Sediment Management Work Group
Comments On The Lower Passaic River Restoration Project Draft Source Control Early Action Focused Feasibility Study

U.S. EPA Region II
October 5, 2007

I. Introduction.

The Sediment Management Work Group ("SMWG")[1] is pleased to provide comments to the United States Environmental Protection Agency ("U.S. EPA") on the Lower Passaic River Restoration Project draft *Source Control Early Action Focused Feasibility Study* ("FFS") dated June 2007, which addresses an eight mile reach within the River. The SMWG has long advocated a national policy addressing contaminated sediment issues that is founded on sound science and risk-based evaluation of contaminated sediment management options. The SMWG believes that U.S. EPA's 2005 *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites* ("Guidance") was an important first step in that direction. In addition, the findings, conclusions and recommendations of the recently published NAS Report, "Sediment Dredging at Superfund Megasites: Assessing the Effectiveness" (NAS 2007) should be factored into the evaluation of options for the Passaic River.

The SMWG's review of the Passaic River draft FFS has identified a number of critical areas where the draft FFS deviates from the Guidance including the lack of source control information, incomplete site characterization, and inadequate information to support development of remedial alternatives as well as its failure to recognize and utilize the recommendations of the NAS Report (NAS 2007). The comments below offer more discussion of the significant limitations in the FFS. In light of these limitations, the SMWG believes that although the September 20, 2007 decision to postpone remedy selection until summer 2008 is a step in the right direction, a year delay is inadequate to perform the significant amount of work required to remedy these limitations.

II. U.S. EPA's National Contaminated Sediment Policy Is Embodied In The Contaminated Sediment Remediation Guidance For Hazardous Waste Sites.

In December 2005, U.S. EPA issued the *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites*. This Guidance embodies national policy on contaminated sediment and should be followed at all contaminated sediment sites. The Guidance was issued for use "by federal and state project managers considering remedial response actions or non-time-critical removal actions" under CERCLA (p. 1-1). The Guidance provides a risk management decision-making framework to assist with selecting appropriate remedies.

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[1] The Sediment Management Work Group is an ad hoc group of industry and government parties actively involved in the evaluation and management of contaminated sediments. (See Exhibit "A" for a list of its Members.) The Group is dedicated to the use of sound science and risk-based evaluation of contaminated sediment management options. The SMWG recognizes that the management of sites involving contaminated sediments frequently involves unique and complex scientific and technical issues, including assessment methodologies and evaluation of risk and risk reduction options. As an active participant in the national discussions on sediment management issues, the SMWG welcomes the opportunity to offer observations and comments on the draft *Source Control Early Action Focused Feasibility Study* for the Lower Passaic River.

There are at least seven key remedy selection principles in the Guidance:

- Confirming that the site is ready for remediation by controlling sources to the greatest extent practical before commencing remediation (p. 2-20, 7-17)

- The focus of remediation should be on risk reduction, not simply on contaminant removal or on the number of cubic yards of dredged sediment (p. 7-1, 7-16).

- A realistic, site-specific evaluation of the potential effectiveness of each sediment management option, including dredging, capping, and monitored natural recovery, should be incorporated into the selection of remedies at a site (p. 7-3).

- An appropriate evaluation of the comparative net risk reduction potential of the various sediment management options, including a realistic evaluation of their respective advantages and site-specific limitations should be conducted (p. 7-13, 7-14).

- At large and/or complex sites, consideration of the use of combinations of remedies may be appropriate (p. 7-3).

- Adaptive management concepts, which recognize the need for reconsideration of the original remedy chosen where new data and/or results of pilots suggest the appropriateness of revising the original approach, should be applied (p. 2-22, 3-1, 7-16).

- Comparing and contrasting the costs and benefits of the various remedies is part of the risk management decision-making framework (p. 7-1).

These principles all focus on risk reduction, which the Guidance reinforces by stating that contaminated sediment that is not bioavailable or bioaccessible and that is reasonably stable, meaning that the contaminants are unlikely to be released from the sediment in concentrations which will pose an unacceptable risk to human health and the environment, does not necessarily contribute to site risks (p. 7-3). These principles, if applied appropriately, will lead to protective remedies that are also cost effective as required by CERCLA and the National Contingency Plan (NCP).

