

GOWANUS CANAL SUPERFUND SITE  
Kings County, New York

COMMENTS ON DECEMBER 2012 PROPOSED PLAN  
Prepared by the Small Parties Group

The following provides comments, prepared by the Small Parties Group (SPG),<sup>1</sup> on the Proposed Remedial Action Plan (Proposed Plan) for the Gowanus Canal Superfund Site (the Site) issued by the United States Environmental Protection Agency (EPA) in December 2012. Our comments also address information presented in the January 2011 Remedial Investigation (RI) report, the December 2011 Feasibility Study (FS) report and the December 2012 FS report Addendum as cited in the Proposed Plan. Our comments are organized into two general categories: (I) General Comments, and (II) Specific Comments.

**I. GENERAL COMMENTS**

**1. EPA's Failure To Develop and Analyze Critical Data - EPA Must Develop a Conceptual Site Model That Appropriately and Fully Defines All Current and Future Source Areas Before It Can Select a Remedy**

The sources of contamination to groundwater and combined sewer overflow (CSO) into the Gowanus Canal have been inadequately studied by the EPA and are not well understood. Therefore, the current and future impacts on the Site from these continuing sources have not been adequately evaluated in the Proposed Plan.

EPA's failure adequately to assess these impacts is, in part, due to the facts that: (i) the delineation of contamination at and remedial plans for the manufactured gas plant (MGP) sites are still being developed by National Grid, the party responsible for the MGP sites, in coordination with the New York State Department of Environmental Conservation (NYSDEC), and (ii) the details of New York City's plans for addressing its CSOs into the Gowanus Canal are still in flux and have not been finalized. Without these two pieces of critical

---

<sup>1</sup> Members of the SPG include, in alphabetical order, Beam, Inc.; Dun & Bradstreet, Inc.; ExxonMobil Oil Corporation; Hauck Manufacturing Company; Hess Corporation; Honeywell International, Inc.; MRC Holdings, Inc. for itself and on behalf of Citigroup, Inc.; Patterson Fuel Oil Company, Inc.; Rexam Consumer Plastics, Inc.; SPX Corporation (O-Z-Gedney); Union Oil Company of California and Verizon New York Inc.

information which, as noted above, are in the development stages, an appropriate, cost-effective remedy for the Site cannot be selected or implemented.

The missing information about the planned remediation of the MGP sites and the CSO modifications is critical to selecting an appropriate remedy for the Canal. Additional studies and modeling are necessary to characterize the flux of contaminants of potential concern, including non-aqueous phase liquid (NAPL) from, *inter alia*, the MGP sites and the CSOs. Without the supporting technical studies, it is impossible to know with any certainty how much sediment should be or can be effectively removed, or what cap design is appropriate. Moreover, without this information, the long term effectiveness (a major criterion for evaluating remedial alternatives under Superfund) of any sediment remedy cannot be determined.

**2. The FS and Remedy Selection Should Emphasize Capping Over Dredging and Include Monitored Natural Attenuation**

It is very unusual that the Proposed Plan carries forward only the No Action and sediment dredging alternatives, all of which are variations on the same theme (soft sediment removal), without also carrying forward a capping-only alternative with pilot scale testing. No consideration is given to dividing the remedy into Operable Units, or to first implementing any Interim Remedial Measures relating to the MGP wastes or CSO outfalls before deciding on an appropriate remedy for the remainder of the Site. Other viable alternatives, such as monitored natural attenuation, should have been but were not thoroughly evaluated.

Capping has been successfully implemented at other water bodies in New York and New Jersey, such as the Port Newark/Elizabeth project, where capping was performed in 1993 and monitoring has confirmed that the cap is stable and protective. This project was described in an EPA cap design document (Palermo, et al., 1998). In addition, capping of sediments is the approved remedial approach for the Geddes Brook and Nine Mile Creek projects located in New York. Sediment can be removed to the extent required to construct the capping system.

Therefore, existing sediment surface elevations and water depths can be maintained.

Natural Attenuation should be considered as part of the Canal remedy and is especially applicable to Reach 3 for the following reasons: (a) NAPL saturation was generally not observed in Reach 3, (b) this Reach has the lowest soft-sediment PAH concentrations relative to the other reaches, and (c) Reach 3 is subject to future maintenance dredging operations.

