Testimony of Steven C. Nadeau
Partner, Environmental Practice Group
Honigman Miller Schwartz and Cohn LLP
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Superfund Subcommittee
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Overview:

- For more than 30 years, the United States Environmental Protection Agency (EPA), has successfully identified and treated hundreds of Superfund sites, typically old abandoned landfills or industrial properties. However, the "typical" Superfund site profile has changed from abandoned landfills and industrial properties to complex mining and river sediment sites, often referred to as mega-sites. These mega-sites are far more complicated, expensive, and time consuming than traditional Superfund sites, reflecting hundreds of years of industrial activity and the activities of hundreds or even thousands of public and private parties.

- There are six main steps in the Superfund process—and each one can cause undue delay to putting sites back into productive use if not conducted according to EPA policy. These steps include (in order): (1) investigating the site conditions; (2) assessing the site risk; (3) determining the site background conditions by taking into account contributions from on-going sources; (4) evaluation and selection of the remedial options; (5) remedial design; and (6) remedy implementation. For the assessment phase, EPA must focus on collecting only the data needed for decision-making and risk assessment. It is essential that the agency assess realistic risk and receptors to more accurately evaluate potential human health and ecological site risks.

- It is critically important that EPA headquarters provide earlier and more consistent support throughout the entirety of the Superfund process. At sites where progress is stagnant, several characteristics exist: (1) an unnecessary amount of time and money is wasted on extensive data, of which only a small fraction is used. Instead, EPA should use a step-by-step approach, known as adaptive management; (2) EPA Regions set unrealistically low background concentration levels, which are used to set cleanup goals that are unattainable. Furthermore, cleanup goals that are below background levels make it very difficult to accurately evaluate recontamination levels mid-cleanup or post-cleanup; (3) Regions impose conservative assumptions at the project level that go beyond what is required by applicable law, and EPA's Superfund guidance documents, on virtually every aspect of the site evaluation and risk assessment. These assumptions artificially inflate risk, and significantly skew the information needed by the Administrator in order to make an informed judgment on the appropriate remedy. As a result, it is nearly impossible for the Administrator to effectively select a remedy consistent with EPA's own policies. This pattern of conservatism, when coupled by uncertainty and gridlock, often wastes 10 to 15 years on site investigation and remedy evaluation, costing between $100 and $150 million.

- To assist EPA Regions and Project Managers in making scientifically sound and nationally consistent risk management decisions at contaminated sediment sites, EPA issued two critical policy guidance documents: Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites (OSWER Directive 9285.6-08, 2002) and the comprehensive (170 pages) Contaminated Sediment Remediation Guidance for Hazardous Waste Site, (OSWER 9355.0-85, 2005) (EPA Sediment Guidance or Sediment

Guidance). In the face of growing concern that EPA was not applying these policies consistently or effectively, the Agency formally reaffirmed these policies on January 9, 2017, in memorandum titled "Remediating Contaminated Sediment Sites -- Clarification of Several Key Remedial Investigation/Feasibility Study and Risk Management Recommendations, and Updated Contaminated Sediment technical Advisory Group Operating Procedures, (OLEM Directive 9200.1-130).

- The substance of the Sediment Guidance presents a comprehensive, technically sound policy roadmap for addressing complexities associated with contaminated sediment sites. However, despite this sound national policy, some of the EPA's Regional offices have disregarded the Superfund National Contingency Plan (NCP) regulations and the Sediment Guidance, resulting in inappropriate remedy decisions and significant delays in remediation of impacted sites and the redevelopment of our nation's waterways. The remediation of these waterways is critical to job growth and economic revitalization of these areas.

- Administrator Pruitt's Task Force's 42 recommendations to improve the Superfund program, which were released last Tuesday, as well as the recent change in Delegation of Authority to require the Administrator's approval of all remedies at Superfund sites expected to cost more than $50 million, are important steps in addressing several of the issues currently plaguing the contaminated sediment site cleanups.

- The Task Force's 42 recommendations include many valuable improvements to the administration of the Superfund program. I am especially encouraged that the Task Force's recommendations recognize the value of early actions to address complex sites,

including sediment sites, and the use of adaptive management to refine the remedial approach as progress is made toward cleanup. The Task Force's report also includes sound recommendations regarding the roles of the National Remedy Review Board (NRRB) and the Contaminated Sediment Technical Advisory Group (CSTAG) and EPA Headquarters review of remedy decisions involving costs over $50 million. The Task Force's report is an important contribution to the discussion.

- Although the Delegation of Authority and the Task Force's recommendations are important improvements, I believe there are additional issues that need to be addressed. Appropriate application of NCP provisions, the EPA's Contaminated Sediment Guidance, and the recommendations in my testimony would produce faster, fairer, and more efficient remedies; and would lead to significant acceleration of the redevelopment of Superfund sites located along our nation's waterways.

Chairman Rounds, Ranking Member Harris and Members of the Subcommittee:

Thank you for holding this important oversight hearing on the Comprehensive Environmental Response, Compensation and Liability Act of 1980, otherwise known as CERCLA, or Superfund. My name is Steven Nadeau, and I am an environmental law attorney with more than three decades of experience representing potentially responsible parties (PRPs) at complex Superfund sites across the country, including Michigan, Illinois, Indiana, Ohio, New York, New Jersey and the Pacific Northwest. I also serve as the Coordinating Director for the Sediment Management Work Group (SMWG), which is an ad hoc group of Superfund technical practitioners dedicated to ensuring remedial actions at Superfund sites are based on sound science and risk-based solutions.

