# Superfund and Climate Change: Lessons from Hurricane Sandy

Emily Russell

When Superstorm Sandy hit the northeastern United States in October 2012, its storm surge reached unprecedented levels, flooding homes, businesses, and seven tunnels of New York City's massive subway system. Residents of the New York borough of Brooklyn confronted the floodwaters in their basements and offices and found themselves asking what was *in* the water? The implications of the flood were even more serious for these New Yorkers because the waters came from the Gowanus Canal, one of the most contaminated water bodies in America. In 2010, the U.S. Environmental Protection Agency (EPA) selected the site for cleanup under the federal Superfund program. During the storm, the canal's waters, which could have carried sediment contaminated with cancer-causing chemicals, overtopped the banks and reached as far as a city block in all directions. On Nov. 5, 2012, the *New York Times* reported that "a greasy, oily slick" covered one man's skin as he rushed into his flooding basement to rescue personal belongings.

In a second area of Brooklyn, New Yorkers faced contamination from the flooding of another Superfund site, Newton Creek. Post-Sandy testing by EPA revealed toxic chemicals in the floodwaters, but the agency concluded that the chemicals were below levels that pose risks to human health. Forty miles away, in Sayreville, New Jersey, Sandy's floodwaters carried contaminated sediment from the Raritan Bay Slag Superfund site to neighboring playgrounds. Subsequent sampling indicated levels of lead that exceeded the levels deemed safe for residential exposure. EPA's Hurricane Sandy response is described in detail at www.epa.gov/sandy/history.html.

Sandy is not the first record-breaking storm to disturb Superfund sites. In 2005, EPA investigated three Superfund sites in Louisiana flooded when Hurricane Katrina, the strongest and most expensive storm in U.S. history, brought 20-foot storm surges across the Gulf Coast. In addition, Hurricanes Irene (2011) and Floyd (1999) triggered flooding of the American Cyanamid Superfund site in New Jersey, causing concerned residents to question the appropriateness of EPA's remedial plan to cap the chemical-laden sediment and leave it on-site.

The number of Superfund sites in America's coastal communities is considerable, and the risks to the public from releases of hazardous waste are real. Twenty-two of the contiguous United States border the Atlantic Ocean, Pacific Ocean, and/or a major bay hydrologically connected to either ocean. As of 2010, 39 percent of Americans lived in a county adjacent to an ocean shoreline, a number that is projected to increase to almost 50 percent by 2020. Within 9 miles of these same shorelines lie 289 Superfund sites in varying stages of the remediation process. The five states with the most coastal Superfund sites are New Jersey (55), Florida (40), California (33), Washington (25), and New York (25). In New York and New Jersey, forty-five sites are located within only a half-mile of a coastal area vulnerable to storm surge. *See* "Sandy Stirs Toxic Site Worry," *The Wall Street Journal*, Nov. 11, 2012.

Record-breaking storms inevitably led to a flurry of activity: cleanup efforts, damage assessments, insurance claims, congressional aid packages, and eventual rebuilding. Policy response has favored adaptive management of infrastructure to enable it to withstand climate change impacts. Advocating the need to fortify our communities against effects like sea-level rise, a Government Accountability Office (GAO) study, *Limiting the Federal Government's Fiscal Exposure by Better Managing Climate Change Risks* (2013), online at www.gao.gov/highrisk/limiting_federal_government_fiscal_exposure/why_did_study, has observed that "increasing the nation's ability to respond to a changing climate can be viewed as an insurance policy against climate change risks."

Amidst such community rebuilding efforts and planning for the future, Superfund sites have received little or no attention, either from policy makers or the legal community. For instance, EPA regulations under the Comprehensive Environmental Response, Compensation and Liability Act, 42 U.S.C. §9601 *et seq.* (CERCLA), at 40 C.F.R. §§300.400–300.440, setting forth methods and criteria for determining the appropriate extent of any response authorized by CERCLA (most importantly at Remedial Investigation/Feasibility Study (RI/FS) stage of a Superfund site cleanup, described at 40 C.F.R. §300.430) require detailed site characterization and vetting of remedial alternatives but omit any consideration of the effects of climate change as a risk to the site. No reported case to date has considered climate change in the context of CERCLA.

