UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

June 30, 2021

OFFICE OF
LAND AND EMERGENCY
MANAGEMENT

OLEM Dir. No. 9355.1-120

MEMORANDUM

SUBJECT: Consideration of Climate Resilience in the Superfund Cleanup Process for Non-Federal National Priorities List Sites

FROM: Larry Douchand, Director Douchand, Larry Digitally signed by Douchand, Larry Date: 2021.06.30 15:54:34 -04'00'
Office of Superfund Remediation and Technology Innovation

TO: Regional Superfund National Program Managers, Regions 1-10

PURPOSE

This memorandum[1] recommends approaches for U.S. Environmental Protection Agency (EPA or Agency) regions to consider when evaluating climate resilience throughout the remedy selection and implementation process for sites proposed or currently listed on the National Priorities List (NPL) in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA).[2]

Consideration of climate resilience in the Superfund cleanup process should be carried out in a manner consistent with CERCLA as well as the National Oil and Hazardous Substances Pollution Contingency Plan (NCP)[3] and EPA policy and guidance documents. This memorandum[4] supplements the Agency's existing policy statements addressing climate resilience activities, tools, considerations and technical information found in fact sheets;[5] however, it does not amend or modify the NCP in any way. Consideration of climate resilience should not be treated as a new criterion under 40 CFR §300.430(e)(9)(iii)).

[1] This document provides recommendations to regional staff and management regarding how the Agency interprets and implements the NCP, which provides the blueprint for CERCLA implementation, with respect to climate resilience. However, this document does not substitute for those provisions or regulations, nor is it a regulation itself. Thus, it cannot impose legally binding requirements on EPA, states, or the regulated community and may not apply to a particular situation based upon the circumstances. Any decisions regarding a particular situation will be made based on the statute and the regulations, and EPA decision makers retain the discretion to adopt approaches on a site-specific basis that differ from the recommendations where appropriate.
[2] 42 USC §9601 et seq.
[3] 40 CFR Part 300.
[4] The scope of this document is consistent with recommendations 3 and 4 of the U.S. Government Accountability Office report released on November 18, 2019 (GAO-20-73), https://www.gao.gov/products/gao-20-73.
[5] For additional information, see https://www.epa.gov/superfund/superfund-climate-resilience.

BACKGROUND

Legal Authority

Consistent with CERCLA, the NCP and Executive Order 12580,[6] EPA has broad authority at private-party Superfund sites as the lead agency to carry out response actions to protect human health and the environment with respect to releases of hazardous substances, pollutants or contaminants.[7] While EPA also has oversight responsibilities at Federal facility NPL sites, this memorandum specifically addresses non-Federal NPL sites.[8]

Consistent with CERCLA and the NCP, the Agency ensures protection of human health and the environment and in doing so may consider potential impacts of extreme weather events and changing climate conditions at Superfund sites to ensure the long-term integrity of response actions. The existing Superfund response selection and implementation process provides a basis to consider potential extreme weather impacts and to act, as warranted, to increase remedy resilience.

For example, the NCP provides nine criteria to evaluate remedial action alternatives prior to issuing a proposed plan for a given site (see 40 CFR §300.430(e)(9)(iii)). Consideration of climate resilience should not be treated as a new criterion; however, some or all of the following five criteria may be relevant to evaluating a remedial action alternative's climate resilience:[9]

(A) Threshold criteria: Overall protection of human health and the environment

(B) Primary balancing criteria:

- *Long-term effectiveness and permanence;*
- *Reduction of toxicity, mobility or volume through treatment;*
- *Short-term effectiveness; and*
- *Implementability.*

In instances where remedial actions have been selected but not yet implemented, the remedial design phase may provide an opportunity to consider potential site and remediation system vulnerabilities and identify adaptation measures to help maximize climate resilience.