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I am delighted to be here today to share my experience with the Superfund program. However, before I do, I must say that these views are my own and do not represent the views of any particular client or member of SMWG.

I appreciate the oversight that this subcommittee is providing on Superfund reforms and in particular, as it affects contaminated sediment sites. Since January, I have observed a diligent effort by the new Administration to address concerns with the entirety of the Superfund process—from initial assessment to remedy selection. This includes the Administrator's change to the Superfund Delegation Authority (No. 14-2) on May 9, 2017, requiring all CERCLA remedial decisions expected to result in costs that exceed $50 million to be approved by the EPA Administrator, rather than being decided exclusively by the Regions. Subsequently, the Administrator created a Task Force on May 22, 2017, to recommend improvements to the Superfund program. Last Tuesday, the Task Force released 42 recommendations, which are designed to achieve a number of worthy objectives, including (among others):

- Implementing measures to expedite cleanup and remediation, including by promoting the application of adaptive management at complex sites and through the use of early/interim RODs (Records of Decision) and removal actions and the use of early response action while comprehensive negotiations are underway for the entire cleanup.
- Clarifying policies and guidance to expedite remediation, including expanding the role of the National Remedy Review Board (NRRB) and the Contaminated Sediments Technical Advisory Group (CSTAG).
- Maximizing the use of Special Accounts to facilitate site cleanup and/or redevelopment.
- Promoting sustainable redevelopment/reuse of sites and community revitalization.

- Engaging with partners and stakeholders to improve decision-making.

The Task Force's work is a key step toward ensuring that testing and evaluation are not overly conservative, which artificially creates risk and adds expense and time to the process, and requiring accountability and compliance with CERCLA, the NCP, and the EPA Contaminated Sediment Guidance (2005) at the Regional level for Superfund sites expected to cost over $50 Million.

Unfortunately, significant concerns remain about two major aspects of contaminated sediment mega-sites: (1) the change in delegation only affects future decisions and, therefore, does not correct several contaminated sediment remedy decisions with serious inconsistencies with the NCP and the Sediment Guidance that were issued by EPA Regions during the past two years, and (2) the pattern of lengthy (10-15 years) and costly ($150-$100 million) pre-remedy selection phases also needs to be addressed.

In addition, changes in the review process for contaminated sediment sites by CSTAG and the NRRB, are necessary to ensure that the Administrator has a strong foundation of information on which to efficiently and effectively approve remedy selection decisions. These include requiring CSTAG and the NRRB to specifically recommend the appropriate remedy for the site. CSTAG's recommendation should be highly valued because it consists of the leading sediment experts at EPA Headquarters and the Regions.

Today, I would like to discuss with you some of the critical improvements necessary to restore the basis of the investigation and remediation of contaminated sediment sites on sound science, in an expedited and cost-effective manner. Doing so will achieve the societal goal of accelerating the redevelopment of the communities bordering our nation's waterways.

Congress enacted CERCLA in response to a growing desire for the federal government to ensure the cleanup of the nation's most contaminated sites and to protect the public from potential harm. CERCLA authorizes the cleanup and enforcement actions of federal agencies, such as the EPA, to respond to actual or threatened releases of hazardous substances into the environment. CERCLA establishes a broad liability scheme that holds past and current owners and operators of facilities, from which a release occurs, financially responsible for cleanup costs, natural resource damages, and the cost of federal public health studies. Accordingly, the EPA identifies PRPs for hazardous substances releases to the environment and then either requires them to clean up the sites or undertakes the cleanup on its own using the Superfund trust fund and/or costs recovered from potentially responsible parties. (Significantly, the single most common PRP at CERCLA sites is the federal government itself, so any program to render CERCLA more cost-effective yields a net saving to the taxpayer.) The liability of these PRPs has been interpreted by the courts to be strict, joint and several, and retroactive.

I. The New Reality of the Superfund Program

For more than 30 years, the EPA has successfully identified and remediated hundreds of Superfund sites, typically old abandoned landfills or industrial properties. However, the "traditional" Superfund site profile has changed from abandoned landfills and industrial properties to complex mining and river sediment sites, often referred to as mega-sites. These mega-sites are far more complicated, expensive, and time consuming than traditional Superfund sites. These mega-sites typically reflect hundreds of years of urban and industrial activity, and at contaminated sediment sites, sources often include hundreds and even thousands of public and private entities. As such, these sites present the challenge of addressing the environmental

impacts of ongoing urban and industrial use, rather than cleaning up discreet releases from individual entities.

For example, large-scale, contaminated sediment remediation projects on urban rivers, like the Willamette River in Portland, Oregon, can often include dozens of PRPs, including public entities, with a cost over $1 billion, that will drag on for decades. Contaminated sediment is a widespread and costly problem in the United States. It is often tied to large scale urban development generating municipal and industrial waste by untold number of parties, over a hundred years or more. Its wide distribution results from the propensity of many contaminants that migrate or are discharged to surface waters to accumulate in sediment or in suspended solids that later settle. Furthermore, specific contaminants can persist in sediment over long periods if they do not degrade (i.e. metals) or if they degrade very slowly. The map below shows EPA-identified watersheds as of 2004 containing areas of concern for sediment contamination.