**3. The Effectiveness of the Selected Remedy Is in Serious Doubt**

The effectiveness and successful implementation of the proposed remedy are doubtful given the lack of adequate treatability testing to date; the ongoing sources of contamination, including mobile dense non-aqueous phase liquid (DNAPL) in the subsurface; and continuing CSO discharges. The “Adaptive Management” approach discussed in the Proposed Plan assumes that a way will somehow be found during the implementation phase of the remedy to address these ongoing sources in a timely fashion. This will require an unprecedented degree of coordination with and cooperation by the NYSDEC and National Grid with respect to abatement of upland groundwater contamination sources and DNAPL from MGP plants, and between the New York City Department of Environmental Protection (NYCDEP) and the NYSDEC with respect to the City’s CSO discharge elimination. The Proposed Plan contains no contingency plan if these ongoing sources of contamination cannot be addressed in the time frame anticipated for dredging of the Canal. It should also be noted that the plans currently proposed anticipate only a 34% reduction in CSO discharges. This means that 66% of the current CSO volume will continue to be discharged for a significant period of time.

The remedy includes implementing *in-situ* soil stabilization (ISS) techniques involving delivery of stabilization material to the sediment *in situ*. EPA fails to provide any information about whether this approach has been successfully implemented at similar sites on a full scale. Ebullition of biogenic gas from

organically enriched sediments, such as the Gowanus Canal, has been demonstrated to cause migration of contaminants into the overlying water column. In particular, the migration of NAPLs from sediment to the surface of water bodies has been reported at former MGP sites elsewhere. Gas generation in sediment has the potential to cause failure of sediment caps in tidal and non-tidal rivers by way of breakthrough (channelization), or blockage of hydraulic flow. Additionally, dredging will also bring NAPL to the surface of the water, and it is expected that odorous volatile constituents will be released to the atmosphere from the water surface.

Therefore, unless the selection, design and implementation of the remedy are delayed until all ongoing sources are identified, delineated and contained, EPA's proposed remedy is potentially doomed to failure *ab initio*.

**4. The Selected PRGs Are Too Low**

The PRGs selected by EPA are artificially depressed based on Reference Area (RA) selection and the PRG development process. The PRGs are based on extremely limited sediment sampling in Gowanus Bay and Upper New York Bay. The selection of these locations as RAs reflective of background is highly questionable based on the lack of similar basin size, shape, composition, and industrial development characteristics versus the Gowanus Canal. Consequently, the PRGs selected are skewed low and are not reflective of the industrial purpose and history of the Canal. There are better RA choices for evaluation and comparison, such as the approach currently being utilized at the Newtown Creek Superfund Site, which examines a cross-section of industrial versus non-industrial, and CSO versus non-CSO, reference areas.

With respect to PRGs for protection of the ecological community, the Proposed Plan describes the PRG development process for ecological risks to be based on sediment threshold effects concentrations, arriving at 20 mg/kg Total PAH in bulk sediment. It is not stated how confounding factors, such as ammonia or sulfide toxicity, were considered. The RI data finds that amphipods had only "limited"

toxicity (no survival or growth effects) at 39 mg/kg Total PAH, which is nearly twice the selected PRG. The Proposed Plan should utilize the ESB-TU approach to develop the PRGs for sediment using measured porewater concentrations to appropriately consider PAH bioavailability.

**5. The Impact of Bulkhead Replacements and Upgrades Needs To Be Fully Evaluated Prior to Remedy Selection and Implementation**

The Proposed Plan concedes that existing bulkheads along much of the Canal are degraded and will have to be stabilized, reinforced or replaced for the remedy to be implemented and succeed. The FS Addendum assumes that as much as 80% of the bulkheads in each RTA will require replacement. However, the Proposed Plan does not specify which bulkheads need to be addressed. More importantly, it does not explain how the sediment remedy would deal with new releases of contaminants from behind the bulkheads that may occur if the sediment remedy is implemented before bulkhead replacement or repair, nor whether bulkheads are being considered in some areas as an engineered source control structure. EPA acknowledges that its sediment remedy, namely the cap, addresses only NAPL already present in the Canal sediments. It does not address NAPL entering the Canal by seepage through the bulkheads. EPA, thus, appears to have selected a remedy which relies upon an uncertain design element and thereby risks remedy failure. Bulkhead replacement/upgrade evaluation must be integrated into the Proposed Plan prior to addressing sediments in the Canal and not deferred until the design phase of the remedy, because it represents a component critical to the selection of an appropriate remedy.

