Greener Cleanups Best Management Practices: PCB Cleanups

PCB Information and Reference Series Fact Sheet

December 2022

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The goal of this fact sheet is to help owners, operators, contractors, and regulators implement Greener Cleanup Best Management Practices (BMPs) at PCB cleanup sites. This fact sheet contains case studies and a toolkit, including a list of common BMPs used at PCB cleanup sites.

What is a Greener Cleanup?

The U.S. Environmental Protection Agency's (EPA) *Principles for Greener Cleanups* (Greener Cleanups) establishes policy for EPA and its partners to evaluate cleanup actions comprehensively to ensure protection of human health and the environment, and to reduce the environmental footprint of cleanup activities to the maximum extent possible. Cleanups and any associated environmental footprint reduction should be consistent with statutes and regulations governing EPA cleanup programs and should not compromise cleanup objectives, community interests, the reasonableness of cleanup timeframes, or the protectiveness of the cleanup actions. The environmental footprint can be assessed qualitatively or quantitatively, and the Principles should be considered and can be implemented at any phase of a cleanup. Five core elements can be addressed during a Greener Cleanup:

- Total energy use and renewable energy use.
- Air pollutants and greenhouse gas emissions.
- Water use and impacts to water resources.
- Materials management and waste reduction.
- Land management and ecosystems protection.

Consensus Standard

EPA worked with federal and state partners and ASTM International (ASTM) to develop a consensus-based standard of greener practices for contaminated site cleanup, the *Standard Guide for Greener Cleanups* (Standard Guide). The Standard Guide provides a framework to reduce the environmental footprint of cleanups while maintaining the cleanup objectives and ensuring protectiveness of the remedy. The Standard Guide includes BMPs organized by core element, phase of the remedy, and remedial technology. EPA analysis of PCB cleanup completion reports identified that 22 of these BMPs are frequently used at PCB cleanups. These 22 BMPs are listed at the end of this fact sheet**.**

Greener Cleanups, Environmental Justice, and Climate Change

Many BMPs help address Environmental Justice concerns such as access to clean air and water. For example, if a cleanup site is in a non-attainment area for air pollution, BMPs that reduce air pollutants during cleanup can be prioritized. Additionally, several BMPs reduce greenhouse gas emissions from site activities. Many other BMPs improve a site's resilience to extreme events caused by climate change and can be found in the Interstate Technology & Regulatory Council (ITRC) *Sustainable, Resilient Remediation Guidance*.

Polychlorinated Biphenyls (PCBs)

PCBs were manufactured between 1929 and 1979 and used extensively in many applications such as coolants in hydraulic systems and as dielectric fluids in electrical equipment. Most manufacturing, processing, distribution in commerce, and use of PCBs was banned under the Toxic Substances Control Act after 1979. However, PCBs may still be present in products and materials produced before 1979 (including oil used in motors and hydraulic systems) or in excluded manufacturing processes, as defined in Title 40 of the Code of Regulations Section 761.3, and can still be released into the environment, where they do not readily break down.

PCBs have been identified as probable human carcinogens and cause a variety of non-cancer health effects.[1]

PCB Greener Cleanups

The PCB Program regularly requires cleanup completion reports to document compliance with the PCB cleanup approval and regulations. ASTM guidance on reporting Greener Cleanups recommends documenting Greener Cleanup BMPs in a completion report. EPA reviewed 50 PCB cleanup completion reports documenting Greener Cleanup BMPs since 2015. EPA analysis found that BMPs from the Standard Guide have been implemented from all cleanup categories to address all core elements of EPA's Principles for Greener Cleanups, as shown below. Case studies highlighting some PCB Greener Cleanups follow, as well as a list of 22 frequently used BMPs at PCB Cleanups.

