Human Exposures at Cleanup Sites

The EPA Superfund and Resource Conservation and Recovery Act (RCRA) Programs conduct a number of activities to address the nation's most severely contaminated lands. The Programs investigate and collect data on potentially contaminated sites to determine whether they are contaminated and require cleanup. When a potentially hazardous waste site is reported to EPA, trained inspectors determine whether the site presents a hazard to human health and the environment. Sites that pose the greatest threat are placed on the Superfund National Priorities List (NPL) or RCRA Cleanup Baseline. For RCRA, "sites" are more commonly referred to as RCRA Corrective Action "facilities."

One of the priorities for both the NPL and RCRA Cleanup Baseline sites is safeguarding against human exposures to site contamination. EPA and state officials determine whether there is a reasonable expectation that humans could be exposed to site contamination and if interim actions are needed to reduce or eliminate all current human exposure in excess of health-based standards. Such activities may include removing and/or isolating contaminated media, providing alternative water supplies, and restricting access or other land use controls. Exposure at levels below the standards is considered protective (i.e., under control). Although these standards may vary from state to state, EPA believes that they fall within an acceptable range for gauging whether human health is protected (U.S. EPA, 1999, 2012, 2016). Determinations of potential human exposure at levels of concern are based on site-specific characterization information and monitoring data (usually many analytical samples) pertaining to relevant environmental media (e.g., soil, indoor air, outdoor air, ground water, and surface water), current human activity patterns, and actions taken to prevent human exposure. All potential exposure routes are assessed, including inhalation, dermal contact, and ingestion of the contaminated media or food affected by contaminated media (U.S. EPA, 1999, 2012, 2016).

This indicator describes the numbers of NPL Indicator Baseline sites and RCRA Cleanup Baseline facilities for which government officials have determined that (1) humans are *not* exposed to contamination in excess of health-based standards (i.e., exposure is under control); (2) there is reasonable expectation that exposure to contamination could be occurring in excess of health-based standards; or (3) insufficient information exists to make a finding of exposure to contamination in excess of health-based standards. The intention of the indicator is not to capture an "action" or "administrative determination" on EPA's part, but to characterize environmental conditions relevant to the risk to human health from contaminants at RCRA Cleanup Baseline and NPL Indicator Baseline sites. Between 2002 and 2015, the number of NPL Indicator Baseline sites increased by 18 percent (from 1,494 to 1,768), and the number of RCRA facilities tracked by EPA as the "Cleanup Baseline" increased by 120 percent (from 1,714 to 3,779). Changes in the RCRA baseline are programmatic determinations and do not necessarily reflect changes in the condition of the environment.

What the Data Show

Over the years 2000-2015, the percentage of RCRA Cleanup Baseline facilities where human exposure to contamination was under control increased from 37 percent (642 facilities out of 1,714) in fiscal year (FY) 2000 to 90 percent (3,396 facilities out of 3,779) in FY 2015 (Exhibit 1). This increase represents a combination of facilities where mitigation has prevented exposure to

contaminants and facilities where there are sufficient data to show that exposure to contaminated media was not a problem, regardless of mitigation. The percentage of RCRA Cleanup Baseline facilities where there was reasonable expectation that humans could be exposed to contamination in excess of health-based standards has decreased from 13 percent (225 facilities out of 1,714) in FY 2000 to less than 1 percent (21 facilities out of 3,779) in FY 2015.

The Superfund NPL Indicator Baseline sites where human exposure to contamination was under control increased as a percentage of the total: 80 percent (1,199 of 1,494 sites) in 2002 and 81 percent (1,439 of 1,768 sites) in 2015 (Exhibit 2). At of the end of FY 2015, officials determined that there were reasonable expectations that humans could be exposed to contamination in excess of health-based standards at 6.2 percent (110 out of 1,768) of the NPL Indicator Baseline sites. This is a decrease from 2002, when the percentage was 8.0 percent (120 out of 1,494). In 2015, there was insufficient information to make a finding of exposure to contamination in excess of health-based standards at 12 percent (219 out of 1,768) of the sites.