In order to comply with these principles of remedy selection and ultimately reduce risk, the Guidance emphasizes the importance of thorough site characterization. Site characterization includes collecting data to develop a conceptual site model, conducting risk assessments, understanding sediment and contaminant fate and transport, and identifying sources (Section 2.1). These data necessarily form the basis of the feasibility study, which subsequently informs the remedial decision (Sections 3, and 7). Thus, the key to informed decision-making at contaminated sediment sites is thorough site characterization and developing a good understanding of what is driving the risk at the site via development of a conceptual site model..

III. The FFS Deviates From U.S. EPA's National Contaminated Sediment Policy.

The draft FFS deviates from the Guidance in a number of critical areas. The SMWG's comments highlight some, but not all, of the many areas where the FFS deviates from U.S. EPA's national contaminated sediment policy as embodied in the Guidance.

A. Site Characterization Is Inadequate.

Sediment site characterization activities are intended to provide the information necessary to permit competent remedial alternatives to be developed, evaluated, and selected. Site characterization is performed through the Remedial Investigation ("RI"). The RI should accomplish the following goals:

- Identify and quantify the contaminants present in sediment, surface water, biota, flood plain soils, and in some cases, ground water;
- Understand the vertical and horizontal distribution of the contaminants within the sediment and flood plains;
- Identify the sources of historical contamination and quantify any continuing sources;
- Understand the geomorphological setting and processes (e.g., resuspension, transport, deposition, weathering) affecting the stability of sediment;
- Understand the key chemical and biological processes affecting the fate, transport, and bioavailability of contaminants;
- Identify the complete or potentially complete human and ecological exposure pathways for the contaminants;
- Identify current and potential future human and ecological risks posed by the contaminants;
- Collect data necessary to evaluate the potential effectiveness of natural recovery, in-situ capping, sediment removal, and promising innovative technologies; and
- Provide a baseline of data that can be used to monitor remedy effectiveness in all appropriate media (generally sediment, water, and biota). (p. 2-1, 2-2)

To aid in accomplishing these goals, the Guidance provides, as an example, a list of sediment site characterization data that should be collected during the RI. (Highlight 2-1, page 2-5). The data gathered during the RI is then used in a feasibility study, which develops and evaluates alternative methods for achieving the remedial action objectives for the site (p. 3-1).

In contrast to the sound policy set forth in detail in the Guidance, no remedial investigation has been conducted and site characterization is incomplete at the Lower Passaic River. As a result, few of the data necessary for a feasibility study to develop and evaluate remedial alternatives is available and, consequently, these data have not been included in support documents released with the draft FFS. While these data will be collected in an RI conducted by the Cooperating Parties Group under an administrative settlement agreement and order on consent (CERCLA Docket No. 02-2007-2009), which was executed in

May 2007, one month before the draft FFS was released, these important data should have been collected prior to the draft FSS.[2]

Because the kinds of data outlined in the Guidance have not yet been collected, the draft FFS largely relies on very little data (essentially relying on the analyses of only three core samples taken in the eight mile "Area of Focus") to characterize the site, develop the remedial alternatives, and screen the alternatives. This is insufficient information to perform the analyses and decision-making required by the Guidance. The significance of the missing information can be illustrated through a few examples where additional information is needed to develop and screen sound remedial alternatives. These examples are discussed below.

1. Failure To Identify Ongoing Sources.

Early control of sources has long been a U.S. EPA priority at contaminated sediment sites. In its *Contaminated Sediment Management Strategy* (1998), the U.S. EPA stated that "before initiating any remediation, active or natural, it is important that point and nonpoint sources of contamination be identified and controlled." (emphasis added) This strategy identified specific point sources as potential contaminant sources, including "municipal treatment plants, combined sewer overflows ("CSOs"), storm water discharges from municipal and industrial facilities, direct industrial discharges of process waste, runoff and leachate from hazardous and solid waste sites, agricultural runoff, runoff from mining operations, runoff from industrial manufacturing and storage sites, atmospheric deposition of contaminants, and contaminated groundwater discharges to surface water."

The need to control sources early is emphasized in the Guidance (as well as in the 2002 OSWER Directive 9285.6-08). The Guidance provides:

> "Identifying and controlling contaminant sources typically is critical to the effectiveness of any Superfund sediment cleanup. Source control generally is defined for the purposes of this guidance as those efforts are taken to eliminate or reduce, to the extent practicable, the release of contaminants from direct and indirect continuing sources to the water body under investigation." (p. 2-20)

The Guidance continues by reiterating that "significant upland sources (including ground water, NAPL, or upgradient water releases) should be controlled to the greatest extent possible before sediment cleanup." (p. 2-21) The Guidance calls for these potential continuing sources to be identified (see Highlight 2-2) and for a source control strategy to be developed before sediment cleanup begins.

