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." For Superfund, this indicator tracks final and deleted NPL and Superfund Alternative Approach (SAA) sites, which together comprise the Superfund Environmental Indicator Baseline sites.

One of EPA's priorities for both the Superfund Environmental Indicator and RCRA Cleanup Baseline sites is safeguarding against potential 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, 2004, 2022d, 2022f). 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 (e.g., signs, fences, fish advisories). 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, 2004, 2022d, 2022f).

This indicator describes the number of Superfund Environmental Indicator Baseline sites and RCRA Cleanup Baseline facilities for which government officials have determined that either: (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. These are the three site-wide options for this indicator. The intention of the indicator is not to capture an "action" or "administrative determination" on EPA's part, but to characterize current environmental conditions relevant to the risk to human health from contaminants at RCRA Cleanup Baseline and Superfund sites. The indicator status changes as site conditions change to convey the incremental progress in protecting human health. Between fiscal year (FY) 2002 and FY 2021, the number of NPL and SAA sites in the Superfund Environmental Indicator Baseline has increased by 22 percent (from 1,494 to 1,826). The number of RCRA facilities tracked by EPA as the "Cleanup Baseline" increased by 129 percent from FY 2000 through FY 2021 (from 1,714 to 3,924). 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 2000–2021, 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 FY 2000 to 93 percent (3,651 facilities out of 3,924) in FY 2021 (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 a 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 0.3 percent (11 facilities out of 3,924) in FY 2021.

The total number of NPL and SAA sites where human exposure to contamination was under control has steadily increased as a percentage of the total: 80 percent (1,199 of 1,494 sites) in FY 2002 and 85 percent (1,556 of 1,826 sites) in FY 2021 (Exhibit 2). At the end of FY 2021, officials determined that there was a reasonable expectation that

humans could potentially be exposed to contamination in excess of health-based standards at 7.4 percent (135 out of 1,826) of the NPL and SAA Environmental Indicator Baseline sites. This is a decrease from FY 2002, when the percentage was 8.0 percent (120 out of 1,494). In FY 2021, there was insufficient data to make a Human Exposure status determination at 7.4 percent (135 out of 1,826) of the sites. For additional information on the "Human Exposures Under Control at Cleanup Sites" Indicator, please visit EPA's Human Exposure Dashboard, available online at https://www.epa.gov/superfund/superfund-human-exposure-dashboard#about.

Limitations

- The Superfund Environmental Indicator Baseline does not represent all of the contaminated or potentially contaminated sites in the United States. EPA also tracks information on 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 fiscal year (FY) 2000 and increasing to 3,924 facilities in FY 2021) 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 RCRA Cleanup Baseline facilities, but it 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 result in designation of 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, 2004, 2022d).
- 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.

Data Sources

- Fiscal year 2021 data for this indicator were provided by EPA's Office of Land and Emergency Management (OLEM) (U.S. EPA, 2022a, 2022b).
- A list showing the current status of every RCRA baseline facility is available online on the Cleanups in My Community portal at https://ofmpub.epa.gov/apex/cimc/f?p=cimc:createtable:0:.
- A national summary of the status of Superfund NPL and SAA sites is available online on the Superfund Performance Measures webpage at https://www.epa.gov/superfund/superfund-remedial-performance-measures#he_anchor and site-specific statuses are available online on EPA's Superfund site profile pages: https://www.epa.gov/superfund/search-superfund-sites-where-you-live#basic.
- A live dashboard of Human Exposure determinations for Superfund sites is available online at https://www.epa.gov/superfund/superfund-human-exposure-dashboard#about.
- Information on the current status of any individual NPL or SAA site can be queried using EPA's Superfund Enterprise Management System (formerly CERCLIS) database (U.S. EPA, 2022c).

References

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U.S. EPA. 2022d. Superfund Program implementation manual: Fiscal year 2022. OLEM 9200.3-157. Accessed August

8, 2022. https://www.epa.gov/superfund/superfund-program-implementation-manual.