For remedial actions under construction or those already in place, five-year reviews may provide opportunities to evaluate remedy protectiveness considering new information, such as changes in intensity, frequency or duration of extreme weather events. As discussed in the 2001 *Comprehensive Five-year Review Guidance* and the 2016 *Five-year Review Recommended Template*, [10] site changes or vulnerabilities that may not have been apparent during remedy selection, implementation or operation and maintenance are to be considered when assessing the protectiveness of a remedy. Site changes and vulnerabilities also may concern climate-related changes that are gradual, such as sea level rise, seasonal changes in precipitation or temperatures,

---

[6] Executive Order 12580 as amended, "Superfund Implementation" (January 23, 1987) delegates to various federal officials the responsibilities vested in the President for implementing CERCLA.
[7] 42 USC §9604(a)(1).
[8] Non-Federal sites are those where EPA generally carries out or oversees the cleanup conducted by one or more potentially responsible parties (PRP).
[9] 40 CFR 300.430(e)(9)(iii)).
[10] See Section 4 Exhibit 4-1 on p. 4-1 and p. 4-9 of the 2001 *Comprehensive Five-Year Review Guidance* (http://semspub.epa.gov/src/document/11/128607) and Technical Assessment Question C on p. 10 of the 2016 *Five-Year Review Recommended Template* (https://semspub.epa.gov/work/HQ/100000001.pdf).

increasing risk of floods, increasing intensity and frequency of hurricanes and wildfires, and melting of permafrost in northern regions. If the original remedial action selected in a record of decision (ROD) requires climate resilience-related changes, they should be documented in an explanation of significant difference or ROD amendment consistent with the provisions in CERCLA (e.g., § 117) and the NCP (e.g., 40 CFR §300.435).

Climate Resilience Key Terms

For purposes of this guidance, key terminology[11] used in climate resilience evaluations includes:

- Adaptation: adjustment or preparation of natural or human systems to a new or changing environment which moderates harm or exploits beneficial opportunities.
- Adaptive capacity: the ability of a system to adjust to climate change (including climate variability and extremes), to moderate potential damages, to take advantage of opportunities, or to cope with the consequences.
- Resilience: a capability to anticipate, prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to human health and the environment.
- Sensitivity: the degree to which a system is affected, either adversely or beneficially, by climate variability or change. The change may be direct or indirect.
- Vulnerability: the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes; it is a function of the character, magnitude, and rate of climate variation to which a system is exposed; its sensitivity; and its adaptive capacity.

IMPLEMENTATION

Consistent with CERCLA, the NCP and associated EPA Superfund guidance, we encourage regions to consider the following recommendations during remedy selection and remedy implementation for non-Federal NPL sites. The recommended approach may involve program or site activities intended to assure or build, where needed, resilience in the long-term integrity of remedial actions, considering extreme weather events. Specific adaptation measures may be identified through an evaluation of the following recommended considerations:

(1) Regions generally should assess the vulnerability of a remedial action's components, including its associated site infrastructure and evaluate whether the long-term integrity of a selected remedy may be impaired by adverse effects of climate change. A site-specific analysis of the remedial action in light of current, forward-looking information on local or regional climate and weather regimes may be useful. For example, the assessment may include predictive information on future climate conditions, such as intensities and frequencies of extreme weather events over a timeframe corresponding to a remedy's anticipated duration, including long-term monitoring.

(2) Based on any potential vulnerabilities identified in (1) above, regions generally should evaluate adaptation measures that increase the system's resilience to a changing climate

[11] Vocabulary Catalog; Topic: Climate Change; Publisher: EPA Office of Air and Radiation/Office of Atmospheric Programs/Climate Change Division. https://ofmpub.epa.gov/sor_internet/registry/termreg/searchandretrieve/glossariesandkeywordlists/search.do

and ensure continued protectiveness of human health and the environment.[12] Examples of climate resilience measures may include adapting a system's operating parameters, such as installing equipment that enables offsite workers to remotely adjust or suspend operations during extreme weather events. Other measures may involve installing engineered structures that address vulnerabilities, such as elevation of onsite power supplies and enhanced erosion controls. Engineered structures also may help prevent transport of contaminated material across a site or to offsite areas during heavy or prolonged precipitation, thereby avoiding site recontamination due to stormwater runoff from offsite sources.

(3) Regions generally should consider implementing adaptation measures, as needed, to ensure the long-term integrity of CERCLA remedial actions and their protectiveness of human health and the environment. Multiple adaptation measures may be appropriate based on the evaluation of (2) above; in such cases, the site team typically should prioritize the resilience measures to maximize return on limited resources, based on best professional judgment regarding factors, such as cost and impact on site operations.