While the title page of the draft FFS includes the term "source control," the FFS neither attempts to identify, nor proposes to control, such sources. The draft FFS does not provide an inventory of upland sources, as the Guidance requires, although the draft FFS acknowledges in passing that combined sewer overflows, storm water discharges, permitted discharges, and contaminated groundwater discharges all exist within the eight mile Area of Focus. The FFS fails to identify or characterize continuing discharges with respect to contaminants and loadings. This is a critical shortcoming which is inconsistent with the Guidance.

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[2] Even if an accelerated approach is viewed as necessary, proceeding with an early action without adequate data also would be inconsistent with the Guidance. Based on the site description and circumstances as described in the FFS, however, there appears to be no justification to rush to conduct an early action in the absence of source control and adequate data to evaluate the appropriate early action.

Shear et al. (1996) reported that no less than 36 CSOs discharge to the Passaic River below its confluence with the Second River (the approximate upriver bound of the Area of Focus). Instead of analyzing, characterizing, and reporting the contaminants of potential concern ("COPCs") and contaminants of potential ecological concern ("COPECs") in these discharges, the draft FFS improperly relied on data collected in CSOs located in other cities and discharging to other waterways, and even then only reported values for a small fraction of the identified COPCs and COPECs. To complete the CSM and to properly characterize the site in the RI, additional information is necessary in order to understand contaminants (episodic and/or continuing) from these specific sources discharging to and/or adjacent to the Area of Focus, including:

- CSO discharges (36 identified);
- Storm water discharges (inventory unknown);
- Identified contaminated groundwater/NAPL sources;
- Tributaries; and
- Any abandoned discharge sources that may not be included above (field/records survey required).

We are aware that the site *Pathways Analysis Report* ("PAR") (Battelle 2005) reported that 32 COPCs and 56 COPECs exceeded screening level risk values in the Passaic River sediments, based on historical data. The very limited source information contained in the draft FFS and its Conceptual Site Model ("CSM") addressed only seven of these contaminants and contaminant classes. Even if one accepted the unsupportable position that analyses of CSO discharges in other waterways were somehow representative of the discharges into the Area of Focus, the potential for recontamination by these other 25 COPCs and 49 COPECs would remain unaddressed, contrary to the Guidance. In fact, Shear et al. (1996), Huntley et al. (1997), and Iannuzzi et al. (1997) published site-specific data showing that the CSO discharges are likely to recontaminate the Area of Focus quickly if <u>any</u> of the remedies proposed were constructed.

Moreover, the threat of recontamination is not just theoretical. Recontamination following remediation has been observed at other sediment sites. Nadeau and Skaggs (2007) recently analyzed twenty sediment sites that had become recontaminated after remediation and reported that more than 50% of these sites had become recontaminated from CSO and public storm water sources.

The Guidance advises site managers to factor the potential for recontamination into the remedy selection process, such as by including source control measures (p. 2-21, Highlight 4-5, Highlight 5-4, Highlight 6-11). The Guidance also emphasizes that phasing of remedy construction may be useful when the effectiveness of source control is in doubt (p. 2-22). The Guidance concludes, "By knowing the effectiveness of source control prior to implementing sediment cleanups, the risk of having to revisit recontaminated areas is greatly reduced." (p. 2-22) Unfortunately, the draft FFS does none of these things, contrary to the Guidance.

An evaluation of ongoing source loading and potential for sediment recontamination should be conducted before any early action is considered. In the case where recontamination is likely, a plan for controlling or reducing sources should be developed.

2. Failure To Adequately Characterize The Site.

The draft FFS and its supporting documents fail to adequately characterize the COPCs and COPECs within the sediment bed in the Area of Focus with respect to nature and extent and risk. The draft FFS itself relies solely on three core samples to characterize the surficial sediments that it claims are being mobilized. Relying on such limited data points fails to comply with Section 2.1 and 2.8 of the Guidance. Further, the analysis of these three cores in the Empirical Mass Balance Model ("EMBM") appears to have been constrained to seven of the contaminants that exceed the generic screening levels proposed as cleanup criteria. COPCs and COPECs should be considered in the CSM and the various RI elements, such as the EMBM, unless/until screened out through a properly performed baseline risk assessment (and baseline ecological risk assessment).