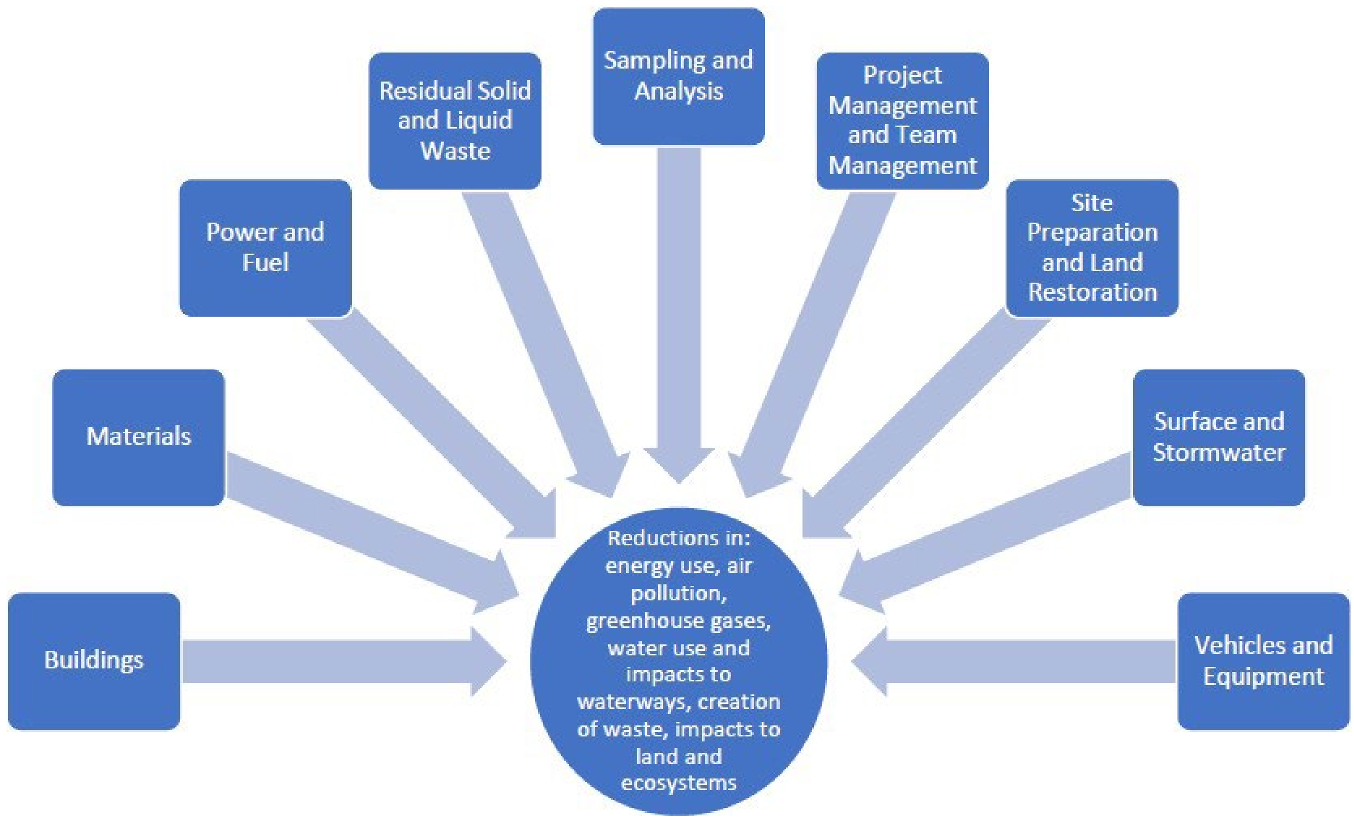


Figure 1 – Boxes represent each cleanup activity category in the ASTM Standard Guide. Implementation of BMPs from these categories directly affects the Core Elements of EPA's Principles for Greener Cleanups in the center circle.

Boeing Everett Plant, Everett, Washington:

The Boeing Company successfully demonstrated that Greener Cleanup BMPs were feasible at a small dig-and-haul transformer substation PCB and volatile organic compound cleanup under tight time constraints.

The PCB cleanup was conducted as part of preparing the site for new commercial use by Boeing to construct the 777x composite wing plant, a $1 billion project with up to 1,700 construction personnel involved. The PCB cleanup was a small part of the overall work on-site and relatively straightforward. Cleanup activities spanned two days and included removal and disposal of concrete slabs over two vaults, and underlying soil contaminated by historical PCB transformer leaks. The figure below depicts one of the vaults.