The vast majority of scientists agree that global warming is occurring. The CERCLA regulatory framework to protect human health from releases of toxic chemicals has been in place for thirty-three years. The thesis of this paper is that both the explicit language and the underlying policies of CERCLA require that climate change analysis be incorporated into the remediation and management of new and existing Superfund sites. CERCLA provides legal options to EPA, concerned citizens, and state governments to secure Superfund sites against the threats of increased precipitation, flooding, and stronger, more frequent storms.

In general, under CERCLA, after EPA lists a site for cleanup, environmental agencies begin the process of site characterization to select an appropriate remedy. EPA, potentially responsible parties (PRPs), and/or, as necessary, the state

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environmental agency, conduct the RI/FS to determine the constituents present, the extent of contamination, and the risks posed to the public. Data gathered during the RI/FS stage are used to create a list of remedial alternatives from which the final remedial action is eventually chosen. CERCLA § 121(d)(1), 42 U.S.C. § 9621(d)(1), requires that a remedial action "shall attain a degree of cleanup of hazardous substances . . . and of control of *further* release at a minimum which assures protection of human health and the environment [emphasis added]." Ostensibly, an RI/FS risk assessment that omits consideration of the probability of "further" release posed by stronger, more frequent weather events, contravenes this statutory directive.

Despite the prevalence of Superfund sites in heavily populated coastal communities, regulators today fail to consider climate change in significant documents developed at the preliminary stages of remediation. The *Human Health Risk Assessment* (HRRA), Appendix L to the Remedial Investigation for the Gowanus Canal, made public in February 2011, while acknowledging that nearby residents may be exposed to hazardous waste when water and sediment overtops the canal during "significant rainfall events," (www.epa.gov/region2/superfund/npl/gowanus/ri_docs/Appendix_L_HHRA_combined.pdf) fails to analyze climate change specifically, including the likelihood of storm surges or sea-level rise inundating surrounding communities with such contamination. EPA Region 2 did finally use the term "climate change" in its final plan for cleanup of the Gowanus, released in September 2013. www.epa.gov/region2/superfund/npl/gowanus/ri_docs/692106_gowanus_canal_rod_9_27_13_final.pdf. However, EPA's consideration of climate change is barely consideration at all. The plan refers to only one impact of climate change, future rainfall increases, and only then in the context of designing the cleanup to prevent recontamination of the site. EPA missed the big picture—that sea-level rise and extreme weather events may cause sites to contaminate *communities* if it ignores those elements of climate change when selecting site remediation designs. At the very least, sea-level rise and extreme weather like Superstorm Sandy may threaten the permanence of site remediation with the likelihood of release during site disturbance. Similarly, the *Remedial Investigation/Feasibility Study Work Plan for Newtown Creek* (June 2011), www.newtowncreek.info/docs/RIFS%20Work%20Plan%20Newtown%20Creek%20(1).pdf, lacks any reference to climate-induced extreme weather events, including tidal storm surges or sea-level rise. The record of decision for this site has yet to be released.

## Sandy is not the first record-breaking storm to disturb Superfund sites.

Such oversights are not for lack of attempts by the public to draw agency attention to the issue. In 2009, for example, a citizen organization actively participating in the cleanup of the Duwamish River Superfund site in Seattle, Washington, specifically requested that the environmental agencies consider climate change when selecting the final remedial alternative. In its public comments on the Draft Feasibility Study for the Duwamish River, the Duwamish River Cleanup Coalition, a citizens' group, noted that "[The Responsible Parties] must consider climate change and its implications for the Seattle area and the Duwamish River before proposing an alternative that does not remove contaminated sediment and relies on a 20–30 year time frame to complete remediation." Four years later, EPA's *Proposed Plan for the Lower Duwamish Waterway Superfund Site* (Feb. 2013), www.epa.gov/region10/pdf/sites/ldw/pp/ldw_pp_022513.pdf, contains no mention of "flood," "sea level rise," "climate change," or "global warming." EPA and PRPs are left in great uncertainty about the future scope of remedial efforts, costs, and timeframes, insofar as these may be increased by climate change. Given the liability regime of CERCLA, there can be far less uncertainty as to the responsibility of the PRPs for climate-induced releases.