In brief one-to-two paragraph discussions, the CSM "describe[s] the nature and extent of contamination" for five contaminants [pp. 7-(3-6)]. This incomplete site characterization is recognized in the draft FFS itself, which states in conclusion,

> "The CSM will be updated with site-specific COPCs and COPECs after the problem-formulation phase of the BERA is completed." (p. 7-3)

The draft FFS site characterization of the Passaic River Area of Focus is clearly inadequate for proper development of a focused feasibility study. This is particularly true where the process by which site-specific COPCs and COPECs will be selected has not even been completed or the collection of the data necessary to "understand the vertical and horizontal distribution of these [yet-to-be-selected] contaminants within the sediment" (Guidance at p. 2-1). In order to conduct the FFS, it is recommended that at a minimum, the nature and extent of COPCs and COPECs be completed, and baseline ecological and human health risk assessments be conducted.

3. Failure To Provide Fate And Transport Modeling Suitable To The Site.

The Guidance emphasizes the importance of assessing the fate and transport of sediment and contaminants at sediment sites (Section 2.8) because information on sediment and contaminant fate and transport is valuable for assessing the exposure and risk associated with the contaminants and for evaluating the protectiveness of remedial alternatives (p. 2-23, 2-32). To assess sediment and contaminant fate and transport, modeling is required (p. 2-25). At large or complex sites, the Guidance emphasizes the importance of using mathematical modeling:

> "Mathematical modeling generally is recommended for large or complex sites, especially where it is necessary to predict contaminant transport and fate over extended periods of time to evaluate relative differences among possible remedial approaches." (p. 2-36)

Neither the draft FFS nor its supporting documents follows this Guidance provision, but instead use a different approach that the draft FFS describes as the "Empirical Mass Balance Model." The EMBM is a simple observational tool that relies on unverified assumptions for inputs as a substitute for real data due to the inadequacy of site characterization. Neither the EMBM methodology generally, nor its application (calibration, verification) in the draft FFS has undergone external validation or peer review as called for in Section 2.9.4 of the Guidance.

> "It is EPA policy that a peer review of numerical models is often appropriate to ensure that a model provides decision makers with useful and relevant information. … As a rule of thumb, when a model is being

used outside the niche for which it was developed, is being applied for the first time, or is a critical component of a decision that is very costly, a peer review should be performed." (p. 2-41)

The failure to provide appropriate modeling for the site in the draft FFS, coupled with the absence of site characterization data, precludes an effective remedial alternatives evaluation process as required by the Guidance. At a highly complex site with interim remedies ranging from $0.9 - $2.3 billion, a comprehensive understanding of contaminant fate and transport under current and proposed post-remedy conditions is a necessity requiring a more sophisticated modeling tool than the EMBM. More discussion of remedial alternatives development is included below. (Section III.B.)

4. Failure To Conduct A Baseline Risk Assessment.

The draft FFS relies on screening level risk assessment approaches rather than developing a site-specific baseline risk assessment. The use of screening criteria in remedial decision-making (especially on this scale -- $ 0.9 to 2.3 billion) is contrary to sound practice as well as the provisions of the NCP, U.S. EPA's 1997 *Ecological Risk Assessment Guidance For Superfund: Process For Designing And Conducting Ecological Risk Assessment* ("ERAGS"), and the Guidance (Sections 2.3 and 2.4).

The Guidance notes that screening and baseline risk assessments are essential to evaluate the potential threat to human health and the environment and to aid in developing risk-based remediation goals (p. 2-9). Screening risk assessments are used to identify COPCs while baseline risk assessments are a critical part of "the framework for developing risk-based remediation goals." (p. 2-9). Additionally, risk assessments should "provide information to evaluate risks associated with implementing various remedial alternatives that may be considered for the site." (p. 2-9) Thus, remedial alternatives should not have been developed in a draft FFS until the site had been properly characterized and a baseline risk assessment completed.

B. Inadequate Development Of Remedial Alternatives.

The Guidance's requirement of collecting and evaluating sufficient baseline data to support a realistic evaluation of remedial alternatives, the remedy's likely ability to reduce risk on a site-specific basis, and to provide realistic cost comparisons was not followed in developing the draft FFS (see Sections 2.1, 2.3, 3.1, 3.4, and 3.5 of the Guidance). The draft FFS fails to develop and provide adequate information and analyses to support the so-called "early action" remedial program that it proposes, which is realistically a 6-10 year, or even longer, project. Adequate analysis of remedial alternatives cannot be completed without proper site characterization. Some of this inconsistency is the natural result of the failure to properly characterize the site as described above and elsewhere in the Guidance. Some of these site characterization and conceptual site model (CSM) omissions were described above. Other remedial alternative development failures arise from data collection tasks that have not been undertaken. Examples of these are described below.