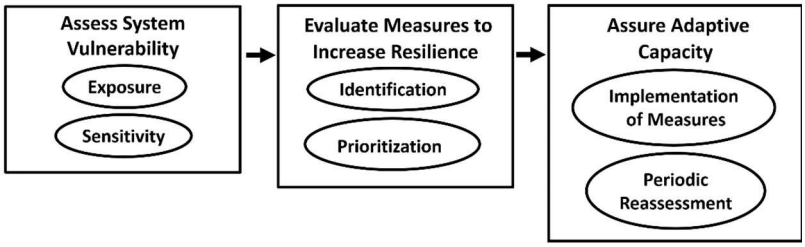

Figure 1: Climate resilience planning for a remedy generally involves: (1) Assessing vulnerability of the remedy's elements and site's infrastructure. (2) Evaluating measures potentially increasing the remedy's resilience to a changing climate. (3) Assuring the remedy's capacity to adapt to a changing climate, which helps the remedy continue to be protective of human health and the environment (Climate Resilience Technical Fact Sheet: Groundwater Remediation Systems, EPA 542-F-19-005).

Available Resilience Tools

There are several sources of information and tools that may be useful to support teams assessing and addressing climate resilience. The Agency's Superfund web page has a climate resilience section[13] with information about recommended considerations and approaches for adapting to climate change and building resilience to extreme weather at contaminated sites undergoing cleanup. The Agency's *Climate Change Adaptation Resource Center*[14] website includes broader information on climate resilience efforts and tools.

In 2019, the Agency's Superfund Program released three updated climate resilience technical fact sheets designed to help project managers and other cleanup stakeholders identify, prioritize and implement site-specific measures for increasing remedy resilience to climate change and extreme weather events. These fact sheets cover three of the most common remedy and site types

[12] Selected federal resources can be accessed at *Superfund Climate Resilience: Vulnerability Assessment*, https://www.epa.gov/superfund/superfund-climate-resilience-vulnerability-assessment.
[13] Superfund Climate Resilience, https://www.epa.gov/superfund/superfund-climate-resilience.
[14] Climate Change Adaptation Resource Center (ARC-X), https://www.epa.gov/arc-x.

likely to have significant investments in remedy infrastructure, potential for contaminant remobilization and longer operating periods

- Climate Resilience Technical Fact Sheet: Groundwater Remediation Systems;
- Climate Resilience Technical Fact Sheet: Contaminated Sediment Sites; and
- Climate Resilience Technical Fact Sheet: Contaminated Waste Containment Systems.

Technical assistance with site-specific vulnerability and resilience assessments is available through the Optimization and Technical Support Program. For questions, please contact your Regional Optimization Liaison.

CONCLUSION

Throughout the CERCLA remedial process at non-Federal NPL sites, including the decision-making and implementation processes, regions generally should continue to consider remedial actions' climate resilience to ensure protectiveness of human health and the environment. Regional staff should continue to use the existing response selection and implementation process at non-Federal NPL sites in a manner consistent with CERCLA, the NCP, and relevant EPA guidance and policy.

If you have questions or would like assistance with evaluating climate vulnerabilities and adaptation measures as they relate to remedy protectiveness resilience, please contact Carlos Pachon, Office of Superfund Remediation and Technology Innovation (OSRTI) or your Regional Optimization Liaison.

Attachments

cc:

Barry Breen, OLEM
Kathleen Salyer, OLEM/OEM
Carolyn Hoskinson, OLEM/ORCR
David Lloyd, OLEM/OBLR
Gregory Gervais, OLEM/FFRRO
Cyndy Mackey, OECA/OSRE
Kent Benjamin, OLEM/OCPA
Karin Leff, OECA/FFEO
Lorie Schmidt OGC/SWERLO
OSRTI Managers
Superfund Regional Counsel Branch Chiefs
NARPM Co-Chairs
Federal Facilities Leadership Council
Superfund Optimization Liaisons:
Derrick Golden/Kim White (R1)
Jeff Josephson/Diana Cutt (R2)
Kathy Davies (R3)
Rusty Kestle (R4)
Nabil Fayoumi (R5)
Vincent Malott (R6)
Sandeep Mehta (R7)
Steve Dyment (R8)
Sharissa Singh (R9)
Ben Leake (R10)