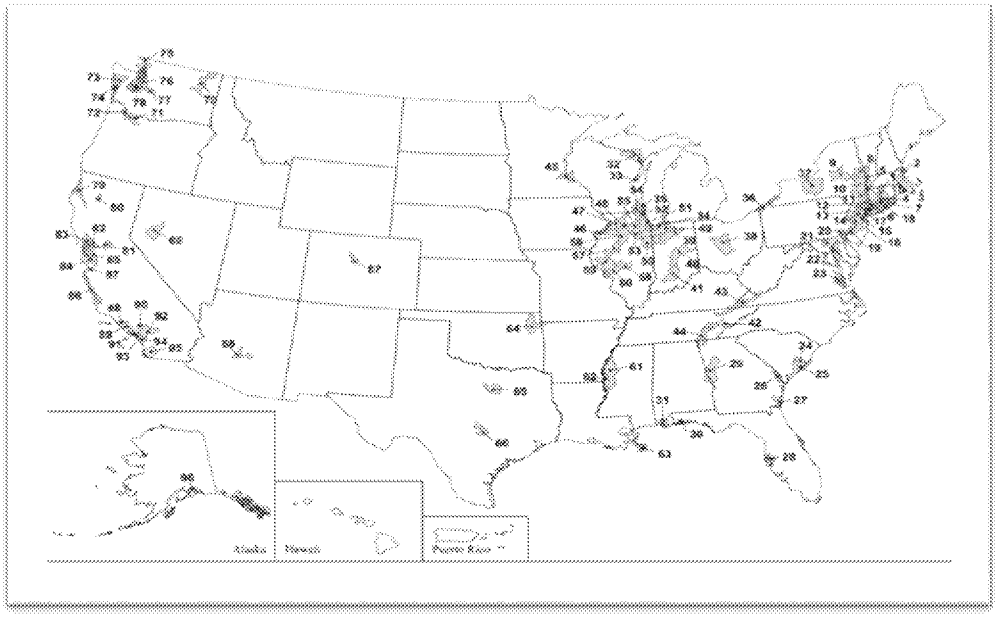

Figure 1: Source: Environmental Protection Agency - National Sediment Quality Survey, 2nd Edition (2004)

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To put costs in perspective, in 1998, in a limited survey of the problem, EPA estimated that 1.2 billion cubic yards of sediment are contaminated nationwide. Assuming dredging is required, the total cost, using a conservative $250 per yard for dredging, would be a staggering $300 billion. And that is an underestimate because scores of additional contaminated sediment sites have since been identified.

From a regulatory standpoint, contaminated sediment sites are challenging to manage. There is a limited range of remedial techniques that one can employ for managing contaminated sediments, including dredging; application of in-situ amendments to bind up contaminants; capping or covering contaminated sediments with clean material; and relying on natural processes to reduce risk, while monitoring the site to ensure that contaminant exposures are decreasing or stable. Each approach differs in complexity and cost. Dredging typically is the most complex and expensive, and monitored natural recovery is the least intrusive and least expensive. In addition, each remedial action has certain trade-offs between the short-term and long-term risks that are created during implementation and the anticipated risk reduction from the remedy.

To assist EPA Regions and Project Managers in making scientifically sound and nationally consistent risk management decisions, EPA issued two critical policy guidance documents: Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites (OSWER Directive 9285.6-08, 2002) and the comprehensive (170 pages) Contaminated Sediment Remediation Guidance for Hazardous Waste Site, (OSWER 9355.0-85, 2005) (EPA Sediment Guidance or Sediment Guidance). The EPA Sediment Guidance was meticulously developed by EPA over five years and was the subject of internal review, comments from EPA Regions, and extensive public comments.

The Sediment Guidance presents a comprehensive, technically sound policy roadmap for addressing complexities associated with contaminated sediment sites. In particular, the Sediment Guidance called for a phased iterative approach to addressing complex sediment sites, known as adaptive management. For sediment sites, as an example, most critical areas of a large site would be addressed first, and the remainder of the site would be evaluated for recovery before additional remediation is implemented. This approach has been proven to be successful, but is not applied consistently by the Regions.

I applaud the new EPA Administrator's recent change to the Superfund remedy selection delegation that requires all Superfund remedy selection decisions expected to cost over $50 million to be reviewed and approved by the EPA Administrator. This should go a long way towards ensuring that EPA's sound national sediment policy is followed. However, as I describe below, some of the EPA Regions failure to follow the Sediment Guidance in the recent past has severely limited the effectiveness of the Superfund Program at sediment sites. In fact, the failure to follow the NCP and the Sediment Guidance often has long lasting impacts on local communities and their citizens. For example, risks to human health and the environment posed by contaminated sediments are ongoing during delays of ten to twenty years or more in order to complete studies deemed necessary due to an aversion of decision-making in the face of some uncertainty. Similar lengthy delays often occur beyond the study phase if large scale dredging remedies are implemented over a decade or more. Lengthy dredging remedies often result in adverse impacts to biota in the waterway, to transportation and other infrastructure in urban areas, and to disruption of commercial and recreational use of the waterway for many years, which prevents redevelopment.