Limitations

- The NPL does not represent all of the contaminated or potentially contaminated sites listed in the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) database, which contains information on thousands of hazardous waste sites, potential hazardous waste sites, and remedial activities across the nation.
- The indicator results are presented for the number of RCRA Cleanup Baseline facilities tracked each year (starting with 1,714 facilities in 2000 and increasing to 3,779 facilities in 2015) and not the entire group of approximately 6,000 hazardous waste management facilities that are potentially subject to RCRA Corrective Action requirements (e.g., initial assessments and, if needed, more thorough investigations and cleanups).
- The indicator does not typically make measurements of exposure biomarkers among potentially exposed individuals at the NPL Indicator Baseline or RCRA Cleanup Baseline facilities, but relies on environmental measures at or near the point of exposure and activities that should prevent exposure to contaminants.
- Concentrations of toxic and hazardous contaminants that must not be exceeded to designate a site as having/not having human exposures to contamination in excess of health-based standards vary from state to state, although they fall within a range determined to be acceptable to EPA (U.S. EPA, 1999, 2015).
- The indicator is based on certification by a responsible official that the criteria necessary to designate a site as having/not having human exposures to contamination in excess of health-based standards have been met (U.S. EPA, 1999, 2015). The trend in the number of sites may be underestimated to the extent that certification lags behind the potential human exposure to contamination or certification is delayed due to insufficient or outdated information.
- This approach may not take into account certain risks (e.g., endocrine disruptors) where specific risk levels (e.g., to human health) may not have been established.
- Some new sites (e.g., those created with the “reportable quantity” spill response program) as well as other known sites (e.g., spills) are not included in this indicator.

Data Sources

Data for this indicator were provided by EPA's Office of Land and Emergency Management (OLEM) (U.S. EPA, 2015a,b). A list showing the current status of every RCRA baseline facility is published online (U.S. EPA, 2014). A discussion of NPL indicators is available (U.S. EPA, 2015c); information on the current status of any individual NPL site can be queried using EPA's CERCLIS database (U.S. EPA, 2016).

References

U.S. EPA (United States Environmental Protection Agency). 2016. Superfund site information. (http://cumulis.epa.gov/supercpad/cursites/srchsites.cfm). Accessed January 26, 2016.

U.S. EPA. 2015a. Data for RCRA corrective action sites. Personal communication, Steve Kohm, EPA Office of Resource Conservation and Recovery, within the Office of Land and Emergency Management. December 14, 2015.

U.S. EPA. 2015b. Data for Superfund NPL sites. Personal communication, Richard Norris, EPA Office of Land and Emergency Management. December 17, 2015.

U.S. EPA. 2015c. Superfund Remedial Performance Measures. http://www.epa.gov/superfund/superfund-remedial-performance-measures#he_anchor. Last Updated November 23, 2015.

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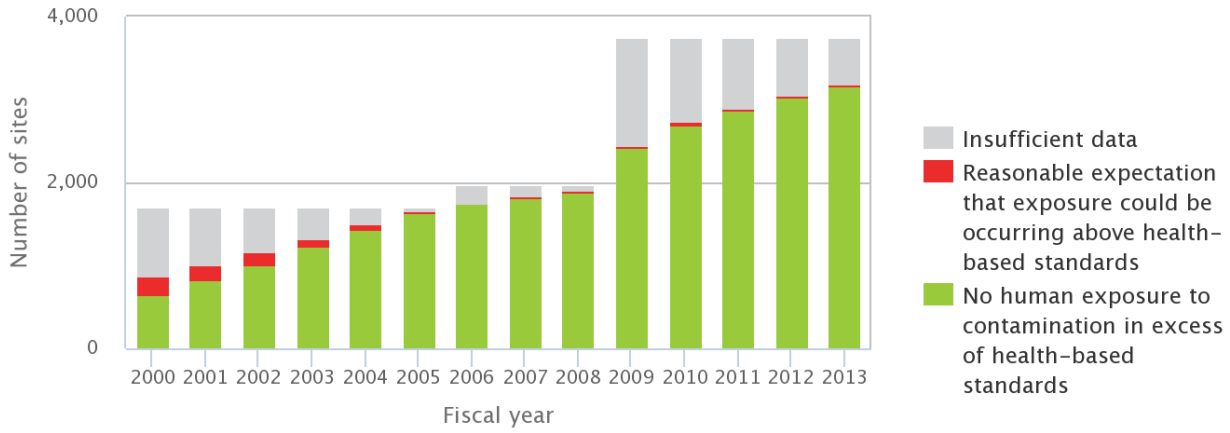
U.S. EPA. 2012. Corrective action: Environmental indicators.

