United States
Environmental Protection
Agency

Hazardous Waste
Engineering Research Laboratory
Cincinnati, OH 45268

Research and Development

EPA/540/S2-88/001 June 1988

EPA

Project Summary

Case Studies Addendum: 1-8 Remedial Response at Hazardous Waste Sites

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In response to the threat to human health and the environment posed by numerous uncontrolled hazardous waste sites across the country, new remedial action technologies are evolving, and known technologies are being retrofitted and adapted for use in cleaning up these sites. This report identifies and assesses various types of site response activities which have been implemented, are in progress, or have been proposed to date at Superfund-financed and enforcement action hazardous waste sites in the United States. A nationwide survey was conducted in which 23 uncontrolled hazardous waste sites were identified where either some form of enforcement action was planned or where remedial actions undertaken were Superfund-financed. Based on an assessment of the 23 sites, eight were selected for detailed investigations. This document presents case study reports for each of the eight sites. These reports include extensive discussions of the remedial responses at each of the eight sites with respect to technology, cost, and institutional framework.

This Project Summary was developed by EPA's Hazardous Waste Engineering Research Laboratory, Cincinnati, OH, to announce key findings of the research project that is fully documented in a separate report of the same title (see Project Report ordering information at back).

Introduction

As part of ongoing research of existing and emerging technologies for remediation of uncontrolled hazardous waste releases, a study was conducted in 1983-1984. This study involved a survey of uncontrolled hazardous waste sites nationwide. Twenty-three detailed case study reports were prepared. The objective of the survey was to identify, examine and quantify the different types of remedial response actions implemented or proposed for control of these 23 sites. Compiled into 23 succinct case study reports, the information can be used in planning, selection, design, and cost analyses of future remedial actions.

The final report summarized herein is a continuation of the foregoing research. Eight new detailed case studies are presented, utilizing the results of the 1983-1984 survey published in March 1984. The focus of the current eight case studies is on Superfund-financed enforcement or cleanup actions, as opposed to the previous 23 studies' emphasis on private or state activities.

The case study reports are intended for use by EPA regional officials, state agencies, industry and commerce, and local authorities involved in selection, evaluation and design of remedial response actions. The case study reports provide the following:

- A systematic method of recording detailed results of remediation programs
- An understanding of the remediation process such that future response actions can be developed and implemented in the most technically efficient and cost-effective manner possible
- A standard of comparison during evaluation and selection of response measures at sites with similar problems
- Identification of remedial technologies that may warrant further research

- Quantification and documentation of the extent and type of remedial response actions being implemented nationwide
- Development of data to aid in cost recovery actions promulgated by the USEPA.

Section 2 of the Executive Summary in the final report discusses the site selection and case study investigation processes involved in the completion of this research project. The results obtained from the eight case study investigations are summarized in Section 3, and the remainder of the document consists of the eight detailed case study reports.

Site Selection and Case Study Methodology

Initially a survey was conducted of Superfund-financed sites and enforcement sites to identify candidate case study sites. The survey, conducted by regional EPA Superfund offices, identified over 23 sites where remedial responses had been partially or entirely completed. Eight sites were selected from the candidate list for case study reports. These sites are listed in Table 1 of this project summary. The criteria used for site selection included:

- Current status with regard to percent completion of the remedial action
- Availability, accessibility, and completeness of remedial action, cost and engineering data
- Type of remedial action technology implemented, resulting in the investigation of remedial action techniques.
- Type of waste management practice, generating studies of a wide range of technologies, commonly used in hazardous waste management.
- Types of waste and contaminants present at the facility to ensure that a variety of waste stream and pollutants were included
- Hydrogeologic setting, representing a variety of settings
- Enforcement sensitivity.