EPA has both enforcement and guidance tools it can use to better manage the risks to Superfund sites resulting from climate change. EPA's use of settlement agreements, consent decrees, and agency guidance could catalyze the consideration of climate change in the Superfund RI/FS process. Through creative negotiation, EPA regulators can inject climate change analysis into the risk analysis portion of a cleanup. These agreements present the first opportunity for EPA, PRPs, and state agencies to address climate change as a part of the cleanup. EPA's broad settlement authority under CERCLA § 122, 42 U.S.C. § 9622, allows EPA to include conditions requiring consideration of climate change risks in the RI/FS process (e.g., through the baseline risk assessment). Such a provision might state: "The baseline risk assessment shall be deemed insufficient for purposes of CERCLA § 121(b) [General Rules] if it fails to account for the likelihood and consequences of further releases posed by climate change."

In addition to addressing Superfund sites individually through settlement agreements, EPA can issue guidance applicable to all Superfund sites clarifying the relationship between climate change adaptation and the Superfund remediation process. EPA's most straightforward means of removing uncertainty regarding climate change adaptation and Superfund sites is to issue guidance that directly addresses the issue. At least one other federal agency has taken a comparable step. The Securities and Exchange Commission, in Release Nos. 33-9106 and 34-61469 (2010), advises securities registrants whose businesses may be vulnerable to severe weather or climate-related events to consider disclosing material risks of, or consequences from, such events in their publicly filed disclosure documents.

EPA itself is aware of the issue. In its technical document on remediating contaminated sediment, *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites* (2005), www.epa.gov/superfund/health/conmedia/sediment/pdfs/guidance.pdf, recommends that in-situ caps, essentially layers installed on top of contaminated sediment to immobilize them, be designed to withstand a 100-year storm. This guidance goes on to note, in section 2.8.2, that "it is not uncommon for multiple low probability events to happen more frequently than expected, especially when the hydrograph record used to determine these probabilities is not very long *or where land use or climate is changing*" [emphasis added]. Given this language, and advancing science, it may well be wondered why climate change is not explicitly incorporated into EPA's Superfund RI/



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FS process or, as the recent Superfund settlements discussed demonstrate, transparently considered in remedial designs.

For maximum impact, an updated EPA guidance on climate change adaptation and Superfund sites should include touchstone practices related to the RI/FS and remedial design process. Such practices might include (1) evaluating the currently predicted climate change impacts at the site's geographic location, including the history of storms, flooding, and past releases at the site; (2) selecting remedies that treat waste rather than leave it on-site; (3) require the periodic updating of the probable maximum flood (the "100-year flood"), or other relevant impacts, based on updated science and empirical data; and (4) prioritizing cleanup in areas most likely to be impacted by climate change in anticipation that the effects of climate change may occur before a site is fully remediated. Such guidance would provide a clear understanding for PRPs on how to proceed with cleanups in a way that is cost-efficient and assures protection of human health and the environment for the long term.

For PRPs and the government alike, the financial stakes are considerable. In February 2013, the GAO issued an update to its assessment of "high risks" to the United States, stating that climate change poses a "high risk" threat to the financial stability of the country. "[T]he impacts and costliness of weather disasters . . . will increase in significance as what are considered 'rare' events become more common and intense due to climate change." Moreover, "the federal government is not well positioned to address this fiscal exposure." www.gao.gov/assets/660/652133.pdf. In the case of CERCLA, neither are PRPs.