The current level of site characterization is wholly inadequate to support the remedial alternative selection process under the Guidance.

1. Inadequate Volume And Contaminant Concentration Estimates.

As part of the RI/FS process, the Guidance mandates that volumes of sediment requiring remediation be identified (p. 3-2). The draft FFS, however, presents incomplete and speculative sediment volumes. This uncertainty arises from the fact that many of the older core samples appear to have been "incomplete" in that they did not penetrate through the entire layer of contaminated sediments to clean

underlying soils. Additionally, no data were available in two miles of the Area of Focus, so an additional 30% was arbitrarily added to the total volume calculated. The draft FFS incorporates these unsupported volume estimates into its dredging scenarios, which means that the associated cost estimates are also equally speculative and unsupported.

Additionally, the draft FFS does not characterize the COPC and COPEC concentrations (locations, averages) within the various alternatives' dredge prisms. This characterization is key to evaluating and estimating the resuspension losses, releases, post-dredging residuals, and other risks that would be associated with implementing each of the proposed remedial alternatives (Sections 2.3, 3.4, 6.5.5, 7.3, and 7.4 of the Guidance). Without understanding the magnitude of resuspension, releases, and post-dredging residuals, the net risk reduction of each remedial alternative cannot be evaluated, which is counter to the decision-making process described in the Guidance (p. 7-13).

2. Submerged Debris And Obstructions Were Not Appropriately Evaluated.

The Guidance directs project managers to evaluate the impact of debris on sediment resuspension and releases during dredging (Sections 6.2, 6.3, and 5.5) as well as on residuals (Sections 6.2, 6.3, and 6.5.7). Understanding debris and its impact is important to evaluating remedial alternatives because, as the Guidance explains, one condition conducive to effective dredging at a site is one where there is little debris (Highlight 6-2). The Guidance notes that post-dredging residual contamination is likely to be higher, dredging production rates are likely to be lower, and the magnitudes of resuspension and releases are likely to be higher at sites bearing substantial debris. Moreover, the 2007 NRC report *Sediment Dredging at Superfund Megasites: Addressing the Effectiveness* mentions debris as inhibiting dredging effectiveness more than 60 times. For example:

> "Low sediment bulk density and the presence of debris and hardpan or bedrock all tend to increase resuspension and residuals. Available data indicate that dredging is most likely to be successful when dredges penetrate into clean sediment layers reducing the amount of generated residuals. At sites where structures, debris, hardpan, or bedrock limit dredging effectiveness, the desired cleanup levels, if based on the attainment of specified chemical concentrations, are unlikely to be met by dredging alone. The inability to attain cleanup levels would presumably translate into an inability to meet both short-term and long-term remedial goals and objectives." (p. 82)

The draft FFS describes submerged debris by referencing a 2004 side-scan sonar survey that "identified 47 large objects, 16 of which had the signatures of automobiles" over the entire area. (p. 4-22) Appendix J of the FFS estimates that only between 2000 and 8000 tons of debris will be removed during the course of the entire project. These quantities represent less than 0.05% of the materials proposed for removal – which is a significant underestimation and is inconsistent with observations made elsewhere. The draft FFS inappropriately recommends that a video survey be performed to characterize and locate debris during the pre-design investigation. Deferring critical site characterization data to the "pre-design" phase is inconsistent with the Guidance (Sections 2.1, 2.3, 3.1, 3.2, 3.4, 7.1, 7.3, and 7.4) and sound practice, because the missing information can often lead to the selection of a significantly different approach.

The inadequacy of this debris information is illustrated in other documents:

- TAMS (2005) conducted a geophysical debris survey of portions of a 1000 foot long area in the Harrison Reach of the Passaic River. This survey reported that the entire northern shoreline was populated by debris including tires, rocks, poles, and other objects. Within this limited area, this survey identified two other areas with multiple debris targets, plus other discernable targets including a 15' tree, a 26 foot long piling, a 37 foot long piling, several areas of organic debris, and 14 other objects. (p. 16)

- Endesco (2005) recorded that "as-dredged Passaic sediments may contain many different types of debris including wood, tires, telephone poles, fencing materials, white goods, trash, etc." (p. 18)

- In Appendix H of the draft FFS, Biogenesis reported that the Passaic River sediments delivered to their test process contained "an unusually high amount of trash and debris". The trash and debris noted by BioGenesis was smaller in size and was of a nature that would not have been detected by geophysical means such as those employed by TAMS.