**6. EPA Failed To Consider Potential Public Exposure to Airborne Pathogens During Dredging**

The Proposed Plan cites concern over odors during dredging as one reason not to drain the Canal prior to dredging activities. But there has been inadequate study and evaluation of potential odors, and migration and exposure, of airborne bacterial and chemical substances (pharmaceuticals, personal care products, etc.) during dredging under the proposed plan with the Canal not drained. NYCDEP

began oxygenation/aeration in July 2010 that will continue until the flushing tunnel is repaired, and aeration is presently being conducted at the Canal to oxidize odor-causing compounds because of the massive CSO discharges. EPA needed, but failed, to consider recent studies by Columbia University that evaluated air quality during the ongoing in-canal aeration activities by NYC at Newtown Creek. That air sampling confirmed that aeration provides "...a novel pathway of microbial exposure in densely populated urban communities containing contaminated soil and water" that have not been studied or addressed in the proposed Gowanus Canal remedy. Consequently, further study of the potential effect on public health of these impacts must be undertaken before a final decision on the ROD is made.

## **II. SPECIFIC COMMENTS**

### **1. Purpose of This Proposed Plan**

The Proposed Plan, at page 1, states that, "NYSDEC is currently overseeing work being performed by NYC to reduce CSOs to the canal by approximately 34 percent." Stated differently, even if NYC is successful in reaching this reduction, the CSOs will continue to contribute 66% of current loadings into the Canal, thereby resulting in significant recontamination of the post-remediation sediments. The Proposed Plan's failure to account for 2/3 of the future CSOs contribution into the Canal is untenable and demonstrates that the proposed remedy will, in fact, not remedy the targeted contamination.

### **2. Scope and Role of Action**

The Proposed Plan, at page 2, mentions a groundwater mitigation action to be addressed as part of the upland source remediation but does not reference the plan or its timing related to sediment remediation. In fact, little information is provided in the Proposed Plan about source control plans for upland areas. As source control is required before sediment remediation can be effective to prevent recontamination (which is one of EPA's stated goals in the Proposed Plan), this gap in a significant component of the overall restoration cannot be left out of the

remedy selection scope without undermining the basis for EPA's decision. Simply put, EPA's decision to hold in abeyance the evaluation and control of upland sources until after remedy selection is inconsistent with the National Contingency Plan (NCP) and is contrary to established EPA Guidance.

**3. Discharges from Combined Sewer Overflows and Stormwater**

- a. The first part of this section, at page 4, describes the current wastewater treatment plants that serve the area, as well as the active CSOs and how they have affected sediment quality. Wholly missing from this analysis is an assessment of how historical CSOs have impacted the sediment quality in the Canal.
- b. Paragraph 5 on page 4 of this section states that “the cumulative impact of these projected flow reductions and flushing improvements on sediment transport and deposition throughout the canal cannot be currently predicted with a high degree of confidence.” Obviously, this uncertainty has a considerable impact on recontamination potential after the proposed remedy is implemented and is likely to lead to remedy failure. EPA has to clarify whether the uncertainty is related to the reduced particulate loading resulting from the construction, or to the increase in flow that limits deposition of particulates from other sources or some other factors. Without this critical review at this stage, the uncertainty will permeate and taint the remedy selection process.
- c. This section also notes on page 4 that “[n]early 250 outfalls were identified in the RI, most of which were pipes located on private property....Twenty-five of these pipe outfalls were observed to be actively discharging during dry weather...” Similar to other statements that the EPA makes throughout the Proposed Plan, this one underscores essential data gaps that, although noted by EPA, are routinely given short shrift, or rather no shrift, in the Proposed Plan. Future loadings from all of these

outfalls need to be fully evaluated and addressed before the remedy can be selected and implemented.

**4. Site Hydrology**

- a. The Proposed Plan states at page 5 that “the only fresh surface water inflows to the canal are wet-weather CSO and stormwater discharges.” Sheet flow off of land during rainfall and snowmelt is also likely and should have been, but was not, considered as part of the site hydrology.
- b. The Proposed Plan notes at page 6 that “intermediate wells screened in the glacial deposits indicate groundwater flow upward toward the canal.” What is missing from this section is any analysis of the horizontal direction (source) of the flow and what influence the marsh deposit overburden (peat, etc.) would have on the contaminant concentration in this flow (i.e., possibly to provide a contaminant migration barrier). EPA’s evaluation of site hydrology is deficient without that assessment, casting doubt, again, on its ability to select a remedy at this stage of the process.