CERCLA § 107, 42 U.S.C. 9607 and CERCLA § 113, 42 U.S.C. 9613 impose liability upon past owners and operators of facilities for releases or threatened releases of hazardous substances, as well as upon persons who contribute to such releases. Under section 107, owners and operators are liable for "all costs of removal or remedial action incurred by the U.S. Government. . . and any other costs of responses incurred by any other person." CERCLA does not impose a time limit on releases. In addition, EPA has power to "re-open" Superfund settlements in certain instances and to impose additional remedial costs on PRPs. According to an EPA interim guidance on covenants not to sue, 52 FR 28038 (1987), "a 'reopener' is a provision which reserves EPA's right to require settling parties to take further response action in addition to cleanup measures already provided for in a settlement agreement, notwithstanding the covenant not to sue." EPA policy, which is particularly relevant to climate change, dictates that the agency may require further response action after the parties have entered a consent decree when new scientific information "indicates there is an imminent and substantial endangerment to the public health or the environment." 52 FR 28,038 (1987). The reopener clause is one area where EPA can ensure that PRPs remain liable for releases caused by climate change, even if climate change was not contemplated by the parties at the time the consent decree was entered.

Courts have interpreted CERCLA as imposing strict liability upon such PRPs and do not require private CERCLA plaintiffs to bear the burden of tracing a release back to a specific party. As the Fourth Circuit explained in *United States v. Monsanto*, 858 F.2d 160, 167 (4th Cir. 1988), "[i]n deleting causation language from section 107(a), we assume as have many other courts, that Congress knew of the synergistic and migratory capacities of leaking chemical waste, and the technological infeasibility of tracing improperly disposed waste to its source." When the harm caused by a release is indivisible, CERCLA permits joint and several liability because it is "logical and it works to ensure complete cost recovery."

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CERCLA's very narrow defenses for PRPs are unlikely to exempt a PRP from liability for a release caused by extreme weather events attributable to climate change. Each of the three defenses listed in CERCLA § 107 "carves out from liability an exception based on causation." The pertinent defense for climate purposes is a release caused by an act of God, defined as "an unanticipated grave natural disaster or other natural phenomenon of an exceptional, inevitable, and irresistible character, the effects of which could not have been prevented or avoided by the exercise of due care or foresight."

To date, courts have been reluctant to grant PRPs any reprieve from CERCLA's strict liability regime, and no reported case has permitted a defense based on an act of God. It is thus highly unlikely that a hurricane or flood, whether or not attributable to climate change, would give rise to an "act of God" CERCLA defense.

Additionally, Congress made very clear that the event causing the release must have been completely unexpected in light of factors including *climatic circumstances*: "Only those acts about which the owner could have had no foreknowledge, could have made no plans to avoid, or could not predict would" qualify as an act of God. H.R. Rep. No. 91-940 (1970). A predicted storm is ineligible for qualification as an act of God. Given the clarity with which Congress has spoken, and the absence of contrary case law, the act of God defense is not one likely to exculpate PRPs from their reimbursement obligations if a release occurs due to effects of climate change.

Foresighted PRPs may thus want to proactively plan for the effects of climate on the site or, alternatively, seek a liability "cap" in any settlement agreement. To avoid reopener liability for the impacts of climate change, major PRPs could consider negotiating a "cash out" agreement where they agree to allow EPA to perform the remediation of a site but resolve their liability through an administrative agreement. The U.S. District Court for the District of Massachusetts recently approved such an agreement, allowing major PRP AVX Corporation to pay $366,250,000 toward the cleanup of the New Bedford Harbor Superfund Site. EPA's summary of the settlement is available at www2.epa.gov/enforcement/case-summary-avx-agrees-pay-366250000-towards-clean-new-bedford-harbor-mass#site. EPA took the position that CERCLA's reopener clauses should not



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apply when the agreement is a simple cost recovery rather than a cleanup settlement or an agreement that the PRP will complete the remedial action. EPA was aware that such a large infusion of money would accelerate the remediation and in the interest of reaching a settlement declined to include a reopener in the agreement despite the urging of environmental groups, whose positions are set forth in an online report, www.southcoasttoday.com/apps/pbcs.dll/article?AID=/20130803/NEWS/308030336/1001. Thus, a protective "cash out" option may be available to proactive PRPs, if they are able to characterize their liability retrospectively as "cost recovery," as opposed to a prospective, and open-ended, remedial liability.