Once the list of Superfund and enforcement sites had been developed, an in-depth and site-specific data acquisition effort was initiated. All available background information relative to each site's environmental setting, operational history, remedial actions and Superfund involvement was collected. Two readily available sources of information were used to complete this task. The first source was site-specific information collected from public

Table 1. Sites Selected for Case Study Investigations

Site Name	Location
1. *Bruin Lagoon*	*Bruin Borough, Pennsylvania*
2. *Denney Farm*	*Barry County, Missouri*
3. *Gulf Coast Lead*	*Tampa, Florida*
4. *Lipari Landfill*	*Pitman, New Jersey*
5. *Picillo Farm*	*Coventry, Rhode Island*
6. *Rose Park Sludge Pit*	*Salt Lake City, Utah*
7. *Tacoma Well 12A*	*Tacoma, Washington*
8. *Taylor Road Landfill*	*Seffner, Florida*

information data sources, including the following:

- USGS topographic and geologic maps, geologic and hydrologic reports, soils and climatological maps and reports
- Detailed review of the remedial action data previously collected, which included pre-remediation and monitoring activities, remedial action and treatment technologies, implementation and cost details, and remedial action design data.

All sources of information and site-specific data were carefully referenced in field logs for later documentation in the case study reports prepared for each site. Photographic slides or prints developed from the site visits were collected and developed to track the response history.

After every site visit, individual case study reports were prepared and forwarded to the USEPA Project Officer, Task Managers, and parties involved in implementing the remedial action for their review. The case study reports have been structured so that they provide detailed data on the remediation techniques employed; the circumstances and conditions under which they were implemented; their apparent effectiveness in correcting or controlling the problem; and their potential uses in other remedial action scenarios. The following is an outline of the typical case study report:

I. Introduction
   - Background
   - Synopsis of Site Response
II. Site Description
   - Surface Characteristics
   - Hydrogeology
III. Waste Disposal History
IV. Description of Contamination
V. Planning the Site Response
   - Initiation of Site Response
   - Selection of Response Technology
   - Extent of Site Response
VI. Design and Execution of Site Response
VII. Cost and Funding
   - Source of Funding
   - Selection of Contractors
   - Project Cost
VIII. Performance Evaluation
IX. Bibliography
   - USEPA and state files, including site-specific data on operational history, superfund involvement, detailed remedial action, engineering design and cost data, previously documented cost studies, and litigative case support data.

The second source of site-specific data was direct correspondence with the USEPA Superfund on-site coordinators, the facility operators, and the parties primarily responsible for designing and implementing the site remedial action. During correspondence, additional site-specific information was collected, and written or verbal approvals for site visits were obtained. Prior to any field visits, collected information was throughly reviewed and data gaps identified for clarification during the site visits.

A schedule for all visits was then developed. Follow-up telephone calls were made to appropriate contacts to coordinate field visit activities and schedules. Each site visit was two days in duration and included the following activities:

- Detailed site inspection including documentation of layout, evidence of environmental contamination, and observation of remedial action technologies being employed
- Review of all available remedial acting design drawings and existing cost information.

Results

The eight final case study reports describe an array of remedial technologies implemented at uncontrolled hazardous waste sites. In addition to technical discussions, the case studies present available cost and funding data for each site, and describe the more important institutional issues that affected the implementation of the response programs. Table 2 in this project summary presents the site conditions at the eight sites prior to implementation of remedial and/or response actions, the remedial technologies utilized, and the total estimated costs associated with each of the eight response programs.