Proper characterization of debris and obstructions is an important predicate to remedial evaluations in a high debris site like the Passaic River. Unfortunately, the draft FFS fails to adequately consider this issue.

3. Failure To Estimate Resuspension And Releases.

The Guidance requires resuspension losses and releases to be estimated as part of the remedy evaluation process:

> "To the extent possible, the project manager should estimate total dredging losses on a site-specific basis and consider them in the comparison of alternatives during the feasibility study. " (p. 6-23)

Reasonable estimates of the resuspension and releases that would result from each remedial alternative are necessary to permit reasoned comparisons of the net risk reduction associated with each alternative. The risks associated with resuspension and releases may be substantial because, as the Guidance notes, sediment resuspension losses "generally range from less than one percent to between 0.5 and 9 percent." (p. 6-23) These estimates and their incorporation into the remedy evaluation process are mandated by the Guidance (Sections 6.2, 6.5.5, 6.5.6, 6.5.7, Highlight 6-11, and Highlight 7-3).

The draft FFS and its support documents fail to provide an estimate of the expected resuspension losses and releases for the dredging alternatives. A number of factors suggest that losses from a dredging project, such as those described in the draft FFS, would be substantial for at least the following reasons:

- The large amount of debris and obstructions will increase resuspension losses and releases[3];
- The draft FFS Appendix E concludes that neither sheet pile nor silt curtain containment can be used in this setting; and
- Substantial vertical concentration gradients exist, with the COPCs and COPECs increasing greatly with depth.

Thus, the failure to estimate losses due to resuspension and releases increases the uncertainty about the expected risk reduction associated with each remedial alternative.

4. Failure To Estimate Post-Dredging Residual Concentrations.

The Guidance notes that "[a]ll dredging operations leave behind some residual contamination in sediment, usually both within the dredged area and spread to adjacent areas." (p. 6-25). A "realistic estimate of dredging residuals" should be factored into an evaluation of the alternatives (p. 6-26). This includes considering "whether conditions are favorable for achieving desired post-dredging residual concentrations." (p. 6-26).

Contrary to the Guidance, the draft FFS and its support documents fail to provide an estimate of the expected levels of post-dredging residual contamination. The site is too poorly characterized in the draft FFS to generate realistic estimates, either within the proposed response area or in the surrounding waterways.

While this analysis was not performed in the draft FFS, even a cursory examination of the previously generated data, as summarized in the PAR, suggests that the dredging prisms for these alternatives may contain average COPC and COPEC concentrations that are 2-4 orders of magnitude higher than the current surficial sediments. If this is true, then the post-dredging residuals will also be far more contaminated than the current surficial sediments.[4] This would suggest that the large dredging approaches proposed will be ineffective at meeting risk-based cleanup criteria and are likely to increase risk and, thus, will be counterproductive. The detailed findings of the NAS Report (2007) further forewarns the likely ineffectiveness of a dredging remedy at this site, particularly where debris is likely to be encountered, as is often the case in urban waterways.

5. Failure To Estimate The Implementation Risks Associated With Each Alternative.

Section 7.4 of the Guidance requires a net risk reduction evaluation of each of the remedial alternatives under consideration. This should include an evaluation of the risks from remedy implementation:

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[3] The Guidance notes that debris conditions often increase resuspension losses and releases during dredging (p. 6-22, 6-26).

[4] The Guidance states that "preliminary research has shown that the residual concentration may be expected to be similar to the average contaminant concentration within the dredging prism." (p. 6-26)

> "Consideration should be given not only to risk reduction associated with reduced human and ecological exposure to contaminants, but also to risks introduced by implementing the alternatives. The magnitude of implementation risks associated with each alternative generally is extremely site-specific, as is the time frame over which these risks may apply to the site. Evaluation of both implementation risk and residual risk are existing important parts of the NCP remedy selection process. By evaluating these two concepts in tandem, additional information may be gained to help in the remedy selection process." (p. 7-13)

One of the risks of remedy implementation for dredging projects is the risk of worker injuries and deaths. The risk would be necessarily increase with the increasing size of the extremely large remedial alternatives considered in the draft FFS. NRC (2007) recently noted the importance of considering such risks in selecting site remedies:

> "Other 'implementation risks' (risks potentially imposed by the implementation of a remediation strategy) such as worker and community health and safety, equipment failures, and accident rates associated with an active remediation are given little consideration in EPA's feasibility studies at Superfund sites (Wenning et al. 2006). Cura et al. (2004) identify several challenges associated with comparative risk assessment, given data limitations and the unavoidably subjective nature of quantifying some risks associated with dredged-material management decisions. However, ignoring those types of risk in comparisons of remedial options is not the solution and may have undesirable consequences, particularly when the cost of being wrong is high (Bridges et al. 2006)." (p. 159)

Leigh and Hoskin (2000) developed and published the methodologies and the five year average worker risk incidence rates for those worker classes that would be involved in a theoretical 427,000 cubic yard dredging project. Leigh and Hoskin's project was defined as using a combination of mechanical and hydraulic removal techniques. Leigh and Hoskin concluded that the probability of at least one fatality occurring in this project was about 1 in 2.4.