II. Typical Issues and Challenges at Contaminated Sediment Sites

Despite the existence of a sound national contaminated sediment policy (as embodied in the EPA Sediment Guidance), the EPA Superfund program has not functioned properly at sediment mega-sites for a number of years. For example, the Sediment Guidance and the remedy selection criteria within the NCP regulation have been disregarded by the EPA Regions at many sediment sites, particularly where it is needed the most—at mega sediment sites (with projected costs greater than $50 million, with several projected to exceed $1 billion dollars)[1]. This disregard of NCP regulations and the Sediment Guidance is significantly delaying the remediation of impacted sites and the redevelopment of our nation's waterways.

I support EPA Administrator Pruitt's efforts to prioritize and enhance the effectiveness and efficiency of the Superfund program. Enhancing the process to remediate sediment sites can result in earlier risk reduction and more efficiently put these water bodies into beneficial use generating billions of dollars in economic and social benefits.[2] Reaching sensible risk-based remedy decisions that allow the cleanup to be completed sooner, rather than many years in the future, unlocks vast opportunities for human health protection, greater public use, and promotion of urban redevelopment.

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[1] The magnitude of these sediment sites is extraordinary: Lower Willamette River, Portland OR –the January 2017 Record of Decision estimated remedy costs to be $1.7 billion; Lower Passaic River, NJ - $1.38 billion for the lower eight miles of the river; Lower Duwamish, Seattle WA – $395 million; Gowanus Canal, NY – $560 million; and the Fox River, WI –originally was estimated to cost $390 million, but costs now are projected to exceed $1 billion

[2] https://www.epa.gov/superfund-redevelopment-initiative/redevelopment-economics-superfund-sites

1. Adherence By All EPA Regions to the National Sediment Policy is Critical to the Effectiveness and Success of the Superfund Program.

The lack of accountability of the EPA Regions when they disregard the provisions of the NCP or the Sediment Guidance has led to long delays in addressing contaminated sediment sites and remedies that are unachievable, impractical and excessive in scope and cost. In contrast, realistic risk-based remedies will drive efficient and protective results without excessive cost and delays. EPA's Sediment Guidance provides a comprehensive foundation for decision-making at contaminated sediment sites that is based on risk management principles. Although the Sediment Guidance was adopted after an extensive internal and external review process, some recent EPA Region decisions involving contaminated sediment sites are inconsistent with the Sediment Guidance, particularly at sediment mega-sites. The following recommendations are designed to correct many of these inconsistencies between the applicable NCP and Sediment Guidance provisions and the remedies being selected. Renewed focus on adherence to the NCP and Sediment Guidance in decision-making will further the objectives set forth in the Administrator's May 22, 2017 Superfund Task Force memorandum by reducing the amount of time before a site can be determined ready for reuse, realigning the incentives of all parties to foster faster cleanups, supporting the use of risk-management principles in remedy selection at contaminated sediment sites and promoting consistency in remedy selection.

These difficult and unpredictable factors have led to numerous issues and challenges at contaminated sediment sites, many of which are described below.

- Example: Lower Passaic River (NJ) – The 2016 Record of Decision (ROD) for the river's lower eight miles included additional dredging to accommodate navigational

needs. Navigational dredging is beyond the scope of CERCLA. CERCLA is a cleanup statute. The navigational dredge is estimated to be 1/3 of the cost of the ROD for the Passaic's lower eight mile

2. Sources are Inadequately Characterized and Source Control is Incomplete, Especially at Large Urban Rivers.

At some sediment sites, EPA has ignored the Sediment Guidance and selected remedies without adopting adequate measures to reasonably control continuing contamination sources before implementing those remedies. The failure to adequately characterize and control upstream and adjacent sources can result in ineffective remedies that are almost certain to be re-contaminated, often shortly after remedy completion, especially in large urban rivers.

- Example: Gowanus Canal (NY) – The ROD only addresses a handful of the hundreds of municipal storm water and industrial outfalls as well as contaminated surface water runoff and upland contaminated soil sources that contribute hundreds of millions of gallons of contaminated water to the canal. This leaves the waterway completely vulnerable to recontamination and failure after completion of the remedy at a cost of more than $550 million.

3. Lengthy and Costly Studies, Spurred by Ultra-Conservatism and the Fear of Proceeding in the Face of Uncertainty, Despite the Availability of Sufficient Information to Make Sound Decisions.

The length of the RI/FS phase at large contaminated sediment sites is running ten to twenty years with investigation and administrative costs running over $100 - 150 million while little to no risks are being addressed. Such delays are spurred on by regulatory conservatism and an emphasis on dredging, even where it is not cost-effective or necessary based on the best available sciences. As a result, appropriate risk management is delayed, community-based redevelopment of waterfronts is impaired, and resources that could be used to implement a cleanup are instead spent on unnecessary and unproductive studies.

- Example: Willamette River (OR) RI/FS – 15 years duration and a cost of over $100 million for the investigation phase.

4. EPA's Reliance at the Regional Level on "Mass Removal"—Disregarding the Sediment Guidance's Strong Emphasis on Risk Reduction.