Table 2. *Summary of Case Study Investigations*

Site	Site Conditions	Site Response	Status of Remedial Program	Estimated Costs
Bruin Lagoon, Bruin Borough, Pennsylvania	*Earthen-diked lagoon constructed in 1930s and used as a repository for oil production wastes, waste motor oil re-refining residues, coal fines and fly ash; began to draw public attention following a 3,000-gallon sludge spill into Bear Creek which lies adjacent to site.*	• *Lagoon embankment improvements* • *Construction of concrete retaining wall along Bear Creek* • *Tank demolition, removal and off-site disposal* • *Removal and off-site disposal of liquid supernatant contained in lagoon* • *Sludge stabilization* • *Installation of venting system for acidic gas*	*I*	*$1.76 million*
Denney Farm, Barry County, Missouri	*Estimated 80-90 drums of wastes containing TCDD or dioxin discarded in a trench on property known as Denney Farm.*	• *Excavation of waste materials* • *Placement of soils without visible contamination in microbiological degradation basins (MDBs)* • *On-site storage of drummed wastes (solid waste and visibly contaminated soils)* • *Trench backfilling and capping* • *On-site incineration for ultimate destruction and disposal of wastes currently under investigation*	*I*	*N/A*
Gulf Coast Lead, Tampa, Florida	*Contaminated rinsewater and battery casings from lead recovery operations at the GCL smelting facility were dumped in unlined surface depression of company property. Soil and shallow ground water became contaminated with sulfuric acid and heavy metals, thus presenting a threat to an underlying aquifer.*	• *Implementation of groundwater monitoring program* • *Removal of battery casings from surface depression* • *Capping of site* • *Installation of retention basin to collect and recycle contaminated surface runoff from site* • *Installation of underdrain system to collect rainwater runoff from uncontaminated areas for discharge to Tampa storm drains* • *Installation of groundwater treatment system* • *Subsurface acid reaction barrier to intercept/neutralize contaminated ground water that migrated off site was under study at time of this writing*	*C*	*$700,000*
Lipari Landfill, Pitman, New Jersey	*Seven-acre area used for disposal of industrial and domestic wastes including solvents, formaldehyde, paints, phenol and amine wastes; concern focused on contamination of two nearby streams, a lake and two aquifers.*	• *Construction of a soil-bentonite slurry trench cutoff wall around a 16-acre area which included the 7-acre landfill* • *Installation of synthetic membrane cap over the 16-acre site* • *Installation of passive gas collection and venting system* • *Completion of groundwater treatability study and design of a collection and treatment system*	*I*	*$2.5 million*
Picillo Farm, Coventry, Rhode Island	*A 7.5-acre area used as a hazardous waste disposal site during the 1970s; over 10,000 drums found containing such wastes as industrial solvents and oils, pesticides, PCBs, paint wastes, and explosives were buried in 4 trenches on site; leachate migrated through soil into nearby swamp, contaminating ground water, surface water and soil in vicinity.*	• *Drum removal and off-site disposal* • *Ground and surface water monitoring of swamp and contaminated groundwater plume* • *Detonation of unidentified materials* • *Landfarming of contaminated soils* • *Completion of a feasibility study of groundwater recovery, treatment and discharge*	*I*	*$4.96 million*
Rose Park Sludge Pit, Salt Lake City, Utah	*Six-acre disposal site located in a public park; between 1920 and 1957 acid sludges were discarded in unlined pits and covered with lime and soil; the site was covered with a soil cap in 1960; the site again received attention in 1976 when construction activities induced the extrusion of sludge at the surface; low concentrations of contaminants were found in ground water in immediate area but had not migrated appreciably.*	• *Installation of groundwater monitoring wells around sludge pit* • *Construction of a soil-bentonite slurry trench cutoff wall around the site* • *Construction of a sand filter, filter fabric and clay cap system* • *Installation of fence around perimeter of site*	*C*	*$1.2 million*

I — *Incomplete at the time of case study preparation*
C — *Complete at the time of case study preparation*
N/A — *Not available at the time of case study preparation*

(Continued)

Table 2. (Continued)

Site	Site Conditions	Site Response	Status of Remedial Program	Estimated Costs
Tacoma Well 12A, Tacoma, Washington	*Well 12A, the northernmost of 13 wells in a well field in South Tacoma Channel, was taken off line after chlorinated organic solvents were detected in groundwater sample; the source was identified as being north of the well field; the spreading of contaminants to other wells after 12A was taken out of service indicated that further contamination of the well field could be prevented if Well 12A remained operational to act as an intercepter or barrier.*	• *Installation of an air-stripping system at Well 12A to remove volatile organics (considered an interim remedial measure)* • *Completion of studies to identify contaminant source, and design and implement a permanent solution*	*C*	*$948,133*
Taylor Road Landfill, Seffner, Florida	*A 42.5-acre sanitary landfill in which unknown quantities of hazardous wastes including solvents, paint thinners, insecticides, herbicides, fungicides and sludges were deposited; groundwater samples collected at the site were found to contain VOCs and metals in concentrations above acceptable safe drinking water standards.*	• *Upgrading of surface cap* • *Channelization of surface drainage along eastern and southern site boundaries* • *Installation of a methane gas collection and control system* • *Development of long-term groundwater and methane gas monitoring program*	*C*	*$3.56 million*

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C — Complete at the time of case study preparation
N/A — Not available at the time of case study preparation

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The complete report, entitled "Case Studies Addendum: 1-8 Remedial Response at Hazardous Waste Sites," (Order No. PB 88-204 284/AS; Cost: $44.95, subject to change) will be available only from:
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