for exposure for both human and ecological receptors. The results will be evaluated to determine if additional higher resolution sampling or focused modeling analysis is needed in any of the focus areas to support development and evaluation of remedial alternatives. The regions anticipate shifting the strategy away from a watershed-wide fate and transport model to instead rely on an empirically-supported framework for watershed-scale considerations. Modeling will be considered to characterize physical processes in prioritized focus areas identified based on sources of metals loading and areas of human and ecological exposure.

4. Site Characterization to Support the Ecological Risk Assessment (ERA)

CSTAG observed that the proposed PRGs were developed based on an analysis of exposure effects on benthic invertebrates based on data from other sites that benthic invertebrates are expected to be more sensitive than other aquatic receptors. The proposed PRGs were determined based on their protectiveness of benthic invertebrates with the presumption that those PRGs would be protective of other receptor groups (e.g., microbiota, aquatic plants, fish, amphibians, terrestrial plants, terrestrial invertebrates, reptiles, birds, and mammals). CSTAG recommends that the presumption be explicitly evaluated by comparing COC sensitivity of benthic invertebrates to the other receptor groups. The regions agree that further evaluation and additional studies may be necessary to support the presumption that proposed sediment PRGs that were determined to be protective of benthic invertebrates are also protective of the other referenced receptor groups. The regions anticipate incorporating these recommendations into decision documents moving forward.

5. Surface Water Data Review of Mercury

CSTAG performed a cursory review of the water quality data set and recommended that future analyses of mercury (and other COCs as necessary) be performed using methods with analytical detection limits below concentration criteria for decisions. CSTAG recommendations suggest future analyses utilize EPA methods 1631 and 1630 for total mercury and methylmercury in water, respectively. The regions anticipate incorporating these recommendations into decision documents moving forward.

6. Appropriate Background COC Derivation

CSTAG recommendations regarding background concentrations of COCs focus on determining appropriate sampling locations and consistent sampling protocols for background samples. Appropriate background sampling locations include areas upstream of sources and tributaries without source areas. Background sampling protocols need to be the same (or as similar as possible) to those used to sample contaminated areas within the site. The regions understand and agree with this comment, and we anticipate incorporating these recommendations into decision documents moving forward.

7. Pilot Studies to Support Technology Selection and Source Control

The regions have conducted several pilot studies to evaluate remedial technologies, and there are additional pilot studies in the planning and development phases. CSTAG recommends that additional pilot studies (or early actions) be structured to evaluate the study results based on how the studies contribute to achieving site-related objectives. Specifically, pilot study effectiveness should be evaluated using monitoring metrics related to reduction in COC sources, exposure, and transport. The regions understand and agree with CSTAG recommendations regarding pilot studies, and we anticipate incorporating these recommendations into decision documents moving forward.

8. Interim Approach to Risk Management

CSTAG recommends the regions develop a prioritization scheme to select and sequence early or interim action areas. Recommended prioritization considerations would include flux of erodible source material, highest risk, soluble COC release, or potential to drive recontamination. The regions' response to CSTAG recommendation details the approach to generating the watershed-wide data and information necessary to inform the prioritization scheme. The regions will consult the EPA's "Adaptive Site Management – A Framework for Implementing Adaptive Management at Contaminated Sediment Superfund Sites". The large scale and dynamic nature of the channel network would benefit from an iterative adaptive approach. The regions understand and agree with these recommendations, and we anticipate incorporating them into decision documents moving forward.

9. Community Relations and Communication

The regions are committed to effective communication with the communities and stakeholders located within the TSMD watersheds. The regions understand and concur with the CSTAG recommendation to develop and publish information identifying areas where elevated COC concentrations pose risks to people. Such a "risk map" would be effective in helping community members make informed decisions that could reduce their exposure to COCs. The regions will evaluate whether signage would be appropriate in high-use areas where elevated COC concentrations are present in sediment and surface water. The regions anticipate incorporating these recommendations into decision documents moving forward.

10. Considerations of Remedy Resiliency

The regions understand that regional climate change effects may include increased frequency and intensity of flooding, and those hydrologic changes may translate to geomorphic changes. The regions plan to evaluate the site's vulnerability with respect to those potential changes. The shift away from a watershed-wide hydraulic modeling effort (as described in our response to CSTAG recommendations under item 3-Modeling) will provide a

map of geomorphic features; designation of channel segments as erosional, depositional, or transport dominant; and identification of priority focus areas. That information will provide a basis for evaluating vulnerability to increases in flood flow frequency and intensity. The regions will consult with the EPA's Office of Superfund Remediation and Technology Innovation to develop a specific approach to evaluating the site's vulnerability. We anticipate incorporating these recommendations into decision documents moving forward.

11. Baseline and Long-term Monitoring Plans

CSTAG recommends the regions develop and implement a long-term monitoring program capable of evaluating COC exposure and transport in the TSMD and supporting ongoing evaluation and feedback of remedy effectiveness. Implementing a long-term monitoring program aligns well with CSTAG recommendations under item 8 (Interim Approach to Risk Management) advocating for an iterative adaptive approach to site management. Monitoring forms a central component of adaptive management by identifying key performance metrics, establishing baseline conditions, documenting progress, and triggering course corrections during remedy implementation. The regions understand and agree with this recommendation, and we anticipate incorporating long-term monitoring into decision documents moving forward.

CONCLUDING STATMENT

The regions appreciate CSTAG's insight and recommendations. Our responses were developed with the intention of acknowledging and incorporating the recommendations provided by CSTAG into the overall strategy at the TSMD Watershed moving forward. The regions will continue to work with our partners and stakeholders to address and incorporate CSTAG recommendations at this complex sediment site.