EPA's unrealistic risk scenarios and failure to apply the sediment guidance have led to overly conservative remedies that focus on "mass removal," rather than reducing risks, which often results in significant release of contaminants from the sediment into the water. Sediment sites differ significantly from traditional upland CERCLA sites in that more intrusive remedies (i.e., dredging) can potentially increase the risk of harm to human health and the environment. Despite the use of Best Management Practices, resuspension and release of contaminants during dredging is inevitable and unavoidable. This can cause short term and long term adverse impacts to the waterbody and fish, such as elevating fish tissue concentrations often for decades, depriving communities of the use of their natural resources. Proper application of the Sediment Guidance would help ensure that the appropriate remedy, or mix of remedies, is

chosen to appropriately reduce risk rather than to just maximize sediment removal. This approach would significantly speed up remedy decision-making, remedy completion and the return of a valuable resource to the community.

- Example: Commencement Bay (WA) – After two major dredging projects were completed, concentrations of PCBs in fish tissue are still higher than they were over twenty years ago before dredging began (38 ppb before and 70 ppb after).
- Example: Lower Duwamish River (WA) – Remedial alternatives three through six of the Feasibility Study would have all achieved approximately the same level of long-term risk reduction, yet EPA Region 10 selected a remedy that required 460,000 cy of additional dredging (a 94 percent increase) and added four additional years of dredging/construction time. This will inevitably result in a substantial release of contaminants to the river during the Region's estimated seven years of dredging.

5. Disregard of the Recommendations of NRRB/CSTAG and Lack of Senior HQ Support for NRRB/CSTAG's Recommendations.

EPA established CSTAG as a panel of 18 experts in the field of sediment remediation drawn from each EPA Region, Headquarters, and EPA's Office of Research and Development to provide expert advice and foster consistency with the NCP and the EPA Sediment Guidance at contaminated sediment sites, including the critical remedy selection decision. The role of CSTAG's experts was greatly diminished in 2011 when CSTAG's review was combined with the previously separate NRRB review.[3] EPA's Regions have frequently disregarded the

[3] In the combined NRRB/CSTAG review, CSTAG's role has been greatly diminished, with only two or three CSTAG representatives (instead of the full panel of 18 experts) listening in on the NRRB deliberations. This well-intended

recommendations of NRRB/CSTAG because the review is considered advisory and non-binding. Of equal significance is that, based on the historical EPA decision-making process (prior to the Delegation of Authority change on May 9, 2017), senior EPA Headquarters management did not make the remedy selection decision at mega-sediment sites and typically did not push back on the Regions that ignored the CSTAG or NRRB recommendations due to the previous Superfund delegation of remedy selection authority to the Regions.

- Example: Gowanus Canal (NY) – NRRB/CSTAG recommended that the Region evaluate several specifically listed alternatives that could reduce the amount of dredging based on what CSTAG saw as the "expected limited effectiveness of dredging." However, the Region's Feasibility Study failed to consider CSTAG's recommended alternatives.
- Example: Lower Passaic (NJ) – In its 2014 review of Region 2's Proposed Plan, CSTAG/NRRB noted remedial goals were below background levels, but the Region's Proposed Plan and eventually the ROD still included remedial goals that were below anthropogenic background (contradicting long-standing EPA policy). NRRB/CSTAG also recommended that the Region address the potential for recontamination after the proposed remedy was implemented for the Lower Passaic River, yet the final Conceptual

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streamlining significantly diluted and changed the nature of the internal EPA peer review, because the CSTAG's members consist of some of the leading EPA sediment experts, whereas the NRRB members typically are senior Regional Superfund Program Managers, normally not schooled in complex sediment issues. Notwithstanding their diminished nature, the combined NRRB/CSTAG reviews have recognized and commented on many of the same Regions' inconsistencies with the NCP and Sediment Guidance noted in this memorandum and have made specific recommendations to the Regions to correct those inconsistencies, many of which have been ignored by the Regions without consequences

Site Model issued by the Region did not adequately account for ongoing sources and the potential for sediment recontamination.

6. CSTAG and NRRB Enhancements for Reviewing Key Issues at Contaminated Sediment Sites Expected to Cost Over $50 Million Are Needed. In Particular, CSTAG Should Be Required to Recommend the Appropriate Remedy for the Site to the NRRB, and then by the NRRB to the EPA Administrator.

I recommend that EPA's decision process for contaminated sediment sites fully integrate the comments of CSTAG and the NRRB into the formal sediment site remedy selection process and formalize the existing process for CSTAG involvement at all stages in the process. Although CSTAG includes personnel within EPA with the greatest technical expertise as it relates to sediment sites, I believe that CSTAG's ability to positively influence decisions has been diminished because CSTAG's recommendations have been viewed by Regional staff as merely advisory, and not given appropriate weight. This dynamic should be formally changed. Also, CSTAG's former (from 2002-2011) separate review of the EPA Regions' recommended remedy for contaminated sediment sites prior to NRRB review should be restored for all sediment sites expected to cost over $50 million (currently only sites over $500 million are eligible for a detailed CSTAG remedy review).

Consequently, the CSTAG and NRRB procedures should be revised to require that their respective sequential deliberations on evaluation of site remedial options include the issuance of a recommended remedy from each Board for all sediment sites expected to cost over $50 million. This important change would make CSTAG's recommendations, including its recommended

remedy, a formal step in the Agency's decision-making process for sediment remedies (as opposed to its current "advisory only" status).