Despite the small size of the cleanup, Boeing Everett was the first PCB cleanup site in the national PCB program to implement Greener Cleanups. Nine BMPs were implemented, including:

- ✓ Established green requirements as evaluation criteria in the selection of contractors and including language in requests for proposals, contracts, etc.
- ✓ Covered inactive areas of the cleanup to control dust, rather than spraying water.
- ✓ Used dedicated materials for sampling, rather than disposable materials and equipment.
- ✓ Selected products that are environmentally preferable – such as products packed in reusable/recyclable containers and drums to reduce packaging waste.
- ✓ Used a local laboratory to minimize impacts from transportation and avoid shipping samples out of state.

Case Studies

Martin State Airport, Middle River, Maryland:

Lockheed Martin Corporation removed two localized areas of PCB contamination in soil at the Martin State Airport to a level of less than or equal to 25 milligrams per kilogram, suitable for a low-occupancy area. The airport is bounded on the east and west by creeks that are tidal tributaries of the Chesapeake Bay, and the cleanup site is in the southeastern portion of the airport. Lockheed Martin implemented 11 Greener Cleanup BMPs, a few of which are described below:

- ✓ Implemented an idle reduction plan.
- ✓ Used drilling methods which minimized the generation and disposal of cuttings; specifically, direct-push technology – rather than a rotary auger or Rotasonic drill rig – was used to significantly reduce drilling time, avoid generating drilling fluids, and eliminate/reduce drill-cutting that would require characterization and disposal.
- ✓ Used local staff and equipment and product vendors with production and distribution centers near the site when possible to minimize transportation impacts.
- ✓ Used biobased products – specifically, a biodegradable erosion control blanket with grass seed was used to restore the excavated area.

Case Studies

Hoyt Island, Norwalk, Connecticut:

This cleanup of PCB bulk product waste and PCB remediation waste (contaminated soil) occurred at the remains of a former residential structure on the northern portion of a three-acre wooded island located in the Long Island Sound. The island currently serves as a bird sanctuary. The black flashing tar (sealant) on a fireplace chimney contained PCBs and asbestos which also impacted the soil. The sealant was removed, and contaminated soils were excavated and taken off site for disposal. The Norwalk Land Trust designed the cleanup in consideration of the intended use of the island as a bird sanctuary and potential for impacts to other ecological receptors. The primary goal was for remediation activities to have minimal impacts to the natural surrounding soils and vegetation. To this end, an array of Greener Cleanup BMPs were implemented, a few of which are described below:

- ✓ Reused on-site clean materials – the non-impacted building masonry and site soils were used for island restoration.
- ✓ Restricted traffic to confined corridors to minimize soil compaction and land disturbance – the equipment was offloaded on the island near the work zone, and work zone pathways were predetermined to reduce the amount of vegetation clearance and soil compaction.
- ✓ Restored and/or maintain ecosystems in ways that mirror natural conditions – the soils were regraded to reduce erosion during reestablishment of native plants, and remediation was scheduled to prevent interference with migratory bird nesting season.

Durbin Inert Debris Landfill, Irwindale, California:

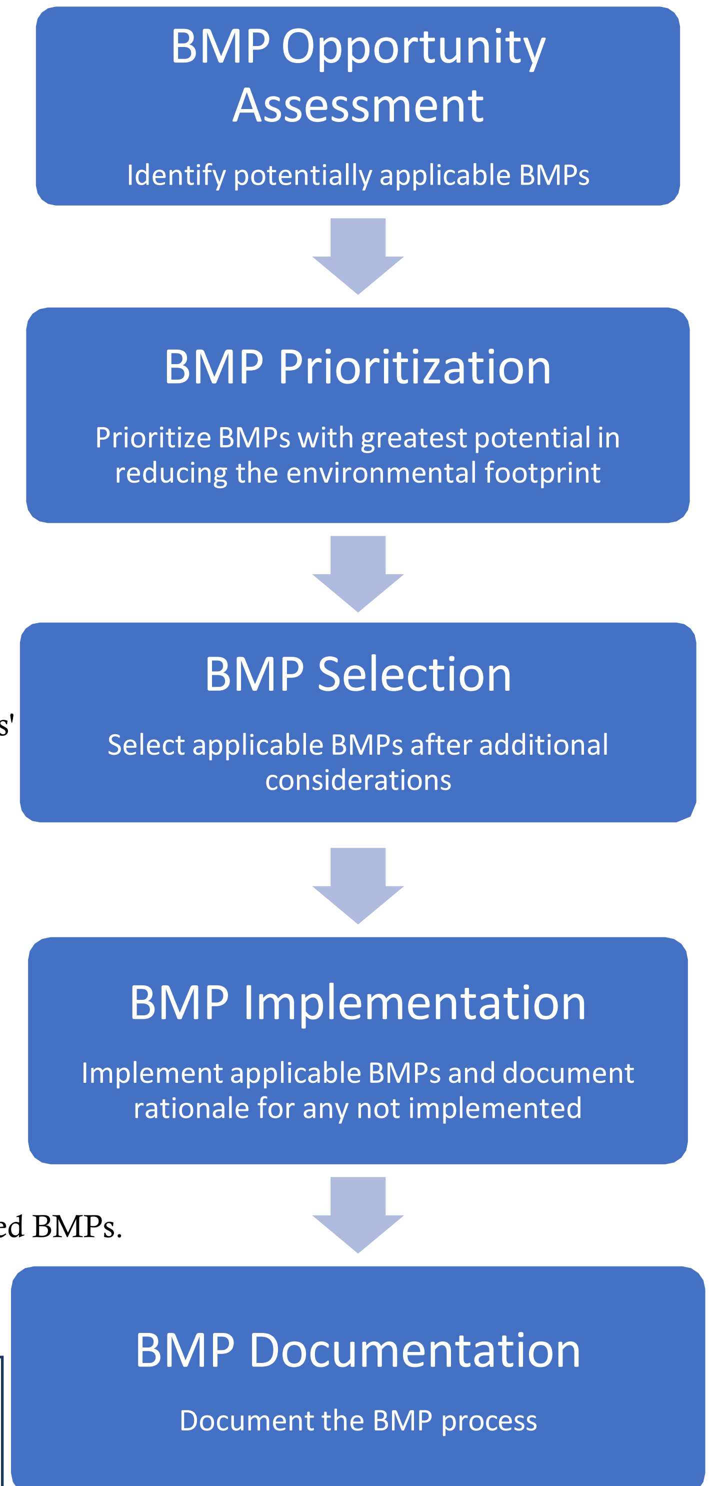
Vulcan Materials Company (Vulcan) removed PCB contaminated soils from this site in 2019. Excavation necessitated decontamination of the excavator, including the sprockets, track shoes, track links/chains, track rollers, excavator bucket, and the side plate of the track system. Vulcan applied for and was approved by EPA Region 9 to use an alternate decontamination method that did not rely on petroleum-based solvents. Instead, the decontamination was carried out by first scraping large debris off the components, then using high pressure wash with Alconox, a biodegradable detergent, to remove any remaining dust and soils, and finally performing a high-pressure rinse with tap water. The decontamination method was validated as effective through wipe sampling. Through this alternate decontamination method, Vulcan was able to implement a Greener Cleanup BMP to protect water and impacts to land and ecosystems.

Toolkit: How to Implement Greener Cleanups

BMP Process

The ASTM Standard Guide is a tool that includes a process to enable the user to identify, prioritize, select, implement, and document the use of BMPs to reduce the environmental footprint of cleanup activities. The process includes the following steps:

1. **BMP Opportunity Assessment**
   Determine which BMPs are potentially applicable to the project's cleanup phase without regard to other factors that will ultimately influence the decision to use a particular BMP. A list of 22 frequently used BMPs at PCB Cleanups is included in this Fact Sheet.
2. **BMP Prioritization**
   Prioritize BMPs based on their ability to reduce the environmental footprint of the cleanup activity and based on interested parties' concerns.
3. **BMP Selection**
   Select the specific BMPs that will be implemented. Selection considerations may include regulatory requirements, cleanup objectives, community concerns, corporate social and environmental responsibility priorities, feasibility, effectiveness, reliability, short-term risks, costs, and local ordinances.
4. **BMP Implementation**
   Implement the selected BMPs or document the rationale for not implementing any selected BMPs.
5. **BMP Documentation**
   Record Steps 2-4 in a completion report.



Additional Information:

ASTM Standard Guide for Greener Cleanups (E2893-13)

PCB Greener Cleanups Frequently Used BMPs[1]

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Buildings

- ✓ Reuse existing structures for treatment, storage, or sample management. For example, use an existing rock wall and vegetation as a buffer to impede potential sediment transport in stormwater runoff.