The dredging alternatives presented in the draft FFS are all similar to but comparatively much larger than Leigh and Hoskin's case. Implementation risks must to be calculated and included in the remedial decision-making process.

6. Geotechnical Assessment Of Implementability Is Unreliable.

Section 5.5 of the Guidance requires evaluation of geotechnical considerations in the feasibility study, which is key to determining the implementability of different remedial alternatives (p. 5-11, Highlight 7-3). While the draft FFS Appendix E provides a discussion that purports to be an assessment of slope stability with respect to a cap scenario, this assessment did not provide assurance that any of the remedial alternatives could be technically implemented or constructed. Below are several issues with the purported slope stability assessment:

- No site specific geotechnical data were available, so textbook soil data (based on USCS soil classification) were used instead.

- A post-construction Factor of Safety ("FOS") of 1.0 or greater was assumed to represent acceptable stability, and the scenarios evaluated provided calculated FOS of between 1.01 and 1.32. However, a FOS of 1.5 or greater is typically required for such analyses, particularly at this early stage before site specific data have been collected/incorporated in the analyses and no design work performed. (Otten and Gately 2007)

- Only post-construction conditions appear to have been assessed. The limiting conditions almost certainly occur during construction, rather than at its completion. Certainly this will be true for any alternative that involves dredging.

- The analysis did not extend to informing the project manager about the potential stability of bridge abutments, shoreline buildings and bulkheads, or the safety of underground utilities that pass beneath the Area of Focus.

- Areas of historical berthing remain uncharacterized throughout the Area of Focus. These areas will present particular problems with shoreline stability, limiting the ways that removal alternatives can be implemented.

Once site-specific geotechnical data are collected to properly characterize the site, a site-specific geotechnical assessment will be necessary to assess the stability and implementability of the various remedial alternatives being considered (Highlight 7-3).

7. "Alternative Best Representing Overall Risk Reduction" Remains Undefined.

The Guidance notes that "[e]ach approach to managing contaminated sediment has its own uncertainties and potential relative risks." (p. 7-13). To ensure that "all positive and negative aspects of each sediment management approach" are considered, the Guidance strongly encourages the use of comparative net risk in decision-making (p. 7-13). The Guidance provides the following list of "Sample Elements for Comparative Evaluation of Net Risk Reduction" (p. 7-14):

- Contaminant releases during sediment removal, transport, or disposal (or capping)

- Continued exposure to contaminants currently in the food chain

- Other community impacts (e.g., accidents, noise, residential or commercial disruption)

- Worker risk during sediment removal and handling (or cap placement)

- Residual contamination following sediment removal

- Releases from contaminants remaining outside dredged/excavated area (movement through the cap)

- Disruption of benthic community

The draft FFS fails to provide sufficient information to determine what, if any, risk reduction may be associated with any of its alternatives. In light of the NAS Report (2007), the ability of several of the alternatives under consideration to be successful in reducing risk is seriously doubtful. Nor would the NAS Report (2007) support proceeding with such a significant remedial action without a complete understanding of site conditions. The draft FFS fails to provide reasoned assessments of what cleanup criteria, if any, might be achieved by any of the proposed remedial alternatives. Further, the risks that

would be introduced by the implementation of each remedy were neither described nor quantified. The failure to perform this analysis is inconsistent with the Guidance.

The draft FFS and its supporting documents do not provide the types and quality of information necessary to perform the risk-based remedial assessment and decision-making that is anticipated under the NCP and the Guidance. This consideration is particularly important at a site as large and complex as the Lower Passaic River, especially given the amount of source characterization work and sediment characterization that remains to be performed.