**5. Sediment Characteristics**

This section notes at page 6 that soft sediments have accumulated since Canal construction. What is missing in this section is any discussion of how the pattern/deposition rate of sediment may have changed since 1850 and the factors responsible. Understanding these factors is crucial to selection of the remedy and source control design/methodologies. EPA’s failure to do so undermines the basis for its remedy evaluation and selection.

**6. Results of the Remedial Investigation**

In this section of the Proposed Plan at page 8, EPA states that additional work included “tracing outfall features to their origin.” However, there is no reference in the document of where the data from this supposed additional work can be



found. As such, it cannot be evaluated or confirmed and cannot, therefore, be an appropriate underpinning for EPA's decision-making.

**7. Extent of Contamination**

- a. The second paragraph of this section at page 8 states that tidal exchanges and the flushing tunnel are the only "surface water" sources. This totally ignores both the CSO discharges and sheet flow surface water sources, which are also major contributing sources.
- b. Another portion of this section, also on page 8, briefly describes relative differences in PAH concentration for various sample depths/locations. It may be true that the surface sediment mainly reflects CSO discharges, but as noted in the Proposed Plan, tidal exchanges and the flushing tunnel are also sources of solids. Data on particulate loading of the various sources should be presented to support EPA's claim. Additionally, the PAH trends would be better supported by utilizing the TOC data discussed previously to normalize the data, in order to illustrate differences in loading. Relative to canal surface sediments (~90mg/kg @1% TOC), soft sediments are 3X higher (~300 mg/kg @1% TOC) but also 6X lower than native sediments (~1500 mg/kg @1% TOC). These differences in loading suggest that vastly different sources and rates are involved for each depositional layer.

**8. Groundwater**

In this section of the Proposed Plan, at page 10, EPA discusses using an ESB approach to determine toxic units in groundwater. However, scant information is provided to clarify whether measured groundwater values were used, since the referenced ESB approach uses sediment values and partitioning calculations. EPA must explain its approach in detail.

**9. Sediment Transport and Deposition**

- a. This section of the Proposed Plan, at page 10, notes that the “upper canal is the reach most affected by the deposition of solids from CSO discharges.” However, EPA fails to provide any explanation of this statement and why the lower reach is not similarly impacted by the CSOs.
- b. Another portion of this section, at page 10, suggests that Canal sediments “may be resuspended by currents, propeller wash, dredging and other disturbances.” Contrary to this claim, the Proposed Plan notes that currents in the Canal are generally weak and that dredging has not occurred in 3 decades. The Proposed Plan notes further that propeller wash may result in localized re-suspension and re-deposition but that the finest particles are transported further downstream where contamination levels are lower. There is no explanation of why the finest particles would be expected to carry a lower contaminant load, which would have to be the case in order to explain the concentration trends. Again, these internal discrepancies undercut the EPA’s position on remedy selection.

**10. Solids Impacts from CSOs**

- a. The Proposed Plan, at page 11, notes that the hazardous substances in shallow sediments in the upper reaches are a result of CSO and stormwater discharges, as opposed to releases from MGP sites. However, there is no definition of what is meant by “shallow sediments.” Specifically, does this refer to the upper six inches of the soft sediments or some other vertical interval? This missing information is critical to a proper assessment of solid impacts.
- b. The Proposed Plan, at page 11, reports that high TOC of about 6% is evidence that the surface 0-2 ft. sediment is dominated by CSO loading. However, Table 2 reports that soft sediment has a substantially higher

TOC average of 11.9%. EPA needs to clarify this section to explain whether the entire soft sediment column is primarily impacted by CSOs or is also impacted by the NAPL associated with the MGP Sites.

- c. The Proposed Plan, at page 11, reports that PAH, copper and lead are similar in concentration in the surface sediment and in CSO solids. Although aluminum and iron as crustal elements are mentioned in this section, EPA fails to evaluate their likely sources.