In addition, although interaction currently occurs between CSTAG and the Regions before remedy selection, I recommend that the current CSTAG procedures that contemplate ongoing interaction with the Regions throughout the various stages of the site prior to the remedy evaluation stage be formalized at sediment mega-sites on critical site issues. CSTAG's involvement at these sites should include the critical issues of the appropriate scope of the Remedial Investigation, the appropriate assumptions and basis for the Risk Assessment and the review and evaluation of the Feasibility Study's analysis of the remedial options, which is meant to focus—not slow—progress towards reaching the remedy selection phase. Conducting reviews at the end of the process is simply too late. It does not allow for review of critical aspects of the site that provide a foundation for effective remedy evaluation and selection.

Also, in order to provide the EPA Administrator with a sound and informed basis to approve future sediment remedies expected to cost over $50 million, the NRRB should review CSTAG's recommended remedy and make its own recommendation to the Administrator. This change would formally incorporate the NRRB's remedy recommendation into the Agency's decision-making process for contaminated sediment sites as opposed to its current "advisory only" role.

Enhancing the role of the CSTAG and the NRRB in remedy decisions would provide a critical cornerstone of the changes needed in order to meet the objectives of EPA's May 22, 2017 Task Force memorandum by ensuring that the NCP and Sediment Guidance are appropriately applied in making the remedy selection at contaminated sediment sites over $50 million and by promoting more effective use of the experience and expertise of CSTAG and the NRRB in an

efficient and expeditious manner. For major sites, these updates would add some additional ongoing interaction between CSTAG and the Regions prior to the remedy evaluation process. But this increased oversight would lead to significant efficiencies and the substantial reduction of Agency and PRP costs, because there will be much greater alignment between the thinking of Headquarters and the Regions throughout the process.

7. Using Adaptive Management to Develop Consensus Remedies that Reduce Risk Quickly, Through a Phased Approach, Rather than Attempting a Single, Comprehensive Remedy that Takes Decades to Develop and Billions to Implement.

At many sediment mega-sites, some EPA Regions have selected remedies that unrealistically and inappropriately attempt to address all site risks in one comprehensive, ultraconservative ROD. A large part of this phenomenon appears to have resulted from fear of the uncertainty about the effectiveness of a complicated, long-term remedy. Such all-encompassing RODs can stall remediation work, increase risks and drive away responsible parties who would otherwise be willing to implement.

Fortunately, the Sediment Guidance identifies a mechanism to address this problem: a step-wise approach to risk reduction called Adaptive Management. Adaptive Management tools are designed to implement specific, focused remedies and then monitor the results and effectiveness before proceeding with additional remedial measures if necessary. Adaptive Management, and other similar tools for phasing cleanups, have been successful at many large upland Superfund sites for years. The Sediment Guidance also recognizes that a phased, adaptive, approach "may be the best or only option" at complex sites.

The Adaptive Management approach would greatly accelerate progress at sediment mega-sites by facilitating earlier risk reduction in areas of the site needing the most attention, instead of waiting for 10 to 20 years to select mega-remedies that mandate virtually all perceived risk be addressed up front, regardless of the actual level of risk posed. I strongly urge that this approach be utilized at all sediment mega-sites, including those with recent selected remedies that are not yet under construction. The Superfund Task Force has recommended the expanded use of Adaptive Management, and Secretary Pruitt has already directed EPA to identify pilot sites to implement this approach. Emphasizing the use of early actions will further the objectives of EPA's May 22, 2017 memo to achieve protective, faster and more cost-effective remedies at contaminated sediment sites. Indeed, some EPA Regions have already begun to apply this approach at certain sediment mega-sites. This trend should be required in all Regions.

8. Selection of Cleanup Standards that are Unachievable as a Result of Setting Inappropriate Cleanup Goals that are Lower than Ambient Background Conditions.

While the CERCLA program focuses on contamination caused by local releases into the environment, some contaminants in water and sediment can be naturally occurring or the result of ongoing, uncontrollable human-caused sources. Some contaminants, such as mercury, are transported atmospherically before being deposited on soil or in waterbodies hundreds of miles away. Under CERCLA, the Sediment Guidance and other longstanding EPA policy documents, cleanup standards are not to be established below anthropogenic background concentrations. "Anthropogenic background" refers to the level of contaminants that is present as a result of human sources (not specifically related to the contaminated site in question) and causes sediments not to recover to the levels below those numbers. Despite this policy, which

recognizes the reality of other sources that will prevent achieving and maintaining remedial goals, some EPA Regions' decisions inappropriately set remedial goals below anthropogenic background.

- Example: Lower Duwamish (WA) – The 2014 ROD inappropriately requires remedial goals to achieve natural background levels, which are not achievable due to anthropogenic conditions.
- Example: Lower Duwamish River (WA) – The remedy selected by EPA Region 10 for the Early Action Area in the Lower Duwamish Waterway required full dredge and backfill of the contaminated sediments. Shortly after the construction was complete, elevated concentrations of PCBs were found in the fine-grained material being deposited on the clean backfill surface. Current average concentrations of PCB's in the incoming material are 100 μg/kg DW, which is 50 times higher than the Lower Duwamish Waterway Superfund Site cleanup goal of 2 ug/kg DW set in the ROD.
- Example: Lower Passaic River (NJ) – EPA selected remediation goals that are 1/10th of background levels for mercury and PCBs.

