

**S/S-Related Points from
EPA's *Treatment Technologies for Site Cleanup: Annual Status Report***

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EPA considers S/S an established treatment technology

- “The most frequently used established technologies are on- and off-site incineration, solidification/stabilization (S/S), soil vapor extraction (SVE), and thermal desorption for source control. “ (page 1-2)

Source Control Remedies

- “Source control remedies address soil, sediment, sludge, soil-matrix waste, or NAPL (in other words the source of contamination) and do not address groundwater directly.” (page 3-1) Additional S/S relevance: S/S of nonaqueous phase liquid-bearing soil/sediment is source control.

EPA considers S/S as a permanent remedy

- “Superfund Amendments and Reauthorization Act of 1986 (SARA) expressed the preference for permanent remedies (that is, treatment) over containment or removal and disposal in remediation of Superfund sites. “ (page 1-1)
- “Treatment technologies for source control: *In situ* and *ex situ* treatment technologies for sources of contamination (such as soil, sludge, sediment, other solid matrix wastes and nonaqueous phase liquids [NAPL]).” (page ES-1)
- “On-site containment remedies: Vertical engineered barriers (VEB), caps and liners used to prevent the migration of contaminants or contaminated media.” (ES-1) S/S relevance: S/S is not containment it is considered treatment and further considered a permanent remedy.

S/S Selection Rate

- Figure 8 Source Control Treatment Projects 1982-2005. (page 3-4)
 - 18% of *ex situ* projects use S/S, making S/S is the most frequently selected *ex situ* treatment technology.
 - 5% of *in situ* projects use S/S.
 - At a total of 23%, S/S second overall only to soil vapor extraction in selection rate for source control remedies.
- Table 3 Status of Source Treatment Projects by Technology. (page 3-8)
 - There are a total of 217 S/S projects included in the Status Report (table 3)
 - S/S has the greatest number of completed project (164) of any treatment technology. (table 3)
 - “The highest percentage of completed projects on *in situ* technologies was for S/S...” (page 3-8)
 - The completion percentages of *ex situ* technologies are high (above 75%) “because they often can be completed within months, in contrast to *in situ* technologies such as SVE” (soil vapor extraction) “which may require years to

complete remediation. In general, *ex situ* projects, which can be implemented more quickly than *in situ* projects, represent a greater percentage of completed projects”. (page 3-8)

Versatility of S/S- applicable to a broad range of contaminants

- Nine major groups of contaminants targeted by specific technologies were analyzed for the EPA report. (page 3-11) S/S treatment was selected for projects involving every one of the nine groups. (table 4)
- S/S is often used for treatment of metals contamination “because metals form insoluble compounds when combined with appropriate additives, such as Portland cement.”

S/S replacing other technologies in remedy revisions

- The most commonly changed source control technologies in site remedies are incineration, bioremediation and thermal desorption. S/S is a frequently used “replacement” technology. (table 5)

Report findings concerning *in situ* treatment

- “The selection of *in situ* treatment for source control continues to increase.” (page ES-2)
- “*In situ* treatments are applied to contaminated media in place, without excavation.” (page ES-2)
- “*In situ* treatments are applied to contaminated media in place without excavation. These projects typically require longer treatment times because they take place in a less controlled environment, which may limit treatment rate.” (page 2-5)
- “Because *in situ* technologies require no excavation, risk from exposure to contaminated media is reduced, compared with levels of risk associated with *ex situ* technologies that require excavation”. (page 3-5)
- “*In situ* technologies are often more cost-effective at large sites where excavation and materials handling for *ex situ* technologies can be expensive”. (page 3-7)
- As *in situ* treatment technologies are used more frequently, site managers, regulators, and other remediation professionals are coming to accept them as a reliable technology”. (page 3-7)

Report findings concerning *ex situ* treatment

- “Most of the completed projects are *ex situ* source control treatments. Approximately 80 percent of the solidification/stabilization (S/S) and thermal desorption projects have been completed. “ (page ES-2 & 2-5) (Relevance: ease of application of *ex situ* applications)
- “*Ex situ* source control projects usually involve excavation of contaminated soil and application of an aggressive treatment technology in a controlled environment. Therefore, this type of remedy typically requires a shorter amount of time to complete.” (page 2-5)