C. Procedure For Addressing Contaminated Sediment Sites.

USEPA's *Sediment Management Principles* (2002) and the Guidance state that remedies are to be selected based on site specific information. This information will not exist until the site is well characterized. Note Principle 7 of *Principles for Managing Contaminated Sediment Risks At Hazardous Waste Sites* (OSWER Directive 9285.6-08, February 12, 2002):

> "*Select Site-specific, Project-specific, and Sediment-specific Risk Management Approaches that will Achieve Risk-based Goals*.
>
> EPA's policy has been and continues to be that there is no presumptive remedy for any contaminated sediment site, regardless of the contaminant or level of risk. … At Superfund sites, for example, the most appropriate remedy should be chosen after considering site-specific data and the NCP's nine remedy selection criteria. All remedies that may potentially meet the removal or remedial action objectives (e.g., dredging or excavation, in-situ capping, in-situ treatment, monitored natural recovery) should be evaluated prior to selecting the remedy. This evaluation should be conducted on a comparable basis, considering all components of the remedies, the temporal and spatial aspects of the sites, and the overall risk reduction potentially achieved under each option." (*Guidance*, p. A-7) (emphasis added).

The Passaic River draft FFS is very limited, which is not appropriate for an extremely complex site, such as the Passaic River. Moreover, no characterization has yet to be performed of the dozens of ongoing sources that are known to exist in this waterway, nor has there been an effort to find as-yet unidentified sources. Only a very few samples were taken prior to the preparation of the draft FFS, and the draft FFS omitted much of the modeling and analysis traditionally relied on in sediment site remedial decision-making. Further, the draft FFS specified that hundreds of core samples are to be taken in the remedial design phase, without even knowing what remedy is to be designed. It seems apparent that many of these samples, to the extent they are necessary, are proposed for collection due to the lack of site characterization when the draft FFS was prepared. These significant shortcomings are further examples of inconsistency with the Guidance.

IV. Conclusion.

The Guidance provides a scientifically sound, risk-based approach to addressing contaminated sediment sites. Sediment sites present challenging problems, but following the policy and procedures in the Guidance is necessary to assure that an appropriate remedy is selected which is capable of actually being successful in reducing risk based on site-specific conditions. In contrast, the draft FFS for the Lower Passaic River deviates from the Guidance in several critical ways including lack of source control information, incomplete site characterization, and inadequate information to support development of

remedial alternatives. As a consequence, it is unclear that the $0.9 - $2.3 billion early action proposed in the draft FFS will achieve risk reduction. Accordingly, the current draft FFS should be withdrawn.

The next step should be to identify and control sources to the greatest extent possible in accordance with the Guidance (Section 2.6). During this important activity, the work necessary to properly develop site-specific risk management approaches that will achieve risk-based goals under the Guidance should be undertaken and completed. Much of the data that will support this effort already is scheduled to be collected in the near future under the Passaic River RI.

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The SMWG would be pleased to answer any questions about its comments on the draft FFS for the Lower Passaic River. For further information, please feel free to contact the SMWG's Coordinating Director, Steven C. Nadeau, c/o Honigman Miller Schwartz and Cohn LLP, 2290 First National Building, 660 Woodward Avenue, Detroit, MI 48226, (313) 465-7492, snadeau@honigman.com.

Respectfully submitted,

By: Steven C Nadeau

Steven C. Nadeau, Coordinating Director
Sediment Management Work Group

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Exhibit A
Membership In The Sediment Management Work Group

ALCOA, Inc.
Atlantic Richfield (a BP company)
BASF Corporation
Beazer East, Inc.
Boeing Company, The
CBS Corporation
Chevron Energy Technology Company
Consumers Energy
Dow Chemical Company
DTE Energy
E.I. duPont de Nemours and Company
El Paso Corporation
ExxonMobil
General Electric Company
General Motors Corporation
Georgia-Pacific Corporation
Glenn Springs Holdings, Inc.
Honeywell International, Inc.
Monsanto Company
NW Natural
Phelps Dodge Corporation
PPG Industries, Inc.
Rohm and Haas Company
Sherwin Williams Co.
Tierra Solutions, Inc.
U.S. Steel Group
WE Energies
WTM I
American Chemistry Council (ACC)
American Forest & Paper Association
American Gas Association
American Petroleum Institute
Centre for Advanced Analytical Chemistry
Council of Great Lakes Industries (CGLI)
EPRI
International Lead Zinc Research Organization
National Council of Paper Industry for Air & Stream Improvement
Norwegian Institute for Water
U.S. Army Corps of Engineers, Waterways Experiment Station
U.S. Navy Space and Naval Warfare Systems Center, San Diego
U.S. Navy Naval Facilities Eng. Command
Utility Solid Waste Activities Group