Likewise, so-called "de minimis" PRPs (PRPs whose contribution is comparatively minor), may be offered a chance to cap their contribution liability, under CERCLA § 114, 42 U.S.C. § 9614, to the EPA "target" PRPs (typically, the larger PRPs) at an early stage. The main PRP group may offer these de minimis PRPs the choice of a either a greater cash settlement with no contribution liability in the event of an EPA "reopener" of the case or a smaller cash settlement but continued exposure to the risk of such a "reopener." De minimis parties may well want to take the former option, paying more upfront as a means of hedging against future climate-related liability.

If neither EPA nor PRPs negotiate the insertion of a climate change provision in a settlement agreement, individuals and citizen organizations may want to consider bringing an action to compel one.

If neither EPA nor PRPs negotiate the insertion of a climate change provision in a settlement agreement, individuals and citizen organizations may want to consider bringing an action to compel one, on the basis that failure to include analysis of climate change at the RI/FS stage would be a violation of CERCLA's cleanup standards. The issue would be whether an RI/FS that lacks discussion of climate change is an insufficient characterization of the risk such that the remedial action chosen is in violation of CERCLA's general cleanup standards. Specifically, a cleanup must attain "a degree . . . of control of further release that assures protection of human health and the environment," 42 U.S.C. § 9621(d). EPA regulations require the lead agency to "characterize the nature of and threat posed by the hazardous substances and hazardous materials and gather data necessary to assess the extent to which the release poses a threat to human health or the environment or to support the analysis and design of potential response actions." 40 C.F.R. 300.430(d)(2) (2013). Citizen plaintiffs might consider a civil action for injunctive or declaratory relief, or for penalties, perhaps on the basis that omission of climate change impacts renders an RI/FS inadequate under the regulation cited. For example, EPA Region 10 recently assessed $125,000 in penalties against the PRPs responsible for the Portland Harbor Superfund Site in Oregon for an inadequate risk assessment.

CERCLA § 113(h), 42 U.S.C. § 9613, however, presents a formidable jurisdictional obstacle to such a suit. This provision bars what is known as preenforcement review provision, stating that "no Federal court shall have jurisdiction . . . to review any challenges to removal or remedial action or to review any [enforcement] order." Relying on this language, the Ninth Circuit recently rejected a citizen suit claim seeking penalties for a PRP's noncompliance with an administrative order from EPA to conduct a study of the nature and extent of contamination at a Superfund site in Washington state. In *Pakootas v. Teck Cominco Metals, Ltd.*, 646 F. 3d 1214 (9th Cir. 2011), the Ninth Circuit found that the citizen suit was a challenge to an ongoing CERCLA cleanup such it was barred under § 113(h), reasoning that the ability to seek penalties is EPA's "hammer" to wield against noncompliant PRPs, *not* the citizens.'

However, § 113(h) may not bar all challenges to a CERCLA settlement agreement. Subsection (4) of the statute provides a limited exception allowing an action "alleging that the removal or remedial action . . . was in violation of any requirement of this chapter." Thus a citizen group could bring an action for injunctive or declaratory relief, on the basis that a proposed cleanup is noncompliant with the standards of CERCLA § 121, discussed above.

To succeed on such a claim, the plaintiffs would have to convince the court that a risk assessment is incomplete without climate change analysis and violates CERCLA because the risk assessment does not present an accurate picture of factors required under the cleanup standards of CERCLA § 121. Climate change may impact: (1) "the long-term effectiveness of various alternatives," (2) the hazardous waste's mobility, (3) the long-term maintenance costs, and (4) "the potential for future remedial action costs if the alternative remedial action in question were to fail," 42 U.S.C. § 9621(d). Consequently, a risk assessment is incomplete if it ignores climate change impacts. Moreover, any remedial action selected on the basis of this incomplete risk assessment will fall short of the legal requirement that a selected remedy must control further release to assure protection of human health and the environment. Plaintiffs' expert witness will need to provide solid testimony based on data from storms like Sandy, Katrina, Irene, and Floyd, on the likelihood that climate change will impact a specific site and on the way such impact will lead to additional releases. The citizen suit avenue has yet to play out in court but remains an option for creative lawyers and citizen groups passionate about protecting their communities from an influx of hazardous waste.