EPA needs to reaffirm its existing policy regarding cleanup below anthropogenic background, and should issue a new policy guidance on the proper determination and use of background concentrations that is specifically tailored for use at contaminated sediment sites. This document should provide clear and detailed methodology for the identification and use of realistic background conditions. This guidance must account for many sediment sites that are located in highly urbanized settings in order to set achievable remedial goals. In addition, EPA Regions must not be allowed to selectively pick data to drive cleanup goals below the actual

regional background, as has happened at some sites. It is essential that technically defensible, representative background values be used in setting appropriate cleanup levels at contaminated sediment sites, taking urban settings into account, to develop achievable and sustainable cleanup goals.

9. EPA Should Support the Use of the Realistic Risk Assessment Methodologies at Contaminated Sediment Sites.

Use of realistic risk assessment is particularly valuable when highly specific (and uncertain) exposure scenarios are driving cleanup standards. For example, at contaminated sediment sites, many risk-based cleanup goals are based on hypothetical risks based on worst-case (and in some cases, unrealistic) assumptions, such as artificially inflated public fish consumption rates. Particularly where the exposure pathway involves multiple sources, significant uncertainty and highly unrealistic risk estimates can result. Realistic risk assessment provides a more accurate understanding of actual risk. It requires populations to be identified that are currently at risk and can lead to the development of meaningful risk management plans while expediting remedies by focusing on areas that exceed risk levels or background. This approach is consistent with the objectives of the EPA May 22, 2017 memorandum while being protective of stakeholders but eliminating unrealistic risk scenarios that have been known to drive unnecessary remedies (in some instances increasing the cost by hundreds of millions of dollars) that in turn lead to legal disputes and delays.

10. Sustainability Principles Are Consistent with the Superfund NCP Criteria and Should Be Incorporated into the Remedy Selection Evaluation at Sediment Sites.

EPA should formally incorporate a sustainability analysis in its Superfund remedy analysis and decisions. Sustainability incorporates risk-based decision-making by incorporating consideration of social and economic impacts as well as environmental impacts over the life cycle of the remedial action. It is, therefore, a useful concept under which risk and long-term stewardship fit well. Opportunities exist for utilizing sustainability analysis both in pending Superfund remedy decisions and also for those sites where RODs have been issued but not yet constructed. Increased utilization of sustainability principles in remedy selection decisions will further the objectives of the EPA May 22, 2017 memo.

11. Disregard of the Cost-Effectiveness Test Set Forth in CERCLA, the NCP, and the Sediment Guidance.

EPA must now take seriously the requirement in the law and regulations that remedy selection must ensure that "costs [be] proportional to the [remedial alternative's] overall effectiveness."[4] Unfortunately, EPA Regions often have historically rejected remedies that provide equivalent risk reduction at lower costs in favor of more costly remedies that focus on dredging more sediment but do not significantly reduce risk. This emphasis on dredging over risk reduction is inconsistent with the CERCLA statute, the NCP and the Sediment Guidance. This concept was further explained in the *Federal Register* preamble to the NCP, which states that "if the difference in effectiveness is small but the difference in cost is very large, a proportional relationship between the alternatives does not exist."[5]

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[4] 40 CFR §300.430(f)(1)(ii)(D).

[5] U.S. EPA 1990, Preamble to NCP.

Simply put, the idea that the more sediment removed, the better, does not work at contaminated sediment sites. Not only does this thinking often result in more releases of contaminants into the water body, which cause greater short- and long-term impact on fish and other aquatic life, it is contrary to the requirements of the statute.[6]

- Example: Lower Duwamish (WA) – Region 10's 2014 ROD selected an alternative (5C modified) that will cost at least $142 million more (representing a 71% increase) than the alternative with a comparable level of protectiveness.
- Example: Lower Passaic (NJ) – Region 2's cost-effectiveness "analysis" for a $1.4 billion remedy consists of six sentences, provides no details as to how cost-effectiveness or proportionality were determined, and fails to address how the cost-effectiveness of the selected remedy was compared to other alternatives, as required by the NCP.

To remedy this distortion of CERCLA's requirements, EPA should issue detailed guidance requiring that Superfund sediment remedies comply with the NCP's requirement that there be a proportionality between incremental risk reduction and incremental cost in the proposed remedy. This guidance should further specify a method or process for transparently determining and documenting how potential remedies meet the objective of cost/risk proportionality. New guidance is needed to ensure that EPA's decision-makers will be required to demonstrate that a proportional relationship exists between the incremental risk reduction expectations of a given remedy and the incremental cost of that remedy over the next protective alternative.

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[6] See p. 15, Commencement Bay example.

12. EPA Should Use its Existing Authorities to Develop an Approach That Addresses Contaminated Sediment Sites by Using a Collaborative Public-Private Partnership Such as the Highly Successful Great Lakes Legacy Act Program.