Materials

- ✓ Select products that are environmentally preferable. Explore the GSA Sustainable Facilities tool at https://sftool.gov/ for products with sustainable raw materials consumption, manufacturing processes, packaging, distribution, recycled content and recyclability, maintenance needs, and disposal procedures.
- ✓ Decontaminate equipment with environmentally preferable methods such as steam cleaning. Search for cleaning products that meet EPA's Safer Choice Standard at https://www.epa.gov/saferchoice/products.
- ✓ Use biobased or biodegradable products such as biodegradable seed matting; control erosion and sedimentation with fabrics containing agricultural by-products, straw wattles, and straw; use oils made from algae, soybeans, or waste/by-products from forestries, plant nurseries, or food processing; and use biodegradable staples.

Power and Fuel

- ✓ Use gravity flow to transfer water after subsurface extraction or to discharge treated water.

Residual Solid and Liquid Waste

- ✓ Reuse or recycle recovered product and materials (for example, cardboard, plastics, asphalt, concrete, etc.) in accordance with the PCB regulations: https://www.ecfr.gov/title-40/chapter-I/subchapter-R/part-761
- ✓ Salvage uncontaminated items for recycling, resale, donation, or reuse.
- ✓ Recycle or reuse un-used or uncontaminated equipment, materials, or infrastructure.

Sampling and Analysis

- ✓ Use dedicated materials and sampling equipment instead of disposable materials and equipment.

Project Planning and Team Management

- ✓ Use local staff, contractors, and subcontractors to minimize resource consumption.
- ✓ Use a local laboratory to minimize impacts from transportation.
- ✓ Contract with a laboratory that uses green practices.

Site Preparation and Land Restoration

- ✓ Select pre-existing, native, and non-invasive vegetation for site restoration to minimize use of water and soil amendments and preserve biodiversity and related ecosystem services.
- ✓ Use biodegradable covers to protect land surfaces, redirect traffic, and preserve healthy plants.
- ✓ Restore and/or maintain ecosystems in ways that mirror natural conditions, such as grading surfaces to pre-construction conditions, restoring disturbed wetland areas, backfilling an excavation immediately to restore stormwater runoff and/or infiltration, and scheduling site activities to not interfere with migration patterns.
- ✓ Minimize clearing of trees and other vegetation, for example, by pre-determining the work zone pathways and locating equipment loading areas as close to the work zone as possible.
- ✓ Cover waste piles, areas where active work is not performed, and filled excavations with biodegradable fabric to control erosion, reduce the use of water for dust suppression, and/or serve as a substrate for ecosystems.
- ✓ Reuse on-site or local clean materials when possible. For example, wood waste for compost, rocks for drainage control, uncontaminated building masonry or crushed concrete for backfill, topsoil from a local source.
- ✓ Pre-plan and restrict work zone paths and traffic corridors to minimize soil compaction and land disturbance.

Surface and Stormwater

- ✓ Capture rainwater for tasks such as wash water, irrigation, dust control, constructed wetlands, or other uses.

Vehicles and Equipment

- ✓ Implement an idle reduction plan.
- ✓ Use retrofitted engines that use ultra-low or low sulfur diesel or alternative fuels, or filter/treatment devices to achieve Best Available Control Technology (BACT) or Maximum Achievable Control Technology (MACT).

[1] BMPs were adapted from the ASTM Standard Guide for Greener Cleanups (E2893-13) and reports submitted to the EPA.

References:

EPA Principles for Greener Cleanups, https://www.epa.gov/greenercleanups/epa-principles-greener-cleanups.

ASTM E2893-16, Standard Guide for Greener Cleanups, ASTM International, West Conshohocken, PA, 2016, www.astm.org.

ITRC. 2021. *Sustainable Resilient Remediation* SRR-1. Washington, D.C.: Interstate Technology & Regulatory Council, SRR Team, www.itrcweb.org.

Contact your EPA Regional PCB Coordinator

If you have concerns about PCB contamination or need more information, consult your EPA Regional PCB Coordinator at http://www.epa.gov/pcbs/program-contacts and your state environmental agency. EPA recommends that you make decisions about appropriate action after thoughtful consideration of all available information and all legal requirements.

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