There may also be a citizen option for sites where remedies are already being implemented, through the five-year remedial alternative review process. Congress intended the review to serve as a means of determining whether the remedial action is sufficient to protect human health and the environment and whether the remedial action could be upgraded to take advantage of developments in technology. During the floor debate, Senator Mitchell stated: "The ultimate goal of the Superfund Program must be to implement [a] permanent solution at all national priorities list sites. One way to accomplish this goal



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is to require periodic review and to assure that sites are not removed from the ambit of the program until such permanent solutions have been implemented." 132 Cong. Rec. 28,426 (1986).

Congress, however, did not make such reviews mandatory. While EPA "strongly encourages . . . review of the protectiveness of the remedy," EPA Remedial Project Managers have the discretion whether to conduct five-year reviews. Reviews may take place in response to a request from the community or before deleting a site from the National Priorities List. USEPA, *Five-Year Reviews, Frequently Asked Questions (FAQs) and Answers* (Sept. 2009), www.epa.gov/superfund/cleanup/postconstruction/5yr.pdf.

Five-year reviews are appropriate when new information about a site raises an issue as to the continued protectiveness of the selected remedy. In recent years, for example, EPA has identified soil vapor intrusion and asbestos as such issues. Regarding soil vapor intrusion, EPA guidance has noted: "[T]he five-year review process may offer an appropriate opportunity to identify issues, review data, make recommendations and develop a protectiveness determination * * *," USEPA, *Assessing Protectiveness at Sites for Vapor Intrusion: Supplement to the "Comprehensive Five-Year Review Guidance,"* (Nov. 2012), www.epa.gov/superfund/cleanup/postconstruction/pdfs/VI_FYR_Guidance-Final-11-14-12.pdf. The same considerations apply to new data regarding climate change impacts.

Finally, although CERCLA is a federal law administered primarily by EPA directly or through delegation to PRPs (with EPA oversight), there is a role for individual states in the adapting of Superfund to climate change considerations. States can force consideration of climate change through legislation to be incorporated into individual remedial action plans as enforceable standards, known as legally applicable or relevant and appropriate requirements (ARARs). State agencies may also include climate change concerns during the review-and-comment period for various cleanup documents, even if such input is not binding on federal decision makers. The National Contingency Plan requires that remedial actions must conform to state ARARs. 42 U.S.C. § 121(d). If any pollutant remains onsite, the remedial action *shall require*, at the completion of the remedial action, a level or standard of control for such hazardous substance that at least attains the standard of any state law that "is legally applicable to the hazardous substance or pollutant or contaminant concerned or is relevant and appropriate under the circumstances of the release or threatened release of such hazardous substance, pollutant, or contaminant." 42 U.S.C § 9621(d)(2)(A)(ii).

In order to qualify as a state ARAR, the requirement must be "a state * * * environmental or facility siting law, promulgated, more stringent than the Federal requirement, identified in a timely manner, and consistently applied." 42 U.S.C § 9621(d)(2)(A)(ii). ARAR identification begins at the scoping phase for RI/FS. If states do not give notice of ARARs to the lead agency prior to this phase, they can miss the "timeliness" requirement.

States can force consideration of climate change through legislation to be incorporated into individual remedial action plans as enforceable standards, known as legally applicable or relevant and appropriate requirements.

For example, state legislation could require certain infrastructure improvements in areas most vulnerable to storm surge or flooding due to climate change. While such a law would not directly address hazardous substances, it would meet the second criterion for an ARAR as being "relevant and appropriate" to the threat of a release from such a storm. While neither technically nor politically easy, such legislation is worth considering as a plausible option to protect communities from hazardous waste releases from Superfund sites.

A variety of legal tools are available to manage climate change as a growing challenge to the long-term integrity of Superfund sites. EPA has hitherto unexercised authority to address the issue at the RI/FS and remedial design phases of current sites. Responsible parties may want to consider financial alternatives to hedge climate risks. The citizen suit exception to the CERCLA § 113(h) bar to preenforcement review, while untested on the climate issue, remains a viable possibility. States may have influence on the topic through legislation establishing ARARs. Despite the present inaction on this issue, options to force consideration of the impacts of flooding, sea-level rise, and stronger, more frequent hurricanes on America's Superfund sites do exist. Now, who will be the first to take them?



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