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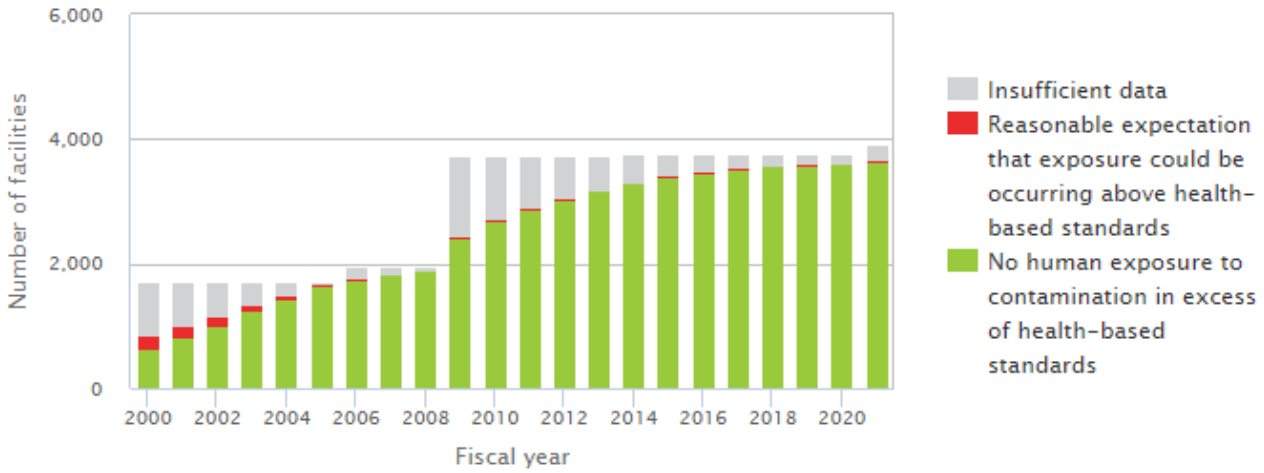
Exhibit 1. Human exposures status at RCRA Cleanup Baseline facilities for fiscal years 2000–2021

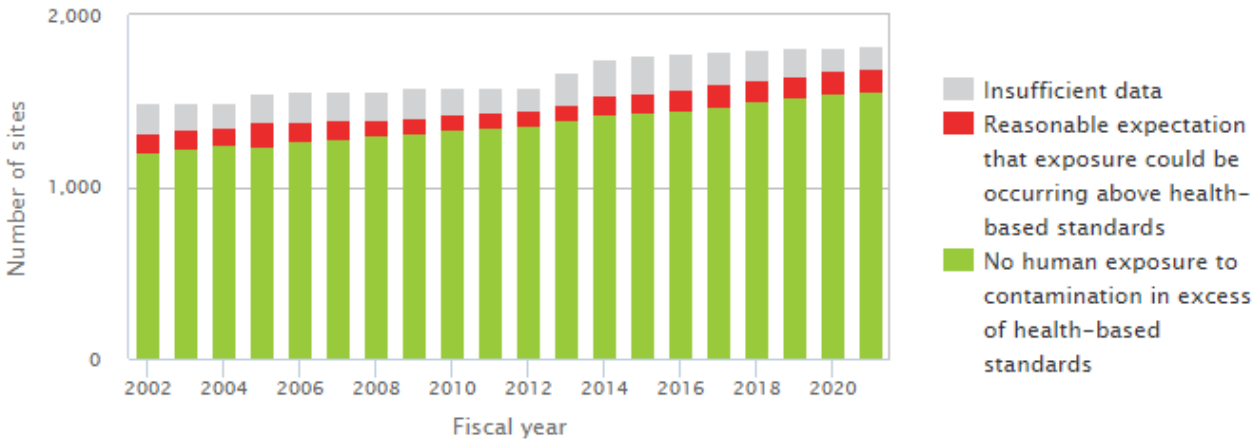


The number of facilities included in the RCRA Cleanup Baseline changed in 2006, 2009, 2014, and 2021.

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, 2022a

Exhibit 2. Human exposures status at Superfund Environmental Indicator sites for fiscal years 2002–2021



These data include final and deleted National Priorities List (NPL) sites as well as Superfund Alternative Approach (SAA) sites, which comprise the Superfund Environmental Indicator Baseline sites. The number of sites included in the Superfund Environmental Indicator Baseline changed in 2005, 2006, 2009, and each year from 2013–2021.

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, 2022b