**11. Non-aqueous Phase Liquid Fate and Transport**

- a. This section, at page 12, generally describes NAPL dynamics but offers little information on the spatial distribution in the Canal. This missing data is important to EPA's fate and transport analysis.
- b. The Proposed Plan, at page 12, states, "NAPL in the canal sediments can be transported upward through the sediments into the water column through several transport mechanisms, including ebullition, seep migration, sheen migration and groundwater advection." EPA needs to estimate the total mass and rate of such transport, given that the selected remedy includes an oleophilic clay treatment layer that is intended to adsorb such residual NAPL after remedy implementation. (Page 21 of the Proposed Plan indicates that the oleophilic clay layer is only 1 foot thick in RTA 1 and RTA 2 and 0.5 feet in RTA 3.) EPA also needs to conduct treatability studies to determine the specific adsorptive capacity of the clay to be used for this treatment layer so that the required depth and associated total volume (and costs) for this clay layer can be estimated. In the event that such calculations show higher NAPL residual masses and/or lower clay adsorptive capacities than envisioned in the remedy, significant modifications to the multi-layered cap design would be needed prior to implementation. Further, if the volume of clay thus estimated were significantly to increase, the entire remedy may be infeasible due either to cost increases or impact on bathymetry (thicker treatment clay layer

interfering with navigational requirements; page 21 indicates a depth of ~16 feet is needed for navigation).

## **12. Summary of Remedial Alternatives**

- a. This portion of the Proposed Plan, at page 19, mentions sediment disposal options but fails to consider any recommendation for a Confined Aquatic Disposal (CAD) cell. This type of remedy has been used at other Superfund sites in the region, such as Newark Bay. EPA's failure to include this option makes its remedy alternative assessment non-compliant with the NCP.
- b. The Proposed Plan, at page 30, states that if the cap treatment layer proves to be inadequate over the life expectancy, then "the remedy may include the replacement of portions of the treatment layer (replacing the treatment layer would also necessitate the removal and replacement of the overlying sand and armor layers)." Although 1,356 CY of "clay import" (at a cost of \$271,245/year in 2012 dollars) is included in the annual O&M, this cost does not include larger scale replacement of the clay treatment layer in the event that large areas of the clay layer reach their sorptive capacity for the residual NAPL not removed during remedy implementation. As discussed earlier, EPA has not conducted treatability studies to assess the clay sorptive capacity, nor has it attempted to estimate the total residual NAPL that will need to be treated by the clay layer. Insufficient sorptive capacity of the clay treatment layer will result in recontamination and catastrophic failure of the remedy.

## **13. Basis for Remedy Preference**

Alternatives 5 and 7, discussed at page 31, involve placement of an oleophilic clay layer in the Canal. Because active vertical migration of groundwater is noted for the native layer below soft sediments, EPA should have discussed the implications of an impermeable cap that could be subjected to potential uplift,

and/or and/or whether groundwater would be redirected around the cap and result in discharge along preferential pathways, such as bulkhead interfaces.

**14. Source Control Components**

- a. The Proposed Plan, at page 32, indicates that “EPA and NYSDEC are closely coordinating and EPA is confident that these source areas can be appropriately addressed within the anticipated remedial approach and schedule for the canal remedy.” Other than to so indicate, EPA offers no tangible evidence of such coordination, such as anticipated implementation schedules for non-MGP upland cleanups, CSO control, and the sediment remedy to be implemented by NYSDEC and NYCDEP. As noted in our general comments, this crucial element--the remedies to be employed to control the CSOs and to clean up the MGP sites--cannot be left to an after-the-fact decision. Such cleanups must be conducted prior to addressing Canal sediments as there is the potential for recontamination of such sediments from these sources.
- b. The Proposed Plan, at page 33, indicates that “[p]lanned development in the area has the potential to increase sewage flows further, which can contribute to increases in CSO discharges.” However, what are missing from this assessment are any projections from NYCDEP for increases in CSO discharges and whether such projects have been incorporated into the projected 34% reduction of CSO discharges.
- c. The Proposed Plan, at page 33, indicates that a separate groundwater remedy is not required as part of this selected remedy. This presumes that NYSDEC will implement the necessary groundwater remediation prior to construction of the sediment remedy by EPA, and that no compatibility issues with that effort (e.g., bulkhead sheet piling) will arise. Selecting the alternative prior to establishing the groundwater control plan is premature and will likely lead to conflicts between the remedies chosen by EPA and NYSDEC.