Large sediment sites pose a challenge to EPA, since these waterways reflect the impacts of hundreds of years of industrial activity and general urbanization. This process often broadly benefited the public, either directly by managing the sewage generated by a growing population, or indirectly by encouraging the growth of industry and jobs. At any given sediment site, potentially thousands of public and private entities having, at one time or another, contributed pollutants to these rivers. This is not the classic Superfund scenario where one, two or a handful of entities are responsible for polluting a relatively confined area. These sites are truly societal issues, created by many actors, public and private, that resulted in the urbanization and industrialization of our cities.

For these sites, a mixed public/private funding model is often the best solution. Not only does this approach recognize the reality of how these rivers were developed around urban areas, it also results in quicker and better decision making about remedies. Having a monetary stake in the cleanup process bolsters commitments from both PRPs and the federal government to more quickly and efficiently identify and implement a remedy. This, I believe, would drastically speed up the investigation and remediation of these sites and reduce the overall cost of the Superfund Program, perhaps dramatically.

This mixed funding model has been very successfully used at contaminated sediment sites under the Great Lakes Legacy Act, administered by EPA's Great Lakes National Program Office (GLNPO). Under this program, sediment sites are efficiently and cost-effectively getting cleaned up. The Legacy Act requires a binding cost-sharing agreement between the EPA and a

non-federal cooperating agency and/or industry partner. Industry has significantly participated in funding numerous sediment cleanups in the Great Lakes over a very short number of years. In particular, GLNPO has demonstrated an ability to work collaboratively with private PRPs to implement cost-effective and timely remedies. GLNPO has shown an ability to base its decisions on realistic risk assessment assumptions and with due consideration of the relative costs and benefits among remedial alternatives. EPA Administrator Pruitt has recently noted the success of the GLNPO model in achieving cleanups of sediment sites cost-effectively, expeditiously, and with broad stakeholder support. The Superfund Task Force has recommended greater exploration of use of non-CERCLA authorities to remediate contaminated sites, and the expanded use of Special Account funds to facilitate cleanup, recommendations that are consistent with the expanded use of the GLNPO model. I urge EPA to follow through on these recommendations by creating a public-private collaborative program using the very successful Great Lakes Legacy Act program as its model.

Also, EPA should increase its collaboration with the Army Corps of Engineers at sediment sites. EPA should partner with the Corps (which does have navigational responsibility under the "Water Resources Development Act) so that navigational dredging can be coordinated with sediment remediation, expediting the restoration of these waterways. Greater collaboration with the Corps can also reduce the cost of sediment remedies by making use of the Corps' lower cost sediment disposal facilities.

III. Solutions

Based on my extensive work at sediment sites across the country and the issues outlined above, I respectfully request you consider the following recommendations to improve remedy

selection decisions at contaminated sediment sites. Implementing these recommendations, most of which are consistent with and build upon the recommendations of the Superfund Task Force, will protect human health and the environment, will accelerate sediment cleanups and redevelopment of adjacent sites, and will provide for efficient use of our national resources by ensuring cost-effectiveness, which in turn will save the EPA (and taxpayer) dollars. Most importantly, it will return the EPA to compliance with the requirements of the governing statute and regulations.

1. EPA Headquarters should require Regions to strictly adhere to CERCLA, the NCP, and the Sediment Guidance at the site investigation, risk assessment, remedy evaluation and remedy selection stages at all contaminated sediment sites.
2. The remedy-selection recommendations by the NRRB and CSTAG should be documented and incorporated into the agency's formal decision process, rather than their current status as a non-binding (and largely ignored) internal agency peer review. Moreover, EPA Regions should be required to consult with CSTAG at all key phases of the sediment site assessment, including the Remedial Investigation, Risk Assessment and Feasibility Study phases. CSTAG should be tasked to recommend the appropriate remedy at contaminated sediment sites to the NRRB. Likewise, the NRRB should make a recommendation of the appropriate remedy for the Administrator's consideration.
3. The pre-2011 CSTAG and NRRB process involving a comprehensive review of all stages of remedy identification and selection for mega sediment sites by the full CSTAG prior to the NRRB review should be restored to permit the agency's leading subject-matter sediment experts around the country to provide detailed review and comment on the consistency of Regional Proposed Plans with the NCP and the Sediment Guidance.

4. EPA Regions need to follow the Sediment Guidance and apply well-established Superfund process of Adaptive Management at sediment mega-sites, rather than attempting to address virtually all site issues, large and small, up front in one massive, ultraconservative removal remedy. This will accelerate cleanups and get to the right answers in the most efficient way to achieve a scientifically supportable remedy.
5. Every ROD should comply with the cost-effectiveness requirement of the NCP by including a detailed and transparent analysis demonstrating the "proportionality" between the anticipated risk reduction of each remedial alternative and the incremental cost of such alternative. This will force the Regions to actually conduct a detailed evaluation of the proportionality cost-effectiveness requirement of the NCP rather than simply stating the remedy is cost-effective, which is the current, unacceptable practice.
6. Use existing authorities to develop an approach that addresses contaminated sediment sites through collaborative public-private partnership, building upon the positive experience of the GLNPO model.

IV. CONCLUSION

Appropriate application of CERCLA's NCP provisions, EPA's Contaminated Sediment Guidance, and these recommendations would result in making remedies faster, fairer, more efficient and more effective. This would result in the important societal benefit of significantly accelerating the redevelopment of Superfund sites located along our nation's waterways.

Again, I want to thank the Committee for holding this important hearing, and I look forward to answering your questions.

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