U.S. EPA. 2008. Superfund environmental indicators guidance: Human exposure revisions. https://semspub.epa.gov/work/11/176152.pdf (PDF) (80 pp, 1.6MB).

U.S. EPA. 1999. Documentation of environmental indicator determination, interim final 2/5/99.

Exhibit 1. Status of potential human exposures at RCRA Cleanup Baseline sites in fiscal years 2000–2013



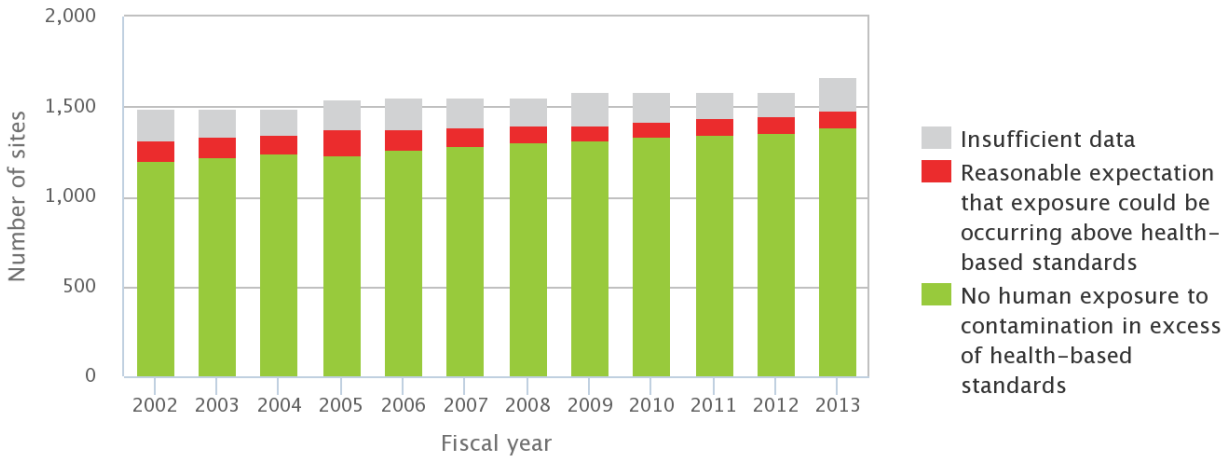
The number of sites included in the RCRA Cleanup Baseline changed from 1,494 to 1,968 to 3,747 in 2006 and 2009, respectively. The 2009 baseline of 3,747 sites is referred to as the RCRA Corrective Action 2020 Universe.

"Insufficient data" includes sites officially classified as "insufficient data" or "no status."

Information on the statistical significance of the trends in this exhibit is not presented here. For more information about uncertainty, variability, and statistical analysis, view the technical documentation for this indicator.

Data source: U.S. EPA, 2014a

Exhibit 2. Status of potential human exposures at Superfund National Priorities List Indicator Baseline sites in fiscal years 2002–2013



The number of sites included in the NPL Indicator Baseline changed from 1,494 to 1,544 to 1,554 to 1,583 to 1,672 in 2005, 2006, 2009, and 2013, respectively.

"Insufficient data" includes sites officially classified as "insufficient data" or "no status."

Information on the statistical significance of the trends in this exhibit is not presented here. For more information about uncertainty, variability, and statistical analysis, view the technical documentation for this indicator.

Data source: U.S. EPA, 2014b